June 2022

Nelson Institute for Environmental Studies
UNIVERSITY OF WISCONSIN–MADISON

THE COMMONS

For alumni and friends of the Nelson Institute for Environmental Studies at the University of Wisconsin–Madison

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Nelson Graduate cohort report addresses flood resiliency in Wisconsin's Driftless Region

By Diane Stojanovich

A cohort of graduate students within the Nelson Institute's Water Resources Management (WRM) program recently published a report that took an interdisciplinary approach to researching flood resilience in the Coon Creek watershed, an over 90,000-acre area in the unglaciated Driftless Area that crosses three Wisconsin counties and is considered the birthplace of modern soil conservation.

Initiated by the 2019–21 WRM cohort, the project was developed in response to a severe rain event that fell over the Coon Creek Watershed in 2018, resulting in the failure of three dam structures and inundating areas downstream with floodwater. The report serves as the culmination of a two-plus year project focused on the watershed of Coon Creek in Monroe, La Crosse, and Vernon Counties, Wisconsin.

An example of erosion in Coon Creek that prompted the first watershed demonstration project in the nation. Photo courtesy of the USDA Natural Resources Conservation Service.

The six-member practicum cohort had a multi-pronged hands-on approach to the project including taking infiltration measurements across different land uses in the watershed, assessing the changes in land management practices through GIS and determining the economic impacts of changes in land use, conducting interviews with watershed managers and members of the general public, analyzing the institutional landscape as it relates to flooding, and identifying indicators of resilience within the community.

Bob Micheel, director of the Monroe County Land Conservation Department and key partner on the project, has led many discussions in his community in recent years about the connections between land management, climate, and flooding. "It's one thing for me to have a notion about some of these changes and drivers of flooding in our region, but it's really valuable to have those changes analyzed and documented by UW researchers so that we can use them for our programming purposes," Micheel said. The report serves to inform municipal and community stakeholders in the five different but overlapping areas of interest that culminated in tailored recommendations including creating a Joint Powers Board, promoting good land management practices such as contour strips and managed grazing, increasing funding for local government staff, expanding the role of infiltration in state agricultural programs, and developing better public-facing flood mitigation and response resources.

Eric Booth, associate scientist in the Departments of Agronomy and Civil & Environmental Engineering and

lead advisor on the project, decided to have the students focus on the Coon Creek Watershed after hearing Micheel give a presentation back in February of 2019. "It really seemed like a great opportunity for the students to study and engage with a watershed community on the frontlines of climate change adaptation and for them to provide valuable information to help the community plan for the future," Booth said.

Stream reach in the Rullands Coulee sub-watershed within the Coon Creek Watershed that was impacted by upstream dam breaches in 2018. Photo credit: Eric Booth

"It's one thing for me to have a notion about some of these changes and drivers of flooding in our region, but it's really valuable to have those changes analyzed and documented by UW researchers so that we can use them for our programming purposes."

–Bob Micheel

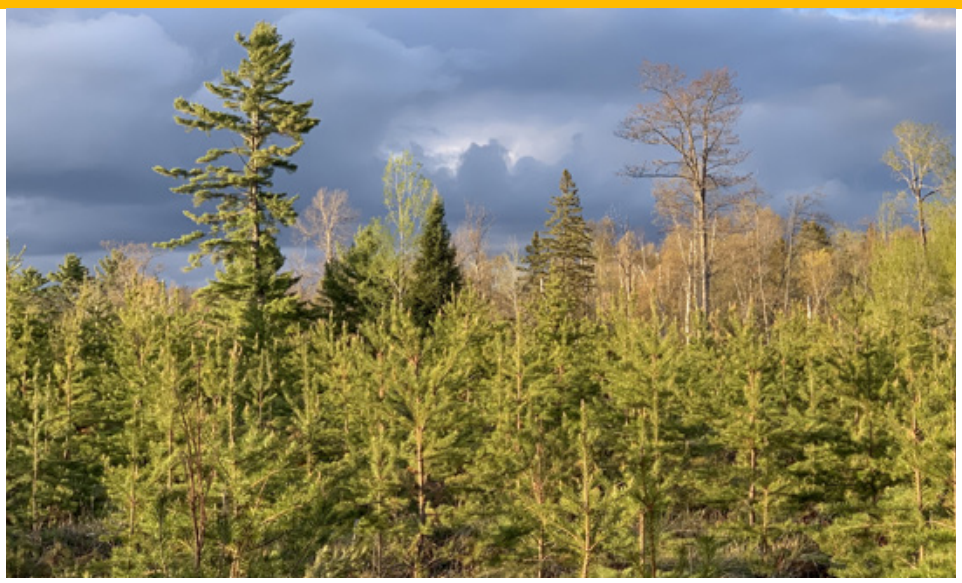
Water Resources Management (WRM) is a master of science degree program housed within the Nelson Institute for Environmental Studies at the University of Wisconsin–Madison. WRM graduate students complete 45 credits of interdisciplinary coursework across categories such as the natural sciences, engineering, social sciences, planning, and water management. Instead of conducting individual research, students participate in a collaborative practicum that extends across their two years in the program.

The WRM practicum concentrates on a relevant water management issue facing a local community, and students form partnerships with organizations and institutions to develop project objectives and ultimately deliver management recommendations.

Learn more about the Water Resources Management program and how you can support the program.

