FINAL Evaluation Findings

Chesapeake Bay National Estuarine Research Reserve in Virginia

April 2003 – March 2007

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Office of Ocean and Coastal Resource Management
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TABLE OF CONTENTS

I. EXECUTIVE SUMMARY

The Coastal Zone Management Act (CZMA) of 1972, as amended, established the National Estuarine Research Reserve System (NERRS). Sections 312 and 315 of the CZMA require the National Oceanic and Atmospheric Administration (NOAA) to conduct periodic performance reviews or evaluations of all federally approved National Estuarine Research Reserves (NERRs). The review described in this document examined the operation and management of the Chesapeake Bay National Estuarine Research Reserve (CBNERRVA) during the period of April 2003 through May 2007. The Chesapeake Bay National Estuarine Research Reserve is administered by the Virginia Institute of Marine Science in the College of William and Mary.

This document describes the evaluation findings of the Director of NOAA's Office of Ocean and Coastal Resource Management (OCRM) with respect to CBNERRVA during the review period. These evaluation findings include discussions of major accomplishments as well as recommendations for program improvement. The fundamental conclusion of the findings is that VIMS is successfully implementing and enforcing its federally approved NERR.

The evaluation team documented a number of CBNERRVA accomplishments during this review period. The Reserve continues to provide the local and regional resource management community with strong science-based information for coastal decision-making and planning. Expanding already productive collaborations with state and federal coastal management communities, educators, and researchers has greatly enhanced CBNERRVA's programming. Notable Reserve efforts during this evaluation period included: completion of the Catlett-Burruss Research and Education Laboratory; expanded and enhanced monitoring efforts including those related to the integrated ocean observing systems; development of a robust 7th grade estuarine education program; implementation of the Coastal Training Program and coordination of the Living Shorelines Summit; and the development of resource management plans for Reserve components as well as a stewardship program to implement them. CBNERRVA has also completed the draft update of its Management Plan.

In addition to these numerous accomplishments, the evaluation team identified a few areas where the Reserve and its programming could be strengthened. All but one recommendation for CBNERRVA are in the form of Program Suggestions, and describe actions that OCRM believes VIMS could take to improve or enhance the program but that are not mandatory. The Reserve also has one Necessary Action related to the completion of its site profile. As mentioned above, CBNERRVA has had many achievements during this review period, including the implementation of new Reserve programming. This program development motivated evaluation recommendations that address Reserve capacity and identify opportunities for program enhancement. Suggestions thus include increasing state funding to support core staff positions, identifying professional development opportunities, and setting clear expectations for partnerships.

II. PROGRAM REVIEW PROCEDURES

A. OVERVIEW

NOAA began its review of CBNERRVA in February 2007. The §312 evaluation process involves four distinct components:

1. An initial document review and identification of specific issues of particular concern;
2. A site visit to Virginia including interviews and a public meeting;
3. Development of draft evaluation findings; and
4. Preparation of the final evaluation findings, partly based on comments from the state regarding the content and timetables of recommendations specified in the draft document.

B. DOCUMENT REVIEW AND ISSUE DEVELOPMENT

The evaluation team reviewed a wide variety of documents prior to the site visit, including: (1) federally approved Environmental Impact Statement and program documents; (2) financial assistance awards and work products; (3) semi-annual performance reports; (4) official correspondence; (5) previous evaluation findings; and (6) relevant publications on natural resource management issues in Virginia.

Based on this review and on discussions with OCRM's Estuarine Reserves Division, the evaluation team identified the following priority issues:

- Status of CBNERRVA's management plan revision and compatibility of existing and planned uses;
- Major accomplishments during the review period;
- Status of the Reserve's general administration, including grants, fiscal management and staffing;
- Status and visibility of research, education and stewardship programs, including local and system-wide initiatives such as the System-wide Monitoring Program (SWMP) and the Coastal Training Program (CTP);
- The manner in which CBNERRVA coordinates with other federal, state, and local agencies and programs;
- Status of CBNERRVA facilities, land acquisition projects and resource management;

- The status and effectiveness of CBNERRVA staffing and programs, and participation in national research, monitoring and education programs; and

- The manner in which CBNERRVA has addressed the recommendations contained in the §312 evaluation findings released in 2003.

C. SITE VISIT TO VIRGINIA

Notification of the scheduled evaluation was sent to VIMS, CBNERRVA, relevant federal environmental agencies, Virginia's congressional delegation and regional newspapers. In addition, a notice of NOAA's "Intent to Evaluate" was published in the *Federal Register* on January 3, 2007

The site visit to Virginia was conducted March 20-22, 2007. Kimberly Penn, Evaluation Team Leader, OCRM National Policy and Evaluation Division, Cory Riley, CBNERRVA Program Specialist, OCRM Estuarine Reserves Division, Beth Ebersole, Reserve Manager, Chesapeake Bay National Estuarine Research Reserve in Maryland, and Marian Dicas, Coastal Training Program Coordinator, Grand Bay National Estuarine Research Reserve, Mississippi, formed the evaluation team.

During the site visit, the evaluation team interviewed CBNERRVA staff, VIMS management and staff and other state officials, federal agency representatives, coastal researchers, educators, nongovernmental representatives and private citizens. Appendix B lists persons and institutions contacted during this review.

As required by the CZMA, NOAA held an advertised public meeting during the evaluation on March 21, 2007, at 6:30 p.m., at the Virginia Institute of Marine Sciences, Greate Road, Gloucester Point, Virginia. The public meeting gave members of the general public the opportunity to express their opinions about the overall operation and management of CBNERRVA. Appendix C lists individuals who registered at the meeting.

The excellent support of CBNERRVA staff with the site visit's planning and logistics is gratefully acknowledged.

III. RESERVE PROGRAM DESCRIPTION

NOAA's Office of Ocean and Coastal Resource Management approved the Chesapeake Bay National Estuarine Research Reserve in Virginia in 1991. The lead state partner is the Virginia Institute of Marine Science in the College of William and Mary.

The Chesapeake Bay National Estuarine Research Reserve in Virginia (CBNERRVA) is located in Gloucester County in the tidewater region of southeast Virginia. The Reserve encompasses approximately 3300 acres of land and water along a salinity gradient on the York River. As the nation's largest estuary, Chesapeake Bay contains a diverse collection of habitats and salinity regimes. In order to incorporate the diversity of habitats in the southern Chesapeake Bay subregion, CBNERRVA established a multi-component system along the salinity gradient of the York River estuary. The Reserve consists of four components: Sweet Hall Marsh, Taskinas Creek, Catlett Islands, and the Goodwin Islands, which represent a diversity of coastal ecosystems found within the York River estuary and its principle tidal tributaries. Sweet Hall Marsh (871 ac), is an extensive tidal freshwater-oligohaline marsh ecosystem located in the Pamunkey River, one of two major tributaries of the York River. Taskinas Creek (980 ac) contains non-tidal feeder streams that drain oak-hickory forests, maple-gum-ash swamps and freshwater marshes which transition into tidal oligo and mesohaline salt marshes. The Catlett Islands (690 ac), consist of multiple parallel ridges of forested wetland hammocks, maritime-forest uplands, and emergent mesohaline salt marshes. The Goodwin Islands (777 ac), are an archipelago of polyhaline salt-marsh islands surrounded by inter-tidal flats, extensive submerged aquatic vegetation beds, and shallow open estuarine waters near mouth of the York River.

Ownership of CBNERRVA component sites varies, but the Reserve has ensured a stable environment for education and research through easements, MOUs, and fee simple ownership. Goodwin Islands are owned by the College of William and Mary and VIMS/CBNERRVA serves as the on-site manager of the Goodwin Islands component of the Reserve. The majority of land comprising the Catlett Islands component is privately owned and VIMS holds deed to a small portion of the most southeast portion of the island complex. The Reserve serves as the on-site manager of the Catlett Island component of the Reserve and assures consistency with the Catlett Island National Estuarine Research Reserve in Virginia Conservation Easements. The Sweet Hall Marsh component is privately owned by the Tacoma Hunting and Fishing Club; and the Taskinas Creek component is part of the state owned and managed York River State Park. The Reserve has MOUs in place with the owners of the latter two components.

The Reserve operates in close partnership with the Virginia Institute of Marine Science, with NOAA partners on campus, with the Virginia Coastal Zone Management Program and with several other management and research entities in the Chesapeake Bay.

IV. REVIEW FINDINGS, ACCOMPLISHMENTS AND RECOMMENDATIONS

A. OPERATIONS AND MANAGEMENT

1. Reserve Administration

The widespread success of CBNERRVA programs is directly attributable to experienced Reserve leadership and the knowledgeable and dedicated staff. Reserve staff are highly regarded in their fields, and many are actively involved in national reserve system efforts. The drive and ability to advance both site-specific and system-wide initiatives is to be commended. Reserve staff are also trusted partners in the research, education and resource stewardship communities at local, regional and national levels. The evaluation team noted that CBNERRVA is an excellent example of how the NERRS can support and influence adaptive coastal management.

Accomplishment: CBNERRVA staff are respected leaders and partners in the research, education, and resource stewardship communities, and thus contribute to the advancement of coastal management at the local, regional and national levels.

By all accounts, VIMS and CBNERRVA exemplify what was envisioned for a state-federal partnership in administering a National Estuarine Research Reserve. Throughout the site visit, the evaluation team observed a multitude of ways that CBNERRVA and VIMS support and complement each other's operations and missions. For example, CBNERRVA provides VIMS with strong applied research and long-term monitoring programs, and an education and outreach program that helps to strengthen VIMS relationship with the community. CBNERRVA is one of four research centers at the Institute, and therefore the Reserve manager is involved in monthly Department Head-Center Director meetings and included on the Institute's Planning and Policy Committee. Reserve programs also benefit from VIMS' human resources--the faculty, staff and students at the Institute--and supplemental financial resources, such as the Rouse-Bottom Endowment and the equipment trust fund. In addition, state funds were appropriated to VIMS to support CBNERRVA facility maintenance in 2005. OCRM commends the Commonwealth and VIMS for this wealth of organizational support provided to the Reserve.

Virginia's direct financial support of the Reserve, however, has remained level for quite some time. And although OCRM encourages state partners to fund core staff positions and use NERRS operations awards to fund projects, only the business manager and part of the Reserve Manager's positions are currently funded by the Commonwealth. By contrast, the Reserve supports the equivalent of approximately nine positions with their grant. That said, CBNERRVA has still been able to significantly expand staff and programming throughout review period with a combination of NERRS operational funds, state match, and external sponsored program funds derived from competitive and noncompetitive grants. In light of the current level of state support, and in order to sustain this current (and proposed) level of operations and take advantage of the opportunities inherent to the enhanced programs, OCRM recommends that the Commonwealth/VIMS consider increasing funds provided to the Reserve.

Ideally, this would be accomplished by supporting another position, such as the Education or Stewardship coordinators.

Program Suggestion: OCRM strongly encourages the Commonwealth/VIMS to consider increasing funds provided to CBNERRVA, potentially through the support of one of the Reserve's staff positions.

