

**ALBEMARLE-PAMLICO
NATIONAL ESTUARY PARTNERSHIP**

**Annual Work Plan
for
October 1, 2017 - September 30, 2018
under the
Cooperative Agreement for October 1, 2014 to September 30, 2020
Between
The United States Environmental Protection Agency
And the
North Carolina Department of Environmental Quality
in Cooperation with the
Commonwealth of Virginia**



*Approved By
APNEP Policy Board on
February 24, 2017
ECU Greenville Center,
Greenville, NC*

*U.S. EPA Cooperative Agreement CE 00D20614
Region IV
February 24, 2017*

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CONTENTS & CONTACTS

Required Cooperative Agreement Related Contents in this Document:

- A report of accomplishments since April 29, 2016 is provided on pages 8 through 28.
- Proposed Work Plan items for 10/1/17 to 9/30/18 are presented on pages 30 through 34.
- The Proposed Work Plan budget for 10/1/17 to 9/30/18 is presented on page 42.
- Administrative and financial information items are presented on pages 35 through 47.

Purpose: The purpose of this cooperative agreement is to provide support to the North Carolina Department of Environmental Quality (NCDEQ) from the US Environmental Protection Agency (EPA) for continuing implementation of the unique management strategies and actions recommended in the Albemarle-Pamlico National Estuary Partnership's (APNEP) 2012-2022 Comprehensive Conservation and Management Plan (CCMP) and support for the APNEP mission to identify, restore and protect the significant resources of the region.

Funding: This work plan and the associated grant application represent a funding request of \$600,000 for year 4 (10/1/17 to 9/30/18) under cooperative agreement *CE-0D20614* for the time period of October 1, 2014 to September 30, 2020. This request will constitute the third modification to this cooperative agreement.

Cooperative Agreement CE-95451210 expired on September 30, 2016 and was deemed complete and closed by EPA Region IV on December 22, 2016 .

Period of Performance:

The period of performance under the current Cooperative Agreement CE- *CE-0D20614* is from October 1, 2014 through September 30, 2020.

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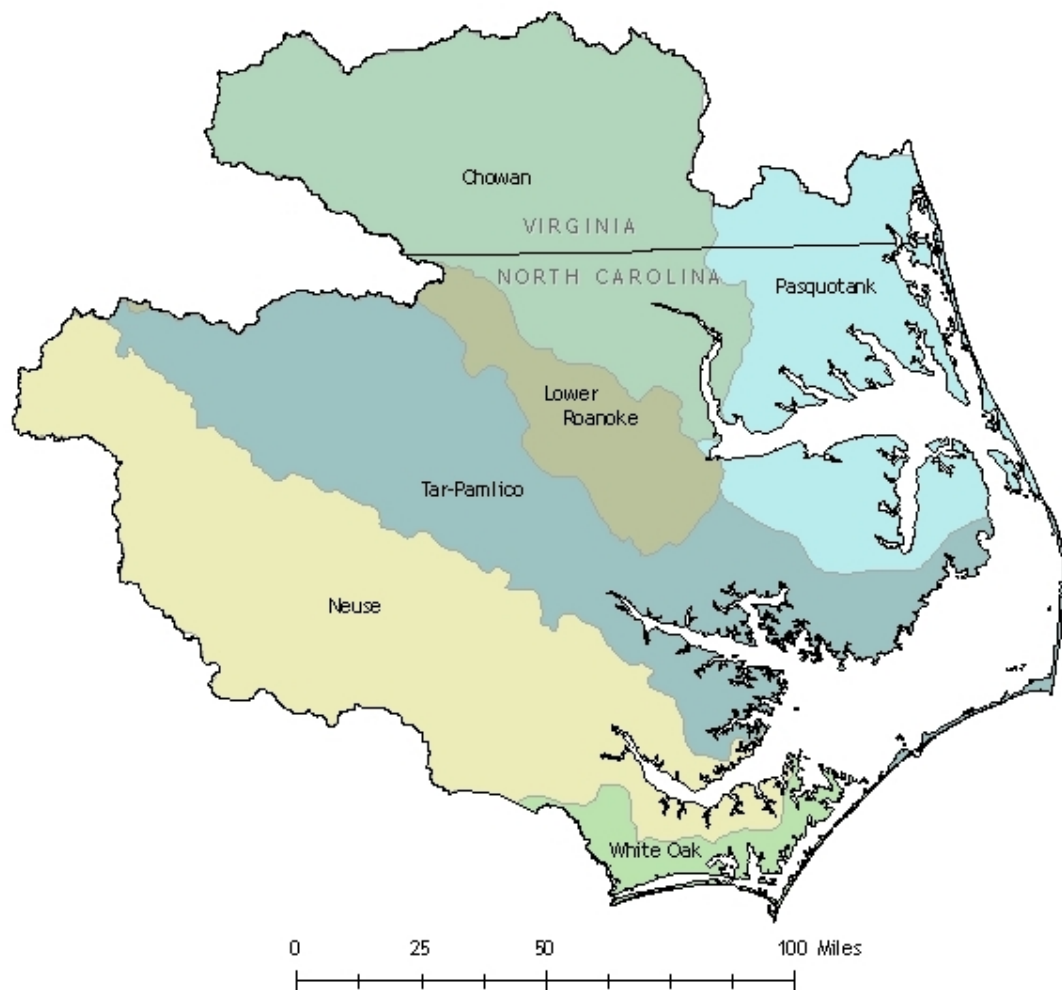
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INTRODUCTION

The Albemarle and Pamlico Sounds comprise the nation's largest lagoonal estuarine system. The system is composed of eight sounds and five major river basins draining over 30,000 square miles of watershed in North Carolina and Virginia. The sounds, rivers, creeks, wetlands and terrestrial areas provide habitat for an abundance of animal and plant species. People depend on the system for residential and resort development, food, recreation, mining, forestry, agriculture, business, and industry.

The Albemarle-Pamlico National Estuary Partnership (APNEP) is a component of the U.S. Environmental Protection Agency's (EPA) National Estuary Program (NEP). It was one of the first programs established under amendments to the Clean Water Act in 1987. The initial Comprehensive Conservation and Management Plan (CCMP) was ratified by the Governor of North Carolina and approved by the EPA in November 1994. The APNEP Policy Board approved a revised CCMP and submitted to the EPA in March 2012. The 2012-2022 CCMP advances an ecosystem-based management (EBM) paradigm and is intended as a practical, cost-effective and equitable approach to managing the valuable resources within the Albemarle-Pamlico region.



The APNEP Ecosystem-Based Management Approach

Ecosystem-based management (EBM) is based on the tenet that managing natural resources from a systems perspective increases the likelihood of success by forging more effective connections among humans, nature, science, and management actions. Before 2012, APNEP worked with limited resources to integrate and implement EBM concepts and tools within the program and with its local, state, and federal partners, albeit in a piecemeal fashion. Given the relative complexity and increased resources required up front to implement EBM in full, APNEP staff began actively working toward a paradigm change in 2008 with the APNEP Policy Board, advisory committees, and partners.

This activity culminated in March 2012 with the adoption of a new CCMP based on EBM principles to replace the original 1994 CCMP. As implementation of this Work Plan begins, APNEP anticipates completing the development of its ecosystem indicators and monitoring strategy to support the new EBM-based CCMP. With a new CCMP established for a ten-year planning horizon, this work plan includes a proposal to support activities of the CCMP Implementation Workgroups for actions that support the desired ecosystem and management outcomes.

Ecosystem-Based Management (EBM) is a management approach¹ that:

- Is concerned with the ecological integrity that sustains both human and natural resources systems.
- Integrates ecological, social, and economic goals and recognizes humans as key components of the ecosystem.
- Considers ecological, not just political, boundaries.
- Addresses systems and the complexity of natural processes and uses adaptive management to reduce risks related to decisions and actions.
- Engages multiple stakeholders in a collaborative process to define problems and find solutions providing mutual benefit.

¹ http://www.ebmtools.org/about_ebm.html



AUTHORITY

Federal Water Pollution Control Act

Congress established the National Estuary Program (NEP) in 1987 to improve the quality of *Estuaries of National Significance*. The Federal Water Pollution Control Act (33 U.S.C. 1251 *et seq.*), Section 320 directs EPA to develop plans for attaining or maintaining water quality in an estuary. This includes: protection of public water supplies; the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife; allowance of recreational activities in and on water; and control of point and nonpoint sources of pollution to supplement existing controls of pollution. Each program establishes a Comprehensive Conservation and Management Plan (CCMP) to meet the goals of Section 320.

Comprehensive Conservation and Management Plan

In 1987, Congress designated the Albemarle-Pamlico Estuarine System as *Estuary of National Significance* and thus began a comprehensive study effort, entitled the Albemarle-Pamlico Estuarine Study (APES). The result of this process was the APNEP CCMP. The initial CCMP was developed over a seven-year period by representatives from private and public sectors, including government, industry, business, environmental interest groups, and municipal officials. The plan is a guide for environmental stewardship of the Albemarle-Pamlico estuarine system. The CCMP reflects the input of people from the region that will be affected by the plan's recommendations. The CCMP seeks to balance the need for economic growth in region with the need to secure the environmental future of the region. Approved on March 14, 2012, the new CCMP replaces the original 1994 document.

North Carolina Governor's Executive Order #133 (Expired)

On November 5, 2012, North Carolina Governor Beverly Eaves Perdue issued Executive Order # 133: *Albemarle-Pamlico National Estuary Partnership*. This Executive Order was developed after more than two years of program review and ecosystem assessment and the development of a new CCMP. This Executive Order replaced Executive Order #122 (2007) and provided the operational advisory framework for the partnership office and support for the EBM approach. The current Executive Order expired in November 5, 2016 pursuant to N.C. Gen. Stat. § 147-16.2, a new order is in the process of being drafted at present. A copy of the Executive Order #133 is available from the APNEP office at 1601 MSC, Raleigh, NC 27699 and at www.apnep.org. The replacement will be posted when available.

APNEP Office

The APNEP Office coordinates and facilitates the implementation and advancement of the CCMP, the APNEP mission, and the activities of the Policy Board and Advisory Committees. The APNEP Office serves as a conduit for information between the Policy Board, Advisory Committees, state and federal agencies, local governments, tribes, academia, and the public. The main office is located within the Planning Section of the Division of Water Resources of the NC Department of Environmental Quality in Raleigh, North Carolina, with additional program personnel in Washington, North Carolina. The



Virginia Department of Environmental Quality also provides support through a position in Virginia Beach, Virginia. Under the direction of the Policy Board, APNEP staff are pursuing a new host within the University of North Carolina System.

Policy Board

This Policy Board is the main advisory body for APNEP and the Management Conference. It was established by a North Carolina Governor's Executive Order to advise, guide, evaluate and support the CCMP implementation process, advance the CCMP and its management actions, and to ensure the highest level of collaboration, coordination and cooperation among state and federal agencies, local governments, the public and various interest groups. The Policy Board consults with the advisory committees and the APNEP Office for recommendations pertaining to implementation of CCMP actions at the regional and local levels, and the coordination and development of research and monitoring priorities. A major duty of the Policy Board is to evaluate the relevance of the CCMP and to make recommendations to address emerging issues that may affect the significant natural resources of the Albemarle-Pamlico estuarine system. The Policy Board, in cooperation with the APNEP Office, develops an annual report, budget and work plan.

Science and Technical Advisory Committee

A Science and Technical Advisory Committee (STAC) was established to provide independent advice to the Policy Board and the Implementation Committee on scientific and technical issues, including ecosystem assessment and monitoring, in support of CCMP implementation. The revised STAC held its first meeting during November 2012 in Manteo, North Carolina.

Implementation Committee

An Implementation Committee is currently being established to work with the Policy Board to execute the actions necessary to implement the CCMP. The Implementation Committee will be comprised of representatives from the action teams (formerly known as implementation workgroups), each of which will advance a discrete set of related CCMP actions. Members of the Implementation Committee will serve as liaisons to agencies, organizations, and other workgroups regarding CCMP implementation. Information on the Implementation Committee and each of the action teams may be found on the APNEP website: <http://www.apnep.org/web/apnep/implementation-committee>. Currently the committee consisting of leadership of the Science and Technical Advisory Committee and Policy Board accomplishes the role of the implementation committee in choosing projects for funding as needed.

Action Teams

APNEP has established and is currently establishing a number of Action Teams focused on implementing the objectives and actions in the CCMP. Action Teams are responsible for developing the outputs associated with each action deemed necessary to achieve desired ecosystem outcomes. Action Team membership is open to any interested party. Details on the Actions Teams may be found through the Implementation Committee website: <http://portal.ncdenr.org/web/apnep/implementation-committee>



2016-17 PROJECTS & ACTIVITIES

The following provides an update on activities and projects that APNEP has been involved in since the last annual work plan report approved on April 29, 2016, and items proposed in the previous workplan. An update of all projects was also provided to EPA Region IV in December, 2016 and included in this description. Some projects and activities did not require contracts. As an EPA reporting requirement, all projects that involved contracts or grants funded under this Cooperative Agreement since April 29, 2016 are summarized in the table on pages 37 - 40.

Program Administration & Indirect Costs (ongoing)

For more detail see Administration and Financial section. Cost are anticipated to be lower than projected due to staff vacancies during a portion of FY2016-17. (pages 35-47).

CCMP Component:	All
CCMP Actions:	All
CCMP Outcome:	All
Intended Programmatic Output:	Program administration, partnership building, CCMP implementation
Intended Programmatic Outcome:	CCMP implementation
Status:	Ongoing
Estimated 320 Cost:	\$428,815 direct and \$29,061 indirect cost @8.7%

Management Conference Support (Including Action Teams) (ongoing)

The key element of CCMP implementation is active citizen participation through the Management Conference and Action Teams. Funds were used to support meetings, speakers, and materials as needed.