Water@UW: Addressing Wisconsin's Water Challenges

A session at the 2022 Earth Day Learning Event explored the ways Water@UW is bringing together water-focused faculty, staff, and students on campus to foster connection and communication among members of the UW–Madison water community. The session featured Caroline Gottschalk Druschke, associate professor of composition and rhetoric, Department of English, University of Wisconsin–Madison, Grace Wilkinson, assistant professor, Center for Limnology, University of Wisconsin–Madison, Hilary Dugan, assistant professor, Department of Integrative Biology, Center for Limnology, University of Wisconsin–Madison, and Christy Remucal, associate professor, Department of Civil and Environmental Engineering, Environmental Chemistry and Technology Program, and Freshwater and Marine Science Program; director of Water Science and Engineering Laboratory, University of Wisconsin–Madison who addressed the ways Water@UW strengthens bridges between UW–Madison's water research and research being done across the state. The panel also focused on the urgent water challenges in the state including harmful algal blooms, road salt pollution, PFAS, and flooding. If you missed the program, you can view the recording here.



Diversity and reserve trees in jack pine plantation. Northern Highland-American Legion State Forest, Vilas County, Wis.
Photo credit: Ron Eckstein

Warmer winters and extreme rain are stressing Wisconsin's forest resources

By Dea Larsen Converse

A focus on climate impacts to Wisconsin's forests in the most recent assessment from the Wisconsin Initiative on Climate Change Impacts (WICCI) shows that warming temperatures and changing precipitation patterns are impacting Wisconsin's urban and rural forests. WICCI is a nationally recognized collaboration of scientists and stakeholders working together to help foster solutions to climate change in Wisconsin.

A group of experts participating in the WICCI Forestry Working Group found that warmer winters, extreme weather events, summer droughts, and longer growing seasons are impacting Wisconsin's forests. Wisconsin's average daily temperature has become three degrees Fahrenheit warmer and precipitation has increased 17 percent, about five inches, since 1950. The last two decades have been the warmest on record and last decade was the wettest. Winter has warmed about twice as fast as other seasons in Wisconsin over the past few decades.

Warmer winters
The group found that in northern Wisconsin, where most of Wisconsin's forests are located, warmer winters are reducing the snowpack that insulates trees and other organisms, impacting forest operations such as harvesting and transportation that rely on frozen ground, and creating less lethal conditions for pests and diseases. These impacts can tip the competitive balance in forests from species like native boreal trees towards southern species. One surprising but substantial impact of warmer winters is the increase in deer herds. With less severe winters, especially in northern Wisconsin, larger numbers of deer are surviving and having a big impact on forest regeneration as they browse on understory plants, including sensitive species.

Extreme weather events
The group also found that extreme storms are happening more frequently and creating a great deal of damage in forests through flooding, erosion, and deposition of nutrients and invasive species seeds. These extreme storms also cause considerable damage to infrastructure on forest land, such as roads, trails, culverts, bridges, and campgrounds.

"Wisconsin forests cover nearly half of Wisconsin and provide a unique opportunity to address climate change by reducing concentrations of greenhouse gases while simultaneously providing essential social, environmental, and economic benefits."

–Stephen Handler, WICCI Forestry Working Group Chair

Summer droughts and longer growing seasons
In addition, the group found that warmer temperatures, longer growing seasons, and decreasing summer precipitation in northern Wisconsin, are increasing the risk for wildfires, pests, and disease. Reduced snowpack and earlier springs are also drying out vegetation at a faster rate in the spring and summer. While prescribed fires could help, it is becoming increasingly

difficult to find a safe window to use them as the climate changes.

Impacts to culturally important species

Wisconsin tribes are working to help culturally significant species, like paper birch, adapt to changing conditions. With the guidance of tribal leaders, elders, and harvesters, the Great Lakes Indian Fish and Wildlife Commission has developed climate change vulnerability assessments to provide resources for tribes and their partners to respond to climate change and help maintain their treaty rights.

Impacts on communities

While all communities in Wisconsin are at risk, historically disadvantaged communities bear a disproportionate burden and suffer the greatest harms. For example, large canopy trees can play a big role in helping urban areas become more resilient to climate change, yet studies are showing a disparity in the location of tree canopy in some cities. In Milwaukee, for example, higher income neighborhoods have more trees than areas with renters and minority homeownership.

Solutions

The WICCI Forestry Working Group suggests solutions to prepare for and minimize the climate impacts to forests by keeping forests as forests, supporting holistic deer management, expanding forest cover in both urban and rural areas, and supporting climate-focused planning and management. Visit the Forestry Working Group webpage to learn more about these issues, impacts, and solutions.

Support WICCI

Gifts to the Wisconsin Initiative on Climate Change Impacts (WICCI) Program Fund provide general, discretionary program support and are used to enhance and expand WICCI's teaching, research, and public service roles. Gifts are also used to support partnership-building activities, include faculty, staff, and student recruitment, retention, and morale.

The Wisconsin Initiative on Climate Change Impacts (WICCI) is a statewide collaboration of scientists and stakeholders formed as a partnership between UW–Madison's Nelson Institute for Environmental Studies and the Wisconsin

Department of Natural Resources. WICCI's goals are to evaluate climate change impacts on Wisconsin and foster solutions.

This article is part of a series highlighting the contribution from each WICCI Working Group for the 2021 WICCI Assessment Report.

Forestry Working Group - Stories

A diverse tree canopy, both in terms of age and species type, can not only make cities more resilient as the climate changes, but can also cool urban landscapes and capture and slow runoff during extreme rain events.

Derechos, or severe straight-line windstorms, are one type of extreme event that may become more frequent in the future.

With Wisconsin's winters warming rapidly over the past several decades, the reliable operating window for forest management, which relies on frozen ground or deep snow to avoid damaging sensitive areas with heavy machinery, has been shrinking steadily. This is a major issue for the forest products supply chain and the forest economy in Wisconsin.

