



**Harry R. Hughes**  
CENTER FOR AGRO-ECOLOGY



COLLEGE OF  
AGRICULTURE &  
NATURAL RESOURCES

# ANNUAL REPORT

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FISCAL YEAR 2022



Maryland has made great strides in finding solutions to critical issues facing our ecosystems and food system. The Hughes Center for Agro-Ecology is proud to be part of that progress. Since 1999, the Center for Agro-Ecology has brought together diverse interests from the agricultural, forestry and environmental communities to retain Maryland's working landscapes and the industries they support while protecting and improving the health of the Chesapeake Bay and its tributaries. We take pride in our collaborative work to bring research-based solutions at the systems level.

This document reflects on some recent accomplishments of the Center for Agro-Ecology. In 2021, the Center was awarded the University of Maryland College of Agriculture and Natural Resources internal Cornerstone Award for our work toward the College's strategic initiative, Ensure a Clean and Healthy Chesapeake Bay. In the past few years, our Board of Directors has reviewed and funded scientific research and projects totaling close to a million dollars, all while updating our five-year strategic plan to guide the Center as it looks toward future issues impacting Maryland farms, forests and communities. Our funded research is based on stakeholder input from a Research Advisory Council, comprised of leaders in Maryland's relevant state agencies, and from a Research Advisory Committee, comprised of leaders representing Maryland's agricultural, forestry and environmental sectors. In addition, the state legislature requested we execute two studies that will impact the future of Maryland's farms in the face of a changing climate and its forests as it is met with pressure from development and other sources. And we've been funded to partner on several grants that deal with some of agriculture's top issues of the day in food system resilience, animal waste technology and climate change.

As we look toward next year, the Center for Agro-Ecology will continue to be part of the dialogue that advances our mission of providing leadership to promote environmentally sound and economically viable agriculture and forestry as Maryland's preferred land use through research, outreach and collaboration. One organization cannot solve the issues the Hughes Center addresses while working in a silo. Often this work takes the participation of many partners to achieve a desirable and equitable outcome. So for this, we ask for your support and partnership so that we may help build a better future for Maryland's farmers, forests and waterways.

## Mission and Board of Directors

Founded in 1999, the Center brings together diverse interests from the agricultural, forestry and environmental communities for the purpose of retaining Maryland's working landscapes and the industries they support while protecting and improving the health of the Chesapeake Bay and its tributaries.

The Hughes Center's mission is to provide leadership to promote environmentally sound and economically viable agriculture and forestry as Maryland's preferred land use through research, outreach and collaboration. The Center works toward achieving its mission through a three-pronged approach of scientific research, policy analysis, and outreach and education efforts.

Management and direction of the Center are vested in the Board of Directors, comprised of not less than 12 or more than 27 members. The purpose of the Board is to advise the Executive Director in the development of a budget, on the policies and procedures of the Center, in the funding of research grant proposals, and on program planning and review.

### Staff:

Executive Director: Dr. Kate Everts  
 Assistant Director: Nancy Nunn  
 Administrative Coordinator: Linda Dawkins  
 Business Manager: Richard Gomez  
 Communications Coordinator: Josh Bollinger  
 Coordinator: Elizabeth Friedel  
 Research Associate: Dr. Aditi Dubey  
 Faculty Assistant: Rachele Franceschi

The Board members as of FY 2022 are as follows:

**President:** The Hon. Thomas McLain "Mac" Middleton

**Vice President:** Ernie Shea

**Secretary:** Steve Black

**Treasurer:** Andrew McLean

### Board Members:

Dr. Craig Beyroudy

Dr. William W. Bowerman

Dr. Jonathan Cumming

The Hon. Addie Eckardt

The Hon. James Gilchrist

Brett Grohsgal

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Ed Heikes

Amy Jacobs

Steven Jones

Erroll Mattox

Alison Prost

Pat Stuntz

Billy Willard

Keith Wills

Christopher S. Zarba

### Members Emeriti:


K. King Burnett

Edwin R. Fry

Robert M. Hutchison



Pictured above are Hughes Center staff members and members its Board of Directors as of FY 2022.



# Chesapeake Watershed Health

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We have come a long way on the path to cleaning the Chesapeake Bay, and the contributions from local governments and farmers to achieve the goals outlined in the Chesapeake Bay Watershed Implementation Plan (WIP) cannot be understated. However, as the population increases, society and science progress and real-world projects are initiated, we acknowledge that it may take longer than 2025 to achieve some of these goals. Therefore, the Hughes Center remains a committed partner in this effort.

