



**2019 – 2020 Annual Progress Report
and
Work Plan**

October 1, 2018 – September 30, 2019

Submitted to the APNEP Leadership Council
for review on May 14, 2019

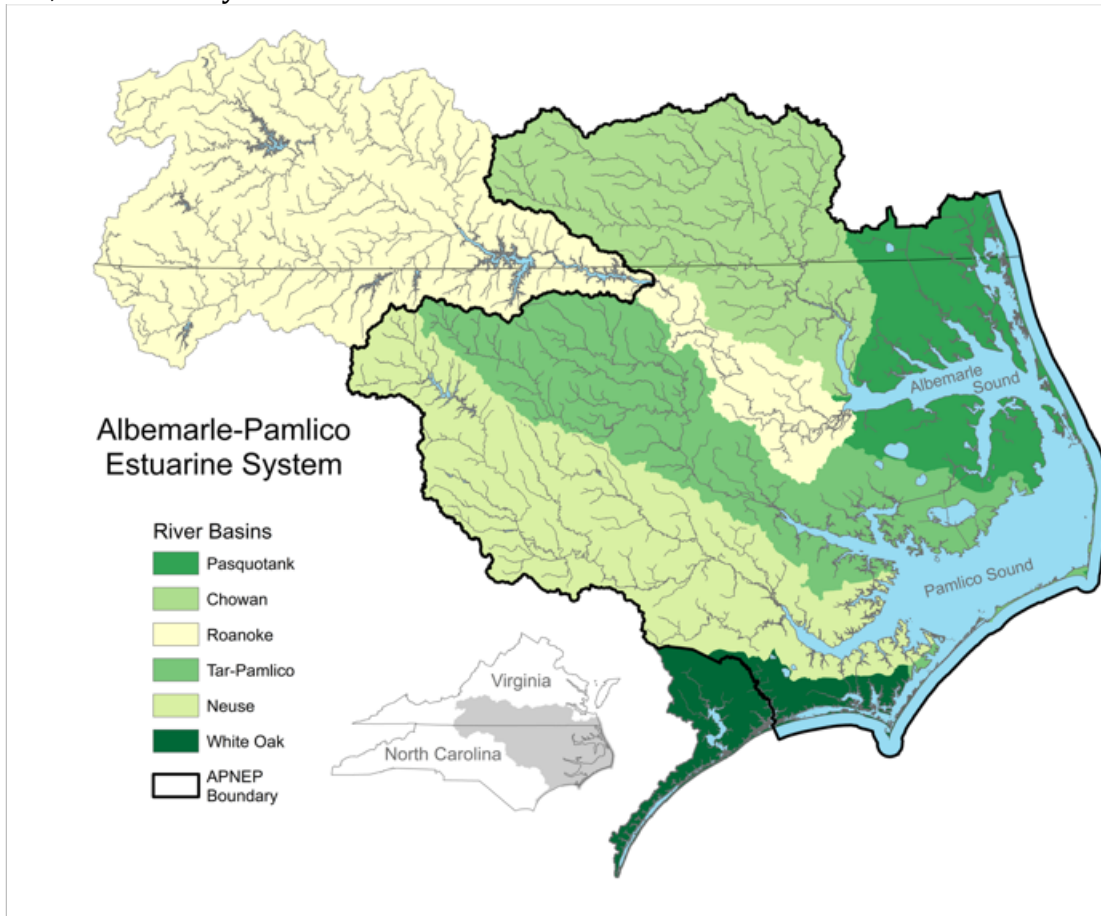
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INTRODUCTION

The Albemarle and Pamlico Sounds comprise the nation's largest semi-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. It was one of the first programs established under amendments to the Clean Water Act in 1987. APNEP's mission is to identify, protect, and restore the significant natural resources of the Albemarle-Pamlico region. The Partnership is a cooperative effort currently hosted by the N.C. Department of Environmental Quality under a cooperative agreement with the EPA and works closely with the Commonwealth of Virginia. The Partnership also works closely with both Region III and IV of the EPA.

APNEP's 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](#) was created in a stakeholder-driven process with an ecosystem-based management approach and is

intended as a practical, cost-effective and equitable approach to managing the valuable resources within the Albemarle-Pamlico region.