CBNERRVA has greatly enhanced program operations during this evaluation period. Though there has been some turnover during this evaluation period, core positions seem stable now, and the evaluation team noted a strong synergy among staff. Reserve staff have strengthened partnerships, identified and addressed coastal management issues, implemented new education programming and developed resource management plans. The evaluation team noted, however, that the staff's ability to take advantage of professional development opportunities, such as training on Geographic Information Systems applications and boating safety courses, would further increase capacity at the Reserve. OCRM encourages VIMS and CBNERR to identify and support professional development opportunities that would serve to increase capacity at CBNERRVA and enhance future programmatic growth.

In addition to NERRS activities, the CBNERRVA's staff work on a variety of initiatives that are funded by, and benefit, partners including VIMS, the Commonwealth and the U.S. Environmental Protection Agency. OCRM finds that the Reserve manager and staff successfully balance work that is directed toward the York River and NERRS-specific activities with those funded via outside grants and focused elsewhere in the Chesapeake Bay region. CBNERRVA's thoughtful balance of activities both compliments and enhances the NERRS mission. Currently, this integrated approach to project oversight is very well managed, and staff involvement with such an array of activities and partners also serves to enhance the credibility and value of the Reserve. While OCRM encourages partnering and the leveraging of Reserve resources to augment the Reserve's impact in this way, CBNERRVA should continue to ensure that NERRS core programs are not affected by expansion in other program areas.

2. Management Plan

Reserves are required by Federal regulation to have a current NOAA-approved management plan (15 C.F.R. Part 921.13). The plan should describe the reserve's goals, objectives and management issues, as well as strategies for research, education and interpretation, public access, construction, acquisition and resource preservation, and, if applicable, restoration and habitat manipulation. A management plan so written has four valuable functions: (1) to provide a vision and framework to guide reserve activities during a five year period; (2) to enable the reserve and NOAA to track progress and realize opportunities for growth; (3) to present reserve goals, objectives, and strategies for meeting the goals to constituents; and (4) to guide program evaluations. Regulations also require that a reserve's plan must be updated every five years.

CBNERRVA has recently completed and submitted a draft of their revised management plan, which reflects the Reserve's vision and strategy for the years 2007 to 2011. The evaluation team

greatly appreciated having such a comprehensive and up-to-date document prior to the review. The draft is currently being reviewed by NOAA's Estuarine Reserves Division.

Accomplishment: CBNERRVA has submitted a final draft of their management plan for the years 2007 to 2011.

3. Partnerships

CBNERRVA develops and maintains productive partnerships to further Reserve goals. The evaluation team noticed a great rapport between Reserve staff and program partners, which has resulted in many successful initiatives including educational curriculum development, coastal training workshops, applied research projects, and the expansion of observing systems efforts. Partners seem enthusiastic to collaborate with CBNERRVA, and do so at local, regional and national levels. Key partners include: the Virginia Coastal Zone Management Program, other departments in VIMS, the State of Maryland, and other NOAA entities. OCRM finds that CBNERRVA successfully leverages NOAA funds to engage partners and enhance Reserve programming beyond that which could be supported by state and federal support alone.

a. Virginia Coastal Zone Management Program

One of the primary goals of the NERR System is to help address priority coastal management issues through scientific research conducted at reserves. Attaining this goal requires strong two-way communication and collaboration with the coastal management community. The evaluation team found that the partnership between CBNERRVA and the Virginia Coastal Zone Management Program (VCZMP) exemplifies this adaptive science-to-management continuum expected and valued by OCRM. The CBNERRVA manager is a member of the VCZMP's Coastal Policy Team, which provides for regular exchange of information regarding research needs and opportunities to support each other's efforts. It appears that collaboration between the two programs has increased during this evaluation period through activities including the identification of research and monitoring priorities, the development of education and outreach programs, and land acquisition planning.

For example, the VCZMP supports various Reserve research and monitoring projects, the results of which will directly apply to coastal management issues and needs. Current efforts include: monitoring the atmospheric deposition of mercury in the southern Chesapeake Bay region; shallow water monitoring to help assess and develop water quality criteria; research to guide submerged aquatic vegetation (SAV) restoration activities; and research on design considerations and alternatives for shoreline protection. The Coastal Program and Reserve also collaborated on the highly successful Living Shoreline Summit offered via the Coastal Training Program, which provided a forum for user needs assessment and strategic planning for both programs. These activities will be discussed in greater detail in the Research and Monitoring and Education Program sections of this report. And finally, as the entity responsible for the Commonwealth's Coastal and Estuarine Land Conservation Program (CELCP) submission, the VCZMP has worked closely with CBNERRVA to incorporate the Reserve's priority areas into the land acquisition plan.

The evaluation team also discussed some opportunities for future collaborations between the programs. For example, there is excellent potential for integrating CBNERRVA monitoring data into the VCZMP's Coastal Geospatial and Educational Mapping System (GEMS). Specifically the Reserve could use data from the robust Virginia Estuarine and Coastal Observing System to develop resource suitability maps that would enhance the planning tools provided by GEMS. In addition, the Coastal Training Program could provide a forum to train resource managers and other data uses on the Coastal GEMS application. Shoreline management and climate change were also identified as topics that the programs plan to work collaboratively on in the coming years. Both the VCZMP and CBNERRVA are anticipating a productive relationship with the new Sea Grant office, and look forward to engaging the new director in these priority issues as well.

Accomplishment: CBNERRVA works with the VCZMP to identify priority coastal management needs, and conducts applicable scientific research to address them. The programs' close collaboration ensures that management strategies are informed by the most current science.

b. York River State Park

The Taskinas Creek component of the CBENRRVA is located within the boundaries of the York River State Park (YRSP), and thus the Park is an important partner for Reserve research, education and stewardship initiatives. For example, the Taskinas Creek includes one of the Reserve's primary SWMP water quality and weather monitoring stations, and has been a site for research studies on blue crab ecology, harmful algae, and wetland classification. In addition, YRSP and CBNERRVA have worked in partnership to expand the Park's boundary through the Harrison tract acquisition and are currently focused on the Stieffen tract (to be discussed further later in this document).

There is tremendous potential for collaborative efforts between YRSP and CBNERRVA in the realm of public education. Educators at YRSP and CBNERRVA work together to provide a variety of opportunities for students, teachers and the general public. Successful education programs have included Estuaries Day celebrations, Tour of the Reserves: Taskinas Creek; Naturalist Series trail walks, and the development of the Historic Rivers Master Naturalist Chapter (2006). This partnership allows both the YRSP and CBNERRVA to leverage resources and reach a wider audience than either might on their own.

The evaluation team noted, however, that most educational activities cooperatively offered by the Reserve and Park have been conducted at the YRSP. While this certainly allows CBNERRVA to reach a wider audience, it seems as if the partnership has not resulted in the level of cooperative programming anticipated. Recently, CBNERRVA entered into a more formal agreement with YRSP to support a part-time educator who will be located at the Park. Given the Reserve's financial support for the position, the expectation is that this educator will work on education programming for both the Park and CBNERRVA. This should provide an excellent opportunity for strengthening the Park-Reserve partnership, as well as increase the educational offerings for both programs. For example, planning for the summer day camp "Estuary Explorers Adventure Week" is currently underway. This program will allow twenty-

five 8-12 year olds the opportunity to spend time at both VIMS and YRSP seining, canoeing, fishing, fossil hunting and fish printing. In addition working collaboratively on educational endeavors, YRSP and CBNERRVA should make sure that resource management plans and strategies are in agreement in order to best coordinate stewardship efforts and leverage resources. One way to ensure that expectations are well understood between the reserve and the park would be to work together to write specific joint tasks for the NOAA operations funding dedicated to YRSP activities.

Program Suggestion: The CBNERRVA support of a position at YRSP has the potential to greatly enhance their partnership. In order to ensure that this arrangement is mutually beneficial, OCRM encourages CBNERRVA and YRSP partners to set clear expectations for collaborative activities.

Another opportunity for CBNERRVA and YRSP to enhance educational programming is through the planned renovation of the Park's Visitor Center and office facility. Currently, there is no indoor space for group activities or classroom programming, and both the Park and Reserve would like to update the exhibits. For example, CBNERRVA is interested in developing an interactive exhibit that displays information about the weather station and water quality monitoring conducted at the Reserve through links to realtime data. Plans for the facility's renovation are in the very early stages, so if YRSP and CBNERRVA decide to move forward together on it, OCRM encourages the programs to involve teachers and other potential user groups throughout the design and construction process.

c. Other NOAA Partners

CBNERRVA continues to strengthen their partnerships with other NOAA entities at VIMS and in the region. The Reserve routinely coordinates and collaborates with the Chesapeake Bay Office, Sea Grant, the Restoration Center, and the Weather Service. The evaluation team had the opportunity to hear from all of these entities during the site visit, and it was evident that they highly value the expertise and enthusiasm of Reserve staff, as well as CBNERRVA's responsiveness to NOAA partners' priorities. There are numerous examples of how the Reserve contributes to NOAA-led initiatives, such as: providing an appropriate location for an atmospheric deposition monitoring site; supporting the development and implementation of the John Smith Interpretive Buoy Trail; and assisting with special events such as the Blue Crab Bowl. The excellent working relationship between the Reserve and NOAA partners is clearly beneficial to all those involved.

Accomplishment: CBNERRVA proactively develops and supports productive cross-NOAA collaborations and efforts.

In addition to the NERR and a Chesapeake Bay Office, VIMS will soon house the Virginia Sea Grant Program (currently only education staff are on-site). The co-location of so many NOAA partners will provide great potential for new projects and leveraging opportunities for Reserve research, education and stewardship. OCRM encourages VIMS to support and encourage partnerships among the NOAA entities as appropriate and to involve the NERR as the institute welcomes Sea Grant to campus.

d. Tianjin Palaeocoastal and Wetland National Nature Reserve

CBNERRVA is currently involved in an international partnership project with the Tianjin Palaeocoastal and Wetland National Nature Reserve (TPWNNR) in the People's Republic of China. The TPWNNR is a "sister" reserve to the two Chesapeake Bay NERRs, and staff from CBNERRVA most recently visited the Reserve in 2005. At that time, CBNERRVA renewed a memorandum of understanding with the TPWNNR (originally signed in 1992) for one year. The partnership was initially developed to include activities such as staff and student exchange and learning opportunities. Since there have been a number of high level delegation exchanges thus far, CBNERRVA is interested in reassessing the partnership's goals and expected outcomes, and encouraging future exchanges involving technical level staff. CBNERRVA has thus invited TPWNNR to the United States and sent a draft agenda for a visit. The involvement of staff who implement reserve initiatives would allow for more in depth discussions regarding technical information on reserve research and stewardship activities. The evaluation team discussed the benefit of CBNERRVA partnering with NOAA and the CBNERR in Maryland to support the future development of this partnership, and particularly the Chinese delegation's next visit.

