

12TH ANNUAL SUSTAINABILITY SYMPOSIUM

Change Makers AND
COMMUNITY BUILDERS

APRIL
3
2025

Bucknell Center for Sustainability & the Environment

PROGRAM WITH ABSTRACTS

April 3, 2025

Center for Sustainability & the Environment
Bucknell University

<http://sustainabilitysymposium.scholar.bucknell.edu/>

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The Sustainability Symposium celebrates sustainability and environmental related research, teaching, creative works, practice, and action where faculty, staff, students, and community stakeholders from regional institutions share their completed and ongoing works, network for ongoing or new initiatives, and are inspired by shared keynote activities. This annual meeting showcases work from the natural sciences, physical sciences, social sciences, engineering, management, and humanities exploring emerging themes such as climate change, energy, human rights, food, and resilience.

The Center for Sustainability & the Environment

The Bucknell Center for Sustainability & the Environment creates impactful, interdisciplinary, experiential opportunities for learning and research that address global and environmental challenges. By enabling collaborative scholarship from across the University, we empower students and faculty to explore, learn about, engage with and transform their world.

The Center for Sustainability & the Environment was created as the Bucknell Environmental Center in 2005 with support from about 50 faculty and staff from across the University and from students, who helped to define areas of interest. From the beginning, the center sought to create a University-wide platform capable of supporting collaborative, interdisciplinary scholarship, teaching and outreach, situating Bucknell as a national leader in applied research and teaching on 21st-century environmental and sustainability issues.

Today, the Center's three signature programs manage a network of 18 interdisciplinary field stations and sites in Pennsylvania giving students, faculty, and community partners experiential, applied research and learning opportunities that impact our local communities and beyond.

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.

Sustainable Technology and the Built Environment Program

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

Place Studies Program

The Place Studies program explores how we imagine, sustain, understand, and engage with place historically, in the present, and in potential futures, and brings this to life through experiential and transformative education and scholarship. It is, at its core, about creating transformative approaches to understanding human-environment relationships, broadly defined, and over time. This includes areas such as sustainable communities, community revitalization, environmental histories, policy, environmental justice, energy transition, placemaking and place meaning, creative works with sustainability and/or environmental foci, and more.

Letter from Symposium Chair

Welcome to the 12th Annual Sustainability Symposium!

In 2013, the Center for Sustainability and Environment held its first sustainability symposium, *Envisioning a Sustainable University*. That event furthered discussions and actions that continued to push Bucknell's progress towards being a more sustainable institution. In the years since, the sustainability symposia have centered on topics including Reimagining Prosperity (2014); Imagination, Design, and Creativity (2015); Global Sustainabilities (2016); Generations of Power (2017); Climate Changes: All Hands on Deck (2018); Envisioning the Future: Energy, Climate, and Human Rights (2019); Adapting in Uncertain Times (2021); Is it Really too late?: Hope, Agency, and Change (2022); Moving from hope to action: Building thriving communities (2023), and Perspectives on Sustainability (2024). Each symposium has engaged attendees in discussions furthering our understanding of human-environment interactions; showcasing projects, creative works, and research from across disciplines; and engaging practitioners and researchers in collaborative endeavors for thriving communities.

This year's Symposium, *Change Makers and Community Builders*, invites us to consider how connection, collaboration, and persistence through hope can lead to positive change. This year we highlight change makers and community builders working in our local lower anthracite coal region as we celebrate 10 years of the Coal Region Field Station. The Coal Region Field Station, managed by the Center for Sustainability & the Environment is a Bucknell and Community collaboration that has seen over 700 students involved in more than 100 projects with over 25 local partners who have leveraged the resulting work for over \$3.5 million in funding for community priorities. Join us as we learn from local leaders about their journeys and consider the lessons that can apply to our own found and rooted communities as we invite all to consider the role each of us can play in change making and community building.

We begin with a keynote address by Betsy Kramer, SEDA-COG Program Manager for Community Revitalization on "Bridging the Past and Future: Sustainability's Role in Revitalizing Coal Communities." From here we move to a panel discussion highlighting Change Makers and Community Builders, learning from community leaders who are actively involved in revitalization through the arts, environmental advocacy, and addressing social and economic needs. This year, we introduce campus tour options, one an opportunity to learn more about Bucknell's sustainability features and the other an environmental lab to see science in action with abandoned mine discharge research. We wrap up the day with a Sustainability Expo featuring a range of creative works, research, and environmental activism.