As authorized in [N.C. Governor's Executive Order #26 \(2017\)](#), APNEP staff are advised by a Management Conference composed of a Leadership Council, Science and Technical Advisory Committee, and an Implementation Advisory Committee.

EXECUTIVE SUMMARY

Annual Work Plan Purpose

The 2019-2020 Annual Work Plan and associated budget presents information about the Albemarle-Pamlico National Estuary Partnership's completed projects from May 2018 to October 2019, as well as ongoing and proposed projects for the fiscal year beginning on October 1, 2019.

This Work Plan and the associated grant application represent a funding request of \$600,000 for year five (10/1/19 to 9/30/20) under cooperative agreement *CE-0D20614* between the US Environmental Protection Agency (EPA) and the North Carolina Department of Environmental Quality (NCDEQ). Under this application an additional supplemental funding amount of \$25,000 in FY2019-2020 was made available to APNEP by the EPA for *Assisting Underserved Communities with Incorporating Resiliency into Local and Regional Planning Processes*.

The purpose of this cooperative agreement is to support implementation of the management strategies recommended in APNEP's [2012-2022 Comprehensive Conservation and Management Plan \(CCMP\)](#), as well as to support APNEP's mission of identifying, protecting, and restoring the Albemarle-Pamlico region's significant natural resources. The overall period of performance under this Cooperative Agreement is from October 1, 2014 through September 30, 2020.

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2018-2019 Highlights

Key accomplishments from May 2018 to April 2019 are listed below. Details about individual projects or initiatives can be found in the [Ongoing](#) and [Completed](#) Projects sections of this work plan.

Scientific and Technical Initiatives

Submerged Aquatic Vegetation Monitoring and Coordination

APNEP has been a leader in recognizing the value of North Carolina's submerged aquatic vegetation (SAV) resource since the early 2000's and continues to facilitate an SAV Team to coordinate monitoring, mapping, and outreach efforts in the state. By April 2019, the Team has come close to finalizing the 2013-2014 SAV map and has discussed plans for an overall assessment of the status of the resource in the state. An initial plan for an SAV communications campaign in the Albemarle-Pamlico region has been completed by a Masters Thesis student from the UNC-Chapel Hill School of Journalism with the guidance of APNEP staff and will be utilized in 2019 and 2020 to further build knowledge and appreciation of this resource in the state.

Water Quality and Quantity Improvement Projects

Core to APNEP's mission as a program authorized by the Clean Water Act is protecting and restoring the Albemarle-Pamlico region's waters, and in 2018-2019 the Partnership funded or facilitated a number of projects in support of this goal, including:

- **Research:** Through APNEP's Ecological Flows Action Team, the Partnership supported the completion of an assessment of existing ecological flows data for the region. Determination of ecological flows, which support sustainable human and natural communities, has been difficult for the Albemarle-Pamlico region due to data gaps and the tidal influence of the sounds. This assessment has given the Ecological Flows Team vital data to identify next steps towards the eventual determination of regional ecological flows.
- **Planning:** APNEP funded several projects in the region to assist communities in planning for better stormwater management. Through Sound Rivers Inc.'s College Campus Stormwater Impact and Needs Assessment, six college campuses in the Tar-Pamlico and Neuse river basins developed comprehensive reports that identify priority areas for BMP implementation and accompanying educational materials. The LID Stormwater Strategy Development project with the River City Community Development Corporation and NC Coastal Federation enabled LID designs to be incorporated into a housing development for veterans and special needs individuals in Elizabeth City, NC.
- **Monitoring:** Through support for Sound River's Swim Guide program and NC Division of Marine Fisheries' Recreational Water Quality Monitoring program, APNEP is expanding the collection of water quality data for our region and prioritizing public health. Both programs monitor water quality with the primary goal of alerting local communities to potentially hazardous conditions, and the Swim Guide program has the added benefit of operating through citizen scientists, providing an additional educational and outreach benefit.

Communications and Outreach

Long-Term Watershed Outreach Projects

APNEP's long-term support for the Summer Teacher Institute, a multi-day environmental and outdoor education professional development opportunity for the region's educators, has reached approximately 25 teachers each year since its inception in 2004. The UNC Institute for the Environment's ExPLORE NC program, which included the Teacher Institute as part of a year-long watershed-wide professional development experience, had up to 50 contact hours per teacher per year and significantly increased teacher knowledge of local ecosystems and watershed science, confidence in using the outdoors to teach required curriculums, and science teaching and outdoor science teaching self-efficacy beliefs.

