Center for Coastal Resources Management

Annual Report 2007

Center for Coastal Resources Management

Virginia Institute of Marine Science

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Center for Coastal Resources Management

2007 Annual Report

Virginia Institute of Marine Science
P.O. Box 1346
Gloucester Point, Virginia 23062

Report Contents

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Center Programs

Background

The Center for Coastal Resources Management exists to develop and support integrated and adaptive management of coastal zone resources. To fulfill this mission, the Center undertakes research, provides advisory service, and conducts outreach education. These tasks are carried out by a staff of professional scientists and technical experts using a mix of state funding and grant/contract support.

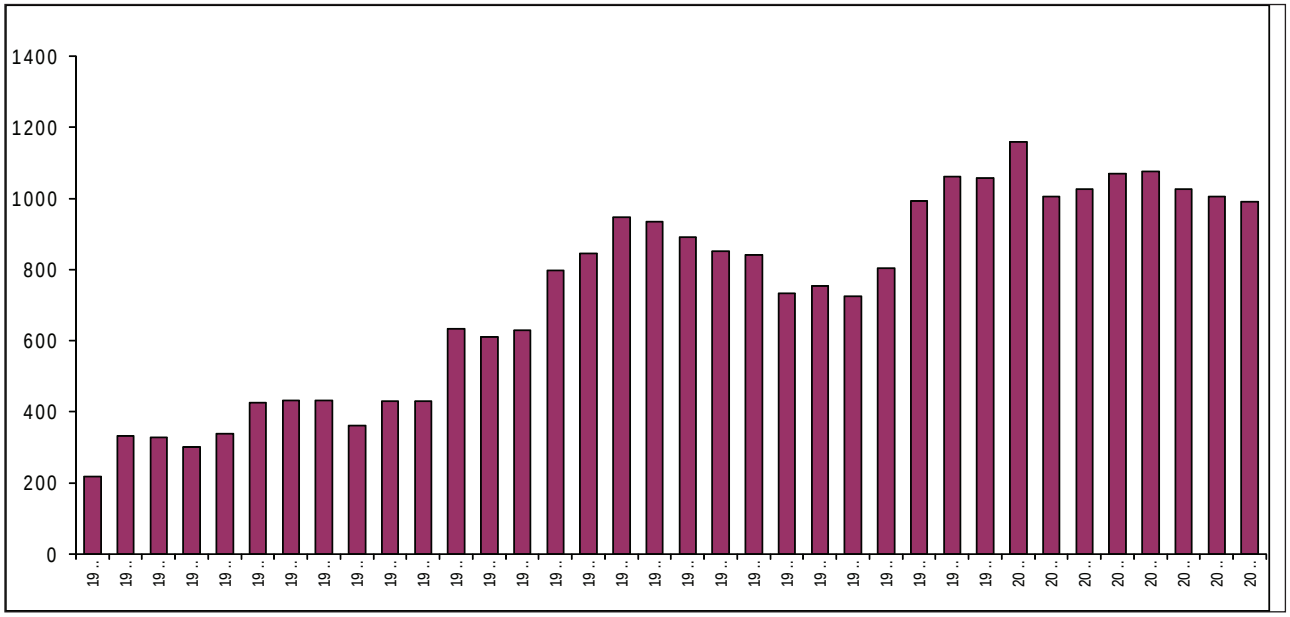
Within its broader mission, the Center has specific tasks to support Virginia's wetlands and shoreline management programs. These core activities create a natural focus on the littoral zone and riparian lands in coastal and estuarine areas. Management of resources in these areas has evolved from resource-specific considerations to system-level perspectives. The Center has been an active agent in this change, and has developed the required internal capabilities and external collaborations to support multidisciplinary approaches to management and policy issues.

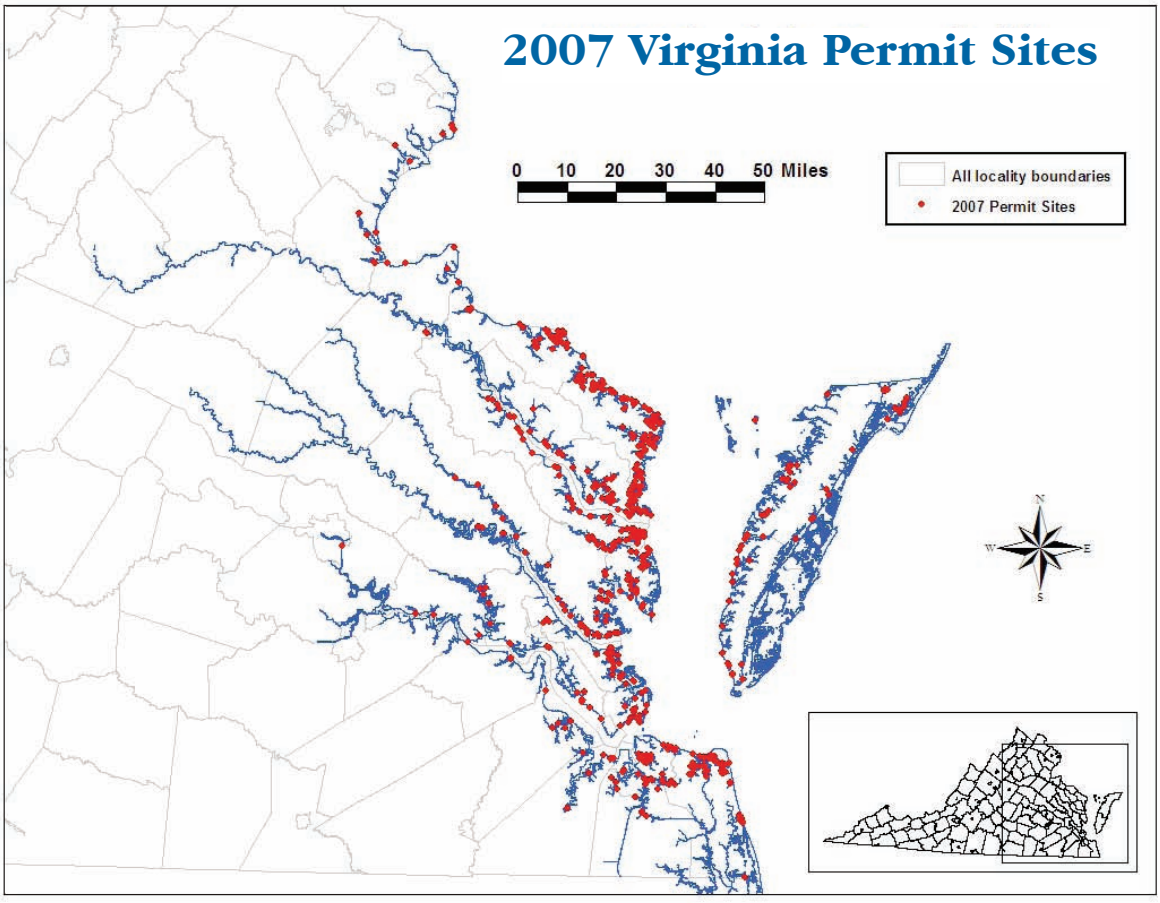
The Center currently manages its multiple activities within three broad and interacting programs.

The Wetlands Program

The Wetlands Program deals with both tidal and nontidal wetlands. The program conducts basic research on the structure and functions of these systems, collaborating with researchers throughout the mid-Atlantic region. A wide variety of applied research is also undertaken. This includes policy option analysis, functional assessment methods, inventory and monitoring techniques, and creation/restoration protocols. The Wetlands Program provides extensive support to the Commonwealths tidal wetlands and subaqueous lands management programs through review of individual tidal wetland permit applications, training for local and state managers, and development/ management of data bases supporting and tracking regulatory program activities.

