

**BC
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**20
25**

Bucknell Center for
Sustainability &
the Environment

ANNUAL REPORT

TEACHING



COLLABORATION



RESEARCH



**UNIVERSITY
SERVICE**

**COMMUNITY
SERVICE**



I. Overview of the BCSE

The Center for Sustainability & the Environment began as the Bucknell Environmental Center in 2005 and from the beginning, the Center aimed to establish a university-wide platform that prioritizes student-centered teaching and interdisciplinary high impact learning, while also supporting collaborative scholarship and outreach—positioning Bucknell as a national leader in environmental and sustainability education and applied research.

Today, the Center’s three signature programs support teaching and learning by managing a network of 15 interdisciplinary field sites and stations, providing faculty and students with unique, hands-on opportunities for experiential education and applied research that enrich classroom learning and contribute to real-world impacts in local communities and beyond.

The Center has six permanent staff members and a faculty director. During certain years we have additional members such as an AmeriCorps VISTA. A member in the VISTA program serves full-time for one year to build capacity in nonprofit organizations and public agencies to help them more effectively generate the commitment of private sector resources, encourage volunteer service at the local level, and empower individuals and communities. In addition, we typically have several courtesy appointments with experts that work directly with faculty and students through the Center. Key personnel of the Center this past year include:

Office Staff:

Matthew Higgins – Faculty Director 2022-2025

Dr. Matthew Higgins has taught in the Civil and Environmental Engineering Department at Bucknell University since 1995, and is currently serving as the Faculty Director for the BCSE. His scholarship has largely focused on production of renewable energy from the anaerobic digestion of organic wastes, and his teaching is focused on sustainability and environmental engineering. He conceived and helped develop the first sustainable engineering course at Bucknell.

Janeen Putman – Operations Director

Janeen brings over 20 years of higher education experience. With degrees in civil engineering as well as a Master’s in training and development this combination and her advising experience bring a fresh new perspective to the center. Janeen has also served as president of a Staff Senate with almost 5500 staff members during her career. It is the combination of her experience and service that give leadership to the center’s daily operations.

Krista Smith – Office Assistant

Krista is a passionate environmental advocate with a diverse work background. She is detail oriented, motivated, and makes a positive impact at The Bucknell Center for Sustainability & the Environment by assisting the center in all facets of the day to day functions.

Program Staff:

Sean Reese - Program Scientist, Watershed Sciences and Engineering

Sean has a diverse background in aquatic ecology, with a passion for studying Mid-Atlantic fisheries and freshwater invertebrates. In his role as Project Scientist, Sean oversees the maintenance and calibration of the Watershed Science and Engineering Program's water quality sonde network and collaborates with faculty and staff on a number of research projects. Sean is a certified professional diver with several years' experience conducting aquatic ecology studies on large rivers, including the Mississippi, Ohio, Monongahela, and Susquehanna. Since joining the Watershed Sciences and Engineering Program in 2010, Sean has completed a number of mussel, snail, and crayfish surveys in the central Susquehanna River region.

Benjamin Hayes - Program Director, Watershed Sciences and Engineering

As Director of the Watershed Sciences and Engineering (WSE) Program, Ben has given leadership to shepherding the vision, mission, and vitality of the program. He has a diverse teaching background in geomorphology and hydrogeology and research strengths in fluvial processes, aquatic habitat restoration, and erosion and sediment transport. He's been at Bucknell since 1996.

Shaunna Barnhart - Program Director, Place Studies Program

As Director of the Place Studies Program and a geographer by training, Dr. Shaunna Barnhart's work explores the intersection of human-environment interactions with a focus on sustainability dilemmas, environmental governance, and perceptions of nature, particularly in regard to energy and waste.

Olyssa Starry - Program Director, Sustainable Technology & the Built Environment Program

Dr. Olyssa Starry is the Director of the Sustainable Technology & the Built Environment Program and is a systems scientist whose research explores the dynamic interactions between built infrastructure and the ecological processes that shape our daily lives. Her primary work focuses on using green roofs as model systems to inform sustainable management practices in human-dominated landscapes. She holds a Ph.D. in Plant Science and Landscape Architecture from the University of Maryland and an M.S. in Biology, with a concentration in Stream Ecology, from Virginia Polytechnic Institute and State University.

