IGC IGEP Graduate Research Symposium

April 18, 2025

The Moss Arts Center

- AGENDA -

8:00 – 8:55	• Welcome Table with name tags (Entrance to Main Lobby) • Coffee & granola bars - 1st Floor Fife Lobby • Poster setup - 2nd & 3rd Floor Fife Lobbies
8:55-9:00	**Welcome,** by Dr. Bill Hopkins - The Cube
9:00-10:10	**IGC Platform Presentations Session 1** - The Cube Moderator: Bailey Howell **9:00-9:15** - Changes in reservoir dissolved organic matter composition between lotic and lentic sites across a longitudinal gradient, **Dexter Howard**, BIOL **9:15-9:30** - Navigating Participation and Identity: Understanding Motivations and Barriers for Participation in Private Lands Conservation Programs, **Reyhane Rastgoo**, FWC **9:30-9:45** - Soil biota sensitivity to hydroclimate variability in a polar desert ecosystem, **Meredith Snyder**, BIOL **9:45-10:00** - Rethinking the relationship between home range and body size: evaluating the ontogenetic variation in space use in large mobile marine predators, **Brendan Shea**, FWC **10:00-10:10** - CAPSTONE PRESENTATION: Highlighting Local Voices in Global Change, **Seyi Dasho, Abir Jain, Carla López Lloreda, Casey McLaughlin, Becky Riddle**
10:10-11:30	• **Poster Viewing: Morning Session** – 3rd Floor Fife Lobby • Coffee- 1st Floor Fife Lobby - Threatened Orchid Isotria Medeoloides Response to Prescribed Fire Restoration, **Pika**, SPES - Assessing circularity in flexible PU foam value chain using Material Flow Analysis, **Mona Abadian**, SBIO - Sinking Cities: Unmasking the Hidden Threat of Land Subsidence and Sea Level Rise in Africa's Coastal Hubs, **Seyi Dasho**, GEOS - A nationwide systematic analysis indicates increased risks of antibiotic resistance for socially vulnerable populations exposed to soils under climate change, **Ying-Xian Goh**, CEE - A Team Science Approach to Research with Community Partners, **Amanda Hensley**, TBMH - Drought, drawdown, and cyanobacteria: a review to inform reservoir management in the southwestern USA, **Katie Hoffman**, BIOL

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	- Do plumbing components leach PFAS compounds into drinking water?, **Kathleen Hohweiler**, CEE - The Quadripartite Framework in Bat Research: Enhancing Pathogen Risk Reduction and Data Quality, **Sharif Islam**, FWC - Mosquitoes Eat Nectar? - Analysis of Mosquito Sugar Feeding on Goldenrod Flowers, **James Moloney**, BCHEM - Rethinking breeding phenology in a dryland amphibian: acoustic monitoring reveals spatiotemporal patchwork of breeding chorus activity, **Grace O'Malley**, BIOL - Estimating causes of nest failure in the southern breeding population of Saltmarsh Sparrows, **Bridget Re**, FWC - Are Functional Metrics More Sensitive Than Structural Ones To Ecological Change Across Land Uses, Management Practices and Regions?, **Sergio Sabat-Bonilla**, ENT

11:30-12:45	**Lunch Break** - 1st Floor Fife Lobby **Students that presented in the AM session must remove their posters from the 3rd floor at this time.*

12:45-2:00	**IGC Platform Presentations Session 2** - The Cube Moderator: Sam Silknetter **12:45-1:00** - Working and Restored Grasslands Incompletely Conserve Native Plant Biodiversity in Northern Virginia, **Jordan Coscia**, SPES **1:00-1:15** - Neural correlates of increased aggression in an urban songbird: A focus on arginine vasotocin, **Taylor Fossett**, BIOL **1:15-1:30** - Did the Record-Breaking Rains and Snow of Water Year 2023 Recharge Deep Aquifers of California's Central Valley?, **Nitheshnirmal Sadhasivam**, GEOS **1:30-1:45** - Identifying Drivers of Demand for Wild Turtles in the United States: Characterizing Consumers, **Zoie McMillian**, FWC **1:45-2:00** - Seasonal and short-term changes in carbon cycling in hydrologically dynamic wetlands, **Carla López Lloreda**, BIOL

2:00-2:15	**Intermission** - Coffee available outside of the Cube

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2:15-3:30	**Keynote Speaker -** The Cube Keynote Title: Surviving a Zombie Attack: Advice for Graduate Students in Uncertain Times **Dr. Corey Welch**, Director of the STEM Scholars Program, Iowa State University

3:30-4:45	● **Poster Viewing: Afternoon Session** – 2nd Floor Fife Lobby - Investigating the Demographics and Characteristics of Recreational Anglers of Summer Flounder Along the U.S. East Coast, **Mary Adebote**, FWC - Extractivism, Health, and Community Resilience: Insights from Central Appalachia and Guatemala, **Meghan Albritton**, GEOG - Comparative Analysis of Voluntary Programs and Mandatory Regulations for Effective Bulky Materials Management, **Atif Ali**, SBIO - Untangling Flood Pulse Effects on Inland Fisheries: A Critical Review, **Gabriel Borba**, FWC - Social Norms as Drivers in Community-Based Fisheries Management, **Caetano Franco**, FREC - Evaluating the Influence of Scientific Advisory Committees on Federal Antimicrobial Resistance Policy, **Luke Goodman**, SPIA - Identifying Drivers of Arapaima Population Dynamics in a Floodplain Ecosystem, **Emma Hultin**, FWC - Drivers of putative bacterial pathogen abundance in soils of the contiguous United States and correlations with future exposure risk and receptor vulnerability, **Emily Matthews**, CEE - Sublethal lead (Pb) exposure impacts gene expression in the brain of developing songbirds, **Casey McLaughlin**, BIOL - What can Mixed Flocks tell us about Habitat Quality?, **Noah McNeill**, BIOL - Integrating existing demographic data to identify critical data gaps and estimate population dynamics of Cerulean Warblers (Setophaga cerulea), **Elaine Metz**, FWC - Leadership-Trust Dynamics in community-based management when members feel connected to the institution, **Anu Rai**, FREC - Perverse revegetation outcomes in Chesapeake Bay watershed stream restorations, **Gabrielle Ripa**, SPES - Using Phylogenetics to Predict Bat Species Susceptibility to White-Nose Syndrome, **Eliza Tarimo**, BIOL
4:45-6:00	**Reception and Platform Award Announcements** – 3rd Floor Fife Lobby Following the awards, students that presented in the PM session should remove their posters from the 2nd floor

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MORNING PLATFORM PRESENTATION

Changes in reservoir dissolved organic matter composition between lotic and lentic sites across a longitudinal gradient

Howard, D.W.*[1]*, Breef-Pilz, A.[1], Woelmer, W.M.[1,2], Scott, D.[3], Carey, C.C.[1]*

[1]Department of Biological Sciences, Virginia Tech
[2]School of Science, University of Waikato
[3]Department of Biological Systems Engineering, Virginia Tech

Dissolved organic matter (DOM) plays an essential role in freshwater ecosystem functioning and aquatic carbon cycling, motivating a need to understand the changes in DOM quantity and quality across ecosystem gradients. Drinking water reservoirs receive large inputs of DOM that enters through streams and undergoes transformations in quantity and quality as it is transported to reservoir outflows. Along this lotic (stream) to lentic (reservoir) continuum, DOM is produced and respired, and undergoes changes in molecular composition before reservoir export, where it can enter drinking water supplies. We monitored DOM quantity and composition along a longitudinal gradient in a reservoir watershed located in Roanoke, Virginia between May 2024 - February 2025, a period with variable hydrology and reservoir water level fluctuations >3 meters. Across the study period, we observed greater composition of terrestrial DOM in lotic sites with a transition to more algal/microbial DOM in the surface water of lentic regions, but DOM remained more terrestrial at depth in lentic sites, highlighting potential underflow of lotic water through the reservoir. DOM composition was also responsive to changing hydrology, with increases in terrestrial DOM following storm events and decreases following extended dry periods. DOM quantity did not vary as much as composition, with concentrations between 2-4 mg C/L for most of the study period. These differences in DOM across a lotic to lentic gradient highlight the important role reservoirs play in processing DOM, which has implications for the role of reservoirs in global carbon budgets as well as drinking water quality.