Permits Reviewed 1972 - 2007

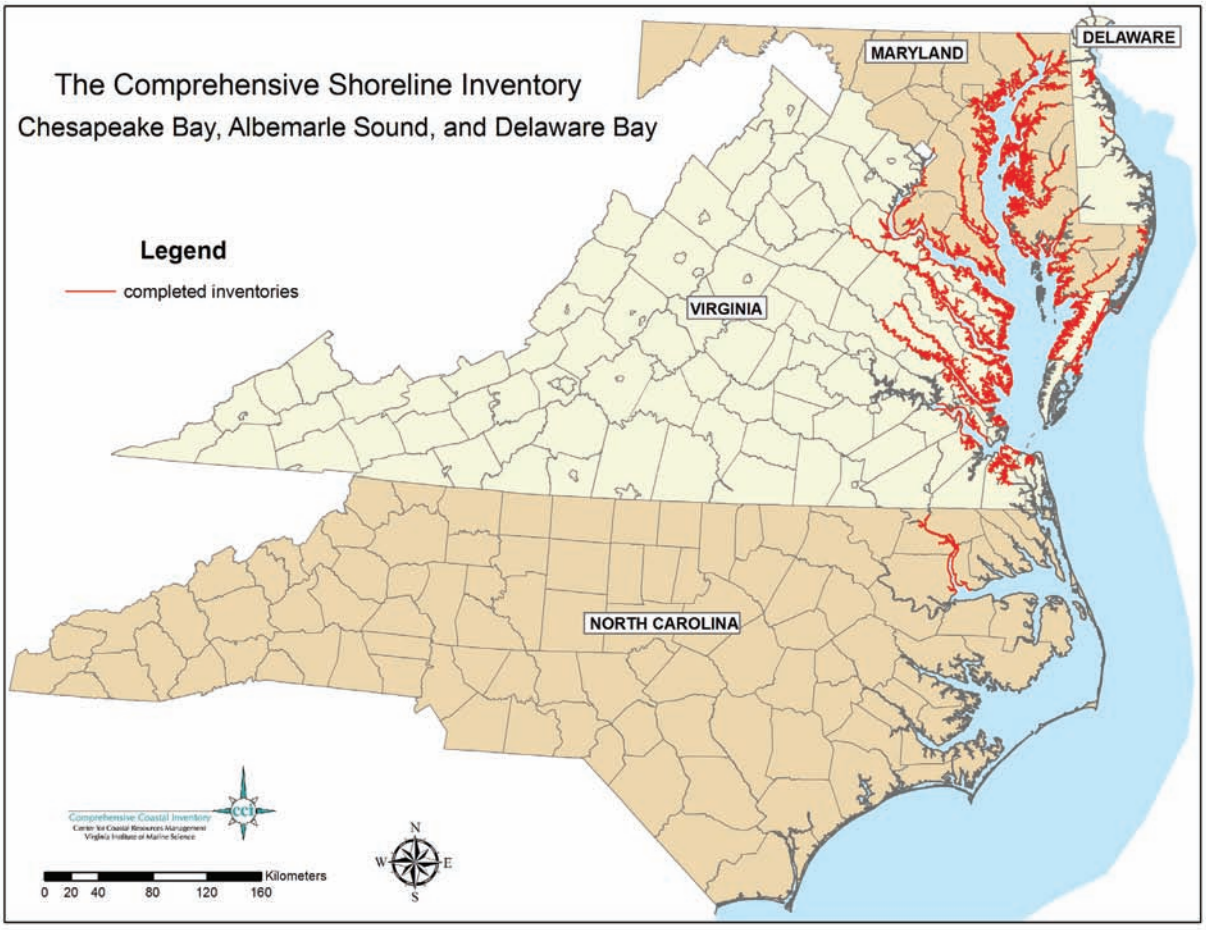




Coastal Inventory Program

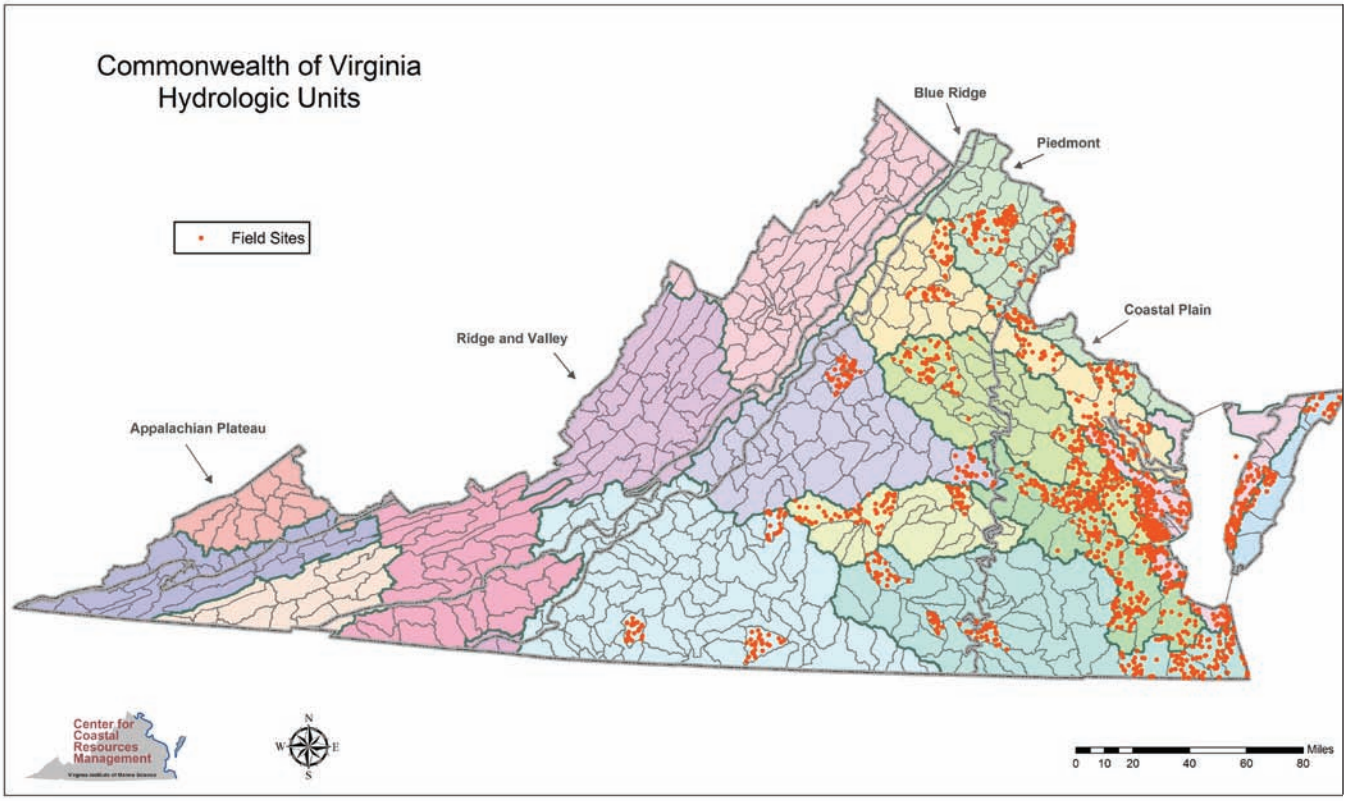
Comprehensive Coastal Inventory
Center for Coastal Resources Management
Virginia Institute of Marine Science

The Coastal Inventory Program has a basic mission to monitor tidal shoreline conditions and to develop policy/management recommendations based on analysis of that information. The Coastal Inventory Program has developed extensive capabilities in geographic information systems and in analysis of remotely sensed information. It has expanded its inventorying activities to include almost all terrestrial and aquatic resources within the coastal zone in support of the Center's focus on integrated and adaptive management. Development of GIS-based analytical protocols has become a major activity in the Coastal Inventory. Development of these tools has proven to be a most effective mechanism for integrating technical understanding and extensive data sets in a format that is comprehensible and informative for managers. The Coastal Inventory generates detailed shoreline condition inventories for every tidal county and city as part of its basic mission, and shares its extensive GIS data bases with state and federal agencies throughout the region.



Coastal Watersheds Program

The Coastal Watersheds Program evolved to deal with the water quality/quantity, land use, and habitat issues that were part of integrated management of coastal resources. The program focuses on basic and applied research in support of policy and regulation development. There are both regional and international elements in the Coastal Watershed Program. The program is working on development of indicators for health of aquatic ecosystems, use conflict management plans for shallow waters, anadromous fish spawning and nursery habitat studies, and climate change impact assessments. Because much of the work on use conflict analysis, shallow water management, and fishery habitat assessment is of interest in coastal systems around the world, the Center manages growing international collaborations through the Coastal Watersheds Program.



Personnel and Funding

The Center has a full time staff of about 23 individuals and supports several graduate students. The staffing varies slightly depending on grant and contract activities. Currently the Commonwealth of Virginia provides base funding for the Center that covers less than 50% of the salary expenses and about 15% of the annual operating expenses. The balance of funding is derived from grant and contract activity. The primary sources of this support have been the U.S. Environmental Protection Agency and Virginia's Coastal Resource Management Program (funding from NOAA). Other sources of recent funding have included National Oceanic and Atmospheric Administration, National Science Foundation, Virginia Department of Health, Virginia Department of Conservation and Recreation, and private donors.

Center for Coastal Resources Management

John Wells
VIMS Dean and Director

Roger Mann
Director for Research and Advisory Service

Carl Hershner
Director, Center for Coastal Resources Management

Agnes Lewis
Business Manager A

Dawn Fleming
Administrative Coordinator

Inez Boerner
Administrative Assistant

Comprehensive Coastal Inventory

Marcia Berman
Program Director

Harry Berquist
Sr. Programmer/ Analyst

Mary Huang
Graduate Intern

Karinna Nunez
GIS Specialist

Tamia Rudnicky
Programmer/Analyst

Dave Weiss
Database Manager

Julie Herman
Research Associate

Sharon Killeen
Programmer/Analyst

Dan Schatt
Programmer/Analyst

Coastal Watersheds Program

Kirk Havens
Assistant Director, CCRM

Donna Bilkovic
Research Associate

Karen Reay
Internet Database Manager

Dave Stanhope
Lab/Research Manager

Kory Angstadt
Research Specialist II

Wetlands Program

David O'Brien
Program Director

Julie Bradshaw
Marine Scientist, Sr.

Karen Duhring
Marine Scientist Supervisor

Pam Mason
Marine Scientist Supervisor

Molly Roggero
Marine Scientist Sr.

Center Fellows

The Center Fellowship Program is designed to enhance capabilities to provide the very best research and advice by ensuring a constant influx of new ideas and perspectives. The goal is to bring dynamic young scientists into close collaboration with Center staff on a continuing basis. Each year one or two researchers from other institutions will be appointed to a two-year term as Center Fellows. Each Fellow is expected to spend a minimum of one week in residence at the Center giving seminars and leading workshops in areas of their particular expertise. In addition, Fellows are engaged in development of proposals for collaborative research that may extend well beyond their formal appointments. Fellows are selected by the Center's leadership based on nominations from Center staff or colleagues at other institutions. The selection process emphasizes the goal of bringing in post-doctoral scientists who have begun careers as independent researchers, with expertise that compliments but does not duplicate Center staff expertise. Fellowship Program success is measured by the number of new research topics and approaches developed from these collaborations. These appointments started on May 1, 2004.

