COAST Card
Chesapeake Bay

The Chesapeake Bay is a place of history and restoration

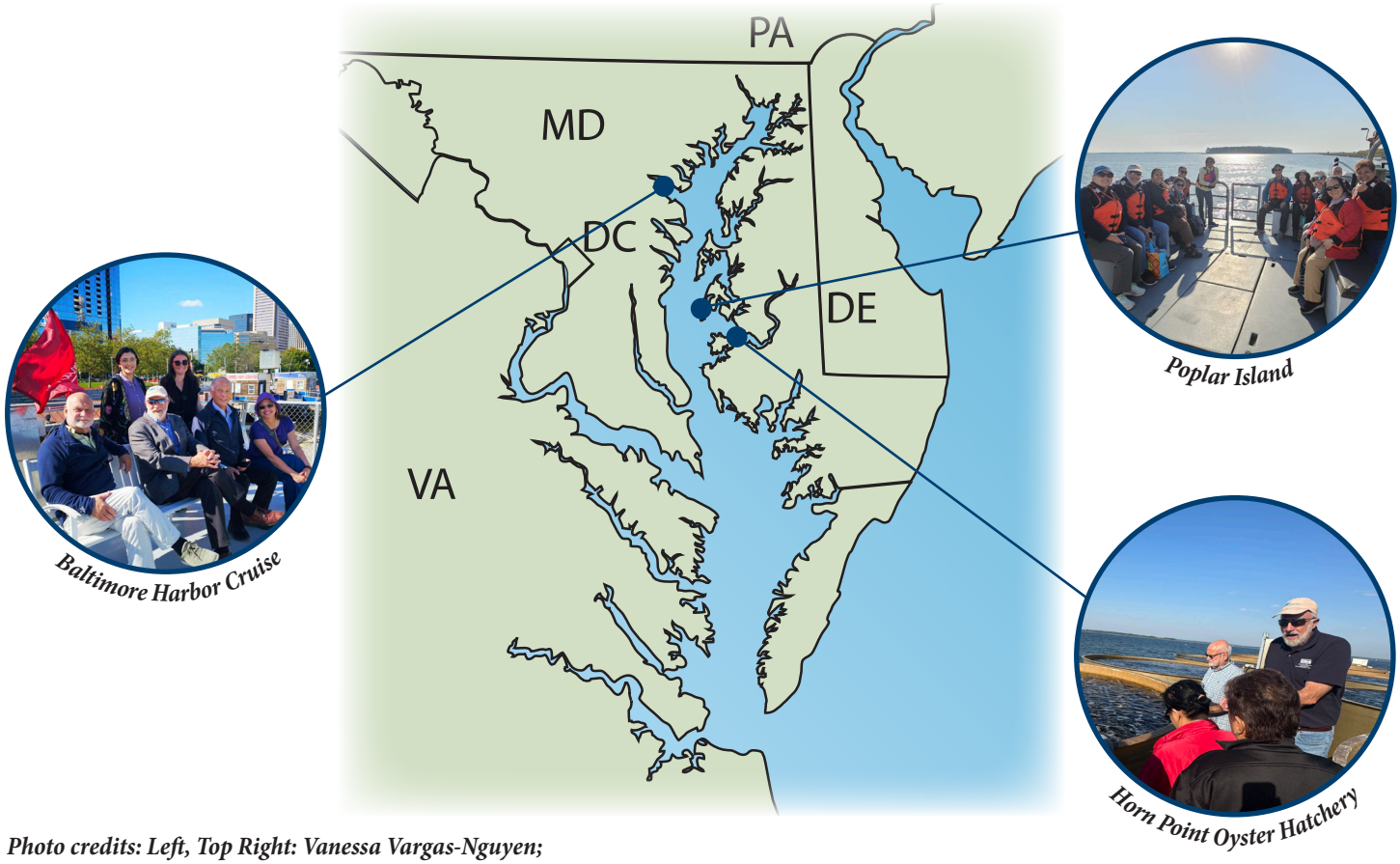


Photo credits: Left, Top Right: Vanessa Vargas-Nguyen; Bottom Right: Lili Badri.