A perspective on urban forests and climate change

Effects of the 2019 derecho on the Chequamegon-Nicolet National Forest

The impacts of warmer winters and unpredictable conditions on a logging business

UW–Madison professor appointed to Not Invisible Act Commission to address violent crime against Indigenous Americans

By Diane Stojanovich

Grace Bulltail, a professor in the University of Wisconsin–Madison's Nelson Institute for Environmental Studies, is among those appointed to serve on a commission focusing on addressing violent crime within Indian lands and against American Indians and Alaska Natives.

Grace Bulltail

"We want to ensure that our advocacy efforts are heard and make a meaningful contribution toward addressing this horrific crisis in our communities."

–Grace Bulltail

Deb Haaland, Secretary of the Interior, named members of the Not Invisible Act Commission during a live webcast recognizing May 5 as National Missing and Murdered Indigenous Peoples Day. Bulltail's research centers on natural resource management, tribal resource sovereignty and environmental justice in Indigenous communities.

Bulltail and her family have been impacted by the missing and murdered Indigenous women and girls (MMIWG) crisis. Her 18-year-old niece Kaysera Stops Pretty Places went missing in August 2019, and was later found murdered in Hardin, Mont., a border town of the Crow reservation. Her disappearance and death have not been investigated as a homicide by Big Horn County law enforcement. Big Horn County has the highest rates of MMIWG cases per capita of any county in the nation. Grace and her family have had to conduct their own investigation, as many MMIWG families do, seeking answers while continuing to be dismissed by all levels of law enforcement in the state.

"We want to ensure that our advocacy efforts are heard and make a meaningful contribution toward addressing this horrific crisis in our communities. Too many families have gone without investigations, answers, and justice in their loved ones' disappearances and murders," says Bulltail. "We have asked all the officials and taskforces for help, often to no avail. We demand that those creating policy resolutions to the crisis listen to those of us who have had to become our own advocates in navigating the justice system."

The cross-jurisdictional advisory committee is composed of law enforcement, tribal leaders, federal partners, service providers, family members of missing and murdered individuals and, most importantly, survivors.

"Everyone deserves to feel safe in their community, but a lack of urgency, transparency and coordination have hampered our country's efforts to combat violence against American Indians and Alaska Natives," Secretary of the Interior Haaland said in the webcast announcing commission members. "As we work with the Department of Justice to prioritize the national crisis of missing and murdered Indigenous peoples, the Not Invisible Act Commission will help address its underlying roots by ensuring the voices of those impacted by violence against Native people are included in our quest to implement solutions."

Secretary Deb Haaland addresses the missing and murdered Indigenous women crisis during a live webcast on May 5, 2022. Photo courtesy of the U.S. Department of the Interior

"The Justice Department is committed to addressing the crisis of missing or murdered Indigenous persons with the urgency it demands," said Attorney General Merrick Garland in the announcement. "That commitment is reflected in the strength of our partnerships across the federal government, including with the Department of the Interior as we take the next steps in launching the Not Invisible Act Commission. The Commissioners announced today will play a critical role in our efforts to better meet the public safety needs of Native communities. The Justice Department will continue to work alongside our Tribal partners with respect, sincerity, and a shared interest in the wellbeing of Tribal communities."

The Not Invisible Act Commission will make recommendations to the Departments of the Interior and Justice to improve intergovernmental coordination and establish best practices for state, tribal, and federal law enforcement, to bolster resources for survivors and victim's families, and to combat the epidemic of missing persons, murder and trafficking of Native American, Alaska Native and Native Hawaiian people.

Among its mission, the Commission will:

- **Identify, report and respond to instances of missing and murdered Indigenous peoples (MMIP) cases and human trafficking,**
- **Develop legislative and administrative changes necessary to use federal programs, properties, and resources to combat the crisis,**
- **Track and report data on MMIP and human trafficking cases,**
- **Consider issues related to the hiring and retention of law enforcement offices,**
- **Coordinate tribal-state-federal resources to combat MMIP and human trafficking offices on Indian lands, and**
- **Increase information sharing with tribal governments on violent crimes investigations and other prosecutions on Indian lands.**

The Commission has the authority to hold hearings, gather testimony, and receive additional evidence and feedback from its members to develop recommendations to the Secretary and Attorney General.

Enacted in October 2020, the Not Invisible Act of 2019 was signed into law as the first bill in history to be introduced and passed by four U.S. congressional members enrolled in their respective federally recognized tribes, led by Secretary Haaland during her time in Congress.

Bulltail's research goals are at the intersection of watershed management and tribal sovereignty. Her work addresses environmental justice as it encompasses Indigenous human rights, with the most vulnerable population being Indigenous women and girls, particularly in resource-extractive communities. A member of the Crow Tribe and a descendant of the Mandan, Hidatsa, and Arikara Tribes of Fort Berthold, North Dakota, Bulltail has spent much of her career studying the impact natural resource extraction on water quality and watershed management. A professional engineer and American Indian Science and Engineering Society board member, Bulltail received a bachelor of science in civil and environmental engineering from Stanford University and a doctorate from the Department of Biological and Environmental Engineering in the College of Agriculture and Life Sciences at Cornell University.

Sustainability projects showcase students' creativity in Geography 309: People, Land and Food

Caroline Crowley and Grady LaJeunesse both created websites for their final projects in Geography 309: People, Land and Food. Photo courtesy of Holly Gibbs.

By Hope Karnopp

A documentary of the F. H. King Students for Sustainable Agriculture. Paintings that address food waste and incorporate paint made from food scraps. A wood-burned map that describes the impact of land use change on trout streams. A hand-drawn guide to foraging.

