



Chesapeake Bay National Estuarine Research Reserve - Virginia

Highlights 2014

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,
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

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

Research and Monitoring

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

Betty Neikirk
Marine Scientist Supervisor
804.684.7400, betty@vims.edu

Joy Baber
Laboratory Supervisor
804.684.7307, justjoy@vims.edu

Eduardo Miles
Analytical Laboratory
804.684.7836, emiles@vims.edu

Education and Training

Sarah Nuss
Education Coordinator
804.684.7878, meguire@vims.edu

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

Stewardship

Scott Lerberg
Stewardship Coordinator
804.684.7129, lerbergs@vims.edu

Alex Demeo
Stewardship Research Specialist
804.684.7037, awdemeo@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 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), William & Mary. In this 2014 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 Evaluation

As required by the Coastal Zone Management Act, NOAA conducted a periodic review of CBNERR in 2014 for the period April 2007 – September 2014. The purpose of these evaluations are to ensure that reserves are following stated objectives in approved site specific management plans as well as showing satisfactory performance on annual operations award deliverables. As part of the review, the Reserve submitted required documentation and hosted numerous on-site meetings and two public hearings. Based on exit interviews and public comments (of which a record number of support letters were received), the Reserve anticipates positive findings; finalized evaluation findings will be available in the future.

Reserve Science

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).** In 2014 CBNERR continued to monitor and assess shallow water quality at 13 sites within the southern Chesapeake Bay region. Six continuous (15 min. interval) water quality stations spanned the salinity gradient of the York River as part of NOAA/NERRS System-wide monitoring program, 5 stations monitored western shore embayments (Elizabeth River, James River, Indian Creek, Dividing Creek, Ingram Bay) and 2 stations were maintained on the Eastern Shore (Hunting Creek, Pocomoke Sound); high spatial resolution water quality information was mapped monthly for western and eastern shore embayments. Quality assured data is available via the VECOS web portal (<http://web2.vims.edu/vecos>). Additionally, CBNERR provided field maintenance support for the 4 NOAA Chesapeake Bay interpretive buoys located with Virginia tidal waters (<http://buoybay.noaa.gov>).

● **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 2014, there were 29 permitted research and monitoring projects from 5 universities and 4 agencies.

● **NERRS Graduate Research Fellowship (GRF).** Rajaa Mesfioui (2 yr NOAA/NERR GRF, Old Dominion University) successfully defended her doctorate work entitled “Reactivity and chemical characterization of dissolved organic nitrogen from natural and anthropogenic sources determined by Fourier transform ion cyclotron resonance mass spectrometry”.

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 for Middle School.** The Reserve completed its ninth year of the program Chesapeake Studies for Virginia Middle Schools. This program provides students from neighboring counties (principally Gloucester, Mathews, York and James City County/Wiliamsburg) with classroom visits and meaningful field bay experiences. Over



1,100 students participated in 2014 with programs that focused on estuarine water quality, observing systems, fish adaptations and shallow water habitats. An additional 940 middle school students benefited from the Reserve’s Resource Boxes that provides Teachers access to materials necessary to complete different lessons related to the Chesapeake Bay.

● **Climate Education for a Changing Bay (CECB).** The Reserve was granted a NOAA Bay Watershed Education and Training (BWET) grant to fully implement a climate education program with 9th grade students at Gloucester and Mathews High Schools. The overall objective of the CECB curriculum is to improve climate literacy within local high schools by advancing the use of locally relevant environmental data and information in classroom curriculum, field experiences and professional teacher training. The Reserve’s ‘Sentinel Sites Initiative’ provided the foundation of data and protocols used to assess sea level rise impacts on tidal wetlands. This program reached over 200 students and 7 local teachers during its initial year.

● **Teacher Training.** CBNERR offered professional development opportunities for 100 teachers through several programs including the NERRS Teachers on the Estuary (TOTE) and Meaningful Watershed Educational Experiences (MWEE) Capacity Building programs. Topics focused on climate change education, analysis of water quality data, and estuarine aquarium keeping for in-school aquariums including collection of organisms.

