



# Potomac River and Watershed Listening Sessions



# A vision for a sustainable and community-driven watershed

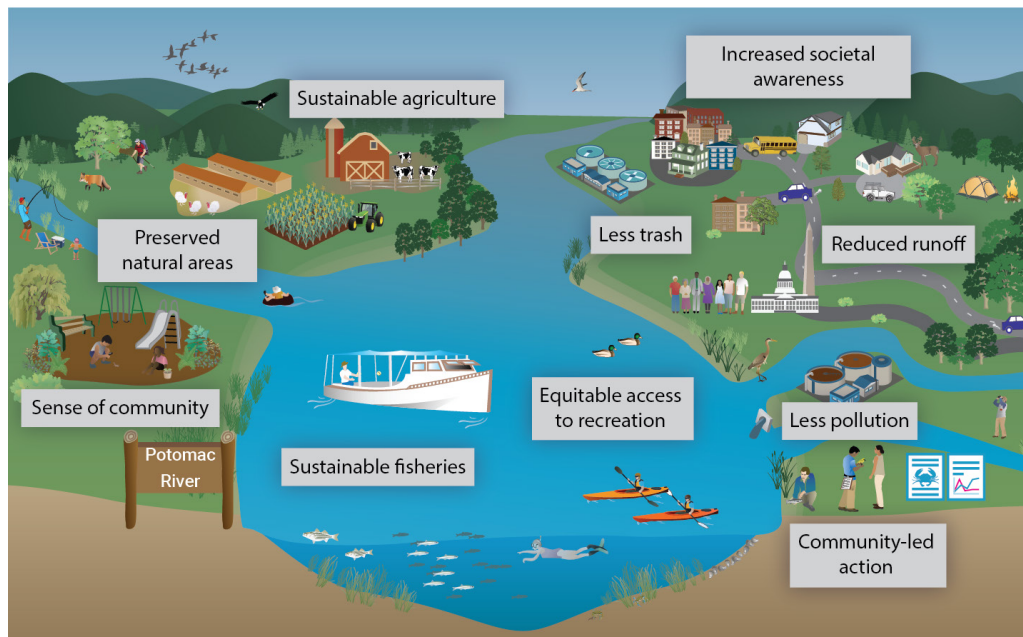


Kayakers on the Potomac River.  
Photo Credit: Lili Badri.

The Potomac River watershed is an essential resource with interconnected and shared values. An inclusive and participatory approach can lead to a comprehensive vision for the entire watershed that supports informed decision-making. During each Listening Session, participants identified the qualities they wish to see in the Potomac watershed in the future. They also proposed specific actions to achieve those goals.

Overall, participants envision a cleaner Potomac with reduced trash and pollution, increased community engagement, sustainable agriculture and fisheries, preserved natural areas, and equal access to recreation. To achieve this vision, they also recommend actions such as community education, policy advocacy, anti-litter campaigns, sustainable development, and ecosystem-based management.

While the locations shared many concerns, each has its specific priorities. Cumberland focuses on improving flood management and increasing funds. Frederick values cultural heritage preservation and increasing citizen science initiatives. Wheaton aims to preserve natural areas and promote accountability. Alexandria would like reduced traffic and increased trash cleanups. Woodbridge seeks functional, resilient wetlands and broader stakeholder engagement, while Leonardtown emphasizes biodiversity preservation and an increase in community investment.



Community outreach



Impervious surface reduction



Increased education



Ecosystem-based management



Anti-litter messaging



Sustainable development



Efforts in policy and government

A conceptualized vision of a sustainable Potomac co-developed with stakeholders over five Listening Sessions held from 2022-2025.



## Listening Sessions: A Tool for Stakeholder Engagement

In 2024, Global Sustainability Scholar Taylor Ouellette produced a Story Map outlining the Listening Session Model and its importance to the COAST Card Project. To read more about how the Listening Sessions are applied in the Chesapeake Bay, scan the QR code to the left or follow the link: <https://tinyurl.com/2esfrf2f>.

# The Potomac Watershed as a case study

In the Chesapeake Bay, COAST Card (Coastal Ocean Assessment for Sustainability and Transformation) is first being developed for the Potomac Watershed, which is divided into three distinct regions: the Upper Potomac (upriver of Harper's Ferry), the Middle Potomac (from Harper's Ferry to the start of the tidal waters), and the Lower Potomac (downriver of the tidal waters).