These are all projects that students have created in Geography 309: People, Land and Food, taught by Nelson Institute Center for Sustainability and the Global Environment (SAGE) and Department of Geography Professor Holly Gibbs. The class explores food sustainability through topics like tropical deforestation and farming systems. As part of the course, students embark on their own projects related to sustainability.

"One of the strongest points of my class and the thread that holds it all together are these food sustainability projects. They're semester-long projects ... [in which] students are grappling with an issue that they pick out, an issue that they internalize and think about how they want to make change," Gibbs said.

Students in the course enjoy having the creative freedom to pursue topics that are interesting to them. "That's I think one of the coolest parts about it," said Caroline Crowley, a student in the class. "As long as the project mostly relates to food or honestly just sustainability, they're kind of just like, 'Run with it, see what you can do.'"

Crowley, a second-year student majoring in Journalism with a certificate in Environmental Studies, created a blog with vegan recipes tailored to athletes. A food writer for the magazine *The Dish*, and a vegan herself, Crowley wanted to make a website that would be accessible to college students.

Crowley, a second-year student majoring in journalism with a certificate in environmental studies, shares her work with the class. Photo courtesy of Holly Gibbs.

"I really like making websites and I think that it's easier to reach more people with them," Crowley said. "I just felt like the website was a good use of my skills from the [Journalism] School and all my time I've spent doing website stuff to reach more people."

Grady LaJeunesse, a junior majoring in Biology and Environmental Studies, also built a website that provides information about rewilding lawns with native plants. He remembered playing in his lawn as a kid, but noticed the whole yard being used less as he got older.

"I feel like it's something everyone could do with relative ease, just plant some stuff here and there,"

LaJeunesse, a junior majoring in biology and environmental studies, presents his project on rewilding lawns. Photo courtesy of Holly Gibbs.

LaJeunesse said. "Basically, you spend less time taking care of your lawn and it's more like you let stuff grow."

Other students worked with organizations like the Appleton International Airport and the Friends of Koshkonong Creek. The class has received grants from the Office of Sustainability, the College of Letters & Science, and the Kemper K. Knapp Bequest, and it is now partnering with the UniverCity Alliance.

The Kemper K. Knapp Bequest "allowed us to have an additional TA in the classroom that can help facilitate relationships with stakeholders for the students," Gibbs explained. "Having that extra TA really allows us to go a step farther in supporting the students."

As the end of the semester approaches, students are working on final papers about their projects and will present their work to the class. Crowley and LaJeunesse hope to share their work via social media or have it featured on other websites.

Gibbs said students are inspired by the idea of their work living on and said future capstone classes in Environmental Studies or independent studies could allow students to keep their projects going.

"I wanted the students to kind of embody this idea that undergraduates are able to make change now," Gibbs said. "That was one of the motivating forces behind these projects, to help the students learn to grow these networks, to practice these skills, but also to actually make change, to matter in our community and make our community better."

FULBRIGHT Scholar Program

Andrea Hicks named 2022–23 Fulbright Scholar

Andrea Hicks, who serves as a Nelson Institute affiliate, director of Sustainability Education and Research, Hanson Family Fellow in Sustainability, and associate professor of Civil and Environmental Engineering, has been named a 2022–23 Fulbright Scholar.

Hicks is a leading expert in using life-cycle assessments to determine the overall environmental impact of products or processes. She's put that expertise to use to research challenges ranging from sustainable aquaponics methods or filling gaps in personal protective equipment supplies in the early days of the COVID-19 pandemic to the feasibility of using carbon dioxide in the atmosphere to create more environmentally friendly plastics. She also works on a wide range of sustainability initiatives across campus and teaches several courses.

Hicks received widespread recognition for her work, including, among others, a National Science Foundation CAREER Award and several Scialog grants for negative emissions research and has been named a Negative Emissions Science Fellow.

Fulbright Scholar Awards are prestigious, competitive fellowships that provide opportunities for scholars to teach and conduct research abroad. Recipient scholars also play a critical role in U.S. public diplomacy by engaging and establishing long-term relationships between people and nations. The Fulbright Program was established in 1946 and has since been awarded to more than 400,000 students, scholars, teachers, artists and professionals of all backgrounds and fields.

Ask Andrea

Andrea Hicks

A monthly column from Andrea Hicks, Director of Sustainability Education and Research, an assistant professor in the Department of Civil and Environmental Engineering, and the Hanson Family Fellow in Sustainability

Question: I've decided to go on a vacation this summer, after not traveling for a while due to the pandemic. I'm concerned about my environmental impact and was wondering if you could recommend the best way to travel to visit my mom in Florida?

Answer: That is a great question, and one that I am sure many people have. As you suggested, there is an environmental impact to travel, which can change depending on how you decide to travel. Let's have a look at our planned trip to visit your mom in Florida, and we will assume that you are starting your travel from Madison, Wisconsin and heading to Orlando, Florida. According to Google Maps, that is about 1,300 miles by car and would take about 19 hours of driving. Another option would be to fly on an airplane, which would take a little over 2 hours and about 1,010 miles for a direct flight. There are of course other options such as taking public transportation, which might include a combination of buses and trains. But, for the sake of simplicity, let's only consider the automobile versus airplane question. Here is a look at the emission factors we are using from the BBC to calculate impacts.