4. Virginia Estuarine and Coastal Research Reserve System

The Virginia Estuarine and Coastal Research Reserve System (VECRRS) was created in 1999 by the General Assembly of Virginia to establish a system of protected sites representative of the Commonwealth's estuarine and coastal lands. VECRRS is administered through VIMS and CBNERRVA, as both of the reserve systems are designed to provide platforms for research and long-term monitoring programs that will support coastal management efforts. The potential for collaboration and leveraging of resources between these two systems is significant. However, while the Reserve is the ideal choice to coordinate VECRRS initiatives, CBNERRVA should seek additional support from the Commonwealth if this task develops into a larger responsibility than it is currently. For example, efforts are underway to establish VECRRS reserves within the Dragon Run/Piankatank River and the James River watersheds. Because neither of these areas is located within CBNERRVA boundaries or the larger York River watershed, management of activities at the sites should be completely supported by the Commonwealth.

5. Facilities

CBNERRVA made significant progress with regards to facilities enhancement during this evaluation period. In 2003, just prior to the last evaluation, Reserve staff were able to move into their newly expanded and renovated headquarters at Wilson House. Construction was completed on CBNERRVA's Catlett-Burruss Research and Education Laboratory in 2005. The Reserve has also invested in two new vessels and three new trucks over the past 4 years.

Catlett-Burruss Laboratory houses the Reserve's primary research, monitoring and education laboratories. The facility includes a large teaching laboratory, a water quality lab, lab space for several other staff and projects, and storage space. All shallow water quality monitoring is

currently conducted out of the laboratory. The increased, and dedicated, space for Reserve research and monitoring programs in particular has been a significant improvement. Adding a classroom lab has increased capacity to link field trips for students and teachers to classroom activities. These new facilities have greatly enhanced CBNERRVA's capacity, as well as increased the Reserve's visibility, through the establishment of a prominent physical presence on the VIMS campus.

Accomplishment: CBNERRVA has successfully expanded Reserve facilities with the completion of the Catlett-Burruss Research and Education Laboratory. This new facility has enhanced the Reserve's education and research capacity and visibility at VIMS.

Additional opportunities for CBNERRVA expansion on campus were discussed during the site visit. For instance, the Reserve and VIMS have identified space in a new building that could potentially house some of the shallow water quality monitoring work. Also, since many NERRS sites in the region use VIMS for their nutrient analyses, another laboratory with additional office space would be a reasonable consideration in the future.

B. RESEARCH AND MONITORING PROGRAM

The overall goal of CBNERRVA's research and monitoring program is to promote, support, coordinate, and engage in applied research and monitoring efforts that enhance scientific understanding of estuarine and watershed ecosystems and associated processes and functions, and to communicate results of research to assist in environmental education and wise stewardship of coastal resources. Primary research and monitoring focus areas currently include: ecology and management aspects of estuarine and coastal shallow water environments; watershed and airshed material flux into coastal waters; ecological impacts of large-scale episodic events, climate change and sea-level rise; shoreline management; and participation in the development and implementation of observing systems. In order to implement this plan, the Reserve fosters relationships with academic and research communities, as well as coastal managers, at local, regional, and national levels.

While research and monitoring is focused within the four Reserve components, CBNERRVA efforts extend into the larger York River system, which includes the Pamunkey and Mattaponi Rivers. This range provides CBNERRVA and Reserve partners with the scientific information necessary to address the large-scale processes that influence the estuarine system. The evaluation team found CBNERRVA's research and monitoring program efforts to be excellent. OCRM finds that CBNERRVA is conducting essential and applicable research and monitoring that benefits coastal resource management throughout the region.

1. Reserve Research

CBNERRVA is exceptionally positioned to be a platform for estuarine and coastal research. The Reserve office and laboratories are situated in a world-renowned marine science institute on the York River, an estuarine system which is intensively studied. The evaluation team heard from

many scientists who regularly use Reserve sites and monitoring data. CBNERRVA typically has 30 or more externally funded research projects conducted within the Reserve annually. By all accounts, access to CBNERRVA sites and monitoring data is highly valued by the academic and research communities.

As mentioned above, research conducted and supported by the Reserve is focused in four areas, all of which are directly linked to current coastal management needs. CBNERRVA's current work in the ecology of shallow water habitats is one excellent example of how Reserve research supports management efforts. SAV habitat is a designated use in Commonwealth's shallow water zone, and bay grass abundance is a Chesapeake Bay Program indicator. Water quality and SAV data from the suite of long-term monitoring programs and experiments conducted at the Reserve are currently being used to develop and assess water quality criteria specific to SAV growth and survival. The Reserve also developed maps that overlaid areas of water clarity attainment with those areas without SAV coverage to help target SAV restoration activities. OCRM encourages the Reserve to work with the VCZMP to make these maps available on its Coastal GEMS website.

The Reserve has enhanced its research on watershed and airshed material flux during this evaluation period as well through efforts including: mercury loading studies in the Dragon Run Swamp/Piankatank River area and the establishment of an atmospheric deposition monitoring site in the southern Chesapeake Bay region. In partnership with the Virginia Department of Environmental Quality, NOAA's Chesapeake Bay Office, and NOAA's Air Resources Laboratories, the Reserve has initiated research on the atmospheric deposition of mercury in the southern Chesapeake Bay and its relationship to fish contamination. CBNERRVA and the NOAA Chesapeake Bay Office have also partnered to support the National Atmospheric Deposition Program's National Trends Network and the Mercury Deposition Network in the southern Chesapeake Bay region. A long-term atmospheric monitoring station (VA98) was established on a site that is easily accessible to Reserve staff, though not within the Reserve boundaries. CBNERRVA will be primarily responsible for the ongoing support of the station. The establishment of atmospheric deposition monitoring sites at reserves has emerged as a priority within the NERR System, and so CBNERRVA's effort will help to support the build-out.

In addition to supporting VIMS and visiting researchers, CBNERRVA excels in the guidance and support it provides to NERRS Graduate Research Fellows (GRF). GRFs not only conduct their independent research projects within the Reserve, but also gain valuable experience through active participation in Reserve operations. Graduate students are integrated into every facet of programming, contributing directly to not only research and monitoring activities, but also education, outreach and stewardship projects. This inclusive approach not only ensures that the GRF research is relevant to Reserve goals, but also allows the students to acquire in depth understanding of the NERRS and its role in coastal management. OCRM commends CBNERRVA on its thoughtful implementation of the GRF Program.

CBNERRVA also supports and encourages applied research conducted within the Reserve through its partnership with the Cooperative Institute for Coastal and Estuarine Environmental

Technology (CICEET). During this evaluation period, CBNERRVA and CICEET collaborated on seven projects on topics ranging from water quality to wetland buffer restoration to satellite telemetry. OCRM commends this successful partnership, which could serve as model for such collaboration at other reserves.

2. Monitoring Programs

CBNERRVA conducts a suite of monitoring efforts in the York River and watershed. Variables range from abiotic water quality parameters, mandated by the NERR System-Wide Monitoring Program, to biological monitoring of indicator species specific to York River and Chesapeake Bay ecosystems. Monitoring this breadth of variables is integral to resource management and research programs in and around Chesapeake Bay Bay, as well as to the NERR system as a whole. CBNERRVA actively promotes the use of its extensive monitoring data to enhance education, research and resource stewardship. Data collected are an integral part of the education program's water quality curriculum, help guide reserve stewardship efforts, are used extensively by VIMS students and researchers, and feed into local and regional observing systems. OCRM commends CBNERRVA for developing robust monitoring programs that directly address coastal management issues, and for being a leader in local, regional and national integrated coastal and ocean observing system efforts.

a. System-wide Monitoring Program

The goal of the NERR System-wide Monitoring Program (SWMP) is to identify and track short-term variability and long-term changes in estuarine water quality, habitat and land use in each reserve. The data gathered through SWMP provides standardized information about how estuaries function and change over time, enabling scientists to predict how these systems will respond to anthropogenic changes. CBNERRVA's SWMP performance is exemplary in every aspect. CBNERRVA is fully compliant with NERRS SWMP requirements, monitoring four water quality stations for submission to the Centralized Data Management Office (CDMO). The Reserve has also enhanced their SWMP by supporting at least one continuous water quality and one meteorological station at all but one of the components, which allows for more comprehensive spatial coverage of the York River system. Water quality stations are currently maintained at the Goodwin Island, Taskinas Creek, and Sweet Hall March components, as well as at Gloucester Point, Clay Bank and White House Marsh. CBNERRVA collects data at a higher frequency than other Reserves in the system (every 15 minutes), and CDMO data submissions consistently comply with SWMP requirements. SWMP data are used extensively by the Reserve, students and faculty at VIMS, visiting researchers, state and regional coastal management entities, and observing system networks. The evaluation team heard from many of these partners regarding the quality and value of the Reserve's monitoring data, and all were highly appreciative of its accessibility.

Starting in 2003, CBNERRVA has supplemented its SWMP data with measurements taken via DATAFLOW, a water quality mapping system. DATAFLOW can sample water quality, location and depth information simultaneously and continuously (every 3-4 seconds). This quick and continuous mapping capability allows for broader geographic coverage than fixed stations, in order to illustrate how water quality variables differ spatially in a water body. Data collected

via this method is valuable to coastal management in particular, because it can be used when considering habitat suitability for SAV and fish. Reserve staff have been helping to transfer this capability to other reserves as well.

In addition to ensuring quality data collection and management at their site, staff at CBNERRVA strive to increase SWMP capacity at other reserves, and quality assurance system-wide. Staff are actively involved on several SWMP committees, and have participated in pilot efforts to enhance the national SWMP such as testing chlorophyll sensors, telemetry capabilities, and biomonitoring. CBNERRVA also lead the effort to conduct independent quality checks on the laboratories that NERRS sites use for nutrient analyses. While CDMO does now pay for the nutrient standard stock for the comparison studies, CBNERRVA continues to provide the reference material and staff from the Reserve analyze and report the results. OCRM commends CBNERRVA staff on their dedication to advancing national SWMP efforts.

b. Shallow Water Monitoring Program

In addition to SWMP efforts in the York River, CBNERRVA maintains fixed continuous water quality stations and conducts DATAFLOW cruises in a number of southern Chesapeake Bay tributaries. This enhanced shallow water monitoring program is funded via the Chesapeake Bay Program (CBP, the Department of Environmental Quality is the Virginia CBP partner.) The Reserve was specifically chosen as the Virginia lead for this effort due to their experience in implementing high quality monitoring programs. The Maryland Department of Natural Resources is also a partner in the Chesapeake Bay Program, and so SWMP data from both the CBNERR in Maryland and CBNERRVA have been integral to this regional initiative. The Chesapeake Bay Program will use data collected via the shallow water program to examine the relationship of water quality to habitat/organism structure and function such as submerged aquatic vegetation survival and migratory fish spawning and nursery use. CBNERRVA has already used data collected via this program to measure the attainment of SAV water quality criteria in Virginia. The Reserve's involvement in the Bay-wide shallow water monitoring program is an excellent complement to SWMP and other CBNERRVA research and monitoring efforts.

c. Integrated monitoring programs and observing system efforts

During this evaluation period, CBNERRVA's overall monitoring program has grown tremendously. The Reserve has worked with various partners to successfully incorporate SWMP into other local and regional monitoring and observing system efforts. CBNERRVA and its monitoring efforts are thus an integral component of the local Virginia Estuarine and Coastal Observing System (VECOS) and the sub-regional Chesapeake Bay Observing System (CBOS), and is also an active member of the regional Mid-Atlantic Coastal Ocean Observing Regional Association (MACOORA). Not only does the Reserve participate at multiple scales of observing system implementation, but also in all aspects from data collection to the development of management products such as data access portals and models. OCRM commends CBNERRVA for their enthusiastic and valuable contributions to integrated observing system efforts.