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MORNING PLATFORM PRESENTATION

Navigating Participation and Identity: Understanding Motivations and Barriers for Participation in Private Lands Conservation Programs

Rastgoo, R.*[1], *Holland, K.*[1], *Dayer, A.*[1], *Jennings, K.*[1], *Allred, S.*[2], *Oppong, K.*[2], *Draper, H.*[3]

[1]Department of Fish and Wildlife Conservation, Virginia Tech
[2]Department of Geography and Environment, University of North Carolina at Chapel Hill
[3]Department of Forest Resources, University of Minnesota

Underrepresented landowners have been systematically excluded from conservation programs, exacerbating inequity in agricultural policy and practice. Understanding motivations and barriers to participation for underrepresented communities and addressing their unique needs is essential for fostering inclusive conservation efforts. We conducted a literature review using Google Scholar to identify relevant studies on underrepresented landowners' participation in federal conservation programs. Searches combined an underrepresented group, landowner types, and “conservation” (e.g., “women” + “private landowner” + “conservation”). Studies were screened based on the following criteria: peer-reviewed research in the U.S., inclusion of at least one underrepresented group, publication within the past 20 years, and relevance to private landowners participating in conservation. The total sample size was 151 articles, with women landowners as the most common subgroup followed by Black landowners, while gender minorities were the least common subgroup. Personal stewardship, economic incentives, and cultural traditions were the most documented motivations for participation in programs. Interestingly, 89 of the articles did not document motivation for participation. Access to information was the most indicated barrier to participation followed by discrimination, and financial barriers. We found that 63 of the articles did not report barriers to participation. This paper brings forward existing literature on motivations and barriers to conservation program participation among underrepresented communities and highlights the need for applied research that links this understanding to effective program delivery. Gaining a deeper understanding of motivations and barriers to participation by underrepresented groups can inform program design that promotes inclusive and lasting conservation outcomes on private lands.

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MORNING PLATFORM PRESENTATION

Soil biota sensitivity to hydroclimate variability in a polar desert ecosystem

Snyder, M.D.*[1], *Adams, B.J.*[2], *Borgmeier, A.*[2], *Jorna J.*[2], *Power S.N.*[1], *Salvatore, M.R.*[3], *Barrett, J.E.*[1]

[1]Dept. of Biological Sciences, Virginia Tech
[2]Dept. of Biology, Brigham Young University
[3]Dept. of Astronomy and Planetary Science, Northern Arizona University

An anomalous warm weather event in the Antarctic McMurdo Dry Valleys on March 18, 2022, created an opportunity to characterize soil biota communities most sensitive to freeze-thaw stress. This event caused unseasonal melt within Taylor Valley–activating stream water and microbial mats around Canada Stream. Liquid water availability in this polar desert is a driver of soil biota distribution and activity. As climate change impacts hydrological regimes, we aimed to determine the effect on soil communities. We sampled soils identified from this event that experienced thaw, nearby hyper-arid areas, and wetted areas that did not experience thaw to compare soil bacterial and invertebrate communities. Areas that exhibited evidence of freeze-thaw supported the highest live and dead nematode counts and were composed of soil taxa from hyper-arid landscapes and wetted areas. They received water inputs from snowpacks, hyporheic water, or glacial melt–contributing to community differences associated with organic matter and salinity gradients. Inundated soils had higher organic matter, lower conductivity ($p<0.02$), and hosted the most diverse microbial and invertebrate communities on average. Our findings suggest that as liquid water becomes more available under predicted climate change, soil communities adapted to the hyper-arid landscape will shift toward diverse, wetted soil communities.

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MORNING PLATFORM PRESENTATION

Rethinking the relationship between home range and body size: evaluating the ontogenetic variation in space use in large mobile marine predators

Shea, B.D.*[1], *Ferretti, F.*[1]

[1]Department of Fish and Wildlife Conservation, Virginia Tech

Much of the theory describing the space use of migratory animals comes from terrestrial species, but there are significant differences between the terrestrial and marine realms, including lower energetic costs of transport in the ocean, making it unlikely that home range theory derived from terrestrial animals holds true for mobile marine fishes like large sharks. In terrestrial animals, home range scales allometrically with body size - as animals grow larger, they must traverse a larger area to locate sufficient resources. Among sharks, however, there is equivocal evidence regarding this ontogenetic variation in space use, particularly for highly mobile species, and this knowledge gap limits the implementation of spatial protections or other management actions. We used large-scale telemetry datasets sourced from multiple collaborators, standardizing much of the track processing and statistical analysis, to evaluate ontogenetic variation in the space use of large sharks. After processing tracks and estimating home range, we modeled for the influence of body size using generalized linear mixed models. We hypothesized that the shape and scale of this relationship would show high levels of inter-specific variation, and that in large species, the relationship would be polytonic, whereby initially small juvenile home ranges would expand with maturity, before constricting for the oldest, largest sharks, as animals gain information and structure their movements between core areas more efficiently. Analysis is ongoing, but early results using Atlantic white shark data support the existence of this quadratic relationship, where the largest sharks may preferentially occupy smaller areas of quality habitat.

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CAPSTONE PRESENTATION

Highlighting Local Voices in Global Change

López Lloreda, C.[1], Riddle, R.[2], Dasho, O.[3], McLaughlin, C.[1], Jain, A.[4]*, Reid, J.L.[5]*

[1]Dept. of Biological Sciences, Virginia Tech
[2]School of Public and International Affairs, Virginia Tech
[3]Dept. of Geosciences, Virginia Tech
[4]Dept. of Fish and Wildlife Conservation, Virginia Tech
[5]School of Plant and Environmental Sciences, Virginia Tech

There are many marginalized voices missing from global change research, management, and education, especially those from places at the forefront of climate change, such as small islands, coastal areas, countries with lower economic resources, and places with historic environmental destruction. The goal of our IGC Capstone project was therefore to highlight the stories of scientists in different disciplines working locally in their own countries and regions on topics such as environmental justice, community engagement, global change, and environmental sustainability. To accomplish this, each group member nominated a person to interview and carried out semi-structured interviews individually. We developed an interview guide to cover general questions about interviewees' research, background, challenges, work with communities, and thoughts on the future of diversity and inclusion within global change science. We then identified common themes across the interviews, with the goal of writing an article that highlights the interviewees' experiences and insights. In addition, we created an ArcGIS StoryMap with profiles of each interviewee, highlighting the geographical spread of our interviewees and their work. Common themes and perspectives across the interviews included the importance of local engagement and co-creation and long-term relationships and embracing diverse backgrounds and experiences. The insights from our interviews underscore the importance of diversifying the scientists we highlight and interact with in the global change community and the value of community-driven approaches to addressing global challenges.

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POSTER: MORNING SESSION

Threatened Orchid Isotria Medeoloides Response to Prescribed Fire Restoration

Pika*[1], *Coates, A.T.*[2], *Klopf, R.*[3], *Reid, J.L.*[1]

[1]School of Plant and Environmental Sciences, Virginia Tech
[2]Department of Forest Resources and Environmental Conservation, Virginia Tech
[3]Virginia Natural Heritage Program, Department of Conservation and Recreation

Isotria medeoloides is an endangered orchid whose existence is threatened by habitat loss and thus fire exclusion. We hypothesize that restoring fire to the landscape can preserve the woodland habitats that Isotria relies on and can help save the orchid from extinction. This study is a collaborative effort of Virginia Natural Heritage Program, DCR, and Virginia Tech to save this endangered flower and explore its unique relationship to fire.

This study will determine whether prescribed fire management harms or helps Isotria medeoloides. This study will determine population response to fire and the mechanisms that mediate this response. Our findings should be used to inform management prescriptions for the species and aid in species recovery.

