

### III. EDUCATION PLAN

#### A. Education Program Overview

##### *1. National Education Program*

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” (NERRS 2008). The National Estuarine Research Reserve System (NERRS) is one of only four programs within the National Oceanic and Atmospheric Administration (NOAA) in which education is federally mandated, and the NERRS provides a wide range of educational programs to fulfill that mandate.

The Reserve System provides a vehicle to increase understanding and awareness of estuarine systems and improve decision-making among key audiences to promote stewardship of the nation’s coastal resources. Education and interpretation in the Reserves incorporates a range of programs and methodologies that are systematically tailored to key audiences around priority coastal resource issues and incorporate science-based content. Reserve staff members work with local communities and regional groups to address coastal resource management issues, such as non-point source pollution, habitat restoration and invasive species. Through integrated research and education programs, the Reserves help communities develop strategies to deal successfully with these coastal resource issues.

Formal and non-formal education and training programs in the NERRS target K-12 students, teachers, university and college students and faculty, as well as coastal decision-maker audiences such as environmental groups, professionals involved in coastal resource management, municipal and county zoning boards, planners, elected officials, landscapers, eco-tour operators and professional associations.

K-12 and professional development programs for teachers include the use of established coastal and estuarine science curricula aligned with state and national science education standards and frequently involves both on-site and in-school follow-up activities. Reserve education activities are guided by national plans that identify goals, priorities, and implementation strategies for these programs. Education and training programs, interpretive exhibits and community outreach programs integrate elements of NERRS science, research and monitoring activities and ensure a systematic, multi-faceted, and locally focused approach to fostering stewardship.

##### *a. Reserve System Education Goals*

The National Estuarine Research Reserve System’s mission includes an emphasis on education, interpretation, and outreach. Education policy at the North Carolina National Estuarine Research Reserve is designed to fulfill the Reserve System goals as defined in the regulations (15 C.F.R Part 921(b)). Education goals include:

- Enhance public awareness and understanding of estuarine areas and provide suitable opportunities for public education and interpretation;

- Conduct and coordinate estuarine research within the system, gathering and making available information necessary for improved understanding and management of estuarine areas.

***b. Reserve System Education Objectives***

Education-related objectives in the Reserve System Strategic Plan 2005-2010 include:

1. People are aware of the ecological, economic, historical, and cultural importance of estuarine resources.
2. People understand how human choices and natural disturbances impact social, economic, and estuarine ecological systems.
3. People apply science-based information when making decisions that could impact coastal and estuarine resources.

***c. Reserve System Coastal Training Program***

The Coastal Training Program (CTP) provides up-to-date scientific information and skill-building opportunities to coastal decision-makers who are responsible for making decisions that affect coastal resources. Through this program, National Estuarine Research Reserves can ensure that coastal decision-makers have the knowledge and tools they need to address critical resource management issues of concern to local communities.

Coastal Training Programs offered by Reserves relate to coastal habitat conservation and restoration, biodiversity, water quality and sustainable resource management and integrate Reserve-based research, monitoring and stewardship activities. Programs target a range of audiences, such as land-use planners, elected officials, regulators, land developers, community groups, environmental non-profits, business and applied scientific groups. These training programs provide opportunities for professionals to network across disciplines, and develop new collaborative relationships to solve complex environmental problems. Additionally, the CTP provides a critical feedback loop to ensure that professional audiences inform local and regional science and research agendas. Programs are developed in a variety of formats ranging from seminars, hands-on skill training, participatory workshops, lectures, and technology demonstrations. Participants benefit from opportunities to share experiences and network in a multidisciplinary setting, often with a Reserve-based field activity.

Partnerships are important to the success of the program. Reserves work closely with State Coastal Programs, Sea Grant College extension and education staff, and a host of local partners in determining key coastal resource issues to address, as well as the identification of target audiences. Partnerships with local agencies and organizations are critical in the exchange and sharing of expertise and resources to deliver relevant and accessible training programs that meet the needs of specific groups.

The CTP requires a systematic program development process, involving periodic review of the Reserve niche in the training provider market, audience assessments, development of a three to five year program strategy, a marketing plan and the establishment of an advisory

group for guidance, program review and perspective in program development. The Coastal Training Program implements a performance monitoring system, wherein staff report data in operations progress reports according to a suite of performance indicators related to increases in participant understanding, applications of learning and enhanced networking with peers and experts to inform programs.

## ***2. North Carolina NERR Education Plan Overview***

The North Carolina National Estuarine Research Reserve (NCNERR) offers educational programs for K-12 school groups, the general public, special interest groups, teachers, and coastal decision-makers. Components of the education program include student curricula, field trips, adult lectures, teacher workshops, volunteer programs, summer camps, and a wide variety of printed media. All education, training, and outreach activities are designed to enhance public awareness of the importance of estuarine systems and provide opportunities for public education and interpretation. A critical aspect of these efforts is the linkage of education to science and stewardship. The overall aim of the education program is to translate scientific information into language that can be understood and applied by program audiences.

The NCNERR's education programs are developed and administered by the education staff located in Beaufort, in the central part of the North Carolina coast. These education programs are conducted in concert with other Reserve staff, including the Reserve Manager, research staff in Wilmington and Beaufort, and stewardship staff in Wilmington and Kitty Hawk. Partnerships with other organizations are an integral part of the Reserve's ability to educate a broader population along the 300 miles of North Carolina's coast. Partners include N.C. Sea Grant, Albemarle-Pamlico National Estuary Program, the N.C. Wildlife Resources Commission, Southeast Center for Ocean Sciences and Education Excellence, the N.C. Office of Environmental Education and various divisions within the N.C. Department of Environment and Natural Resources, to name a few. All education programs are administered in accordance with NERRS education goals and objectives as outlined in the NERRS Strategic Plan (Appendix B).