Virginia Estuarine and Coastal Observing System
CBNERRVA and VIMS' Department of Physical Sciences have taken the lead in developing the Virginia Estuarine and Coastal Observing System (VECOS.) This local observing system uniquely links monitoring efforts in the southern Chesapeake Bay. CBNERRVA has also contributed to VECOS through: the expansion of data collection platforms and sensor arrays (such as the development of the Goodwin-York Research Observatory, or GYRO); the delivery of real-time data; quality assurance and data management; and data delivery via a new web portal.

The goal of the VECOS website is to provide one portal for VIMS' monitoring efforts that can be readily accessed for research, resource management and education. In addition to accessing quality assured and quality controlled datasets, users can view and download surface maps and time series graphs of available data. The development of this website both supports and enhances the Reserve's IOOS efforts as it provides an excellent data access and archive center for observing systems in the Chesapeake Bay region. (The VECOS website is Virginia's regional complement to Maryland's well-known "Eyes on the Bay," eyesonthebay.net.) This easy to navigate web portal will help to ensure that the wealth of monitoring data collected can be used by as many people as possible. Though it has not been publicly launched, the evaluation team heard significant positive feedback from partners regarding the effort. The website is already frequently used by VIMS students and scientists, Reserve educators, and state agencies. Future plans for VECOS include: incorporating real-time data, as well as current and wave data from the GYRO buoy.

OCRM commends CBNERRVA for taking the lead in VECOS development, and encourages the Reserve to evaluate use of the website once it is publicly launched. The dissemination of information regarding VECOS is an excellent opportunity for coordination between the Reserve's research and Coastal Training Program.

Accomplishment: CBNERRVA, in partnership with VIMS' Department of Physical Sciences, developed the innovative Virginia Estuarine and Coastal Observing System (VECOS). This local observing system effort both coordinates and enhances the efforts of individual entities collecting data in Virginia's Chesapeake Bay watershed. It also includes a web portal that allows researchers, educators, and coastal managers to access to the wealth of monitoring data collected by VIMS and its partners.

Goodwin-York Research Observatory
An interesting and innovative accomplishment of the Reserve's research and monitoring program this evaluation period was the development and implementation of the Goodwin-York Research Observatory (GYRO). CBNERRVA partnered with researchers at VIMS, the National Data Buoy Center (NDBC), the Office of Naval Research (ONR), and the private company Strategic Applications International Corporation (SAIC) to deploy a NOMAD buoy off of Goodwin Island at the mouth of the York River. This state-of-the-art data collection platform was developed to support both environmental and security issues, and to complement the Chesapeake Bay Observing System. Real-time and continuous data is transmitted from the buoy to a land station on Goodwin Island via fiber optic cable. Plans for GYRO include: research and

development (as a cabled observatory test-bed); continuous water quality, biological and toxin data collection; integration into the NDBC's data stream as part of IOOS; and the development of interactive interfaces for web-based display of time-series and map-based data. All of these opportunities, in addition to the innovative partnership with a private company, make GYRO an exciting venture. This project will likely advance observatory systems monitoring while serving many of NOAA's IOOS goals, as well as bring outside research interest to VIMS and CBNERRVA. The Reserve plans to incorporate data from the GYRO into the VECOS website as the project gains momentum.

Accomplishment: The state-of-the-art Goodwin-York Research Observatory was deployed through an innovative partnership between CBNERRVA, the private company SAIC, VIMS, NOAA and ONR. GYRO will complement the Reserve's integrated ocean observing systems efforts, as well as provide a platform for testing new monitoring technologies.

Chesapeake Bay Observing System

CBNERRVA continues to actively support and participate in the sub-regional Chesapeake Bay Observing System (CBOS) effort. The vision of CBOS is to create and enhance a network of fundamental, real-time, and verifiable observations with related metadata, archived data and information products that meet the needs of the Chesapeake Bay community. In this evaluation period, the Reserve has worked with the CBOS Steering Committee on efforts including: sponsoring the NOAA Coastal Services Center project "CBOS Cooperative Expansion and Integration Demonstration"; web page development; and a user needs survey. CBNERRVA has been particularly involved in the CBOS Needs Assessment Survey. The CBOS Steering Committee wants to assess current and potential users of the CBOS data and website. The boating community will be targeted initially, and there are plans to extend sampling to commercial fisherman later. Goals for the survey including obtaining information on the habits of Chesapeake Bay users such as: what parts of the Bay are most heavily used; where users get their water/weather information; how it is used; and what would enhance both the information and ease of obtaining it. The Reserve's CTP has helped to further refine the survey instrument. Since the survey is web-based (created using Survey Monkey), the Steering Committee will likely have to be creative about encouraging participation. Information gained will be valuable in guiding future enhancements to CBOS and website design. CBNERRVA has also been active in CBOS' strategic planning with regards to observatory build-out and partnerships.

Mid-Atlantic Coastal Ocean Observing Regional Association

The Reserve is also a member of the Mid-Atlantic Coastal Ocean Observing Regional Association (MACOORA), which is a consortium of data providers and users that use, depend on, study and manage coastal resources in a region. MACOORA is one of eleven such regional associations that make up the Integrated Coastal Ocean Observing System. The Reserve primarily supports MACOORA through its efforts with CBOS and the NERRS. CBNERRVA is currently involved in efforts to develop a demonstration project addressing fisheries management and storm inundation.

NERRS IOOS Efforts
CBNERRVA supports NERRS' IOOS by collaborating with other NOAA partners and participating in efforts such as: hosting the CICEET sponsored demonstration and scale-up project on satellite linking networked water quality monitoring platforms; supporting the Coastal Services Center sponsored NERRS Mid-Atlantic and Northwest IOOS build-out demonstration projects, and serving on the NERRS IOOS Committee. CBNERRVA is also working with other NERRS partners to develop user-driven regional applications of NERRS IOOS data streams.

OCRM commends CBNERRVA for being an integral part of making the Chesapeake Bay region an excellent example of what integrated ocean observing systems can provide to society, and how IOOS is can be implemented on a regional and national scale. CBNERRVA's leadership and involvement in the development and implementation of various levels of observing systems has demonstrated the Reserve's capacity to make significant integrated efforts happen and to link data to people living, managing and studying the coast.

d. Biological Monitoring

CBNERRVA implemented a successful submerged aquatic vegetation (SAV) biological monitoring program in 2004. Initially under the auspices of NERRS SWMP tier II build-out, the primary goal of the project is to quantify SAV (eel grass) inter-annual variability in shoot density and distribution in relation to water quality. SAV beds at Goodwin Islands and Gloucester Point are monitored monthly (approximately April to October) via fixed transects. Results of the 2004 and 2005 data show interesting trends related to the relationship between temperature and SAV growth. This could be important to habitat management efforts, as eel grass is at the edge of its range in Virginia and so climate change could significantly affect habitat suitability and its potential distribution. Information gained from this project thus far has been widely disseminated. Due to the importance of this effort, the Reserve has opted to continue this effort using external funding sources. In addition, fixed transects within emergent wetland vegetation have been established at each of the Reserve components in order to measure plant diversity over time and as a function of salinity regime. These will be monitored on an approximate five year basis. OCRM commends the Reserve on the implementation of this biological monitoring program, and on their initiative to continue supporting the effort without additional NERRS funding.

3. Site Profile

NERRS implementing regulations require each reserve to develop a comprehensive site profile. A site profile is designed to: (1) compile scientific datasets relating to the reserve, (2) characterize the physical and biotic components of the environment, (3) synthesize the known ecological relationships within the reserve and its watershed, (4) trace the impact of natural and human disturbances, and (5) explore the need for future research, education and management initiatives.

CBNERRVA is currently in the process of developing their site profile. To do so, the Reserve has recruited researchers from several institutions to contribute chapters in their respective fields

of expertise. These papers will populate the environmental setting and ecological components sections, while staff will author sections on research and monitoring priorities, activities, and needs. This approach will undoubtedly produce a comprehensive document with current information on the Reserve components that will be useful to both researchers and resource managers. It has also, however, resulted in missing submission targets with OCRM, as the Reserve has found it difficult to coordinate the multiple authors with regards to deadlines. As of the site visit, CBNERRVA had identified alternative authors for incomplete chapters and agreed with ERD on a realistic timeline for the profile's completion.

Necessary Action: CBNERRVA must complete its site profile. A final draft should be provided to ERD by the end of September 2007.

C. EDUCATION, INTERPRETATION AND OUTREACH

National Estuarine Research Reserves are federally designated "to enhance public awareness and understanding of estuarine areas, and provide suitable opportunities for public education and interpretation." The reserve system provides a range of educational programming to key audiences depending on watershed and community needs and the specific capacity of each reserve. The primary goal of the CBNERRVA's General Education and Public Outreach Program is to increase awareness, understanding, appreciation and wise-use of the Chesapeake Bay estuary through various information and formal education programs for K-12 and college audiences, teacher training workshops and programs for the general public. During this evaluation period, CBNERRVA enhanced their education program in notable ways including: the development of a 7th grade comprehensive estuarine education program, and the implementation of their Coastal Training Program (CTP).

CBNERRVA's specific goals for the education program include: increasing public awareness, understanding and appreciation of coastal environments, and promoting the effective management and conservation of natural and cultural coastal resources through informed decision-making. In order to achieve these goals, the Reserve offers classroom and field-based educational programming for kindergarten thru 12th grade students, teacher trainings, workshops for adult professional audiences, and interpretation for, and outreach to, the general public. Staff at CBNERRVA collaborate with many local and regional partners to implement education and outreach programming. Another significant way that the Reserve participates in outreach is through advisory service. Staff share their expertise with state and local partners as an integral part of their job. The Reserve's primary partner continues to be VIMS, who is (also) mandated to provide unbiased scientific information to help policymakers, industry, and citizens effectively manage and conserve coastal and estuarine resources. CBNERRVA's education program works with: the VCZMP, the NOAA Chesapeake Bay Office, Virginia Sea Grant, Gloucester and Mathews County Public Schools, York River State Park, Gloucester Rotary Club, the National Aquarium in Baltimore, and the Oyster Reef Keepers of Virginia. The Reserve coordinates with these groups on education issues such as curriculum development, topic identification for workshops, public event coordination and execution, and program sponsorship. The evaluation team did hear that there are some obstacles to partnering with outside groups (including NOAA

and other Commonwealth departments) on educational activities such as field trips. Given the value and efficiency inherent in collaborating on efforts such as these, OCRM encourages all partners to be supportive and realistic with regards to coordinating program logistics.