The Potomac River gets its name from the Algonquin word Patawomeck, after the village that used to sit on the river's southern bank. The Potomac Watershed is the second largest watershed in the Chesapeake Bay at 14,670 square miles and is home to 6.9 million people. Its boundary overlaps four states (Maryland, Virginia, West Virginia, and Pennsylvania) and contains the District of Columbia.

Beginning in 2022, the University of Maryland Center for Environmental Science began holding community Listening Sessions, events held in public places for any person interested in discussing how they interact with their watershed, the characteristics they value, and their concerns for the future. Over the last three years, a total of six events have been held along the Potomac River. Four took place in Maryland—Cumberland, Frederick, Leonardtown, and Wheaton—and two took place in Virginia—Alexandria and Woodbridge.

The primary goal of these Listening Sessions is to inform the application of the COAST Card framework to a particular area, incorporating the daily experiences and concerns of local stakeholders. Participants engage in a series of activities (listed below) to provide feedback on valued characteristics of their watershed, perceived threats, desired future conditions, and actions needed to achieve their vision. This process captures how residents interact with their watershed and how management actions might affect their lives.



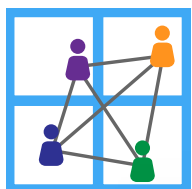
## Why should you care?

Establishing a shared understanding with stakeholders and identifying their perspectives on current conditions, including values and threats facing the watershed is important for the COAST Card framework.



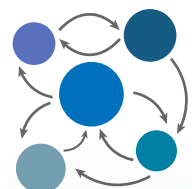
## What do we measure?

After taking stakeholder perspectives into account, the next step in the framework is identifying social, cultural, economic, and governance indicators in order to create an inclusive socio-environmental Report Card.



## Who should be involved?

Identifying stakeholders involved in Potomac watershed issues and determining who else should be included to improve collaborations through social network analysis.



## What can be done?

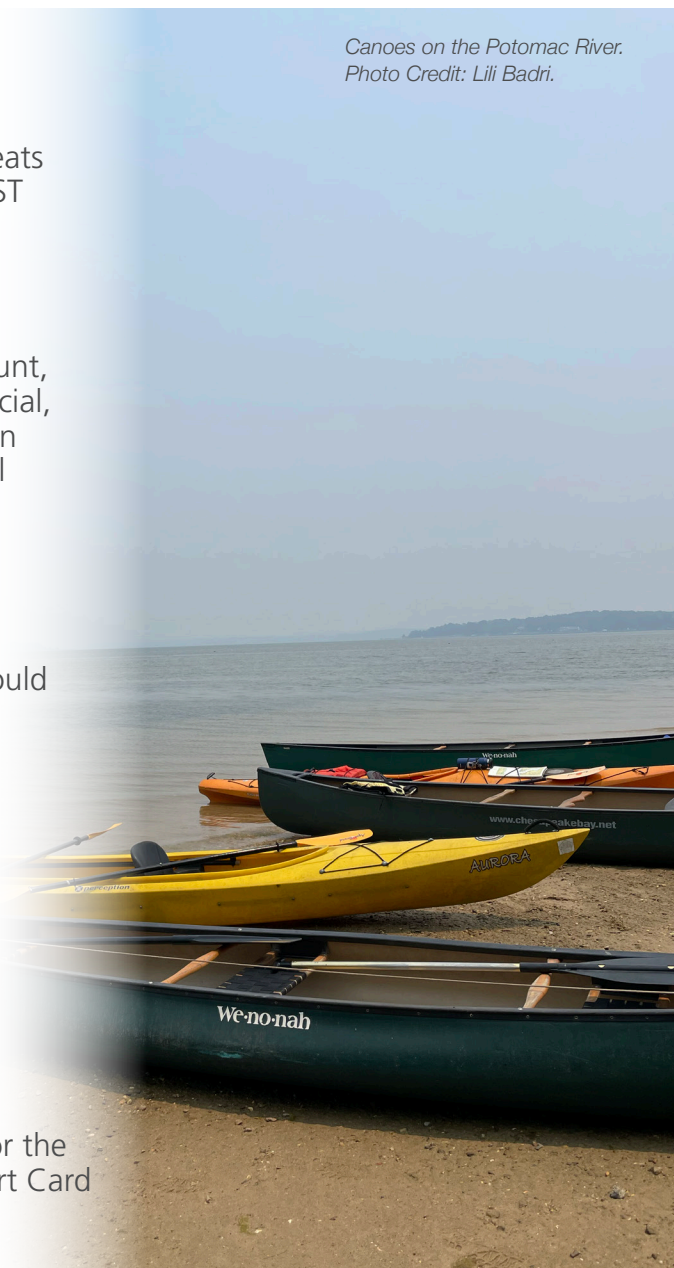
Using system dynamics modeling, actions are ranked by quantifying indicator relationships, assessing management scenarios, and making recommendations for better outcomes.