The environmental impact of driving to your destination will depend on what type of vehicle you have (internal combustion, hybrid, electric, etc.), the efficiency of the vehicle, and the source of the fuel (fossil-based gasoline, diesel or biodiesel, or in the case of an electric car, whether the electricity is from coal or renewables). Assuming that you have an internal combustion automobile that uses diesel, a one-way trip would produce about 790 pounds of carbon dioxide, or about 1,580 pounds of carbon dioxide for a round trip. One thing to consider, however, is that if there are more people traveling in the same car, the additional environmental impact due to the increased weight is fairly marginal. So, the carbon dioxide emissions per person would decrease dramatically. For example, if there were four people in the car, the impact per person for the trip would be about 395 pounds of carbon dioxide. This number is only for driving, and does not include potentially spending a night in a hotel somewhere, instead of driving 19 hours straight through from Wisconsin to Florida.

Flying on a domestic flight in economy class would produce about 480 pounds of carbon dioxide per person each way, or about 954 pounds of carbon dioxide per person roundtrip. This means that if you only consider round trip transportation for a single person, i.e., if you are traveling alone, it would likely be a better option environmentally to fly (954 pounds versus 1,580 pounds). However, if you are traveling with three companions and decide to drive straight through to Orlando, the less environmentally impactful choice on a per person basis would be to drive. Check out this link for more information on the carbon footprint of travel.

To submit questions for future columns, please email us at: info@sustainability.wisc.edu with the subject line "Ask Andrea question"

Sustainability at UW–Madison: Spring 2022

Strategic Initiatives

- UW–Madison submitted its second Sustainability Tracking, Assessment, and Rating System (STARS) report in spring 2022. The university improved in the categories of research and scholarship, student orientation, continuing education, and construction and demolition waste, though it will maintain its Silver rating.
- Over 20 renewable energy and energy efficiency projects are underway or in the planning stages thanks to the Physical Plant's $3.2 million strategic allocation for FY21. Many of the projects involve students thanks to collaboration with the UW–Madison Green Fund.
- UW–Madison and Alliant Energy will partner on a solar and agricultural research project at the Kegonsa Research Station near Stoughton, Wisconsin. At maximum output, the project is expected to generate enough energy to power more than 450 homes. UW–Madison will receive renewable energy credits generated by the solar project.

Student members of Slow Food UW prepare one of their weekly meals in celebration of Earth Week in April 2022.

Research

- Students from the Climate Action Planning: Sustainable Transportation course, taught by Professor Carey McAndrews, teamed up with the Office of Sustainability and Transportation Services to develop recommendations for UW–Madison's transportation fleet.
- Office of Sustainability-sponsored researcher Henry Hundt is working with Professor Morgan Edwards's Climate Action Lab to impact renewable energy deployment in Wisconsin using satellite data.
- UW–Madison graduate student Seth Spawn-Lee has been assisting with an effort to map and identify worldwide carbon sources that are vulnerable to release from human activity.

Student Involvement

- The Class of 2022 chose the UW–Madison Green Fund as the recipient of the Senior Class Gift. The Green Fund supports student projects that address the environmental footprint, social impact, and operating costs of campus facilities to bring about long-standing impactful change.

76
departments that conduct sustainability research at UW–Madison

329
sustainability courses offered during the 2020-2021 academic year.

- UW–Madison celebrated its fifth annual Earth Week in April, with events organized by the Office of Sustainability alongside 20 partners from across campus.
- Graduating Badgers and their families experienced a greener commencement in May 2022, including digital programs, updated recycling information, and integrated messaging about UW–Madison's sustainability efforts.

Green Fund

The Green Fund offers support for student projects that make campus more sustainable. With additional funding from the utility carryover budget, 2021–2022 projects included:

- Adding additional panels to complete the solar array on Gordon Dining & Event Center.
- Identifying 47 bus shelters for solar-powered bus route mapping; 20 panels will be installed over summer 2022.
- Proposing projects to collaborate with the Physical Therapy Department to optimize campus lighting and promote wellness, and to collaborate with the Grounds Department to electrify their equipment.

Wisconsin Experience

- In March, UW–Madison participated in a worldwide teach-in on climate and justice. Faculty and staff from a range of departments presented concurrent sessions on topics like global climate wisdom, climate change and the Midwest, and food justice and climate change.
- Co-led by a student from UW–Madison, the Midwest Climate Collaborative Student Systems Conference hosted students from all the Big Ten schools, UC Berkeley, Johns Hopkins, Cornell, and others.

Staffing

- This summer, the Office of Sustainability will welcome 18 new undergraduates into its student intern program for 2022–2023, the largest cohort in Office history. The cohort will include rising sophomores, juniors, and seniors from many majors, including psychology, conservation biology, engineering, computer science, political science, economics, math, physics, chemistry, dance, legal studies, philosophy, and communications, as well as environmental studies and sciences.

Alumni

- Several UW–Madison alumni were highlighted in a recent article that summarized the ongoing progress on their Green Fund lighting projects.
- John Daugherty '09 of SunVest Solar is part of the project team that will help create UW–Madison's first agrivoltaics solar research site at the Kegonsa Research Campus.

27%
reduction in total waste generated per campus user between 2007-2020

- Office of Sustainability interns are leveraging their campus sustainability experience beyond graduation. Outgoing seniors plan to attend graduate school, join nonprofit food justice efforts, and work in sustainability and energy analysis consulting.

Honors & Mentions

- UW–Madison's Director of Sustainability Education & Research, Andrea Hicks, won the Laudise Medal in recognition for her outstanding achievements in the field of industrial ecology. Hicks was also awarded the Fulbright Award to spend the spring 2023 semester at the University of Limerick, researching sustainable batteries.
- Staff, faculty, and students from UW–Madison participated in the UW System Board of Regents meeting in April to share strategies for more effective, coordinated, and committed engagement in sustainability system-wide.