In 2022, the Hughes Center continued its partnership with the Maryland Department of the Environment in its outreach on Bay-cleaning efforts. A-StoRM, or Advancing Stormwater Resiliency in Maryland, is a multi-year stakeholder-focused effort by MDE to modernize its stormwater regulations. Maryland continues to face urban flooding. Over the year, the Hughes Center hosted and helped publicize several public meetings for MDE's A-StoRM Stakeholder Consultation Group, which consists of leaders in local governments, nonprofits and representative organizations impacted by urban flooding. This effort comes as a result of Senate Bill 227 passed in the 2021 General Assembly. More information is available at [sb-227-maryland.hub.arcgis.com](https://sb-227-maryland.hub.arcgis.com).

The Hughes Center, in years past, has similarly assisted MDE with outreach to support the WIP. With the additional support of the Maryland Department of Agriculture, the Hughes Center and MDE regularly held workshops throughout the state to hear directly from local leaders in government and the agriculture community and to communicate expectations with the coming WIP phase. Feedback from these meetings was used when drafting new WIP phases. These meetings were vital to maintaining a transparent WIP process and creating a sense of community and teamwork around the effort to clean the Chesapeake Bay. As federal and state leaders continue to evaluate WIP goals, the Hughes Center is prepared to help with similar outreach efforts.

# Agriculture

Maryland's largest industry is benefiting from society's renewed interest in resource conservation. Nationally, our farmers and our local foods are recognized as vital resources in a time of rising prices at the grocery store, empty shelves and economic uncertainty.

At the Hughes Center, we are proud to be part of agriculture's enduring legacy through supporting research that pushes the boundaries of scientific advancement. From supporting research on cover crops to nutrient applications to saltwater intrusion on Maryland's coastline, the Hughes Center remains at the forefront of participating in research that makes a beneficial difference in our agriculture sector.

## **Maryland Agriculture Climate Vulnerability**

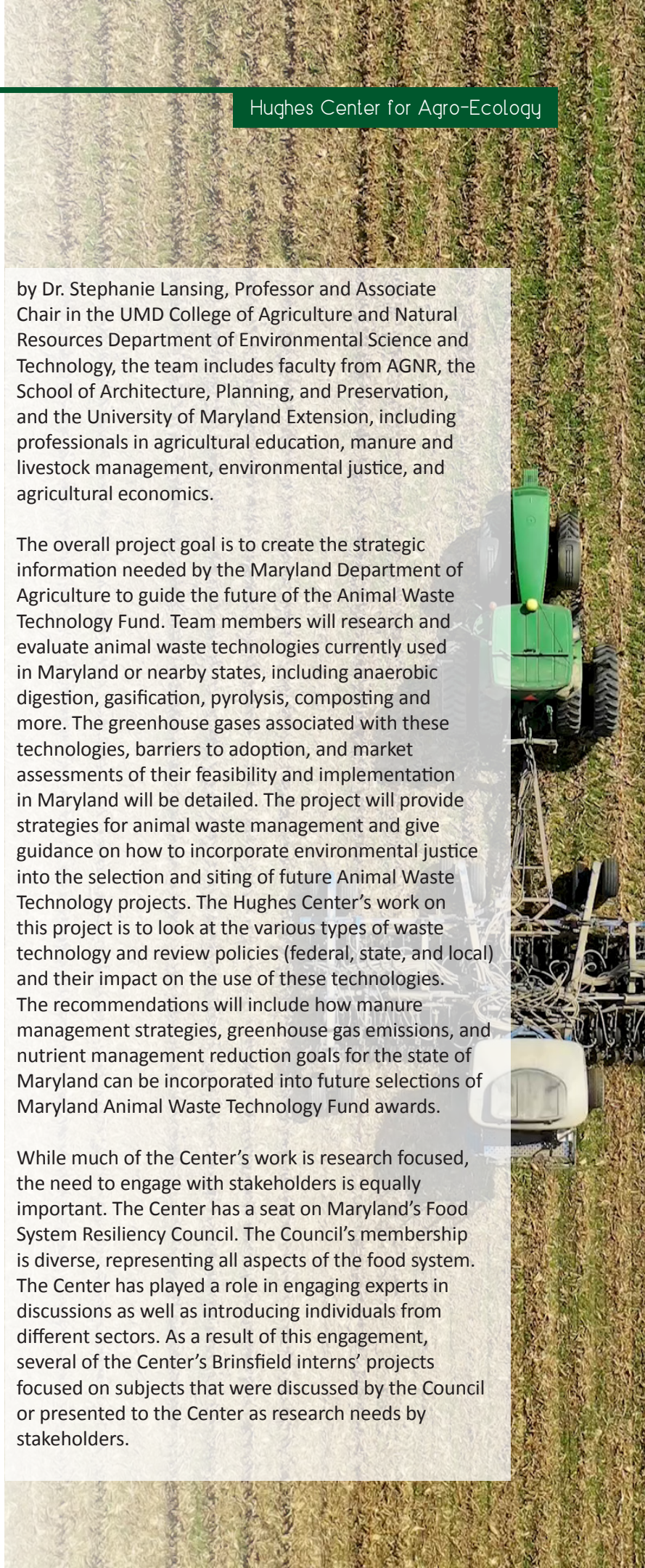
**Assessment:** Maryland's state government and legislature, in recognition of the challenge faced by farmers due to changing weather, supported agriculture by funding the Maryland Agriculture Climate Vulnerability Assessment. In 2021, the General Assembly passed supplemental budget language that required the Harry R. Hughes Center for Agro-Ecology (Hughes Center), Maryland Department of Agriculture (MDA), and Maryland Department of the Environment (MDE) to jointly develop a strategy to assess the vulnerability of Maryland agriculture to climate change. This resulted in a call for a full climate vulnerability assessment of Maryland agriculture to develop strategies to adapt to climate-induced changes to minimize adverse impacts. The General Assembly funded this study in 2022, and the Hughes Center began work on this project throughout the year. In addition to hiring a project coordinator, the Center hosted a daylong research convening to better understand the state of climate research and identify gaps where research could help advance agriculture's resilience to climate change. This study is expected to be released in 2024 and will include significant collaboration and outreach efforts so that it is driven by the needs of Maryland's farmers. More information is available at [go.umd.edu/MdClimateSmartAg](http://go.umd.edu/MdClimateSmartAg).