This study consists of a chronosequence of burned habitat. Methods employed include microplot destructive fuel sampling and fire effects monitoring. The Virginia Natural Heritage community plot method was used for species composition surveys. Population monitoring involved tracking tagged individual emergence and phenology. A canopy imager was used to analyze canopy openness.

Results are preliminary. Data includes population monitoring, community composition, canopy openness and fire characterization from 2017 through current. Fire characteristics were low intensity, low severity with a moderate rate-of-spread during the dormant season. Population responses this May showed significant fire response.

This study is a first of its kind using fire on Isotria medeoloides and examining multivariate ecosystem response. Consequences could be far reaching for species recovery. If fire is shown to be beneficial, that could save this species from extinction.

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POSTER: MORNING SESSION

Assessing circularity in flexible PU foam value chain using Material Flow Analysis (MFA)

Abadian, M.*[1], *Russell, J.*[1]

[1]Dept. of Sustainable Biomaterials, Virginia Tech

Polyurethane (PU) is the sixth most used polymer in the world. Flexible PU foam, the primary category of PU materials, is used in wide applications, including furniture, mattresses, packaging, and transportation. Due to its complex chemical structure and challenges with end-of-life management, landfilling remains the main disposal method for PU foam. Due to environmental concerns, the industry is moving towards more sustainable practices, by employing Circular Economy (CE) principles. However, successful implementation of CE requires systemic changes and a comprehensive understanding of material flows.

Material Flow Analysis (MFA) is a tool that maps and quantifies material flows and stocks across the entire life cycle, revealing inefficiencies and opportunities for circularity. This study employs MFA to assess the flexible PU foam value chain and provide insights for enhancing circularity. A static MFA was conducted using both top-down and bottom-up methodologies, leveraging data from open-access sources and industry reports. The analysis encompassed the entire life cycle of flexible PU foam in 2021, from production to waste management.

According to results, 940.71 kt of flexible PU foam was produced, and 549.28 kt was imported in 2021. While only 9.47 kt of post-consumer foam was recycled in the system. The results show, however, that a technical solution such as mechanical recycling is available for waste management, the recycling rates are slow. The study proposes improving end-of-life practices, including reverse logistics and expanding markets for recycled products. This research demonstrates MFA's value in evaluating circularity and guiding informed decision-making to enhance sustainability.

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POSTER: MORNING SESSION

Sinking Cities: Unmasking the Hidden Threat of Land Subsidence and Sea Level Rise in Africa's Coastal Hubs

Dasho, O.*[1]*, Shirzaei, M.[1], Ohenhen, L.O.[2], Sherpa, S.F.[3], Almar, R.[4]*

[1]Department of Geosciences, Virginia Tech
[2]Lamont-Doherty Earth Observatory of Columbia University
[3]Department of Earth, Environmental & Planetary Sciences (DEEPS) Brown University
[4]Laboratoire d'Etudes en Géophysique et Océanographie Spatiales (LEGOS), IRD, Toulouse, France

Africa's coastal cities are facing growing flood risks due to rising sea levels and sinking land. In this study, we analyze future sea level rise and flood exposure in 20 major African coastal cities by combining satellite data on land subsidence with projections from the Intergovernmental Panel on Climate Change (IPCC). Using advanced satellite technology called Interferometric Synthetic Aperture Radar (InSAR), we mapped how fast different areas are sinking. Our findings show that cities like Alexandria, Lagos, and Luanda are sinking at rates much higher than the IPCC estimates—by 6.3 mm, 5.2 mm, and 3 mm per year, respectively. This means the actual sea level rise in these cities will be significantly worse than previously thought. When we refine IPCC projections with our more precise data, we find that relative sea levels in Dakar, for example, could rise 70% faster than expected. As a result, flood-prone areas in cities like Lagos will expand dramatically—from 981 km² in 2020 to 1,209 km² by 2100 under moderate climate change scenarios. If no protective measures are taken, extreme coastal flooding will become more frequent and severe, leaving cities like Lagos with 57% of their low-lying land at risk. The impacts will be especially harsh for communities in Lagos, Alexandria, and Douala. Our study highlights the urgent need for localized projections and better flood protection strategies to help African coastal cities adapt and reduce future risks.

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POSTER: MORNING SESSION

A nationwide systematic analysis indicates increased risks of antibiotic resistance for socially vulnerable populations exposed to soils under climate change

Goh, Y.-X.* [1,2,3], *Scott, D.*[4], *Anupoju, S.M.B.*[5], *Zhang, H.*[6], *Bartell, S.M.*[4], *Liao, J.*[1,2,3]

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[2]Global Change Center, Virginia Tech
[3]Center for Emerging, Zoonotic, and Arthropod-Borne Pathogens, Virginia Tech
[4]Oak Ridge Associated Universities, TN
[5]Department of Computer Science, Virginia Tech
[6]Department of Business Information Technology, Virginia Tech

Antimicrobial resistance (AMR) has emerged as a significant global health challenge experienced disproportionately by marginalized populations. Climate-related impacts on soils, a vital reservoir of AMR genes, might increase human exposure to AMR and exacerbate existing disparities in AMR-related health risks. However, evidence-supported knowledge of the interactions among climate change, the soil environment, and the AMR-related health risks are lacking. To address this gap, we characterized the abundance of AMR genes using existing metagenomic data in 454 soil samples collected throughout the United States. We found that AMR genes conferring resistance to several clinically important antibiotics, including multidrug, rifampicin, and vancomycin, are highly prevalent in soils. Based on the abundance of AMR genes and soil erodibility, we developed an exposure risk index (ERI) and identified a significantly positive correlation with social vulnerability, indicating that socially vulnerable populations are at a higher risk of exposure to AMR in soils. Individuals aged 1 to 4, the unemployed, people with lower income and education levels, females, and those identified as Asian and Native Hawaiian particularly appear at greater risk of exposure. Additionally, we identified significant positive correlations between temperature, wind speed, and precipitation and the ERI, with 74% of the variability in the ERI explained by these climate factors determined from a k-nearest neighbors model. Structural equation modeling further supports a causal relationship between climate factors and ERI. Collectively, our findings suggest that climate change amplifies health disparities nationwide by increasing exposure to environmental biohazards, specifically AMR genes.

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POSTER: MORNING SESSION

A Team Science Approach to Research with Community Partners

Hensley, A.A.*[1]

[1]Translational Biology, Medicine, and Health Program, Virginia Tech

A major emphasis of the integrated Translational Health Research Institute of Virginia (iTHRIV) is to engage community members across the Commonwealth in all facets of translational research and to improve human health and promote health equity. iTHRIV is an NIH-funded partnership among the University of Virginia, Virginia Tech, Carilion Clinic, and the INOVA Health System. iTHRIV's Community and Collaboration Core developed brief educational videos, called Learning Shorts, to help educate, dispel misinformation, and create a basis for conversation between the community and health researchers. The Learning Short Series "Team Science with Community Partners" is designed to reach the general public as well as early career and established researchers. Topics include defining team science within the context of partnership with community members and stakeholders, funding opportunities, characteristics of effective team science approaches, emphasizing the importance of trust, communication, collaboration, accountability, and representation. This video series seeks to facilitate conversation between health researchers and community members who may be interested in being a part of clinical or translational research teams.