"We are positioning UW–Madison to take its rightful place as a leader in sustainability, not only in the conventional sense of reducing our environmental impacts and improving our operations, but also in leveraging our truly world-class faculty involved in climate research as well as channeling the passion and talents of our remarkable students. We also want to be sure that our efforts pay particular attention to "social sustainability," including how we honor and engage members of our Native Nations, how we address environmental injustices, and how we examine issues of diversity and inclusion in the environmental movement."

—Chancellor Rebecca Blank

Pollution layer over Los Angeles, California. Photo credit: iStock

Cutting air pollution emissions would save 50,000 U.S. lives, $600 billion each year

By Chris Barncard

Eliminating air pollution emissions from energy-related activities in the United States would prevent more than 50,000 premature deaths each year and provide more than $600 billion in benefits each year from avoided illness and death, according to a new study by University of Wisconsin–Madison researchers.

Published recently in the journal GeoHealth, the study reports the health benefits of removing dangerous fine particulates released into the air by electricity generation, transportation, industrial activities and building functions like heating and cooking — also major sources of carbon dioxide emissions that cause climate change, since they predominantly rely on burning fossil fuels like coal, oil, and natural gas.

"Our work provides a sense of the scale of the air quality health benefits that could accompany deep decarbonization of the U.S. energy system," says Nick Mailloux, lead author of the study and a graduate student at the Center for Sustainability and the Global Environment in UW–Madison's Nelson Institute for Environmental Studies. "Shifting to clean energy sources can provide enormous benefit for public health in the near term while mitigating climate change in the longer term."

Working with scientists specializing in air quality and public health, Mailloux used a model from the U.S. Environmental Protection Agency to determine the health benefits from a complete reduction in emissions of fine particulate matter and of sulfur dioxide and nitrogen oxides. These compounds can form particulate matter once released into the atmosphere.

These pollutants contribute to health problems such as heart disease, stroke, chronic ob-

"Shifting to clean energy sources can provide enormous benefit for public health in the near term while mitigating climate change in the longer term."

–Nick Mailloux

structive pulmonary disease, lung cancer and lower respiratory infections that can dramatically shorten lifespans. Doing away with these pollutants would save about 53,200 lives each year in the US, providing about $608 billion in benefits from avoided healthcare costs and loss of life, according to the researchers' analysis.

Nick Mailloux

The researchers also studied the health effects if regions of the country were to act independently to reduce emissions instead of as part of a concerted nationwide effort. The effects can differ widely in different parts of the US, in part because of regional variations in energy use and population.

The Southwest, a region comprising Arizona, California, and Nevada, would retain 95 percent of the benefits if it moved alone to eliminate fine particle emissions.

"In the Mountain region, though, most of the benefit of emissions removal is felt somewhere else," Mailloux says. "Just 32 percent of the benefit remains in states in the Mountain region. This is partly because there are large population centers downwind of the Mountain region that would also benefit." Every region of the country sees more benefit from nationwide action than from acting on their own to reduce emissions.

"The Great Plains, for example, gets more than twice as much benefit from nationwide efforts as it does from acting alone," says Mailloux. "The more that states and regions can coordinate their emissions reductions efforts, the greater the benefit they can provide to us all."

The researchers hope that by describing the near-term payoffs on top of the threats of more distant climate impacts, the new study motivates more action on climate change.

"Our analysis is timely, following last month's report from the UN Intergovernmental Panel on Climate Change that called for urgent action to transform the world's energy economy," says Jonathan Patz, senior author of the study and a UW–Madison professor in the Nelson Institute and Department of Population Health Sciences. "My hope is that our research findings might spur decision-makers grappling with the necessary move away from fossil fuels, to shift their thinking from burdens to benefits."

Learn more about Environment and Resources and how you can support the program.

CCR graduate student awarded NCAR Fellowship

Rudradutt Thaker, research assistant with Nelson Institute's Center for Climatic Research (CCR) and the Department of Atmospheric and Oceanic Sciences, has been awarded a fellowship through the National Center for Atmospheric Research's (NCAR) Graduate Visitor Program. In collaboration with CCR Scientist, Steve Vavrus, Thaker will work with four NCAR colleagues during summer 2022 on a National Science Foundation-funded project to study the interaction among Arctic cyclones, sea ice, and atmospheric rivers.

Thaker's research will primarily focus on the atmospheric river aspect of the project. It will be the foundation of his master's thesis and a presentation at the American Meteorological Society (AMS) Polar Meteorology and Oceanography Conference held in August in Madison, Wis.

Rudradutt Thaker

From the peach state to the badger state, EOI student works to monitor and preserve wetlands

Sunset on St. Simon's Island in Glynn County, Georgia. Photo credit: Kevin Ronczkowski

By Anica Graney

Environmental Observation and Informatics (EOI) graduate student Kevin Ronczkowski has always been a badger fan. Cheering from his home state of Georgia, Ronczkowski jumped at the opportunity to continue his education at the University of Wisconsin–Madison. "My family is from the Wisconsin area," Ronczkowski said. "I grew up a badger fan and always wanted to go to school here."

Kevin Ronczkowski. Photo credit: Cooper Ulrich

After completing his undergraduate degree in parks, recreation, and tourism management at the University of Georgia, Ronczkowski found the EOI program and moved to Madison two weeks after graduating.

The Nelson Institute's Environmental Observation and Informatics (EOI) program is a 15-month MS degree that prepares students for a career at the intersection of the geospatial and environmental fields. Students learn digital image analysis and interpretation, geospatial data science, programming and the policy and ethics of observational data.

His passion stems from Geographic Information Systems (GIS), a computer database that analyzes and displays geographic information. "I looked at GIS like a puzzle. I love doing puzzles, always have. It just seemed like a cool way to incorporate that into environmental problems," Ronczkowski said. "I learned why stuff happened on the ground through the lens of space and something you can see on a computer screen."