**Animal Waste Technology:** In 2022, the Hughes Center began working with a team of University of Maryland faculty on a comprehensive feasibility study of animal waste technologies in Maryland. Led

by Dr. Stephanie Lansing, Professor and Associate Chair in the UMD College of Agriculture and Natural Resources Department of Environmental Science and Technology, the team includes faculty from AGNR, the School of Architecture, Planning, and Preservation, and the University of Maryland Extension, including professionals in agricultural education, manure and livestock management, environmental justice, and agricultural economics.

The overall project goal is to create the strategic information needed by the Maryland Department of Agriculture to guide the future of the Animal Waste Technology Fund. Team members will research and evaluate animal waste technologies currently used in Maryland or nearby states, including anaerobic digestion, gasification, pyrolysis, composting and more. The greenhouse gases associated with these technologies, barriers to adoption, and market assessments of their feasibility and implementation in Maryland will be detailed. The project will provide strategies for animal waste management and give guidance on how to incorporate environmental justice into the selection and siting of future Animal Waste Technology projects. The Hughes Center's work on this project is to look at the various types of waste technology and review policies (federal, state, and local) and their impact on the use of these technologies. The recommendations will include how manure management strategies, greenhouse gas emissions, and nutrient management reduction goals for the state of Maryland can be incorporated into future selections of Maryland Animal Waste Technology Fund awards.

While much of the Center's work is research focused, the need to engage with stakeholders is equally important. The Center has a seat on Maryland's Food System Resiliency Council. The Council's membership is diverse, representing all aspects of the food system. The Center has played a role in engaging experts in discussions as well as introducing individuals from different sectors. As a result of this engagement, several of the Center's Brinsfield interns' projects focused on subjects that were discussed by the Council or presented to the Center as research needs by stakeholders.



# Forestry

In FY 2022, the Hughes Center released the most comprehensive study on Maryland's forests in the state's history. The state legislature requested and funded the Technical Study on Forest Cover and Tree Canopy in Maryland in 2019 under Senate Bill 729 and then later in 2021 under House Bill 991. The study was conducted by the Hughes Center, Chesapeake Conservancy and the University of Vermont Spatial Analysis Lab in consultation with the Chesapeake Bay Program, and an Advisory Committee comprised of the Maryland Department of Natural Resources, the Department of the Environment, the Department of Planning, the Department of Agriculture and the Chesapeake Bay Program. In an effort to improve Maryland's statewide inventory of forest and tree canopy cover and assess forest and tree canopy change and the effectiveness of Maryland's forest and tree programs, the Maryland Senate enacted a bill authorizing the study in 2019.