Success of a restoration site

The COAST Card team kicked off a week-long event held in the Chesapeake Bay with a trip to Poplar Island. Poplar Island is an ecosystem restoration project that aims to repurpose dredged material from Baltimore Harbor to restore the island to its original size and create a habitat for birds and fish. The island was once inhabited, but the residents fled once the landmass began decreasing significantly around the 1920s. By the 1990s, there was almost nothing left of the island besides small islets that were barely above water level. The US Army Corps of Engineers and state and federal environmental agencies came together to restore the island due to its remote location and use as a critical stopping point for migratory species. With that in mind, Poplar Island has been nearly restored to its original size. Currently, the island is divided into different cells being restored piece by piece. The COAST Card team went on a bus tour of the whole island with stopping points to look at the various cells and the present conditions. Some cells are used for storage of dredge material, some for drying, and some have progressed enough to be planted with native vegetation. The plan is to continue to develop the island until it is half wetland and half upland habitat, as well as some sub-habitats of shrub, forest, and freshwater wetland conditions to serve as habitat for a wide variety of wildlife species.

COAST Card team takes a picture with the sign at Poplar Island. Photo Credit: Vanessa Vargas-Nguyen.

Raising and restoring oyster populations

Fiberglass drum with oyster shell cages for oyster spat seedlings. Water filters through while the oyster larvae grow large enough to be placed into the bay. Photo Credit: Lili Badri.

After the Poplar Island trip, the COAST Card team visited UMCES Horn Point Laboratory (HPL) in Cambridge, MD. The trip featured a tour of the campus's oyster hatchery, the largest of its kind on the East Coast. Attendees learned about the process of oyster aquaculture from spawning to larval cultures to shell attachment. Since oysters mainly consume algae, part of the hatchery is used to grow different species of algae to provide a complete diet for the oysters. The team also learned about the Oyster Recovery Partnership, a nonprofit partnered with HPL to restore oyster reefs in the Chesapeake Bay through oyster shell recycling. Their program collects oyster shells from restaurants and related businesses in the Mid-Atlantic region where they are then transported to HPL to be cleaned and used as substrate for baby oysters. Several mountains of these shells were seen outside of the processing area on the campus. The trip was then concluded with a brief visit to the Integration and Application Network's office building, also located on the HPL campus. This visit finished off a great day of learning about restoration projects in the Chesapeake Bay and provided an invigorating start to a week of project activities.

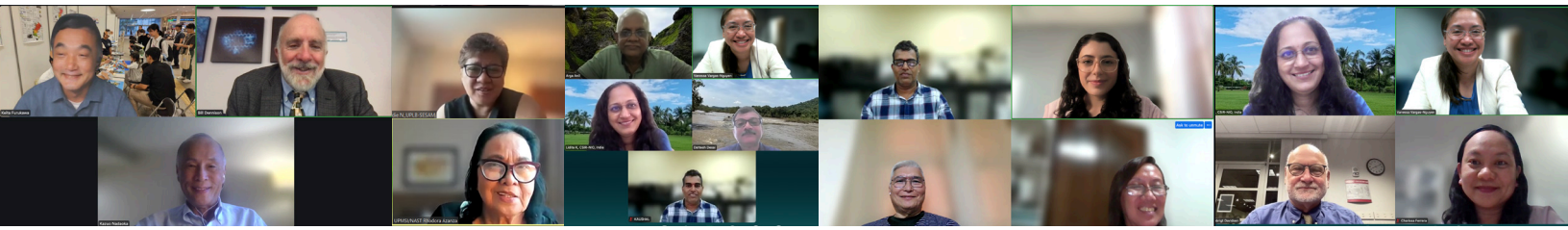
A tour around historic Baltimore Harbor

View of IMET from Baltimore Harbor cruise. Photo credit: Sidney Anderson

On October 8th, the COAST Card team embarked on a short cruise of the Baltimore Harbor, a bustling area of the Patapsco River. During the cruise, information about the history of the Harbor was narrated to attendees, providing context about the various buildings found along the shore. Industrial activity has been a core feature of the harbor, and with time, it has also transformed to include the tourism industry. This activity was on display during the tour with sights such as the Domino Sugar refinery, a cement plant, an asphalt refinery, and the National Aquarium among many others. Attendees also learned that the Harbor is a major handler of vehicles, machinery, and sugar. As the last cruise of the day, the captain took the ship slightly further down the harbor to see the remnants of the Francis Scott Key Bridge, which collapsed in March 2024 after a container ship struck the bridge. The disaster led to 6 fatalities and closed the harbor for nearly three months. This trip allowed international project partners to gain an understanding of the importance of the harbor as a major port and the challenges it continues to face by human activity. It also provided important context for the Chesapeake Global Collaboratory (CGC) meeting later in the week focused on the Baltimore Harbor.