CCMP Component:	All
CCMP Actions:	All
CCMP Outcome:	All
Intended Programmatic Output:	Partnership building, outreach, prioritizing CCMP implementation
Intended Programmatic Outcome:	New and greater public involvement, estuarine indicator development
Status:	Ongoing
Estimated 320 Cost:	3,000
Estimated Leverage:	\$11,000

Implementation Action Team: Oysters (ongoing)

The N.C. Coastal Federation, which has been an active partner with APNEP and others in oyster restoration efforts since the late 1990's, facilitates the Oyster Action Team. Members participating with this Action Team are pursuing initiatives aligned with both the 2015 North Carolina Oyster Blueprint and the CCMP. APNEP provided staff support for the development of a website, databases, and environmental indicators to support oyster restoration in the Albemarle-Pamlico region.

CCMP Components:	Restore, Monitor
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CCMP Actions:	C5.1, C5.2, C5.3
CCMP Outcomes:	2b
Intended Programmatic Output:	Reports, recommendations, and restoration activities
Intended Programmatic Outcome:	Risk assessments, increased monitoring
Status:	Ongoing
Estimated 320 Cost:	Staff time
Estimated Leverage:	\$12,000

Implementation Action Team: Flows (ongoing)

The Flows Action Team is focused on ecological flows issues in A-P region. This work entails identifying appropriate ecological flow requirements for the sounds and coastal rivers and working with regulatory partners to ensure in-stream flows are maintained. Also see Ecological Flows project, page 16).

CCMP Components:	Identify, Protect, Engage
CCMP Actions:	A3.3, D3.2
CCMP Outcomes:	2a, 2b, 3a, 2b
Intended Programmatic Output:	Reports and recommendations
Intended Programmatic Outcome:	Risk assessments, increased monitoring
Status:	Ongoing
Estimated 320 Cost:	Staff time
Estimated Leverage:	\$2,000

Implementation Action Team: Freshwater Habitat and Fish Passage (ongoing)

This action team will work to assist with CCMP implementation and identify the potential need to complete the following action items: 1)Develop a comprehensive map of ditched and drained areas; 2)Map inland freshwater habitat; 3)Map anadromous fish spawning areas; 4) Create a list of dams that need passage; 5)Assess existing research related to dam removal; and 6) Review guidelines for culvert removal. The freshwater habitat and fish passage action team will leverage partnerships to complete assessments and identify knowledge gaps.

CCMP Components:	Protect, Restore
CCMP Actions:	B2.1, B2.4, B2.5, C4.1, C4.2, C4.3, C4.4
CCMP Outcomes:	2a, 2b
Intended Programmatic Output:	Assessment of freshwater habitat and fish passage
Intended Programmatic Outcome:	Identify knowledge gaps associated with freshwater habitat and fish passage
Status:	In Progress
Estimated 320 Cost:	\$15,000
Estimated Leverage:	To be determined

Implementation Action Team: Invasives (ongoing)

This action team works to assist with CCMP implementation and identify the potential need to complete the following action items: 1)Develop a regional target species list for aquatic invasives by extracting appropriate elements from the 2015 North Carolina Aquatic Nuisance Species Management Plan and 2012 Virginia Invasive Species Management Plan: 1)Develop a regional target species list for terrestrial invasives by extracting appropriate elements from



the 2012 Virginia Invasive Species Management Plan, the 2014 Virginia Invasive Plant Species List, and interviewing taxonomic specialists, including those in North Carolina and Virginia agencies; 2) Map presence of each target species where possible; 3) Assess risk both from established and species threatening to establish foothold; and 4) Manage risk by proposing new eradication projects for high-risk species, as well as building upon partner efforts. The invasives action team will leverage partnerships to complete assessments and identify knowledge gaps.

CCMP Components:	Identify Protect, Restore, Engage
CCMP Actions:	A2.1, B2.6, C3.1, D1.3
CCMP Outcomes:	2c
Intended Programmatic Output:	Risk assessment and management of invasive species
Intended Programmatic Outcome:	Net increase of ecosystem services provided by native species
Status:	In Progress
Estimated 320 Cost:	\$15,000
Estimated Leverage:	To be determined

Implementation Action Team: Education and Engagement (ongoing)

APNEP facilitates an Education and Engagement Action Team to implement assigned actions below from the CCMP, and support its partners in their estuarine and watershed-themed education and outreach initiatives. The team also provides support for the other action teams that have education and engagement outputs (workshops, printed materials, etc.). The team has been meeting since 2015. In fall 2016, the team identified the following initial items for inclusion in an action plan: 1) D2.2: Create an inventory of existing teacher workshops and training in the APNEP region to determine who is working where and if there are needs or gaps to be filled. 2) D2.3: Create an inventory of existing initiatives related to public health advisories related to water, fish and game. Identify who is working where and what gaps need to be filled.

CCMP Components:	Engage
CCMP Actions:	D1.1, D2.1, D2.2, D2.3
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3b
Intended Programmatic Output:	Workshops and materials on stewardship and volunteer opportunities, increase in outdoor experiences, workshops and materials for educators, outreach and educational materials for public.
Intended Programmatic Outcome:	Increase in citizen action to protect and restore the Albemarle-Pamlico ecosystem, promote stewardship of the A-P system, increase in environmental education opportunities for adults and K-12 teachers, improved water quality, increased public awareness and engagement in CCMP implementation
Status:	In Progress
Estimated 320 Cost:	\$15,000
Estimated Leverage:	To be determined



Implementation Action Team: Decision Support Tools (ongoing)

This action team works to assist with CCMP implementation and identify the potential need to complete the following action items: 1)Develop a central database of web services 2)Develop a central database of conservation management tools 3)Develop framework layers and sources necessary to assist CCMP implementation. This team had its kickoff meeting in June 2016 and is currently updating resources for APNEP and will be assisting other APNEP action teams with decision support tools needs or requirements.

CCMP Components:	Identify, Monitor
CCMP Actions:	A1.1, A1.2, A2.2, E2.1, E2.2
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	To be determined
Intended Programmatic Outcome:	To be determined
Status:	Ongoing
Estimated 320 Cost:	Staff Time
Estimated Leverage:	To be determined

Implementation Action Team: Submerged Aquatic Vegetation (ongoing)

Since preliminary discussions among its agency partners began in 2001, APNEP has supported a collaborative partnership that aims to promote the conservation of SAV along the entire coast of North Carolina and southeastern Virginia. This partnership has been meeting regularly since 2004 and was formalized through a Memorandum of Agreement in late 2006.

CCMP Components:	Protect, Restore, Monitor
CCMP Actions:	B2.2, C3.3
CCMP Outcomes:	2a, 2b, 3d
Intended Programmatic Output:	To be determined
Intended Programmatic Outcome:	To be determined
Status:	Ongoing
Estimated 320 Cost:	Staff Time
Estimated Leverage:	\$8,000

Implementation Action Team: Contaminants /Nutrients (ongoing)

The former Contaminant Management Workgroup was split into two groups in 2015. In 2015-2016, the Nutrient Workgroup shifted focus towards recommendations for appropriate nutrient standards for North Carolina’s estuaries as part of North Carolina’s Nutrient Criteria Development Plan using the Albemarle Sound as a pilot study area. Phase I of this pilot ended in 2016 and the team is expected to provide recommendations to NC DWR in 2017. The Contaminants Action Team is working to develop risk assessments for metals and emerging contaminants. Also see: **Albemarle Sound Nutrient Criteria Development**

CCMP Components:	Identify, Protect, Restore, Monitor
CCMP Actions:	A2.4, A2.5, C1.1, C1.2
CCMP Outcomes:	1a, 1b, 3b, 3c, 1d
Intended Programmatic Output:	Reports and recommendations
Intended Programmatic Outcome:	Risk assessments, increased monitoring
Status:	Ongoing
Estimated 320 Cost:	Staff time



Estimated Leverage: \$8,000

Albemarle Sound Nutrient Criteria Development (new)

APNEP led an effort to review the nutrient criteria that protect our estuaries under the Clean Water Act. This review was conducted by an interdisciplinary working group in close partnership with the N.C. Division of Water Resources, the U.S. Environmental Protection Agency, and other partners as part of the North Carolina Nutrient Criteria Development Plan. With an initial focus on Albemarle Sound, the committee has forwarded lessons learned over NC DWR as part of its state wide Nutrient Criteria Development Plan. (Also see

Implementation Action Team: Contaminants /Nutrients)

CCMP Components: Restore
CCMP Actions: C1.1, C1.2
CCMP Outcomes: 1a, 1b, 1d, 3b, 3c
Intended Programmatic Output: Recommendations to NC DWR for nutrient criteria for Albemarle Sound
Intended Programmatic Outcome: Maintain & restore good water quality
Status: APNEP portion completed
Estimated 320 Cost: \$400, staff time
Estimated Leverage: \$3900

Watershed Field Coordinator - Virginia (ongoing)

The APNEP Watershed Field Coordinator for Virginia provides coordination and support to APNEP, NCDEQ and the Virginia Department of Environmental Quality enhances CCMP implementation in the Roanoke, Chowan and Pasquotank river basins. APNEP supported one-half of this position for at least 20 hours per week. 2014 was the final year of direct funding support from APNEP. Virginia Department of Environmental Quality will continue to partner with APNEP without funding from APNEP. Position is currently in the hiring process.

CCMP Component: All
CCMP Actions: All
CCMP Outcome: All
Programmatic Output: Program administration, reports, leverage, presentations
Programmatic Outcome: CCMP implementation and program support
Status: Ongoing
Estimated 320 Cost: Staff Time for coordination efforts
Estimated Leverage: \$ 24,000

Neuse River Estuary Modeling and Monitoring Project (ongoing)

ModMon is a collaborative effort between the University of North Carolina and the North Carolina Department of Environmental Quality. It supports North Carolina's needs for space and time-intensive monitoring and assessment of water quality and environmental conditions; including nutrient-eutrophication dynamics, algal blooms, hypoxia, fish kills and related issues. ModMon is the main source of data for calibration, verification and validation of water quality models being used to adaptively test and manage the Total Maximum Daily Load (TMDL) for the Neuse River Estuary (NRE). ModMon also serves State and federal agencies



as a ground-truthing data source for aircraft and satellite-based remote sensing of chlorophyll, turbidity and harmful algal blooms. This project began in June, 2014. (5371)

CCMP Components: Identify, Monitor
CCMP Actions: A1.1, A2.2, A3.1, E1.2, E2.1
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output: Report and recommendations, monitoring support to NC DWR
Intended Programmatic Outcome: Greater understanding of environmental condition
Status: In Progress
Estimated 320 Cost: \$100,000
Estimated Leverage: \$200,000

Shad in the Classroom 2016

Continuation of the collaborative project continues to provide students with an understanding of the science process, an inspiration for careers in science, and a desire to protect our waterways through hands-on experience raising American shad from egg to releasable fry. This is a collaboration was led by the North Carolina Museum of Natural Sciences.

CCMP Components: Engage, Restore
CCMP Actions: D 2.1, 2.2, 2.3
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3b
Intended Programmatic Output: Increased community involvement in water quality and habitat protection
Intended Programmatic Outcome: Educational program, restoration activities
Status: Ongoing APNEP program (session complete)
Estimated 320 Cost: \$ 22,000
Estimated Leverage: \$ 14,000

NC Division of Water Resources Project WET Facilitator Workshop 2016

APNEP supported the Project WET Facilitator Training Workshop that provides educators with background information and quality environmental education activities focused on water quality, invasive species, and water resources. By hosting their own subsequent Project WET workshops, these trained facilitators then pass skills on to other educators who will teach students in their area.

CCMP Components: Engage
CCMP Actions: D1.1, D2.2, D2.3
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3b
Intended Programmatic Output: Environmental education training
Intended Programmatic Outcome: Increase public awareness and involvement
Status: Complete
Estimated 320 Cost: \$ 2,000
Estimated Leverage: \$ 5,568

Sea Wolf at CMAST Communication Project

This project was awarded as a grant from the Education and Outreach Action Team in response to an RFP in the spring of 2015. The Sea Wolf at CMAST program provides marine



science and STEM opportunities for area high school students through educational programs, presentations, and experiential learning.

CCMP Components:	Engage
CCMP Actions:	D1.1, 2.2, 2.3
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3b,
Intended Programmatic Output:	Educational program
Intended Programmatic Outcome:	Knowledge transfer, public outreach & involvement, increased environmental awareness
Status:	Complete
Estimated 320 Cost:	\$ 730.67
Estimated Leverage:	\$ 4,700

Graduate Fellowship in Estuarine Research 2016 (ongoing)

APNEP and the North Carolina Sea Grant (NCSG) College Program continued joint support of the Graduate Fellowship in Estuarine Research established in 2015. The fellowship provided funding for a graduate student based in North Carolina and Virginia with an opportunity to conduct applied research within the North Carolina portion of the APNEP management boundary. Fellows must conduct research that addresses focus areas identified in NCSG Strategic Plan and management actions identified in CCMP.

CCMP Components:	Identify
CCMP Actions:	To be determined
CCMP Outcomes:	To be determined
Intended Programmatic Output:	Report, maps, data
Intended Programmatic Outcome:	Increased capacity to address CCMP implantation actions
Status:	In Progress
Estimated 320 Cost:	\$5,000
Estimated Leverage:	\$5,000

Teacher Institute on Watersheds 2016

APNEP continued its partnership with the UNC Institute for the Environment and others to offer a four-day teacher training institute titled At Water's Edge at the Trinity Center in Salter Path, NC summer 2016. Public school 8-12th grade science teachers from across the state were provided with curriculum training in earth and environmental sciences with hands-on activities, local site visits, and specific content to support inquiry, experiential, and research-based instruction on estuarine and watershed resources.

CCMP Components:	Engage
CCMP Actions:	D 2.1, 2.2, 2.3
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3b
Intended Programmatic Output:	20 teachers trained in environmental education, water quality, and watersheds
Intended Programmatic Outcome:	Increased environmental education activities in North Carolina schools
Status:	Complete
Estimated 320 Cost:	\$ 22,000
Estimated Leverage:	\$ 14,000



Secrets of the Swamp and River Days

This project was awarded as a grant from the Education and Outreach Action Team in response to an RFP in the spring of 2015. The NC Museum of Natural Sciences provided a two-day, one night field-based workshop for educators in the swamps of the Roanoke River basin. The workshop was held on the two days prior to the Environmental Educators of North Carolina (EENC) conference, held in Columbia, NC in September 2015. This field experience provided an in-depth exploration of eastern North Carolina ecosystems and habitats that were built upon during the conference.