Dr. Anamarija Frankic is an assistant professor in the Environmental Earth and Ocean Science Department of the University of Massachusetts in Boston. She is interested in coastal ecosystem management, and particularly in adaptive management applications to establish sustainable practices in coastal environments. Anamarija received a B.S. in Biology and an M.S. in Ecology and Limnology from the University of Natural and Mathematical Sciences in Zagreb, Croatia, her homeland. Her Ph.D. was earned at the Virginia Institute of Marine Science, College of William and Mary. Anamarija is currently teaching and conducting research on management of aquaculture, protected areas, and tourism/ecotourism. She has worked as a contractor and consultant for the World Bank and Global Environment Facility on a variety of ecosystem conservation projects in Croatia, and has been an active participant in multiple workgroups sponsored by the United Nations. Most recently, Anamarija presented her work at the Association of Scottish Shellfish Growers International Conference in Oban and spent the month of July working with the Government of Tanzania and Zanzibar on the Marine and Coastal Environment Management Project. She has worked with CCRM staff in establishing collaborations with coastal centers in Croatia and Ireland, and has directed and/or participated in research projects focused on integrated coastal management involving CCRM staff and students.

Dr. Chris Pyke is the Director of Climate Change Services for CTG Energetics, Inc., a team of engineers, architects, planners, and scientists dedicated to integrating sustainability principles with the design and operation of the built environment. He coordinates CTG's climate change services that help public and private-sector clients understand and reduce greenhouse gas emissions while preparing for changing climatic conditions. Dr. Pyke serves as a member of the Chesapeake Bay Program's Scientific and Technical Advisory Committee. Prior to joining CTG, Dr. Pyke was an environmental scientist with the US EPA's Global Change Research Program and co-chair of the US Climate Change Science Program's Interagency Working Group on Human Contributions and Responses to Climate Change. Collaboration with VIMS researchers provides opportunities for Dr. Pyke to pursue his interests in interactions between climate and land use change, particularly decisions associated with land management and the design and operation of built environments. He is collaborating with VIMS researchers on a study of the implications of climate change for the Chesapeake Bay Program. Findings from the report were presented to members of the US Senate Committee on Environment and Public works in September. Dr. Pyke has also worked with VIMS researchers on several proposals to investigate climate-related impacts and adaptation opportunities associated with coastal land use practices.

Dr. Denice Wardrop is a research faculty member in the Cooperative Wetlands Research Center at Pennsylvania State University. Dr. Wardrop has been engaged in investigation of nontidal wetlands structure and function in the ridge and valley province of Pennsylvania. She has also been an active participant in a number of technical advisory committees at the state, regional, and federal level, including the national committee on Biological Assessment of Wetlands. Dr. Wardrop's expertise is particularly important to the VIMS' Center staff as they undertake development of new wetlands assessment protocols for the Commonwealth of Virginia. She is currently collaborating with the VIMS' researchers in a multi-institutional project to develop indicators of aquatic ecosystem health. This work is now evolving to pursue related lines of research through new proposals.

Center Adjunct Research Faculty

CCRM Adjunct Research Faculty are College of William and Mary colleagues from other departments or schools. These individuals collaborate with Center staff on a continuing basis in basic and applied research. Adjunct Research Faculty expand the expertise available for CCRM projects, constituting a very efficient mechanism for addressing multidisciplinary issues. Appointments are for fixed terms and are renewable as the work of the Center and the interest of faculty members dictate. Success in the Adjunct Research Faculty program is judged by generation of collaborative proposals and research products. The first appointments to the CCRM Adjunct Research Faculty were made in December 2005.

Dr. Randy Chambers is Associate Professor of Biology and Director of the Keck Environmental Field Laboratory at The College of William and Mary. He received a B.A. in Biology from Gettysburg College, an M.S. in Zoology from the University of Massachusetts-Amherst, and a Ph.D. in Environmental Science from the University of Virginia. His research interests are in environmental science and the ecology and restoration of wetlands. Currently, he teaches courses in watershed ecology, environmental science and policy, and wetland ecosystems. Dr. Chambers' most recent projects include an evaluation of invasive plants in tidal wetlands, long-term research in the Florida Coastal Everglades, and the study of turtles in southeastern Virginia wetlands.

Dr. Gregory Hancock is Associate Professor of Geology at the College of William and Mary. A geomorphologist and hydrologist, Greg is interested in the impacts of land use change on Coastal Plain streams, and the effectiveness of engineered structures (i.e. retention ponds) on minimizing these impacts. He is collaborating with James City County to evaluate the effectiveness of retention ponds for controlling stormwater runoff, and is investigating the impacts of urbanization-induced channel incision on local riparian groundwater systems.

Center Associate Researchers

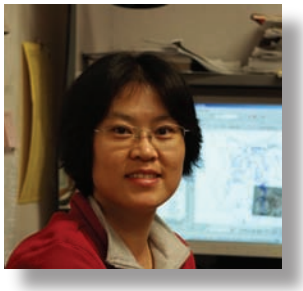
CCRM Associate Researchers are scientists from other institutions, government agencies, and/or the private sector who collaborate with Center staff on research and advisory projects. Appointment as an Associate Researcher is based on sustained productive interaction. Appointments are for fixed terms and renewable as appropriate. The first appointments of CCRM Associate Researchers were in September 2005.

Daniel Redgate is an Environmental Scientist at Kimley-Horn and Associates, Inc. His research interests include Hydrology, Assessment and Restoration of Streams and Wetlands; Watershed Modeling, Assessment and Water Quality Improvement. Dan is presently working as a consultant in the assessment and design of stream and wetland ecosystems, and in the evaluation of watershed-scale water quality improvement measures. He received a B.S. in Ecology from The Pennsylvania State University, and an M.S. degree from the Virginia Institute of Marine Science, The College of William and Mary. While studying at VIMS, Dan's research focused on the hydrology of forested wetlands and seasonal water budgets of forested wetland mineral flats. Dan has since worked on the assessment and design of numerous wetland and stream restoration sites for the purpose of compensatory mitigation and for watershed water quality improvement. His research interests are wetland

and stream hydraulics and hydrobiology, riparian ecology and restoration science. He is working on the development of regional hydraulic geometry relationships for stream design, an evaluation of techniques for the assessment of stream quality, and the assessment of perennial, intermittent and ephemeral streams. Dan is a member of the Society of Wetland Scientists and the Virginia Association of Wetland Professionals.

Dr. Ed Sharp was born in Uniontown, PA, attended Wheeling College and John Carroll University and received a Ph. D. from Texas A&M University in 1966. He conducted basic research in the area of applied nonlinear optics at the U.S. Army Night Vision & Electro-Optics Laboratory and the U.S. Army Research Laboratory until this past year. Presently he is working as a consultant on the use of infrared imaging equipment in novel application areas. His major areas of interest include laser crystal physics, thermal imaging materials and devices, electro-optic and nonlinear-optical processes in organic materials, beam-control devices, optical solitons, harmonic generation, holographic storage, and photorefractive effects in ferroelectric materials. He is the author or co-author of more than 100 technical publications and holds over 15 patents on optical materials and devices. He is a member of the American Optical Society, IEEE, The American Ceramic Society, and SPIE. Ed currently is working on developing methodologies for the use of thermal imaging in natural resource research.

Center Graduate Students



Mary Huang - Mary is a Ph.D. candidate at the Virginia Institute of Marine Science investigating the role of watershed characteristics as a source of fecal coliform by analyzing the model predicted errors between observed data and water quality model predictions. The results of this work may have an impact on the development of shellfish total maximum daily loads (TMDLs) in Virginia.

Matt Strickler - This year Matt graduated with a joint Masters from the Thomas Jefferson Program in Public Policy at the College of William and Mary and Department of Coastal and Ocean Policy, Virginia Institute of Marine Science. His research interests include marine resource policy and economics, coastal zone management, and recreational fisheries. Matt is currently working for NOAA's Office of International Affairs in Washington, DC. for his Knauss Fellowship.
http://www.vims.edu/library/Theses/Strickler07.pdf

Center Collaborations

Albemarle Pamlico National Estuary Program

Baltimore District Corp of Engineers

Chesapeake Bay National Estuarine Research Reserve

College of William and Mary

Delaware Department of Natural Resources & Environmental Control

East Carolina University

Longwood University

Maryland Department of the Environment

Maryland Department of Natural Resources

NOAA Chesapeake Bay Program Office

NOAA Coastal Services Center

North Carolina Coastal Federation

Oregon State University

Pennsylvania State University

Smithsonian Environmental Research Center

U.S. Coast Guard Auxiliary

U.S. Dept of the Army, Night Vision & Electro-optics Div. (retired)

U.S. Environmental Protection Agency

University College Cork, Ireland

University of Maryland

University of North Carolina

University of Oregon State

University of Washington

Virginia Department of Conservation & Recreation

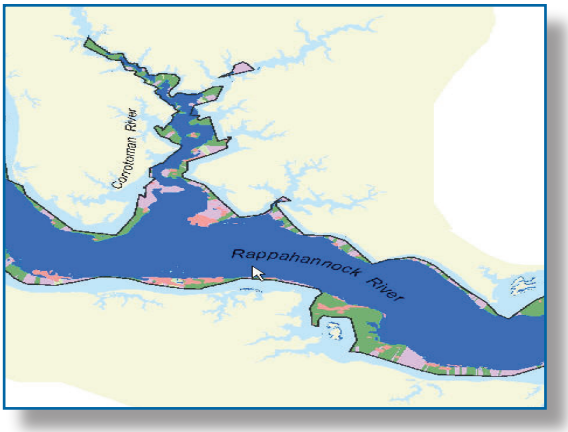
Virginia Department of Forestry

Virginia Polytechnic Institute and State University

Wetlands Watch

Center Projects

Assessment of Aquaculture Potential Within Baylor Grounds in the Lower Rappahannock River



PI: Berman
Funding Agency: VA Coastal Zone Management Program
Period: 10/30/07-9/30/08
Amount: $60,000

The suitability for using public Baylor grounds for aquaculture is being explored through a GIS based analysis to determine if areas could support aquaculture given current condition and surrounding land-use.