The NCNERR education program goal is to promote estuarine literacy by increasing humans understanding of natural estuarine systems, their connections to them, and the benefits derived from them. In order to accomplish this goal education programs will deliver information on N.C. coastal resources to formal and informal educators, and K-12 and college students to foster environmental stewardship and inform decision-making. In addition, Coastal Training Program activities will deliver science-based knowledge and skills appropriate to the needs of the target audiences and relevant to sustainable coastal management. The greater community, including the general public, visitors, and pre-school children, will also receive educational programming to meet the education program goal.

As the educational needs and services in the state changes, the Reserve's education program will adapt to meet those needs and fill identified gaps. Market analyses (MA) and needs assessments (NA) will be conducted on a regular basis and are an integral part of identifying target audience needs and planning future programs. In the past, site-based programs have been popular. Although the Reserve will continue to offer site-based programs, online training opportunities and web-based educational resources will also be made available. In addition, the Reserve

education program is focusing on engaging schools in the tri-county area instead of conducting programs in an opportunistic, ad-hoc manner. As resources become available education programs will be expanded to other areas of the coast.

***a. K-12 Student Education Program***

The K-12 student education program provides students with hands-on, inquiry-based learning opportunities where the content is focused on estuarine habitats, organisms or coastal issues. Field trips and field studies are held primarily at the Rachel Carson component. Teachers bring their classes to the Reserve for two-hour interpretive nature hikes. Education staff also offer hands-on learning activities such as seining for fish, conducting shore profiles, or testing water quality. The education program goal is to have students actively engaged in their learning experience and the best way to accomplish this is through hands-on opportunities. All Reserve K-12 education programs are aligned to the North Carolina Standard Course of Study and National Science Standards. National Ocean Literacy Essential Principles and Estuarine Principles and Concepts are also incorporated into all programs.

Students and teachers can also learn about estuaries by participating in the EstuaryLive Program, which is an interactive, web-based, field trip available nationwide. These live broadcasts are designed for classroom use and can be viewed by anyone. Participating Reserves host different sessions on a variety of estuarine topics. Pre- and post-session classroom activities enhance the live broadcast experience for both teachers and students.

For schools that cannot travel, the Reserve offers a variety of classroom-based programs that are led by Reserve education staff on estuarine-related topics. The Reserve also provides K-12 teachers with written, estuarine-based, curricular material for both classroom and field-based activities. In addition to the curriculum, the Reserve produces educational posters, activity books, Newspapers in Education inserts, Digital Video Discs (DVDs) and a variety of estuarine-based informational brochures. Web resources are also available and include basic estuarine information, curricula, videos, field guides, and archived EstuaryLive sessions.

***b. Teacher Professional Development Program***

The purpose of the teacher professional development program is to increase the number of teachers trained to teach students about estuaries and coastal ecosystems thus increasing estuarine literacy in both teachers and students. The Reserve accomplishes this through workshops and by providing supplementary curricular materials.

Teacher professional development workshops target formal and informal educators across the State as well as pre-service teachers. All educator workshops are based on curricula developed either locally by NCNERR educators or by the NERRS. All North Carolina teacher workshop participants are eligible to receive teaching certificate renewal credits and/or North Carolina Environmental Education Certification credits. A new national curriculum was recently developed for K-12 students and teachers as part of NERRS' K-12 Estuarine Education Program (KEEP). This curriculum, called Estuaries 101, teaches key

principles and concepts of estuarine ecology and illustrates how estuaries relate to other human and ecological systems, while teaching to national and state science standards. KEEP not only teaches students about coastal and estuarine processes, but it also develops and strengthens data literacy, critical thinking, team building, and problem solving skills in students of all ages. KEEP uses a multifaceted approach that is designed to provide teachers with appropriate estuarine-based lessons plans as well as hands-on field experiences for teachers and students within the Reserves.

Post-workshop evaluations are conducted for every workshop to ensure that the content and delivery are meeting participant needs. Many teacher professional development workshops are conducted in partnership with other organizations.

### **c. Community Education and Outreach Program**

The community education and outreach program strives to increase public awareness of the goals and mission of the NCNERR and to enhance an understanding of estuarine systems and processes among the general public including pre-school children, local citizens, and visitors of coastal North Carolina. The intent of the outreach program is to increase estuarine literacy and foster environmental stewardship in citizens of all ages. Outreach activities include: public field trips; summer camps; workshops, seminars, science symposia on coastal topics; participation at environmental festivals and fairs; and production of educational materials.

Every summer the Reserve offers naturalist-led public field trips twice a week to the Rachel Carson Reserve. These outings are led by trained volunteers and/or education staff. Public nature hikes have also been offered at the Currituck Banks site in the summer as staff and resources allow. Public field trips are also offered on National Estuaries Day and during Take A Child Outside Week (late September).

In 2008, as part of the Outreach Program, the Reserve offered four different summer programs for children: Preschool Storytime and Crafts (ages 3-5); Adventures in the Estuary summer camp (grades 1-3); Saltwater Science Camp (grades 5-6); and a Junior Naturalist Camp (grades 4-8). These programs were held in the Reserve's new facility in Beaufort with daily field trips to the Rachel Carson Reserve where the students conducted field investigations and learned from hands-on activities.