In addition to site-specific educational programming, the CBNERRVA education coordinator is involved in various system-wide efforts. The education coordinator participates in the KEEP workgroup and the development of Estuaries 101 and the Chesapeake Bay module, and has assisted with proposal for funding to train teachers on the new curriculum. OCRM commends CBNERRVA on its attention to both Reserve-specific and system-wide education goals and needs.

OCRM finds that CBNERRVA is successfully addressing their education goals through the implementation of a comprehensive program that makes information available on a variety of topics to a range of audiences.

1. Education Program

Traditionally, education programming at CBNERRVA has been field-based, with an emphasis on introducing students and teachers to the York River estuary through hands-on experiences. The CBNERRVA's field programs are designed to address Virginia Standards of Learning for middle and high school students in an applied context, while also meeting the Commonwealth of Virginia's requirement that each student participate in a meaningful Chesapeake Bay field experience before graduation from high school. The Reserve continues to be very successful in providing high quality field opportunities that introduce students to a range of estuarine environments while ensuring that those involved have a positive learning experience.

In addition to their field-based programming, CBNERRVA offers, and has recently enhanced, classroom offerings. The Reserve has developed curricula on topics such as water quality and estuarine aquarium keeping, and provides teacher trainings to introduce them. Classroom curriculum often also incorporates information, tools and technologies used by Reserve staff. For example, the "York River Water Quality Curriculum" makes use of the Reserve's SWMP data that teachers access in the classroom via the internet. This innovative curriculum has been shared with other education coordinators in the NERRS. OCRM commends the Reserve on initiating projects such as these that not only relate directly to current estuarine science and management, but also demonstrate Reserve capabilities, while addressing the required standards of learning. CBNERRVA also continues to provide about four well-attended teacher trainings a year.

A significant accomplishment during this evaluation period is the development of a comprehensive 7th grade estuarine education program for Gloucester and Mathews county schools. The program, partially funded through NOAA's Bay Watershed Education and Training Program (B-WET), is called *Chesapeake Studies for Gloucester and Mathews County Middle Schools: Linking Field Trips with the Classroom* and is correlated with the Virginia Standards of Learning. Throughout the course of a year, Reserve education staff make regular presentations to every 7th grade public school class in both counties, provide them with

aquariums and the fauna about which they are learning, and lead field trips that connect the classroom activities with the estuarine environment. The program provides a unique opportunity for sustained contact with the same group of students (approximately 650) over the course of a year. Currently in its second year, students and teachers are extremely excited about the opportunities that this program provides. Teachers who met with the evaluation team praised Reserve staff for their thoughtful integration of B-WET with 7th grade standards and curricula, as well as for being organized and excellent with the students.

Accomplishment: CBNERRVA has developed an innovative and highly successful middle school education program as part of NOAA's Bay Watershed Education and Training Program. The Reserve's robust B-WET program is well integrated into the standard 7th grade curriculum, and includes a suite of classroom lessons and relevant field experiences.

Future plans for B-WET include expanding teacher workshops and curriculum development, and providing online access to activities and lesson plans. In addition, the education coordinator is currently considering how to better evaluate how much students are learning throughout the year. OCRM encourages the Reserve to continue to support and enhance this successful program.

As a complement to their school-year programs, CBNERRVA offers students a more intensive educational experience through multi-day summer courses such as the Explore the Chesapeake Bay Summer Day Camp (in partnership with NOAA's Chesapeake Bay Office) and the annual Chesapeake Bay Conference. The Chesapeake Bay Conference is a five-day residential program offered in partnership with the Gloucester Rotary Club, and open to high school students from throughout Virginia. Students are recruited and supported by their local Rotary clubs, while the Reserve is responsible for the conference education content, including field trips and expert speakers. Typical attendance is 25 students and five adults. Conference themes vary year-to-year, and during this evaluation period included: restoration of aquatic habitats; preservation of Dragon Run; blue crab ecology, and; oysters and oyster restoration.

CBNERRVA also participates in a variety of internship programs. Currently, the Reserve has one extremely enthusiastic high school intern, who is working with education staff on the design of a Discovery Lab series. This has turned into a great collaboration with VIMS, where marine science faculty help to introduce young students to topics such as oyster ecology. Undergraduate opportunities at the Reserve include those through the National Science Foundation's Research Experience for Undergraduates Program at VIMS and the Conservation Work Study Program sponsored by the National Aquarium in Baltimore (NAIB). The goal of the latter program is to increase under-represented and minority involvement in environmental conservation sciences. NAIB thus partnered with CBNERRVA in order to expose interns to on-the-ground research and graduate student life. On post-program evaluation surveys, interns consistently rank their week at VIMS as the most rewarding experience of the summer. Internships such as these provide a unique opportunity for students to learn more not just about estuarine science, but also about the CBNERRVA, the Reserve System and VIMS. OCRM commends the Reserve for their participation in and support of internship programs that introduce young people to the science, education and stewardship integral to coastal management.

One of the education program's unofficial goals is to reach 1000 students and 100 teachers a year. Though excellent programming to do so is certainly in place, staff time is a limiting factor. With only the Reserve's education coordinator, the reaching this goal would difficult. Fortunately, the B-WET grant and other sources have enabled CBNERRVA to hire a middle school education specialist. Given the time commitment inherent to serving the entire 7th grade population in two counties, this position is critical to the B-WET program's success. Unfortunately, the availability of future B-WET funding is not guaranteed. In order to continue to implement B-WET in addition to the rest of the Reserves' highly successful education programming, OCRM encourages CBNERRVA to begin to identify other partners and avenues for support. The evaluation team noted several excellent opportunities for partnering with other NOAA offices, as well as the potential to use the York River State Park environmental educator. OCRM commends CBNERRVA on their strong commitment to providing quality educational experiences to students, and encourage the Reserve to continue to strengthen partnerships with the Chesapeake Bay Office and Sea Grant, as well as NOAA's Education Office, to do so.

2. Coastal Training Program

An important aspect of a reserve's education program is the Coastal Training Program (CTP). The CTP is designed to inform coastal decision-making, improve coastal stewardship at local and regional levels through the application of science-based knowledge, and increase dialogue and collaboration among decision-makers. Planning for the program includes establishing a training advisory committee, conducting a market survey of training providers and an audience needs assessment, developing a program strategy that outlines priority coastal issues to be addressed, prioritizing target audiences, and creating a marketing plan.

CBNERRVA's Coastal Training Program was fully implemented in 2005. The overall strategic goal of the Reserve's CTP is to improve decision-making related to coastal resources management at both the local and regional (Chesapeake Bay) level. Per the results of their Market Analysis and Needs Assessment, as well as the Reserve's unique strengths, current and near future efforts will be focused on: 1) wetlands and riparian buffers, 2) shoreline management, and 3) water quality and water management. CBNERRVA's target audiences include: local elected and appointed officials, state and local agency staff, volunteer boards, members of environmental and business organization, and state and regional professional associations.

In order to produce quality trainings and to successfully engage target audiences, the CTP has developed strong and promising partnerships with VIMS Center for Coastal Resource Management (CCRM) and Communications Department, the Virginia Coastal Zone Management Program (VCZMP), and the Virginia Department of Conservation and Recreation (VDCR). The evaluation team had the opportunity to talk with these partners, all of which commended the Reserve's Program's implementation and supported its direction. VIMS partners, in particular, reinforced that the CTP goals are also important to the Institute, and that having a coordinator at the Reserve is an invaluable resource in executing VIMS' advisory services function.

Accomplishment: CBNERRVA's Coastal Training Program was formally implemented during this evaluation period. The CTP has developed productive partnerships to provide workshops and seminar series that are well received, and highly regarded in the community.

CBNERRVA has already developed and offered several successful workshops and trainings. Examples of recent Coastal Training Programs include:

- Living Shorelines – Erosion Control Alternatives
- Perennial Stream Determination Workshop
- Dragon Run Natural Resources Symposium
- Riparian Buffers Workshop, with the VDCR
- Tools of the Trade Shoreline Management Workshop, with VIMS CCRM

In addition to these well attended programs, the VIMS After Hours Seminar Series and a recent CTP initiative, the Living Shoreline Summit, merit special mention.

The VIMS After Hours Seminar Series is a joint effort by the CTP, VIMS Communications Department and the Center for Coastal Resource Management (CCRM). The naturalist seminars focus on relevant topics of interest within the Chesapeake Bay region. Initiated just prior to the last evaluation, attendance at these seminars has grown tremendously during this evaluation period due to timely topic selection and dynamic speakers. VIMS currently expects upwards of 100 people per seminar, and so while they are free, pre-registration is required. Attendees are asked to evaluate topics and speakers via the VIMS website. Recent offerings have included:

- Reptiles and Amphibians of Lower Chesapeake Bay: Their Natural History and Conservation
- Wetlands—the Disappearing Resource
- Coastal Virginia: Hub of Bird Migration
- Dead Zones in Chesapeake Bay: Causes & Consequences
- Jellyfish in Chesapeake Bay: Rise of the Slime?
- Sand Dunes of the Chesapeake Bay
- The Tide Next Time

This series is an excellent example of the robust collaboration between the Reserve and Institute. OCRM commends CBNERRVA and VIMS on this outstanding program, which provides an informative and motivating education opportunity that is clearly valued by the public.

The Living Shoreline Summit was a highly successful conference developed and offered by CBNERRVA and partners including (but not limited to): the Chesapeake Research Consortium, NOAA's Restoration Center and Chesapeake Bay Office, the Virginia and Maryland coastal programs, VIMS, the Keith Campbell Foundation, and the Chesapeake Bay Trust. "Living shoreline" management employs natural elements to protect shorelines from erosion while also providing water quality benefits and critical habitat for wildlife. Goals of the Summit were to: 1) bring together those groups in Maryland and Virginia who work with or are interested in this technique for erosion control, and 2) identify research, management, design methods, and site suitability priorities which need to be addressed in order to expand this practice. Hosted by CBNERRVA, the Summit was attended by approximately 175 individuals representing stakeholders in shoreline management such as local, state and federal government, county and

city wetlands boards, non-profit organizations, environmental consultants and contractors, scientists, and private landowners.

There has also been significant follow-up to the Summit. The CTP coordinator has used feedback received from attendees to guide future course content, for example, technical training on living shoreline design and maintenance. In addition, CBNERRVA, in partnership with VCZMP, is conducting research on the performance of various sill designs for shoreline protection and water quality. Results from this research will support the development of guidance on sill design alternatives. OCRM commends the Reserve on this excellent example of a research-education-stewardship continuum that supports and encourages coastal management.

Accomplishment: CBNERRVA and partners developed and coordinated the extremely successful Living Shoreline Summit. The Reserve is actively using feedback from the Summit to guide future workshop offerings and Reserve research. CBNERRVA's initiatives with regards to education and research on living shorelines exemplify the Reserve's commitment to supporting adaptive coastal management.