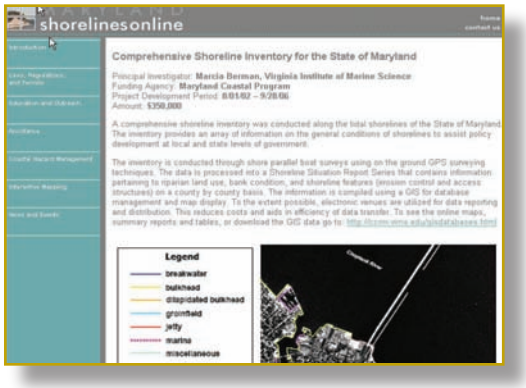
Coastal Maritime Forests in Virginia - Delineation and Distribution

PI: Berman
Funding Agency: Virginia Coastal Zone Management Program
Period: 2/1/06 - 3/31/07
Amount: $37,500

This project delineates the boundaries of coastal maritime forests using remote sensing techniques and assesses to amount of maritime forest habitat within each coastal locality.

http://ccrm.vims.edu/gis_data_maps/data/maritimeforest/index.html

Development of Maryland's Shoreline Inventory Training Manual



PI: Berman
Funding Agency: MD Department of Natural Resources
Period: 3/30/07 - 7/30/07
Amount: $9,600

This project developed a training manual to guide end users in the use and dissemination of data contained within the Shoreline Inventories developed for Maryland's tidal localities.

Development of Shoreline Inventories for Delaware

Principal Investigator: Berman
Funding Agency: DE Department of the Environment and Environmental Control
Period: 6/1/07-2/30/08
Amount: $30,000

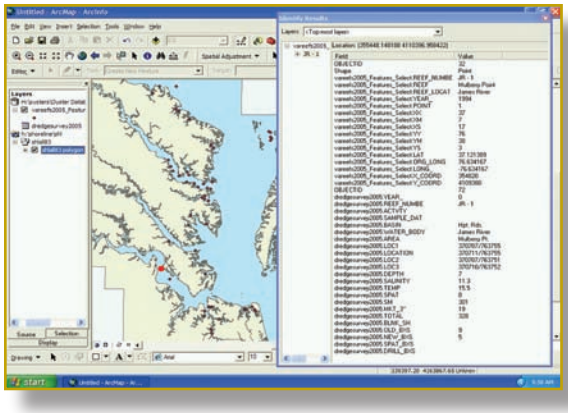
This project generates a shoreline inventory for three watersheds in the state of Delaware: St. Jones, Appaquinamink, and Blackbird Creeks.
Website: *http://ccrm.vims.edu/gis_data_maps/shoreline_inventories/delaware/delaware_disclaimer.html*

Effects of Sea Level Rise on Tidal Wetlands

Principal Investigator: Berman
Funding Agency: VA Environmental Endowment
Period: 10/1/07-9/30/2008
Amount: $31,462

This project maps the anticipated loss of tidal wetlands habitat in the Lynnhaven River watershed attributed to sea level rise. The project uses remote sensing techniques and high-resolution imagery to delineate current wetlands distribution. High-resolution elevation data generated from LIDAR will be used to compute the horizontal and vertical inundation due to sea level rise.

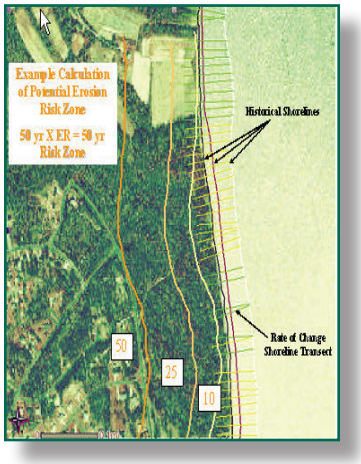
Evaluating Efforts, Outcomes and Next Steps for Native Oyster Restoration in the Chesapeake Bay



Principal Investigator: Berman
Funding Agency: CRC / NOAA / Campbell Foundation
Period: 3/30/07-9/30/07
Amount: $27,716

This project assembles, collates, and georeferences existing oyster restoration databases among major programs and agencies in Virginia. The project develops and populates a geo-database framework to manage the data over time.

Geographic Information Support to Chesapeake Bay Erosion Feasibility Study, Maryland

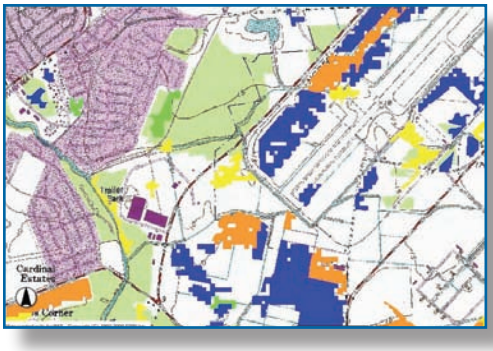


Principal Investigator: Berman
Funding Agency: Baltimore District US Army Corps of Engineers
Period: 8/8/2006-1/31/2008
Amount: $125,000

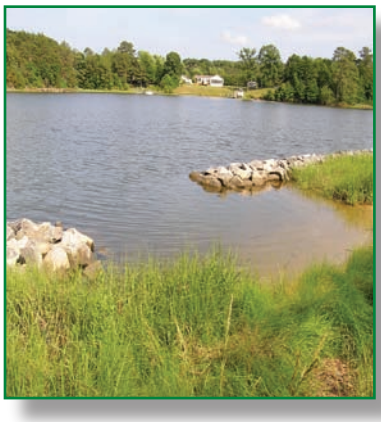
This project determines the risk to natural habitat (beaches and marshes), and socio-economic resources that can be attributed to shoreline erosion. The project also looks at the influence boat wake activity has on shoreline erosion in protected embayments. The degree of vulnerability will be determined using a GIS based spatial model. The output will be displayed in an interactive map environment.

Internet Based Decision Tool for Siting Wetland Restoration Sites in Hampton Roads, Virginia

Principal Investigator: Berman
Funding Agency: US Environmental Protection Agency, in-house
Period: 2005-2008
Amount: $82,361



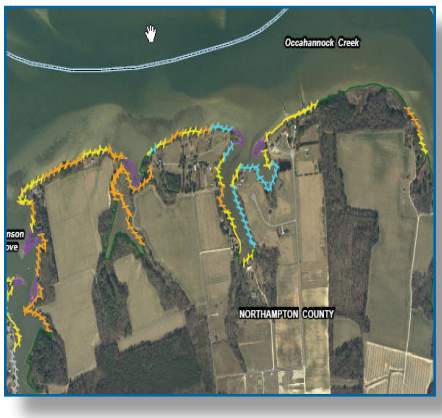
Revised in 2005, the update now includes Virginia's entire coastal zone. This project uses the protocol and findings of the Advanced Identification of Wetland Restoration sites, to develop an interactive, web-based management tool to assist regulators, developers, and project agents in location of potential compensatory mitigation sites in Hampton Roads. The model has been run for the entire coastal zone in Virginia. Link to ArcIMS at *http://ccrm.vims.edu/publications/completed_projects/wetlands/internetdecisiontool.html*



Living Shoreline Suitability Modeling - Worcester County Maryland

Principal Investigator: Berman
Funding Agency: MD Department of Natural Resources
Period: 11/01/07-9/30/2008
Amount: $37,000

This project applies a living shoreline suitability model to the county of Worcester to generate a coastal management strategy map delineating areas suitable for living shoreline treatments.



