



Chesapeake Bay National Estuarine Research Reserve in Virginia

Highlights 2011

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
P.O. Box 1346
Rt. 1208 Greate Rd
Gloucester Point, VA 23061
Phone: 804.684.7135

Program Contacts:

Administration

William Reay Ph.D.
Reserve Director
804.684.7119, wreay@vims.edu

Sally Lawrence
Asst. to the Director
804.684.7135, slawrence@vims.edu

Research and Monitoring

Kenneth Moore Ph.D.
Research Coordinator
804.684.7384, moore@vims.edu

Joy Austin
Laboratory Supervisor
804.684.7307, justjoy@vims.edu

Education and Training

Sarah McGuire
Education Coordinator
804.684.7878, m McGuire@vims.edu

Sandra Erdle
Coastal Training Program Coordinator
804.684.7144, sverdle@vims.edu

Stewardship

Scott Lerberg
Stewardship Coordinator
804.684.7129, lerbergs@vims.edu

Jim Goins
Field Operations Manager
804.684.7559, goins@vims.edu

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) was established for long-term research, education and stewardship in support of informed management of our Nation's estuaries and coastal habitats. In this 2011 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.

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.

- Completed five year mark for participation in the National Atmospheric Deposition Program (NADP) and Mercury Deposition Program (MDN). Information derived from these programs contribute to regional and national evaluations and assessments of mercury, nitrogen and acid deposition (Link to National Acid Precipitation Assessment Program Report to Congress 2011: An Integrated Assessment, <http://ny.water.usgs.gov/projects/NAPAP>).
- Continued operations of the Virginia Estuarine and Coastal Observing System (VECOS; www.vecos.org), which provides web accessible near and real-time, quality assured environmental data, and support of the Chesapeake Bay Observing System (CBOS). In June 2011, the VECOS database exceeded 100,000,000 quality assured water quality measurements. Regional water quality management issues addressed with VECOS and the CBNERR System-Wide Monitoring Program (SWMP) information in 2011 included Hurricane Irene impacts on bottom water dissolved oxygen dynamics, water quality assessment of Mobjack Bay, monitoring of harmful algal blooms and identification of underwater seagrass stressors.
- Continued biological monitoring of underwater grasses in support of the NERRS Sentinel Site Initiative for detecting and understanding the effects of climate change on critical Bay habitats. Eelgrass beds showed some recovery from the widespread diebacks that were observed in the summer of 2010. Research is continuing on this recovery process, focusing on the role of seedlings and the seed bank.
- Increased efforts to assess the ability of York River wetlands to "keep pace" with local sea level rise through the measurement of marsh soil accretion and surface elevation changes. Collected information will be used to develop a more refined vulnerability assessment for Reserve wetland habitat types.
- Rachel Blake (2 yr NOAA/NERR Graduate Research Fellow) successfully defended her doctorate work entitled "Field Estimation of the Ecological Impacts of Shoreline Modifications on the Structure and Functioning of the Faunal Community in *Zostera marina* (eelgrass) Beds".

Research and Monitoring_- continued

- Completed and submitted the final report on the measurement and assessment of restored and reference salt marsh structural and functional performance indicators in the southern Chesapeake Bay to the NOAA/Restoration Office. This multi-reserve project included the development of standardized templates and innovative analysis techniques to assess the success of wetland restoration projects.
- 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 2011, over 25 projects were permitted within Reserve boundaries.

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.

- Completed a six year effort with students from Gloucester, Mathews, and York Counties receiving classroom visits and meaningful field experiences through the Reserve's Chesapeake Studies for Virginia Middle Schools program. Over 1,500 students participated in 2011. This program was supported by NOAA's Bay-Watershed Education and Training (BWET) competitive grant program.
- Offered professional development opportunities for over 30 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.
- Through 13 public outreach programs, including 9 monthly Discovery Labs, 1,500 life-long learners participated in family-friendly learning opportunities in 2011. Lab presentations, exhibits and hands-on activities focused on sharks, marine careers, deep sea, aquaculture, Antarctica, underwater sounds, ghost (derelict) crab pots, Halloween Mad Lab and Holiday edition crafts.
- Over 90 students in grades 1-8 participated in week-long summer programs focused on habitats (1st and 2nd grades), sustainability (3rd and 4th grades), stewardship (5th and 6th grades) and field studies (7th and 8th grades). The five weeklong camps were made possible by a gift from an anonymous private donor.
- Conducted a needs assessment of K-12 education programs and a market analysis of education providers within the Hampton Roads area. Over 240 teachers and educators completed the surveys, which will allow for gap analysis of existing environmental educational programs, determination of local teacher needs, and assessment/improvement of Reserve education program offerings. Final reports will be available in Spring 2012.