## Where do we go?

Developing a shared vision and path forward for the watershed is necessary to ensure that the Report Card will be useful to the community.

*Canoes on the Potomac River.  
Photo Credit: Lili Badri.*



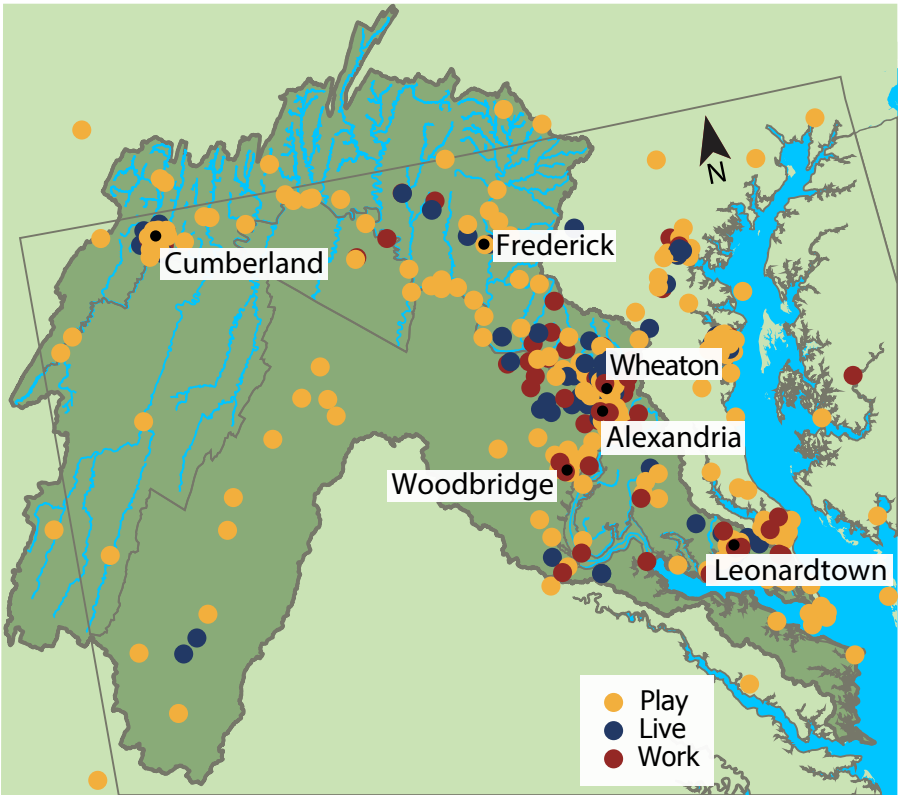
# Diverse participation provides comprehensive insight

Participants across all listening sessions represent various interests: government agencies (local, state, and federal), research institutions (universities, labs, and scientific bodies), private businesses, nonprofits, and faith-based organizations reflecting the diversity of Potomac River watershed stakeholders. Each listening session brought together different combinations of stakeholder groups, reflecting the value of this inclusive and broader outreach to foster multi-sector collaboration:

- **Hood College (Frederick, MD)** featured diverse participants, from policy and science experts to community members and local officials.
- The **Washington Sailing Marina (Alexandria, VA)** had a mix of science, government, local marina personnel, and the private sector.
- **Leonardtwn Wharf (Leonardtwn, MD)** primarily drew community residents, boaters, and visitors from Southern Maryland, showing strong local interest despite fewer formal affiliations.
- The **Potomac Science Center (Woodbridge, VA)** attendees were mainly from the Chesapeake Bay Program Scientific and Technical Advisory Committee, with some residents joining.
- **Canal Place (Cumberland, MD)** attracted a mix of grassroots nonprofits, riverkeepers, church groups, and tourists.
- The **Capital Rivers Church (Wheaton, MD)** had a strong faith community connected to healthcare, education, and nonprofits.