This year, we welcome over 25 speakers/presenters representing more than 40 authors, activists, practitioners, and artists. We welcome you to learn from one another, inspire one another, and create new networks that nurture pathways for thriving in our communities and work.

Dr. Shaunna Barnhart
Chair, 11th Annual Sustainability Symposium

Schedule of Events

THURSDAY – APRIL 3

All events are held in MacDonald Commons

12:00 p.m. – 1:00 p.m. Keynote Address by Betsy Kramer, SEDA-COG Program Manager for Community Revitalization: ***“Bridging the Past and Future: Sustainability’s Role in Revitalizing Coal Communities.”*** Lunch Provided

1:00 p.m. – 2:20 p.m. ***“Change Makers and Community Builders: A Panel Discussion”***

Panelists:

Jake Betz - Mother Maria Kaupas Center and Mount Carmel Area Community Center

Betsy Kramer - SEDA-COG Program Manager for Community Revitalization

Heather Makal - Shamokin Creek Restoration Alliance

Matt McMullen - Environmental Resiliency VISTA, AmeriCorps

Mark Stansberry - Screen Arts Institute

Moderator:

Katherine Faull - Panel Moderator, Associate Provost for Local and Global Engagement

2:30 p.m. – 3:00 p.m. Change-Making on Bucknell Campus: A walking tour.

3:15 p.m. – 3:45 p.m. What’s in Abandoned Mine Drainage: A laboratory tour.

4:00 p.m. – 5:30 p.m. Sustainability Expo and Coal Region Field Station Celebration
Range of research, creative works, and tabling showcasing sustainability and environment related scholarship, action and more.

5:30 p.m. Closing Remarks

Keynote Address

Bridging the Past and Future: Sustainability's Role in Revitalizing Coal Communities

(April 3, 12:00-12:50pm – MacDonald Commons)



Betsy Kramer

*SEDA-COG Program Manager
for Community Revitalization*

In “Bridging the Past and Future: Sustainability’s Role in Revitalizing Coal Communities,” Kramer offers a reflection on how collaboration, sustainability, and community leadership are shaping the future of our region. Working as a revitalization coordinator for the City of Shamokin since 2019, she provides an inspirational perspective on how community revitalization can take root when collaboration is the foundation for action.

About Betsy Kramer:

Betsy Kramer is a leader in economic and environmental resiliency, driving transformative redevelopment across central Pennsylvania. Since its creation in 2019, SEDA-COG’s Community Revitalization program has secured nearly \$37 million in grant funding to support infrastructure improvements, flood resiliency, and sustainable redevelopment across the 11-county SEDA-COG region. Betsy’s work began in Shamokin, where she led the award-winning GoShamokin Plan, an ongoing initiative that has positioned the city as a regional model for revitalization. Through major grants such as EPA Brownfield funding and DOT Safe Streets for All (SS4A), she has spearheaded projects including environmental remediation, downtown revitalization, and green infrastructure improvements. Collaboration has been central to Betsy’s success, with key partnerships including Bucknell University’s Center for Sustainability & the Environment, the EPA, DEP, and the AmeriCorps VISTA program. These efforts have advanced initiatives from Shamokin’s Climate Action Plan, which Betsy helped develop and is now actively implementing.

With over eight years at SEDA-COG, Betsy has played a pivotal role in regional strategic planning and sustainable economic development. Before joining the agency, she spent 12 years as a small business owner, author, and speaker, recognized as a featured success story by Bucknell University’s Small Business Development Center (SBDC). Betsy is a Certified Economic Development professional (CEcD) and Entrepreneurship Development Professional (EDP) through the International Economic Development Council (IEDC) and holds a Business Contracts Certification from Cornell Law School, reinforcing her expertise in navigating complex partnerships that drive sustainable growth.

Panel Discussion

Change Makers and Community Builders: A Panel Discussion

(April 3, 1:00-2:20pm – MacDonald Commons)

A panel of community leaders who are actively involved in revitalization through the arts, environmental advocacy, and addressing social and economic needs discuss what it means to be change makers and community builders. As we learn from their experiences, we invite you to consider what change making and community building means for you and how you might fill this role in your own communities here at Bucknell and beyond.