This report was supported by a grant from the Harry R. Hughes Center for Agro-Ecology utilizing funding from the State of Maryland, awarded following an open Request for Proposal (RFP) process.

The Technical Study on Changes in Forest Cover and Tree Canopy in Maryland, or Maryland Forest Technical Study, uses high-resolution data to analyze forest and tree canopy change at the local scale and provide a greater understanding of the key drivers of change. Insights derived from the study may help develop recommendations and policies that shift the balance to meet Maryland's forest cover and tree canopy goals. The partners made several recommendations as a result of this study, including improving monitoring through technological innovation, addressing the loss of tree canopy outside forests and assessing causes of tree canopy change within forest blocks.

The study finds that over time, Maryland's rate of forest loss has declined and the state is approaching a goal of achieving no net forest loss. With State priorities focused on tree plantings and increased funding available for land protection and agricultural conservation practices, the state has the opportunity to soon achieve no net forest loss and tip the balance towards forest gain.

At regional and county scales, patterns of forest change vary widely, and some concerning trends continue. Counties in central Maryland with rapid development and population growth experienced greater rates of loss, especially loss associated with development. While forest levels as a whole are stabilizing, continued urbanization is fragmenting forests and encouraging the spread of invasive species. Fragmentation and invasive species spread are likely to continue, given current patterns of change, especially in rapidly growing areas of the state.

As the Forest Conservation Act reached 30 years in practice in 2021, this is an important occasion to mark the successes of Maryland's forest protection legislation and reflect on opportunities to further leverage forests and tree canopy to enhance benefits for habitat, water quality protection, climate resilience and mitigation, human health and environmental justice.



## Technical Study on Changes in Forest Cover and Tree Canopy in Maryland

November 2022



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Chesapeake  
Conservancy



University of Vermont  
Spatial Analysis Lab

To review the methodology and read the study, “Technical Study on Changes in Forest Cover and Tree Canopy in Maryland,” in its entirety, visit [www.chesapeakeconservancy.org/mdforeststudy2022](http://www.chesapeakeconservancy.org/mdforeststudy2022).

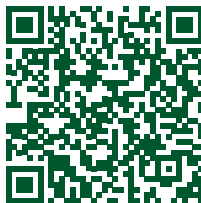
Additionally, an associated online story map provides the opportunity to view and interact with data and results produced in support of this study: [cicgis.org/portal/apps/storymaps/stories/b519e88ccc8c4c4c8d4c870f64e210ed](https://cicgis.org/portal/apps/storymaps/stories/b519e88ccc8c4c4c8d4c870f64e210ed).

“The findings from this study are key for decision-makers at both the statewide and local levels as they consider future strategies for trees and forests,” said Harry R. Hughes Center for Agro-Ecology Executive Director Dr. Kate Everts. “This study comes at a critical time in Maryland as populations continue to increase and as we consider the future of Chesapeake Bay restoration. The Hughes Center is grateful for the opportunity to release this study and help tell the story of changes among our forests and trees so that science-based decisions can drive Maryland’s approach to protect them into the future.”

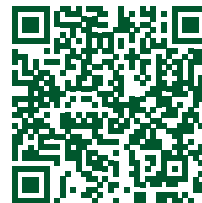
**Key Findings Include Data On:**

- Maryland’s Existing Forest Cover and Tree Canopy
- Potential Locations for Afforestation and Reforestation
- Health and Quality of Maryland’s Forests
- Progress toward Chesapeake Bay Watershed Agreement of 2014
- Forest and Tree Canopy Changes
- Protected Areas Slow Forest Loss and Are Also a Source of Tree Canopy Gain
- Forest Mitigation Banking
- Tree Planting Programs throughout Maryland

**Read The Study**



**View the Story Map**





# Funded Research

Each year, the Hughes Center enters into a request for proposals process to fund research priorities identified in our strategic plan that advance science in agriculture, forestry or the Chesapeake Bay. We solicit proposals on topics developed following an extensive outreach process to stakeholders. This process aims to extract information on top issues and identify gaps where scientific research is needed to address those issues and find viable solutions that balance environmental and economic interests.

