



# Chesapeake Bay National Estuarine Research Reserve in Virginia

Highlights 2012

A partnership between NOAA, the Commonwealth and the Virginia Institute of Marine Science

## Reserve Information

### Location:

In order to incorporate the diversity of habitats found within the southern Chesapeake Bay, CBNERR maintains a multi-component system along the salinity gradient of the York River estuary. Reserve components include Sweet Hall Marsh, Taskinas Creek, Catlett Islands and Goodwin Islands.

### Lead State Agency:

Virginia Institute of Marine Science,  
The College of William & Mary

### Reserve Web Sites:

<http://vims.edu/cbnerr>  
<http://nerrs.noaa.gov>

### Contact Information:

CBNERR  
Virginia Institute of Marine Science  
1375 Greate Rd  
Gloucester Point, VA 23062-1346  
Phone: 804.684.7135

### Program Contacts:

#### Administration

William Reay Ph.D.  
Reserve Director  
804.684.7119, [wreay@vims.edu](mailto:wreay@vims.edu)

Sally Lawrence  
Asst. to the Director  
804.684.7135, [slawrence@vims.edu](mailto:slawrence@vims.edu)

#### Research and Monitoring

Kenneth Moore Ph.D.  
Research Coordinator  
804.684.7384, [moore@vims.edu](mailto:moore@vims.edu)

Joy Austin  
Laboratory Supervisor  
804.684.7307, [justjoy@vims.edu](mailto:justjoy@vims.edu)

#### Education and Training

Sarah McGuire  
Education Coordinator  
804.684.7878, [m McGuire@vims.edu](mailto:m McGuire@vims.edu)

Sandra Erdle  
Coastal Training Program Coordinator  
804.684.7144, [sverdle@vims.edu](mailto:sverdle@vims.edu)

#### Stewardship

Scott Lerberg  
Stewardship Coordinator  
804.684.7129, [lerbergs@vims.edu](mailto:lerbergs@vims.edu)

Jim Goins  
Field Operations Manager  
804.684.7559, [goins@vims.edu](mailto:goins@vims.edu)

**Integrating  
Science,  
Education and  
Resource Management.**

## Dear Friends of the Chesapeake Bay Research Reserve,

As part of 28 protected areas that make up the NOAA's National Estuarine Research Reserve System, the Chesapeake Bay Research Reserve (CBNERR or Reserve) was established for long-term research, education and stewardship in support of informed management of our Nation's estuaries and coastal habitats. The Reserve is administered by the Virginia Institute of Marine Science (VIMS), of the College of William and Mary. In this 2012 summary report, we highlight a diverse range of activities, products and services provided by the Reserve to further our understanding and better conserve our coastal resources and enhance support of our coastal communities.

## Program Administration

- **Acquisition of Catlett Islands.** Through a NOAA Acquisition and Development Award, CBNERR completed the long-term goal of acquiring approximately 450 acres on Catlett Islands. This acquisition will expand research and education opportunities at this component of the Reserve.
- **Green Point Memorandum of Understanding.** A five year MOU between VIMS and the property owner of Green Point, York County was signed allowing Institute research and education programs land access to bay habitats, including extensive emergent wetlands and natural beaches adjacent to Goodwin Islands.
- **40<sup>th</sup> Coastal Zone Management Act Anniversary.** CBNERR was selected to host the 40<sup>th</sup> Coastal Zone Management Act (CZMA) Anniversary celebration sponsored by the National Estuarine Research Reserve Association and Coastal States Organization. The water quality themed program highlighted the state-federal (NOAA) partnerships of CBNERR and Virginia's Coastal Zone Management Program through examples of coastal water quality protection efforts, land use planning and decision support tools, environmental K-12 education and professional training, ecotourism, shoreline management, habitat restoration, water quality monitoring and observing systems, and coastal impacts as related to changes in sea level.

## Research and Monitoring

The Reserve's research program is designed to enhance scientific understanding of coastal ecosystems, surrounding environments and the natural and human processes influencing such systems. To accomplish this, the Reserve monitors coastal ecosystems to describe reference conditions and changes over space and time, develops in-house research programs that address Reserve priorities, and encourages and assists other scientists conducting research activities within Reserve boundaries.

