

THE CENTER FOR COASTAL RESOURCES MANAGEMENT

Annual Report 2024



Batten School of
Coastal & Marine Sciences
WILLIAM & MARY • VIMS

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VIRGINIA INSTITUTE OF MARINE SCIENCE



DIRECTOR'S MESSAGE

At the heart of CCRM’s mission is its commitment to conducting scientific research that directly informs decision-making and policy development while advancing the local, regional, and global impact of VIMS. CCRM serves as a bridge between scientific research and practical application, ensuring that coastal management strategies are grounded in robust evidence and cutting-edge science. To achieve this, CCRM develops user-friendly tools and resources, such as interactive maps, decision-support systems, and best practice guides. These tools empower local governments, planners, and property owners to make informed choices that align with both environmental and community goals. Additionally, CCRM’s training programs and workshops provide partners with the knowledge and skills needed to implement sustainable coastal management practices. 2024 was another example of the impactful work conducted within the Center and in support of William & Mary President Rowe’s University wide Water Initiative.

CCRM’s collaboration with state agencies and policymakers continued to be a key driver of its impact. By providing scientific expertise and data, CCRM informed the legislative and regulatory frameworks that support the protection and restoration of coastal ecosystems. For example, in 2024 we responded to direct requests from the Virginia Department of Environmental Quality (VADEQ) regarding the jurisdictional impact on Virginia’s wetlands of the US Supreme Court Sackett decision and on VADEQ’s protocol on nutrient crediting of shoreline management projects, as well as the Soil & Water Conservation District’s Virginia Conservation Assistance Program. Our work continues to be instrumental in shaping policies that promote the use of living shorelines, safeguard marsh habitats, inform communities on flooding risk, reduce marine debris, and ensure the sustainable use of our shorelines.

This focus on the nexus between science and implementation of scientific understanding has resulted in a 2024 cadre of students and interns eager to gain hands-on experience in applying scientific knowledge in service to the public. Students tackled issues ranging from community coastal resilience to modeling coastal storm surge to derelict fishing gear to raising baby ribbed mussels to enhance living shorelines for coastal resilience.

By conducting research and advancing science that directly supports decision-makers, work conducted and products produced by CCRM in coordination with our partner organizations and agencies helps ensure that our work has tangible impacts on the sustainability and health of coastal ecosystems. As climate change and sea-level rise continue to reshape our coastlines and present challenges, CCRM’s contributions will remain vital in safeguarding the future of our coastal communities and natural resources.

Kirk Havens, Director
Center for Coastal Resources Management

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ADVANCING SCIENCE FOR MARSHES, SHORELINES, AND LIVING SHORELINES

The Center plays a pivotal role in understanding, managing, and preserving coastal environments. Its mission focuses on integrating cutting-edge scientific research with practical tools and guidance that aids decision-makers and policymakers in fostering sustainable coastal ecosystems.

Marshes, dynamic ecosystems located at the interface of land and water, are crucial for maintaining coastal health. These wetland areas improve water quality and function as natural buffers, absorbing excess water during storms and reducing the risk of flooding to inland communities. CCRM maintains inventories of marsh communities and conducts extensive research to understand their scales of ecological functions including their roles in water filtration, carbon sequestration, and habitat provision.

CCRM has been providing state-of-the-art science on tidal marshes for over 50 years and key areas of focus include marshes and living shorelines, both of which are integral to enhancing community resilience and mitigating the impacts of climate change. Visit the historical review [“Over a Half Century of Connecting Science and Management of Virginia’s Tidal Wetlands at the Virginia Institute of Marine Science”](#) to learn more about CCRM’s long history and extensive research on tidal marsh systems and our comprehensive tidal marsh and shoreline inventories.

A significant aspect of CCRM’s work involves monitoring marsh health and identifying threats posed by sea-level rise, development pressures, and pollution. CCRM maps marsh distribution and evaluates marsh changes over time using state-of-the-art tools like remote sensing, artificial intelligence (deep learning), geographic information systems (GIS) as well as in-the-field sampling including drones. For example, in 2024 CCRM published on

[model considerations in the restoration of coastal wetlands](#). By understanding these dynamics, CCRM provides actionable data to guide restoration efforts and inform policies aimed at conserving these critical ecosystems.

Additionally, CCRM develops best management practices for marsh preservation. These include strategies to mitigate the impacts of coastal development and enhance marsh resilience to rising sea levels. Through partnerships with state agencies, local governments, and community partners, CCRM ensures that scientific insights are translated into effective conservation practices.

Shorelines, including tidal marshes and beaches, face significant challenges from erosion, rising sea levels, and human activity. CCRM’s research on shoreline management emphasizes the need for sustainable solutions that balance environmental protection with economic and social needs.