The CBNERRVA CTP is continuously re-assessing audience needs and Program direction via post-workshop surveys and through regular contact with the Advisory Board. The CTP Advisory Board is very active, providing relevant guidance on, and support for, Program development and implementation. The Board consists of representatives from the coastal management community including: the NOAA Chesapeake Bay Office, VCZMP, Virginia Sea Grant, the Chesapeake Research Consortium, and various offices in the VDCR, all of whom are also close partners of CBNERRVA in education and outreach. There was a Board meeting just prior to the evaluation site visit, during which members discussed CTP goals and objectives based on the ongoing needs assessments, and helped CBNERRVA to identify future workshops topics. OCRM commends the Reserve on this dynamic approach to program evaluation and enhancement.

The CTP coordinator and Advisory Board recently identified a new approach by which the Program might be able to enhance its reach and impact. In order to ensure that all coastal decision-makers (including elected officials, technical/planning staff and the general public) understand a key issue, the CTP will offer parallel presentations and trainings that are audience-specific in their content and length. For example, elected officials might receive an hour-long bulleted presentation on the importance of an issue, while technical staff would participate in a day-long training with an applied component. In addition the public might receive information via an After Hours Seminar on the importance of a current issue to encourage stewardship, or details regarding why a regulation has changed and how to comply.

The implementation of the Reserve's CTP will provide new opportunities to expand collaborations and coordination within and outside CBNERRVA and VIMS. For instance, there are a multitude of other Reserve program initiatives, such as water quality monitoring and sea level rise research, which could be incorporated into future workshops. The evaluation team also noted that many external networks and partnerships, such as those with the CCRM and VCZMP, are already in place and enthusiastic about workshop possibilities. The CTP is truly in an

exciting position to effect positive change by providing high quality science-based information, using Reserve and VIMS applied research, to coastal decision-makers and managers. OCRM encourages CBNERRVA to continue efforts to integrate the CTP with the Reserve's research and stewardship programs, and to take advantage of opportunities to enhance program implementation.

3. Public Outreach

CBNERRVA provides a variety of public education and outreach opportunities. Much of this programming is offered in collaboration with the VIMS Communications Department. As discussed previously, CBNERRVA also coordinates with the York River State Park (YRSP) and various NOAA offices to offer public education and outreach events. Adult programs include the VIMS After Hours Seminar Series and the canoe-based Tour of the Reserves, while Marine Science Day and Estuaries Day events are oriented for all ages.

The Tour of the Reserves, offered in partnership with the VIMS Communications Department and YRSP, provides the public an opportunity to see Reserve components from the water with a CBNERRVA scientist or educator as a guide. The canoe trips provide natural science and history information, as well as highlight research conducted within the York River estuary. Families often participate, and Reserve staff have been praised not only for the unique experience, but also for their professionalism and attention to safety. OCRM encourages the Reserve and VIMS to continue to support this distinctive and meaningful program.

Accomplishment: The Tour of the Reserves provides a unique opportunity for the public to learn about the natural history of the York River estuary, CBNERRVA, and the scientific research conducted by the Reserve and VIMS.

VIMS Marine Science Day is an annual open house at the Institute with events, tours and activities geared towards all ages. Estimated participation is typically between 1500 and 2000 persons. CBNERRVA programming includes hands-on science activities and interactive displays. For example, the Reserve hosts a seining station and the oyster science Discovery Lab, as well as microscope and aquaria displays.

Opportunities such as these are critical in increasing public awareness and understanding of coastal and estuarine resources and management. The evaluation team noted that in particular, CBNERRVA's public education and outreach programming offered in collaboration with VIMS Communications Department is dynamic and highly successful. This partnership enhances both the content and reach of public outreach opportunities in the region. It was evident to the team that VIMS feels the Reserve's education program helps raise the visibility of the Institute and strengthens their relationship with the community. OCRM commends the CBNERRVA and VIMS for fostering this partnership, which clearly benefits not only the programs, but the community as a whole.

D. STEWARDSHIP PROGRAM

Over the past few years, the NERRS has focused on developing a stewardship component to complement its existing research and education programs. At most reserves, stewardship staff participate in activities including research, monitoring, education, and implementation of resource management actions. Stewardship at CBNERRVA is focused on the long-term management of natural resources and antiquities found within the Reserve boundaries. Management priorities include: natural resource management; archaeological, historical and cultural resources management; fire management; the management of hunting, fishing and other traditional uses; oil and toxic substance spill response; operations management (i.e. boundary line maintenance and enforcement); and, public access. In order to better understand and apply resource management, the Reserve also conducts significant stewardship-directed research and monitoring.

CBNERRVA's stewardship program has grown tremendously during this evaluation period. In 2006, the Reserve hired a dedicated stewardship/watershed coordinator to guide program development. Prior to this, there was limited on-the-ground resource management on the Reserve. The new coordinator has not only provided enthusiasm and direction to the program, but also initiated many successful new activities. In addition, the Reserve has invested significant resources (both time and money) to develop resource management plans specific to each Reserve component, and to work with land owners and program partners to clarify boundaries and use issues for the management plans. OCRM commends CBNERRVA for making the development of their stewardship program a priority. Some current activities and future plans for the Reserve's stewardship program are discussed below.

Accomplishment: CBNERRVA has made the development of a strong, resource management oriented stewardship program a priority during this evaluation period. The Reserve invested in the staff and planning documents to thoughtfully guide program implementation.

1. Natural Resource Management

A significant accomplishment in this evaluation period was the completion of comprehensive resource management and stewardship plans for each of the four Reserve components. The Department of Conservation and Recreation (VDCR) developed the plans, in consultation with the CBNERRVA, and the new stewardship coordinator will guide their implementation. Each plan consists of: 1) background information on the component; 2) an overview of any potential or existing natural heritage resources found at the site; and 3) management issues affecting each component and management recommendations or implementation actions deemed necessary to address those issues. At the time of the evaluation site visit, management plans for the Goodwin Islands and Catlett Islands have been approved, and those for Taskinas Creek and Sweet Hall Marsh were in review. OCRM commends the CBNERRVA on investing in the development of such comprehensive planning documents to help guide the stewardship program. These plans will no doubt greatly enhance the Reserve's resource management efforts.

Accomplishment: Comprehensive resource management and stewardship plans have been developed for each of the CBNERRVA component sites. These plans will guide adaptive management in the Reserve.

In fact, management recommendations from these plans are already being implemented. For example, control of the invasive species *Phragmites austrailis* was identified as an important management issue in both the Goodwin and Catlett Islands components. CBNERRVA thus prioritized the control of 22 acres of the invasive, and treated it using a non-selective herbicide applied via aerial spraying. The Reserve plans to assess the effectiveness of this control measure on Goodwin and Catlett Islands via monitoring transects this year.

2. Stewardship-Directed Research

The Reserve is also conducting many stewardship-driven research projects that will inform coastal and estuarine management in the Commonwealth. The stewardship program's goal for its applied research is to understand the long-term resource management impacts of climate change, sea level rise, and anthropogenic impacts as they relate to habitat change, shoreline change and habitat quality. Current research and monitoring efforts under the auspices of stewardship include studies on: erosion at the Goodwin Islands; early juvenile flounder habitat utilization; habitat value of fringing marsh; hardened shorelines; and benthic habitat mapping. Some future research plans include assessment and restoration studies of critical species such as the horseshoe crab and terrapin. OCRM commends CBNERRVA for identifying and addressing a suite of applied research areas that are exceptionally relevant to coastal management in Virginia.

The focus of stewardship-directed research at CBNERRVA clearly dovetails with the coastal management priorities identified by the Coastal Training Program. The common themes, water quality, shoreline management, and climate change, are coastal issues that have both local and regional importance. This convergence of focus areas is ideal for increasing the Reserve's impact, as it reinforces the use of current research to inform adaptive management. OCRM encourages the relatively young stewardship and CTP programs to work together to identify opportunities for collaboration and ways to strengthen this science-to-management continuum.

3. Public Access Management

CBNERRVA manages Reserve components for a variety of public uses including canoeing, hiking, wildlife watching, and hunting. The Reserve supports passive recreational uses primarily through the maintenance of boundary information, placement of signage regarding access rules and responsibilities, and the development of geo-referenced trail maps. Hunting is also a traditional use within all four Reserve components, and is therefore currently managed by the Reserve at Goodwin Islands. (Hunting access at the other three components is managed by their respective management entities.) Activity on the Islands is controlled through the placement of stationary blinds and a managed permit application system.

4. Geographic Information Systems

Another goal for the stewardship program is to enhance CBNERRVA's Geographic Information Systems (GIS) capability in order to support various Reserve activities. Specifically, the stewardship coordinator will focus on the development of a GIS database library and products that will facilitate the implementation of resource management plans. Prioritized GIS data layers include: habitat types using the NERRS-approved habitat classification system; research and monitoring stations and transects; trails and hunting/wildlife viewing platforms rates at Goodwin and Catlett Islands; and invasive species distribution and control measures. In addition to supporting stewardship efforts, the expansion of GIS capacity will enhance the Reserve's research and monitoring programs. OCRM encourages CBNERRVA to identify training opportunities to help increase staff GIS knowledge and skills so that such a robust database library can be realized.

5. Land Acquisition

The primary mission of the CBNERRVA, as outlined in their draft management plan, is to: preserve a network of reserves that represent the diversity of coastal ecosystems found within the York River estuary and its principal tidal tributaries, and manage these components to support informed management of coastal resources. In the York River watershed, habitat fragmentation and increased population growth are the main threats to the coastal and estuarine systems represented by CBNERRVA components. The comprehensive resource management plans that were recently developed for each of these four components include the identification of Reserve land acquisition and protection needs. These plans currently serve as CBNERRVA's land acquisition plan. As mentioned previously, CBNERRVA is also working closely with the Virginia Coastal Zone Management Program (VCZMP) on the Commonwealth's plan for the Coastal and Estuarine Land Conservation Program (CELCP). The Reserve will be incorporating information from site-specific resource management plans, their work with adjacent landowners, and their conversations with CELCP partners into a comprehensive land acquisition plan over the next year.

At three of the four Reserve components, CBNERRVA boundaries are based on memoranda of understanding (MOUs) and/or conservation easements as opposed to fee simple ownership of the land. While these MOUs are currently adequate for the Reserve's intended use of the areas, in some cases it might be prudent for CBNERRVA to reevaluate the status and future of these agreements. The Reserve might benefit from the establishment of more robust MOUs with the land owners, or alternatively, from the Commonwealth owning the land outright. This assessment could develop into an updated suite of MOUs or potentially into a more comprehensive land acquisition plan for the CBNERRVA. OCRM thus encourages the Reserve to revisit MOUs with land owners in order to clarify and better predict what the owners' conservation priorities and plans are, and to ensure that long-term protection measures are in place.