Panelists:



JAKE BETZ - Mother Maria Kaupas Center and Mount Carmel Area Community Center



MATT McMULLEN - Environmental Resiliency VISTA, AmeriCorps



BETSY KRAMER - SEDA-COG Program Manager for Community Revitalization



MARK STANSBERRY - Screen Arts Institute



HEATHER MAKAL - Shamokin Creek Restoration Alliance



Moderator:
KATHERINE FAULL - Associate Provost for Local and Global Engagement



Campus Tours

Change-making on the Bucknell Campus.

Olyssa Starry, Center for Sustainability & the Environment, Bucknell University

2:30 p.m. – 3:00 p.m. Leaves from MacDonald Commons.

Tour participants will learn about different sustainable solutions that have been implemented on the Bucknell campus while stretching their legs on a 30 min walking tour. Enjoy this break outside and network with other attendees.

What's in Abandoned Mine Drainage (AMD)?

Eddie P. Zuber IV, '27, Civil Engineering, Bucknell University

3:15 p.m. – 3:45 p.m. Meet in front of Breakiron (between Academic East and Breakiron).

See the science in action! Visit an environmental engineering lab (Breakiron 366) to see and learn how metals are precipitated out of AMD from Shamokin Creek. You'll see a demonstration of metal precipitation from AMD and learn about the process.



Poster Presentations

Creating Renewable Natural Gas through Biomethanation

Jackson Becker, Undergraduate Student, Bucknell University; **Hannah Gallagher**, Undergraduate Student, Bucknell University; **Matthew Higgins**, Professor of Civil and Environmental Engineering, Bucknell University

Biogas produced from anaerobic digestion typically comprises about 60% methane and 40% carbon dioxide. To produce high-value renewable natural gas suitable for injection in the natural gas grid, most digester operators remove the carbon dioxide to achieve the required methane concentration greater than 95% for grid injection. Instead of removing carbon dioxide, our project is investigating converting the CO₂ to methane using microbes that will combine H₂ and CO₂ to form methane. The goal of our project is to develop a process that will efficiently and cost-effectively convert CO₂ into methane by injecting H₂ into the biogas stream and treating these combined gases in a reactor that creates a surface area for the contact of the gases with microbes that perform the conversion. We are attempting to determine the most effective way to construct a biogas-upgrading bioreactor. We have operated a prototype reactor for over eight months, with plans to construct and operate multiple other reactors at various scales. Head gas from this reactor was regularly sampled and its composition analyzed. We have fine-tuned the reactor conditions to determine the ideal conditions for methanogenic activity, and have attained normalized methane concentrations of >99%, compared to an initial biogas methane concentration of 60%. Future plans include the operation of a large heated bioreactor to assess the impact of temperature on production efficiency and the construction and operation of a set of four mini-reactors in order to directly compare operating conditions.

Perceptions of Hazards and Risks in the Borough of Kulpmont

Chloe Benner, Undergraduate Student, Bucknell University; **Haylee Erme**, Undergraduate Student, Bucknell University; **Shaunna Barnhart**, Center for Sustainability & the Environment, Bucknell University; **Olyssa Starry**, Center for Sustainability & the Environment, Bucknell University

The borough of Kulpmont has a current population of about 2,700 people. A survey on transportation, energy, waste/re-use, and hazards was conducted to inform borough planning efforts in these areas. A total of 85 residents completed the survey. Our survey was interested in discovering the critical impacts and damages on the community from hazards that could occur in Kulpmont. The survey specifically

asked their opinions on flooding, blizzards, hurricanes, drought, heatwaves, etc. The results indicate that survey respondents believe the two most common concerns for environmental hazards are droughts (56%) and blizzards (59%). We recommend, that in the future, more borough meetings should be held to specifically discuss the hazards and risks that are impacting Kulpmont, and how to create a safer environment.