Long-term APNEP support for the NC Museum of Natural Science's Shad in the Classroom program has reached approximately 30 educators each year since 2011, and through those educators over 1000 students each year. From 2010 (pre-APNEP funding) to 2018, the program has been able to grow from 13 classrooms to 30 classrooms across the region.

Long-term support for these programs has enabled them to become collaborative initiatives that involve many regional, state, and local partner organizations, refine and continually improve on their outreach strategies, and gather relatively long-term data on program efficacy and impact.

New APNEP Website and Interactive Project Map

APNEP's new website was unveiled in March 2019 and is being improved on an ongoing basis. The new site is mobile-friendly and built with improved accessibility for those with visual, hearing, or motor impairments. It includes updated and refreshed information about what makes APNEP unique as well as the value the Partnership brings to the Albemarle-Pamlico region. Featured on the new site is an interactive map of 2012-2019 funded projects, increased and up-to-date information about current initiatives, and improved integration with APNEP's social media platforms.

Partnership-Building and Regional Coordination

NC Aquatic Nuisance Species Management Plan Committee Coordination

In 2018, APNEP staff began working with the members of North Carolina's Aquatic Nuisance Species Management Plan Committee to facilitate the completion of the plan in 2019. This state plan for coordinated management, research, and outreach of aquatic nuisance species, once finalized and federally approved, will make North Carolina eligible for federal funding to support the plan's implementation. Improved coordination and collaboration across state agencies will leverage limited resources available for invasive species management in North Carolina.

Virginia-North Carolina Memorandum of Understanding Implementation

Since facilitation of an MOU between the NC Department of Environmental Quality, NC Department of Natural and Cultural Resources, and Virginia Secretary of Natural Resources in 2017, APNEP has been working to implement this Memorandum through strengthened partnerships and targeted initiatives. In the past year APNEP helped to organize the North Landing River and Albemarle Sound Estuarine Symposium in Virginia Beach, which fostered partnerships between Virginia and North Carolina stakeholder groups on environmental issues in the states' shared river basins. APNEP leads the Coordination Committee of the Virginia Alosa Task Force (VATF) to encourage

coordination of VATF members from Virginia and North Carolina on monitoring and management of anadromous fish in interjurisdictional waters. In addition, APNEP organized a panel at the 2019 NC Water Resources Research Institute (WRRRI) Conference that brought together NC and VA-based resiliency experts and practitioners to share knowledge, lessons learned, and best practices across state lines.

2019-2020 Work Plan Summary

In 2019-2020, APNEP staff will focus on the following programs and initiatives. Details about individual projects can be found in the [Ongoing](#) and [Proposed](#) Projects sections of the work plan.

Scientific and Technical Initiatives

Development of Monitoring Strategy and Ecosystem Indicators

With the input of its Science and Technical Advisory Committee (STAC), APNEP plans to complete development of its monitoring strategy for the region in 2020, as well as identification of high-priority ecosystem indicators and reports on their status in the Albemarle-Pamlico region.

Submerged Aquatic Vegetation Monitoring

- **SAV Mapping:** SAV mapping via aerial imagery and boat-based groundtruthing will take place in spring/summer 2019 and potentially in fall 2019, resulting in the creation of a third map of SAV extent and density in the Albemarle-Pamlico region.
- **SAV Economic Analysis:** APNEP plans to fund an analysis of the economic value of submerged aquatic vegetation in the region and to incorporate the study's findings into future outreach and communication campaigns about the resource.
- **SAV Communication Campaign:** To highlight the value of SAV to the state as well as APNEP's role in monitoring the resource, the Partnership plans to focus outreach and communication efforts on this topic in 2019-2020.

Communications and Outreach

Continuation of Long-Term Outreach Projects

APNEP plans to continue funding for Shad in the Classroom and the Teacher Institute from 2019-2021, at which time continued funding for both programs will be reevaluated. With input from its Engagement and Stewardship Team, in 2019 and 2020 APNEP plans to create and communicate a process for determining continued funding, likely through an open RFP process that will allow APNEP to solicit diverse ideas for its outreach funds.