CCMP Components:	Engage, Restore
CCMP Actions:	D 2.1, 2.2,
CCMP Outcomes:	1c, 1e, 2a, 2b, 2c, 3b
Intended Programmatic Output:	Educational program
Intended Programmatic Outcome:	Increased community involvement in water quality and habitat protection efforts
Status:	Complete
Estimated 320 Cost:	\$ 3,000
Estimated Leverage:	\$ 2,500

Coastal Discovery Camps

A project in partnership with the North Carolina Coastal Federation, this camp focused on coastal ecology and water quality. It engaged students in outdoor education and experiential learning during their summer enrichment programs. Students explored biology at Cape Lookout National Seashore, coastal restoration projects at North River Wetland Preserve and oyster ecology at the Carolina Mariculture Company. They also completed a service project to collect marine debris from local shorelines.

CCMP Components:	Engage, Monitor
CCMP Actions:	D 1.1, 1.5, 2.1, 2.3
CCMP Outcomes:	1a, 1b, 1d, 1e, 2a
Intended Programmatic Output:	Educational program
Intended Programmatic Outcome:	Knowledge transfer, public outreach & involvement, increased environmental awareness
Status:	Complete
Estimated 320 Cost:	\$1,668
Estimated Leverage:	\$1,492

East Carolina University Ecosystem Assessment Support

APNEP contracted support from the ECU Department of Geography, Planning and Environment to synthesize, analyze, and summarize relevant ecosystem information to provide a comprehensive data report for the ecosystem indicators being evaluated by the Program Scientist.

CCMP Components:	Monitor
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CCMP Actions:	E1.2, E2.2
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	Assessment of candidate ecological indicators
Intended Programmatic Outcome:	Identify knowledge gaps associated with candidate ecological indicators
Status:	Complete
Estimated 320 Cost:	\$ 9,998
Estimated Leverage:	\$ 1,000

North Carolina State University Ecosystem Assessment Support

APNEP contracted support from the Center for Geospatial Analytics, North Carolina State University to synthesize, analyze, and summarize relevant ecosystem information to provide a comprehensive data report for the ecosystem indicators being evaluated by the Program Scientist.

CCMP Components:	Monitor
CCMP Actions:	E1.2, E2.2
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	Assessment of candidate ecological indicators
Intended Programmatic Outcome:	Identify knowledge gaps associated with candidate ecological indicators
Status:	Complete
Estimated 320 Cost:	\$ 9,200
Estimated Leverage:	\$ 1,000

Town of Edenton Wetland Renovation and Environmental Education (new)

The project was a component of a regional effort to increase public awareness of the importance of constructed wetlands for protecting water quality. New educational signage and a wetland area cleanup was completed. The contract involved working with environmental groups, the local high school, and volunteers to help clean-up the wetland, and increase public awareness of the Albemarle-Pamlico ecosystem.

CCMP Components:	Protect, Restore, Engage
CCMP Actions:	B1.1 C2.3, C3.2, D1.1, D2.1, D2.3
CCMP Outcomes:	1a, 1b, 1d, 1e, 2a, 2b, 3a, 3b, 3c, 3d
Intended Programmatic Output:	Wetland restoration and kiosk displays
Intended Programmatic Outcome:	Knowledge transfer, public outreach & involvement, increased environmental awareness
Status:	Complete
Estimated 320 Cost:	\$ 2,000
Estimated Leverage:	\$ 2,000

Watershed and Water Quality Planning Workshop (new)

APNEP provided support for a watershed planning workshop hosted by the North Carolina Coastal Federation and the North Carolina Watershed Stewardship Network titled *Watershed Planning: Strategies and Tools to Protect and Restore Coastal Water Quality*. The workshop will feature tools and strategies for setting quantifiable goals for reducing the volume of polluted stormwater runoff, explain how to strategically select the most effective best



management practices to achieve water quality goals and engage coastal communities in this effort.

CCMP Components: Engage
CCMP Actions: D1.1, D1.2, D2.2, D2.3, D3.1
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output: Workshops
Intended Programmatic Outcome: Improved water quality and watershed health
Status: To be held in March 2017
Estimated 320 Cost: \$500
Estimated Leverage: To be determined

Effects of Environment on Blue Crab Size: Fisheries Science Place Based Learning and a Reciprocal Transplant Growth Study

This research and education project informs decisions by managers at Mattamuskeet National Wildlife Refuge as they manage the flow of water in and around the lake. This is a place-based STEM educational opportunity with Lake Mattamuskeet schools located 3 miles from optimal recreational crabbing locations on the lake. The requested funds are matched by other grant funds and used specifically to meet a fisheries interest in determining the weight as well as size in adult male and female crabs in the Lake. Local High School Students make bimonthly trips to the Lake, catch crabs, take pictures of crabs, weigh individuals and generate data on gender, size and weight of crabs over the active season. A teacher workshop will also be held.

CCMP Components: Identify, Engage
CCMP Actions: D2.1, D2.2
CCMP Outcomes: 1c, 1e, 2a, 2b, 2c, 3b
Intended Programmatic Output: Report and recommendations
Intended Programmatic Outcome: Increased awareness and engagement
Status: In-Progress
Estimated 320 Cost: \$4,000
Estimated Leverage: \$4,000

NC Division of Marine Fisheries Recreational Water Quality Monitoring (ongoing)

APNEP is continuing to provide bridge funding to the N.C. Division of Marine Fisheries' Recreational Water Quality Monitoring Program for the continuation of water quality monitoring near recreational areas. The program tests bacterial concentrations in coastal recreational waters to protect public health. The program is responsible for notifying the public when bacteriological standards for safe bodily contact have been exceeded. The program also has an educational component that accompanies the testing. Their educational campaign informs the public how bacteria enter coastal waters and actions that can help prevent it.

CCMP Components: Monitor, Engage
CCMP Actions: D2.3, E1.1, E2.1, E2.2
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output: Monitoring data
Intended Programmatic Outcome: CCMP Implementation, integrated monitoring strategy
Status: In progress (no-cost time extended)
Estimated 320 Cost: \$ 20,000



Estimated Leverage: \$ 283,000

Sound Economic Development: Creating A Rising Economic Tide for the NC Coast (Oyster Action Team) (new)

The summit is to convene key stakeholders, practitioners, elected and appointed officials and academia and businesses to discuss opportunities for oyster and coastal environmental restoration as an economic development strategy for North Carolina. The summit will assemble state and local leaders to review a newly developed strategy, share progress and determine next strategic steps. Participants will learn about efforts in neighboring states and North Carolina and to promote a strategic economic and environmental vision for coastal communities.

CCMP Components: Restore, Engage
CCMP Actions: C1.5, C5.1, C5.2, C5.3, D3.1
CCMP Outcomes: 1a, 1b, 1d, 1e, 2a, 2b, 3a, 3c, 3d
Intended Programmatic Output: Increased community involvement and informed decision-making
Intended Programmatic Outcome: Knowledge transfer, community involvement, increased awareness of environmental services
Status: In Progress
Estimated 320 Cost: \$4,000
Estimated Leverage: \$16,000

Ecological Flows (Flows Action Team)

This research was identified as an action item by the Ecological Flows Action Team during their 2016 meeting. The project will help to find, organize, and review currently available data that can help with ecological flow assessment in the region and identify data gaps. Identifying the existing data and centralizing it will help material, personnel, and monetary resources to be efficiently distributed toward the ecological flow characterization efforts in the APNEP region.

CCMP Components: Identify
CCMP Actions: A3.3, D2.2, D3.1, E2.2
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output: Assessment of ecological flows data
Intended Programmatic Outcome: Identify knowledge gaps associated with ecological flows
Status: In Progress
Estimated 320 Cost: \$18,435
Estimated Leverage: \$ 5,000

WRI Annual Conference 2017 (new)

APNEP provided support to the 2017 WRI Annual Conference that has been the premier conference highlighting diverse topics in water research, management and policy in North Carolina. The conference features oral and poster presentations, themed panel discussions, ample networking opportunities, and hands-on interactive sessions for more in-depth discussions and problem solving related to water resources. Attendance and sponsorship allows APNEP to raise visibility of the program, grow our network of partners, and engage in targeted



discussions about water resources and water quality issues, wetland & hydrologic restoration, fish habitat & fish passage, ecological flows, and coastal resilience.

CCMP Components: Identify, Engage
CCMP Actions: A2.2, D1.1, D1.2, D2.2, D2.3, D3.1
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output: Problem solving and collaboration for decision-makers
Intended Programmatic Outcome: Knowledge transfer, increased awareness, and engagement
Status: In Progress
Estimated 320 Cost: \$1,000
Estimated Leverage: \$33,300

2017 North Carolina Coastal Conference (new)

Conference support to North Carolina Sea Grant in addressing the state's urgent and long-term needs in ocean, coastal and watershed resource management. The conference will address critical issues including weather, storms, and climate; community and ecosystem health; fisheries and aquaculture; and planning and economics. Attendance and sponsorship allows APNEP to raise visibility of the program, grow our network of partners, and engage in targeted discussions about water resources and water quality issues, wetland & hydrologic restoration, fish habitat & fish passage, ecological flows, and coastal resilience.

CCMP Components: Identify, Engage
CCMP Actions: A2.2, D1.1, D1.2, D2.2, D2.3, D3.1
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output: Problem solving and collaboration for decision-makers
Intended Programmatic Outcome: Knowledge transfer, increased awareness, and engagement
Status: In Progress
Estimated 320 Cost: \$500
Estimated Leverage: \$25,000

Shad in the Classroom 2017 (ongoing)

Continuation of the collaborative project continues to provide students with an understanding of the science process, an inspiration for careers in science, and a desire to protect our waterways through hands-on experience raising American shad from egg to releasable fry. This is a collaboration led by the North Carolina Museum of Natural Sciences. Classroom activities and releases will occur in the spring of 2017.

CCMP Components: Engage
CCMP Actions: D2.1, D2.2, D2.3
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3b
Intended Programmatic Output: Increased community involvement in water quality and habitat protection
Intended Programmatic Outcome: Educational program, restoration activities
Status: In Progress
Estimated 320 Cost: \$ 24,000



Estimated Leverage: \$ 77,000

North Carolina River Basin Booklets and Posters (new)

The purpose of the effort is to illustrate the connections between people's everyday choices and the quality of natural resources as well as give citizens a sense of place within the natural environment. The materials were developed by the N.C. Office of Environmental Education and Public Affairs, are a popular teaching resource.

CCMP Components: Engage
CCMP Actions: D2.3, D1.1, D1.5
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a
Intended Programmatic Output: River basin booklets
Intended Programmatic Outcome: Increased awareness
Status: Complete
Estimated 320 Cost: \$5,000
Estimated Leverage: \$8,000

Teacher Institute on Watersheds 2017 (ongoing)

APNEP will again work with partners to offer a teacher training institute in summer of 2017. Approximately 25 public school teachers will be provided with curriculum training in earth and environmental sciences with hands-on activities, site visits, and specific content to support inquiry, experiential, and research-based instruction on estuarine and water resources. UNC Institute of the Environment has been the lead over the past few years. We expect this partnership to continue.

CCMP Components: Engage
CCMP Actions: D 2.1, 2.2, 2.3
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3b
Intended Programmatic Output: 25 teachers trained in environmental education, water quality, and watersheds
Intended Programmatic Outcome: Increased environmental education activities in North Carolina schools
Status: Pending (July 2017)
Estimated 320 Cost: \$ 24,000
Estimated Leverage: \$ 12,000

Low Impact Development Stormwater Strategies (new)

River City Community Development Corporation will collaborate with APNEP, the North Carolina Coastal Federation, and community partners to incorporate Low Impact Development (LID) stormwater management designs and permitting into its new proposed 18 unit multi-family supportive housing development. The collaboration offers a unique opportunity to incorporate sound stormwater management into a housing project for veterans and special needs individuals within Elizabeth City and Northeastern North Carolina. The stormwater



design for the new housing development will include LID measures to prevent polluted runoff from reaching surface waters.

CCMP Components:	Restore, Engage
CCMP Actions:	C1.5, D1.1, D1.2, D2.2, D3.1
CCMP Outcomes:	1a, 1b, 1d, 1e, 2a, 2b, 2c, 3a, 3c, 3d
Intended Programmatic Output:	Improved stormwater management strategies
Intended Programmatic Outcome:	Knowledge transfer, improved restoration and management techniques
Status:	In Progress
Estimated 320 Cost:	\$15,000
Estimated Leverage:	\$20,000

Survey of Submerged Aquatic Vegetation (ongoing)

APNEP supported a boat-based SAV survey in the Sounds in a project with ECU. The purpose of the survey is threefold: (1) to delineate the extent of SAV along shore-parallel transects (2) to use the data collected select 20 sentinel sites in the Sound and establish a polygon size appropriate for long-term observation; and (3) to compare two types of SONAR data collected along some representative transects. Boat-based methods supplement remote-sensing efforts for detecting SAV, where turbidity and other environmental factors can limit detection.

CCMP Components:	Identify, Monitor
CCMP Actions:	A1.1
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	Public outreach and involvement
Intended Programmatic Outcome:	CCMP Implementation, increased environmental awareness
Status:	Complete
Estimated 320 Cost:	\$ 6,476
Estimated Leverage:	\$ 56,451

Scientific Research and Education Network (ongoing)

The Scientific Research and Education Network (SciREN) connect educators with research scientists to provide learners with relevant learning experiences. APNEP and SciREN reached more than 500 teachers at events held in the Triangle, Greenville, and at the coast to demonstrate newly developed lesson plans, offer enrichment materials for their classrooms, and highlight other opportunities for teachers including our searchable lesson plan database and other training opportunities.

CCMP Components:	Engage
CCMP Actions:	D2.2
CCMP Outcomes:	1c, 1e, 2a, 2b, 2c, 3b
Intended Programmatic Output:	Lesson plans
Intended Programmatic Outcome:	Engaged educational community
Status:	Complete
Estimated 320 Cost:	\$ 984
Estimated Leverage:	\$18,000



NC Coastal Envirothon 2016

APNEP participated in the [North Carolina Coastal Envirothon](#), which brought students, educators and environmental professionals from 28 coastal counties together to test their knowledge of environmental topics in North Carolina. APNEP staff led a presentation on “Current Environmental Issues” to middle school students from across the coastal plain. The N.C. Coastal Envirothon is held annually at the cool Springs Environmental Education Center.