Pictured below, from left to right: Sean Reese speaks to Foundation Seminar students at the River Discovery event, held at the Bucknell River Landing; Ben Hayes views a student research poster at the 2024 River Symposium; Olyssa Starry and Shaunna Barnhart participate in the River Discovery event



The three signature programs of the BCSE are described below.

Watershed Sciences & Engineering Program

Bucknell makes the most of our proximity to the majestic Susquehanna River through the Watershed Sciences & Engineering Program. By taking the classroom outdoors, Bucknell connects people to the river and builds upon our existing strengths in science and engineering. Faculty, staff and students partner with local, state and federal organizations on watershed research, stewardship and conservation projects.

Place Studies Program

Working in collaboration with faculty, students and staff from across disciplines the Place Studies Program develops teaching, research and outreach projects that facilitate explorations of human-environment relationships. These opportunities allow faculty and students to actively engage with the social, political, historical and cultural dimensions of nature-society relationships and sustainability, related to how we imagine, understand and engage with “place.”

Sustainable Technology & the Built Environment Program

Bucknell's Sustainable Technology & the Built Environment Program works to build on the University's advances in sustainable technology through research, teaching and class projects. Using the campus as a living-learning laboratory, the program brings a collaborative, hands-on approach to a variety of topics, including green roofs, climate change, renewable energy and eco-landscaping.

II. Introduction

The Bucknell Center for Sustainability & the Environment (BCSE) is pleased to present its annual report for the academic year 2024-2025. This report highlights the center's achievements, ongoing initiatives, and collaborations in promoting sustainability and environmental goals, our part in the Bucknell plan 2025, and high impact learning through teaching and research with faculty and students across Bucknell University all in service to our mission to:

Facilitate high impact, interdisciplinary, experiential learning and research opportunities that address local and global environmental and sustainability challenges. We enhance the academic experience through accessible, equitable, and inclusive teaching, fundamental and applied research, community outreach, and University Service.

The Center hosted approximately 30 students for a 2 hour River Discovery event at the Bucknell landing along the West Branch of the Susquehanna River for the foundation seminar series and provided hands-on modules that included river sampling for water quality, mussel identification and importance, and also the history of the waterway for students to actively engage with and in the river. The students got their feet wet and downright into this class. The students also had the opportunity to learn more about the BCSE and our activities and ways to get involved in undergraduate research and campus sustainability activities.

Students who attended the River Discovery event pose for a photo.



Over the last academic year, the BCSE:

- engaged about 800 students from over 30 classes in all three colleges through field trips, guest lectures, classes, symposia and research activities;
- directly supervised or supported 14 undergraduate research students as well as 45 faculty members and produced scholarly works including 8 written works and 24 conference presentations with most of these presentations being done student collaborators. Our work was featured in over 20 media stories;
- hosted the first annual Riverfest event to connect with approx. 45 faculty, staff and students and celebrate Bucknell's proximity to the Susquehanna River and highlight the opportunities the river provides for recreation, teaching and scholarship;
- hired and engaged 6 BCSE Student Ambassadors;
- organized and hosted the 19th annual River Symposium in the fall semester with about 200 participants;
- organized and hosted the 12th annual Sustainability Symposium in the spring semester with over 150 participants;
- hosted several Earth Day events including a Miller Run and Limestone Run Stream Cleanup, social media posts and tabling in ELC;
- provided service to the university through numerous campus committees and professional agencies at the local, state, and federal levels.

3
COLLEGES

33
CLASSES

45
FACULTY

800
STUDENTS

III. Discussion of Accomplishments

The following sections describe the BCSE key accomplishments in more detail.

1. Student and Faculty and Engagement and Support

The BCSE staff interacted with over 30 classes and about 800 students. The class interactions included organizing and leading field trips, attending classes for guest lectures, and teaching classes. These interactions supported courses in all three Colleges (Engineering, Management, and Arts & Sciences). All of these interactions supported students and faculty, creating high impact learning experiences. Several of these interactions are discussed in more detail in the following sections.