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POSTER: MORNING SESSION

Drought, drawdown, and cyanobacteria: A review to inform reservoir management in the southwestern USA

Hoffman, K.K.*[1]*, Deemer, B.R.*[2], Lofton, M.E*[1], Gibney, N.D.*[3], Carey, C.C.*[1]

[1]Department of Biological Sciences, Virginia Tech
[2]U.S. Geological Survey, Southwest Biological Science Center, Grand Canyon Monitoring and Research Center, Flagstaff, AZ
[3]National Park Service, Regions 6, 7, and 8 Intermountain, Resource Stewardship and Science, Denver, CO

Water levels in freshwater reservoirs worldwide are changing due to altered climate, management practices, and increasing human demand for water. In the desert southwestern USA, managers are considering significant changes to reservoir operation strategies and water management in response to consumptive use and ongoing drought. To inform reservoir management decision-making, we reviewed current peer-reviewed literature to identify the effects of decreasing or increasing water level on phytoplankton and cyanobacteria. We identified 34 studies containing 42 individual waterbodies that investigated the effects of water level increases or decreases on phytoplankton or cyanobacteria. We found that water level decreases resulted in a higher likelihood of increased cyanobacteria, and that phytoplankton were more likely to decrease in response to water level increases. Most of the waterbodies included in the literature review were eutrophic or hypereutrophic, underscoring the need to explore the effects of water level fluctuations on oligotrophic systems. We supplemented our review with regional white papers and case studies within the Colorado River Basin and the Rio Grande River Basin to highlight relevant research. Prior and ongoing research highlights the need to explore impacts of water level fluctuations on phytoplankton and cyanobacteria to guide future management decision-making.

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POSTER: MORNING SESSION

Do plumbing components leach PFAS compounds into drinking water?

Hohweiler, K.*[1]*, *Krometis, L.A.*[1]

[1]Biological Systems Engineering, Virginia Tech

Per- and polyfluoroalkyl substances (PFAS) are a group of over 10,000 anthropogenic compounds widely used in consumer and industrial products. Recent research suggests PFAS compounds are frequently detected in both public and private drinking water systems in the United States, which is a concern given newly established US Environmental Protection Agency (USEPA) regulatory limits, which are quite low. At present, USEPA Maximum Contaminant Level Goals (MCLG) for both PFOA and PFOS are zero, indicating no safe level of exposure. Previous work suggests plastic and Teflon-based pipes and joining materials may leach PFAS into drinking water supplies. The *ANSI/NSF Standard 61 for Drinking Water System Components – Health Effects,* establishes maximum leaching levels for drinking water system infrastructure and components, reduced the leachability certification limit for seven PFAS compounds to align with new regulations in 2024. However, enforcement for compliance with new leaching standards does not begin until January 2028, indicating that many drinking water systems may be operating with materials that are no longer compliant with new standards.

This poster will report the results of a preliminary experiment confirming PFAS leaching from polytetrafluoroethylene paste, a common joining material for pipes in drinking water systems. The highest PFAS concentration (2.03 ppt) occurred with a paste-copper combination treated with the least aggressive water chemistry. Other treatment groups had detectable levels of PFBS and PFBA, common replacement compounds for regulated PFAS. This experiment provides proof of concept for a larger experiment planned to quantify PFAS leaching material to guide efforts to reduce human exposure.

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POSTER: MORNING SESSION

The Quadripartite Framework in Bat Research: Enhancing Pathogen Risk Reduction and Data Quality

Islam, S.*[1, 2], *Kangoyé, N.M.*[3], *Diallo, A.H.*[3, 4], *Katani, R.*[5,6], *and Escobar, L.E.*[1,2,7]

[1]Dept. of Fish and Wildlife Conservation, Virginia Tech
[2]Global Change Center, Virginia Tech
[3]Dept. of Animals Biology and Physiology, University Joseph Ki-Zerbo, Ouagadougou, Burkina Faso
[4]Dept. of Public Health, Centre Muraz Research Institute, Bobo-Dioulasso, Burkina Faso
[5]The Huck Institute of the Life Sciences, Pennsylvania State University
[6]Nelson Mandela African Institute of Science and Technology, Arusha, Tanzania
[7]Center for Emerging Zoonotic and Arthropod-Borne Pathogens, Virginia Tech

As researchers increasingly interact with wildlife, the risk of pathogen transmission grows, necessitating stringent biosecurity and biosafety measures. Lapses in these practices, along with compromised sample quality, can pose threats to individuals, populations, species, and ecosystems. Understanding the current state of biosecurity and biosafety in bat research is crucial for mitigating these risks. This study aimed to assess biosecurity and biosafety practices in vampire bat research and introduce the concept of a quadripartite framework for improving research integrity and safety.

We conducted a scoping review of published studies that involved direct capture and sampling of vampire bats. Of 562 articles reviewed, 161 (28.65%) reported direct sample collection from vampire bats. However, only 4 (2.48%) explicitly mentioned biosecurity and biosafety measures or the protective tools used during sampling. Our findings highlight a critical gap—either in adherence to proper biosecurity and biosafety protocols or in the reporting of such practices.

To address the biosecurity and biosafety practice limitations, we propose a holistic, interdisciplinary quadripartite framework that considers four key pillars: researcher safety, animal welfare, environmental health, and sample quality. Researcher safety emphasizes effective biosecurity and biosafety practices with regular monitoring and evaluation. Animal welfare follows the principles of replacement, reduction, and refinement. Environmental health focuses on proper cleaning, waste management, and disposal. Sample integrity ensures research-specific collection, secure transportation, and appropriate storage. This quadripartite framework will promote ethical research practices while ensuring transparent, high-quality data collection. The effective implementation of this framework will enhance research reliability and benefit human, bat, and environmental health alike.

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POSTER: MORNING SESSION

Mosquitoes Eat Nectar? - Analysis of Mosquito Sugar Feeding on Goldenrod Flowers

Moloney, J.*[1]*, Lahondère, C.*[1]

[1]Department of Biochemistry, Virginia Tech

Mosquitoes are generally known for biting vertebrates and consuming blood meals from their hosts. They hold a fundamental role in transmitting pathogens and an estimated 700,000 people die every year from mosquito borne diseases. Because mosquito-borne pathogens are transmitted during blood intake, most research is aimed toward studying host preference and pathogen-host interactions. However, not all mosquito species bite and of those that do, only females consume blood. Plant carbohydrates (e.g., nectar, sap) are thus the primary source of energy for mosquitoes, regardless of sex or species. Additionally, these sugars have a profound impact on the mosquito reproductive output, leading to a higher egg production. Despite its potential as a method for mosquito population biocontrol, sugar feeding, and particularly how mosquitoes locate potential sources of carbohydrates, has been historically overlooked in the field of mosquito biology. Previous work in our lab has identified the late fall-blooming common ornamental and wildflower, goldenrod (Solidago spp.), as particularly attractive to multiple mosquito species. To assess goldenrod's capacity for extending mosquito range and season, we assessed mosquito propensity for feeding on the plant as well as their ability to carry pollen. Field-collected and lab-reared mosquitoes were screened for pollen and sugar, then the source of sugar in their bodies was identified via DNA barcoding. We determined that mosquitoes do indeed feed on goldenrod and have the capacity to carry its pollen. This work has the potential to serve as the basis of a plant-based mosquito control strategy.

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POSTER: MORNING SESSION

Rethinking breeding phenology in a dryland amphibian: acoustic monitoring reveals spatiotemporal patchwork of breeding chorus activity

O'Malley, G.*[1]*, Mims, M.*[1]

[1]Biological Sciences, Virginia Tech

Amphibians are increasingly threatened due to rising rates of habitat loss, increased disease prevalence, and the introduction of invasive species. In addition to these stressors, climate change is causing shifts in environmental cues that many amphibians track to initiate migration and breeding events. Determining the link between environmental cues and life history events for amphibians is a critical part of understanding the risk of amphibians to climate change, yet these links are often poorly understood - especially at a regional scale for species that may only breed a few nights per year. Bioacoustic monitoring of vocalizing amphibians, such as frogs and toads, can reveal fine-scale spatial and temporal variation in breeding phenology, helping to address this knowledge gap. We used bioacoustic monitoring to detect the presence of the native Arizona treefrog (Hyla wrightorum) across multiple locations, at daily intervals, in the southwestern United States in 2021, 2022, and 2023. The Arizona treefrog is listed as a species of conservation concern in the state of Arizona. Arizona treefrog breeding activity is predicted to be tightly linked to pond inundation timing, which varies widely across the region. Using acoustic monitoring, we found up to 30 days in the initiation of breeding choruses at two different sites less than 9 km apart. Breeding choruses lasted up to 28 days of consecutive calling. These preliminary results, coupled with fine scale pond inundation data, suggest that breeding activity is driven by pond inundation dynamics.