Development of Updated Printed Outreach Materials and Activities

APNEP is in the process of redesigning its printed materials to target priority audiences and communicate the Partnership's value to the region. New materials will have a more consistent look and feel that will be utilized across the board in APNEP communications.

APNEP is also in the process of revitalizing its outreach activities and materials. While direct outreach and environmental education is not a core focus for the Partnership, APNEP participates in tabling events and environmental education initiatives throughout the year and is updating its materials to make sure that its participation in these events assists in CCMP implementation and is effective and informative outreach.

Installation of Albemarle-Pamlico Estuary Highway Signs

APNEP is working with the NC Department of Transportation to design and install highway signs at the edges of the river basins of the Albemarle-Pamlico region. These signs will raise awareness of the extent of the region and the connectivity of the watershed.

Partnership-Building and Coordination

Aquatic Nuisance Species Coordination and Management

APNEP staff will continue working with the NC Aquatic Nuisance Species Management Plan Committee in 2019-2020 to finalize and submit the Plan for federal approval, and afterwards identify next steps for Plan implementation.

Beginning with an intern in summer 2019, APNEP will be working to assess current aquatic nuisance/invasive species outreach and communications efforts in North Carolina, as well as to begin development of a citizen science-based rapid response/monitoring strategy for aquatic invasives that can be implemented in the Albemarle-Pamlico region.

Virginia-North Carolina Memorandum of Understanding Implementation

APNEP staff will continue working on MOU implementation in 2020 . Three major initiatives that will be the focus of staff efforts are

- Collaborating with the Virginia Institute of Marine Sciences to identify ways to apply the Virginia-focused tools of *Using Natural and Nature-Based Features to Build Resilience to Storm-Driven Flooding* to the North Carolina portion of the APNEP region.
- Continued coordination of the Virginia Alosa Task Force.
- APNEP staff are also working with Lynnhaven River NOW and other Virginia-based agencies and organizations to organize a workshop for teachers in Virginia’s “Southern Watersheds” to raise awareness about the connection of those watersheds to the wider Albemarle-Pamlico region.

Coastal Resiliency Initiatives

Assisting Underserved Communities with Incorporating Resiliency into Local and Regional Planning Processes

With these supplemental 320 funds, APNEP will utilize funding from EPA to help underserved communities develop and implement risk and resiliency plans.

NC Coastal Resiliency Workshops and NC Executive Order 80 Implementation

APNEP staff are assisting the NC Department of Environmental Quality with planning a series of workshops for local governments to share knowledge and resources related to coastal resilience

issues, as well as identify local challenges and needs. APNEP staff are also co-chairing the Coastal Habitats Subcommittee and participating on various other subcommittees of the Natural and Working Lands Stakeholder Group.

Scuppernong Study Facilitation (non 320 funds)

APNEP convened a technical workgroup and submitted a proposal to fund development of a regional water management strategy for the Scuppernong Coastal System. In 2019 and 2020, APNEP will be determining (1) what local government organization can best serve as the administrator for the Water Resources Development Grant funds, and (2) determining APNEP's role in facilitating implementation of this project, a hydrologic study of the Lake Phelps/Scuppernong River area in eastern North Carolina. The study has been identified as a need by local communities and agencies in order to better understand and manage flooding in the region.

Water Level Monitoring Stations (non 320 funds)

APNEP will be working with the North Carolina Emergency Management to install at least three (3) water gages in the Albemarle-Pamlico region. These gages will provide valuable flooding and inundation monitoring data.

2019-2020 PROPOSED BUDGET OVERVIEW

For 2019-2020, APNEP anticipates receiving a grant award of \$600,000 from the EPA to support activities geared towards implementing the Partnership's CCMP and its mission. An additional award of \$25,000 of supplemental funding for APNEP to assisting communities with incorporating resiliency into planning processes will be provided by US EPA.

The proposed uses for this funding are highlighted below. Detailed information about each funding category is described within the work plan.