The dominant undercurrent of this work is the development of tools and guidelines for appropriate shoreline stabilization methods. CCRM’s Shoreline Management Model integrates ecological and physical data with engineering principles to recommend site-specific solutions that prioritize nature-inspired approaches. The Shoreline Management Model has been applied in AL, FL, LA, MD, NC, TX, and VA. In 2024, an upgraded version of the [Shoreline Management Model](#) (v6.0) was released and applied in five coastal communities in Virginia (Hampton, Northumberland, Poquoson, Virginia Beach, and Westmoreland).

CCRM recommends the use of living shorelines over traditional hard infrastructure like bulkheads where appropriate. Living shorelines mimic natural systems to

not only reduce erosion but also enhance habitat quality and biodiversity. Living shorelines represent an innovative and environmentally friendly approach to managing coastal erosion and enhancing ecosystem services. One of CCRM’s primary contributions is the development of technical guidelines for designing and implementing living shorelines. These guidelines consider factors such as site-specific conditions, expected wave energy, and ecological objectives. CCRM also studies the long-term performance of these installations, providing valuable data on their ecological and economic benefits and in 2024 published a seminal paper with research partners on the [economic value of living shorelines](#).

By demonstrating the success of living shorelines in reducing erosion, improving water quality, and supporting wildlife, CCRM has influenced policy frameworks at the local, state, federal, and international levels. The CCRM’s strict adherence to evidence-based research has influenced the increased adoption of living shorelines as a preferred, and now mandated, alternative to traditional shoreline hardening techniques. As a leader in this field, CCRM conducts rigorous research to evaluate the effectiveness of living shoreline techniques and refine their application.

CCRM is working to enhance recruitment of ribbed mussels to living shorelines. For the first time this past summer, ribbed mussels were spawned at VIMS as part of a collaborative effort between CCRM and the Acuff Center for Aquaculture. We aim to incorporate these native bivalves into living shorelines to help improve water quality and stabilize marsh sediments. About 15,000 of these tiny filter-feeders made their debut into a living shoreline marsh in the fall of 2024.

In 2024 CCRM developed and refined a number of tools and applications to inform shoreline management.

[SHORE-BET](#) is a Marsh Restoration Community Benefit App that calculates the economic value of select key coastal community benefits to be gained by using living shoreline techniques that restore marshes. This tool helps to account for these ecosystem services so that coastal communities can be better informed when making decisions impacting their environment, economy, and overall quality of life.

[SHOREWATCH](#) is a field application for the collection of standardized monitoring data for living shorelines to better understand the performance and effectiveness of projects in different settings and for varied designs. It is designed for organizations and groups involved in living shoreline management and/or application.

[MAPMYSHORE](#) is an App that allows the community to assist VIMS with collecting and ground-truthing shoreline inventory features critical to natural and cultural resources.

CCRM’s outreach efforts are instrumental in shaping marsh and shoreline management policies. By engaging with local planners, practitioners, property owners, and policymakers, CCRM ensures that shoreline decisions are informed by the latest scientific findings. This collaborative approach fosters long-term resilience and supports the sustainable use of coastal resources.



ADVANCING SCIENCE FOR COASTAL RESILIENCE



The Center is at the forefront of addressing the challenges posed by sea level rise and fostering community resilience. By combining advanced scientific research on sea level rise projections, marsh migration, and transportation infrastructure inundation with innovative tools, the CCRM empowers decision-makers and policymakers to implement effective solutions that protect coastal ecosystems and infrastructure. Key areas of focus include supporting CCRM tools such as ADAPTVA, Tidewatch, U.S. Sea Level Report Cards (trends & projections), Virginia Coastal Resources Tool, the Virginia Wastewater Data Viewer, vessel sewage No Discharge Zone data viewer for waterways, StormSense award-winning smart cities project, AlosApp to assist in planning in-stream activities, and the Wetland Condition Assessment online viewer to inform decision-makers. Sea level rise presents significant risks to coastal communities, including increased flooding, erosion, and habitat loss. CCRM's research aims to quantify these risks and provide actionable insights to mitigate their impacts. Advanced modeling and monitoring techniques are used to develop sea level rise projections and assess the effects on both natural and built environments.

In 2024, CCRM worked closely with the Virginia Department of Conservation and Recreation on Virginia's Coastal Resilience Master Plan providing data and serving in an advisory capacity. CCRM has also developed several innovative tools to support communities in adapting to sea level rise and continues to update the following:

ADAPTVA: This tool provides a comprehensive framework for assessing vulnerability and planning adaptive strategies for coastal regions in Virginia. By integrating environmental, social, and economic data, ADAPTVA helps decision-makers identify areas at greatest risk and prioritize actions to enhance resilience.