The Reserve has held several workshops, seminars and science symposia on coastal management issues and topics for the general public including Beach Nourishment, Coastal Birds, and Coastal Mammals. In addition, public presentations on a variety of topics are given year-round to an assortment of organizations including: Boys and Girls Clubs; Boy Scout Troops; church groups; garden clubs; science clubs; preschools; colleges and universities; and other interested parties.

To inform local citizens and visitors about the Reserve and estuarine habitats, informational brochures, posters, pamphlets, interpretive signs, DVDs and display boards have been developed. Web resources are also available and include basic estuarine information, curricula, and field guides.

#### **d. Coastal Training Program**

The North Carolina CTP's mission is to promote informed coastal decisions through science-based training for professionals. This is accomplished through assessments of audience needs as well as incorporating emerging science, technology, and policy into trainings. The CTP is successful in providing scientific data, practical training, and outreach materials on a variety of topics including grant writing, septic systems, stormwater management, alternative land use practices, and marina management. Positive impacts of CTP events include educating realtors on septic systems and stormwater management; helping coastal communities obtain grant funding to install stormwater control devices and purchase conservation easements; and helping state agencies disseminate information to those they regulate. Information is mainly delivered through workshops.

The CTP uses assessments and training evaluations to improve its ability to meet audience needs. The CTP undertakes periodic formal needs assessments to help the program provide current and targeted information to coastal decision-makers. Training evaluations shape future programs and provide the data for the NERRS CTP performance measures. Performance measures create a standardized reporting method for CTPs across the country and justify CTP funding to the federal government.

To strengthen the trainings offered throughout North Carolina's 20 coastal counties, the CTP works closely with Reserve staff and established partners (Appendix L). Reserve and Division of Coastal Management (DCM) staff and CTP partners provide technical expertise, including serving as workshop presenters, to help the CTP stay abreast of emerging science, technology, and policy. The CTP is responsible for drawing the attention of coastal decision-makers to these emerging issues and their implications for coastal management.

Workshop design is based on knowledge of education techniques that effectively engage adult audiences. Training events give participants the opportunity to network with others who are dealing with the same issues. These opportunities may breed new partnerships to solve coastal problems and identify barriers in implementing effective coastal management techniques and policies.

#### **B. NCNERR Education Objectives**

The NCNERR education activities address the following Reserve objectives (Figure 1; Table 1):

- **Objective 1.1:** Education programs will deliver information on N.C. coastal resources to formal and informal educators, and K-12 and college students to foster environmental stewardship and informed decision-making.
- **Objective 1.2:** The greater community, including the general public, visitors, and pre-school children, will receive educational programming.

- **Objective 1.3:** Coastal Training Program activities will deliver science-based knowledge and skills appropriate to the needs of target audiences and relevant to sustainable coastal management.
- **Objective 2.1:** NCNERR research products will be used by the coastal management community.
- **Objective 4.3:** Coastal systems and their value will be interpreted and access to the Reserve sites will be directed to representative habitats to reduce impacts on sensitive habitats.
- **Objective 5.4:** The NCNERR will assess use of the sites by various education, research and commercial entities.
- **Objective 5.7:** The community will recognize the NCNERR and understand how the Reserve serves the citizens and visitors of North Carolina.
- **Objective 5.8:** NCNERR needs will be more fully met by volunteers and volunteers will be trained in coastal issues.

### **C. Activities in Support of NCNERR Education Objectives**

Education objectives are presented in bold, italic text with the objective number that refers to Figure 1 in parentheses. Objective activities are presented beneath each objective.

***1. Education programs will deliver information on N.C. coastal resources to formal and informal educators, and K-12 and college students to foster environmental stewardship and decision-making (1.1)***

#### ***Conduct Educator Workshops***

As a way to foster estuarine literacy and stewardship, the Reserve's teacher professional development program will seek to increase the number of formal and informal educators as well as pre-service teachers that participate in Reserve workshops. As more teachers become estuarine literate they can impart their knowledge to their students and thus increase estuarine literacy in the State. Through expanded partnerships the Reserve will be able to conduct professional development educator workshops in other coastal regions (north and south) thus increasing the Reserve's programmatic impact. Education staff will develop workshop content, deliver programming, and increase educational resources through grant writing or partnership opportunities. Several teacher workshops will be offered targeting elementary, middle and high school teachers from the 20 coastal counties

The new national Estuaries 101 curriculum will be integrated into existing workshops and a new series of Teachers on the Estuary workshops will be developed that meet national NERRS education standards as well as the State of North Carolina's environmental education standards. Emerging coastal issues such as the environmental impact of population growth, the effect of

invasive species on natural areas, and the effect of sea level rise will be incorporated into teacher training workshops. All workshops will be evaluated to determine their effectiveness in communicating estuarine concepts and will be modified or refined to improve relevancy and better serve future participants.

### ***Update Workshops and Curricula based on current techniques and needs***

The NCNERR is currently updating its curricular activities which were originally developed in the early 1990s. Old activities have been updated in content and format and new activities are being written to address current coastal issues such as development pressures, coastal water quality, barrier island dynamics, and habitat conservation. Additionally, up-to-date educational methods that better address different learning styles, such as inquiry-based activities have been incorporated into the new curriculum. New technologies, including Global Positioning Systems/Geographic Information Systems and the NCNERR's System-wide Monitoring Program data are also being incorporated into new curricula. The Reserve's teacher workshops are also being redesigned to meet the new North Carolina Environmental Education Standards.