Currently, research is being conducted on topics ranging from saltwater intrusion on Maryland's Eastern Shore, to healthy forest practices for landscapers, to providing training to ag technical service providers, or using machine learning to improve aquaculture oyster growing conditions.

Read about all  
our research here:



## ***Building coastal resiliency: adapting cropping systems to saltwater intrusion and mitigating climate change and Adapting to increasingly saline soils in coastal Maryland:***

These projects represent a suite of research partially funded by the Hughes Center that addresses saltwater intrusion on the Delmarva Peninsula. This work is being pioneered by UMD scientist Dr. Kate Tully in collaboration with researchers including Dr. Pinki Mondal and Dr. Jarod Miller of the University of Delaware, Dr. Keryn Gedan of George Washington University and UMD researcher Dr. Rebecca Ephanchin-Niell.

Saltwater intrusion represents the leading edge of coastal climate impacts. Inland movement of seawater and land subsidence can change soil salinity in coastal farmlands, leading to crop yield declines and reduced resilience of coastal lands to climatic events. Current research indicates a 79% rise in salt deposits along the farm fringes in coastal Maryland between 2011 and 2017. However, no dataset exists to determine the annual rate of changes that can be used for better decision-making. *(Continued on next page)*



Funded in 2021, Mondal's study, *Adapting to increasingly saline soils in coastal Maryland*, seeks to fill this gap and provide farmers, technical advisors, and policy-makers with information that is needed to promote adaptation and resilience to these sea-level rise and climate-driven changes. The interdisciplinary group will combine satellite, drone, crop and soil data, and use predictive modeling to calculate the annual rate of change in plant growth due to salt deposit formation and to predict future land or salinity changes. This research will inform agricultural stakeholders about at-risk areas and potential transitions' timing, facilitating timely adaptation. Identifying and predicting transition zones where salinity problems are not yet apparent but will soon degrade land productivity. This may enable farmers to transition at-risk land into easements and allow ecosystem transitions that promote soil and ecosystem health. This project builds on research investigating saltwater intrusion on Maryland's Lower Eastern Shore that this team has been performing since 2017. Previous grants funded by the Hughes Center looked into ways to ameliorate salt stress, potential alternative crops, the effectiveness of establishing perennial grasses in the margins of farm fields affected by saltwater intrusion, and the creation of maps to identify priority risk areas.



#### ***Assessing the Effectiveness of Soil Health Practices in Enhancing Soil Organic Carbon in Maryland:***

Conducted by University of Maryland Associate Professor Dr. Gurpal Toor, and Colorado State University Professor and Nobel Laureate Dr. Keith Paustian, an ultimate goal of this study is to strengthen the science of measuring and tracking soil carbon. This has been a noted need in soil science in order to maintain and optimize soil health and to sustain farm productivity and protect the environment. In Maryland, policy in a 2017 bill defined a need to develop local capacity to measure and track organic carbon in soil, as part of a larger promotion of soil health programs and practices. Investigators of the Hughes Center-funded study will: (1) collect, collate and analyze existing (but disparate) data on impacts of agricultural management practices on organic carbon storage and soil health; (2) collect new on-farm measurements and lay the foundation for a long-term soil monitoring/measuring network in Maryland; (3) test and refine state-of-the-art decision support systems to aid farmers and land management agencies evaluate their best options for increasing organic carbon in soil and soil health; and (4) provide training and outreach on using these tools to the full range of stakeholders.

#### ***Improving Forest Health of Small-Acreage Properties through Service Provider Training and Landowner Education:***

This project is led by Jonathan Kays of the University of Maryland Extension in partnership with the Alliance for the Bay and the Maryland Department of Natural Resources. Most (85%) woodland parcels in Maryland are from 1 to 9 acres in size, a trend caused by continued parcelization of the landscape. The lack of conventional forestry assistance and a focus on amenity-based objectives requires a new approach to enhance forest health and encourage woodland stewardship. This project created a Woodland Health Practices Handbook aimed at service providers like landscapers in order to train them on a suite of healthy practices for small forest patches between 1 and 9 acres. This expands their services and offers landowners opportunities to improve their forests for things like ecosystem services or recreation. Since its funding in 2019, this project has expanded into other states, including Pennsylvania and West Virginia.