Tidewatch and **Tidewatch Map:** Tidewatch offers real-time tide predictions and flooding forecasts, enabling communities to prepare for extreme water levels. By providing localized and timely information, the tool helps mitigate the impacts of storm surges and extraordinary high tides on vulnerable areas.

Virginia Wastewater Data Viewer: Coastal flooding can compromise wastewater systems, leading to public health risks. CCRM's wastewater viewer maps the vulnerability of wastewater infrastructure to inundation, providing valuable insights for planners to protect these critical systems from rising waters.

Virginia Coastal Resources Tool: A map viewer and three dashboards display shoreline conditions throughout coastal Virginia based on the latest CCRM shoreline and tidal marsh inventory. The [Virginia Coastal Viewer](#) map layers include shoreline structures, tidal marshes, submerged aquatic vegetation, sea level rise scenarios, and different base maps. The [Shoreline Inventory Dashboards](#) combine a map with summary statistics by locality or river system, while the [Shoreline Management Model Dashboard](#) displays shoreline best management practices based on characteristics at the time of the analysis.

Marshes are vital ecosystems that act as natural buffers against flooding and erosion. However, rising sea levels can outpace the ability of marshes to adapt, leading to their loss. Using tools like GIS, drones, remote sensing, and artificial intelligence (deep learning techniques), CCRM identifies areas where marshes can migrate inland and provides guidance for conserving these essential habitats

through products such as the award-winning [Wetland Condition Assessment Tool](#) and a 2024 award-winning publication on [marsh migration corridors](#).

The insights gained from this research inform land-use planning and habitat restoration efforts, ensuring that marshes continue to provide their invaluable ecosystem services. By identifying areas suitable for marsh migration, CCRM helps maintain natural defenses that benefit both wildlife and coastal communities.

For example, the Catch the King Tide community science project has been actively mapping the impacts of sea level rise annually during each year's highest astronomical tides (known as King Tides) for the past eight years, and by 2024 the effort has collected over ¼ million GPS-reported high-water marks. These flooding extent contours are used to help validate CCRM's Tidewatch Map's 36-hour storm tide forecasts.

As sea levels rise, transportation infrastructure such as roads, bridges, and railways face increased risks of flooding and damage. CCRM works with the Virginia Department of Transportation to identify the most vulnerable transportation assets and to develop strategies to minimize disruptions. In 2024, CCRM completed a 5-year project with the [Virginia Department of Transportation on infrastructure inundation](#). CCRM's findings are critical for ensuring the long-term functionality of transportation networks, which are essential for emergency response, economic activity, and daily life in coastal regions.

CCRM's commitment to conducting science that directly supports decision-making and policy development is central to its mission. By providing robust data, user-friendly tools, and actionable recommendations, CCRM ensures that coastal resilience strategies are informed by the best available science.



TACKLING DERELICT FISHING GEAR



At the core of the Center's marine debris related efforts is the integration of science into policy and decision-making. CCRM develops user-friendly tools and resources, such as derelict fishing trap distribution maps and economic impact assessments, to assist in developing effective marine debris management plans. CCRM partnered with the Commonwealth to help craft the Nation's first marine debris management plan.

The Center is a leader in addressing the growing issue of marine debris, which poses significant threats to coastal ecosystems, wildlife, and communities. By combining scientific research with targeted programs, including the National Derelict Fishing Trap Removal, Assessment, and Prevention (TRAP) Program and the Virginia Marine Debris Removal Program, CCRM provides essential tools and guidance to support decision-makers and policymakers. These initiatives are underpinned by CCRM's commitment to conducting science that informs effective management and policy development.

Marine debris, which includes abandoned, lost, or discarded fishing gear, plastics, and other waste materials, has far-reaching environmental, economic, and social consequences. It harms marine life, disrupts ecosystems, and poses hazards to navigation and human safety.

The National TRAP Program is a flagship initiative of CCRM aimed at addressing the problem of derelict fishing gear which can persist in the marine environment for years, such as crab and lobster pots and traps. These abandoned traps not only waste resources by affecting seafood harvests but also continue to capture and kill marine life, a phenomenon known as "ghost fishing." In 2024, CCRM launched the TRAP website [National TRAP Program](#) and provided over \$1.4 million to support eleven derelict trap removal efforts nationwide (California, Delaware, Florida, Louisiana, New York, Maine, Maryland, the Freely Associated State of Palau, Virginia, Washington).