An education program market analysis and needs assessment will be conducted to identify gaps in curricula, topic areas, and programs to better serve the needs of the teachers in the State of North Carolina.

### ***Provide Field Trip Experiences***

The Reserve's K-12 student education program will continue to provide field trip and/or field study experiences for students. Reserve student field trips are ecology-based nature hikes that present basic estuarine information. Most field trips are conducted on the Rachel Carson site due to its close proximity to the education staff. Teachers are provided with pre- and post-field trip resources to supplement the outdoor experience. As staff and resources allow, the education program will work to increase field trip opportunities for student groups at the other Reserve components (Zeke's Island, Masonboro Island, and Currituck Banks). Emerging coastal issues including stormwater runoff, eutrophication, invasive species and sea level rise will be discussed with students when appropriate.

### ***Incorporate Research and Monitoring Data into Programs***

As the NERRS System-wide Monitoring Program develops more accessible online water quality data and the Integrated Ocean Observing System broadens their partnerships, the education program will incorporate these user-friendly data interfaces into student and teacher activities. In addition, the Estuaries 101 curriculum which utilizes SWMP data will be incorporated into teacher and student education programs.

The Education Coordinator is currently analyzing the Reserve's 13 years of SWMP and nutrient data to identify water quality trends and to observe how past events have affected local estuaries. Based on the data analysis new educational products will be developed for teachers, students, researchers, coastal decision-makers and the general public.

As current research results become available the education staff will work to translate, distill and incorporate the new research information about estuaries and watersheds into educational programs and products assisting in the implementation of goal 2.1.4. The education staff will focus on the overarching issues facing the North Carolina coast as outlined in section I, C, 4.

### ***Conduct Local Outreach Efforts in Schools***

The K-12 student education program will expand local outreach efforts in schools. These outreach efforts include conducting hands-on, inquiry-based activities in the classroom, giving classroom presentations on the Reserve and its habitats, and distributing estuarine curricula to teachers. This increased outreach effort will be marketed to teachers through workshops, seminars, personal communications, and the web. The education program will also focus on strengthening their relationship with the local school system by providing district-wide teacher professional development workshops, allowing the Reserve's classroom space to be used for in-service teacher training, and offering in-classroom experiences for local schools. In addition, the Reserve will work with individual teachers and students on research and senior projects and will partner with the local high school environmental club to help them fulfill their mission (*e.g.*, Earth Day fair, Clean Sweep, and trash clean-ups).

### ***Design Field-based Site Management Projects***

The education staff will seek to integrate field-based site management projects into student programs, in coordination with Reserve stewardship staff. Field-based projects provide students with hands-on experience in the field and a heightened sense of appreciation of estuarine resources, while enhancing site management of the NCNERR sites. Past projects included trash clean ups, invasive species management (*e.g.*, Tamarisk tree mapping and removal), bird and horse surveys, and osprey nest platform construction. These efforts are currently focused on the Rachel Carson site due to its proximity to the Reserve education staff, yet the Reserve hopes to expand these activities to the other Reserve components based on need and available staffing and funding.

### ***Fine-tune Programs based on Evaluations***

All education programs will periodically be examined to determine how effective they are at increasing participant knowledge of basic estuarine ecology and the major pressures on coastal habitats. Post field trip and workshop assessments will be given to teachers and students to help education staff create more effective learning experiences for students and to respond to teacher needs. The number of programs offered and the timing of these events will also routinely be evaluated to deliver the most effective programs possible. Performance measures, which the NERRS has begun to collect, will be applied to some programs, including field trips, to measure program impact. The State of North Carolina has also begun to collect annual performance measures which apply to all of the Reserve's education programs. Assessment tools are developed and analyzed in-house by the Education Coordinator.

### ***Conduct Market Analysis and Needs Assessment***

A market analysis (MA) and needs assessment (NA) of the education program will be conducted with the guidance of the Education Advisory Committee and will incorporate recommendations from the NERRS KEEP MA/NA workgroup. The market analysis will allow the Reserve to determine what other educational programs and teacher professional development opportunities exist in the state and how this program can complement existing programs or fill identified needs. The results from the needs assessment will allow the Reserve to develop relevant and effective education and training programs and marketable and useful educational products.

### ***Determine Efficacy and Future of Local EstuaryLive Events***

EstuaryLive has been a part of the NCNERR's K-12 student education program since the fall of 1998. Increasing production costs combined with reductions in budgets and staffing has led the Reserve to reevaluate the efficacy of the local EstuaryLive program. The local EstuaryLive program will be evaluated in the needs assessment and by the Education Advisory Committee.

***2. The greater community, including the general public, visitors, and pre-school children will receive educational programming (1.2)***

### ***Conduct Public Educational Field Trips***

Summer public field trips are a core component of the community education and outreach program. These field trips are currently conducted bi-weekly on the Rachel Carson component during the summer months. Increasing the number and types of field trips will further promote stewardship of North Carolina's estuaries, particularly as awareness of and demand for these types of trips increases. An additional public field trip was added in 2008 following the completion of the Rachel Carson boardwalk on Carrot Island. All summer field trips are offered in the mornings due to extremely high air temperatures in the afternoon hours. Two types of field trips are offered: 1) 2-hour nature hike across the western part of the Rachel Carson Reserve or 2) a 2-hour boat trip to the Rachel Carson boardwalk at the eastern end of the Reserve. The type of summer bi-weekly field trip offered depends on the tide. Nature hikes are dependent upon low tide whereas a boardwalk trip is tide independent.