***Advanced machine learning of factors for improving oyster hatchery production:***

This project is being conducted by the University of Maryland Center for Environmental Sciences researchers Drs. Vyacheslav Lyubchich, Matthew Grey and Greg Silsbe. It aims to process large amounts of hatchery and environmental data to identify conditions leading to hatchery inefficiencies and strategies for mitigating their impacts on production. The hatcheries are heavily influenced by environmental conditions in the coastal zones where they are located. The water is taken from the environment and, after more or less thorough processing (such as filtering, heating, or cooling), is used for growing oyster larvae. This project proposes to use machine learning techniques to identify patterns in the data; between hatchery production outcomes and factors such as water quality, atmospheric conditions, and implementation of agricultural fertilizers and herbicides upstream from the hatchery. This extensive data analysis will help in finding the causes of the crashes and will allow managers to stay informed about the potential success of the production. With this knowledge, the managers will be able to focus on manipulating specific variables to improve production outcomes.

***Advancing farmers' capacity to prepare for and address climate change:***

Achieving resilience to climate change and developing thriving agricultural carbon programs present distinct challenges to Maryland's agricultural system. Yet, these tasks are also interrelated, where carbon program enrollment can support farmers' adoption of practices that reduce emissions while promoting climate resilience. However, there are many unknowns regarding what is needed to support these transitions. Farmers are the primary decision-makers, but technical service providers support farmers' decisions by offering trusted management counseling, application services and products. These two key agricultural stakeholders are the primary focus of this research project, which is being performed by Matt Houser and Amy Jacobs, both of The Nature Conservancy, in coordination with Lindsay Thompson, executive director of the Maryland Grain Producers. The researchers will interview farmers and technical service providers to understand their respective: (1) views and experiences with climate risks, (2) existing use of resilience-management approaches, (3) interest in and support for carbon programs, and finally (4) what barriers limit or discourage them from further engaging with these topics. The interviews will take place across the state of Maryland and offer practical insight into how organizations and policies can better support our state's agricultural system as it transitions to address climate change.



# Internship Programs



## **Brinsfield Internship Program:**

*Note: The Hughes Center wishes to express its most profound appreciation to the University of Maryland Strategic Partnership: MPowering the State (MPower) and its Executive Director Adrienne Arthur for their support of the internship program.*

The Russ Brinsfield Internship Program is a collaboration between the Hughes Center and the University of Maryland Agriculture Law Education Initiative. The internship program, which began in 2017, engages an undergraduate student from the University of Maryland College of AGNR and a law student enrolled at the Maryland Francis King Carey School of Law, who work together to develop viable solutions to a variety of complex environmental, agricultural and forestry-related issues.

In 2022, we were happy to welcome four interns under the program. Mariah Campbell and Nathan McMullen (University of Maryland at College Park, College of Agriculture and Natural Resources, 2023), Samantha Fairbanks and Alex Sadzewicz (University of Maryland Francis K. Carey School of Law, 2024) worked on five main project areas throughout the summer of 2022.

**Agritourism and Zoning:** Maryland’s zoning laws differ by county. Agritourism has gained popularity in recent years with the oncoming of activities like corn mazes, “glamping” or websites like Hipcamp, or using farms for event venues, for example.

However, there is no uniform definition used by counties across the state for agritourism, and each county may interpret policies or a definition’s intention differently. This can lead to uncertainty for owners of agriculture operations seeking to diversify their income.

In response to a request to investigate and understand various zoning definitions throughout Maryland, the Brinsfield interns created a comprehensive zoning matrix related to agritourism and on-farm manufacturing.

“This was a really cool experience to understand how zoning impacts agriculture in Maryland and understand the importance of expanding agritourism so we can keep a thriving agricultural industry,” said intern Sam Fairbanks, a Maryland Carey Law student with a bachelor’s degree in geology and environmental management from James Madison University.

**2023 Farm Bill Analysis:** Working with the Farm Bill Law Enterprise program (FBLE) and other interns at institutions like Vermont Law School and Harvard, the Brinsfield interns condensed lengthy Congressional hearings on the 2023 Farm Bill into easily digestible law posts for the general public. They then co-wrote blog posts for the FBLE to include in its report on ways to improve the upcoming Farm Bill in support of aspects of climate and conservation.