Process Design for Lab Scale Testing of Novel Hydrokinetic Devices

Caiden Covell, Undergraduate Student, Bucknell University; **David Owen**, Undergraduate Student, Bucknell University; **M. Laura Beninati, PhD.**, Associate Professor of Mechanical Engineering, Bucknell University

When compared with solar, wind, and other hydrokinetic technologies, marine hydrokinetics (MHK) remains a relatively underutilized source of renewable energy, despite possessing huge potential for generating carbon-free power. As it stands, MHK devices experience high levelized cost of electricity (LCOE), due to excessive maintenance requirements, deployment costs, and development costs, which hinder the competitiveness of the technology against fossil fuels and other forms of renewable energy. The Fluid Mechanics lab at Bucknell University has been conducting low fidelity testing of a lab-scale model of a proposed MHK technology to address limitations. The proposed technology aims to augment low energy-density flows to use as a meaningful energy source in open-ocean applications. Summer work was focused on collecting streamwise velocity measurements of perforated plates using Laser Doppler Velocimetry, and collecting drag force measurements on the plates using a custom drag sled. The conclusion of summer work saw successful velocity measurements, along with a finalised drag sled design.

Foraging Friends Community Project

Jack Greene, Undergraduate Student, Bucknell University; **Michael Pero**, Undergraduate Student, Bucknell University; **Isabella JeBran**, Undergraduate Student, Bucknell University; **Michele Stansberry**, Foraging Friends; **Olyssa Starry**, Center for Sustainability & the Environment, Bucknell University; **Amanda Wooden**, Professor of Environmental Studies & Sciences, Bucknell University

This student community project that seeks to bring awareness about the health of the plants that people forage in Shamokin. Throughout the semester we have been working with Michele Stansberry who is an active member of The Foraging Friends in Shamokin, Pennsylvania. She has been guiding us to 6 different locations in Shamokin where we have been searching for all different plant species. They are sites that foragers in Shamokin commonly forage from. The goal for our project is to bring these plants back to the lab and test them for any harmful pollutants so we can know if the areas the Foraging Friends are foraging in are safe.

Solar Development in PA with a focus on Northumberland County

Hasiba Hasin Royesh, Undergraduate Student, Bucknell University; **Shaunna Barnhart**, Center for Sustainability & the Environment, Bucknell University, **Vanessa Massaro**, Associate Professor of Geography, Bucknell University.

This research examines the growth of solar energy projects in Northumberland County, Pennsylvania, a region historically tied to coal mining but now emerging as a key site for renewable energy development. Pennsylvania's increasing focus on solar energy aims to support farmers, small businesses, and rural communities in transitioning to solar power. This study focuses on key solar projects, particularly the Cottontail Solar Project, analyzing its development, funding sources, and local impact.

The research also explores the complex balance between agricultural land use, solar expansion, and policy regulations, as landowners navigate the economic benefits of solar leases alongside concerns about farmland preservation. By analyzing policy documents, media coverage, and stakeholder perspectives, this study provides insights into how farmers, residents, and local policymakers are shaping the future of solar energy in the county. Ultimately, this project highlights both the opportunities and challenges of integrating large-scale solar infrastructure in rural Pennsylvania and its implications for broader renewable energy transitions in similar regions.

Transportation Efforts in Kulpmont

Dawson Hastings, Undergraduate Student, Bucknell University; **Kayla Connors**, Undergraduate Student, Bucknell University; **Riley Shapiro**, Undergraduate Student, Bucknell University; **Shaunna Barnhart**, Center for Sustainability & the Environment, Bucknell University; **Olyssa Starr**, Center for Sustainability & the Environment, Bucknell University

Kulpmont is a borough in the lower anthracite region of Pennsylvania that shares a transportation system with Mount Carmel and Shamokin. The borough has a population of 2,700 and a size of 613 acres. The local government is attempting to create an action plan to address issues regarding waste, energy, and transportation in the area. Our group is focusing on improving the transportation section and is providing suggestions that may help the borough environmentally while enhancing quality of life for the residents. Using survey data, this research explores- How can the transportation and accessibility of the borough be improved in a way that would benefit and support the different dynamics of the residents of Kulpmont? Kulpmont as a community has a lack of accessible, efficient, and practical public transportation, with all but 2 people in the survey never using a form of public transportation. Between the Bus availability, the lack of bike lanes, poor conditioned sidewalks, and condition of route 61 (which runs directly through the town) Kulpmont could benefit from improvements regarding transportation. Recommendations include implementing more bus stops across the town, especially in underrepresented regions and blocks, better signage and safety for pedestrians, and a bike trail cutting north to south from the town.