- **Virginia Estuarine and Coastal Observing System (VECOS).** The Reserve continued operations as related to VECOS ([www3.vims.edu/vecos](http://www3.vims.edu/vecos)), which provides web accessible near/real-time and historical, quality assured environmental data in support of state (VADEQ) and Chesapeake Bay (U.S.EPA) tidal water quality assessments. In 2012, with a database that exceeded 129 million quality assured water quality measurements, VECOS and the CBNERR System-Wide Monitoring Program addressed a number of water quality management issues that included turbidity and oxygen impacts from Superstorm Sandy, assessment of the lower western shore Chesapeake Bay embayments, monitoring of harmful algal blooms and identification of underwater seagrass stressors.
- **Service as a Living Laboratory.** Due to their protected status and availability of extensive onsite information, the four components of the Reserve continued to serve as platforms and living laboratories for both short and long-term research efforts. In 2012, there were over 25 permitted projects within Reserve boundaries.

- **Habitat Restoration.** The Reserve continued collaboration and work with partners including the Virginia Office of Coastal Zone Management and the Virginia Nature Conservancy on the restoration of seagrass within the Virginia Coastal Reserve located on the Eastern Shore. This sea-side project is one of the largest and most successful seagrass restoration projects in the world with more than 2,400 acres of productive eelgrass beds being restored from seeds originally harvested and planted from eelgrass beds in the Chesapeake Bay.

- **Climate Change Sentinel Site Initiative.** CBNERR continued its monitoring and experimental inquiries of coastal habitats (underwater grasses, emergent wetlands, marsh-forest ecotones) in order to assess vulnerability of these environmentally and economically important systems to dominant climate change impactors (increased sea level and water temperature) with an end goal of supporting the development and demonstration of adaptive strategies. In addition to Reserve level efforts, CBNERR is an integral component of the broader NOAA Sentinel Site Cooperative Program that includes the Chesapeake Bay, North Carolina, Northern Gulf of Mexico, Hawaii and San Francisco Bay regions.



## Education and Outreach

The Reserve's Education and Outreach Program strives to increase awareness, understanding, appreciation and wise-use of coastal resources through K-12 education programs, teacher training, summer camps, participation in college intern programs and implementation of family/community based activities.

- **Chesapeake Studies.** Now in its seventh year, the Reserve continued its Chesapeake Studies for Virginia Middle Schools Program that provides students from Gloucester, Mathews, and York Counties with classroom visits and meaningful field bay experiences. Over 1,300 students participated in 2012. This program was supported, in part, by NOAA's Bay-Watershed Education and Training (BWET) competitive grant program.

- **Teacher Training.** CBNERR offered professional development opportunities for over 37 teachers through several workshops focusing on building capacity of teachers to conduct meaningful watershed educational experiences and estuarine aquarium keeping for in-school aquariums including collection of organisms.

- **Experiential Summer Camps.** Over 100 students in grades 1-8 participated in week-long CBNERR led summer programs focused on bay habitats (1<sup>st</sup> and 2<sup>nd</sup> grades), natural resource sustainability (3<sup>rd</sup> and 4<sup>th</sup> grades), stewardship (5<sup>th</sup> and 6<sup>th</sup> grades) and coastal field studies (7<sup>th</sup> and 8<sup>th</sup> grades). The five weeklong camps were made possible by a gift from an anonymous private donor.

- **Market Analysis and Needs Assessments.** CBNERR completed K-12 grade environmental education market analysis and needs assessment reports for the Hampton Roads region. Over 240 teachers and educators completed the surveys, which allowed for gap analysis of existing environmental educational programs, determination of local teacher needs, and assessment/improvement of Reserve education program offerings.

- **National Aquarium Conservation Intern Program.** The National Aquarium in Baltimore, in partnership with CBNERR, has developed a Conservation Work Study Program for under-represented and minority students. College interns and Aquarium staff received training from Reserve staff and participated ecosystem stress studies as related to a changing climate and sea level.