Activity or Project	2019-20 Budget	2018-19 Budget
<u>Ongoing & New Implementation Projects</u>	\$74,942	\$98,771
<u>Supplemental Funding: Resiliency Project</u>	\$25,000	N/A
<u>Administration</u>	\$460,123	\$441,814
<u>Travel</u>	\$12,000	\$12,000
Subtotal	\$572,065	\$552,585
Indirect Cost	\$52,935	\$47,415
Total Grant Funds	\$ 625,000	\$ 600,000

2018-2019 COMPLETED PROJECTS

The following list provides an overview of APNEP's completed projects since the last annual work plan report was approved by the Leadership Council on April 30, 2018.



Identify: Research and Technical Assistance

Coastal Plain Ecological Flows Evaluation

At a 2016 meeting, the APNEP Ecological Flows Action Team identified an assessment of existing ecological flows data for North Carolina's coastal plain as a regional need. APNEP provided funds to Team Lead Dr. Mike O'Driscoll (ECU) to conduct this assessment and the resulting study, "Existing Data for Evaluating Coastal Plain Ecological Flows in the Albemarle-Pamlico Estuary Region" has assisted the Team in identifying data gaps. The assessment has assisted the Team in determining that conducting pilot studies in selected watersheds is a necessary next step in order to determine if existing data for the region is adequate to determine ecological flows. Collection and centralization of existing data will help material, personnel, and monetary resources to be efficiently distributed toward the ecological flow characterization efforts in the APNEP region.

Partners: East Carolina University (Lead), Duke University
Outputs/Deliverables: Report: ["Existing Data for Evaluating Coastal Plain Ecological Flows in the Albemarle-Pamlico Estuary Region"](#)
Outcomes: Identification of knowledge gaps associated with ecological flows in the NC coastal plain
Cost: \$17,890
Estimated Leverage: \$ 2,000

CCMP Actions: A3.3, D3.2, E2.2
CCMP Outcomes: 2a, 2b, 3a, 2b
CWA Core Programs Addressed: (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program

College Campus Stormwater Impact and Needs Assessment

APNEP provided funds for Sound Rivers, Inc. to conduct a stormwater impact and needs assessment for six college campuses in the Tar-Pamlico and Neuse River basins, including Vance-Granville Community College (four campuses), NC Wesleyan College, and Nash Community College. The objective of this effort was to identify and prioritize stormwater projects that would yield the greatest water quality benefits, as well as dovetail with campus environmental education programs. As a portion of each assessment, stormwater BMPs were recommended and estimates of probable implementation costs of potential projects were provided. Findings from this assessment may be used by Sound Rivers and the colleges to secure funds for project implementation and integrate projects with environmental education curricula.

Partners: Sound Rivers (Lead), Vance Granville Community College, NC Wesleyan College, Nash Community College

Outputs/Deliverables: Comprehensive stormwater reports for each campus outlining areas of concern and campus needs, educational materials and suggested outdoor classroom lessons, and ranking matrix to suggest order of BMP implementation for future work

Outcomes: Increased knowledge of BMPs and opportunities to manage stormwater at each campus; opportunities to implement BMPs and improve stormwater impacts on campuses and surrounding areas

Cost: \$19,500

Estimated Leverage: \$10,561

CCMP Actions: B1.1, C1.5, D1.4, D2.2

CCMP Outcomes: 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3b, 3c, 3d

CWA Core Programs Addressed: (2) identifying polluted waters and developing plans to restore them, (4) addressing diffuse, nonpoint sources of pollution



Ecosystem Protection and Restoration

Low Impact Development Stormwater Strategies

The River City Community Development Corporation collaborated with APNEP, the North Carolina Coastal Federation, and community partners to incorporate Low Impact Development (LID) stormwater management designs and permitting into its new 18-unit multi-family supportive housing development. The collaboration offered 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 included LID measures to prevent polluted runoff from reaching surface waters.