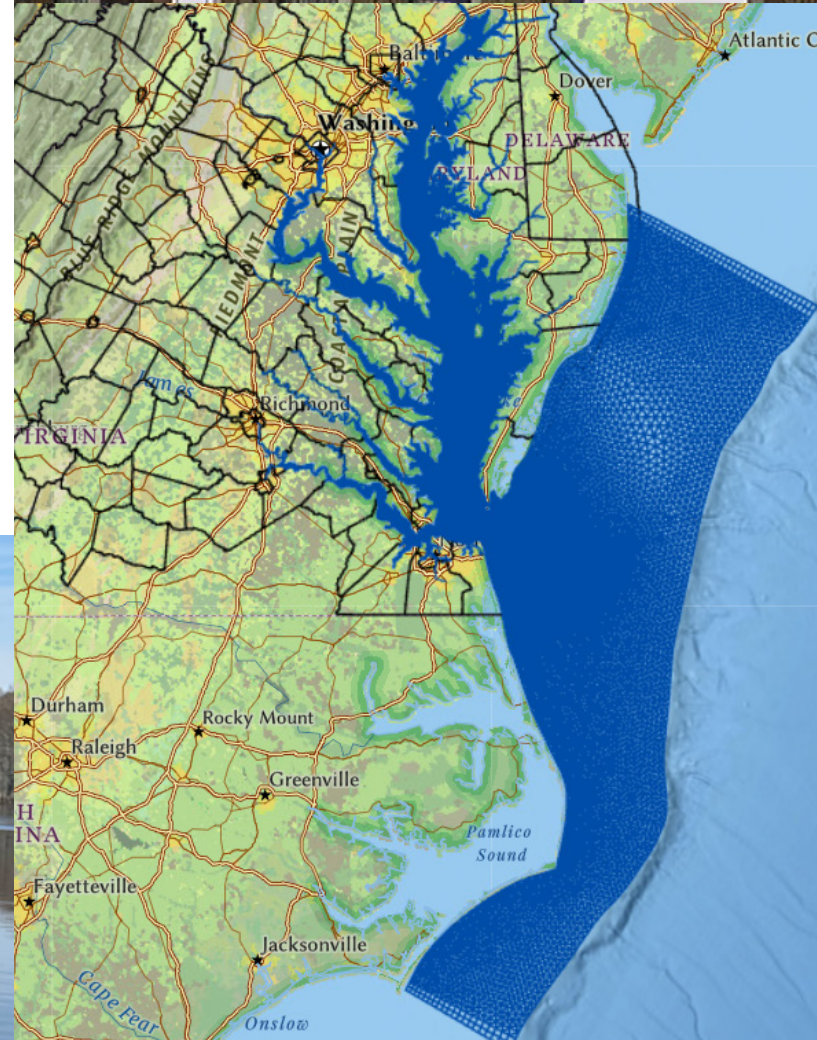
HYDROSCIENCE MODELING IN THE CHESAPEAKE BAY AND BEYOND

Hydroscience focuses on understanding water systems, their interactions with ecological and human systems, and their responses to environmental changes. For the Chesapeake Bay—the largest estuary in the United States—this science is essential for addressing issues such as water quality, habitat conservation, and climate resilience. The Center’s work integrates advanced modeling, field observations, and partner engagement to deliver actionable knowledge.

CCRM plays a pivotal role in advancing hydroscience to address critical environmental and societal challenges. By leveraging innovative tools and research methodologies such as the [SCHISM](#) (Semi-implicit Cross-scale Hydroscience Integrated System Model) modeling framework and its applications to the Chesapeake Bay and waterways around the world, CCRM provides invaluable insights that underpin decision-making and policy development. SCHISM is also used in the CCRM [Tidal Marsh Model](#) that, because of the highly resolved outputs, can allow coastal planners and managers to more accurately identify the potential future location of marsh habitats.

Decision-makers use SCHISM to evaluate the potential impacts of different management strategies under climate scenarios and gain critical insights into water dynamics,

ecosystem health, and climate resilience. SCHISM enabled forecasts are being actively used by the general public and emergency managers during major storm events, and for disaster planning and mitigation. SCHISM’s ability to integrate a multitude of datasets and produce high-resolution outputs makes it a cornerstone of CCRM’s hydroscience research and a valuable tool for regional, national, and international collaborations. Developed to address challenges across scales, SCHISM’s adaptability and precision have positioned it as a global gold standard for hydrodynamic and ecosystem modeling. In 2024, CCRM published work on [coastal flooding and storm surge](#) and continued work on the EPA’s Chesapeake Bay Main Bay Model and NOAA’s operational forecast systems for Atlantic and Gulf coasts, as well as the Pacific Ocean (including the US West Coast and Alaska), and for Taiwan waters. In addition, CCRM launched a community science program in partnership with the United States Power Squadron to collect bathymetric data [SHOAL Project \(vims.edu\)](#). The bathymetry information collected by community scientists throughout the country serves multiple purposes. First, it serves as validation to other measurements that may have gaps in space and time. Second, it is being actively used in many modeling projects and to enhance model performance where accurate bathymetry is lacking.