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POSTER: MORNING SESSION

Estimating causes of nest failure in the southern breeding population of Saltmarsh Sparrows

Re, B.*[1], *Hunter, E.A.*[1,2]

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Populations occurring along the trailing-edge—defined by the lower elevation or lower latitude limits of a species range—are predicted to be most vulnerable to climate-induced extinction. Despite their increased vulnerability, trailing-edge populations have received less research attention than leading-edge populations. Among differences between a trailing-edge and core population is nest success through successful reproduction. In birds, it is well established that annual fecundity, or the number of offspring produced per year, is constrained by biotic stressors at low latitudes and abiotic stressors at high latitudes. Understanding how biotic and abiotic pressures act on populations at the trailing-edge of their range is critical for managing populations in the face of climate change. In this study, we estimate the relative importance of biotic and abiotic factors on nesting success for a threatened songbird, the Saltmarsh Sparrow (Ammospiza caudacuta), at the trailing-edge of its range. We found that biotic factors were best predicted by nest location within a marsh while abiotic factors were best predicted by nest location within a marsh and the plant species the nest was built in. We found that the daily nest survival rate for flooding in Virginia was an order of magnitude less compared to the rest of the Saltmarsh Sparrow range. Our results suggest that the trailing-edge population of breeding Saltmarsh Sparrows face vastly different nesting threats compared to the core and leading-edge populations.

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POSTER: MORNING SESSION

Are Functional Metrics More Sensitive Than Structural Ones To Ecological Change Across Land Uses, Management Practices and Regions?

Sabat-Bonilla, S.A.*[1]

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Fluctuating macroinvertebrate populations suggest that climate, land-use changes and habitat conversion drive global stream health trends. Although management practices (MPs) are widely implemented to mitigate in-stream habitat degradation, our synthesis of macroinvertebrate metrics in agricultural and urban streams revealed inconsistent outcomes (43% positive, 19% negative, 38% neutral), varying by region, land use, MP type and metric measured (Sabat-Bonilla et al., in prep.). For example, in the Valley and Ridge, functional metrics were the strongest indicators of positive MP effects, whereas structural metrics were less responsive, and biotic indices often remained unchanged. In the Coastal Plain, only functional metrics responded to MPs, being negative. In this study, we compare structural metrics (e.g., macroinvertebrate density) and functional metrics (e.g., biomass) relative to the regional Index of Biotic Integrity (Chessie B-IBI) along gradients of agricultural disturbance and MP implementation. Preliminary findings in the Valley & Ridge indicate that low-pasture streams with extensive MP coverage support higher taxon richness (~53 taxa) but exhibit lower total biomass (3,705 mg/m²) and density (20,557 indiv./m²). In contrast, high-pasture catchments with low-to-medium MP coverage harbor fewer sensitive taxa (43–46 taxa) yet display substantially greater biomass (13,500 mg/m²) and density (128,073 indiv./m²). Indicator-species analyses reveal that sensitive taxa (e.g., Epeorus, Micrasema, Leuctridae) strongly correlate with enhanced MP coverage, while tolerant taxa dominate in heavily pastured catchments. Our ongoing work will extend this analysis to Coastal Plain streams to assess how region, agricultural intensity and MP implementation shape both structural and functional responses.

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AFTERNOON PLATFORM PRESENTATION

Working and Restored Grasslands Incompletely Conserve Native Plant Biodiversity in Northern Virginia

Coscia, J.T.*[1, 2,3], *Johnson, A.E.M.*[2,3], *Harris, J.B.C.*[4,5,6], *Floyd, D.*[7], *Lorick, C.*[2,3,8], *Shibley, E.*[2,3], *Izlar, N.*[2,3], *Reid, J.L.*[1]

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Despite their high biodiversity and ecosystem service value, temperate grasslands have faced habitat loss and degradation due to the anthropogenic pressures of agricultural expansion, development, disrupted disturbance regimes, and climate change. The native grasslands of the Southeastern United States have lost over 90% of their historic range. The loss of these ecosystems and the biodiversity they harbor have been poorly documented. To assess the impacts of agricultural use on grassland biodiversity and to determine the effectiveness of grassland restoration efforts on post-agricultural land, we surveyed plant community composition in 238 publicly and privately owned reference, working, fallow, and restored grasslands across northern and central Virginia. Non-metric multidimensional scaling (NMDS) ordinations of the plant community data using both species composition and functional trait composition reveal that reference and restored grasslands diverge from working and fallow grasslands in different directions. The directions of these divergences are correlated with higher native species richness ($P = 0.01$, $R2 = 0.68$) and native plant cover ($P = 0.01$, $R2 = 0.66$) in reference grasslands and higher introduced plant cover in working and fallow grasslands ($P = 0.01$, $R2 = 0.65$). Pairwise comparisons of plant trait variables indicate that restored grasslands have more herbaceous and graminoid cover (Bonferroni-Adjusted $P = 4.38 \times 10\text{-}3$), fewer perennial plants (Bonferroni-Adjusted $P = 4.19 \times 10\text{-}4$), and more species with late-season reproductive phenology (Bonferroni-Adjusted $P = 0.04$) than reference grasslands. These results suggest that current grassland management and restoration strategies in northern and central Virginia are insufficient to support and restore native biodiversity in degraded grasslands.

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AFTERNOON PLATFORM PRESENTATION

Neural correlates of increased aggression in an urban songbird: A focus on arginine vasotocin (AVT)

Fossett, T.E.*[1], *Lane, S.J.*[2], *VanDiest, I.J.*[1], *Kaul, S.*[3], *Cole, V.*[3]; *Gilbert, E.R.*[3]; *Sewall, K.B.*[1,3]

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Urbanization drastically alters the environment, presenting wildlife with novel challenges to which they must adapt. An animal's first response to environmental change is to shift behavior, which requires processing environmental cues into neural signals that alter behavior. For example, urban song sparrows (Melospiza melodia) are more aggressive than their rural counterparts. However, the neural mechanisms underpinning behavioral responses to urbanization are unclear. Arginine vasotocin (AVT) is involved in the stress response and regulation of sociality, including aggression. Prior work showed that AVT peptide is more abundant in the paraventricular nucleus of the hypothalamus and bed nucleus of the stria terminalis in urban male songbirds compared to rural. However, social behavior is influenced by both AVT receptor expression and availability, making it critical to compare receptor distribution and expression between urban and rural birds. We localized AVT receptor (R) 3 throughout the brain of urban and rural male song sparrows and compared mRNA expression of AVT, AVT3R, and AVT4R in the hypothalamus following simulated territorial intrusion. Rural males had more AVT3R transcripts in the lateral septum compared to urban males, but did not differ in other brain regions. Additionally, urban birds trended towards higher hypothalamic AVT and AVT3R expression when compared to rural birds. Thus, both AVT peptide abundance and receptor distribution are implicated in higher aggression in urban male song sparrows.

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AFTERNOON PLATFORM PRESENTATION

Did the Record-Breaking Rains and Snow of Water Year 2023 Recharge Deep Aquifers of California's Central Valley?

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After enduring severe drought during 2020-2022, California experienced an exceptionally wet year in 2023. This led to a surge in surface water levels across the state, potentially reducing the reliance on groundwater for agricultural purposes and possibly allowing for the recharge of aquifers. The Central Valley of California, an agricultural hub, depends on groundwater from deep confined aquifers for farming. Following the wet year of 2023, questions persist about whether the increased availability of surface water has positively impacted the deep confined aquifers of the Central Valley. To address this question, we estimate the recharge volume of both shallow and deep aquifers during the water year 2023 (Sep 2022 – Aug 2023). We measured deformation ranging from 10.4 cm/year to -29.3 cm/year using 88 Sentinel-1 SAR images. Using the Total water storage data from GRACE-Follow On (GRACE-FO), we estimated a net gain of approximately 19.4 ± 4.1 km^3. Further, using the head level changes from well measurements and aquifer properties, we quantified the groundwater storage change in unconfined aquifer to be 24.3 ± 7.7 km^3 and in confined aquifer to be 3.3-13.4 km^3. We apply a 1D poroelastic model to surface deformation data to validate storage change in deep aquifers. We first estimate and remove the effect of delayed compaction from InSAR observation of surface deformation. We quantify groundwater storage change to be between 1.7 and 6.9 km^3 in deep confined aquifers, which aligns with conventional and empirical approaches, considering the underlying physical processes and uncertainties.