Partners: NC Coastal Federation (Lead), River City Community Development Corporation

Outputs/Deliverables: Improved stormwater management strategies

Outcomes: Knowledge transfer, improved restoration and management techniques, decreased stormwater runoff

Cost: \$15,000

Estimated Leverage: \$20,000

CCMP Actions: C1.5, D1.1, D1.2, D2.2, D3.1

CCMP Outcomes: 1a, 1b, 1d, 1e, 2a, 2b, 2c, 3a, 3c, 3d

CWA Core Programs Addressed: (4) addressing diffuse, nonpoint sources of pollution



Engage: Education and Public Outreach

Planning & Facilitating Collaborative Meetings Workshop

APNEP and many other organizations utilize a stakeholder-focused process that relies on conducting collaborative, consensus-based meetings in order to make decisions. In recognition that the process is difficult and requires a high level of skill in order to be effective, APNEP and NOAA teamed up to offer a training opportunity for APNEP partners to strengthen and refine their meeting facilitation skills. APNEP staff and partners learned to design meetings that enhance problem solving and minimize conflict. The NOAA workshop provided environmental professionals in the APNEP region with the skills to design and implement collaborative approaches to meetings.

Partners: NOAA (Lead), NC Division of Coastal Management

Outputs/Deliverables: Workshop, educational materials and resources

Outcomes: Facilitation of working relationships among APNEP committees and partners, 25 trained facilitators

Cost: \$ 1,400

Estimated Leverage: \$ 2,000

CCMP Actions: Objective D3

CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d

CWA Core Programs Addressed: (4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program



Monitor: Estuarine System Status and Trends

Swim Guide Citizen Science Program

APNEP funded Sound Rivers, Inc. to initiate Swim Guide, a regional, citizen science water quality monitoring program. Swim Guide filled a void in water quality monitoring by identifying sites on the Neuse and Tar-Pamlico rivers not currently monitored by the NC DMF-Recreational Water Quality Program. The funds were used to purchase monitoring equipment and sampling supplies, fund intern stipends, and train citizen science volunteers. Swim Guide engaged and educated the community, helped to identify sources of bacteria pollution, and notified the public of health concerns when using the Neuse and Tar-Pamlico rivers and streams. By organizing this community-oriented, volunteer-driven water monitoring program, Swim Guide helped to empower Eastern

North Carolina residents to participate in stream monitoring, be active in restoration, and to be informed of potential environmental health concerns.

Partners: Sound Rivers (Lead)
Outputs/Deliverables: Monitoring equipment, sampling supplies, funding for intern stipends, training for citizen science volunteers.
Outcomes: Monitoring data, increased understanding of water quality issues in eastern North Carolina, increased community knowledge and engagement
Cost: \$ 9,500
Estimated Leverage: \$14,304

CCMP Actions: D1.1, D2.1, D2.3, D3.1, E1.3
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
CWA Core Programs Addressed: (4) addressing diffuse, nonpoint sources of pollution, (6) protecting coastal waters through the National Estuary Program

2018-2019 ONGOING PROJECTS

The following provides an overview of APNEP's ongoing projects since the last annual work plan was approved on April 30, 2018. Ongoing projects are those that began during or before the last fiscal year, and which APNEP expects to continue through the FY2019-2020 fiscal year. Projects proposed for additional funding in 2019-20 are noted.



Identify: Research and Technical Assistance

APNEP-NC Sea Grant Joint Graduate Fellowship in Estuarine Research

Objectives: Foster interest in research related to APNEP CCMP goals; obtain research that can be used to inform APNEP and regional partner efforts to protect and restore ecosystem processes.

Description: APNEP and the North Carolina Sea Grant (NCSG) College Program have supported a Joint Graduate Fellowship since 2015. The fellowship provides funding for a graduate student based in North Carolina or Virginia to conduct applied research within the North Carolina portion of the APNEP management boundary. Fellows must conduct research that addresses focus areas identified in the NCSG Strategic Plan and APNEP CCMP.

Year(s): 2015 - present

Partners: NC Sea Grant (Lead)

Outputs/Deliverables: Final report, maps, data.

Outcomes: Increased capacity to address CCMP implementation actions

FY2018-19 Cost: \$5,750

Estimated Leverage: \$5,000

CCMP Actions: A2.1, B2.6, C3.1, D1.3, D2.1

CCMP Outcomes: 2a, 2b, 2c, 3d

CWA Core Programs Addressed: (4) addressing diffuse, nonpoint sources of pollution, (6) protecting coastal waters through the National Estuary Program

Progress to Date:

- **2015:** Fellow Liz-Brown Pickren studied consumption of self-caught fish in Tyrrell County, North Carolina in order to determine whether fish consumption advisories for the region's rivers are understood and/or followed. Her research has informed discussions and direction of the APNEP Engagement and Stewardship Action Team, as well as resulted in the participation of APNEP staff in a collaborative "Fish Forum" workgroup that is working to address fish consumption issues in North Carolina.
- **2016:** Fellow Stacey Zhang studied restoration strategies for seagrass beds that harness positive interactions between SAV and oyster reefs. This research is of critical importance to

APNEP, as the program's focus on submerged aquatic vegetation may entail discussion of potential restoration sites and methods.