Expansion of summer public field trips to Zeke's Island and Masonboro Island components in the Wilmington area and Currituck Banks on the Outer Banks are priorities for this program. To accomplish this expansion, the education staff will work closely with the Stewardship Coordinator and Northern Sites Manager to schedule and advertise trips, arrange transportation, and recruit volunteers or partners to lead these trips. Scheduling additional educational field trips for summer camps, day care centers, and visiting adult groups will also be a priority. These trips may be led by Reserve staff, trained volunteers, or partner organizations (*e.g.*, Ft. Fisher Aquarium, Carolina Ocean Studies, and Outer Banks Center for Wildlife Education) depending on the audience and focus of the trip.

### ***Hold Summer Programs for Children***

Summer estuarine ecology programs will be offered to pre-kindergarten through middle school-aged children at the new Reserve headquarters facility in Beaufort. Participants will have hands-on opportunities in the classroom and field. A small fee will be charged to cover program materials. These programs will be marketed through brochures distributed in the local area, advertisements in area visitor magazines, and the Reserve Web site.

In 2008 four different summer programs for children were offered: Preschool Storytime and Crafts (ages 3-5); Adventures in the Estuary summer camp (grades 1-3); Saltwater Science Camp (grades 5-6); and a Junior Naturalist Camp (grades 4-8). As interest in these programs increases the number and size of the program offerings will be expanded.

### ***Plan and Coordinate New Education Events in Response to Needs***

The community education and outreach program will coordinate educational events to respond to emerging coastal issues and needs. Requests by groups will be fulfilled as time and staffing resources allow. These requests may include field trips in addition to the summer public trips, estuarine ecology programs, and presentations for visiting groups.

All-day science symposia for the general public will periodically be held on local coastal management issues such as stormwater runoff, eutrophication, invasive species and sea level rise. These symposia will be planned in collaboration with university scientists, relevant state agencies and partnering organizations.

### ***Deliver Information on NCNERR Programs and Coastal Ecosystems***

To inform local citizens and visitors about the Reserve and coastal habitats, informational brochures, posters, newsletters and displays will be produced and updated regularly. Reserve site brochures are in the process of being updated and will include a new design and format with specific information on site location, habitats, natural history, allowable visitor uses, and a trail map. All brochures will be updated as new information regarding estuarine ecosystems is discovered, as Reserve boundaries expand, or when contact information changes. New flyers will be developed as the NCNERR programs and activities evolve and expand. For example, flyers will be produced for summer public field trips and student summer camps. Bird lists, field guides, and trail brochures will also be updated as needed. Additional posters on estuarine habitats, plants, and animals will be developed as resources allow.

The North Carolina Reserve's Geographic Information System (GIS) program will be utilized by the community education and outreach program, as one of the goals of the GIS program is to improve community awareness of NCNERR through effective geographic products. Reserve GIS and education staff will work together to conceptualize geographic products to be incorporated in the Reserve informational brochures, posters, interpretive signs, curricular activities and displays. The GIS Specialist will prepare appropriate products based on the identified needs.

In addition to the outreach activities in the central part of the state, the NCNERR will continue to expand outreach activities to northern and southern Reserve sites with the help of the Northern Site Manager and Stewardship Coordinator as time and resources allow. These efforts will include coordinating displays at fairs and festivals, volunteer programs, public field trips, after school and summer activities for children and families, and presentations for civic organizations and visitor groups.

***3. CTP activities will deliver science-based knowledge and skills appropriate to the needs of target audiences and relevant to sustainable coastal management (1.3)***

***Conduct Assessments of Information and Training Needs of Coastal Decision-Makers***

CTP workshops are based on the following: training needs identified through informal needs assessments, training needs prioritized in the formal CTP needs assessment, and emerging issues identified through research at the Reserve and elsewhere. The CTP uses assessments and training evaluations to improve its ability to meet audience needs. The CTP undertakes periodic formal needs assessments to help the program provide current and targeted information to coastal decision-makers. Future needs assessments will focus on updating past needs assessments of land use planners and planning board members as well as targeting new audiences such as elected local government officials, DCM staff, N.C. Coastal Resources Commission and Coastal Resources Advisory Council members, and Local Permit Officers.

***Coordinate Fundamental Trainings for Decision-Makers***

The North Carolina CTP regularly offers trainings on grant writing, land use planning, septic systems, and stormwater management. These fundamental trainings are targeted at realtors, land use planning board members, and other decision-makers in need of basic information. Realtor trainings on septic systems and stormwater management are offered in partnership with the North Carolina Cooperative Extension and realtors receive four continuing education credits. Other training topics that are appropriate to offer regularly include barrier island and estuarine shoreline development. The CTP will work with partners, such as North Carolina Sea Grant and NOAA's Center for Coastal Fisheries and Habitat Research, to coordinate trainings on these topics.

***Coordinate New Training Events in Response to Needs***

Based on needs assessments and post-workshop evaluations, the CTP will coordinate several new trainings each year for coastal decision-makers. A needs assessment of municipality planning board members in Carteret County was completed in the spring of 2006. A workshop on stormwater and sustainable development was delivered in November 2006 and a workshop on barrier island development was delivered in June 2007 based on the survey results. Future trainings for this audience are being developed based on these data and the following topics were identified for future workshops: coastal area planning, coastal erosion, and beach restoration.