A. Classroom and Field-Based Instruction:

The Center supported a wide range of student-centered teaching and experiential learning opportunities across academic levels and disciplines. In collaboration with the "Discovery" Residential College, Center staff mentored four first-year students on a semester-long research project investigating land use impacts on water quality in the Susquehanna River. Students conducted field sampling, performed lab analysis using ICP instrumentation, and presented their findings through a video project.

Additional classroom engagement included guest lectures and instructional support in ENGR 100 (Introduction to Engineering), BIOL 302L (Microbiology Lab), and RESC 221 (Zero Waste Dinner). The Center also led immersive field-based learning experiences, including a three-hour snorkeling lab in the Susquehanna River for Amphibian Biology and Conservation (ANBE/BIOL 314/614), a guest lecture and field trip for the BIOL First-Year Seminar (BIOL 201), and a three-hour kayak-based field lab for Animal Behavior (ANBE 320).

The Center supported the Civil and Environmental Engineering Senior Design students working on recovering resources from abandoned mine drainage in the Shamokin area. BCSE staff provided social and cultural context to the students working on the project as well as connected the students to local community groups working on these issues such as the Shamokin Creek Restoration Association. In addition, BCSE staff helped students learn how to use sampling equipment and measure flow in the waterways impacted by abandoned mine drainage. These experiential learning opportunities coupled with community engaged learning created a lasting impact on the students.

Maintaining and developing field sites as living learning laboratories is a central component of achieving our mission. Over 15 of the classes that we worked with utilized our field sites as part of their curriculum highlighting the importance of these sites to the Bucknell curriculum.

Over the past year we have developed two new field sites on the Bucknell Campus. The three paired sites (six location total) associated with the "Leaf them Be" project in which we are 'leaving the leaves' under certain trees and comparing the impacts to paired trees in which the leaves are removed. At least 15 faculty members have expressed interest in the project either through integrating the sites in their classes or associated with their scholarship. The other field sites are the green roofs on campus which, in collaboration with several faculty members are being regenerated and outfitted with monitoring equipment for teaching and scholarly endeavors.

Pictured on the left: One of the trees featured in the "Leaf them Be" project.

Pictured on the right: A green roof on one of Bucknell's academic buildings.



B. Courses Developed and Taught by Center Staff:

- a. Fall 2024 –UNIV 200 Local Climate Action – Shaunna Barnhart
- b. Spring 2025 –UNIV 200 Local Climate Action – Shaunna Barnhart and Olyssa Starry (35 students total)

This course explores how local governments, non-profits, and community organizations in the United States are responding to, preparing for, and trying to mitigate climate change and disasters. Students will learn about the often unnoticed, but impactful, work happening at the local level and the ways in which collaborations are leveraged for sustainable change. By completing the course, students will have a sound understanding of how local government operates, how collaborations are essential for planning, and practical ways communities pursue environment and climate positive development. We apply principles of human geography, urban ecology, disaster risk reduction, and societal resilience to understand how communities succeed or fail with environment and climate positive development.

- c. Spring 2025 – ENST 212/UNIV 215 Stream Ecology and Restoration and the Science of Fly Fishing – Ben Hayes and Sean Reese (9 students)

This course provided a hands-on introduction to the interactions between water quality, hydrology, and aquatic ecosystems and their impact on stream ecosystem health. Stream restoration concepts were studied including impacts of climate change, invasive species and land use through laboratory/field-based high impact experiences. Fly fishing is used as the common thread that ties these topics together.

2. Scholarship

Undergraduate research is recognized as a High Impact Practice that provides ‘significant educational benefits for students who participate in them’ according to the American Association of Colleges and Universities. The BCSE is an enthusiastic supporter of undergraduate research directly as well as through supporting faculty scholarship at Bucknell – this is a core part of our mission. The Center continued to play a critical role in advancing interdisciplinary research, faculty collaboration, and student mentorship through its active engagement in applied, field-based inquiry and academic partnerships as well as providing an opportunity for students to present their work at one of our symposia (see following sections). A few of these collaborations and projects are highlighted below.

During the past academic year, we supported a number of undergraduate researcher projects. The BCSE staff mentored 10 undergraduate research students directly, and funded or partially supported nine student research projects for students working with other faculty members. In addition, BCSE staff worked directly with 30 faculty members to support their research.