- **2017:** Fellow Mollie Yacano researched how nitrogen is processed in sediments associated with the invasive aquatic plant *Phragmites australis*. Her research will be utilized by APNEP and its partners in efforts to assess the impacts of aquatic invasives on ecosystem function, notably through current efforts such as coordination of the Aquatic Nuisance Species Management Plan and Aquatic Invasives Communication and Outreach Plan development.
- **2018:** Fellow Erin Voigt began her research after September 2018. She is studying how native versus invasive marsh species distribution and wave exposure affect shoreline erosion and the availability of nursery habitats.

FY2019-2020 Plans:

Estimated Cost: \$6,000

Milestones:

- July 29, 2019: 2019 Fellowship applications due
- After September 3, 2019: 2019 Fellowship begins
- Before December 31, 2019: 2018 Fellowship work completed
- Before December 31, 2020: 2019 Fellowship work completed

As of April 2019, APNEP and NC Sea Grant are finalizing the new focus areas for the 2019 Fellowship. These focus areas reflect current needs and priorities of both programs, and include submerged aquatic vegetation ecology, harmful algal bloom impacts, and social science approaches to community resilience.

Submerged Aquatic Vegetation Economic Analysis

Objectives: To estimate historic and current economic values directly related to submerged aquatic vegetation (SAV) within the coastal zone area of the Albemarle Pamlico Estuary. The estimate will include the values of goods and services provided by SAV and income relation to SAV habitat.

Description: APNEP will build upon a 2016 EPA-sponsored effort to value the ecosystem services provided by SAV. The refined valuation of SAV will be used by those who reside or have influence in the APNEP region, such as government agencies, local governments, economists, educators, legislators, researchers, key decision makers and the general public.

Year(s): 2018-Present

Partners: TBD

Outputs/Deliverables: Economic analysis report

Outcomes: Increased awareness and appreciation for the value of North Carolina's submerged aquatic vegetation

FY2018-19 Cost: \$50,000

Estimated Leverage: TBD

CCMP Actions: B2.2, C3.3

CCMP Outcomes: 2a, 2b

CWA Core Programs Addressed: (6) protecting coastal waters through the National Estuary Program

Progress to Date:

The RFP has been completed and APNEP is currently working with agencies to determine the most qualified institution to lead the research project.

FY2019-2020 Plans:

Estimated Cost: \$50,000

Milestones:

- Contract should be finalized by July 1, 2019.

The contract will fund an economic study of SAV in the Albemarle Pamlico watershed. The research will estimate historic and current economic value of coastal SAV by evaluating three components:

1. Total economic value of SAV whose final services are “provisioning” or cultural in nature, including benefits to fisheries/wildlife, recreation, water quality, and various economic sub-components;
2. Equivalent market value of SAV whose services are “supporting” or “regulating” in nature, including primary productivity, water purification, flood protection, shoreline and soil stabilization, nutrient and carbon cycling; and
3. Income related to coastal SAV accounting for multiplier effect.



Ecosystem Protection and Restoration

NC Aquatic Nuisance Species Management Plan Coordination

Objectives: To update a strategic plan for coordinated management, research, and outreach on aquatic nuisance species in NC; to garner renewed commitment from lead state agencies for the plan’s implementation; to submit the plan to the NC Governor’s Office for consideration; to acquire approval from the federal Aquatic Nuisance Species Task Force.

Description: The NC Aquatic Nuisance Species Management Plan (NCANSMP) is a collaborative, multiagency plan to improve the state’s ability to address aquatic invasive/nuisance species issues. Although the original plan was adopted in 2015 by the state’s three lead regulatory agencies on invasive species, there has been no implementation to date. Furthermore, NC never submitted the plan for federal approval to become eligible for external funding under the Aquatic Nuisance Species Prevention and Control Act (1990). Given the states limited resources directed towards invasive species management, federal funding support is critical to successful implementation of the NCANSMP. In support of the CCMP, APNEP is leading a revision process of the NCANSMP by the plan’s Steering Committee with the end goals of renewing commitments for collaboration from state agencies and making NC eligible to receive federal funding for invasive species management.