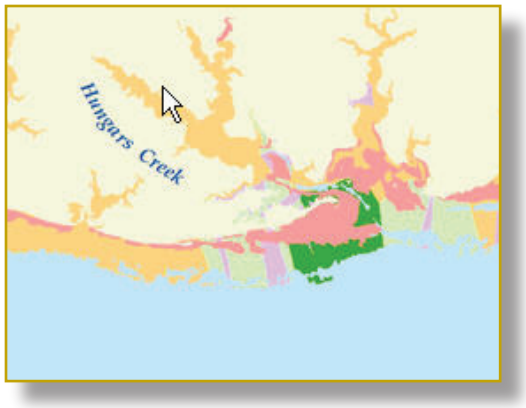
Occahannock Creek Shoreline Management Plan

Principal Investigator: Berman, Hardaway
Funding Agency: NFWF / Eastern Shore of VA Resource Conservation & Dev. Council
Period: 4/1/07-10/31/07
Amount: $40,000

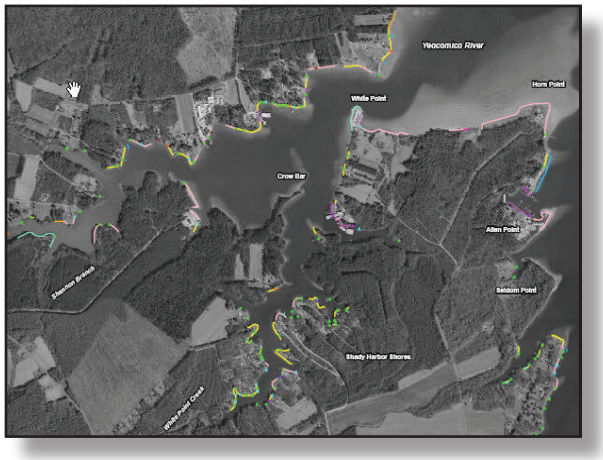
This project develops a shoreline inventory for Occahannock Creek and generates a Shoreline Management Plan to assist with local planning and shoreline management strategies.

Shellfish Aquaculture Suitability Model

Principal Investigator: Berman
Funding Agency: VA Coastal Zone Management Program
Period: 10/1/2006-9/30/2007
Amount: $85,000



This project uses GIS to model the vulnerability of existing or potential aquaculture areas to environmental and anthropogenic stressors.
Website: *http://ccrm.vims.edu/gis_data_maps/interactive_maps/aquaculture_vulnerability/aquaculture_vulnerability_model.html*



Shoreline Situation Reports and Their Application for Tidal Wetlands Management - A Demonstration

Project in Westmoreland County
Principal Investigator: Berman
Funding Agency: VA Coastal Zone Management Program
Period: 3/1/2006-3/31/2007
Amount: $55,000

This project accomplishes two tasks. The first is to develop an updated Shoreline Inventory for the county of Westmoreland. The second is to evaluate the combined power of inventory data and existing permit records for monitoring impacts and actions along tidal shorelines.
Website: *http://ccrm.vims.edu/gis_data_maps/shoreline_inventories/index.html*

Shoreline Situation Reports for Tidewater Localities

Principal Investigator: Berman
Funding Agency: VA Coastal Zone Management Program
Period: 10/07-9/08
Amount: $50,000

This project completes necessary steps to generate new Shoreline Inventories for the City of Chesapeake, City of Portsmouth, County of Gloucester, County of New Kent, and County of King George.
Website: *http://ccrm.vims.edu/gis_data_maps/shoreline_inventories/index.html*

Shallow Water Fish Communities and Coastal Development Stressors in the Lynnhaven River

Principal Investigators: Bilkovic, O'Brien, Berman
Funding Agency: US Army Corps of Engineers
Period: 9/12/06 – 9/11/07
Amount: $134,695

Limited quantitative knowledge exists on nekton assemblages utilizing shallow water habitats, such as tidal creeks, within the Lynnhaven River restoration area. Fish surveys were completed in several tidal creeks, with varying development stressors, to document and compare common fish assemblages. To estimate potential dredging impacts, assemblages were compared between pairs of dredged and natural tidal creeks for resemblance in composition and abundance. Other stressors evaluated with fish assemblages were shoreline hardening and developed lands. The degree of shoreline modification, and developed riparian land use within the system was determined with a comprehensive coastal inventory of shoreline condition. The latter may be used as an indicator of shoreline disturbance and potential habitat degradation for both pelagic and benthic organisms.
Website*: http://ccrm.vims.edu/research/coastal_stressors/lynnhaven_fish_06/index.html*

Survey of Atlantic Sturgeon Spawning Habitat on the James River

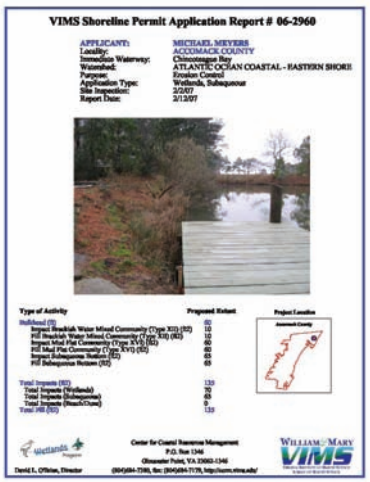
Principal Investigator: Bilkovic
Funding Agencies: US Fish and Wildlife Service, NOAA Chesapeake Bay Program
Periods: 11/01/05-5/31/07 (USFWS), 10/01/07-present (NOAA-CBO)
Amount: $12,945 (USFWS), $20,000 (NOAA-CBO)

This project's objectives are to conduct benthic habitat mapping of potential Atlantic sturgeon spawning reaches using side-scan sonar to ascertain the presence and location of essential spawning habitat (e.g. gravel beds) in the James River. Areas surveyed include the upper reaches of the James River from Shirley Plantation to Richmond. The location of viable hard bottom habitats for sturgeon spawning will be determined and geo-referenced for future evaluation with additional habitat quality information.

Surveying and Summarizing the Spatial Arrangement of Benthic Habitat Types within the Nearshore of Mobjack Bay, Virginia

Principal Investigators: Bilkovic, Hershner
Funding Agency: NOAA Chesapeake Bay Program
Period: 9/01/06-8/31/08
Amount: $68,581

Mobjack Bay and its associated tributaries historically contained a diverse array of critical habitat types including oyster reefs, seagrass beds and tidal wetlands. Currently, multiple restoration efforts are underway throughout this watershed to mitigate losses from disease, and habitat destruction and modification. Benthic habitat will be mapped and quantified within the nearshore of Mobjack Bay, including the Severn, Ware, North and East Rivers, and compared with described aquatic habitat distribution (e.g. SAV, tidal marsh) from other sources (CCRM, wetlands program and VIMS SAV program), to characterize the extent and distribution of habitats.


VIMS Shoreline Permit Application Report # 06-2960

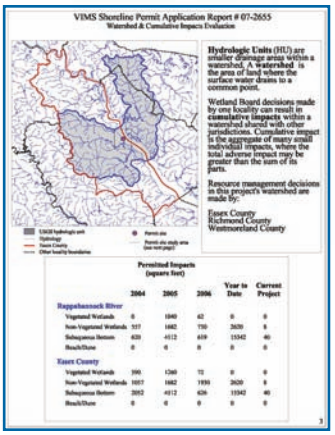
Maintenance of Virginia Nontidal Wetlands Database

Principal Investigators: Fleming, Weiss
Funding Agency: in-house
Period: ongoing

Maintenance of a website-accessible database for nontidal wetlands permitting in Virginia. For more information, please see *http://ccrm.vims.edu/wetlands/nontidal_impacts.html*

Tidal Wetlands Management Technical Support

Principal Investigators: Fleming, Hershner
Funding Agency: VA Coastal Zone Management Program / NOAA
Period: annually 10/1-9/30
Amount: $84,000


VIMS Shoreline Permit Application Report # 07-2655

This project has been a continuing grant renewed annually to support advisory service provided by the Wetlands Program to the Tidal Wetlands Management program. In particular, this grant helps fund travel costs associated with site visits and meeting attendance by staff scientists, publication costs for wetlands newsletters and outreach education materials, as well as some of the expenses of maintaining the tidal wetlands permit database on the Center's website.
http://www.vims.edu/ccrm/wetlands/newpermits.html

Funding was provided to support production of the following publications:

- Virginia Wetlands Report. Spring 2007, Vol. 22, Issue 1. Living on the Edge http://ccrm.vims.edu/publications/publications_topics/index.html
- Virginia Wetlands Report. Fall 2007, Vol. 22, Issue 2. The Big Picture: Managing Wetlands from a Shoreline Perspective http://ccrm.vims.edu/publications/publications_topics/index.html
- Rivers & Coast. Winter 2007, Vol. 2, No. 1. Introduction to the Integrated Guidance Concept http://ccrm.vims.edu/publications/pubs/rivers&coast/index.html

Blue Crab Mortality in the Chesapeake Bay Due to Derelict "Ghost" Crab Pots

Principal Investigators: Havens, Bilkovic, Stanhope, Angstadt
Funding Agency: NOAA / National Fish & Wildlife Foundation
Period: 01/10/07 – 12/31/07
Amount: $35,022

This project investigates blue crab mortality rates associated with abandoned or derelict blue crab traps in the Chesapeake Bay including the 'self-baiting' phenomenon of derelict traps. The study is both field and laboratory based.
http://ccrm.vims.edu/research/mapping_surveying/marine_debris.html

Constructing Probability Surfaces of Ecological Change in Coastal Aquatic Systems Through Retrospective Analysis of *Phragmites australis* Invasion and Expansion.