Spatial Analysis of Changing Environmental Justice Area Designations in Pennsylvania

Zane Hensal, Undergraduate Student, Bucknell University; **Shaunna Barnhart**, Center for Sustainability & the Environment, Bucknell University

Pennsylvania has over 45,000 square miles of dense forest, thriving cityscape, and charming towns across all 67 counties with local economies depending on a range of industries from natural resource extraction to manufacturing. However environmental impacts from these activities can have detrimental effects on local communities, opening the door for a need for protective policy measures. This research dives into the complexity of Environmental Justice (EJ) policies in Pennsylvania, specifically focusing on the impacts of the newly revised Environmental Justice Policy by the Pennsylvania Department of Environmental Protection (DEP) and the overall reception in both rural and urban communities. There are clearly defined revisions throughout the policy, such as new criteria in designating EJ areas, grant opportunities, and a mandated public comment section when permit applications revolve around trigger projects, such as mining permits, waste permits, and air permits. Analysis of the public comment sessions held throughout the Commonwealth in 2023 shows that many constituents have questions surrounding the Department's capability of enforcement, the decision-making process, and the potential repercussions these decisions can have on the community. While many Pennsylvanians possess concerns about the policy, many environmental scientists and advocacy groups feel as though this is a step in the right direction for ensuring Pennsylvania has access to a lively and clean environment, as granted by their constitutional right in Article I Section 27 of the Pennsylvania Constitution.

Energy Use in Kulpmont

Madeline Massa, Undergraduate Student, Bucknell University; **Abbey Vermillion**, Undergraduate Student, Bucknell University; **Shaunna Barnhart**, Center for Sustainability & the Environment, Bucknell University; **Olyssa Starry**, Center for Sustainability & the Environment, Bucknell University

Kulpmont Borough in Northumberland County, Pennsylvania is a small coal region community making efforts to improve energy efficiency and diversify energy sources. Partnering with Bucknell University, the borough conducted a survey to better understand how the Kulpmont community views different aspects of these efforts. This specific analysis looks at the responses regarding energy usage in Kulpmont to understand differences in opinion based on gender, education level, and political affiliation. Initial survey results show differences in opinion on climate change, energy efficiency, and availability of skilled workers. Further analyses should be conducted for a better understanding of the community.

AmeriCorps Environmental Resiliency VISTA: Utilizing VISTA's for Capacity Building in Environmental Matters

Matthew McMullen, Environmental Resiliency VISTA, AmeriCorps

The towns that form Pennsylvania's lower anthracite coal region have been on a steady decline in economic and social terms. As the site of former mining and industrial enterprises, these towns now face several challenges with regards to environmental concerns, such as legacy contamination and transitions to energy alternatives.

Shamokin, contrary to the hardships faced over a decade ago, is a City in transition. With the adoption of an Environmental Resiliency Plan in 2021, and the creation of a strong partnership with Bucknell University years prior, Shamokin is making strides to become more sustainable and resilient. One factor is a 3-year collaborative AmeriCorps VISTA position to build capacity in the City to follow through with these projects and fully implement them. With several connections, including the AmeriCorps program, Partners for Campus Community Engagement, and the University, the VISTA has the ability to leverage these networks and not only continue collaboration between these organizations and the City, but also work with the community towards ensuring a more sustainable future and improved quality of life. This presentation focuses on how the VISTA's connection can enhance community capacity to implement sustainable projects while also maintaining a connection to the University for continued collaboration. Projects, which have been centering around energy efficiency, recycling, shade tree placement, and accessible public transportation are all aimed to show Shamokin's continued commitment to community revitalization and environmental resiliency.

Does Utility-Scale Solar Energy Lead to Sacrifice Zones?