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AFTERNOON PLATFORM PRESENTATION

Identifying Drivers of Demand for Wild Turtles in the United States: Characterizing Consumers

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Illegal turtle trade and unsustainable collection are major threats to turtle populations globally. Increased visibility of wildlife trade as a biodiversity threat have led conservationists to focus more on interventions targeting end consumers of traded species. Domestic drivers of turtle consumption remain largely unstudied. The objective of this research was to understand the relationship between turtle ownership (including interest in ownership) and wildlife value orientations (i.e. traditionalists, mutualists, pluralists, and distanced), turtle care perceptions, and various motivations for turtle ownership. We conducted an online panel survey of 1464 adults living in the U.S, consisting of turtle owners and non-owners. We used two-step binomial logistic regressions to assess the relationship between predictor variables and 1) interest in turtle ownership, then 2) turtle ownership amongst those who were interested. Participants that thought it was easier to care for a turtle were 65% (Odds Ratio [OR]:1.65; 95% Confidence Interval [CI]: 1.39-1.96) more likely to have one. The odds of being interested in turtle ownership were 82% higher (OR:1.82; CI: 1.29-2.56) for mutualists and 64% (OR:1.64; CI: 1.18-2.29) higher for pluralists, compared to distanced participants. Mutualists were more likely to be motivated by a desire for companionship (OR:1.92; CI: 1.22-3.00) and turtle rescue (OR:2.5; CI: 1.45-4.44) than distanced participants. Our findings can support demand reduction strategies (e.g., social marketing campaigns) by characterizing potential turtle consumers and identifying target audiences, such as urbanites, non-hunting wildlife viewers, and pet enthusiasts.

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AFTERNOON PLATFORM PRESENTATION

Seasonal and short-term changes in carbon cycling in hydrologically dynamic wetlands

López Lloreda, C.*[1], *Mulcahy, E.*[1], *Maze, J.*[2], *Wardinski, K.*[3], *Corline, N.*[1], *McLaughlin, D.L.*[4], *Jones, C.N.*[5], *Scott, D.*[3], *Palmer, M.*[6], *Hotchkiss, E.R.*[1]

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Greenhouse gas dynamics in wetlands can be highly variable, particularly at short-time scales and in hydrologically dynamic wetlands. While hydrology is a key control on carbon dioxide (CO_2) dynamics, the strength of its influence relative to other controls, such as aerobic metabolism, can vary spatially and temporally. In this work, we characterized seasonal and short-term changes in CO_2 and dissolved oxygen (DO) concentrations in three forested wetlands in the mid-Atlantic region of the U.S. which varied in size and inundation regime. We deployed high-frequency DO and CO_2 sensors and monitored wetland and groundwater levels. While CO_2 was typically supersaturated, we observed periods of undersaturation during spring and summer, suggesting a potential short-term carbon sink. CO_2 concentrations increased with decreasing water level, with a stronger relationship with decreasing wetland size while influences of aerobic metabolism on CO_2 were stronger in the larger wetland. On shorter timescales, CO_2 concentrations responded quickly to rain events but the response varied across wetlands. In smaller wetlands, CO_2 concentrations initially decreased but later increased while in the larger wetland CO_2 concentrations decreased and re-stabilized. Together, these results highlight an important external source of CO_2 in these wetlands that varies seasonally and with short-term rain events and that is potentially mediated by the size and inundation regime of each wetland. Further characterizing and understanding these dynamics will be critical as ecosystems face increasing climatic and hydrologic variability and as these wetland ecosystems face decreased federal protections.

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POSTER: AFTERNOON SESSION

Investigating the Demographics and Characteristics of Recreational Anglers of Summer Flounder Along the U.S. East Coast

Adebote, M.*[1], *Chaves, W.*[1], *Frimpong, E.*[1], *Kindsvater, H.*[1]

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The summer flounder (Paralichthys dentatus) supports one of the most significant recreational fisheries along the Atlantic coast of the United States, spanning from Massachusetts to North Carolina. Understanding the demographics, motivations, and behaviors of recreational anglers targeting summer flounder is critical for effective fisheries management, particularly as climate change influences species distribution. This study examines the characteristics of recreational anglers engaged in summer flounder fishing along the U.S. East Coast, with a focus on demographic diversity, fishing practices, and perceptions of regulatory measures. An anonymous online survey was distributed to recreational fishers, yielding 1,384 responses, with a completion rate of 70.16%. Survey questions explored fisher identity, motivations, fishing frequency, perceptions of summer flounder abundance, attitudes toward regulations, and self-reported compliance with size and bag limits. Cluster analysis identified four distinct groups of anglers based on demographic and behavioral attributes: (1) diverse middle-aged shore anglers, (2) younger, lower-income males fishing from private boats, (3) college-educated men heavily invested in fishing equipment and boats, and (4) older individuals, including women, primarily fishing from private boats. Despite variations in age, income, and fishing experience, all groups demonstrated a strong interest in targeting summer flounder. Findings from this study provide valuable insights into the composition of the recreational angling community and can inform management strategies aimed at balancing sustainability with stakeholder interests.

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POSTER: AFTERNOON SESSION

Extractivism, Health, and Community Resilience: Insights from Central Appalachia and Guatemala

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This study explores the health impacts of and perceptions surrounding extractivism in Central Appalachia, USA, and Olopa, Guatemala, comparing how extractive industries affect local communities. Using a combination of in-depth interviews and participatory mapping/participatory GIS, the research highlights the experiences of residents living in regions directly impacted by these industries. Interviews were conducted with community members, health professionals, and activists, and the mapping allowed individuals to visually represent perceived health hazards and areas most affected by environmental degradation. The study investigates key health concerns, including respiratory illnesses, water contamination, mental health challenges, and the loss of traditional livelihoods while also examining the socio-political context in both regions, considering the role of local governance, power, and international influence in shaping health outcomes. By comparing the two contexts, the research identifies both shared and unique patterns in how extractivism disrupts overall community well-being. Findings suggest that while there are common health impacts, such as a reported increase in chronic diseases and environmental stressors, the responses of local populations to these issues are shaped by distinct cultural, political, and economic factors. This comparative analysis aims to provide insights into the global nature of the health impacts of extractivism, highlight the importance of community participation prior to the start of extraction, and inform more effective policies for affected communities.

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POSTER: AFTERNOON SESSION

Comparative Analysis of Voluntary Programs and Mandatory Regulations for Effective Bulky Materials Management

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The global market for bulky products like furniture, carpets, rugs, and mattresses is rapidly growing due to e-commerce expansion, affordable pricing, and changing consumer preferences. However, this growth intensifies environmental challenges at end-of-use and end-of-life stages, as current systems struggle with low recycling rates and insufficient infrastructure. For example, only 10% of discarded mattresses in U.S. and 14% in EU are recycled, with majority landfilled or incinerated. To address these issues, this study evaluates two policy approaches: voluntary environmental programs (VEPs), which rely on self-regulation, and mandatory environmental regulations (MERs), enforced by governments to meet environmental targets.

Using Qualitative Comparative Analysis (QCA), the study analyzes 30 cases from U.S. and EU to identify effective policy attributes for managing bulky materials. QCA combines qualitative and quantitative methods, employing Boolean logic to assess causal complexity and determine conditions for desired outcomes. The analysis adopts a lifecycle approach, examining upstream variables like legislation type, producer responsibility, eco-design incentives, and recycling targets, as well as downstream factors such as the roles of producer responsibility organizations, retailers, and consumers in waste return and collection.