- **Public Outreach.** Through public outreach programs, that included the popular monthly Reserve Discovery Lab series, 1,600 life-long learners participated in family-friendly learning opportunities in 2012. Lab presentations, exhibits and hands-on activities focused on underwater robots, water chemistry and quality, watershed and estuarine habitats, along with specific fauna groups. CBNERR also participated in specific events including VIMS Marine Science Day, Estuaries Day at York River State Park, and the Urbanna Oyster Festival.



## Professional Training

The Coastal Training Program (CTP) improves the capacity and skills of coastal decision-makers by communicating results of current research, making science-based information available, and by providing a forum to increase networking and collaboration across local/state/federal government and coastal management disciplines.

- **Technical Workshops.** The Reserve's CTP provided training opportunities to over 425 local and regional coastal decision-makers that directly support their efforts to manage natural and community resources. Training topics in 2012 included green infrastructure for coastal resiliency, evaluating and conserving natural assets in a developing landscape, storm water management, coastal wetland and riparian plant identification, and Coastal Plain perennial stream identification and assessment.

- **Coastal Virginia Habitat Restoration Symposium.** CBNERR hosted the Coastal Virginia Habitat Restoration Symposium which allowed for the exchange of information and ideas as related to restoration of Atlantic sturgeon habitat, submerged aquatic vegetation, native oysters, emergent wetlands, and shorelines. Detailed project descriptions addressed Virginia's first sediment remediation project and examples of wetland restoration projects in the U.S. Navy Cleanup Program.

- **VIMS Public Lectures.** The Reserve continued to co-sponsor the VIMS monthly 'After Hours Seminar Series' that reached approximately 460 persons in 2012 with timely management, cultural and naturalist topics. Lecture topics included earthquakes in Virginia, *Mycobacteriosis* disease as related to striped bass, natural selection in Chesapeake Bay oysters, secret lives of social shrimp, groundwater and the Jamestown 'starving time', and new tools to aid hurricane preparedness and response.



## Stewardship

Stewardship connotes the responsible management of coastal resources using the best available science and developing information in order to maintain and restore healthy, productive and resilient ecosystems.

- **Support of Salt Marsh Restoration.** In a multi-reserve effort, CBNERR staff finalized a report that analyzed salt marsh plant, soil and hydrologic response to restoration, developed performance benchmarks based on local reference systems of the participating reserves and provided recommendations in support of marsh restoration methods and monitoring.

- **Sea Level Rise and Habitat Vulnerability.** Through its network of surface elevation tables (SETs) and collection of accretion data, CBNERR has documented changes in York River wetland elevations and their vulnerability to rising sea levels. Related studies have expanded into the marsh-forest ecotone to identify recruitment and survival success of key plant species and thresholds to salinity intrusion and inundation. Results of these studies will support the development of adaptive management strategies to address rising sea level impacts within these stressed vegetative communities.

- **Habitat Mapping and Change Analysis.** In 2012, CBNERR developed a habitat mapping and change plan that outlines imagery sources, mapping techniques, ground-truthing techniques, and target audiences for information delivery. With support from NOAA's Coastal Services Center, the Reserve will use a semi-automated imagery process to classify imagery followed by ground-truthing efforts. Additionally, Reserve staff completed a comprehensive examination of historical (1937 to present) shoreline and forest boundary change at both the Goodwin Island and Catlett Island components. Results document erosional shoreline changes and landward forest retreat; additional planned studies are designed to increase understanding of processes responsible for increasing trends.



- **Local Vertical Network.** CBNERR continued efforts to enhance its tidal water and wetlands infrastructure (tide gauges, SETs, benchmarks) at Reserve components in order to more fully monitor habitat changes to sea level rise and inundation. Additionally, the Reserve has assisted NOAA partners (National Geodetic Survey and Center for Operational Oceanographic Products and Services) in the development of a sentinel site vertical control guidelines document that is currently under agency review.

- **Public Access.** Through active volunteer participation in maintaining blinds and providing a watchful eye, the Reserve continued to allow for traditional public use through issuance of 30 permits and implementation of its Waterfowl Hunting Program for the 2012-2013 hunting season.