● **Experiential Summer Camps.** Over 100 1st through 8th grade students participated in week-long CBNERR led summer programs focused on bay habitats (1st and 2nd grades), natural resource sustainability (3rd and 4th grades), coastal resource stewardship (5th and 6th grades) and coastal field studies (7th and 8th grades). Rachael Somerville, a NOAA Hollings Scholar from American University, served as a summer intern and won best oral presentation in the resilient coastal communities section of the Hollings Conference for her project ‘Raising Awareness and Understanding of the Chesapeake Bay through Summer Education and Outreach’. The five weeklong camps were made possible by a gift from private donors.

● **Public Outreach.** Through public outreach programs that included the popular monthly Reserve Discovery Lab series, over 2,800 life-long learners participated in family-friendly learning opportunities in 2014. Lab presentations, exhibits and hands-on activities highlighted the deep sea, wetlands, Antarctica, horseshoe crabs, turtles, blue crabs and scallops. CBNERR also participated in specific events including the Virginia Science Festival, Gloucester Science Fair, Mathews Eco Expo, the Women in STEM event, VIMS Marine Science Day, Estuaries Day at York River State Park, and Urbana’s Oyster Festival.

Professional Training

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

- **Technical Workshops.** In 2014, the Reserve provided training opportunities to 185 local and regional coastal decision-makers. Topics in 2014 included stormwater and sediment/erosion inspector training, winter wetland and riparian plant identification, wetland delineation-regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (V2), GIS based Natural Heritage Data Explorer training, as well as multiple case study workshops on the coastal habitat vulnerability assessment tool 'Climate Change Vulnerability Assessment Tool for Coastal Habitats (CCVATCH)'.
- **VIMS Public Lectures.** The Reserve co-sponsored the VIMS monthly 'After Hours Seminar Series' that reached >600 persons in 2014 with timely management, cultural and naturalist topics. Lecture topics included barrier island response to rising sea level, the movie 'Chasing Ice' that documents the world's changing glaciers, a photographic journey of Virginia rivers, environmentally friendly solar powered vehicles, use of unmanned underwater gliders in ocean studies, the archeological background of Gloucester Point, tagging and tracking the introduced blue catfish, and regional dolphin die-offs.

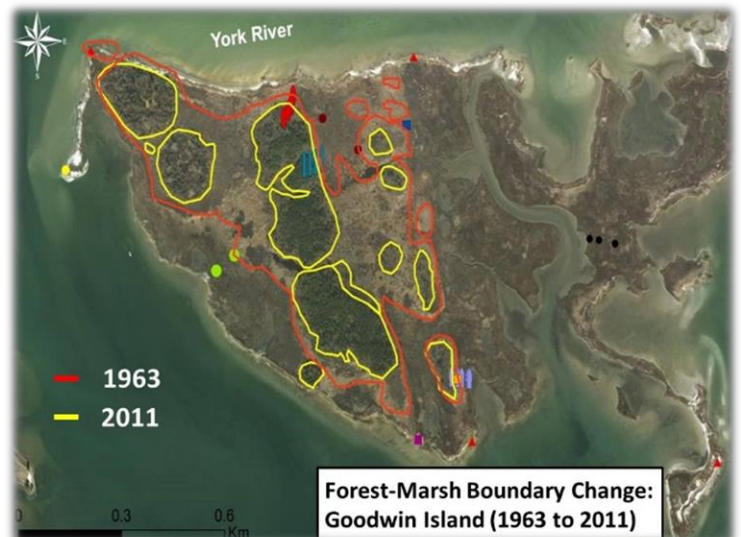
Environmental Stewardship

The Reserve's Stewardship Program evaluates coastal habitat quality and vulnerability in order to identify current and potential conservation issues, and based on findings, implement a range of activities to sustain the long-term integrity and diversity of Reserve habitats. Additionally, the Stewardship program manages public access to protect natural resources and provide for non-conflicting traditional uses.