Pictured is Tessa Foley, recipient of the BCSE's H.W. Wieder Prize for undergraduate environmental research on the Susquehanna River. Tessa built a network of 9 river monitoring buoys and deployed them on the river at several locations, collected and analyzed reams of hydroclimatic data to deconvolute boundary layer thermodynamics and tributary and hyporheic cooling effects on water temperatures in the West Branch Susquehanna River between Milton and Chillasquaque.



The Center actively contributed to a wide array of interdisciplinary faculty research initiatives. In collaboration with Professor Vanessa Massaro (Geography) and Professor Olyssa Starry (Sustainable Technology & the Built Environment), Center staff advised and contributed to research assessing the ecological impacts of large-scale solar energy infrastructure. These efforts reflect the growing emphasis on sustainable energy systems and land use planning.

Humanities-based public scholarship was also supported through contributions to Coal Region Rising, a podcast initiative led by Professor John Westbrook (French). Further engagement in environmental justice and regional storytelling was demonstrated through the Center's collaboration on the Fire History Museum Project with Susan Falciani Maldonado (Special Collections), Kate Tuley (Digital & Public Scholarship), and Professor Emeritus Carl Milofsky (Sociology). These initiatives blend historical preservation, public education, and community-based research.

The Center also provided ongoing research support to faculty in Biology and Animal Behavior (BIO/ANBE), particularly Professor Capaldi. This included assistance with the maintenance and oversight of experimental freshwater mussel tanks, as well as care and monitoring of Bucknell's on-campus bee colonies. Research support extended to juvenile bee identification and capture for behavioral studies, enabling students to contribute to active biological research initiatives.

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"The community network that has been cultivated through the BCSE's Coal Region Field Station allowed me to introduce truly unique, uncommonly credible, and highly impactful approaches into my air quality research program. BCSE provides a consistent level of attention to developing intellectual, interpersonal, and physical resources that serve as a springboard for advancing environmental research and education at Bucknell and throughout Central Pennsylvania."

Doug Collins, Assistant Professor, Chemistry

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In the area of environmental health and air quality, the Center served as co-principal investigator and collaborator on grant proposals with Professors Doug Collins and Dabrina Dutcher (Chemistry and Chemical Engineering). These proposals aim to establish air quality monitoring frameworks across the coal region and engage local communities in environmental data interpretation. The BCSE is excited to announce that this \$250,000 proposal was accepted for funding by the EPA and is scheduled to begin in the upcoming academic year.

Collectively, these projects illustrate the Center's commitment to advancing collaborative, interdisciplinary research that spans the natural and social sciences, engineering, and the humanities. Through sustained faculty partnerships and student involvement, the Center continues to serve as a vital hub for experiential environmental/social research and innovation at Bucknell University.

The BCSE staff and student researchers authored 14 papers/reports and had 24 presentations at regional, state, and international conferences over the past academic year, most of these were presented by student collaborators. We were featured in over 20 media stories over the past academic year. In addition, several external grants were successfully attained to support activities within the Place Studies program in addition to funding for an AmeriCorps VISTA to work with the Place Studies program to enhance community outreach.

3. Ambassador Program Continuation

The BCSE Ambassador Program was developed in the 2022-2023 academic year with the goal to provide a leadership opportunity for students and to connect the BCSE to the Bucknell student body through sustainable projects and initiatives, develop leadership skills through organizing events, attend a weekly meeting, create content and post on social media, and work on Center focused projects. Through this program, the BCSE strives to create a passionate student-led team that can have an impact on the university, campus community, and the BCSE. This cohort of ambassadors included several returning members as well as several new ambassadors with a goal that returning ambassadors lead the new ambassadors and take more ownership in events for their fellow students. The team helped with numerous activities including the River and Sustainability Symposia, and created content to improve our social media presence, and help to connect with 85 students through other communication channels and class visits. A new event organized, advertised, and run solely by the ambassador team was an internship panel for students interested in working for environmental companies in the summer. The event was a huge success with just under 50 students, faculty, and staff attending. The panel comprised seven students from across the university discussing how and where they got their internships and their experience. The Center for Career Advancement was a partner as well. The team led other successful events throughout the academic year culminating with a few events for Earth Day.