The Reserve's draft management plan does identify two near-term acquisition priorities, Catlett Islands and the Stieffen tract. Though the Catlett Islands are currently under conservation easement, CBNERRVA would like to secure the lands through fee simple ownership in order to guarantee the long-term protection of this Reserve component. The purchase of this parcel might have added value in the opportunity to acquire not only the Islands, but also some of the upland portion of the Catlett family farm. This would be advantageous to CBNERRVA for a multitude of reasons, not the least of which is that the Reserve does not encompass significant upland habitat. In addition, upland habitat in this area would protect the area directly adjacent to the islands from development, and allow for the long-term monitoring of wetlands as a result of sea level changes. Currently, the Catlett Island component is not accessible to the public, however, if the Reserve is unable to acquire the uplands and the farm is developed, there is the possibility of increased passive recreational use by residents. Though the conservation easement would still be respected, a change in public access may drive changes in the way CBNERRVA uses the site for research. Fee simple ownership of the Catlett Islands and associated uplands would thus benefit the Reserve and its mission by ensuring long-term protection of the component.

There is also interest, by the Reserve and the Virginia Department of Conservation and Recreation, in a tract of land adjacent to the York River State Park (YRSP) called the Stieffen tract. The acquisition of this parcel would link the protected areas of YRSP to those of a US Department of Defense holding southeast of the Park on the River, and would thus provide a valuable corridor for wildlife. Although OCRM agrees with the logic behind this acquisition, it is recommended that the Commonwealth pursue it as a CELCP project, as the land is a high priority for multiple agencies, and it is not directly adjacent to the current CBNERRVA boundary.

V. CONCLUSIONS

For the reasons stated herein, I find that the State of Virginia is adhering to the programmatic requirements of the National Estuarine Research Reserve System in the operation of its approved Chesapeake Bay National Estuarine Research Reserve (CBNERRVA).

CBNERRVA has made notable progress in the following areas: facilities; research and monitoring program expansion and integration; the enhancement of education and outreach programs; the implementation of the Reserve's Coastal Training Program; and the development of a more focused stewardship program.

The findings contain one Necessary Action which must be addressed according to the timeline provided. These evaluation findings also contain two recommendations in the form of Program Suggestions. The Program Suggestions should be addressed before the next regularly scheduled program evaluation, but they are not mandatory at this time. Summary tables of program accomplishments and recommendations are provided in the Appendix E.

This is a programmatic evaluation of CBNERRVA that may have implications regarding the state's financial assistance awards. However, it does not make any judgment on or replace any financial audits.

__*signed*_____ __*28 June 2007*_____

David M. Kennedy Date

Director, Office of Ocean and Coastal
Resource Management

VII. APPENDICES

APPENDIX A. CBNERRVA'S RESPONSE TO 2000 EVALUATION FINDINGS

Program Suggestion: NOAA recommends that the CBNERRVA postpone expansion into the Potomac, Rappahannock, James, and other lower tributaries of the Chesapeake Bay due to resource constraints. Designation of new components should be re-examined when state resources are sufficient to support the staff ad programming at new sites along with maintaining quality work along the York River. The revised management plan should address how the Reserve could support efforts in other tributaries absent designating new components.

CBNERRVA Response: It is recognized that both the Commonwealth and NOAA originally envisioned CBNERRVA to include multiple Reserve components (>20) on all major tributaries and on Virginia's Eastern Shore, and that the designations were to occur in a phased manner. For administrative purposes, these phases were designated as (I) York River basin, (II) Rappahannock and Potomac River basins, (III) James River basin and western shore of Chesapeake Bay, and (IV) Bay-side Eastern Shore of Chesapeake Bay. Based on a number of concerns, some of which are summarized below, both CBNERRVA and NOAA/ERD have decided not to proceed with expansion at the present time.

Site designations and major expansions involve large time commitments from the NOAA/ERD staff. In addition to addressing the needs of the currently designated reserves, NOAA/ERD staff time is further strained by completing ongoing reserve site designations and addressing anticipated future nominations from under-represented biogeographical regions. In should be noted that in order to create a more coordinated and comprehensive Chesapeake Bay network of research reserves, Maryland and Virginia coordinated their initial efforts with respect to site selection; there are seven components between the two reserves. Furthermore, several reserves in addition to CBNERRVA have been designated within the Virginian biogeographical province (e.g., Jacques Cousteau NERR, Delaware NERR, Chesapeake Bay – MD NERR, and North Carolina NERR). CBNERRVA has similar concerns as NOAA/ERD regarding staff and resource limitations with respect to a major expansion of the Reserve. Upon initial NOAA review of 1998 submitted CBNERRVA expansion documentation, it is anticipated that significant additional information (e.g., environmental impact statements, draft management plans for new reserve components) and efforts (e.g., updated scoping meetings, and public comment opportunities) will be required.

External to the nomination and designation process, it is also generally recognized that additional staff time and resources are required to operate spatially distributed, multi-component reserves as opposed to single unit reserves. This becomes particularly evident with respect to participation in national monitoring programs. It is clearly understood that expansion of CBNERRVA will not result in supplemental funding by NOAA and expansion will only be possible with funding from the state. One final note, due to a variety of human and environmentally induced issues, CBNERRVA will most likely need to expend time and resources to "secure" the long-term

protection of its current York River components. This effort would take a priority in terms of staff time and supporting resources over the addition of new reserve components associated with other tributary systems.

In 1999, the General Assembly of Virginia established the Virginia Estuarine and Coastal Research Reserve System (VaECRRS). The purpose for establishing the VaECRRS was to establish a system of protected sites representative of the Commonwealth's estuarine and coastal lands in which research, monitoring and education could be conducted to support the Commonwealth's coastal resource management efforts. While currently not funded, the mission of VaECRRS is similar to NERRS and therefore could serve as a substitute for the federal expansion of Reserve components within the Commonwealth. Given that CBNERRVA for all intent administers the VaECRRS, staff can still offer considerable expertise to benefit other protected regions outside the York River NERRS. For example, faculties associated with CBNERRVA are the lead investigators for U.S. EPA Chesapeake Bay Program's Southern Bay Enhanced Shallow Water Quality Monitoring Program and the state sponsored Bay water quality initiative. These two programs alone have resulted in continuous monitoring of water within the James, Rappahannock and Potomac Rivers following NERRS System-Wide Monitoring protocols. Additionally, the Reserve's General Education, Coastal Training (CTP), and Advisory Service programs have and continue to reach audiences that reside outside the York River basin.

Currently, CBNERRVA's program direction is focused on York River and expansion into other tidal tributaries and embayments does not seem prudent at this time. We fully anticipate increasing our effort to regions outside the York River system as opportunities and funds external to our NOAA reserve operations grant become available. Additional details regarding the past proposal to expand the CBNERRVA outside the York River can be found in the Reserve's updated draft management plan.

Program Suggestion: The Reserve is encouraged to explore and implement new strategies for increasing the visibility of its participation in the NERRS.

CBNERRVA Response: The Reserve acknowledges the value of increased program visibility and work to explore new and innovative strategies to increase CBNERRVA's and the NERRS visibility at the local, regional and national levels. Perhaps in somewhat of a unique position within the Reserve system, CBNERRVA is administered by one of the largest estuarine research institutes in the nation and, until recently, did not have facilities conducive for public/other audience interaction. Therefore from an audience perspective, a Reserve hosted program could be viewed as a general Institute offering due to the Institutes greater name recognition and use of their facilities. The relatively recently completed Reserve Headquarters, which houses the CBNERRVA lecture room, and Research and Education Laboratory have greatly increased awareness of CBNERRVA and NERRS among the general public and local decision-makers. In addition, the implementation of multiple-exposure programs (e.g., Tour of the Reserves, After Hours Seminar Series, B-WET) have allowed for increased interaction with school groups and the public on a continued basis, thus allowing for a greater opportunity to familiarize participants with the NERRS; the same applies to the Reserve's CTP. Finally, program visibility has

increased through periodic written newsletters/magazines (e.g., VIMS Crest, VA Coastal Zone Management Magazine) and Reserve supported web portals (e.g., VECOS, CBNERRVA home page).

Necessary Action: The Reserve is required to submit a draft revised management plan. This plan must be submitted before the end date of the 2002 operations award, NA17OR2478, as described in the task description of this cooperative agreement.

CBNERRVA Response: CBNERRVA acknowledges that changes have occurred during the last three evaluation periods including staff, programs and management goals. The Reserve also acknowledges the importance of a revised management plan that reflects its current vision and implementation strategy for the next five years (2007-2011). Subsequent to receiving the final evaluation findings of the 2003 NOAA/OCRM review, CBNERRVA began to work with NOAA/ERD to develop a timeline and plan for completion of the revised Reserve management plan consistent with NERRS regulations and guidelines. Due to large extent of effort required to develop the revised Reserve management plan that addresses changes in the program since designation and changes in Reserve staff, CBNERRVA asked for and received a grant extension regarding this specific task item. CBNERRVA has worked extensively with NOAA/ERD on the revised management plan content and format. The draft management plan has been completed and is currently under internal review by NOAA. The draft management plan was also provided to the 2007 NOAA Evaluation Team prior to their site visit. After receiving comments from NOAA, the Reserve will incorporate all required changes and appropriate suggestions with respect to content and format. Following any revisions, the Reserve will move in a timely manner to allow for national and local public review and input (Summer 2007), and then work with NOAA/ERD to finalize the document (late Summer or Fall 2007).

APPENDIX B. PERSONS AND INSTITUTIONS CONTACTED

Chesapeake Bay National Estuarine Research Reserve - Virginia

Name	Title
Brit Anderson	Marine Scientist Supervisor
Joy Austin	Laboratory Supervisor
Sandra Erdle	CTP Coordinator
Carolyn Gardner	Business Manager
Jim Goins	Field Operations Manager
Jesse Jarvis	GRF, Ph.D. Candidate at VIMS
Amber Knowles	Laboratory Specialist
Scott Lerberg	Watershed and Stewardship Coordinator
Sarah McGuire	General Education and Outreach Coordinator
Eduardo Miles	Marine Scientist
Alynda Miller	Laboratory Specialist
Dr. Ken Moore	Research Coordinator
Betty Neikirk	Marine Scientist Supervisor
Frank Parker	Previous GRF, Ph.D. Candidate at VIMS
Jes Russo	Marine Education Specialist
Dave Rutan	Field Technician
Steve Snyder	Laboratory and Field Specialist
Dr. William Reay	Director

Virginia Institute of Marine Sciences

Name	Department or Program	Title
Dr. John Brubaker	Department of Physical Sciences	Associate Professor
Robert Condon	Department of Biological Sciences	Ph.D. Candidate
James Douglas	Department of Biological Sciences	Ph.D. Candidate
Karen Duhring	Center for Coastal Resources Management	Wetlands program
Dr. Carl Friedrichs	Department of Physical Sciences	Professor
Dr. Carl Hershner	Center for Coastal Resources Management	Director
Jane Lopez	Sponsored Research	Director
David Malmquist	Communications Department	Director
Susan Maples	Communications Department	Public Relations
Carroll Owens	Administrative Council	
Dr. James Perry	Department of Biological Sciences	Professor
Dr. Rochelle Seitz	Department of Biological Sciences	Associate Research Professor
Dr. Jian Shen	Department of Physical Sciences	Associate Research Professor
Dr. John Wells	VIMS	Dean/Director