Wrapping up COAST Card

On October 9th, the COAST Card Project held its fifth annual meeting. This meeting happens at the end of every year and brings together all the project teams, as well as team members from every country, to reflect on the past year of the project and set goals for the future. This year's meeting opened with a short ice breaker quiz on the events of the past year, with our colleague Aklilu Tadesse from Norway taking the crown this year. Then, using Zoom and Mural, the project collaborators came together to interact and provide insight into the progress of the project. As the COAST Card project wraps up in 2025, this was the final annual meeting. In two breakout sessions, groups reflected on the impacts of COAST Card in each country and potential proposals for the second round of the Oceans CRA.



Images of the breakout groups from the annual meeting. Photo Credit: COAST Card Team.

COAST Card around the world

United States

The United States Team's social network analysis solidified the importance of governmental agencies as central to change. New indicators developed for the Potomac Watershed have application for larger areas.

Philippines

The Philippines Team built trust and excitement with stakeholders and worked to develop relationships with official agencies for support.

India

The India Team was able to implement new engagement methods and collect samples from other areas due to new stakeholder relationships.

Japan

The Japan Team were able to increase interest and participation in the work at both study sites. They also identified the areas that make implementing new projects difficult in each of the study sites.

Norway

The Norway Team was able to develop partial models for two sites and increase excitement and interest for the work. They gained valuable insight on the greater issues facing each study site.

The future of COAST Card

Identifying future goals

Interest in continuing the work of the COAST Card Project was pervasive, although the project faces a crossroads: does it continue as a research and data gathering project or does it move into an implementation and action phase?

Partners indicated that continuing monitoring for coastal and marine biodiversity is key to the project's future, as well a filling in existing data gaps identified over the last five years. They wish to expand to more varying locations, build capacity for the report card process and include environmental justice issues more strongly.

New and continuing partners

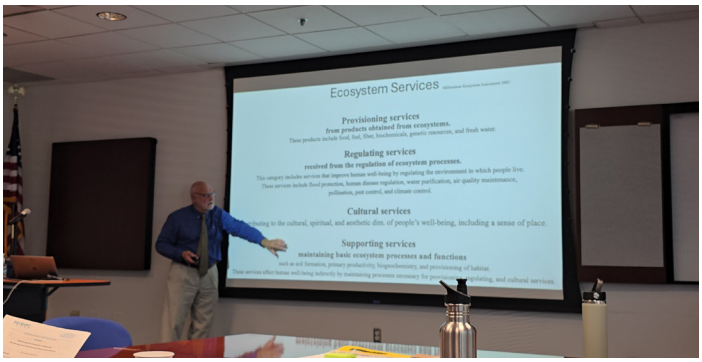
Over the last five years, the collaborators have developed strong relationships that all have a desire to continue and utilize; however, the past years have shown areas for improvement. Including new national partners from sectors such as education and agriculture would provide new and valuable insight.

Participants identified the need for more social scientists and suggested collaborating with the Ocean Knowledge Action Network for expanding the project's reach.

Modeling the Chesapeake Bay

Following the annual meeting, the Norwegian team led a System Dynamics Modeling (SDM) workshop. The morning session familiarized participants with the project, the Chesapeake Bay Assessment and Scenario Tool (CAST), and Best Management Practices (BMPs). The afternoon session was focused on identifying Ecosystem Services (ESSs), their values and threats, mapping their causal relationships, and summarizing the results. To close out the day, Lili Badri presented a summary of the results of Potomac Watershed Listening Sessions, showing what participants value most in their watershed and the indicators they suggested for use in future report cards. Finally, Veronica Malabanan Lucchese presented the results of her Social Network Analysis (SNA) illustrating which actors are the most and least influential in the Potomac watershed.