Sector	Example Group
Government and public	Private citizens Environmental Protection Agency
Academia	Hood College George Mason University Prince George County Public Schools
Private	All Out Adventures LLC Trout Unlimited
Non-profit	MITRE Corporation Project WET

Sectors that attended each listening session with example groups.



Participants identified areas in the Potomac Watershed where they work, live, and play.

Participants mainly came from the towns in and around where each event took place; however, the map to the left, where visitors marked the areas where they live work and play in the watershed, shows how everyone uses the entirety of the Potomac watershed.

Activities like this reveal how interconnected communities and their watersheds are, even if it might not seem apparent at first. Water quality and economies in Cumberland and Frederick can create effects that can be seen downriver in Woodbridge and Leonardtown. People who live in Alexandria head out to Cumberland or Leonardtown to use the water or recreate in the mountains.





# Social, environmental, economic, and governance indicators provide comprehensive assessment

After identifying areas of importance and concern within the watershed, the next step is to consider what specific measurements will accurately describe the health of an area. Called indicators, these measurements must evaluate not only the ecological health of an area, but also the social, environmental, and governance characteristics. These categories are undeniably interconnected; therefore, we must consider each of them for a holistic picture.

- Protected and conserved areas
- Funding
- Management implementation
- Infrastructure safety
- Green infrastructure
- Diversity
- Education
- Environmental justice
- Environmental stewardship

- Development
- Wages
- Affordable housing
- Flood insurance affordability
- Local economies
- Wealth disparity
- Tourism



- Water quality (PFAS)
- Flooding and drainage
- Biodiversity
- Urban heat
- Plastic/trash
- Soil health
- Fisheries
- Climate vulnerability
- Coastal erosion and silting

- Public health
- Recreational access
- Citizen awareness
- Environmental literacy
- Historical sites
- Indigenous and local culture
- Adaptation and resiliency
- Food deserts

*Indicators suggested by participants over the six Listening Sessions. They are categorized by governance, environment, economic, and people and culture, encompassing ecological, social, and economic characteristics.*

## Understanding stakeholder relationships can maximize impact

Current and desired collaboration centers on bridging technical expertise, grassroots advocacy, and policy influence. The Potomac Science Center and Frederick events show strong academic-government linkages. Community and faith-based groups at Canal Place and Capital Rivers Church focus on equity and local solutions, including community-based learning and citizen science. Washington Sailing Marina and Leonardtown Wharf mix public, private, and advocacy interests to address water access, coastal resilience, heritage, and community-based learning.

All sessions express the need to collaborate with additional stakeholders, including Indigenous communities, younger populations, social scientists, underserved communities, and policy-makers. Scientists and technical experts want to broaden their policy initiatives and community engagement. At the same time, local organizations seek stronger technical and research partnerships to improve environmental management.