Amanda Mitchell, Undergraduate Student, Bucknell University; **Shaunna Barnhart**, Center for Sustainability & the Environment, Bucknell University

Thousands of acres of farmland and coal mine land in Pennsylvania are being turned into utility-scale solar farms. Long term ecological effects of solar developments and the potential for land restoration is still not fully understood. Despite this, it is apparent that there are ecological impacts experienced by local communities and wildlife. Large-scale solar installation leads to habitat loss, migration disruptions, and wildlife fatalities from both fencing and solar panels. More specifically, a variety of species have exhibited a multitude of abnormalities in behavior at solar sites, including habitat avoidance, flight alteration, and reduced foraging. In the broader context of political ecology, the effects of large-scale solar can be considered as "sacrifice zones," where social and ecological costs may take toll in one area for a greater environmental benefit in another. This research analyzes how solar farms wield ecological impacts and affect bat populations with a focus on Northumberland County, PA, where a utility-scale solar project is currently being developed.

Assessing protocols for eradication of *Lysimachia vulgaris* (garden loosestrife) in the Susquehanna River valley

PJ Newhart, Undergraduate Student, Bucknell University; **Chris Martine**, Professor of Biology, Bucknell University

The newly problematic species *Lysimachia vulgaris* (Garden Loosestrife, Primulaceae) is plaguing the waterways of central Pennsylvania and is threatening important river brush environments, which form habitats for fish spawning. In order to protect these fragile conditions, it is imperative to understand how to best control and mitigate invasive *L. vulgaris* populations. To achieve this, I have devised a set of conditions to test plots of *L. vulgaris* on an island in the West Branch of the Susquehanna River near Bucknell University, starting in Oct. 2024, where I would use various types of mechanical removal and the introduction of physical barriers. 2 replicates were completed in 2 separate plots of the island. To determine what mechanical removal technique may be best, tested tilling, mowing, pulling, and soil transplantation. I also tested barriers using geotextile fabric, landscape edging, and a modified flowerpot. I will be able to collect data come spring when I can observe how well the plants overwinter. With the information gathered from this project, I hope to be able to find an ideal method to control the spread of *L. vulgaris* to protect vital river environments, as well as gain important knowledge of the plant in general to determine which areas are at risk for its spreading. At this current time, the environment has been examined and associated data has been collected, and the plots have been set up to observe.

Assessing Seasonal Variation of Anthracite Coal Mining-Induced Water Quality: A Case Study of Shamokin Creek in Pennsylvania

Christian West-McCauley, Undergraduate Student, Bucknell University; **Joseph Oduro Appiah**, Assistant Professor of Geography, Bucknell University

As groundwater interacts with rocks and minerals exposed by coal mining, it gradually generates abandoned mine drainage (AMD) and increases iron oxide concentrations. This process renders water unsuitable for domestic use, eliminates aquatic life, and contributes to broader environmental degradation. Creeks and other water resources surrounded by several areas of land used for coal mining are, thus, impacted by the effects of AMD. Previous studies on coal mining and AMD have focused on understanding their ecological impacts, economic implications, and effects on water quality. However, the current study assessed seasonal changes in iron oxides, total suspended solids (TSS), total dissolved solids (TDS), and turbidity using Shamokin Creek in Pennsylvania as a case study watershed. This study hypothesized that there are no significant differences in iron oxide, TSS, TDS, and turbidity values in the early spring and late summer seasons. Geospatial, laboratory, and statistical analyses were utilized to analyze data collected from Shamokin Creek remote sensing and water sampling. Our analyses revealed a significant decrease in turbidity from spring to summer seasons. However, we recorded a significant increase in TDS, TSS and iron oxides. The results of this study can be used to better understand the changes in concentrations of iron oxides and turbidity levels through seasons, further aiding water treatment efforts.

Coal Region Rising: Students Interview Change-Makers

John Westbrook, Associate Professor of French and Francophone Studies, Bucknell University; **Will Brant**, Undergraduate Student, Bucknell University; **Shaunna Barnhart**, Center for Sustainability & the Environment, Bucknell University

Coal Region Rising is a podcast series featuring interviews with community change makers in Mount Carmel and Shamokin. These interviews were conducted by Bucknell University students as part of their first-year seminar taught by John Westbrook from the French and Francophone Studies program. The seminar examined current social issues from a cross-cultural perspective, focusing on the anthracite coal region in central Pennsylvania and the coal regions of northern France. These regions share similar histories: immigration and growth in the 19th and early 20th centuries, followed by industrial decline and social challenges beginning in the post-war era.