State of Virginia

Name	Organization	Title
Rachel Bullene	Department of Environmental Quality, Virginia Coastal Zone Management Program	Grants Coordinator/ Outreach Specialist
Laura McKay	Department of Environmental Quality, Virginia Coastal Zone Management Program	Program Manager
Shep Moon	Department of Environmental Quality, Virginia Coastal Zone Management Program	Coastal Planner
Kelly Price	Department of Environmental Quality, Virginia Coastal Zone Management Program	Coastal Planner
Virginia Witmer	Department of Environmental Quality, Virginia Coastal Zone Management Program	Outreach Coordinator
Russell Johnson	Department of Conservation and Recreation, York River State Park	Park Manager
Julie Linehan	Department of Conservation and Recreation, York River State Park	Environmental Educator
Bradley Thomas	Department of Conservation and Recreation, York River State Park	Chief Ranger
Richard Hoffman	Department of Environmental Quality, Chesapeake Bay Monitoring Program	Manager
Nancy Miller	Department of Conservation and Recreation, Chesapeake Bay Local Assistance Division	Senior Planner – Middle Peninsula

Program Partners

Name	Affiliation	Title
Laura Bankey	National Aquarium in Baltimore	Conservation Program Manager
Jill Bieri	NOAA Chesapeake Bay Office	Marine Education Specialist
Dr. William Boicourt	University of Maryland Center for Environmental Science	Professor
Vicki Clark	Virginia SeaGrant	Marine Education Specialist
Margaret Kerchner	NOAA Chesapeake Bay Office	Chesapeake Bay Program Coordinator
Dr. Micheal Koterba	Chesapeake Bay Observing System	Executive Director
Andrew Larkin	NOAA Chesapeake Bay Office	
Bruce Michael	MD Department of Natural Resources, Tidewater Ecosystem Assessment Division	Director
Walter Priest	NOAA Restoration Center	Restoration Specialist
Sherri Rollins	Page Middle School, Gloucester County	Teacher
Anthony Siebers	NOAA, National Weather Service	Meteorologist-in-Charge
Charlene Small	Thomas Hunter Middle School, Mathews County	Teacher

Stephanie Sowers	Peasley Middle School, Gloucester County	Teacher
Susan Walton	Peasley Middle School, Gloucester County	Teacher
Doug Wilson	NOAA Chesapeake Bay Office	Observation Program Officer

APPENDIX C: PERSONS ATTENDING THE PUBLIC MEETING

Name	Affiliation
Maurice P. Lynch	York Chapter, Chesapeake Bay Foundation
Anne Markwith	Teacher
Hannah McLean	CBNERRVA intern
Charlene Talcott	Former Environmental Educator at York River State Park

APPENDIX D: NOAA'S RESPONSE TO WRITTEN COMMENTS

OCRM received six sets of written comments regarding the Chesapeake Bay NERR Virginia. Each set of comments is summarized below and followed by OCRM's response.

Carol Hopper Brill, Ph.D
Virginia Sea Grant
Gloucester Point, Virginia
Comment: Dr. Brill acknowledged the excellent support that CBNERRVA provides for the Blue Crab Bowl. The Blue Crab Bowl is the Virginia Regional Competition of the National Ocean Sciences Bowl, a project of the Consortium for Oceanographic Research and Education. CBNERRVA has supported the Blue Crab Bowl sine 2004. Staff volunteer as judges and officials, and the Reserve provides awards for the top placing teams. These awards take the form of learning experiences, and are thus field trips to Reserve sites that introduce students and teachers to the biology and ecology of the Chesapeake Bay and to current Reserve research. Dr. Brill concluded that the Blue Crab Bowl is enhanced by CBNERRVA's participation, and looks forward to continuing this valuable partnership.

NOAA's Response: No response necessary. The evaluation teams thanks Dr. Brill for her comments.

Maurice P. Lynch
York Chapter, Chesapeake Bay Foundation
Gloucester Point, Virginia
Comment: Dr. Lynch provided the history of the joint efforts of the York Chapter and CBNERRVA. He described various activities that have been mutually beneficial to both entities, as well as identified opportunities for future collaboration. Dr. Lynch specifically mentioned the potential of the York Chapter serving as a 'citizen support organization' for the Reserve. He also acknowledged CBNERRVA staff and their stewardship of the Reserve, and expressed interest in formalizing a partnership with CBNERRVA in the future.

NOAA's Response: The evaluation team agrees that having a citizen support organization could be beneficial to CBNERRVA, and thanks Dr. Lynch for his comments.

Paul A. Sakach
Booker Elementary School
Hampton, Virginia
Comment: Mr. Sakach highly praised CBNERRVA's teacher training workshops. He described them as "invaluable…in preparing [him] to present accurate, informative, hands on activities to [his] students in support of the Virginia Standards of Learning." Mr. Sakach appreciates that the trainings give him the background information, hands-on experience, and confidence to assist his students in learning about coastal environments. He concluded by

stressing that the Reserve plays and integral role in providing marine science educational opportunities for area schools.

NOAA's Response: No response necessary. The evaluation teams thanks Mr. Sakach for his comments.

Laurie Sorabella
Oyster Reef Keepers of Virginia, Inc.
Virginia Beach, Virginia
Comment: Ms. Sorabella praised CBNERRVA on its contribution to the Oyster Reef Keepers of Virginia (ORKV) program "Schools Restoring Oysters to the Chesapeake" (S-ROC.) S-ROC is a program through which students raise, monitor and transplant oysters to sanctuary reefs in Virginia. S-ROCs primary goals are: environmental education, resource restoration, and stewardship development. Ms. Sorabella commended CBNERRVA contributions to this program which include: providing scientific field investigation programs for participating schools in the area and facilitating oyster transplanting. She described Reserve staff as professional, energetic and knowledgeable. Ms. Sorabella concluded by saying that she looks forward to maintaining this rewarding partnership in the future.

NOAA's Response: No response necessary. The evaluation teams thanks Ms. Sorabella for her comments.

Charlene Talcott
Virginia Department of Conservation and Recreation
Comment: Ms. Talcott worked previously as the Environmental Educator at York River State Park (a cooperative position between the Park and CBNERRVA), and wanted to acknowledge the enjoyable association with the Reserve and VIMS. She described the collaborative efforts made possible by this partnership, such as Estuaries Day and the Naturalist Series, and stressed that this cooperative position greatly enhances programming and educational opportunities at both agencies.

NOAA's Response: OCRM agrees that this shared position can provide an excellent opportunity for strengthening the partnership between the departments, as well as increase the educational offerings at both locations. This document includes further discussion of this partnership and includes a recommendation regarding the environmental educator position. Please refer to section A.3.b. The evaluation teams thanks Ms. Talcott for her comments.

Daniel O. Worthington, Jr
The Gloucester Rotary Club
Gloucester, Virginia
Comment: Mr. Worthington acknowledged and praised CBNERRVA for its support of the annual Rotary Chesapeake Bay Conference. He described how the Gloucester Rotary Club and

Reserve work cooperatively to provide a hands-on Chesapeake Bay experience for up to 24 junior and senior high school students. Mr. Worthington praised the leadership of Reserve education staff, and looks forward to working CBNERRVA this summer.

NOAA's Response: No response necessary. (This document includes additional information on the Chesapeake Bay Conference in section C.1.) The evaluation teams thanks Mr. Worthington for his comments.

APPENDIX E: SUMMARY OF ACCOMPLISHMENTS AND RECOMMENDATIONS

Accomplishments

Issue Area	Accomplishment
Reserve Administration	CBNERRVA staff are respected leaders and partners in the research, education, and resource stewardship communities, and thus contribute to the advancement of coastal management at the local, regional and national levels.
Management Plan	CBNERRVA has submitted a final draft of their management plan for the years 2007 to 2011.
Partnerships	CBNERRVA works with the VCZMP to identify priority coastal management needs, and conducts applicable scientific research to address them. The programs' close collaboration ensures that management strategies are informed by the most current science.
Partnerships	CBNERRVA proactively develops and supports productive cross-NOAA collaborations and efforts.
Facilities	CBNERRVA has successfully expanded Reserve facilities with the completion of the Catlett-Burruss Research and Education Laboratory. This new facility has enhanced the Reserve's education and research capacity and visibility at VIMS.
Monitoring Programs	CBNERRVA, in partnership with VIMS' Department of Physical Sciences, developed the innovative Virginia Estuarine and Coastal Observing System (VECOS). This local observing system effort both coordinates and enhances the efforts of individual entities collecting data in Virginia's Chesapeake Bay watershed. It also includes a web portal that allows researchers, educators, and coastal managers to access to the wealth of monitoring data collected by VIMS and its partners.
Monitoring Programs	The state-of-the-art Goodwin-York Research Observatory was deployed through an innovative partnership between CBNERRVA, the private company SAIC, VIMS, NOAA and ONR. GYRO will complement the Reserve's integrated ocean observing systems efforts, as well as provide a platform for testing new monitoring technologies.
Education Program	CBNERRVA has developed an innovative and highly successful middle school education program as part of NOAA's Bay Watershed Education and Training Program. The Reserve's robust B-WET program is well integrated into the standard 7th grade curriculum, and includes a suite of classroom lessons and relevant field experiences.
Coastal Training Program	CBNERRVA's Coastal Training Program was formally implemented during this evaluation period. The CTP has developed productive partnerships to provide workshops and seminar series that are well received, and highly regarded in the community.

Coastal Training Program	CBNERRVA and partners developed and coordinated the extremely successful Living Shoreline Summit. The Reserve is actively using feedback from the Summit to guide future workshop offerings and Reserve research. CBNERRVA's initiatives with regards to education and research on living shorelines exemplify the Reserve's commitment to supporting adaptive coastal management.
Public Outreach	The Tour of the Reserves provides a unique opportunity for the public to learn about the natural history of the York River estuary, CBNERRVA, and the scientific research conducted by the Reserve and VIMS.
Stewardship Program	CBNERRVA has made the development of a strong, resource management oriented stewardship program a priority during this evaluation period. The Reserve invested in the staff and planning documents to thoughtfully guide program implementation.
Natural Resource Management	Comprehensive resource management and stewardship plans have been developed for each of the CBNERRVA component sites. These plans will guide adaptive management in the Reserve.

Recommendations

Recommendations are in the form of Necessary Actions (NA) or Program Suggestions (PS).

Issue Area	Recommendation
Reserve Administration	PS: OCRM strongly encourages the Commonwealth/VIMS to consider increasing funds provided to CBNERRVA, potentially through the support of one of the Reserve's staff positions.
Partnerships	PS: The CBNERRVA support of a position at YRSP has the potential to greatly enhance their partnership. In order to ensure that this arrangement is mutually beneficial, OCRM encourages CBNERRVA and YRSP partners to set clear expectations for collaborative activities.
Site Profile	NA: CBNERRVA must complete its site profile. A final draft should be provided to ERD by the end of September 2007.