- **Sentinel Site Initiative.** The Reserve continued its monitoring and experimental studies of its coastal habitats in order to better understand and predict habitat response to various anticipated climate related factors with an end goal of supporting the development and demonstration of adaptive strategies. With respect to seagrass habitats, research findings were published regarding the impacts of varying estuarine temperature and light conditions on *Zostera marina* (eelgrass); see list of published contributions. With respect to tidal marsh habitats, efforts focused on analysis of historical imagery to assess marsh perimeter erosion and transgression into ecotone habitats, continued development of a local vertical elevation control network to relate habitat elevations to local sea levels, marsh surface elevation change to assess sedimentation and soil development processes, and marsh-forest ecotone studies to assess critical processes and rates of boundary movement.

- **Climate Change Vulnerability Assessment Tool for Coastal Habitats (CCVATCH).** In support of coastal land managers and others responsible for wetland and land based conservation decisions, CBNERR piloted a habitat vulnerability assessment tool to evaluate climate change impacts on selected case study habitats including Goodwin Island and City of Norfolk saltmarshes, dunes and beaches of Mathews County and the City of Virginia Beach, and southern bay scrub and shrub habitats. The assessment tool is spreadsheet based and calculates numerical vulnerability scores based on collaborative input of local knowledge experts and habitat managers to a series of guidance document questions. Case study results and a finalized guidance document will be available in 2015.

- **National Synthesis of Marsh Sustainability.** Reserve staff have worked extensively as part of team representing 4 Reserves (Narragansett Bay RI, Chesapeake Bay VA, North Inlet SC and Elkhorn Slough CA) to develop and test an approach to assess and compare salt marsh sustainability. Based on information collected as part of the NERRS water quality, sentinel site and biomonitoring programs, the team has compiled and analyzed information across the system and a National Marsh Sustainability Report Card will be released in 2015.



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 on the order of 30 committees and workgroups. Selected 2014 committee membership and service is provided below. Of note, Reserve staff serve in leadership roles in regional (Mid-Atlantic Marine Education Association, President) and national (National Estuarine Research Reserve Association, President) professional associations.

- Federal Government (NOAA/OCM/NERRS)
 - Integrated Ocean Observing System Workgroup
 - Climate Change Workgroup
 - SWMP Biomonitoring Committee
 - SWMP Guidance Committee
 - Sentinel Sites Oversight Committee
 - NOS Coastal Partners Roundtable
 - Regional Government - Chesapeake Bay Program
 - Analytical Method and Quality Assurance Workgroup
 - Tidal Monitoring and Analysis Workgroup
 - SAV Research Monitoring and Restoration Workgroup
 - Chesapeake Bay Sentinel Site Cooperative Steering Board
 - State Government
 - Virginia Coastal Policy Team
 - Virginia Resources Use Education Council Executive Committee
 - Local Government
 - York River and Small Coastal Basin Roundtable
 - Other Committee Service
 - The Coastal Society, Education Committee
 - Chesapeake Bay Education Council
 - Virginia First District Environmental Advisory Council
 - Mid-Atlantic Marine Educators Association Executive Committee
 - National Estuarine Research Reserve Assoc. (NERRA) Executive Committee
- Estuaries 101 Workgroup
Teachers on the Estuary Workgroup
Education Technology Workgroup
Restoration Science Workgroup
Community Education Workgroup
- Criteria Assessment Protocol Committee
Data Manage. and Acquisition Workgroup
Data Integrity Workgroup
- James River Chl Stand. Tech. Workgroup
- NERRA Legislative Affairs Committee
Digital Coasts Partnership
NERRA Board

Selected Reserve Staff Published Contributions

- Kennish, M., M. Brush and K. Moore. 2014. Drivers of change in shallow coastal photic systems: An introduction to a Special Issue. *Estuaries and Coasts* 37: 3-19.
- Jarvis, J.C., K.A. Moore, W.J. Kenworthy. 2014. Persistence of *Zostera marina* L. (eelgrass) seeds in the sediment seed bank. *Journal of Experimental Marine Biology and Ecology* 459: 126-136.
- Moore, K., E. Shields, D. Parrish. 2014. Impacts of varying estuarine temperature and light conditions on *Zostera marina* (eelgrass) and its interactions with *Ruppia maritima* (widgeongrass). *Estuaries and Coasts* 37(1): 20-30.