Building upon previous work by Professor Katherine Faull's students on Mining Memories and Professor Pascal Raggi's students at the Université de Nancy on mining memories in Northern France, our project explored how community members are working to revitalize their regions. This initiative aimed to give students an opportunity to engage beyond the campus while connecting their academic work with people actively improving their communities.

The interviews were originally recorded in 2021 using Bandcamp. Bucknell Center for Sustainability and the Environment, Place Studies Intern Will Brant cleaned up the recordings and remixed them in Audacity, adding brief introductions to each one recorded by John Westbrook. The podcast episodes are now available on the Coal Region Field Station website. We invite suggestions for new interviews to add to the series.

Recovering Fe and Trace Metals from AMD for Supplementing AD of Food Waste

Eddie P. Zuber IV, Undergraduate Student, Bucknell University; **Matthew Higgins**, Professor of Civil and Environmental Engineering, Bucknell University

The objective of this research was to precipitate and recover Fe and Al and trace metals (Co, Ni, Zn) from abandoned mine drainage (AMD) through pH adjustment. AMD samples were collected from 'Site 15' near Ranshaw, PA, with pH values in the range of 3-5. Jar tests were used to evaluate metal removals at defined pH endpoints of approximately 5, 6, 7, 8, 9, and 10. NaOH was used to raise the pH in all experiments. The jar testing procedure included 10 minutes of rapid aeration, 30 minutes of mixing and flocculation, and 30 minutes of settling time. Metal concentrations were measured by ICP-MS. The results showed that the minimum pH value for greater than 90% removal of the metals was 7 for Fe, 6 for Al, 9 for Ni, 9 for Co, and 7 for Zn. A second set of experiments was conducted in which all the metals were precipitated simultaneously using a target pH of 9.0. The goal of this testing was to create a metal solution that could be used to supplement anaerobic digestion of food waste which typically requires addition of trace metals such as Co and Ni.

The final AMD precipitate supplemented anaerobic digestion (AD) of food waste, where methanogens require trace amounts of Fe and other metals to survive. AD reactors supplemented with AMD precipitate produced greater methane content than a control with no trace metal addition, but did not perform as well as a vendor supplied solution of trace metals designed for anaerobic digestion. Using AMD precipitate for AD of food waste potentially gives economic incentive to treating AMD, benefiting humans and the environment, but additional research is needed to fully develop this concept.



Organizations

Sustainable Move-Out - DIG Furniture Bank & Union-Snyder Community Action Agency

Gabby Herman, DIG Furniture Bank

DIG Furniture Bank and Union-Snyder CAA collaborate with campus offices such as Facilities, Res Ed, and the Center for Engaged Learning, Leadership, and Research to host a sustainable move-out initiative each year. We collect gently used furniture and household goods and un-opened non-perishable food to be redistributed to families in need in our community. This initiative significantly decrease's students' waste at the time of move-out while also providing essentials to families in need. We would like to table at this expo to help spread the word around campus about the initiative, so that more students are able to participate when it comes time to move out at the end of the semester.

PennEnviroScreen- a tool for practitioners in an era of uncertainty

Jordi Comas, Pennsylvania Department of Environmental Protection, Office of Environmental Justice; **Hoy, Harry**, Governor's Science-Technology Fellow, Commonwealth of Pennsylvania

We will be demonstrating how PennEnviroScreen works as a GIS tool for risk assessment. We will also review its core methodology as well as answer questions about future updates. As EPA has taken down its CJEST and EJ screener, both GIS tools, PennEnviroScreen is built to be a state tool to weather times of uncertainty.

Sustainability Expo

A special thanks to the set-up crew for the Sustainability Expo!

BCSE Ambassadors

A special thank you to the cohort of BCSE Ambassadors for providing support to the Sustainability Symposium:

Shaheryar Asghar '28

Undeclared major

Dipesh Bhattarai '27

Mathematical Economics major

Fehr Gillett '25

Environmental Studies major

Kristie Semanchik '25

Biology and Environmental Science major

Jodi Siegel '25

Environmental Studies major

Skye Sunderhauf '25

Animal Behavior and Environmental Studies major

Conference Committee

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