“The Farm Bill is so important not just because it is a huge piece of legislation that affects every aspect of the food and agricultural system, but also because while it may be delayed in the legislative process, it will eventually pass and have effects moving forward,” said intern Alex Sadzewicz, a Maryland Carey Law student with a bachelor’s degree in biology and chemistry from Butler University.

“This project has given me much more understanding of the legislative process,” Sadzewicz said. “Coming into this, I didn’t really have a background where we discussed anything like this and being able to actually sit in on the hearings and see what’s going on in the House and the Senate when we’re talking about making this type of legislation was really impactful.”

**Oyster Aquaculture Substrate:** The Brinsfield interns also provided research findings on alternative materials that could potentially be used as a base for planting aquaculture oysters.

Current Maryland law states that, without permission from the Maryland Department of Natural Resources, shells are the only substrate allowable for any oyster plantings, including aquaculture oysters.

Oyster shells and other types of shells can be expensive for oyster growers because there is a finite amount available. Their research followed alternative bottom substrates used in other areas beyond Maryland, the successes and challenges of those alternatives, and the cost-benefits of using them compared to shell. Federal and state permitting laws were considered in the comparisons.

“This project connected the science and the law with the business and cost aspect of this problem in a really interesting way,” Sadzewicz said.

**School Gardens:** The Brinsfield interns also produced research that looks at liability issues surrounding the use of produce from school gardens.

While schools are potentially interested in using the produce grown by their garden programs, there are numerous issues to consider, including food safety, quantity produced, and processing requirements.

“In general, this was a really great project to work on, really rewarding for me personally — I’m familiar with the impact that these school-to-garden programs can have,” said intern Nathan McMullen, an undergraduate student at the UMD College of Agriculture and Natural Resources (UMD AGNR). “When I was in elementary school, we had a couple of raised beds where we grew tomatoes and peppers, and it was a great experience, and I definitely ate a lot more vegetables because of that, so just getting to contribute to a project that’s advancing the goals of access to nutrition and having a real impact through this project in my community was really exciting.”

**Urban Agriculture:** Interest in urban agriculture around Maryland has been spreading as one way to meet the demand of the regional food system in an ever-urbanizing landscape with rising populations. But resources are still limited when it comes to leasing urban land for agricultural purposes.

The Brinsfield interns created a guide for urban farmers looking at Maryland’s policies. The guide answers many questions farmers in urban areas might have about the leasing process, as well as a compilation of sample leases, legal research, and plausible considerations specific to urban agriculture, such as waste disposal.

“Urban agriculture is an emerging sustainable practice transforming urban communities across the U.S. Locally grown food from urban farms provides nourishment and food security to areas that don’t have access to traditional agriculture. It also promotes community bonding and agricultural education for all generations,” said intern Mariah Campbell, an undergraduate at the UMD AGNR.

“Leasing is essential for progressing urban ag in Maryland. I hope that the resources we created will ease the process and encourage individuals and communities to get involved in urban agriculture,” she said.



### **Joint Agro-Ecology and Science Communication Internship on Saltwater Intrusion**

This internship is a collaboration between the Hughes Center and the Agroecology Lab at the University of Maryland. Two UMD students spent the first half of their summer learning field and laboratory research skills with the Agroecology Lab as it continued its groundbreaking work on saltwater intrusion on Maryland's Eastern Shore. The second half of the summer was spent with the Hughes Center translating aspects of what they learned in the field into content for the public. They wrote a collective of nearly 20 stories on saltwater intrusion that are slated for release throughout 2023. They can be read at [go.umd.edu/saltwater-intrusion](http://go.umd.edu/saltwater-intrusion). *Note: This internship was supported through a National Fish and Wildlife Foundation grant.*



**Carrie Anderson** (Class of 2022) majored in environmental science and policy with a concentration in environmental geoscience and restoration at the University of Maryland in College Park. She is interested in how geology can inform the understanding of ecosystem functions and services. With a strong background of coursework in hydrology, geomorphology, and urban and agriculture restoration, Carrie looks forward to a career combating climate change by working with the Earth's natural resources. She is from Rockville, MD, is an active member of UMD's environmental science professional fraternity Epsilon Eta, and has also interned with MaryPIRG's Student Climate Action Coalition.



**Chelsea Patterson** (Class of 2023) majored in environmental science and policy, specializing in policy and politics at the University of Maryland. She is enrolled at UMD's Institute of Applied Agriculture, focusing on agricultural leadership and communication. On campus, she is the chair of the Dean's Student Advisory Council for the College of Agriculture and Natural Resources, of which she has been a member for the past three years. Chelsea is also a member of the pre-law professional fraternity Phi Alpha Delta and served as a member of the Student Advisory Council for the Vice President of Diversity and Inclusion.