CCMP Components:	Engage
CCMP Actions:	D2.2
CCMP Outcomes:	1c, 1e, 2a, 2b, 2c, 3b
Intended Programmatic Output:	Public outreach and involvement
Intended Programmatic Outcome:	Increased environmental awareness
Status:	Complete
Estimated 320 Cost:	Staff time
Estimated Leverage:	To be Determined

Integrated Monitoring Strategy (ongoing)

APNEP continues to facilitate the establishment of an integrated monitoring strategy to detect, measure, and track changes in the ecosystem. Much preparatory work has already been conducted by the APNEP resource monitoring and assessment teams and these teams’ contributions will be essential to complete the strategy. Upon completion, the strategy will provide resource managers and other partners with cost and information quality (uncertainty) alternatives that will facilitate the selection of a set of monitoring protocols to be included in the APNEP integrated monitoring plan.

CCMP Component(s):	Monitor
CCMP Actions:	E1.1, E1.2, E1.3, E2.1, E2.2
CCMP Outcomes:	Integrated monitoring strategy
Intended Programmatic Output:	Document, functional workgroups
Intended Programmatic Outcome:	Integrated monitoring strategy to support ecosystem-based management through the CCMP
Status:	In progress
Estimated 320 Cost:	Staff Time
Estimated Leverage:	To be determined

Habitat Enhancement at Dismal Swamp State Park 2016

APNEP purchased 3,006 Atlantic white cedar trees to be planted at Dismal Swamp State Park by volunteers in April 2016. It is a follow-up to the 2015 planting event.

CCMP Components:	Protect, Restore, Engage
CCMP Actions:	B1.3, C1.3, C2.3, D1.1, D2.1
CCMP Outcomes:	1a, 1b, 1d, 1e, 2a, 2b, 3b, 3d
Intended Programmatic Output:	Tree planting, habitat enhancement
Intended Programmatic Outcome:	Habitat restoration, increased awareness
Status:	Complete
Estimated 320 Cost:	\$ 675
Estimated Leverage:	\$20,00



Citizens' Monitoring Network (ongoing)

The APNEP Citizens' Monitoring Network (CMN) is a network of private citizens who monitor surface water quality in the Albemarle-Pamlico estuary and its tributaries. APNEP currently maintained its existing participating citizens' monitoring efforts. APNEP expenditures covered the costs of chemical supplies.

CCMP Components:	Engage, Monitor
CCMP Actions:	D1.1, E1.3
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	Database of citizen-collected monitoring information
Intended Programmatic Outcome:	Partnership building, outreach, CCMP implementation and prioritization
Status:	In progress
Estimated 320 Cost:	\$ 1,000
Estimated Leverage:	\$ 10,000

Chowan Healthy Waters Initiative (ongoing)

APNEP will continue to partner with Virginia Commonwealth University and the VA Department of Conservation and Recreation, as well as other state agencies on both sides of the border to implement action to protect high quality waters. Identification of these pristine waters is a necessary first step in the ultimate preservation of these valuable areas by land trusts and other organizations. There has been activity thus far this year.

CCMP Components:	Identify, Protect, Engage
CCMP Actions:	A1.1, B3.2, D1.2
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	New partnerships and activities in VA and NC focused on protecting high quality waters
Intended Programmatic Outcome:	Maintain good water quality
Status:	Ongoing
Estimated 320 Cost:	Staff Time
Estimated Leverage:	To be determined

Albemarle-Chowan Roundtable (ongoing)

The Albemarle-Chowan Watershed Roundtable engages stakeholders in the Virginia portions of the Chowan and Pasquotank river basins to collaborate on issues concerning water quality, habitat, and other natural resources within these watersheds.

CCMP Components:	Engage
CCMP Actions:	D1.2
CCMP Outcomes:	1a, 1b, 1c, 1d, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	To be determined
Intended Programmatic Outcome:	To be determined
Status:	In progress
Estimated 320 Cost:	Staff Time
Estimated Leverage:	To be determined

Saltwater Connections (ongoing)



Saltwater Connections is a regional initiative aimed at sustaining livelihoods, cultural heritage, and natural resources along the coast, from Hatteras Island to Ocracoke and Carteret County. The Saltwater Connections Resource Team’s approach to growing sustainable communities is modeled after Handmade in America’s Small Town Revitalization Program, an asset-based economic development project in western North Carolina. The goal for this community vitalization process is to leverage assets, whether cultural, architectural or human, in order to build a complete community vitalization plan.

CCMP Components:	Engage
CCMP Actions:	D1.2
CCMP Outcomes:	1a, 1b, 1c, 1d, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	To be determined
Intended Programmatic Outcome:	To be determined
Status:	In progress
Estimated 320 Cost:	Staff Time
Estimated Leverage:	To be determined

North Carolina Catch (ongoing)

North Carolina Catch supports the work of the four local seafood promotion initiatives that stretch from Currituck County to Brunswick County. Carteret Catch, Ocracoke Fresh, Brunswick Catch, and Outer Banks Catch have emerged as the buoys and markers that guide consumers to local fish and shellfish sources. The groups help educate consumers on the culinary and nutritional rewards of choosing local seafood, as well as the economic, cultural, and ecological benefits for local communities and for the state. North Carolina Catch is a nonprofit umbrella organization that ties the work of the local groups together to foster collaboration, to strengthen communication, and to enhance a statewide and national presence.

More information is available at <http://www.nccatch.org/>

CCMP Components:	Engage
CCMP Actions:	D1.2, D2.3,
CCMP Outcomes:	1d
Intended Programmatic Output:	Habitat protect/ education materials
Intended Programmatic Outcome:	Informed seafood consumers who understand connections between local seafood and habitats.
Status:	In progress
Estimated 320 Cost:	Staff Time
Estimated Leverage:	To be determined

Watershed Restoration and Improvement Team (ongoing)

The Watershed Restoration and Improvement Team (WRIT) is a working group composed of experts from the NC Department of Environment and Natural Resources, the NC Department of Agriculture and Consumer Services and the NC Wildlife Resources Commission. Its mission is to "strengthen partnerships in order to enhance each agency’s ability to carry out its own water-related goals and activities to improve watershed functions throughout North Carolina." The team provides a forum for managers to share insights and work collaboratively on watershed issues. The team has also focused restoration efforts in four sub-watersheds in North Carolina, including one in the Roanoke River basin. Recent actions have been very limited but APNEP staff continue to participate and network with partners.



CCMP Components:	Engage, Protect, Restore
CCMP Actions:	C2.1, D1.2, also supports B1.3, B1.4, B1.5, C1.3
CCMP Outcomes:	1a, 1b, 1c, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	To be determined
Intended Programmatic Outcome:	To be determined
Status:	In progress
Estimated 320 Cost:	Staff Time
Estimated Leverage:	To be determined

North Carolina Watershed Stewardship Network (ongoing)

The Watershed Stewardship Network (WSN) is a working group that includes representatives from state and local government, academic institutions, non-profit organizations, and private industry. The mission of the WSN is to empower more effective watershed stewardship because water is critical to economic, environmental, and community health. The purpose of the group is to identify, include, link, and serve watershed stakeholders in North Carolina.

CCMP Components:	Engage
CCMP Actions:	D1.1, D1.2, D2.2, D2.3, D3.1
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	Workshops, online tools, environmental programs
Intended Programmatic Outcome:	Improved environmental stewardship and watershed health
Status:	In progress
Estimated Cost:	Staff Time
Estimated Leverage:	To be determined

CCMP/Monitoring and Assessment Workshops

A series of workshops will be structured to develop priorities among scientists, managers, policy makers, and citizens on how ecological monitoring should be targeted to best support APNEP indicator tracking of CCMP ecosystem outcomes. This project was placed on hold pending completion of the first phase of indicator development, including target values.

CCMP Component:	Monitor
CCMP Actions:	E1.1, E1.2, E1.3, E2.1, E2.2
CCMP Outcome:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	Indicators, Integrated Monitoring Strategy
Intended Programmatic Outcome:	Detection of environmental changes in support of CCMP implementation
Status:	Pending
Estimated 320 Cost:	\$ 1,000
Estimated Leverage:	Pending

Wetlands Monitoring

APNEP has supported a N.C. State University effort to sustain North Carolina's wetland monitoring program after its discontinuation by the State of North Carolina. APNEP provided an initial support letter for this funded grant and has committed to supporting the effort through the promotion of wetland partnerships, service on the project's technical working group, and assistance with monitoring efforts in the APNEP region.



CCMP Components:	Monitor
CCMP Actions:	A1.1, E1.1
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	Data, report, maps
Intended Programmatic Outcome:	Greater understanding of environmental condition
Status:	Ongoing
Estimated 320 Cost:	Staff Time
Estimated Leverage:	\$568,951 over three years

Hyde County Resilience Planning

APNEP provided support for an effort led by N.C. Sea Grant, Georgia Sea Grant, and Stetson University in Hyde County, NC to develop a community resilience and adaptation plan. Hyde County has sought the team's expertise on topics including coastal flooding and storm resilience.

CCMP Components:	Identify, Engage
CCMP Actions:	A2.2, A2.3, D1.2, D3.1, D3.3
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	Report and recommendations
Intended Programmatic Outcome:	Higher community resilience
Status:	In Progress
Estimated 320 Cost:	Staff time
Estimated Leverage:	\$35,000

Tracking Research in Support of Ecosystem-Based Management

APNEP has participated on the Regional Coordinating Committee for the Defense/Coastal Estuarine Research Program (DCERP) since the committee's inception in 2007. The DCERP was designed to conduct mission-relevant and basic and applied research in support of an ecosystem-based approach. The Department of Defense's Strategic Environmental Research and Development Program (SERDP) launched DCERP at Camp Lejeune, North Carolina, because of it being an ideal research platform with a location that integrates coastal barrier island, estuarine, marsh, and terrestrial ecosystems. These common ecosystems within the APNEP region make probable that insights gained from this ten-year program should provide many useful applications for the APNEP region as well.

CCMP Components:	Identify, Monitor
CCMP Actions:	A2.2, 2.3; E2.1, 2.2
CCMP Outcomes:	
Intended Programmatic Output:	Staff knowledge and research partner development
Intended Programmatic Outcome:	Technical transfer of DCERP protocols for monitoring, modeling, and decision support frameworks
Status:	Ongoing
Estimated 320 Cost:	Staff Time
Estimated Leverage:	To be determined

Updates to the APNEP Engagement Strategy (ongoing)



APNEP is updating its existing two-year Communications Strategy. The plan has been expanded to include partner engagement and education and outreach strategies, in addition to its core communications efforts. APNEP implements this plan in furtherance of its mission and in accordance with its CCMP. Engagement efforts are prioritized and linked to CCMP objectives, actions, and associated environmental outcomes.

CCMP Components:	Identify, Protect, Restore, Engage, Monitor
CCMP Actions:	All
CCMP Outcomes:	All
Intended Programmatic Output:	Increased partner engagement, public outreach and involvement
Intended Programmatic Outcome:	CCMP Implementation, increased environmental awareness, increase program awareness
Status:	In progress
Estimated Cost:	Estimated 320 Cost:
Etimated Leverage:	To be determined

NC Coastal Habitat Protection Plan Implementation Support

The NC Coastal Habitat Protection Plan (CHPP), adopted by Coastal Resources, Environmental Management and Marine Fisheries Commissions, has seen routine development since its implementation began in 2004. While differences in scope, geography and mission exist, implementation of CCMP and the CHPP are complimentary. Jimmy Johnson, APNEP Coastal Habitats Coordinator ensures that both plans are implemented in a coordinated and integrated fashion. A new CHPP implementation plan and updated scientific support documents were produced in 2015-16.

CCMP Components:	Identify, Protect, Restore
CCMP Outcomes:	1a, 1b, 1c, 1d, 2a, 2b, 2c, 3b, 3c, 3d
Intended Programmatic Output:	CHPP annual report
Intended Programmatic Outcome:	Coordinated regulation across NC state agencies to improve estuarine habitats
Status:	In Progress
Estimated 320 Cost:	Staff time
Estimated Leverage:	\$18,000

Atlantic Coastal Fish Habitat Partnership (ACFHP)

APNEP is member of ACFHP, a coast-wide partnership of fish habitat resource managers, scientists, and communications professionals from 32 different states, federal, tribal and non-governmental agencies who have established a commitment to work together for the benefit of aquatic resources. The mission of ACFHP is to accelerate the conservation, protection, restoration, and enhancement of habitat for native Atlantic coastal, estuarine-dependent, and diadromous fishes through partnerships between federal, tribal, state, local, and other entities.

CCMP Components:	Restore
CCMP Actions:	C4.1, C4.2, C4.3, C4.4
CCMP Outcomes:	2a, 2b
Intended Programmatic Output:	Habitat restoration
Intended Programmatic Outcome:	Improved partner coordination,
Status:	In Progress



Estimated 320 Cost:	Staff time
Estimated Leverage:	To be determined

Southeast Natural Resource Leadership Group Pilot Project Development

The Southeast Natural Resource Leadership Group (SENRLG) is comprised of the regional principals of federal natural resource agencies across the Southeast that have undertaken the development of a Landscape Conservation and Restoration Pilot Project (LCRPP) to support climate change adaptation efforts in conservation and restoration in the Southeast that would illustrate how the agencies could coordinate and leverage federal agency mandates and resources to enhance natural resource management. Climate change risks were selected as the point of focus for targeting program resources on the landscape and the focus is the North Carolina coastal area of the Albemarle-Pamlico estuary. The final SENRLG report was released late in 2012. APNEP will work with SENRLG to provide guidance and assistance for a project that supports implementation of the CCMP if initiated by SENRLG. No activity occurred thus far this year.