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“From presenting at symposiums to digging into Union County’s solar technology views, the BCSE gave me opportunities I wouldn’t have thought to pursue on my own. The BCSE was one of the most useful and enriching parts of my Bucknell experience and I am deeply grateful for my experience. Without it, my time in undergrad would have looked very different.”

Michael Hardyway, Class of 2024

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“Working for the BCSE allowed me to connect with like-minded individuals focused on helping our local environment. We had creative freedom to plan different events, such as internship advice panels and stream clean ups, that involved our community. Our big goal was to demonstrate to students and faculty how important our environment is and simple ways that we can make a difference!”

Skye Sunderhauf, Class of '25

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4. Riverfest

The Center held the first Riverfest in the fall of 2024, a dynamic and educational event designed to introduce new students and faculty to the Center’s mission and activities, while also reintroducing our work to the broader Bucknell community. The event was a fun “festival” type event held at the Bucknell Boat Launch with each program highlighting ways students and faculty can benefit from all that the BCSE has to offer and how we can support, connect. Riverfest attracted about 45 faculty, staff and students from across Bucknell and about 10 people from the community.

Photos from the keynote the 19th River Symposium



5. 19th Annual River Symposium

The Center led the coordination of a successful major regional symposium that brought together 194 participants from 19 universities and multiple federal, state, and local agencies. The event featured keynote speakers, including from the native American community, breakout sessions, exhibits, and a broad range of student and faculty research presentations, fostering interdisciplinary collaboration across the mid-Atlantic and providing a forum for students and faculty to present their work and engage with the community.

The symposium expanded this year to include a field trip to reclaimed mine lands, further connecting academic inquiry with real-world environmental challenges.

Additionally, a collaborative digital Story Map was developed as part of a multi-institutional, EPA-funded project focused on restoring headwater stream ecosystems. This effort has engaged five faculty and staff members and 11 students at Bucknell since 2020, underscoring the Center's leadership in applied research, education, and partnership-driven environmental restoration.

Photo from the 12th Sustainability Symposium



6. 12th Annual Sustainability Symposium

The 12th annual Sustainability Symposium, Change Makers and Community Builders, was held. The program began with a keynote address by Betsy Kramer from SEDA-COG, followed by panel discussion with 5 local activists, artists, and community leaders. We introduced campus tours into the format this year, one with a tour of a lab (8 attended) and two tours of campus (30 people attended). The day ended with a Sustainability Expo. Overall, more than 150 people attended the event, mostly student.



Bottom row: Photos from the Stream Clean-Up held in conjunction with Earth Day activities

Top row: Photos from Riverfest



7. Earth Day Activities

The entire BCSE team, alongside the ambassadors worked to not just support others in their Earth Day events, but also helped organize several BCSE events during the month of April. The main event held during Earth Day week was a stream clean-up effort during which approx. 20 people helped remove everything from plastic bags, to a rusted sign, pieces of clothing, water bottles, and even a blanket from two local streams! The effort removed 95 lbs of trash from the sections of Miller Run on campus that crosses from downtown Lewisburg across Saint George Street and onto campus and a small section of Limestone Run that flows through Hufnagle Park in Lewisburg. Additionally, the ambassadors posted on social media, created video interviews of students to share, had a table to bring awareness to the center and our mission.

8. Service to the University

The BCSE staff participated in numerous service activities at Bucknell as well as for the local communities, and local, state, and interstate/federal agencies. The service to Bucknell University included serving on/as:

- a board member in the Bucknell Farm Advisory Board and its Master Plan Visioning Committee
- the co-advisor for Renewable Energy Scholars – a student-led organization
- the advisor for Epsilon Eta – a student-led organization
- co-chair the Sustainable Agriculture Alliance group
- member of the Engaged Bucknell Coordinating Council
- search committee for a Public Scholarship Coordinator for DPS
- member of the Financial Managers Group
- Udall scholarship selection committee

IV. Acknowledgements

The BCSE extends its gratitude to the faculty, staff, students, and community partners who have contributed to the success of the center's initiatives. Their dedication and support have been instrumental in advancing sustainability and environmental stewardship at Bucknell University. We invite you to explore the BCSE's social media pages and website for more information on our programs, research, and upcoming events. Together, we can make a positive impact in our environment and create a sustainable future.