ENGAGING COMMUNITIES FOR COASTAL RESILIENCE

The Center's mission involves a commitment to community engagement by fostering and empowering partners to address coastal resilience challenges. By working closely with Virginia Tribes, local governments, and community groups, CCRM ensures that its science-based initiatives translate into actionable strategies for coastal sustainability. CCRM exemplifies the integration of science, community collaboration, and policy support through programs such as the [Local Government Comprehensive Coastal Resources Management Portal](#), the [Virginia Shoreline Permit Database](#), the [Master Gardeners Shoreline Evaluation Program](#), sponsorship of the [Virginia Master Naturalist Program](#), and actions such as [climate planning for localities](#) in the Chesapeake Bay and the significant historical Werowocomoco National Park.

One of CCRM's most impactful efforts in 2024 was collaboration with Virginia's Native American Tribes and local governments to enhance coastal resilience. Working with the Tribes, CCRM integrates traditional ecological knowledge with contemporary scientific research, addressing unique environmental challenges and preserving cultural heritage. For example, in planning for climate impacts at Werowocomoco National Park, a site of immense historical and cultural importance to the Tribes, CCRM's expertise in climate change modeling and adaptive strategies has been instrumental in providing valuable information for safeguarding this heritage site against rising sea levels and erosion. CCRM also worked with the [Chickahominy Indian Tribe to install a tide gauge](#) on their property along the Chickahominy River and with the Mattaponi Indian Tribe to assess their shoreline. In parallel, CCRM provides local governments with tools and technical assistance to develop and implement resilience plans. CCRM is a member of the NOAA-funded MARISA collaborative, which develops climate data to assist communities in resilience planning. By facilitating workshops, sharing tailored data, and conducting vulnerability assessments, CCRM helps local governments



Photo by Polynesian Voyaging Society, Jonah Apo



craft policies that address both immediate and long-term coastal management needs. This partnership-driven approach ensures that community voices are central to decision-making processes, fostering trust and accountability.

CCRM serves as the [Garden Club of America national coastal wetland studies scholarship](#) advisor and community science programs, such as the Master Gardener Shoreline Evaluation Program, exemplify dedication to engaging citizens in environmental stewardship. By training volunteers to observe, document, and report on shoreline conditions, these programs build a network of informed citizen advocates who contribute valuable data to coastal management initiatives. These community scientists play a crucial role in monitoring ecosystem health, detecting changes, and raising awareness about local environmental challenges.

The Local Government Comprehensive Coastal Resources Management Portal is an initiative of CCRM, designed to provide local governments with easy access to comprehensive data and tools for coastal resource management. This portal includes maps, policy guides, and decision-support tools that enable counties, cities, and towns to evaluate shoreline conditions, assess risk, and develop customized management plans. By offering a centralized resource, the portal reduces barriers to information and streamlines planning processes for communities of all sizes.

Complementing this portal is the Virginia Shoreline Permit Database, which tracks shoreline modification activities in coastal localities across the state. By analyzing this data, CCRM helps managers and agency partners identify opportunities for sustainable practices and mitigate adverse environmental impacts.

Through educational outreach, CCRM also empowers educators and students to understand and address coastal issues. Programs like workshops and public seminars disseminate knowledge about shoreline dynamics, sea

level rise, and habitat restoration, equipping participants with the tools to make informed decisions and advocate for sustainable practices in their communities. CCRM conducted 59 outreach lectures and engagements in 2024 to transfer scientific knowledge to decision-makers, and also held stakeholder engagement sessions with end users during product development. Publications from CCRM were downloaded 16,218 times from 799 institutions across 124 countries and regions worldwide in 2024.

Working with the VIMS Dean & Director's Office, CCRM broadened its community engagement efforts in 2024 through a partnership with the [Polynesian Voyaging Society](#) and its iconic Hōkūle'a sailing canoe. This collaboration highlights the importance of blending traditional knowledge with modern science to inspire environmental stewardship. An example of this is the [VIMS Planktoscope Dashboard](#), an innovative student engagement initiative that uses portable technology to analyze microscopic plankton—critical indicators of ocean health. By integrating this tool into educational outreach programs of coastal and island communities encountered by the Hōkūle'a, students get a hands-on opportunity to explore marine ecosystems and understand their global significance while being exposed to a wide array of cultural communities encountered during the voyage. Engaging with Hōkūle'a emphasizes the interconnectedness of cultural heritage and scientific exploration, fostering a sense of responsibility among the next generation to protect and sustain marine environments. Through this collaboration, CCRM continues to champion the fusion of cultural and scientific narratives to advance coastal and ocean literacy globally.

CCRM's approach to community engagement is deeply rooted in collaboration. By partnering with a myriad of partners—from Tribal communities and local governments to community scientists and educators—CCRM fosters a collective commitment to providing sound science to inform coastal resilience. These partnerships amplify the impact of CCRM's research, ensuring that its findings are not only scientifically robust but also socially and culturally relevant.