Ronczkowski said his coursework prepared him for his industry through hands-on projects and professional development opportunities. One of his classes worked closely with the Marathon County GIS department where students worked on surface water visualization, land cover classification and map and gully inventory creation.

Ronczkowski and his group were tasked with creating a gully inventory by taking a digital elevation model (DEM), identifying areas with high water flow using ArcMap and comparing their findings to high resolution aerial photographs that show where gullies currently exist. The gully inventory was then used to identify agricultural areas at high risk for erosion and water runoff within Marathon County. The project was a learning experience for Ronczkowski in more than just the physical science and data collection. "It really taught me a lot about working with the client and managing their expectations for a project," Ronczkowski said.

His classes also explored professional development strategies for success later in the program and after graduation. "I had never taken any professional development classes before, so it was good to learn interview and resume skills," Ronczkowski said. "It helped me develop my project and grow more comfortable speaking with my project supervisor and reaching out to them more often."

Ronczkowski said the professional development skills have even carried over to his GIS internship with the U.S. Fish and Wildlife Service's National Wetlands Inventory Center. There, his duties include transferring records to a digital database and reaching out to universities or local governments with the records for wetlands monitoring and classification.

Ronczkowski has also started to learn different coding languages to help automate some of his work, complete class assignments and give himself a leg up in the job market. "I never really thought I was going to need to learn how to code," Ronczkowski said. He now uses the coding languages R and Python regularly. "I remember while doing my senior thesis, I specifically avoided R like the plague because I thought I would never be doing this, and now I'm using R every day."

Taking his skills back to his home state of Georgia, Ronczkowski will be working with The Nature Conservancy for his summer independent study course where he will help expand the Community Rating System (CRS) explorer, a web-based tool that helps policy makers identify high priority conservation areas, to coastal Georgia. Ronczkowski will work with the local governments of Glynn County and The City of Brunswick, Georgia to collect the data required for the tool expansion where he hopes to aid these governments in gaining CRS points that help with flood insurance rates.

"I looked at GIS like a puzzle. I love doing puzzles, always have. It just seemed like a cool way to incorporate that into environmental problems."

–Kevin Ronczkowski

"A lot of what this tool does is help people model what their area is going to look like in 50–100 years. Will it be underwater? Or at a higher risk for flood? There is a lot of development going on in coastal Georgia right now. It's a big hot spot. We really need to be smart with our developments down there and not build into these flood plains," Ronczkowski said.

After his summer project ends, Ronczkowski will return to Madison where he plans to take a gap year working at St. Paul's Catholic Student Center on campus and continuing his internship at the U.S. Fish and Wildlife Service. His future goals include continuing to work with wetland monitoring and protection or wildlife consulting.

Ronczkowski advises prospective students to reach out to EOI Program Coordinator Sarah Graves or Professional Program Director Nathan Schulfer. "Sarah and Nathan are awesome, and they have a wealth of knowledge about this program," Ronczkowski said. "They're super willing to answer any questions and get you connected with the right people. So even if you don't think EOI is right for you, they'll steer you in the right direction."

Learn more about the Environmental Observation and Informatics MS and how you can support the program.

Ronczkowski and EOI student Joe Kiel canoeing in the Boundary Waters Canoe Area Wilderness. Photo credit: Ben Bagniewski

Congratulations to our spring 2022 philanthropy-funded scholarship winners!

Scholarship Name	Amount	Recipient
Arthur B. Sacks Award for Artistic Expressions of Human and Environmental Relationships - Inaugural award	$350	Kylie Ruprecht
Arthur B. Sacks Award for Graduate Excellence in Environmental Studies and Sustainability	$350	Becky Rose
Arthur B. Sacks Award for Undergraduate Excellence in Environmental Studies and Sustainability	$350	Manasi Passi-Simhan
Charles G. Meyer Undergraduate Study Abroad Travel Award	$5,000	Shealynn Wegner
Charlotte Zieve Scholarship	$3,000	Makayla Erdmann
Detering Gurfield Family Scholarship	$2,500	Makayla Erdmann
James A. Schleif and William H. Morley Undergraduate Study Abroad Travel Award	$3,500	Robert Hall
Kikkoman Environmental Studies Scholarship (2 awards)	$3,000 $3,000	Kailey Felch Amanda Shalit
Linda Wernecke Marshall Graduate Award in Environmental Studies (3 awards)	$1,000 $1,000 $1,000	Laura Bates Hunter Mackin Audrey Stanton
Reid Bryson Undergraduate Scholarship - Inaugural award	$3,000	Lily Herling

With thanks to the generous donors who made these scholarships possible:

Ian Gurfield and Susan Detering
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For more information about the Spring 2022 scholarships, recipients, and donors, please see here

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Gifts in any amount are needed and appreciated!

WRM alumnus Jackson Parr is working to improve flood resilience planning in Wisconsin

By Bekah McBride

Jackson Parr

As a journalist in northeastern Wisconsin, Nelson Institute alumnus Jackson Parr often found himself writing about flooding and water quality issues. Seeing his community face these challenges time and time again inspired him to make a change. So, he applied to graduate school at the University of Wisconsin–Madison to gain new skills that would allow him to aid rural communities facing water challenges.

Having observed the connections between tourism, agriculture, and water, Parr knew he would need to understand policy to make a change, so he sought his Master's in public affairs from the LaFollette School of Public Affairs. The program has a flexible curriculum that allows students to take classes in departments across campus and Parr found himself drawn to environmental studies.