More information is available at

<http://www.epa.gov/region04/topics/envmanagement/senrlg/index.htm>

The initial project report is available at

http://portal.ncdenr.org/c/document_library/get_file?uuid=dd0f0bf5-2725-4ecc-8985-746ee7b1dd29&groupId=61563

CCMP Components:	To be determined
CCMP Actions:	To be determined
CCMP Outcomes:	To be determined
Intended Programmatic Output:	To be determined
Intended Programmatic Outcome:	To be determined
Status:	No action thus far in 2016-17 (Federal lead)
Estimated 320 Cost:	Staff Time
Estimated Leverage:	To be determined

North Carolina Clean Water Management Trust Fund Projects (Match)

APNEP will work with the North Carolina Clean Water Management Trust Fund (CWMTF) to implement a project to provide water quality improvement projects in one or more of the APNEP river basins. The projects will be used as part of the 1:1 non-federal match for the Section 320 / NEP grant.

CCMP Components:	To be determined
CCMP Actions:	To be determined
CCMP Outcomes:	To be determined
Intended Programmatic Output:	To be determined
Intended Programmatic Outcome:	To be determined
Status:	Pending
Estimated 320 Cost:	Staff Time
Estimated Leverage:	\$ 200,000

North Carolina Division of Water Infrastructure Projects (Match)

APNEP will work with the North Carolina Division of Water Infrastructure to identify projects to provide water quality improvement projects in one or more of the APNEP river



basins. The projects will be used as part of the 1:1 non-federal match for the Section 320 / NEP grant.

CCMP Components:	To be determined
CCMP Actions:	To be determined
CCMP Outcomes:	To be determined
Intended Programmatic Output:	To be determined
Intended Programmatic Outcome:	To be determined
Status:	Pending
Estimated 320 Cost:	Staff Time
Estimated Leverage:	\$ 520,000

Sentinel Network Monitoring of Submerged Aquatic Vegetation in Roanoke and Neuse River Watersheds (NC) [NON-320 Funds]

APNEP received \$75,000 in funding from the National Fish and Wildlife Foundation to support the “Support for Sentinel Network Monitoring of Submerged Aquatic Vegetation in Roanoke and Neuse River Watersheds” project. Submerged aquatic vegetation (SAV) is a primary indicator of ecological condition for waters within the APNEP region. The need to document the effectiveness of implementing CCMP actions through ecological indicator monitoring makes SAV monitoring a priority. This project, conducted in partnership with East Carolina University, will contribute to a multiyear baseline of SAV status and trends in two sub-regions of a SAV sentinel network that is planned for the entire Albemarle-Pamlico Estuarine System (APES).

CCMP Components:	Monitor
CCMP Actions:	E 1.1, 1.2, 2.1, E2.2
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	Sentinel station monitoring to include monitoring data in ecosystem assessment (technical) and environmental indicator report card (non-technical).
Intended Programmatic Outcome:	Information from this project will be used to increase our understanding of factors controlling SAV distribution and abundance. schools
Status:	Ongoing APNEP program (2017-2018)
Estimated 320 Cost:	Staff time
Estimated Leverage:	\$75,000



2017-18 PROPOSED PROJECTS & ACTIVITIES

The following proposed projects and activities for October 1, 2017 through September 30, 2020 are to continue to guide, support, and implement the 2012-22 CCMP. The EPA annual grant allocation to APNEP for this time period is estimated to be \$600,000. It is anticipated that the cooperative agreement award will be allocated in concert with funding forwarded to EPA Region IV under the Congressionally authorized Continuing Resolution under the current the fiscal year. Projects listed below include an anticipated expenditure during FY2017-18. Projects listed as “ongoing” in the previous section made also be active during this timeframe.

Program Administration & Indirect Costs (ongoing)

For more detail see Administration and Financial section.

CCMP Component:	All
CCMP Actions:	All
CCMP Outcome:	All
Intended Programmatic Output:	Program administration, partnership building, CCMP implementation
Intended Programmatic Outcome:	CCMP implementation
Status:	Ongoing
Estimated 320 Cost:	\$438,727 direct and \$51,623 indirect cost @15.1% (see indirect costs page 35).

Management Conference Support (ongoing)

The key element of CCMP implementation is active citizen participation through the Policy Board, each of the two Advisory Committees and the Action Teams. Funds will be used to support meetings, speakers, and materials as needed. Occasional costs for light refreshments and/or meals served at meetings, conferences, training workshops and outreach activities (events), consistent with 41 CFR 301-74.7 and NC DEQ travel policies, and as approved by the Director as needed.

CCMP Component:	All
CCMP Actions:	All
CCMP Outcome:	All
Intended Programmatic Output:	Partnership building, outreach, prioritizing CCMP implementation
Intended Programmatic Outcome:	New and greater public involvement, estuarine indicator development
Status:	Ongoing
Estimated 320 Cost:	\$ 2,650
Estimated Leverage:	To be determined



CCMP Implementation Projects (ongoing undesignated category with new projects approved by Management Conference)

The APNEP staff and Policy Board will work with the Advisory Committees, associated Action Teams and partners to identify projects that need financial support or administrative support from APNEP to support CCMP implementation. A group composed of the leadership of the Policy Board and STAC will evaluate the requests and administer the funding for priority projects and activities. As APNEP works to implement the CCMP under the guidance of the Management Conference and in collaborations with partners, staff will continue to work with the various Actions Teams established over the past few years to lead to projects to implement the CCMP. Funding of these projects in 2017-18 will be primarily conducted using carryover funds within the Cooperative Agreement however as funds become available under this addition to the agreement they may be transferred to this category of projects for the time period of October 1, 2014 - September 30, 2020.

CCMP Component:	All
CCMP Actions:	All
CCMP Outcome:	All
Intended Programmatic Output:	Program administration, partnership building, CCMP implementation
Intended Programmatic Outcome:	CCMP implementation
Status:	New
Estimated 320 Cost:	\$ 280,000 carryover from previous years
Estimated Leverage:	\$ 140,000

2018 Teacher Institute (ongoing)

APNEP will again work with partners to offer a teacher training institute in summer of 2018. Approximately 25 public school teachers will be provided with curriculum training in earth and environmental sciences with hands-on activities, site visits, and specific content to support inquiry, experiential, and research-based instruction on estuarine and water resources. UNC Institute of the Environment has been the lead over the past few years. We expect this partnership to continue.

CCMP Components:	Engage
CCMP Actions:	D 2.1, 2.2, 2.3
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3b
Intended Programmatic Output:	25 teachers trained in environmental education, water quality, and watersheds
Intended Programmatic Outcome:	Increased environmental education activities in North Carolina schools
Status:	Ongoing APNEP program
Estimated 320 Cost:	\$ 21,000
Estimated Leverage:	\$ 11,000

Shad in the Classroom (ongoing)

APNEP will continue to support this collaborative project that provides students with an understanding of the scientific process, an inspiration for careers in science, and a desire to protect our waterways through hands-on experience raising American shad from egg to



releasable fry. This is a collaboration led by, the NC Museum of Natural Sciences with support from the NC Wildlife Resources Commission and the US Fish and Wildlife Service. The objective of this project is to build an understanding of the life history of shad and an appreciation for our natural world.

CCMP Components:	Engage, Restore
CCMP Actions:	D 2.1, 2.2, 2.3
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3b
Intended Programmatic Output:	Increased community involvement in water quality and habitat protection
Intended Programmatic Outcome:	Educational program, restoration activities
Status:	Ongoing APNEP partner project (6 th year)
Estimated 320 Cost:	\$ 21,000
Estimated Leverage:	\$ 11,000

Submerged Aquatic Vegetation Mapping & Monitoring (ongoing)

APNEP continued to lead and support the mapping and assessment of Submerged Aquatic Vegetation (SAV) in the AP region via remote sensing.

CCMP Components:	Identify, Monitor
CCMP Actions:	A1.1,
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	Map, report
Intended Programmatic Outcome:	New information for decision-makers
Status:	Complete
Estimated 320 Cost:	\$55,000
Estimated Leverage:	\$25,000

APNEP Symposium (continued)

APNEP plans to host a third symposium in the series (originally planned for fall 2015) in coastal NC in November 2017. This symposium will feature guest speakers, discussion panels, and various sessions to examine the status of the Albemarle-Pamlico Estuarine System’s natural habitats and resources, discuss progress made, and discuss challenges ahead for protection and restoration. The proceedings from the past conferences are available at

http://portal.ncdenr.org/web/apnep/conferences?p_p_id=15

CCMP Components:	All
CCMP Actions:	TBD
CCMP Outcomes:	TBD
Intended Programmatic Output:	Symposium
Intended Programmatic Outcome:	Elevated program profile, facilitation of working relationships among committees and partners.
Estimated 320 Cost:	Pending
Estimated Cost:	\$ 13,000 <i>allocated in previous year’s budget</i>

Submerged Aquatic Vegetation Monitoring (ongoing)

In coastal waters of the A-P region, submerged aquatic vegetation (SAV) is widely recognized for many important ecological functions. Currently, there are no long-term SAV monitoring



programs established in the region that can provide reliable quantitative data on its status and trends.

CCMP Components:	Identify, Monitor
CCMP Actions:	A1.1, E1.1, E2.1
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3d, 3c, 3d
Intended Programmatic Output:	Essential environmental data collection, public outreach and involvement
Intended Programmatic Outcome:	CCMP Implementation, increased environmental awareness
Status:	In progress
Estimated 320 Cost:	Staff time
Estimated Leverage:	\$ 20,000

North Carolina Division of Water Infrastructure Projects (MATCH ongoing)

APNEP will work with the North Carolina Division of Water Infrastructure to identify projects to provide water quality improvement projects in one or more of the APNEP river basins. The projects will be used as part of the 1:1 non-federal match for the Section 320 / NEP grant.

CCMP Components:	To be determined
CCMP Actions:	To be determined
CCMP Outcomes:	To be determined
Intended Programmatic Output:	To be determined
Intended Programmatic Outcome:	To be determined
Status:	Pending
Estimated 320 Cost:	Staff Time
Estimated Leverage:	\$ 520,000

North Carolina Clean Water Management Trust Fund Projects (MATCH ongoing)

APNEP will work with the North Carolina Clean Water Management Trust Fund (CWMTF) to implement projects to provide water quality improvement projects in one or more of the APNEP river basins.

CCMP Components:	To be determined
CCMP Actions:	To be determined
CCMP Outcomes:	To be determined
Intended Programmatic Output:	To be determined
Intended Programmatic Outcome:	To be determined
Status:	Pending
Estimated 320 Cost:	Staff Time
Estimated Leverage:	\$ 200,000

Sentinel Network Monitoring of Submerged Aquatic Vegetation in Roanoke and Neuse River Watersheds (NC) [Non-320 Funds]

APNEP received \$75,000 in funding from the National Fish and Wildlife Foundation to support the “Submerged aquatic vegetation (SAV) is a primary indicator of ecological condition for waters within the APNEP region. The need to document the effectiveness of



implementing CCMP actions through ecological indicator monitoring makes SAV monitoring a priority. This project, conducted in partnership with East Carolina University, will contribute to a multiyear baseline of SAV status and trends in two sub-regions of a SAV sentinel network that is planned for the entire Albemarle-Pamlico Estuarine System (APES).

CCMP Components:	Monitor
CCMP Actions:	E 1.1, 1.2, 2.1, E2.2
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	Sentinel station monitoring to include monitoring data in ecosystem assessment (technical) and environmental indicator report card (non-technical).
Intended Programmatic Outcome:	Information from this project will be used to increase our understanding of factors controlling SAV distribution and abundance. schools
Status:	Ongoing APNEP program (2017-2018)
Estimated 320 Cost:	Staff time
Estimated Leverage:	\$75,000

ECU Monitoring of Submerged Aquatic Vegetation in Roanoke and Neuse River Watersheds (NC) [Non-320 Funds]

As a result of funding from the National Fish and Wildlife Foundation to support the “Sentinel Network Monitoring of Submerged Aquatic Vegetation in Roanoke and Neuse River Watersheds (NC).” APNEP intends to subcontract with East Carolina University to maintain the methodology and criteria resulting from preliminary work done in 2014 in the Albemarle Sound to establish sentinel sites. At these sentinel sites, the subcontractor will conduct shore-normal transects for seasonal and inter-annual comparisons. Underwater video and single-beam SONAR will be used to identify the presence of SAV along these transects at both types of surveys.

CCMP Components:	Monitor
CCMP Actions:	E 1.1, 1.2, 2.1, E2.2
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
Intended Programmatic Output:	Sentinel station monitoring to include monitoring data in ecosystem assessment (technical) and environmental indicator report card (non-technical).
Intended Programmatic Outcome:	Information from this project will be used to increase our understanding of factors controlling SAV distribution and abundance.
Status:	Ongoing APNEP program (2017-2018)
Estimated 320 Cost:	Staff time
Estimated NON-320 Cost:	\$61,565
Estimated Leverage:	\$53,211



ADMINISTRATION AND FINANCIAL

APNEP ADMINISTRATION

APNEP staff is responsible for the coordination, planning and successful completion of APNEP functions, including Management Conference, and Action Team meetings, APNEP forums and other APNEP-sponsored/partner events. In addition, staff monitors, and often becomes involved in, activities of state resource management agencies that relate to CCMP implementation, APNEP mission, and the Albemarle-Pamlico watershed or estuary. Staff also attends meetings, conferences and workshops in order to stay apprised of technological advancements that may prove beneficial in the APNEP region and the partnership. Although the Policy Board and Advisory Committees are instrumental in identifying local environmental issues and prioritizing management actions within each basin, most management actions are implemented by various state agencies on a local, basin-wide, regional or statewide basis and require staff involvement and interactions.

Indirect Costs

Under the 2017-18 *Negotiated Indirect Cost Agreement* between NCDEQ and the US EPA, the Division of Water Resources indirect rate is 15.1% of all salaries supported by this federal grant. Estimated indirect costs will be \$29,061 based on the indirect rate for grant-supported salaries. *For the purposes of this budget the rates was applied to all positions funded under the Section 320 / NEP grant regardless of the position being currently created or occupied. Indirect increased from 8.7% to 15.1% for this year. This resulted in a increase in indirect cost by \$22,562.*

Administrative Costs

Overall administration costs during 2017-18 are estimated at approximately \$438,727 and include salaries, benefits, longevity pay, equipment, supplies, office and office and storage space rent, IT services and phone, and training and development.