Dynamics of the Bay



Dr. Pal Davidsen presenting on ecosystem services. Photo credit: Aklilu Tadesse.

Dr. Vanessa Vargas-Nguyen set the tone for the session by introducing the COAST Card project, highlighting the objectives of the project and of the work completed so far. Next, Olivia Devereux, the CAST data expert and manager of the Devereux Environmental Consulting, introduced the Chesapeake Bay Program, including its historical foundation and its mandate. She also talked about CAST and the BMPs included in it and the challenges in implementing BMPs.

Following this, Prof. Pål Davidsen introduced the concepts of ESSs and their valuation. Prof. Davidsen briefly discussed the System Dynamics (SD) method. Using the SD tools such as Stock and Flow diagram (S&FD) and Causal Loop Diagram (CLD), he demonstrated how ESSs may be identified and be maintained by supporting services or drained by threats.

Identifying ecosystem services

Breakout group identifying ecosystem services and linkages. Photo credit: Aklilu Tadesse.

The afternoon session was predominantly focused on the identification of ESSs and their interrelationships through Group Model Building (GMB). A SNAP exercise was conducted by Dr. Heath Kelsey where participants identified three ESSs and their values and potential threats. In five breakout groups, participants mapped the causal links between the ESS and their values and threats.

After the breakout group reported back their results, Dr. Aklilu Tadesse presented his summary of the Ecosystem Benefits (benefits of ESSs) included in CAST. He used CLDs to summarize the varied ecosystem benefits that can be gained from implementing BMPs such as Forest Buffers, and the unintended consequences that might arise when such BMPs are not aligned in a sustainable way. Aklilu demonstrated the usefulness of SD tools, to gain insights into problems and potential solutions for complex, dynamic systems such as the Chesapeake Bay Watershed.

Baltimore Harbor in Context

On October 10th, the US-COAST Card team co-hosted The "Baltimore Harbor in Context" meeting with the UMCES Chesapeake Global Collaboratory (CGC) to help set the stage for a broader Baltimore Harbor summit in 2025. Dr. Bill Dennison provided an overview of the event, followed by a keynote presentation by Dr. Eric Schott of IMET, highlighting Baltimore Harbor's evolution as a crucial U.S. port, the toll of industrial pollution, and recent steps toward water quality improvement. This was expanded through insights from a panel featuring representatives from Blue Water Baltimore, Council Fire, the Waterfront Partnership, and the Environmental Justice Journalism Initiative, represented by Veronica Lucchese.

Keynote speaker Dr. Linwood Pendleton of the Ocean Knowledge Action Network. Photo Credit: Roshni Nair.

The keynote presentation by Dr. Linwood Pendleton from the Ocean Knowledge Action Network emphasized the importance of inclusive ocean sustainability strategies prioritizing trust-building and community-led initiatives. This inclusive perspective continued with a global panel moderated by Dr. Vanessa Vargas-Nguyen. The panel, composed of COAST Card project leaders Dr. Nadaoka, Dr. Azanza, and Dr. Davidsen, World Harbor Project US coordinator Dr. Judy O'Neil, and Dr. Pendleton of Ocean KAN shared insights on collaborative socio-environmental initiatives and diverse engagement strategies that could inform the Baltimore Harbor Summit.

The COAST Card team also contributed to two breakout discussions. The first focused on identifying the type of engagement required to assess whether we are measuring the right metrics in the Baltimore Harbor and determining who should be involved in that conversation. The second discussion centered on creating a shared vision for Baltimore Harbor or the Baltimore Harbor Summit and outlining actions and stakeholders needed to achieve this vision.

Attendees at the Baltimore Harbor in Context meeting held at IMET in Baltimore. Photo Credit: Tong Nguyen.

Insights from the COAST Card Project

Panel discussing international coastal habitats. Photo Credit: Roshni Nair.

- Building trusted relationships is important. The COAST Card team spent significant time discussing and designing engagement strategies to foster trust among stakeholders across disciplines, communities, and sectors.
- Stakeholders with different geographic and cultural awarenesses and adaptation to local norms can strengthen trust and mutual respect. In the Philippines, interacting with local fishermen and government officials involved participating in community events.
- Aligning environmental goals with economic benefits for stakeholders can motivate participation. In Ishigaki Island, Japan, showing how ecosystem restoration could positively impact agriculture and tourism expanded participation and created shared goals.
- International projects often face challenges in balancing the goals of multiple funding agencies with project objectives. Flexibility in managing these dynamics is important for maintaining focus.
- The COAST Card tools, such as the report card, system dynamics models, and social networks, enable community co-design and ownership of project results.