Principal Investigators: Wardrop, Whigham, Havens
Funding Agency: US Environmental Protection Agency
Period: 2/1/05-1/31/07
Amount: $299,995 (VIMS $29,317)

The project will develop a unique analytical method, which involves constructing a probability surface, which can be used to identify thresholds for the transition of coastal marshes to dominance by Phragmites. Any set of conditions can then be placed upon the probability surface, allowing the statistical method to be used in a predictive fashion. The method could be applied to a wide variety of aquatic ecosystems for which state changes occur over either a spatial and temporal extent, or both.
http://es.epa.gov/ncer/publications/workshop/pdf/12_whigham.pdf

Developing a Curriculum for a Living Shorelines Education Course for Project Designers and Contractors

Principal Investigators: Havens, Roggero, Bradshaw
Funding Agency: Chesapeake Bay Restoration Fund
Period: 7/01/07 - 7/01/08
Amount: $14,000

This project involves designing curriculum for a course to educate shoreline project designers and contractors about the use of "Living shoreline" designs. The course stresses the reasoning behind the recommended design criteria, so that participants learn why the designs function naturally, not just how to build them. The course also stresses interactions between the upland riparian zone, the wetlands and the aquatic system - three areas that are functionally integrated and tend to be impacted by shoreline projects.

Development of a Nontidal Wetland Inventory and Monitoring Strategy for Virginia – Completion of Phase II (Coastal Plain and Piedmont Physiographic Provinces).

Principal Investigators: Havens, Hershner, Bilkovic, Stanhope, Angstadt
Funding Agency: Environmental Protection Agency / VA Department of Environmental Quality
Period: 1/01/07 – 12/31/07
Funding: $95,245

This project develops and implements a three level assessment protocol for non-tidal wetlands in Virginia. In this project Level II assessments involving field assessments of stressors were conducted in the Piedmont of Virginia. Level III assessments involving detailed analysis of habitat and water quality functions on selected coastal plain sites were also undertaken.
Website*: http://ccrm.vims.edu/publications/completed_projects/index.html*

The Impact of the Blue Crab Fishery on the Population Structure of Diamondback Terrapins

Principal Investigators: Chambers, Havens, Stanhope, Angstadt
Funding Agency: National Science Foundation
Period: 04/01/07-3/31/08
Amount: $15,000

This project employs side-scan sonar technology to locate and retrieve derelict blue crab traps adjacent to Goodwin Islands in the York River, Virginia to determine potential impacts on diamond backed terrapins. The Goodwin Island marsh complex is considered good habitat for terrapins.

Longwood College / Hull Springs Farm Wetlands Project

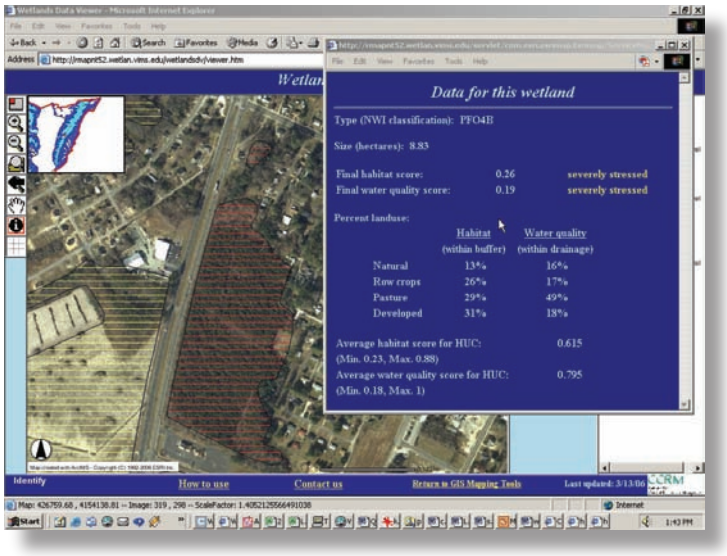
Principal Investigators: Havens, Redgate, Herbert
Funding Agency: private funds, in-house

Hull Springs Farm is owned by Longwood University Foundation, Inc. The Foundation works closely with the faculty of Longwood University and other universities and groups to coordinate all uses of Hull Springs Farm for educational events and research. Scientists from the Virginia Institute of Marine Science (of the College of William and Mary) have been researching the Farm's hydrology, soil, and biological indicators (for example, plants) to determine areas of the farm that could be restored to wetlands.

Mid-Atlantic Multi-Level Non-Tidal Wetlands Assessment

Principal Investigator: Havens
Funding Agency: Environmental Protection Agency
Period: 10/1/07-9/30/12
Amount: $460,000

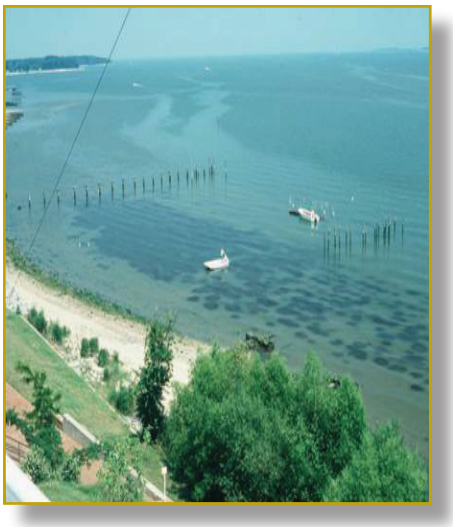
This project implements a level 1 GIS based protocol for assessment of non-tidal wetlands and their functions in the Mid-Atlantic state's of Pennsylvania, Delaware, West Virginia, and the District of Columbia.



Recreational and Commercial Water Use Monitoring

Principal Investigator: Havens
Funding Agency: in-house

This project involves a partnership with the Coast Guard Auxiliary to investigate recreational boat use and commercial crabbing activities in order to develop potential predictive models of derelict blue crab trap locations and densities. Recreational boating activity and commercial crab trap buoys are logged and mapped using GPS technology.



Assessing the Potential for Climate-Driven Changes in Virginia's Shallow Tidal Water Habitats

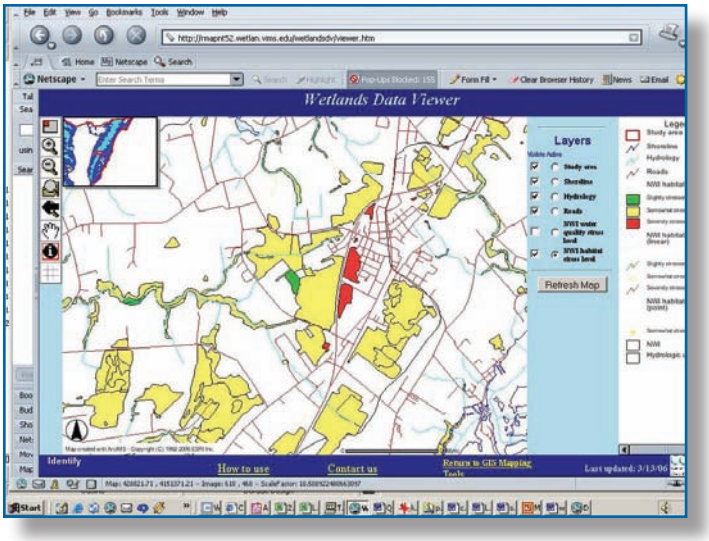
Funding Agency: NOAA Chesapeake Bay Program
Principal Investigators: Hershner, Berman, Bilkovic, Jasinski
Period: 10/01/07-9/30/08
Amount: $120,000

This project is designed to support enhanced stewardship of critical estuarine resources – shallow water habitats. The proposed work will involve integration of a wide variety of data regarding the littoral and riparian areas along Virginia's estuarine shorelines. The objective is to develop a characterization of current habitat components in the shallow water areas of the Commonwealth. This information will then be used as the basis for modeling potential future conditions in these areas as climate change and development exert their influences.

Building Capacity to Perform Wetland Assessment in Maryland

Principal Investigators: Hershner, Berman
Funding Agency: MD Department of Natural Resources
Period: 3/07-3/08
Amount: $40, 925

This project applies a level 1 non-tidal wetlands assessment protocol for evaluating conditions of wetlands and probably ecosystem function.



Facilitation of the Development of a Prototype Integrated Ecological Assessment Approach for the Chesapeake Bay

Funding Agency:NOAA Chesapeake Bay Program
Principal Investigators: Hershner, Bilkovic
Period: 10/01/07-9/30/08
Amount: $30,000

Integrated assessments are defined by NOAA as 'a synthesis and quantitative analysis of information on relevant, physical, chemical, ecological, and human processes in relation to specified ecosystem management objectives'. Inherent in the process of developing integrated assessments is the potential for compounded errors from the use of multiple datasets of varying sources, scales (temporal and spatial), and methodology. To ensure reduction of possible errors and transparency in any analytical assumptions, protocols for development of IEAs need to be developed. This project will review data interpolation and analysis issues encountered in a pilot project that will assess the potential for climate-driven changes shallow tidal water habitat, and work toward development of guidance for future iterations of IEAs in the region.

Garden Club of America Scholarship

Principal Investigator: Hershner, Reay
Funding Agency: Garden Club of America
Period: annual (2000 to present)
Amount: $500

The Center manages the annual advertisement, review, and selection of recipients for the Garden Club of America Scholarship for Wetland Studies. Each year the Center advertises and responds to inquiries regarding the award. In February it receives, reviews, and ranks applicants and makes a recommendation to the GCA for that year's awards. Awards are open to any graduate student undertaking a field-oriented study of wetlands at an American university.
Website: *http://ccrm.vims.edu/education/garden_club/index.html*

Marine Science Teaching Marsh

Principal Investigator: Hershner
Funding Agency: Dreyfus Foundation
Period: Private Funds
Amount: $30,000

Funding was provided for improvements to the VIMS Teaching Marsh via improved signage and informational kiosks, updated video cameras, and modifications to the educational website. The website will describe wetland plant species found within the VIMS Teaching Marsh as well as general marsh properties and function. Website information will also include learning activities for children.
Website: *http://ccrm.vims.edu/wetlands/teaching_marsh/index.html*

Seasonal Monitoring, Fecal Coliform Loads, Lynnhaven River System

Principal Investigators: Hershner
Funding Agency: Virginia Beach
Period: 11/1/05-3/31/07
Amount: $53,259

A collecting and sampling program was developed for fecal coliform following runoff events in the Lynnhaven River System. This information will be used to support water quality and TMDL modeling.