Personnel*

Presently, the APNEP staff consists of the APNEP office in Raleigh, with the Director, Program Scientist, Program Manager, Policy and Engagement Manager, Ecosystem Analyst, and Program Associate. The APNEP office in Washington, NC houses the Coastal Habitats Coordinator. The Virginia Department of Environmental Quality also provides personnel to support CCMP implementation, however this position is not covered under program administration as it occurs at no cost to the program, and is provided in support of APNEP and CCMP implementation.

APNEP Director

The Director administers and coordinates program activities and CCMP implementation, involving interaction with numerous federal and state resource management agencies, universities, interest groups, and the general public. This position manages the post-CCMP grants and associated contracts, provides staff support to the APNEP Policy Board and Advisory Committees, and represents APNEP at local, state, regional and national meetings. Dr. Bill Crowell has been the Director since June 2002.



As of January 1, 2013 the Director position was changed to include duties associated with administration of the NC Clean Water Management Trust Fund (CWMTF). This action was reversed as a result of the 2015 Appropriations Act (*SL 2015-241*) passed by the NC General Assembly in September 2015. This action also led to the relocation of APNEP to within the DEQ Division of Water Resources.

Program Manager

The Program Manager assists the Director to administer the 320 Grant and coordinate and manage APNEP contracting and associated activities within NCDEQ. The position also assists in the development and maintenance of broad support for the APNEP mission and CCMP implementation; provides active support for leadership and strategic direction for Partnership's efforts through CCMP implementation; initiates engagement of key APNEP partners to develop support for joint initiatives in the Albemarle-Pamlico region ; develops tracking mechanisms for performance measures and CCMP implementation efforts; and provides staff support to the Policy Board and Advisory Committees. Dr. Coley Cordeiro has served in this role since December 2016.

Program Scientist

The Program Scientist assists the Director with CCMP administration. This position helps design and implement a comprehensive monitoring strategy and reporting process, guides the Scientific and Technical Advisory Committee (STAC), and reviews project proposals and reports for merit. This position provides staff support to the Policy Board and Advisory Committees. Dr. Dean Carpenter has served in this role since November 2003.

Policy and Engagement Manager

The Policy and Engagement Manager assists the Director and Management Conference with engagement, educational and outreach activities. The position oversees communication strategies, pursues new partnership and funding opportunities, works with program staff to engage in new CCMP implementation actions. It also provides staff support for Management Conference and serves as a liaison on various external working groups. Ms. Stacey Feken has served in this role since March 2016.

Program Associate

The Program Associate supports APNEP education and public outreach activities as well as APNEP field work activities. The position will implement educational and outreach programs; and provides liaison responsibility for the Citizens' Monitoring Network. The position supports field/boat based work with APNEP and its partners. This position will also provide valuable staff support to the Policy Board and other advisory committees. The Policy Board created the position on September 26, 2014. *This position is currently in the NCDEQ-DWR hiring process.*

Ecosystems Analyst

The Ecosystem Analyst coordinates with members of the staff and contributing scientists and managers to analyze and report upon metrics of environmental health within the Albemarle-Pamlico Estuarine System. Responsibilities include: working with partner agencies and researchers to analyze and report upon indicators of watershed and estuarine health,



including identification of monitoring gaps, facilitating and supporting APNEP committees and working groups, and maintaining a current geospatial database and online geospatial products. This position also manages the program's GIS functions. This position also provides valuable staff support to the Policy Board and other advisory committees. The Policy Board created the position on September 26, 2014. *This position is currently in the NCDEQ-DWR hiring process.*

Coastal Habitats Coordinator (Match)

This position provides an essential function as an APNEP liaison to local governments and state agencies. The Coastal Habitats Coordinator (NC) provides coordination and support to local governments and state agencies to enhance CCMP implementation. This position also provides staff support to the Policy Board and Advisory Committees. Jimmy Johnson has served in this role since January 2006. This position also provides support for CWMTF project applications and awardees in the APNEP region. *This position is funded by NCDEQ and provides a portion of the non-federal match for the 320 grant.*

**All positions are administrated in compliance with NC Office of State Personnel rules and policies.*

TABLE of SECTION 320 FUNDED GRANTS and CONTRACTS

APNEP established and managed many grants and contracts since the last workplan from April 2016. An updated description of these items are discussed in the 2016-17 Projects and Activities section of this report.

The following table provides an overview of all active and completed contracts to local entities since the last grant applicant / annual report approved by the Policy Board in April 2016. It only reflects activities funded under this cooperative agreement. The narrative workplan contains descriptions of projects/activities/ contracts/grants funded by other sources.

Additional contracts are anticipated prior to the end of the current federal fiscal year/ reporting period. Any additional contracts / grants in the current federal fiscal year/ reporting period will be reported in the workplan/report next year and in the Year-End Report to EPA Region IV.



GRANTS AND CONTRACTS TO LOCAL ENTITIES

Active or completed: April 29, 2016 to February 24, 2017

See narrative for comprehensive list of partnerships and activities

Project Title	Funded Amount	Project Leader	Purpose	Deliverables	Completion Date	Status
Shad in the Classroom 2016	\$22,000	Friends of the NC Museum of Natural Sciences	Students will raise American Shad in the classroom from egg to releasable fry	Teacher workshop, Shad Release, Podcasts & Film	June 2016	Completed
NC Division of Water Resources Project WET Facilitator Workshop	\$2,000	NC DWR	Workshop to train environmental educators.	Education and Outreach materials, training	June 2016	Completed
Sea Wolf at CMAST Communication Project	\$730.67	NCSU Center for Marine Sciences and Technology	Marine science and STEM opportunities for area high school students through educational programs, presentations, and experiential learning.	Knowledge transfer, Public outreach & involvement, increased environmental awareness	June 2016	Completed
Graduate Fellowship in Estuarine Research 2016	\$5,632	North Carolina Sea Grant	Funding a graduate student fellowship to conduct applied research within the North Carolina portion of the APNEP management boundary.	Knowledge transfer, improved restoration and management techniques, report	July 2016	Completed
Teacher Institute on Watersheds 2016	\$22,000	UNC Institute for the Environment	Develop and Implement a Teacher Institute for up to 24 teachers	Week long Institute, Report	Sept. 2016	Completed
Secrets of the Swamp and River Days	\$3,000	Friends of the NC Museum of Natural Sciences	A two-day, one night field-based workshop for educators in the swamps of the Roanoke River basin.	Teacher workshop, knowledge transfer, education & outreach materials	Sept. 2016	Completed
Coastal Discovery Camps	\$1,668	NCCF	To engage students in outdoor, experiential learning programs.	Education and outreach materials, training	Sept. 2016	Completed

Project Title	Funded Amount	Project Leader	Purpose	Deliverables	Completion Date	Status
East Carolina University Ecosystem Assessment	\$9,998	ECU	Report to provide a management level synthesis of 24 key environmental indicators	Assessment, report	Sept. 2016	Completed
North Carolina State University Ecosystem Assessment	\$9,200	NSCU	Report to provide a management level synthesis of 24 key environmental indicators	Assessment, report	Sept. 2016	Completed
Town of Edenton Wetland Renovation and Environmental Education	\$2,000	Town of Edenton	Project to renovate a constructed wetland in Edenton will help educate the public about the importance of wetlands for treating stormwater and protecting water quality.	Knowledge transfer, Public outreach & involvement, increased environmental awareness	December 2016	Completed
Neuse River Estuary Modeling and Monitoring Project (ModMon)	\$100,000	NC Division of Water Resources	Monitoring and assessment of water quality and environmental conditions	Data, Report and recommendations, monitoring support for NCDWR	June 2016	In Progress
Watershed and Water Quality Planning Workshop	\$500	NCCF	Watershed Planning Workshop	Education and Outreach materials, training	March 2017	In Progress
Effects of Environment on Blue Crab Size: Fisheries Science Place Based Learning and a Reciprocal Transplant Growth Study	\$4,000	Duke University Marine Lab	Outreach and workshops will provide enrichment and place-based education for Mattamuskeet schools' students.	Knowledge transfer, Public outreach & involvement, increased environmental awareness	March 2017	In Progress
NC DMF Recreational Water Quality Monitoring	\$10,074	NC DMF	Bridge funding for bacteria contamination testing in coastal recreational waters.	Monitoring data, report	March 2017	In progress
Sound Economic Development: Creating a Rising Economic Tide for the N.C. Coast	\$4,000	North Carolina Coastal Federation	Stakeholders, practitioners, elected and appointed officials and academia and businesses will discuss opportunities for oyster and coastal environmental restoration.	Workshop, knowledge transfer	March 2017	In Progress



Project Title	Funded Amount	Project Leader	Purpose	Deliverables	Completion Date	Status
WRRI Annual Conference	\$1,000	Water Resources Institute of the UNC System	Sponsorship for WRRI Annual Conference	Knowledge transfer, training	March 2017	In Progress
Ecological Flows	\$18,435	East Carolina University	Assess the status of available flow and related data and analyze these data relative to ecological flows (EF)	Assessment, report	April 2017	In Progress
2017 North Carolina Coastal Conference	\$500	North Carolina Sea Grant	Sponsorship for North Carolina Coastal Conference	Knowledge transfer, training	April 2017	In Progress
Shad in the Classroom 2017	\$24,000	Friends of the NC Museum of Natural Sciences	Students will raise American Shad in the classroom from egg to releasable fry	Teacher workshop, Shad Release, Podcasts & Film	June 2017	In Progress
Discover North Carolina's River Basins Education Program	\$5,000	Office of Environmental Education and Public Affairs, Department of Environmental Quality	Materials provide information about ecosystems and how humans both affect and depend on the health of North Carolina's rivers.	Education and Outreach materials	June 2017	In Progress
Teacher Institute on Watersheds 2017	\$22,000	UNC Institute for the Environment	Develop and Implement a Teacher Institute for up to 24 teachers	Week long Institute, Report	Sept. 2017	In Progress
Low Impact Development Stormwater Strategies	\$15,000	River City Community Development Corporation (RCCDC)	Project to incorporate Low Impact Development Stormwater Strategies into the Renaissance Square Housing Development	Knowledge transfer, improved restoration and management techniques, report	Sept. 2017	In Progress



I. LEVERAGE FUNDS

APNEP has actively sought alternative funding sources for partnership activities and projects to fulfill the CCMP goals. In addition, APNEP sought out additional avenues for collaborating with multiple partners to assist in targeting these program funds towards CCMP and basin-wide goals. Where possible, APNEP worked to cost-share projects to increase the effectiveness or the magnitude of projects, even though in several cases the APNEP was not the primary catalyst for the project or the activity.

APNEP is working to leverage additional funds and support activities through partnerships, projects and grants. APNEP will be working with its Management Conference to develop a strategy for the development of additional funds for CCMP implementation activities.

Additionally, APNEP staff will work with the Management Conference to identify and develop strategies for leveraging funds beyond the EPA section 320 grant funds.

APNEP has been successful in its ability to promote the needs, as well as the successes, associated with natural resource management, protection and enhancement efforts in the A-P region. Several state conservation-funding sources were developed in response to research funded by the Albemarle-Pamlico Estuary Study. Examples of these programs include the Clean Water Management Trust Fund, the Clean Water State Revolving Fund Program, and the North Carolina Conservation Reserve and Enhancement Program.

2017-18

In 2017-18 APNEP will continue to seek additional avenues for collaborating with other partners to assist in targeting funds to support the new CCMP implementation actions and the APNEP mission. Where possible, APNEP will actively seek alternative sources of funding for APNEP activities and projects to fulfill the goals of the CCMP.

2016-17

During the Oct. 1, 2016- Sept. 30 2017 time period APNEP continued to seek partners and additional opportunities for partners in targeting actions and funds towards CCMP implementation.

APNEP submitted its Leverage results in September 2016 to the EPA *NEPORT* database for the time period of October 1, 2015 to September 30, 2016. During this period APNEP leveraged approximately 15 dollars for every dollar received under the grant.



FEDERAL COST SHARE (Budget)

2017 -18 Proposed Budget

Beginning October 1, 2017

The estimated federal cost share grant for each NEP in 2017-17 is \$600,000

Administration (Salaries, benefits**, longevity, rent, supplies, etc.)	\$ 438,727
Management Conference Support	\$ 2,650
Travel	\$ 10,000
<i>Engage: Teacher Institute</i>	\$ 21,000
<i>Engage: Shad in the Classroom</i>	\$ 21,000
SAV Mapping	\$ 55,000
Subtotal	\$ 548,377
Indirect Costs (15.1%)	\$ 51,623
	<hr/>
	\$ 600,000

*** Includes: Benefits are based on Social Security (7.65 %), Retirement (16.33 %) of position's annual salary and Medical Insurance Plan rate of \$5,471 per year per person
Indirect Costs is based 15.1 % of federal salaries.*



*APNEP Policy Board requests that the previous year's budget be included
in the each annual work plan for review and comparison purposes.*

2016 - 17 Proposed Budget

Beginning October 1, 2016

The estimated federal cost share grant for each NEP was \$600,000*

APNEP Administration (Salaries, benefits**, longevity, rent, supplies, etc.)	\$ 428,815
Boards & Committees Support	\$ 2,124
Travel	\$ 10,000
Implementation Projects	\$ 82,000
<i>Engage: Teacher Institute</i>	\$ 24,000
<i>Engage: Shad in the Classroom</i>	\$ 24,000
Subtotal	\$ 599,915
Indirect Costs (8.7%)	\$ 29,061
	\$ 600,000

** Includes: Benefits are based on Social Security (7.65 %) & Retirement (15.31 %) of position's annual salary
Medical Insurance Plan rate of \$5,471 per year and
Indirect Costs based NCDEQ (DWR) request as 8.7 % of federal salaries.



The 2015-16 budget is added to this workplan for additional comparison information.