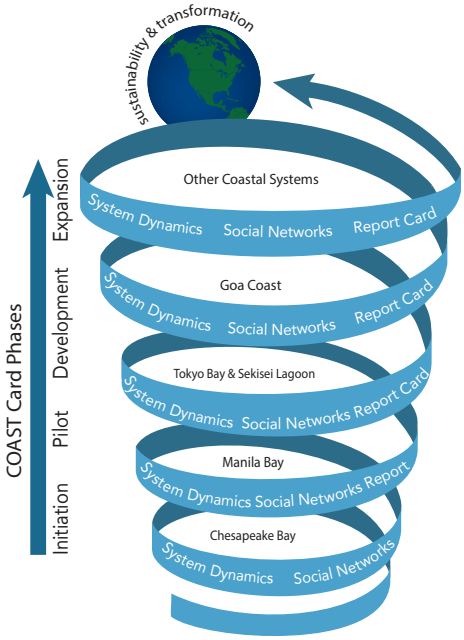
Applying lessons learned to the Baltimore Harbor Summit

Panel discussing the future of Baltimore Harbor. Photo Credit: Roshni Nair.

- Foster equitable participation and trust by tailoring engagement strategies to reflect Baltimore's diverse communities and social dynamics by offering multiple engagement methods, i.e. in-person meetings, virtual workshops, and accessible data-sharing platforms.
- Showcase how harbor restoration can drive economic benefits like blue-green job creation and increased tourism, aligning environmental initiatives with tangible community and economic outcomes.
- Foster community-led initiatives in Baltimore, such as citizen science programs for water quality monitoring or trash clean-up, and empower residents to participate actively in the harbor's restoration.
- Set measurable goals for the summit, such as improvements in water quality or job creation, and establish follow-up structures, such as progress updates or advisory councils, to ensure long-term impact.
- Ensure data transparency by making environmental information user-friendly and accessible to the public.

A New Generation of Report Cards

The Coastal Ocean Assessment for Sustainability and Transformation (COAST) Card project is a transnational and transdisciplinary research program funded through the Belmont Forum, a funding partnership that supports transnational and transdisciplinary research that seeks to understand, mitigate, and adapt to global environmental change. The COAST Card project brings together researchers from the United States, the Philippines, Norway, India, and Japan. COAST Card merges three tools: 1) stakeholder identification and societal guidance through socio-ecological network analysis, 2) status assessment using a socio-environmental report card, and 3) prioritized and linked actions identified with system dynamics models.



Acknowledgments

We would like to thank everyone involved in planning and facilitating this visit. Thank you to the US-COAST Card Team: Dr. William Dennison, Dr. Vanessa Vargas-Nguyen, Sidney Anderson, Lili Badri, Roshni Nair, and Veronica Malabanan Lucchese; the Maryland Environment Service staff at Poplar Island; and the Captain and crew of City Cruises. Additional thank you to the faculty and staff at the Institute for Marine and Environmental Technology for the use of their facilities and participation in the meetings and workshops.

For additional information on the COAST Card Project, please visit www.coast-card.org.

Cover Images: Hatchling diamondback terrapin at Poplar Island, Credit: Sidney Anderson (top left); Mr. Trash Wheel, PC: Sidney Anderson (top center); COAST Card Team at Horn Point Lab, PC: Tong Nguyen (top right); Panel on Baltimore Harbor, PC: Roshni Nair (middle left); Dr. Kazuo Nadaoka eats a blue crab, PC: Roshni Nair (middle center); Breakout groups at the SDM workshop; PC: Aklilu Tadesse (middle right); Planning meeting with the COAST Card Team, PC: Vanessa Vargas-Nguyen (bottom left); Celebrating Dr. Bill Dennison's birthday, PC: Roshni Nair (bottom center); Breakout groups for the CGC meeting; PC: Roshni Nair (bottom right).

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