Tidal Flushing Characteristics in VA's Tidal Embayments

Principal Investigator: Hershner, Herman
Funding Agency: VA Coastal Zone Management Program
Period: 10/01/06-9/30/07
Amount: $60,000

This project combines GIS and water quality modeling to evaluate individual hydrologic systems for general tidal flushing characteristics.
Website*:http://ccrm.vims.edu/research/water_column_quality/*

Identification of Management Strategies for Promoting Aquaculture in Virginia

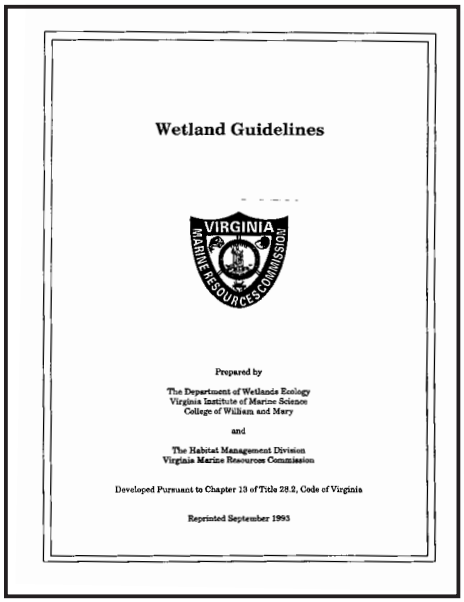
Principal Investigator: Mason
Funding Agency: VA Coastal Zone Management Program / NOAA
Period: 07/01/07 – 12/31/07
Amount: $25,000

This review will identify options for the promotion of shellfish culture generally, as well as options specific to oyster culture. Economic analyses of management options identified pursuant to this proposal are to be conducted Virginia Polytechnic Institute and State University (VT). The management analysis proposed herein, will continue to be refined collaboratively with VT during the course of their proposed study in order to identify new management approaches to optimize public and private benefits from aquaculture.

Recommendations for Revision of the Dunes/ Beaches Guidelines

Principal Investigators: Mason, Bradshaw, Duhring, Hardaway, Varnell
Funding Agency: VA Coastal Zone Management Program / NOAA
Period: 10/01/07 – 09/30/08
Amount: $50,000

There are currently a variety of regulations and guidelines developed by local and state programs managing shoreline development activities. Development of proposed revision to the Dunes/ Beaches Guidelines document is part of CCRM's on-going integrated guidance initiative. The Dunes/ Beaches Guidelines will be based upon the current scientific understanding of the ecology of beaches and dunes wetlands and role in the landscape.


Wetland Guidelines

VIRGINIA MARINE RESOURCES COMMISSION

Prepared by

The Department of Wetlands Ecology
Virginia Institute of Marine Science
College of William and Mary

and

The Habitat Management Division
Virginia Marine Resources Commission

Developed Pursuant to Chapter 13 of Title 28.2, Code of Virginia

Reprinted September 1993

Recommendations for Revision of the Wetlands Guidelines

Principal Investigators: Mason, Bradshaw, Duhring, Herbert, O'Brien, Roggero
Funding Agency: VA Coastal Zone Management Program / NOAA
Period: 10/01/06 – 12/31/07
Amount: $45,000

Development of proposed revisions to the Wetland Guidelines document is part of CCRM's on-going integrated guidance initiative. The Wetlands Guidelines will be based upon the current scientific understanding of the ecology of wetlands and role in the landscape. The document will provide an overview of the state of the science and identify environmental preferences for management options consistent with sustainable ecosystem services.

Integrated Guidance Project

Principal Investigator: staff
Funding Agency: in-house
Period: ongoing

This project involves the development of comprehensive guidance for shoreline management based on ecosystem services. Various combinations of riparian and littoral condition will be modeled for two services; habitat and water quality. The impacts of various shoreline development practices will be assessed based upon those services, and environmental preferences that minimize adverse impacts and/or maximize beneficial outcomes will be identified.

"Can crabs escape from a crabpot" experiment

Artificial reef in the Teaching Marsh

Marsh plant distribution

Frog logger equipment

Dredging for "ghost crabpots"

Hello, my name is Benji.

Butterfly garden at the VIMS Teaching Marsh.

Advisory Activities

Advisory Activity

	Information Requests	Additional Site Visits/ Field Consults	Meetings	Advisory Reports/ Publications	Permit Website Hits
January	169	13	22	46	297
February	170	11	19	60	508
March	170	16	20	101	746
April	177	14	26	61	565
May	221	21	31	71	464
June	219	19	25	64	478
July	173	11	16	51	433
August	183	15	31	57	366
September	146	16	23	65	348
October	168	12	26	50	447
November	170	22	23	74	449
December	101	13	14	55	438
Total	2067	183	276	755	5539

Advisory Committees

CCRM Staff provided service on the following advisory committees:

Albemarle Pamlico National Estuary Program - Policy Committee

Albemarle Pamlico National Estuary Program - North Carolina Comprehensive Conservation and Management Plan Steering Committee

Albemarle Pamlico National Estuary Program - Scientific and Technical Advisory Committee (STAC)

Albemarle Pamlico Scientific and Technical Advisory Committee (STAC) Executive Committee

Chesapeake Bay National Estuarine Research Reserve (CBNERR) Coastal Training Program Advisory Board

Chesapeake Bay Local Assistance Division (CBLAD) Technical Advisory Committee

Chesapeake Bay Program (CBP) Implementation Subcommittee

Chesapeake Bay Program (CBP) Living Resources Subcommittee

Chesapeake Bay Program (CBP) Monitoring and Modeling Workgroup

Chesapeake Bay Program (CBP) Scientific and Technical Advisory Committee

Chesapeake Bay Program (CBP) Sediment Workgroup

Chowan River Basin Roundtable

Department of Conservation and Recreation (DCR) York River Watershed Roundtable

Department of Forestry Virginia Riparian Buffer Workgroup

Department of Environmental Quality (DEQ) Virginia Coastal Policy Team

Elizabeth River Project Steering Committee

Elizabeth River Trust Technical Advisory Committee

Elizabeth River Watershed Action Committee

Mid-Atlantic Wetlands Workgroup

National Fish and Wildlife Foundation (NF&WF) Chesapeake Bay Targeted Watershed Grant Steering Committee

US Army Corps of Engineers (COE) Elizabeth River Study Steering Committee

US Army Corps of Engineers (COE) Lynnhaven River Restoration Study Steering Committee

US Climate Change Science Program - Adaptation Options for Climate-Sensitive Ecosystems and Resources Advisory Committee

US Climate Change Science Program - Coastal Elevations and Sea Level Rise Advisory Committee

Virginia Geographic Information Network (VGIN) STATE GIS User Group

Virginia Association of Wetlands Professionals

Virginia Marine Resources Commission (VMRC) Habitat Management Advisory Committee

Virginia Stream Alliance

Virginia Waters Advisory Committee

York River Council

Outreach Education Classes

Presentations and demonstrations were provided to educate state and local agency personnel, wetlands board members and staff, marine contractors, permitting agents, and the general public on tidal wetland issues.

May 11, 2007

Sea Level Rise & Other Coastal Hazards: The Risks of Coastal Living

Tidal Wetlands Workshop (88 attended)

http://ccrm.vims.edu/seminarpresentations/spring_2007/spring_2007_presentations.html

- National Issues & Implications for Coastal Virginia Institute of Marine Science (Dr. John Wells, Dean & Director, VIMS)
- Sea Level Rise, Hardened Shorelines, and Impacts on Virginia's Tidal Wetlands
- How Global Warming and Climate Change May Be Affecting Chesapeake Bay Seagrasses (Dr. Ken Moore, CBNERR)
- Climate Change Implications for Coastal Communities
- Ecosystem Services: The Reason We Regulate Shoreline Development
- Intensely Managed Shorelines: Cumulative Effects of Historic Decision-Making Limit Today's Management Options
- Managing Sea Level Rise in Developed Areas
- Developing Risky Areas
- Planning for the Future, Developing Today
- Zoning, Subdivision, and Site Planning: What Coastal Communities Can Do to Address Sea Level Rise (Joe Lerch, Chesapeake Bay Foundation)

October 19, 2007

Case Studies: Balancing Risks Associated with Shoreline Protection Strategies

Tidal Wetlands Workshop (70 attended)

http://ccrm.vims.edu//fall2007.html

Morning Presentations:

- Ecosystem Services of Tidal Shorelines
- Case Studies #1 – Typical Tradeoffs & Cumulative Impacts
- Case Studies #2 – Balancing Protection & Ecosystem Services

Afternoon Field Activity:

- Colonial Parkway Bus Tour

Colonial Parkway Scene

Colonial Parkway Scene

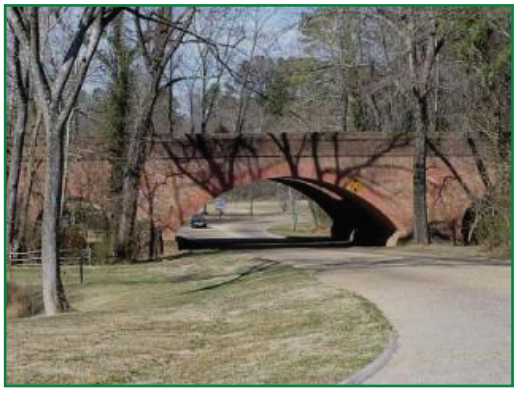


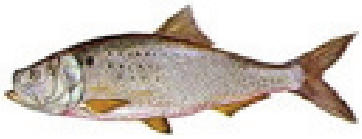
Photo: Courtesy of the National Park Service, Colonial National Historical Park

After Hours Lectures

Funding for this lecture series is provided by the VIMS Communications Department, and CBNERRVA and CCRM programs. There were nine "After Hours" lectures given in 2007 to a total audience of more than 800 people.

http://www.vims.edu/afterhours/2007.html

- James Fort and the Ecohistory of Chesapeake Bay
  Danny Schmidt
  (January 25, 2007).