Professional Training - 'Coastal Training Program'

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.

- Provided training opportunities to over 235 local and regional coastal decision-makers that directly support their efforts to manage natural and community resources. Training opportunities in 2011 included Introduction to Coastal Inundation Warning Systems: VIMS Real-time Storm Tide Observation and Forecast System, Virginia Coastal Plain Assessment/Protocol for Perennial Stream Identification, and Coastal Wetland and Riparian Winter Plant Identification.



Professional Training - continued

- Hosted the York River Research Symposium which allowed for the exchange of information and ideas that increased understanding of the York River watershed and riverine system, and contributed to knowledge of how to best sustain the health and productivity of its resources.
- Used local information to develop a fact sheet on sea level rise to best inform neighboring coastal communities of the Middle Peninsula, Virginia (www.vims.edu/cbnerr/doc; partial funding provided by Virginia Coastal Zone Management Program).
- Co-sponsored the Institute's monthly 'After Hours Seminar Series' that reached approximately 460 persons with timely management, cultural and naturalist topics. Presentations included: Pollution Threats and Control in the Bay, Census of Marine Life, Climate Change, Blue Crab Population Dynamics, Oyster Aquaculture, Habitat Value of Underwater Grasses, and Harmful Algal Blooms.
- Established a social media webpage on "Facebook" to further enhance the Reserve's visibility by targeting new audiences.

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.

- Continued to build upon its capabilities to address the challenges of enhancing awareness and understanding of ecological impacts of a changing climate. In 2011, the Reserve became an approved NERRS Climate Change Sentinel Site and an integral component of the broader NOAA/National Ocean Service Sentinel Site Program (currently includes the Chesapeake Bay, North Carolina, Northern Gulf of Mexico, Hawaii and San Francisco Bay regions).
- Initiated studies within the marsh-forest ecotone to identify recruitment and survival success of key plant species and thresholds to salinity intrusion and inundation. Results will support the development of adaptive management strategies to address climate change stressors within these vegetative communities.
- Continued to assist NOAA partners (National Geodetic Survey and Center for Operational Oceanographic Products and Services) in the development of a vertical control guidelines document. Currently under review, the document entitled "Accurate Elevations for Sea Level Change Sentinel Sites," provides user-friendly guidelines for the process of establishing the geospatial, tidal, and wetland infrastructure required for monitoring habitat changes to sea level rise and inundation.
- Through active volunteer participation in maintaining duck blinds and providing a watchful eye, The Reserve successfully implemented its Waterfowl Hunting Program for the 2011-2012 hunting season and continued to allow for managed public access.



Advisory Service

Reserve staff continued to provide a high-level of advisory 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 25 committees. Selected committee membership and service includes:

Federal Government (NOAA/OCRM/NERRS)

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

Advisory Service - continued

- Coastal Zone Management Act Evaluations Workgroup

Federal (other)/Regional Government

- Chesapeake Bay Program (CBP) Analytical Method and Quality Assurance Workgroup
- CBP Tidal Monitoring and Analysis Workgroup
- CBP Data Management and Acquisition Workgroup
- CBP SAV Research Monitoring and Restoration Workgroup
- CBP Criteria Assessment Protocol Committee
- CBP Data Analysis and Monitoring Workgroup
- CBP Water Quality Steering Committee

State Government

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

Local Government

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

Other Committee Service

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

Selected Reserve Contributions to Manuscripts, Reports and Other Publications

- Lerberg, S. and W. Reay. 2011. Measurement and assessment of restored and reference salt marsh structural and functional performance indicators in the southern Chesapeake Bay. 2011. Final Report submitted to NOAA/NOS Office of Ocean and Coastal resource Management, Silver Spring, MD. 88 pp. plus appendices.
- Moore, K., E. Shields, D. Parrish and R. Orth. *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. (In press)
- Jarvis, J., K. Moore and W. Kenworthy. Characterization and ecological implication of *Zostera marina* L. (eelgrass) life history strategies near the species southern limit in the western North Atlantic. Marine Ecology Progress Series. (In press)
- Shields, E., K. Moore and D. Parrish. Influences of salinity and light availability on submerged aquatic vegetation development in the Chickahominy river, Virginia, USA. Estuaries and Coasts. (In press)
- Orth, R., K. Moore, S. Marion, D. Wilcox and D. Parrish. Seed addition facilitates *Zostera marina* L. (eelgrass) recovery in a coastal bay system (USA). Marine Ecology Progress Series. (In press)
- Reay, W. and S. Erdle. 2011. Sea level rise: Local fact sheet for the Middle Peninsula, Virginia. VIMS/CBNERR Fact Sheet. 4pp.