2024 PROJECTS



- Enhancing community resilience to slr w/ geospatial/ policy assess of threats & opps. noaa / ad science.
- Marisa 2.0: continuity and expansion of community-based engagement and support. noaa / rand.
- Extending 3d coastal model capabilities across oconus. noaa.
- Virginia department of transportation – mou. vdot.
- Valuation of ecological & social benefits by natural & restored habitat for fisheries. noaa.
- Tools for improving protection of wetland resources in virginia. epa / va deq.
- Tidal wetlands management technical support. noaa / czm.
- Advancing spatial data & coastal modeling in adaptive mgmt - “mapmyshore”. noaa / czm.
- Coastal va ecological value assessment: a collaborative integration of conservation datasets & priorities in va (acpa). va deq / czm.
- Climate change planning support for werowocomoco park. usda – nps, kenah.
- A cyber training program to advance data acquisition processing and machine learning-based model. nsf / uncw.
- No discharge zones - phase 2. va deq.
- Expand the virginia wastewater data viewer. va department of health.
- Scenario-based flood planning and adaptation workshop. lincoln.
- Solar panels for charging vims first electric vehicle. w&m green fees.
- Modeling & mapping septic system life expectancy in va coastal plain. chesapeake bay restoration fund.



- Assessing 2035 climate change risk to the ches tmdl using unstructured grid. epa.
- Improving coastal flood modeling infrastructure by including inland hydrologic extremes. noaa.
- Nationwide lost or abandoned fishing trap removal, assessment, and prevention (trap) program. noaa.
- Assessing 2035 climate risks to tmdl in the rappahannock river using schism. epa.
- Fish density and production enhancement in the chesapeake bay. noaa.
- Expanding implementation of a ml algorithmic approach fo near-real time stage detection. usdigs
- Support the development of next generation noaa on-demand storm surge modeling system. noaa.
- Modeling & end users community engagement for upgrade of 3-d storm surge & tide system (stofs-3d). noaa.
- Cascadia event for the northern oregon coast tsunami modeling. dogami.
- Co-developing a decision support framework for adaptation to coastal flooding: ny & va. risa.
- Enhancing wetland management in virginia: tools and community science. epa / va deq.
- Evaluating the benefits of living shoreline stabilization projects. epa / mde.
- Resilient wetlands: science to enhance understanding and support “shorewatch”. epa.
- Tidal wetlands mgmt tech support - task 6. noaa / czm.
- Advancing spatial data and coastal modeling in adaptive management to support coastal community resilience – year 2.
- Next generation water monitoring sensor proliferation in support of coastal resilience in the chesapeake bay. noaa / u of de.
- Enhancing community engagement in support of water level sensor proliferation. maracoos / noaa / u of de.
- Garden club of america wetlands scholarship award. gca.
- Optimatization of a data assimilation system for cwb. taiwan.
- Oyster assessment of the nansemond shoals living shoreline. res.

TOOLS & DASHBOARDS

In support of Code of Virginia § 28.2-1302

VIMS Tidal Marsh Inventory <https://www.vims.edu/ccrm/research/inventory/virginia/>

Tidal Marsh (Migration?) Model https://www.vims.edu/ccrm/research/modeling/schism/tidal_marsh/

In support of Code of Virginia CHAPTER 380. Wetlands Policy

Wetland Condition Assessment Tool (WetCAT) <https://cmap22.vims.edu/WetCAT/>

In support of Code of Virginia § 28.2-104.1

VIMS Shoreline Management Model <https://www.vims.edu/ccrm/advisory/ccrmp/bmp/smm/>

Living Shorelines https://www.vims.edu/ccrm/outreach/living_shorelines/

Virginia Coastal Resources Tool <https://cmap22.vims.edu/VACoastalResourcesTool/>

Shoreline Decision Support Tool <https://cmap2.vims.edu/LivingShoreline/DecisionSupportTool/index.html>

ShoreWatch: living shoreline monitoring app [PowerPoint Presentation \(vims.edu\)](#)

MapMyShore: partnering with the community to assist in mapping Virginia's shoreline features

[MapMyShore | Center for Coastal Resources Management | Virginia Institute of Marine Science \(vims.edu\)](#)

Shore-Bet: marsh restoration community benefit calculator

[Shore-BET: Marsh Restoration Community Benefit Calculator \(vims.edu\)](#)

In support of House Joint Resolution 650. Abandoned and discarded crab traps.