- Small Fish, Big Controversy: Menhaden in Chesapeake Bay
  Dr. Rob Latour
  (February 22, 2007)

- Eel Be Back? American Eels in Chesapeake Bay
  Marcel Montane
  (March 29, 2007)

- Algal Blooms in Chesapeake Bay: The Good, the Bad, and the Ugly
  Dr. Larry Haas
  (April 26, 2007)

- May After Hours at Marine Science Day
  (May 19, 2007)

- Diamonds in the Rough: The Natural History and Status of Diamondback Terrapins in Virginia
  Dr. Randy Chambers
  (June 28, 2007)

- Turning the Tables on Cownose Rays
  Bob Fisher
  (July 26, 2007)

- Hurricanes and Global Warming: Is There a Link?
  Dr. David Malmquist
  (August 30, 2007)

- The Enchanted Sludge Forests of Surry County
  Dr. Rob Hale
  (October 25, 2007)

VIMS Teaching Marsh

Underwater camera sled

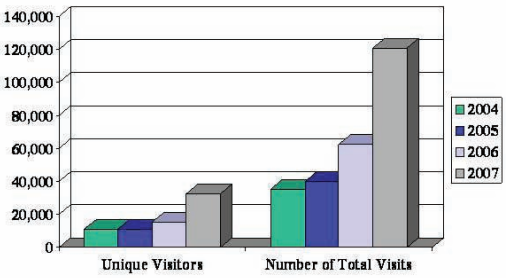
A portion of the CCRM complex

CCRM Website Report

ccrm.vims.edu

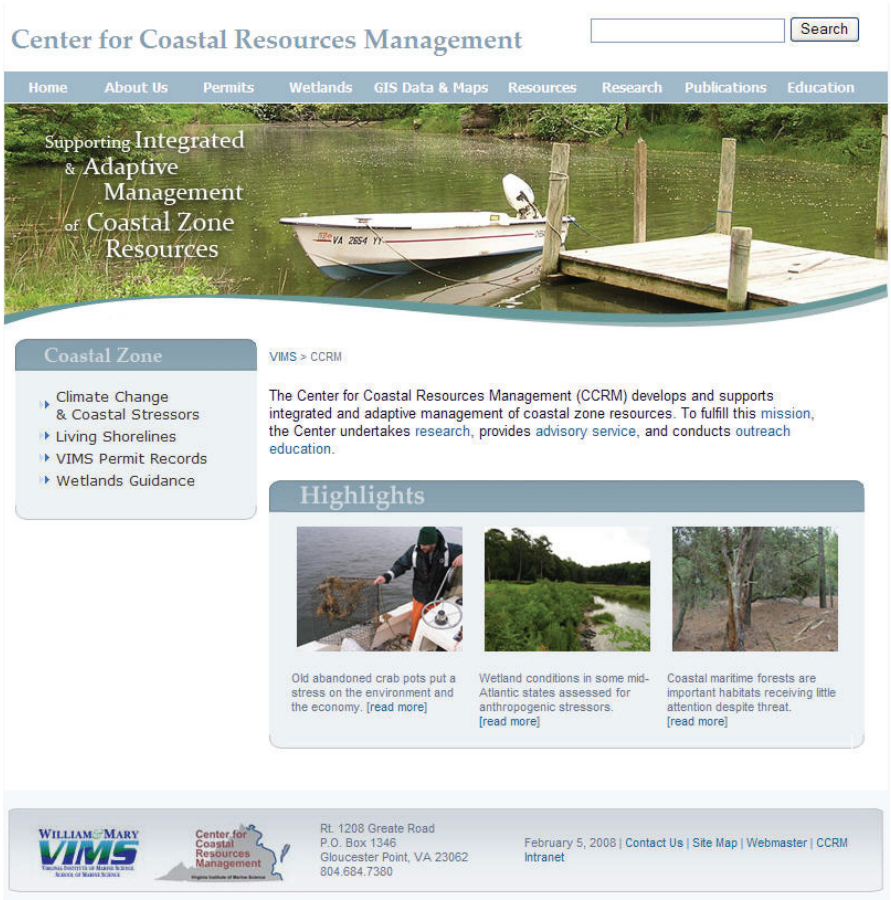
CCRM Web Usage Visitor Information

	Unique Visitors	Number of Visits
2004	11,137	35,655
2005	11,354	40,246
2006	15,560	62,567
2007	32,612	120,793



New CCRM Website

CCRM is rolling out a new website! Drop-down navigation buttons are located along the top of all pages and a side menu accompanies all subpages for ease of use. The Coastal Zone and Highlights sections on the main page will keep website users up-to-date on the latest CCRM projects and information. The site will continue to evolve and improve. Users should remember to use either the sitemap or the search bar if they cannot find a page or publication of interest. Contact kreay@vims.edu for more information.



Publications

Redwing blackbird nest

Center Publications

CCRM produces two newsletters – the Virginia Wetlands Report and the Rivers & Coast. The Virginia Wetlands Report informs readers of near-shore environmental science and related issues in an effort to influence better tidal shoreline decisions, and serves to announce upcoming workshops and educational opportunities, both inside and outside of VIMS. The Rivers & Coast newsletter is designed to keep readers well informed of current scientific understanding behind key environmental issues as they apply to watershed rivers and coastal ecosystems of the Chesapeake Bay. This newsletter is written for three perspectives – the general public, managers or decision-makers, and legislators – and provides information that goes from the big picture down to local relevance. Both newsletters were mailed to over 1900 individuals, including all local wetlands board members, local and state agency personnel, General Assembly members, and interested private citizens. In addition to being distributed for free and available to any interested subscriber, they are available online.

- Virginia Wetlands Report. Spring 2007, Vol. 22, Issue 1. Living on the Edge http://ccrm.vims.edu/publications/publications_topics/index.html
- Virginia Wetlands Report. Fall 2007, Vol. 22, Issue 2. The Big Picture: Managing Wetlands from a Shoreline Perspective http://ccrm.vims.edu/publications/publications_topics/index.html
- Rivers & Coast. Winter 2007, Vol. 2, No. 1. Introduction to the Integrated Guidance Concept http://ccrm.vims.edu/publications/pubs/rivers&coast/index.html

Hershner, C., and K.J. Havens. In press. Managing invasive aquatic plants in a changing system: strategic consideration of ecosystem services.

Havens, K.J., D. Bilkovic, D. Stanhope, K. Angstadt, and C. Hershner. In press. Derelict Blue Crab Trap impacts on marine fisheries in the lower York River, Virginia. North American Journal of Fisheries Management.

CCRM Quality Assurance/ Quality Control Policy

The Center for Coastal Resources Management conducts applied research and serves asa scientific advisor to federal, state and local agencies, and the general public. The Center recognizes the importance of how work processes are implemented to ensure that data collected are of the needed and expected quality for their desired use. In order to provide accurate information to user groups, the CCRM is dedicated to an aggressive, proactive Quality Assurance and Quality Control program. A myriad of activities occur within the Center, including direct support of laboratory and field investigations, support and training of graduate students and interns, training of resource agency personnel and the public, direct support of state agencies and local governments, and sponsorship of lectures, seminars, conferences and visiting scientists. Research activities include both field and laboratory measurements and the development and validation of ecological models. The general goal of the CCRM Quality System is to ensure accurate, reproducible, and unbiased data.

Operational Procedures

The Center recognizes the need for specific plans for individual data collection operations to ensure that data or information collected are of the needed and expected quality for their desired use. As a Center, the quality assurance operation procedures differ from that of an individual research contract. Each principal investigator is responsible for submitting a project-specific quality assurance plan to the relevant Program Quality Assurance Manager and the Center Quality Assurance Manager. The principal investigators will use the underlying principles described in this document as a framework for the specific quality assurance and quality control plans for each project. These plans should detail:

- **The specific objectives of the project, including the hypothesis to be tested.**
- **The data quality objective for the variables to be measured.**
- **The specific sampling and analytical protocols required to meet the data quality objective.**
- **The individual responsible for quality assurance for the project.**

All noncompliance or deviation from the approved quality assurance plan will be reported to the Program Quality Assurance Manager and the Center Quality Assurance Manager. More information about CCRM QA/QC can be found at *http://ccrm.vims.edu/about_us/ccrm/CCRM_QMP_aug06.pdf*

http://ccrm.vims.edu/