2015-16 Proposed Budget

Beginning October 1, 2015

The estimated federal cost share grant for each NEP was \$600,000*

APNEP Administration (Staff salaries, benefits**, longevity, rent, supplies, etc.)	\$ 408,910
Boards & Committees Support	\$ 2,500
Travel	\$ 10,000
APNEP Conference	\$ 13,000
Implementation Projects	\$ 50,500
<i>Engage: Teacher Institute 2017</i>	\$ 22,000
<i>Engage: Shad in the Classroom</i>	\$ 22,000
Subtotal	\$ 528,910
Indirect Costs (22.4%)	\$ 71,090
	<hr/>
	\$ 600,000

*** Includes: Benefits are based on Social Security (7.65 %) & Retirement (15.21 %) of position's annual salary
Medical Insurance Plan rate of \$5,378 per year and
Indirect Costs based NCDENR request as 22.4 % of federal salaries.*



NON-FEDERAL COST SHARE (Match)

Summary of Match Requirements

NCDEQ intends to provide \$600,000 for the required 1:1 non-federal match for time period of October 1, 2017 to September 30, 2018. This match will be provided through:

- 1) **In-kind Services:** The North Carolina Department of Environmental Quality (NCDEQ) intends to provide \$92,257 as part of the required 1:1 non-federal match the period of October 1, 2016 to September 30, 2017. This match will be provided by staff support from the Coastal Habitats Coordinator position. The match position is responsible for program administration, support, community involvement and guiding implementation of the APNEP CCMP and the NC Coastal Habitat Protection Plan (CHPP).

<u>POSITION</u>	<u>#</u>	<u>SALARY</u>	<u>EFFORT</u>	<u>Match</u>
Field Representative	1	69,848	1.0	69,848
			Benefits*	1.0
				<u>22,409</u>
			Total In-Kind Service Match:	\$ 92,257

* Benefits are based on Social Security (7.65 %) & Retirement (16.33 %) of position's annual salary, plus Medical Insurance Plan rate of \$5,659 per year.

- 2) **In-kind Project Expenditures Non-federal Match:** The NCDEQ intends to provide \$507,743 as part of the 1:1 non-federal match for the period of October 1, 2017 to September 30, 2018. The expenditure of non-federal funds will be provided through water quality improvement projects in one or more of the APNEP river basins. State funds allocated to cover costs associated with water quality improvement projects through funding of the Division of Water Infrastructure for one or more projects in the APNEP program boundary.

Division of Water Infrastructure

The North Carolina Division of Water Infrastructure provides financial assistance for projects that improve water quality. Programs within the division fund many types of projects, including sewer collection and treatment systems, drinking water distribution systems, water treatment plants, storm water management systems, and stream restoration. The Division supports the State Water Infrastructure Authority (SWI), which was created in 2013, under North Carolina General Statute 159G-70. The SWI Authority is an independent body with primary responsibility for awarding both federal and state funding for water and wastewater infrastructure projects.

Summary of Non-federal State Match

In-kind Position (salaries and benefits)	\$ 92,257
Water Quality Improvement Project(s) Expenditures:	<u>\$ 507,743</u>
TOTAL:	\$ 600,000



TRAVEL

APNEP, the Management Conference and EPA consider personal, face-to-face contact with peers and colleagues essential for information sharing and technology transfer. As part of the federal grant requirements to attend EPA-NEP meetings, APNEP is required to allocate minimum of \$10,000 as travel funds for program activities, enhancement, education, and outreach support. These funds are to be used for activities such as:

- 1) Presentations at or participation in national or regional NEP and EPA meetings
- 2) Presentations at or participation in workshops or conferences
- 3) Travel to other NEPs or communities to provide peer-to-peer technical assistance
- 4) Travel to other NEPs or watersheds for assistance
- 5) Travel by NEP staff or stakeholders from other NEPs or watershed programs to provide NEP with assistance
- 6) Travel to national or international conferences to share information on the NEP

Travelers may include management conference members, citizens, and members of environmental or public interest organizations, business or industry representatives, academicians, scientists or technical experts. As a requirement of this grant agreement, members of the APNEP core staff are required to attend all meetings called on behalf of the NEPs.

These funds cannot be used to pay for travel of Federal employees.

While most travel funds are associated with staff, management conference members, and action team participants; travel funds may occasionally be used for light refreshments and/or meals served at meetings, conferences, training workshops and outreach activities (events), consistent with 41 CFR 301-74.7 and NC DEQ travel policies, and as approved by the Director.

Travel 2016-17

APNEP staff attended a number of meetings and conferences using the allotted travel funds and specific project funds or administration costs. Below is a summary of these activities that have occurred or are currently planned for the year:

Personnel	Dates	Purpose	Location	Estimated Cost
APNEP Staff/ Board/ Volunteers	10/1/15 to 9/ 30/16	Normal Program Activities/ projects/ workshops/ conferences/ fieldwork	APNEP area	7600*
Crowell	3/2016	Spring EPA / NEP Meeting	Washington, DC	1100
Crowell	8/ 2016	NC Planning Conference	Asheville, NC	300
Cordeiro	12/16	RAE/ANEP	New Orleans, LA	1000
Total*				\$ 10,000

*Estimates up to September 30, 2016

Projected Travel 2017-18

All travel is allocated into three categories: In-State, Out-of-State, and EPA Required. All travel; including non-staff must be consistent with published NCDEQ travel policies (2010) and regulations (<http://www.enr.state.nc.us/ooc/pdf/trav.pdf>). Due to the dynamic nature of the NEP, all travel cannot be scheduled a year ahead; therefore, only an estimate can be provided based on established NCDEQ rates (below). Some travel is associated with specific projects, and travel costs are included in budgeted amounts. Rates are listed in the table below.



Funds will also be used for light refreshments and/or meals served at meetings, conferences, training workshops, and outreach activities (events), consistent with 41 CFR 301-74.7, and as approved by the APNEP Director and the DEQ travel approval processes.

2017-18* NC DEQ TRAVEL RATES

Item	In-State	Out of State	Overnight Trip	Day Trip
Breakfast	\$ 8.30	\$ 8.30	Leave Office before 6:00 AM	Leave Office before 6:00 AM; Extend workday by 2 hours
Lunch	\$ 10.90	\$ 10.90	Leave Office by 12:00 Noon; Overnight return after 2:00 PM	Never claimed on day trip
Dinner	\$ 18.70	\$ 21.30		Depart office before 5:00 PM; Return after 8:00 PM; Workday extended by 3 hours
Hotel	\$ 67.30	\$ 79.50		Never claimed on day trip

* current rates

In State:

In-state travel is primarily for program staff to conduct routine business associated with APNEP daily operations, field work, staff training or topical meetings germane to the program. It may also cover non-staff for NEP business (i.e., board and committee members, guest speakers, and experts). Rates are listed above.

EPA/NEP-associated Out-of-State:

The NEPs generally hold two national meetings each year (these may be in same fiscal year or not). Each program is strongly encouraged to participate in the meetings. The spring meeting is held in the Washington, DC area and the fall meeting location rotates among the different NEP locations. The level of staff participation will vary depending on the agenda for a particular meeting. Generally one or two staff members attend. Travel may also cover non-staff (e.g., Policy Board or Advisory Committee members).

Other Out-of-State:

Out-of-state travel is primarily for program staff to conduct business associated with the NEP, and to attend training or topical meetings germane to the program. It may also cover non-staff (e.g., board and committee members, guest speakers, experts) for NEP related activities.

2017-18 Projected Travel (estimate)

Personnel	Date	Purpose	Location	Estimated Cost
APNEP Staff & volunteers	10/ 2017 to 9/ 2018	Normal program activities	Albemarle – Pamlico Region	\$7,600
APNEP Staff	5/ 2017	EPA/NEP national Spring meeting	Washington, DC	\$1,200
APNEP Staff	12/ 2017	EPA/NEP national fall meeting	TBA	\$1,200



APPENDIX A: 2013 EPA Program Review

2013 Program Review

The EPA Coastal Management Branch conducted an on-site program evaluation of APNEP with staff, Management Conference members, and program partners between April 29 and May 1, 2013. APNEP submitted the required evaluation materials in February. A copy of the submitted program review package is available from the APNEP Office.

A September 30, 2013 letter stated that the EPA found that APNEP continues to make “significant progress” in implementing its CCMP and determined that the APNEP “passed” the 2013 Program Evaluation and is eligible for continued funding under §320 of the Clean Water Act. A copy of the review letter is attached.

Staff are working to address the challenges presented in time for the next program review which is scheduled to occur in 2018.





UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

SEP. 30 2013.

OFFICE OF WATER

John E. Skvarla, III, Secretary
North Carolina Department of Environment
and Natural Resources
1601 Mail Service Center
Raleigh, NC 27699-1601

Dear Secretary Skvarla:

The purpose of this letter is to provide the results of the U.S. Environmental Protection Agency's (EPA) 2013 Program Evaluation (PE) of the Albemarle-Pamlico National Estuary Partnership (APNEP). We want to thank APNEP's Director and staff, as well as their many partners, for the PE package, the site visits, and their responses to our follow-up questions about the package. We also appreciate APNEP's facilitation of the PE Team's site visit that enabled the Team to meet APNEP staff and visit project sites and leaders in the Program's study area.

The PE benefited from the voluntary participation of Troy Rice, Director of the Indian River Lagoon National Estuary Program, who served in an ex officio capacity on the PE Team. Mr. Rice's participation provided other Team members (Marilyn Katz, EPA Headquarters, and Rhonda Evans, EPA Region 4) with an invaluable National Estuary Program (NEP) director's perspective on the perceived strengths and challenges of the Program. He also shared ideas that might be useful for the Program and received insight into APNEP work that he can apply to his own NEP.

The primary purpose of a PE is to help the EPA determine whether the 28 programs included in the NEP are making adequate progress implementing their Comprehensive Conservation and Management Plans (CCMPs). The evaluation process has considerably enhanced EPA Headquarters and Regional knowledge of each individual NEP and promoted sharing of innovative projects and approaches across the NEPs. In addition, EPA uses the evaluation process to assess how the NEPs support Clean Water Act (CWA) core programs and to evaluate the extent and effectiveness of the NEPs' contributions to achievement of one relevant EPA *2011-2015 Strategic Plan* goal—Goal 2: Protecting America's Waters, Objective 2.1, Protect Human Health and Objective 2.2, Protect and Restore Watersheds and Aquatic Ecosystems.

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Based on the PE Team findings, APNEP made significant progress implementing its original 1994 CCMP during the first three years of the review period and demonstrated that it was making significant progress implementing its 2012 CCMP during the fourth year of the review period. We are pleased to announce that APNEP has passed the 2013 PE and is eligible for continued funding under §320 of the CWA.

2013 Program Evaluation Findings

The following summary highlights the PE Team's key findings by identifying APNEP's: (I) Progress Made in the Areas Highlighted in the 2009 Program Evaluation, (II) Support of CWA Core Programs, (III) Strengths, and (IV) Challenges. This summary is intended to recognize the Program's successes and to recommend efforts to further strengthen the Program. The Program's response to these recommendations will be evaluated in the next PE cycle.

I. Progress Made in the Areas Highlighted in the 2009 PE Review

Program Implementation and Reporting--Maintaining Visibility and Independence

The 2009 PE findings letter recommended that the North Carolina Department of Environment and Natural Resources (DENR) re-locate APNEP from the Division of Natural Resource Planning and Conservation (Division) to which the Program had been moved in 2007 to a different organizational home in which the Program would be more visible, independent, and able to fully play a leadership role in the Albemarle-Pamlico estuarine system protection and restoration. While DENR did not re-locate APNEP during the 2009-2012 period, it moved APNEP from a "division" to an "office", which helped to make the Program more visible and influential. The move enabled APNEP and the entire Management Conference to develop more credibility as an autonomous entity independent of any particular political party, agency, stakeholder, or interest group. It ensured that the Program complied with the governance provisions of NEP authorizing language--§320 of the Clean Water Act and associated policy.

As a result, during the review period the Program:

- continued to increase the number of important partnerships with other DENR programs as well as with federal agency, non-governmental organization, and academic research scientist groups in order to complete and begin full-scale implementation of its significantly-enhanced CCMP;
- made full use of social media tools, which greatly enhanced the Program's on-line presence and raised awareness of estuarine protection and restoration issues on the part of the general public, and
- worked to engage the public in development of the 2012 CCMP.

Ecosystem Status and Trends--Demonstrate Environmental Progress

The 2009 PE findings letter also called for expedited completion of the Program's Science and Technical Advisory Committee monitoring plan, implementation of the monitoring program, and initiation of a State regional ecosystem assessment that would influence decision makers' allocation of



monitoring resources. In addition, the findings letter recommended that APNEP draft a strategy for measuring the achievement of environmental results stemming from Program-supported projects.

The PE Team found that during the 2010-2013 review period, the Program took very important steps to set the stage for demonstrating environmental progress. The Program focused considerable effort on reforming its approach to estuarine protection and restoration by completing both the new *2012-2022 Comprehensive Conservation and Management Plan* that reflects an ecosystem-based management approach to estuarine protection and restoration and the *2012 Albemarle-Pamlico Ecosystem Assessment* (Assessment). The Assessment provides information about the study area's ecosystems and is intended to guide policy and management decision making about monitoring and priority efforts to sustain the region's significant resources. The NEP Science and Technical Advisory Committee (STAC) Executive Board guided development of the Assessment and oversaw the peer review of individual indicator assessments included in the document.

The Program also supported research that helped identify significant data gaps that warrant additional monitoring or sampling. The Assessment includes discussion of those gaps and presents a common indicator monitoring proposal template for a long-term monitoring strategy. In the coming years, the Program will continue to develop indicators, including socioeconomic indicators, and identify ecosystem targets necessary to track CCMP implementation.

The Program acknowledged in 2013 PE documentation that it deferred new monitoring plan development until APNEP was in a position to identify ecosystem outcomes, metrics, and targets. Over the next five years EPA expects that the Program will have completed development of an integrated monitoring strategy and that priority monitoring will be well underway. The Ecosystem Assessment provides a strong foundation for the development of the monitoring strategy. Based on mapping completed last year, seagrass abundance/distribution could be a measure to which the Program might aspire. Other metrics could be chlorophyll *a*, total nitrogen, or total phosphorus concentrations.