Additional workshops may arise from researchers that need to disseminate their results and from state agencies that need to educate staff and people whom they regulate. Post-workshop

evaluations always ask participants if there are other topics where training is needed and occasionally these answers provide new workshop ideas.

### ***Use Coastal and Estuarine Science in Training and Support Materials***

Every CTP activity aims to accurately communicate coastal and estuarine scientific information, coastal management research results, new ideas, practical tools, and solutions to coastal management problems. New trainings will be coordinated based on emerging coastal management issues, such as estuarine shoreline stabilization, stormwater runoff, water quality and sea level rise. Expert speakers, including researchers, resource managers, and policy makers, will be called upon to present the most up-to-date information at training events. Support materials will also be developed to inform coastal decision-makers of new coastal and estuarine research results.

### ***Conduct Post-Workshop Evaluations and Fine-Tune Training Efforts***

Post-workshop evaluations will be administered at every training event to determine the effectiveness of the workshop, if the participants intend to apply the knowledge they learned, and if the participants intend to apply diverse perspectives gained from the training in their work. These evaluations fine-tune training efforts by ensuring the CTP is meeting participant needs in an effective way. Workshop evaluations will also be used to report on performance measures established by the NERRS.

Training efforts will also be fine-tuned through workshop participant discussions. Often the questions asked by participants or their reactions to information provide valuable insight on training content and delivery. For example, at a past stormwater workshop for realtors (some of whom were developers), many participants voiced frustration over state regulations as obstacles in implementing low impact development. This discussion helped to refine this workshop as well as design a future stormwater management workshop for planning board members. The future stormwater management workshop will include a panel discussion of various state regulatory agencies to answer questions regarding low impact development implementation.

## ***4. NCNERR research products will be used by the coastal management community (2.1)***

### ***Interpretation and Distribution of Research Results***

The CTP will work with the North Carolina Reserve's research sector to interpret and distribute NCNERR research products to the coastal management community. This will be accomplished by coordinating training events and technical publications. In addition, education staff will assist in the translation, distillation and incorporation of complex science and research information into educational programs and products. The Education staff will focus on the overarching issues facing the North Carolina coast as outlined in the Introduction (section I, C, 4). The Education and Coastal Training Programs will also work with the Reserve's research sector and other area researchers to develop outreach activities for grant proposals.

***5. Coastal systems and their value will be interpreted and access to the Reserves will be directed to representative habitats to reduce impacts on sensitive habitats (4.3)***

***Install structures and signage to provide public access and use***

An increase in coastal population leads to an increase in the number of people using the Reserve properties. While most visitor use of the Reserves is benign, occasional misuse of the properties does occur. Stewardship staff will determine site-specific signage needs to educate the public about acceptable visitor uses. Once the signage needs are identified the Stewardship staff will work with the Education staff to design appropriate signs based on site-specific needs.

***Develop Interpretive Signs for Public Access Areas***

Reserve site signage is an important aspect of delivering information about and creating awareness of the North Carolina Reserve. Reserve GIS, education, and stewardship staff will work together to identify proper location, information, and maps to be included on signage. Education staff will then design the signs with assistance from other sectors.

***6. The NCNERR will assess use of the sites by various education, research and commercial entities (5.4)***

***Develop and Implement a Reservation and Reporting System***

The Education sector will work with the Stewardship Coordinator to develop and implement a reservation and reporting system to better assess site usage. Usage statistics will then be used to inform site management decisions.

***Develop and Provide Users with Training and Materials***

The Education sector will work with the Stewardship Coordinator to design and implement training materials to support educational and commercial uses of Reserve components. Individuals and organizations using Reserve components for these types of activities will receive training regarding: NCNERR and its mission, the ecosystems, communities and organisms of the specific site, appropriate use of the site, and the reservation and reporting system.

***7. The community will recognize the NCNERR and understand how the Reserve serves the citizens and visitors of North Carolina (5.7)***

***Develop and implement an external marketing and communication plan***

In order for the NCNERR to successfully fulfill its mission, the community that the Reserve operates within and serves must recognize the NCNERR name, know where the components are, and understand how the NCNERR serves the citizens and visitors of North Carolina. To accomplish this, the NCNERR will develop and implement an external marketing and communications plan to address these goals and audiences. The education staff will play an

integral role in the development and implementation of this plan. The plan will include activities geared towards these audiences such as publishing the newsletter and accomplishments report, marketing the new logo and Web site, organizing facility dedication and anniversary celebrations; relevant activities will include measures to evaluate performance. Sector-specific communication needs will also be identified to support program marketing and address sector challenges.

***8. NCNERR needs will be more fully met by volunteers and volunteers will be trained in local issues (5.8)***

***Develop and Evaluate Volunteer Training Program***

The Education sector will work with the Stewardship sector to design and implement a community volunteer program. These individuals will work with the Reserve, other partners, and within their communities to champion the protection of coastal resources. Volunteers are an excellent source of help and necessary given that site management, stewardship, education and research tasks require more resources than are available internally. Recruitment of volunteers is most easily done by drawing interested parties to the Reserve through a field trip or publicly announced volunteer workday.