## **Internship Supporting Thriving Agriculture in Urban Landscapes:**

In 2022, the Center also hosted the year-three workshop for a multi-state, multi-million dollar grant project titled Thriving Agriculture in Urban Landscapes. This 5-year, \$9 million project, funded by the USDA's National Institute of Food and Agriculture, uses a segment of the Chesapeake Bay region as a case study for how agricultural communities will evolve in landscapes that continue to urbanize. The Hughes Center is collaborating on this project with researchers from Penn State, the University of Maryland, Virginia Tech, Ohio State, Utah State and the Stroud Water Research Center and hired an intern, recent George Washington University graduate Sydney Luce, to help with research.

This project seeks to create economically thriving and environmentally beneficial agricultural systems in urbanized landscapes, defined as suburban and exurban areas where agricultural activities are interspersed with housing, retail, and other urban land uses. Agricultural operations within these areas are vital to the sustainability of agriculture, with more than 60 percent of U.S. net farm income coming from these urbanized landscapes.

During 2022, Luce worked closely with interns from Penn State and Virginia Tech to collect data and develop a comprehensive understanding on population projections for the region and how agriculture will be impacted. Their work will help provide a baseline for the rest of the study in order to predict trends for how agriculture within urbanized landscapes will evolve over the next 25 years if current trends continue.

You can find more information about this project at [thrivingag.org](http://thrivingag.org).

Read More Here



# Fiscal Year 2022 Financial Statement

July 1, 2021, to June 30, 2022

## Revenue

### Nonprofit Account

Balance	\$55,039
Contributions and Grants	\$14,457
Interest	\$12
<b>Total</b>	<b>\$69,508</b>

### Funds Administered Through the UMD College of Agriculture and Natural Resources Resources, University System of Maryland Foundation, UMD College Park Foundation:

Grants Awarded to Hughes Center	\$54,390
Hughes Endowed Fellowship Fund	\$668,125
Research and Outreach Funds	\$1,013,815
Operations and Compensation	\$310,480
Mpower Maryland Funding for Brinsfield Interns	\$12,000
<b>Total</b>	<b>\$2,058,810</b>

## Expenses

Research and Outreach	\$295,506
Research Conducted by the Hughes Center	\$8,654
Mpower Maryland Funding for Brinsfield Interns	\$10,344
Operations and Compensation	\$288,707
<b>Total</b>	<b>\$603,211</b>

### Funds Administered Through the UMD College of Agriculture and Natural Resources Resources, University System of Maryland Foundation, UMD College Park Foundation (balance as of June 30, 2022):

Grant Funding	\$54,390
Hughes Endowed Fellowship Fund	\$679,217
Endowed Fellowship Fund Operations	\$1,498
Research and Education Funds	\$739,025
<b>Administered Funds Balance</b>	<b>\$1,474,130</b>
<b>Nonprofit Account Balance</b>	<b>\$69,508</b>

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**Total Balance as of June 30, 2022** **\$1,543,638**

## A Unique Partnership

The Harry R. Hughes Center for Agro-Ecology is a nonprofit organization affiliated with the University System of Maryland. The Center supports the system's interests by promoting, sponsoring and implementing scientific research and other services that help advance the university's mission and needs of Maryland.

The Center and University System sign an annual agreement that describes the purpose of the Center and the relationship between the two parties. However, the Center is a legally separate, 501(c)(3) nonprofit organization, recognized as such by the Internal Revenue Service. The management and control of the Center rest with its Board of Directors.

## How is the Center Funded?

The Center receives funding from a variety of private sources, the University of Maryland and the State of Maryland. Donations from individuals and foundations support a variety of research and outreach activities, including the Harry R. Hughes Endowed Fellowship Fund. Annual allocations of state funds are administered through the University of Maryland College of Agriculture and Natural Resources, which also provides operations and compensation funding for five full- and part-time staff positions.

## About This Financial Report

The 501(c)(3) funding stream has been reviewed by an independent auditor. A full copy is available from the Center upon request. We have also listed the funds administered by the University System of Maryland and its agents; those funds are audited separately according to the System's protocol.



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CENTER FOR AGRO-ECOLOGY



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