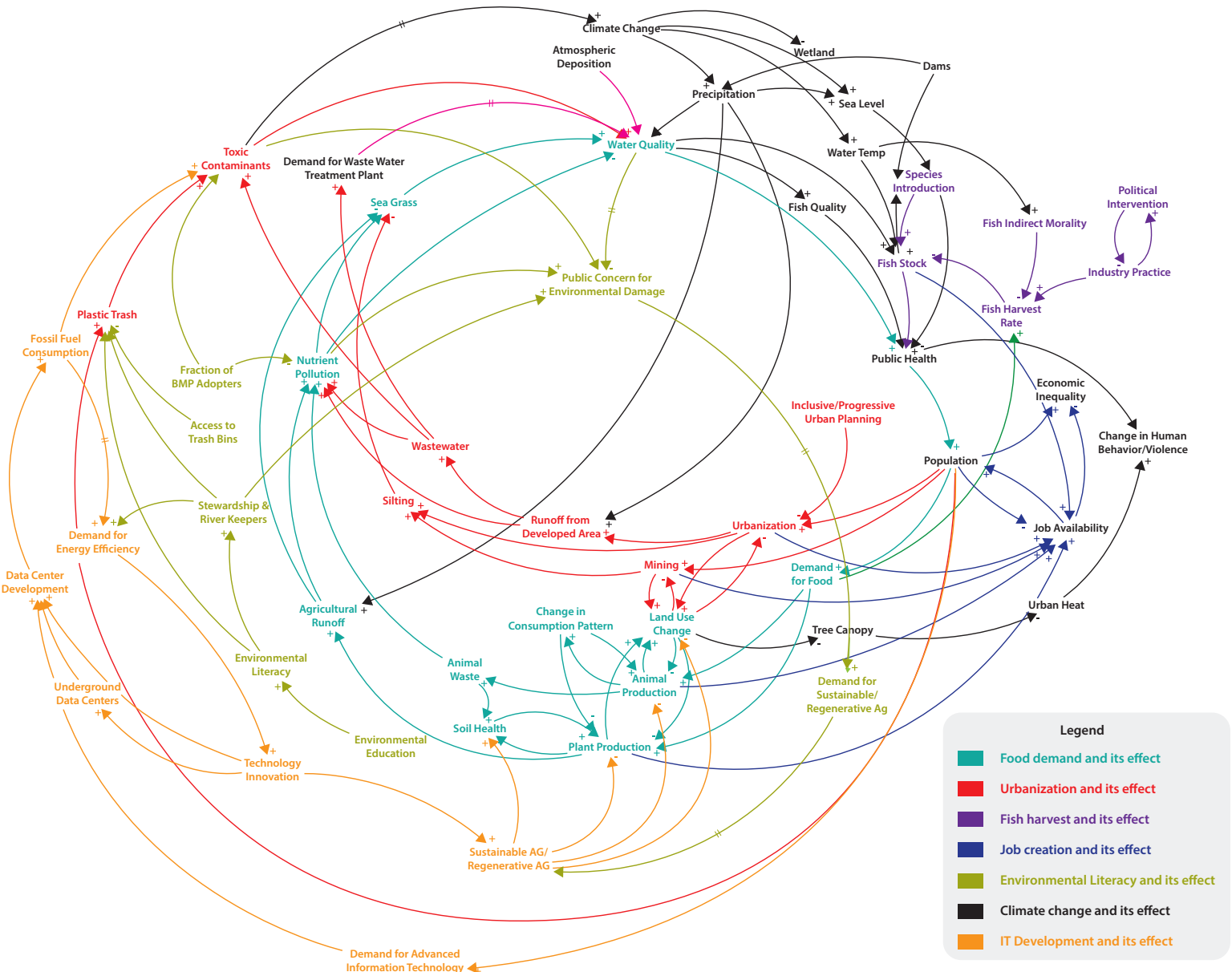
*Participants discuss relationships and additional groups and stakeholders to include in the report card process. Photo Credit: Kameryn Overton.*



## Identifying ecosystem relationships

Causal loop diagrams are tools that help us understand how different parts of ecosystems are connected and how they affect the availability of resources. Resources play a crucial role in this process, and their availability affects how they are used. The carrying capacity of the environment refers to how much pressure it can handle before it starts to break down. These diagrams are a great starting point for discussions with stakeholders and experts about what threatens our environment's carrying capacity and how we can tackle those threats.

The causal loop diagrams created during the Listening Session events highlighted the relationships among aspects of the ecosystem that participants deemed important. Key emerging themes included food demand, urbanization, fish harvest, job creation, environmental literacy, climate change, and information technology development. By integrating insights from different stakeholders, we can have a holistic understanding of the complex relationships within the Potomac Watershed.