The first task is to identify volunteer needs of the Reserve and volunteer interests (phase 1) and develop a Reserve-wide training program (phase 2), recognizing that one reason people volunteer is to gain more knowledge about the natural environment. This Reserve-wide training program will be similar to the training currently offered to Rachel Carson component volunteers, which prepares volunteers for leading summer field trips and includes plant and animal species identification. Training will be specific to the volunteer opportunity and will be conducted in concert with the other Reserve component volunteer efforts. The training effort will reward volunteers and in turn benefit the NCNERR with a more knowledgeable group of volunteers serving as community stewards. Additionally, a coordinated program will provide continuity across the Reserve sites. As part of this task, evaluations of training and volunteer programs will be conducted (phase 3). Doing so will foster a sense of volunteer inclusion and will provide valuable feedback. Evaluations will be done at the program level to include all sites.

***Implement Volunteer Program at all NCNERR Sites***

Given the time, energy and organization required for the volunteer project above, implementation of the volunteer program will proceed in phases as articulated above. The program will also require proper planning regarding volunteer recruiting, training, and recognition. Continued support is essential. Due to the lack of full-time volunteer support systems at the Reserve, it is important that a program-wide plan be put in place to help support volunteer programs at each site. A volunteer email list will be kept for each site. Volunteer forms that include contact information, skills, interests and availability will be used consistently across sites.

NCNERR staff will plan to ensure how continued support of volunteers will take place. Staff will also develop on-site volunteer opportunities. There will be both publicly announced volunteer

workdays and tasks where volunteers will be personally asked to participate based on skill level. Some examples of volunteer activities include leading field trips, conducting field studies, clearing trails, cleaning parking areas, etc. The Reserve will work with the Carolina Estuarine Reserve Foundation (CERF) to develop volunteer recruitment, retention, and recognition programs per CERF's strategic plan. All of these opportunities will allow volunteers to continue their efforts with NCNERR, meeting the fifth management goal of enhancing Reserve capacity through collaboration.

### ***Increase On-Site Volunteer Opportunities***

As programs and facilities expand, volunteers will have more opportunities to help with program needs, visitor needs, and administrative tasks. Expanding opportunities for the geographic range of Reserve volunteers will be an ongoing activity of this program. In addition to individual volunteers, the community education and outreach program will maintain current partnerships and seek to create new partnerships with environmental and service organizations to carry out Reserve-based projects.

## **D. Coordination and Partnerships**

### ***1. Coordination***

#### ***a. NCNERR Components***

To enhance the North Carolina Reserve's abilities through collaboration, the education staff seeks to foster communication and program consistency between Reserve sectors and sites to ensure cohesive and integrated Reserve education programs. The Reserve Manager will encourage this enhanced integration among NCNERR sectors through regular staff meetings and encouraging participation of other sector staff in education programs. Education staff will be notified of educational events undertaken by other sectors to offer help and guidance and to count the event's contact hours. Education staff will aid with the creation of display boards and the distribution of education and outreach materials. These activities will encourage the sectors to work together more efficiently as well as create a more integrated education program throughout North Carolina's 20 coastal counties.

#### ***b. National and Regional NERRs***

The North Carolina Reserve's education programs are consistently reported to NOAA's Estuarine Reserves Division (ERD) through biannual progress reports and through performance monitoring data. Additionally, upcoming education programs are outlined in the annual NCNERR 315 grant application. The NERRS annual meeting and winter education sector meetings are attended by the appropriate education staff as funds allow. The Reserve's education staff regularly communicates with ERD's Education Coordinator and the Program Specialist who oversees the CTP to ensure the NCNERR education programs are consistent with national initiatives. Education staff also advertise program events on the NERRS education calendar. The North Carolina Reserve Education Coordinator serves on numerous

NERRS workgroup including the MA/NA workgroup, the EstuaryLive workgroup, and the Evaluation workgroup. The Education Coordinator is also the Education Sector representative on the NERRS Strategic Committee. The CTP Coordinator has served on the CTP Oversight Committee.

In 2004, the Southeast region education staff began meeting to coordinate education efforts among these Reserves. The Southeast region NERRs are North Carolina, North Inlet-Winyah Bay (SC), ACE Basin (SC), Sapelo Island (GA), and GTM (FL). In 2005, the regional CTP Coordinators collaborated on a series of three green building trainings for coastal decision-makers, held in North Carolina, South Carolina, and Georgia. In 2007, the regional meeting, held in Georgetown, South Carolina, expanded to include all sectors and in 2008 another all sector regional meeting was held in St. Augustine, Florida. In 2008 the regional CTP Coordinators held the Southeast Regional Diamondback Terrapin Workshop, which provided a forum for diamondback terrapin resource managers to discuss their successes and needs in managing this species. Also in 2008 the Education Coordinators from North Carolina and South Carolina met in Beaufort, N.C. to review, edit and exchange regionally-based K-12 curricular activities. The Southeast region will also be hosting an invasive species symposium for resource managers in 2009. This event, similar to the diamondback terrapin workshop, will bring together those managing aquatic and terrestrial flora and fauna in the Southeast region.

### **c. North Carolina Division of Coastal Management**

Coordination with the North Carolina DCM includes incorporation of emerging coastal management issues in education programs, DCM staff help with education programs and site management, and support from the DCM Public Information Officer. DCM staff are routinely expert speakers at CTP events. DCM staff provide manpower for site management activities at all Reserve components, including Reserve trash clean-ups. DCM staff also develop concepts for CTP workshops, such as the Promoting Sustainable Communities Using Smart Growth Principles workshop series that addressed the DCM priority issue of cumulative and secondary impacts. The DCM Public Information Officer assists the education staff by advertising education programs and reviewing outreach publications on the NCNERR and North Carolina Coastal Reserve.