II. Support of CWA Core Programs

EPA commends APNEP for working with its partners to reduce potential nutrient inputs to the system. The Program's assessment of water quality trends and monitoring needs, DENR's stakeholder forum on nutrient loadings, the Program's development of a *Nitrogen Loss Estimation Worksheet*, and the STAC's support of science-based standards are all evidence of an increased focus on nutrient issues.

Annual work plans for the years 2009-2012 included the following activities that supported CWA core programs:

- the Chowan Healthy Waters Initiative—APNEP was instrumental in coordinating with the bi-state team working on this initiative, which targets protection of the healthiest waters in the Chowan River Basin watershed;
- wastewater infrastructure risk analysis and planning—APNEP garnered federal, state, and local resources to analyze wastewater treatment systems in the towns of Columbia and Manteo (North Carolina) and provided recommendations to municipal staff about how to improve the resiliency of those systems in a cost-effective manner;

- restoration projects—APNEP initiated, funded, and participated in numerous restoration projects including hydrologic restoration at Dismal Swamp and Alligator River National Wildlife Refuges, several oyster restoration projects, demonstration projects for stormwater treatment and detention projects, rain gardens, nature trails, natural landscaping demonstrations and a number of wetlands and riparian buffer restoration projects;
- local area leadership activities—APNEP funded a number of projects aimed at enhancing local government and teacher knowledge about CWA programs and ways to enhance CWA program implementation. Projects included: (1) a “Coastal Growth Leadership Training for Local Governments” event, (2) sponsorship of annual teacher training institutes and outdoor classroom symposia, (3) sponsorship of an agricultural BMP symposium, (4) funding of several county water reuse and rainwater harvesting demonstration projects, and (5) sponsorship of a Coastal Explorations Workshop for formal and informal educators; the workshop purpose was to develop curricula for 3rd to 5th grade teachers;
- research and monitoring initiatives—APNEP provided funds and assistance to a number of area universities and non-governmental organizations for research on the effectiveness of restoration projects, river herring sampling, and water quality monitoring efforts like FerryMon—a partnership among North Carolina Department of Transportation ferries, University of North Carolina-Chapel Hill, and Duke Universities, and the DENR Division of Water Quality that monitors water quality and habitat changes within the Sounds; and
- supported the Citizen’s Advisory Committee and the Science and Technical Advisory Committee in their efforts to provide leadership on identification of, initiation and completion of numerous projects that support CWA core program implementation.

III. Strengths

Program Implementation and Reporting--Publication of Two Crucial APNEP Documents

The PE Team was very impressed by the Program’s completion and release of two key documents—the *2012-2022 Comprehensive Conservation and Management Plan (CCMP)* and the *2012 Albemarle-Pamlico Ecosystem Assessment (Assessment)*. The PE Team found the updated CCMP to be a holistic, ecosystem-based management plan that lays the groundwork for effective watershed management of the study area’s natural resources in the coming years. The PE Team noted the fact that the CCMP’s three over-arching goals derive from ecosystem-based management principles, i.e., the goals take into account the need for both natural resource health and human well-being. The PE Team also was impressed by the fact that CCMP outcomes, objectives, and priority actions are based on the Program’s rigorous analyses of study area conditions and established partner actions. In addition, the PE Team liked the straightforward and comprehensive focus of the three CCMP goals—the sustenance of human communities, the health of native living resources, and healthy and abundant water resources.

The PE Team also appreciated that the Assessment brings together in one document essential data about the biological, physical, and chemical characteristics of the estuarine ecosystem as well as data about human population and extent of land cover across the study area. In addition, like the CCMP, the Assessment is a major tool to inform policy and natural resource decision making. The Program and its partners will use the Assessment to help establish protection and restoration priorities, identify emerging issues that need heightened management attention, and determine where there are gaps in scientific understanding of particular ecosystem conditions.

The PE Team congratulates DENR leadership--Dr. Crowell and Dr. Carpenter--for having had the vision, collaborative skills, and determination to lead the development and completion of the updated CCMP and the Assessment. Also, the Team acknowledges that collaborative effort between DENR and the Virginia Institute of Marine Sciences that was crucial to development of the CCMP. Adoption of the ecosystem-based management plan and the Assessment, both of which are based on widely-accepted watershed-management principles, has put APNEP in a leadership role within the wider estuarine management community as well as within the community of federal, non-governmental organization, and academic partners focused specifically on the Albemarle-Pamlico system. The Program now has the standing to inform decision makers about policies and programs to effectively address current and emerging challenges to that system.

Ecosystem Restoration and Protection (Habitat and Water Quality)--Partnerships with Expert Scientists

APNEP is one of many NEPs that has forged extensive partnerships with applied research scientists from federal agencies like the U.S. National Oceanic and Atmospheric Administration, the U.S. Fish and Wildlife Service, and from the North Carolina Division of Marine Fisheries. During the review period, the Program formed partnerships with scientists who have expertise in such areas as: (1) shallow habitat nitrogen cycling and oyster de-nitrification, (2) native fish populations, essential fish habitat, and fish hatcheries; (3) stormwater runoff microbial source tracking, (4) impacts of land use on nutrient and sediment loadings in coastal streams, (5) aerial mapping of submerged aquatic vegetation, (6) sentinel site restoration and monitoring, and (7) sea level rise.

In addition, during the review period senior scientists from federal and state agencies as well as from academic institutions demonstrated their commitment to the Program and its mission by serving on the Science and Technical Advisory Committee (STAC), which helped develop the Assessment. By forging partnerships with a variety of scientists, the Program brought world-class expertise to bear on CCMP priority issues and challenges and reinforced the importance of fully engaging the scientific community in evidence-based approaches to addressing stubborn challenges in the study area like excess nutrient loads, loss of fish habitat, coastal erosion, and sea level rise.

Outreach and Public Involvement--Development and Implementation of a Social Media Strategy

The PE Team was very impressed by the development and implementation of a social media strategy and associated tools. The Program now has an important on-line presence, and is well-positioned to raise awareness about study area natural resources and to educate even more audiences than it already has via its intensive teacher education workshops and school demonstration projects. The strategy is a model for how NEPs can effectively use new media to expand the number of individuals and communities with a basic knowledge of the ecosystem and with a good understanding of ways that they can participate in its protection and restoration. The PE Team recommends that the Program take advantage of opportunities to present information about the strategy at local and national meetings, especially at EPA-NEP national meetings and those sponsored by the Association of National Estuary Programs.

IV. Challenges

Program Implementation and Reporting--Maintaining Visibility and Independence

Given the success of APNEP efforts to increase the Program's visibility and influence and the importance of Program independence to effective CCMP implementation, EPA looks forward to DENR's continued support of APNEP autonomy to manage and implement its programs and activities as specified in the terms and conditions of every future assistance agreement and as called for by the APNEP Policy Board. However, the PE Team remains concerned about APNEP's visibility and independence, and notes that the Program must operate under a governance scheme that supports the decisions of its Management Conference as called for by §320 of the Clean Water Act. The Governor's Executive Order establishing APNEP provides important guidance about governing principles for the Program.

In light of recent personnel policy changes announced by DENR, the Department is reminded that APNEP staff positions are funded via the annual federal EPA assistance agreement and that Program staffing levels as well as Program and position assignment decisions require the consensus of the APNEP Policy Board. To continue effective program operations and successful CCMP implementation, APNEP should maintain current staffing levels, which include the Program's established positions of Program Director, Program Scientist, Project Manager, Policy and Engagement Manager, and Coastal Habitat Coordinator. Also, information gathered during the PE Team's site visit indicated that the Program has lacked adequate administrative support for many years. To better support APNEP, the PE Team encourages DENR to provide the Program with much-needed direct administrative support.

Ecosystem Status and Trends—Need for Assessment and Monitoring

Now that the 2012-2022 CCMP and 2012 Assessment are in place, the Program needs to focus on development of a long-term monitoring plan and of indicators of ecosystem and socio-economic conditions. The PE Team recognizes that the size of the study area, its diversity of natural resources, and the distribution of its human population pose special challenges to those attempting to assess and monitor ecosystem conditions. The Program will need support from DENR senior and division leadership while also leveraging other state and federal agency partner resources in order to develop and implement a full-scale monitoring plan and to effectively track indicators of condition.

Ecosystem Restoration and Protection—Need to Measure and Report on Short-term Project Outcomes

The Program should work to develop a protocol for measuring the short-term outcomes of projects and to establish and document project baselines against which to measure, track, and report on progress. These steps would move the Program beyond CCMP Update and Assessment to measurement of project success. They would also promote the Program as an entity committed to producing environmental results. Additionally, the Program's engagement with the North Carolina Watershed Restoration and Improvement Team, Chowan River Roundtable, the South Atlantic Landscape Conservation Cooperative, and the Southeast Natural Resource Leadership Group Pilot Project Development should provide APNEP opportunities to enhance regional partnerships and can facilitate

the joint achievement of both CCMP goals and the goals of these collaborative networks. This would place the Program in a regionally significant leadership position to leverage projects with new partners and focus these larger groups toward meeting the goals of the CCMP.

Ecosystem Restoration and Protection—Need to Address Nutrient Criteria

The multiple ecosystem outcomes under APNEP's CCMP Goal 3 are intended to ensure that contaminants do not harm species dependent on waters of the Albemarle-Pamlico Estuarine System. One contaminant class long targeted by APNEP and included in CCMP Ecosystem Outcome 3b is nutrients, specifically, forms of nitrogen and phosphorus. A well-established regulatory tool in the water quality manager's toolbox is the establishment of state water quality standards, which include a designated use and criteria. Numeric nutrient criteria (NNC) are favored by EPA for the designated use of protecting aquatic life. While North Carolina's Division of Water Resources, has established a numeric chlorophyll-*a* criteria, it has yet to embrace NNC as a complementary water quality management tool.

EPA recognizes that as a non-regulatory entity, APNEP can't develop (in the case of nutrient concentrations) nor revise (in the case of chlorophyll-*a* concentrations) numeric water quality criteria per se. But, EPA proposes over the next five years to conduct the following activities to ensure that water quality criteria in the Albemarle-Pamlico Basin help meet CCMP Ecosystem Outcome 3b:

- work with partners to collect water quality monitoring data,
- support the development of models,
- facilitate stakeholder involvement in nutrient management,
- investigate relationships between contaminant loads and living resources, and
- propose scientifically-based targets that DWR may consider as numeric criteria.

Also, in the revised CCMP, nutrient management is addressed either implicitly or explicitly under multiple plan objectives. The PE team commends APNEP on its current approach to addressing the nutrient management issue by identifying several CCMP actions such as: C1.1--Establish contaminant strategies for waters not meeting water quality standards), C1.2--Facilitate the implementation of existing contaminant management strategies), and D1.4--Coordinate outreach efforts regarding the proper application of fertilizers to reduce nutrient runoff).

Program Implementation and Reporting—Financial Strategy

The PE Team recognizes that APNEP is dependent on §320 funding and state match for most of its financial resources and that it can sometimes be challenging to collaborate across program boundaries. However, the Team encourages DENR to assist the Program in leveraging the resources of other DENR and state programs. Those efforts will help promote the Program's mission and to raise its visibility among those who are unfamiliar with APNEP. These efforts also may provide new opportunities to leverage projects with new partners, and may promote the adoption of holistic approaches to estuarine protection and restoration by those partners.

The PE Team also recommends that over the next three years, APNEP develop a strategy and funding plan for its communications efforts and identify a tool for assessing the impact of its



investments in communications and outreach, including in social media. By following up on this recommendation, the Program will effectively engage planning and adaptive management tools to set goals for and assess the effectiveness of its outreach and communications efforts. Program follow-up on this recommendation will also demonstrate that the Program is results-driven and works to provide deliverables in the most efficient manner.

Thank you again for participating in the PE process and for DENR's support of APNEP. The Program is poised to make significant progress implementing the 2012-2022 CCMP. We welcome any additional thoughts you may have either about the evaluation process itself or about EPA's involvement in the implementation of the APNEP CCMP. If you have any questions or comments, please contact me at (202) 566-1244.

Sincerely,



Bernice L. Smith, Ph.D., Chief
Coastal Management Branch

cc: Brad Ives, DENR, Assistant Secretary for Natural Resources
Dr. William L. Crowell, Jr., Director, APNEP
Todd Miller, Chair, APNEP Policy Board
Linda Pearsall, DENR, Director of Office of Communications,
Planning and Community Affairs
Benita Best-Wong, U.S. EPA Headquarters
Paul Cough, U.S. EPA Headquarters
William Cox, U.S. EPA Region 4
Jennifer Derby, U.S. EPA Region 4
Dr. Linda Rimer, U.S. EPA Region 4
Troy Rice, Director, Indian River Lagoon
National Estuary Program
Rhonda Evans, U.S. EPA Region 4
Marilyn Katz, U.S. EPA Headquarters

APPENDIX B: 2012 CCMP GOALS AND OUTCOMES

Goal 1: A region where human communities are sustained by a functioning ecosystem

Ecosystem Outcomes:

- a. *Waters are safe for personal contact.*
- b. *Designated surface and ground water supplies are safe for human consumption.*
- c. *Surface hydrologic regimes sustain regulated human uses.*
- d. *Fish and game are safe for human consumption.*
- e. *Opportunities for recreation and access to public lands and waters are protected and enhanced.*

Goal 2: A region where aquatic, wetland, and upland habitats support viable populations of native species

Ecosystem Outcomes:

- a. *The biodiversity, function, and populations of species in aquatic, wetland, and upland communities are protected, restored, or enhanced.*
- b. *The extent and quality of upland, freshwater, estuarine, and near-shore marine habitats fully support biodiversity and ecosystem function.*
- c. *Non-native invasive species do not significantly impair native species' viability or function, nor impair habitat quality, quantity, and the processes that form and maintain habitats.*

Goal 3: A region where water quantity and quality maintain ecological integrity

Ecosystem Outcomes:

- a. *Appropriate hydrologic regimes support ecological integrity.*
- b. *Nutrients and pathogens do not harm species that depend on the waters.*
- c. *Toxics in waters and sediments do not harm species that depend on the waters.*
- d. *Sediments do not harm species that depend on the waters.*

Mission

To identify, restore, and protect the significant resources in the Albemarle-Pamlico estuarine system.