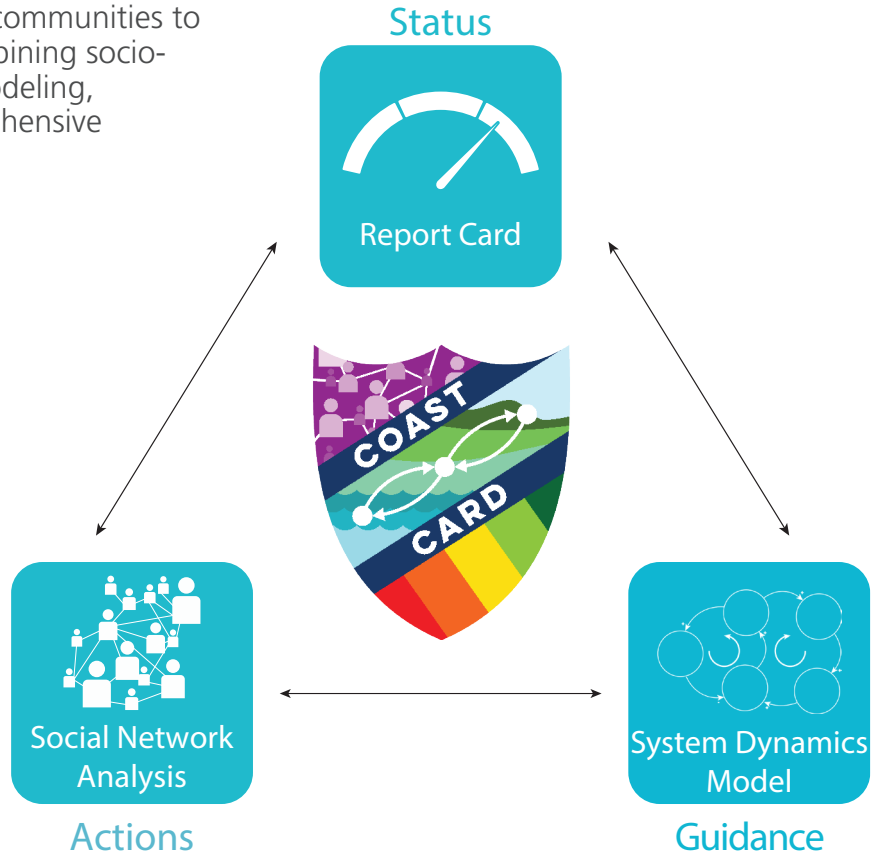
*Causal loop diagram created by Dr. Aklilu Tadesse of the University of Bergen. This diagram shows the relationships among the key environmental resources—food demand, urbanization, fish harvest, environmental literacy, climate change, and IT development—identified by Listening Session participants in Woodbridge, VA.*

# Co-producing the Potomac COAST Card

The COAST Card framework is a useful tool for communities to address socio-environmental challenges. By combining socio-environmental report cards, system dynamics modeling, and social network analysis, it provides a comprehensive understanding of the issues affecting the Potomac Watershed.

Report cards offer an easily understandable overview of key indicators, while system dynamics modeling (SDM) helps to comprehend the interaction between variables over time. The Potomac SDM currently focuses on three counties in the watershed—Shenandoah, Frederick, and St. Mary's. It brings the report card to life by enabling stakeholders to analyze the dynamic patterns of nutrient pollution, assess best management practices, and test policy options.

Lastly, social network analysis helps identify key players in a system, develop strategies to engage with them, and highlights potential areas for coordinated actions. By working together, a more sustainable and equitable future can be created for all.



Group photos of the Listening Session teams from 2022–2024. UMCES Staff included William Dennison, Vanessa Vargas-Nguyen, Sidney Anderson, Lili Badri, Joseph Edgerton, and Veronica Malabanan Lucchese; 2022 Global Sustainability Scholars included Pheng Lor, Anna Calderon, Lawren Caldwell, and Nick An; 2023 Global Sustainability Scholars included Anna Calderon, Kameryn Overton, Emma Gee, Taylor Mitchell, Tre'Nard Morgan, Darien Fredericks; 2024 Global Sustainability Scholars included Kameryn Overton, Bailee Porter, and Taylor Ouellette. COAST Card collaborators Pål Davidsen and Akilu Tadesse joined sessions during 2022 and 2023, respectively. Photo credit: Vanessa Vargas-Nguyen (left and right), Akilu Tadesse (center)

## Acknowledgments

**COAST Card Consortium:** University of Maryland Center for Environmental Science Integration and Application Network (UMCES IAN), University of Bergen, Philippines National Academy of Science and Technology, Tokyo Institute of Technology, and Goa National Institute of Oceanography.

**Funding Agencies:** The Belmont Forum and the National Science Foundation (NSF)

**Key Partners:** Hood College, Livable Frederick Planning and Design Office, Sustainable Monocacy Commission, UMCES Appalachian Laboratory, Interstate Commission on the Potomac River Basin, and Metropolitan Washington Council of Governments, Frederick County, the Potomac Riverkeeper Network, Potomac Science Center, Washington Sailing Marina, Canal Place, Leonardtown Wharf, and Capital Rivers Church.