"I found myself just gravitating towards environmental science in the Nelson Institute and that is when the Water Resources Management program came to my attention," Parr said. "I added that program after my first semester of graduate school."

"Until that project, my world was kind of more in agriculture and water quality. Now, I find myself working exclusively in flood mitigation, and I love it, but I don't think that that would have happened, had I not been given that project in the WRM program…"

–Jackson Parr

The Nelson Institute Water Resources Management (WRM) program prepares students to address the complexities that come with managing this critical natural resource. This is done through a combination of courses and hands-on education that includes a practicum where graduate students work on an issue facing a local community. Students work in cohorts to carry out an applied two-year project that culminates in a report that provides water management recommendations to community leaders.

"My cohort of five other students and I were tasked with looking at flood resilience in the Coon Creek Watershed in the Driftless region, it's pretty rural," Parr said. "They had some dam breaches in August 2018 that really created some devastating flooding in the region. So, we were tasked with looking at ways to improve flood resilience and one of the really cool things about WRM is they really give you a lot of latitude to decide how you want to tackle the project that you're given. So, with me coming from more of a social science, policy, journalism background, I was given the opportunity to do a lot of work on qualitative research and interviews with residents in the area to get a public perspective on flooding and resilience."

While Parr focused on the policy and the people, other team members focused on the fieldwork including infiltration readings and determining rainfall. Parr also had the opportunity to work with his cohort on the socio-economics of flooding in the region.

"That project was pretty influential," said Parr. "Until that project, my world was kind of more in agriculture and water quality. Now, I find myself working exclusively in flood mitigation, and I love it, but I don't think that that would have happened, had I not been given that project in the WRM program and also been given the latitude to explore it in a way that suits my interests and strengths."

Students visited the breached dam sites in the Coon Creek Watershed with Monroe County Conservationist Bob Micheel in 2019. Photo credit: Eric Booth

Eric Booth, an advisor with the WRM program and an associate scientist in the Department of Agronomy, Department of Civil & Environmental Engineering, and the Nelson Institute for Environmental Studies, added, "Jackson has been a fantastic colleague on the Water Resources Management Practicum project exploring flood resilience in the Coon Creek Watershed. He has demonstrated strong leadership, a passion to truly make an impact on communities across Wisconsin, and a deep curiosity to explore the complex interconnections between water, land, climate, public policy, and economics."

Today, Parr is a fellow with Wisconsin Sea Grant, a program based at the University of Wisconsin–Madison that does basic and applied research, education, and outreach that is focused on Great Lakes resources. He is currently working on a project in partnership with the Wisconsin Department of Health Services to better understand flood resilience and how it relates to public health and climate issues. He is developing a flood resilience scorecard, a community self-assessment of flood risk, as a part of this project. Using the scorecard feedback and data, Parr provides recommendations on ways to improve flood resilience.

Moving forward, Parr plans to continue to apply what he's learned towards community outreach and flood resilience planning. He is particularly hopeful that new policies will aid in his goal of helping rural communities to protect their water resources.

"One of the things that I'm really interested in is a discussion that's percolating in a lot of arenas given the new infrastructure bill that just passed at the federal level, is the ability for smaller, often rural, under resourced communities to participate in flood resilience programs," said Parr. "There's a lot of these big programs that rural communities and under resourced communities just don't have the capacity to participate in. That leaves them more disadvantaged relative to more urban or wealthier communities that have the technical or administrative capacity to participate in these programs. I'm really interested in figuring out a way to assist these under resourced communities in accessing funds that would otherwise flow towards places that maybe don't need them quite as much. I just want to make sure that these communities have equal access to the programs that are often intended for them."

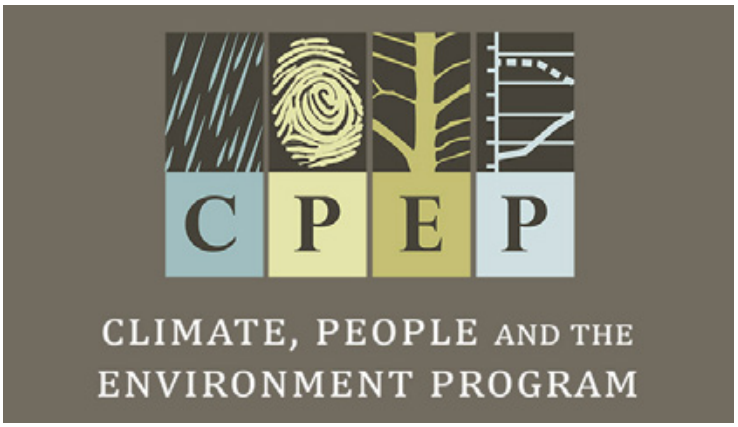
Learn more about the Water Resources Management program and how you can support the program.

2022 Rendezvous on the Terrace:
Friday, September 23, 2022
Alumni Lounge, Pyle Center,
Madison, WI
Registration opening in June

We invite you to stay connected by updating your contact information, by joining Badger Bridge, or making simple updates here.

Weston Series

The Weston Roundtable Series is designed to promote a robust understanding of sustainability science, engineering, and policy through weekly lectures co-sponsored by the Center for Sustainability and the Global Environment (SAGE), the Department of Civil and Environmental Engineering, and the Office of Sustainability. The spring series is complete, but past lecture recordings are available for viewing.



CPEP Series

Each semester the Climate, People, and the Environment Program (CPEP) hosts a weekly seminar featuring lectures by visiting speakers as well as presentations by CPEP faculty, scientists, and students. CPEP seminar presentations are held in conjunction with the Department of Atmospheric and Oceanic Sciences (AOS) and are open to the public. The spring series is complete, but past lecture recordings are available for viewing.

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