The findings aim to guide policymakers in developing balanced approaches that address infrastructure gaps, minimize environmental impacts, and align with circular economy principles. By comparing VEPs and MERs, the study provides actionable insights for enhancing material circularity through reuse, repair, refurbishment, and recycling. The research underscores the need to integrate technical solutions with informed decision-making, offering recommendations to foster sustainable management practices for bulky products, benefiting both the environment and society.

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POSTER: AFTERNOON SESSION

Untangling Flood Pulse Effects on Inland Fisheries: A Critical Review

Borba, G.*[1]*, Castello, L.*[1]

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Fish catch in river floodplains is regulated by seasonal variations in water levels known as flood pulses. However, the ecological mechanisms linking flood pulses, fish species, and fish catch remain poorly understood, limiting our ability to predict and mitigate human impacts on these fisheries. To address this gap, we review the literature, focusing on three key questions: (i) How do flood pulses sustain fish catch? (ii) Which aspects of flood pulses most influence fish catch? (iii) How do life history traits mediate these effects? Our review of 37 studies confirms that flood pulses are key regulators of fish catch, yet two major limitations persist. First, many studies use bankfull discharge as a proxy for flood pulse dynamics, a subjective metric that varies across river systems, limiting cross-study comparisons. Second, most research prioritizes floods over droughts, despite high and low water levels shaping fish catch. This bias skews fisheries models, leading to incomplete predictions. Additionally, life history traits are often overlooked. When considered, they are mainly applied in single-species models, limiting broader ecological insights. Traits such as metabolic rate, reproductive strategy, and longevity influence recruitment, population turnover, and resilience to hydrological variability, shaping fish catch dynamics. Yet, many models fail to account for these species-specific responses, weakening the predictive power. To address these gaps, we propose a comprehensive framework integrating ecological, hydrological, and fisheries data to refine predictions and improve fisheries' management under changing hydrological conditions.

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POSTER: AFTERNOON SESSION

Social Norms as Drivers in Community-Based Fisheries Management

Franco, C.*[1], *Sorice, M.G.*[1], *Chaves, W.*[2], *Hultin, E.*[2]

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Small-scale fisheries contribute to food security, local economies, and cultural heritage in the global south. Community-based management evolved in response to governance reforms recognizing the importance of local knowledge and the lack of capacity to support command-and-control approaches. A key aspect of CBM is the co-development of rules. We examined co-developed rules and the role social norms play in rule adherence. We hypothesize that stricter social norms are related to increased rule adherence. We examine the community-based fisher of Arapaima gigas in the Brazilian Amazon, focusing on three fishery rules: harvesting from protected lakes, out-of-season, and removing fish below the minimum size limit. We conducted face-to-face structured interviews with nearly 500 fishers across 46 rural villages. Social norms were measured as 1) the degree to which community members adhere to rules and 2) the perceived strength of social norms around fishing. We employed the randomized response technique to ask about rule-breaking behavior over the last six months. We found that half and slightly more than half fished out of season (50%) and harvested below minimum size (56%). Slightly more than one-third were harvested from protected lakes (37%). The estimated take per fisher was less than three fish in each category. The strength of social norms and perception of rule adherence were positively related to lower out-of-season harvests. Neither was associated with the minimum size rule, and only norm strength was related to protected lakes. Social norms have heterogeneous effects across rules, underscoring the complex way they relate to cooperation in fisheries management.

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POSTER: AFTERNOON SESSION

Evaluating the Influence of Scientific Advisory Committees on Federal Antimicrobial Resistance Policy

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[1]School of Public and International Affairs, Virginia Tech

The scale of antimicrobial resistance (AMR) necessitates comprehensive policies and coordination across government levels to prevent a looming public health crisis. Over 130 countries have developed AMR National Action Plans (NAPs) to guide policy making, yet translating these goals into federal policies requires strong implementation efforts. This study examines how the U.S. federal government implements its NAP goals through legislative and regulatory policies, assessing alignment and discrepancies that impact local implementation. We also investigated how empirically grounded policy recommendations provided by the Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria influence AMR regulations and legislation.

We developed an evaluative framework to assess AMR NAPs based on issue identification, evidence-based reasoning, policy recommendations, implementation strategies, monitoring, and internal consistency. Using this framework, we systematically reviewed, passed and proposed federal AMR-related regulation and legislation across key sectors, including healthcare, wastewater, animal agriculture, and pharmaceutical development.

Preliminary findings show that U.S. AMR NAPs set explicit goals and assign agency responsibilities, with a primary focus on healthcare, data management, diagnostics, and pharmaceutical innovation. While passed legislation mainly addresses AMR in human and animal health, proposed policies aim to overcome market challenges for drug development. Notably, environmental AMR concerns, such as wastewater monitoring, remain underrepresented.

This study highlights the alignment of federal policies with NAPs and top-down implementation strategies. Our initial findings underscore the need for stronger integration of NAP goals into national policies and identify gaps, particularly in environmental AMR policies, to enhance the effectiveness of federal AMR initiatives.

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POSTER: AFTERNOON SESSION

Identifying Drivers of Arapaima Population Dynamics in a Floodplain Ecosystem

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Freshwater fisheries are an invaluable natural resource, supporting millions of people worldwide as a source of food, financial stability, and cultural value. However, freshwater ecosystems are increasingly threatened by habitat loss and degradation, the effect of invasive species, and overharvest. These problems are particularly severe in tropical regions which are predicted to experience dramatic changes in precipitation and seasonal flows due to climate change. In order to set fisheries management rules that will result in sustainable future harvests, we need to first understand the life history and environmental controls regulating fish populations; therefore, we need to understand the fundamental ecological drivers of population productivity. Typical Western fisheries models assume top-down population control in a relatively uniform habitat like the ocean, but a floodplain ecosystem is temporally dynamic, and fish experience a wide range of habitat conditions each year. Stock dynamics in this system may instead be driven more by the environment than fishing pressure, in which case fish populations will not respond as predicted by traditional biomass production models. We use Arapaima spp. as a case study to explore the role of bottom-up drivers of population dynamics in a floodplain ecosystem. Using a Bayesian approach, we will build a state-space model of Arapaima population dynamics given lake characteristics and annual flood pulse dynamics. We hope to explain the variation in productivity of Arapaima populations at the lake level in this temporally and spatially dynamic floodplain ecosystem.

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POSTER: AFTERNOON SESSION

Drivers of putative bacterial pathogen abundance in soils of the contiguous United States and correlations with future exposure risk and receptor vulnerability

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[4]Department of Population Health Sciences, Virginia Tech

Natural soils are reservoirs of pathogenic bacteria that can be linked to illness in humans. Recent research has identified land-use patterns (e.g., proximity to agriculture) and soil properties (e.g., moisture, nutrient abundance) associated with the abundance of pathogenic bacteria. However, there are major uncertainties associated with (1) the importance of local/regional land-use decisions in the context of variability, and (2) the correlations over large spatial scales among abundance, climate-linked physical processes that may increase pathogen mobility, and vulnerability of human receptors. These uncertainties limit identification of priority areas for outbreak surveillance and development of process-based risk screening models. Here, we analyze a novel data set of 622 soil samples covering 42 of the 48 contiguous United States and describes the relationship between putative pathogenicity and (1) natural and land-use drivers, (2) risk of mobilization via climate variables, (3) social vulnerability of local populations. Wide variability in soil pathogenicity on a national basis is only partially explained by known drivers; natural variables have greater explanatory power than land-use variables, suggesting broadly distributed risks. Putative pathogenicity is generally higher in forested ecoregions, notably in the eastern and southeastern United States and near surface waters. The southeastern United States emerges as a region where relatively higher pathogen abundance intersects with physical risks that may promote pathogen mobility to relatively vulnerable populations. Integrated sampling and modeling focusing on regions of interest are needed to better understand how hotspots of pathogenic bacteria in pristine environments may contribute to human disease now and in the future.