Virginia Derelict Trap Removal Program <https://cmap2.vims.edu/MarineDebris/MarineDebris.html>

In support of Code of Virginia CHAPTER 885. § 15.2-2223.2

Comprehensive Coastal Resources Local Government Portal to assist localities in coastal resilience planning

<https://www.vims.edu/ccrm/advisory/ccrmp/portals/>

Locality Road Flooding Tool https://www.adaptva.org/info/tools_rd.html

Elizabeth River Environmental Justice Tool <https://cmap22.vims.edu/EREJTool/>

In support of Code of Virginia 440 Commonwealth Center for Recurrent Flooding

AdaptVA climate change adaptation for individuals, local programs, and agencies. <https://www.adaptva.org/>

Tidewatch 36-hour coastal flood prediction <https://cmap2.vims.edu/SCHISM/TidewatchViewer.html>

United States Sea Level Report Cards: trends, projections, and processes to aid coastal planning.

<https://www.vims.edu/research/products/slrc/>

Street Level Inundation Model for urban communities

https://www.vims.edu/ccrm/research/modeling/flood/street_level/

Virginia King Tide monitoring "Catch the King". World's largest environmental survey to map the maximum inundation extents during King Tides https://www.vims.edu/people/loftis_jd/Catch%20the%20King/

AlosApp provides information to assist in planning in-stream activities that may affect anadromous fish

<https://shiny.vims.edu/AlosApp/>

In support of Code of Virginia: CHAPTER 486 §§ 32.1-164 and 62.1- 44.15:72

Virginia Wastewater Viewer: understanding the effects of Sea Level Rise on septic system.

<https://experience.arcgis.com/experience/4c8fea3204fd47cc842df6b0de92ee3f/page/About-Project-/>

In support of the Chesapeake Bay Program Water Quality Regulatory Model

SCHISM Water Quality Model https://www.vims.edu/newsandevents/topstories/2022/schism_cbp.php

In support of Coastal Shallow-water Communities

National Derelict Fishing Trap Removal, Assessment, and Prevention (TRAP) Program. Nationwide derelict trap removals. [National TRAP Program](#)

Crab Trap App for derelict trap data collection.

https://www.vims.edu/ccrm/research/marine_debris/solutions/removal/app/

Shallow-water Observation and Assessment Logging (SHOAL) Project, enhanced shallow water bathymetry.

[SHOAL Project \(vims.edu\)](#)