Many opportunities exist to educate the public about why and how coastal resources are regulated, and how the DCM accomplishes this through its programs. Addressing Division regulatory needs is a new focus for the Reserve education staff and reflects the importance and benefit of complementary regulatory and education programs. Several examples of how the Education staff are supporting the Division include:

- Developing a Division-wide education plan;
- Developing an estuarine shoreline stabilization education plan;
- Hosting workshops for marine contractors on permitting rules;
- Providing technical training to Local Permit Officers on wetland plants at Division Local Permit Officer workshops; and
- Serving as a consultant to the Division on education-related initiatives.

## ***2. Partnerships***

The audience, topical, and geographic diversity of the Reserve's education programs offers many opportunities for partnerships throughout coastal North Carolina. While many of the Reserve's partners help facilitate education programs, others routinely provide facilities for professional development educator workshops and CTP events. The use of these facilities is necessary due to the lack of NCNERR meeting space at the northern and southern locations.

Descriptions of representative education program partnerships follow, with a more detailed list in Appendix L.

### ***a. K-12 Student Education Program***

The K-12 student education program partners with a variety of organizations in a variety of ways. Some organizations, such as University of North Carolina-Chapel Hill (UNC-CH), Duke University, NOAA, N.C. Division of Marine Fisheries, and N.C. Division of Water Quality, provide scientific information and expertise that forms the basis of new curricular activities or student programs. Other organizations share resources and assist with the production of educational materials. Recently NCNERR partnered with the Albemarle-Pamlico National Estuary Program to produce a twelve-page Newspapers in Education insert on estuaries. One-hundred and eighty thousand copies of this document were distributed state-wide to K-12 students. North Carolina Sea Grant, North Carolina Wildlife Resources Commission, North Carolina Museum of Natural Science and the North Carolina Aquariums also enhance the Reserve's K-12 student education program through resource sharing.

Education staff hope to increase local K-12 partnership opportunities with the Carteret County Schools, the North Carolina Maritime Museum, Carolina Ocean Studies and Fort Macon State Park. Expansion of the K-12 student education program to other areas of the coast will require additional partnerships as the Reserve has no education staff in these locations. Current partnerships will also be examined to determine their effectiveness in providing programming, pooling resources, and reaching target audiences. Additional partnerships identified by the education sector needs assessment will be pursued.

### ***b. Teacher Professional Development Program***

It is imperative that the education program continue to seek partnership opportunities and creative collaborative solutions to extend the Reserve's programmatic impact despite fiscal challenges. Many of the Reserve's teacher professional development workshops are already conducted in partnership with other organizations including: the N.C. Wildlife Resources Commission; The Bald Head Island Conservancy; the Southeast Center for Ocean Sciences & Education Excellence; the Mid-Atlantic Marine Educators Association; Carteret County Schools; and the North Carolina Office of Environmental Education.

Potential partner organizations, such as the North Carolina Center for the Advancement of Teachers located in Ocracoke and Jockey's Ridge State Park in Nags Head, may also be able

to facilitate program collaboration and allow the Reserve's teacher education programs to reach more educators in the Outer Banks.

**c. Community Education and Outreach Program**

Partnerships with the North Carolina Seafood Festival and the Core Sound Waterfowl Museum have provided opportunities over the past several years to showcase the NCNERR at their annual festivals. In festival education tents, the Reserve has provided attendees with general Reserve information, educational activities, and opportunities to volunteer. Another important partnership for the community outreach and education program is with the National Charity League's mothers and daughters group in Carteret County. Mothers and daughters work as a team to conduct clean-ups on the Rachel Carson component, help staff booths at festivals, and assist with local parades.

Faculty at UNC-CH's Institute of Marine Sciences, Duke University and the Center for Coastal Fisheries and Habitat Research (CCFHR) have participated as scientific experts at numerous seminars and science symposiums held for the general public. Individuals from the Carteret County Shore Protection Office, Carteret Community College, DCM, Division of Marine Fisheries and the U.S. Army Corps of Engineers have also participated in public forums on coastal management issues.

Future partnerships may include those with local libraries as well as local 4-H, Girl Scout, and Boy Scout groups. Library children story times provide an opportunity for Reserve staff to deliver information on estuarine topics, while assisting libraries in providing programming. Libraries may also host displays on the Reserve for their customers, which may include brochures, volunteer opportunities, and upcoming events. Local 4-H, Girl Scout and Boy Scout groups and other civic organizations may assist the NCNERR with site-based service projects and other community activities, such as Reserve trash clean-ups and short-term research projects.

**d. Coastal Training Program**

Coastal Training Program partners consist mainly of organizations that help develop training programs and organizations whose staff serve as expert speakers at training events. The North Carolina Coastal Nonpoint Source Program has worked with the CTP over the years developing publications and workshops on microbial pollution. The North Carolina Cooperative Extension in Craven County has helped facilitate workshops on septic systems and stormwater management for realtors. Speakers from the following agencies have participated in a variety of workshops: Duke University Marine Laboratory, North Carolina Division of Water Quality, University of North Carolina-Wilmington (UNCW), and the City of Wilmington. The CTP is routinely a host for NOAA's Coastal Services Center trainings, including the Coastal Community Planning and Development training and GIS trainings.

Future program development may include sustainable development, barrier island and estuarine shoreline workshops with North Carolina Sea Grant and shoreline stabilization

workshops with CCFHR. The CTP will continue to strengthen its partnerships with various universities, state agencies, local governments, and business organizations to ensure that CTP events consistently deliver science-based information through regional experts.