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POSTER: AFTERNOON SESSION

Sublethal lead (Pb) exposure impacts gene expression in the brain of developing songbirds

McLaughlin, C.*[1]*, Goodchild, C.*[2], Gilbert, E.*[3], Sewall, K.*[1,3]

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Decades of research on lead pollution have focused on wildlife mortality, yielding important insights into acute lead toxicity. Yet many animals are exposed to sublethal lead levels. While the effects of acute lead toxicity are well documented, the underlying mechanisms driving impairment at sublethal doses remain unclear. Songbirds at lead-contaminated sites often have elevated blood lead levels. They do not typically exhibit lead poisoning, yet the exposure levels observed are associated with differences in behavior, cognition, and brain volume that implicate a neurological mechanism. To explore the mechanisms by which sublethal lead could impact the brains of songbirds, we dosed fledgling captive zebra finches with lead during a critical period of development. We measured the expression of 14 genes associated with neural damage and cell death in the brain using qPCR. When compared to their unexposed counterparts, lead-exposed birds showed upregulation of pro-apoptotic caspase-9; downregulation of anti-apoptotic B-cell lymphoma 2 and nuclear factor-κB; and downregulation of antioxidant catalase. These results suggest that sublethal lead exposure, even over a short timeframe, may induce apoptosis and oxidative stress in the developing songbird brain. Inappropriate cell death and oxidative stress, especially during a critical developmental window, could contribute to disruptions in behavior and cognition that persist into adulthood.

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POSTER: AFTERNOON SESSION

What can Mixed Flocks tell us about Habitat Quality?

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Our study describes pine-savanna mixed species bird flocks in two restored, high-quality habitat sites in North Carolina, USA. While mixed flocks are a well-studied worldwide phenomenon, the composition and features of the flocks in this system are of particular interest due to their size, diversity, and abundance throughout the fall and winter months. We systematically surveyed for mixed-species flocks for three seasons for seven months each. Brown-headed Nuthatch and Pine Warbler were the most frequent species in the observed flocks, with a handful of other species comprising the core flocking species. Flock size and diversity peak in the middle of the flocking season, with the more unique habitat site yielding higher values. Several under-described pine-savanna flock varieties were also observed, including mixed flocks without Parid species, annual variation in Red-breasted Nuthatch mixed flocking presence, and monospecific Red-winged Blackbird flocks. Mixed flock compositional and phenological variation are likely caused by both habitat and regional site differences, as well as food and predator dynamics. Human-caused habitat disturbance and heterogeneity may increase flock proportions, but this may not imply higher quality habitat.

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POSTER: AFTERNOON SESSION

Integrating existing demographic data to identify critical data gaps and estimate population dynamics of Cerulean Warblers (Setophaga cerulea)

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Cerulean Warblers (Setophaga cerulea) have experienced long-term declines in abundance. Multiple research efforts over the past decades have resulted in estimates of several demographic parameters; however, substantial uncertainty remains about which life-stages are limiting to population growth and whether there are critical gaps, either spatially or across life-stages. Statistical techniques that can combine demographic data while integrating multiple types of data like count, nest productivity, and mark-recapture may better estimate population size and trajectory and thus better inform future management and research. In bird populations, Integrated Population Models (IPMs) have been increasingly employed for species with long-term data like migratory waterfowl, but many species do not have the spatial or temporal overlap in data that IPMs require, despite years of research across their range. Demographic data collection efforts for Cerulean Warblers span decades and are occasionally temporally concurrent, particularly in their breeding range, but the data have not been collated or simultaneously analyzed. We received count, nesting survey, and banding data sets from over 20 contributors spanning North and South America from the past 20 years. We approached developing an IPM by focusing primarily on the inclusion of data sets with the longest duration of collection across at least two demographic data types. We included environmental covariates to explain temporal fluctuations in rates and trends and connect smaller duration data sets. Our results highlight the utility of collation of data sets across research teams to inform data gaps and future management priorities for a sparsely distributed migratory warbler.

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POSTER: AFTERNOON SESSION

Leadership-Trust Dynamics in community-based management when members feel connected to the institution

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A strong sense of belonging to an institution can foster commitment, cooperation, and long-term engagement, facilitating the success of community-based natural resource management. When individuals perceive an institution as part of their identity and take pride in its success as their own, they are more likely to participate in collective action and adopt institutional norms and rules. This deep feeling of collective identity and self-esteem can foster individuals' trust and enhance perception of leadership effectiveness, which emerges as a social process shaped by group interactions rather than individual traits. It manifests through dedication to group success, coordinated efforts, and shared goals. However, these dynamics remain underexplored in small-scale fisheries systems. The purpose of this study was to explore the relationship between fishers' sense of institutional belongingness and their perceptions of leadership and trust in the Arapaima fishery co-management system. The survey of 457 fishers in the Brazilian Amazon found that over half the respondents had a strong sense of belonging, trust, and confidence in the leadership of the co-management system. Sense of belonging and perceived leadership effectiveness ($\rho = 0.3878$, $p = 0.000$) were positively, and moderately correlated. In contrast, the correlation between sense of belonging and trust in management figures was relatively weak ($\rho = 0.1064$, $p = 0.0276$). A focus on developing sense of belonging can enhance support and commitment to community-based management.

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POSTER: AFTERNOON SESSION

Perverse revegetation outcomes in Chesapeake Bay watershed stream restorations

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Stream restoration is increasingly used within the Chesapeake Bay watershed to remedy sediment, nitrogen, and phosphorus loads and to achieve forest buffer and tree canopy cover goals set forth by the Chesapeake Bay Program. Maryland's Chesapeake Bay watershed is surrounded by urban development which can increase the prevalence of invasive plant species that potentially interfere with stream health and compromise restoration goals. Concerningly, current stream restoration practices may promote invasion by creating suitable microsites for establishment (e.g., soil disturbance, increase in unused resources). To assess the potential for stream restoration to promote invasive plant species, we compared the vegetation composition of 46 stream reaches restored between 1994 and 2016 with a paired unrestored stream reach, representative of pre-restoration stream conditions. For each stream reach, we sampled a 100-m reach with 6 systematic sampling points oriented around the midpoint of the reach. At each sampling point, we measured species composition, basal area, photosynthetically active radiation, and soil nutrition. We found that restoration was associated with a greater proportion of non-native species and reduced coverage of native species. The relationship between stream restoration and increased invasion is potentially mediated by increased resource availability (e.g., light, soil nutrients). Because the majority of restored streams were more invaded than their paired unrestored stream, current restoration methods seem to not be limiting invasion and may even be promoting it.

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POSTER: AFTERNOON SESSION

Using Phylogenetics to Predict Bat Species Susceptibility to White-Nose Syndrome

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Global changes, including rising temperatures and the spread of zoonotic diseases, have forced species to adapt or perish. Understanding species' capacity to respond physiologically to new ecological challenges is essential to determining which species may be most vulnerable to ecological shifts. Evolution leaves a clear phylogenetic signal on a species' physiological and ecological diversification. Integrating physiological, behavioral, and morphological characters in the context of phylogenetic history has the potential to enable better predictions of species adaptive capacity by linking forecasts of species adaptive capacity to the historical evolutionary trajectories of species.

Our research seeks to address the macroevolutionary predictability of hibernating bats' responses to novel physiological threats using phylogenetic comparative methods. We aim to predict species' susceptibility to the spreading fungal disease (White-nose syndrome) in bats caused by the fungus Pseudogyymnoascus destructans across the Western United States. This study addresses the gap in knowledge relating to the phylogenetic predictability of susceptibility to pathogenic diseases in New World bats and species' susceptibility to communicable fungal infections. By utilizing data from empirical studies on the affected east-coast bats in a cross-validated model framework, we found a strong phylogenetic signal of species' susceptibility to zoonotic disease. Future work will use additional phylogenetic methods to predict bat species/populations in the Western United States not yet infected.

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