## **Advisory and Professional Service**

Reserve staff continued to provide a high-level of advisory and professional service to Federal agencies, the Commonwealth, regional government Bay-wide programs, local government, nongovernmental organizations and professional societies; service included membership and participation in over 35 committees and workgroups. Selected 2012 committee membership and service is provided below. Of note, Reserve staff were elected to leadership roles in regional (Mid-Atlantic Marine Education Association, President-Elect) and national (National Estuarine Research Reserve Association, Vice President) professional associations.

- Federal Government (NOAA/OCRM/NERRS)

Integrated Ocean Observing System Workgroup	Estuaries 101 Workgroup
Climate Change Workgroup	Teachers on the Estuary Workgroup
SWMP Biomonitoring Committee	Education Technology Workgroup
SWMP Guidance Committee	CTP Oversight Committee
Restoration Science Workgroup	Sentinel Sites Oversight Committee
Education Market Analysis-Needs Assessment Workgroup	
Coastal and Estuarine Lands Conservation Program (CELCP) Workgroup	
Coastal Zone Management Act Evaluations Workgroup	

- Regional Government - Chesapeake Bay Program

Analytical Method and Quality Assurance Workgroup	Water Quality Steering Committee
Tidal Monitoring and Analysis Workgroup	Data Analysis and Monitoring Workgroup
Data Management and Acquisition Workgroup	Criteria Assessment Protocol Committee
SAV Research Monitoring and Restoration Workgroup	
Chesapeake Bay Sentinel Site Cooperative Steering Board	

- State Government

Virginia Coastal Policy Team	Virginia Phragmites Workgroup
Virginia Nonpoint Source Advisory Committee	Virginia CELCP Evaluation Committee
Surface Water Quality Standards Workgroup	
James River Chlorophyll Standards Technical Workgroup	

- Local Government

York River and Small Coastal Basin Roundtable	Dragon Run Steering Committee
---	-------------------------------

- Other Committee Service

The Coastal Society, Education Committee	Virginia Water Monitoring Council
Mid-Atlantic Marine Educators Association	Chesapeake Bay Education Council
Chesapeake Research Consortium Freshwater SAV Partnership	
National Estuarine Research Reserve Association (NERRA) Legislative Committee	
Virginia First District Environmental Advisory Council	

## **Selected Reserve Contributions to Manuscripts, Reports and Other Publications**

- Shields, E., K. Moore and D. Parrish. 2012. Influences of salinity and light availability on abundance and distribution of tidal freshwater and oligohaline submersed aquatic vegetation. *Estuaries and Coasts* 35: 515-526.
- Jarvis, J., Moore, K. and W. Kenworthy. 2012. Characterization and ecological implication of eelgrass life history strategies near the species' southern limit in the western North Atlantic. *Marine Ecology Progress Series* 444: 43-56.
- Dionne, M., C. Peter, K. Raposa, R. Weber, J. Fear, S. Lerberg, C. Cornu, H. Harris, and N. Garfield. 2012. Measuring salt marsh plant, soil, and hydrologic response to restoration using performance benchmarks from local reference system at National Estuarine Research Reserves. Final synthesis report submitted to NOAA/NOS Office of Coastal Resource Management, Silver Spring, MD. 88 pgs.
- Moore, K., E. Shields, D. Parrish and R. Orth. 2012. *Zostera marina* L. (eelgrass) survival within two contrasting systems in the western mid-Atlantic: the critical role of turbidity and summer water temperatures. *Marine Ecology Progress Series* 448: 247-258.
- Orth, R., K. Moore, S. Marion, D. Wilcox and D. Parrish. 2012. Seed addition facilitates *Zostera marina* L. (eelgrass) recovery in a coastal bay system (USA). *Marine Ecology Progress Series* 448: 177-195
- McGuire, S. 2012. K-12<sup>th</sup> grade environmental education market analysis for the Hampton Roads region. Final report submitted to Estuarine Reserves Division, NOAA, Silver Spring, MD. 25pp.