GLOBAL READERSHIP & ORG CHART

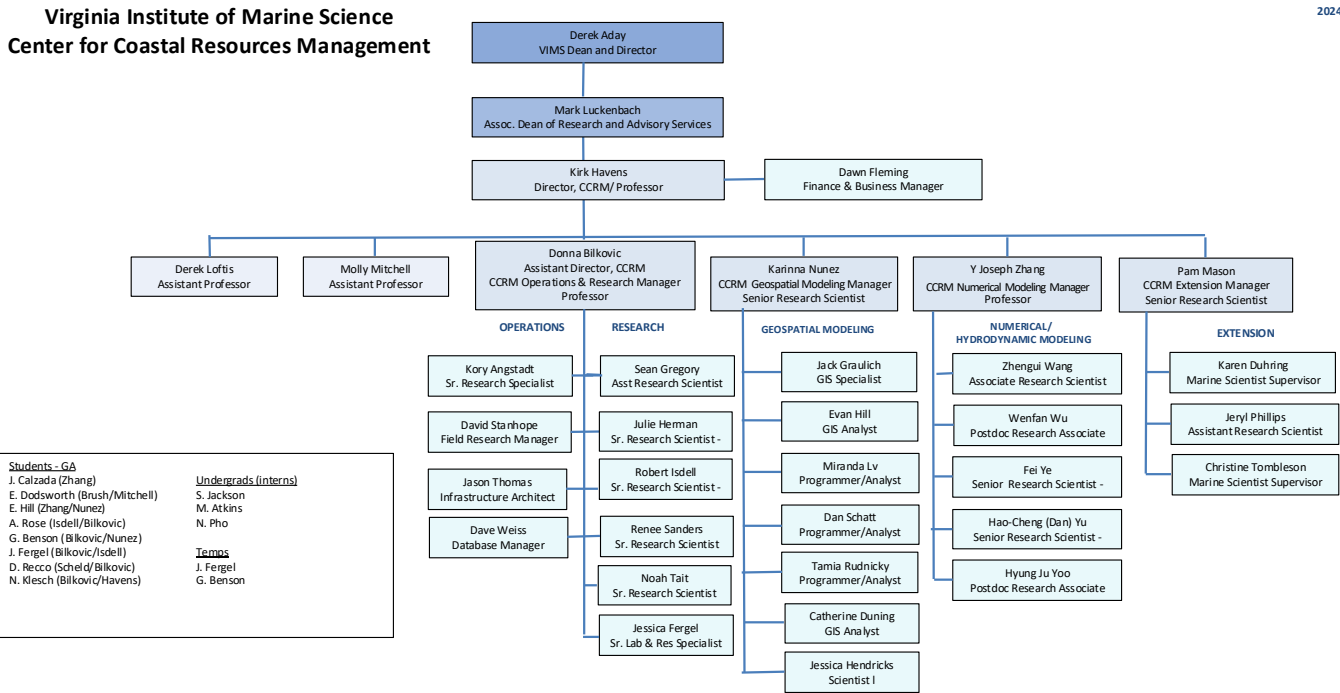
GLOBAL READERSHIP

1-1-2024 to 12-31-2024



16,218 of CCRM publications (799 Institutions worldwide, 124 Countries/Regions)
For Global Readership map 3-23-2010 to 12-31-2024
86,906 downloads of CCRM publications (3,391 Institutions worldwide, 183 Countries/Regions)

ORG CHART



PARTNERS

GOVERNMENT AGENCIES

Accomack-Northampton Planning District Commission

Alabama Geological Survey

California Department of Water Resources

Central Weather Bureau - Taiwan

Colonial Soil and Water Conservation District

Commonwealth of Virginia

Delaware Sea Grant

Environmental Protection Agency

Florida Sea Grant

Hampton Roads Planning District Commission

James City County

Maryland Department of the Environment

Maryland Department of Natural Resources

Middle Peninsula Planning District Commission National

Aeronautics and Space Administration National Park Service

Noaa – Chesapeake Bay Office

Noaa – Marine Debris Program

Noaa – Midatlantic Coastal Adaptation Program, formerly known as Risa

Noaa – National Estuarine Research Reserve System Noaa – National Water Center

Noaa – Office of Coast Survey

Noaa – Office for Coastal Management

Noaa – Sea Grant

National Science Foundation

Natural Resources Conservation Service

New York State Department

North Carolina Coastal Federation

North Carolina Department of Environmental Quality

Northern Neck Planning District Commission

Maryland Department of Environment

Soil and Water Conservation District

US Environmental Protection Agency

US Geological Survey

The Chickahominy Indian Tribe

The Mattaponi Indian Tribe

The Nansemond Indian Nation

The Pamunkey indian Tribe

The Upper Mattaponi Indian Tribe

Virginia Coastal Zone Management Program

Virginia Department of Conservation and Recreation

Virginia Department of Environmental Quality

Virginia Department of Health

Virginia Department of Transportation

Virginia Department of Wildlife Resources

Virginia Geographic Information Network

Virginia Marine Resources Commission

Virginia Sea Grant

UNIVERSITIES / INSTITUTES

Chesapeake Bay National Estuarine Research Reserve

Coastal Studies Institute (ecu/unc)

Christopher Newport University

Cornell Cooperative Extension

Duke University

East Carolina State

George Mason University

Gordon College

Hampton University

Louisiana State University Agricultural Center

Louisiana State University College of Coast & Environment

Mississippi State University

National Cheng Kung University - Taiwan

Old Dominion University

Pennsylvania State University

Smithsonian Environmental Research Center

Stony Brook University

Troy University

Universitat Politecnica De Catalunya

University of Florida

University of Lincoln

University of Georgia Carl Vinson Institute of Government

University of Hawaii - National Disaster Preparedness Training Center

University of Maine

University of Melbourne - Australia

University of North South Wales - Australia

University of Queensland - Australia

University of Tasmania – Australia

University of the Republic of Uruguay - Ctr for Interdisciplinary Coastal Mgmt

University of Virginia

University of Washington

Virginia Tech

Wageningen University and Research - The Netherlands

Water Institute of the Gulf

William & Mary – Department of Applied Science William & Mary - Center for Conservation Biology

NON-GOVERNMENT ORGANIZATIONS

Albemarle-Pamlico National Estuary Partnership

America's Boating Club - US Power Squadron

California Lobster & Trap Fishermen's Association

Chesapeake Bay Foundation

Chesapeake Bay Program

Chesapeake Bay Trust

Chesapeake Research Consortium

Coastal Mapping & Sciences LLC

Defenders of Wildlife

Ebiil Society Inc

Friends of the Rappahannock

Green fin Studio

Honda Foundation

James River Association

Jessie Ball Dupont Fund

Kenah Consulting

National Fish & Wildlife Foundation

National Marine Sanctuary Foundation

Northwest Straits Foundation

Ocean Aid 360

Oceanwide

Oyster Recovery Partnership

Peconic Estuary Partnership

Partnership for Delaware Estuary

Polynesian Voyaging Society

Rand Corporation

Rappahannock River Basin Commission

The Garden Club of America

The Elizabeth River Project

The Nature Conservancy

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Virginia Extension Master Gardeners - Northern Neck

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Virginia Master Naturalists - Historic Rivers

Virginia Master Naturalists - Middle Peninsula

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