Year(s): 2015-2016, 2018 - Present (years of APNEP involvement)

Partners: NC Dept. of Environmental Quality, NC Wildlife Resources Commission, NC Dept. of Agriculture and Consumer Services, NC Dept. of Natural and Cultural Resources, US Fish and Wildlife Services, NC State University, The Nature Conservancy, NC Sea Grant

Outputs/Deliverables: State plan for coordinated management, research, and outreach on aquatic nuisance species.

Outcomes: Federal approval of this plan will make NC eligible to receive federal funding (~\$40K/year) to support the plan's implementation. Improved coordination and collaboration across state agencies will leverage limited resources available for invasive species management in NC. The NCANSMP will also compliment Virginia's equivalent plan, thereby better enabling coordinated management actions between the two states under the 2017 MOU.

FY2018-19 Cost: Staff Time

Estimated Leverage: TBD

CCMP Actions: A2.1, B2.6, C3.1, D1.3

CCMP Outcomes: 2c

CWA Core Programs Addressed: (5) protecting wetlands (6) protecting coastal waters through the National Estuary Program

Progress to Date:

APNEP staff provided feedback on the original NC ANS Management Plan that was adopted in 2015 and have been facilitating an update of the Plan through the NCANSMP Steering Committee in 2018-2019.

FY2019-2020 Plans:

Estimated Cost: Staff Time

Milestones:

- Fall 2019: Re-adoption of a revised NCANSMP by NCDEQ, NCWRC, and NCDA&CS, and first adoption by NCDNCR. Submission of updated NCANSMP to the federal Aquatic Nuisance Species Task Force for approval.

APNEP staff will continue to facilitate the coordination of revisions to the NC ANS Management Plan in 2019, with the goal of having the NC Governor's Office submit the revised Plan to the federal Aquatic Nuisance Species Task Force in late 2019 or early 2020. From there, APNEP staff will continue to work with the Plan's Steering Committee towards implementing the NCANSMP in support of shared CCMP priorities.

NC Coastal Habitat Protection Plan Implementation Support

Objectives: To coordinate across NC state agencies in order to improve coastal habitats and to raise awareness about the importance of these habitats for NC fisheries.

Description: The NC Coastal Habitat Protection Plan (CHPP), adopted by the Coastal Resources, Environmental Management and Marine Fisheries Commissions, has seen routine development since its implementation began in 2004. The Coastal Habitat Protection Plan has assisted in creating an opportunity for agencies and commissions within DEQ to work together on issues specific to fish habitat. The nature of the document forces the commissions and agencies focus their actions on rules and regulations that enhance, improve, or restore significant habitats as they pertain to fisheries. While differences in scope, geography and mission exist, implementation of CCMP and the CHPP are complimentary and APNEP staff ensure 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.

Year(s): 2004 - Present

Partners: NC Department of Environmental Quality, NC Coastal Resources Commission, NC Environmental Management Commission, NC Marine Fisheries Commission, Sedimentation Control Commission

Outputs/Deliverables: CHPP Annual Report

Outcomes: Coordinated activities and regulation across NC state agencies to improve estuarine habitats.

FY2018-19 Cost: Staff Time

Estimated Leverage: \$24,000

CCMP Actions: A1.1, A2.3, A2.4, B1.2, B1.3, B1.4, B1.5, B2.2, B3.2, B3.3, C1.3, C1.4, C1.5, C2.2, C3.2, C3.3, C4.2, C4.3, C5.1, C5.2, C5.3, D1.2, D1.4, E1.2

CCMP Outcomes: 1a, 1b, 1c, 1d, 2a, 2b, 2c, 3b, 3c, 3d

CWA Core Programs Addressed: (6) protecting coastal waters through the National Estuary Program

Progress to Date:

- A baseline has now been established for the extent and coverage of submerged aquatic vegetation in the Albemarle-Pamlico region. Photographic flights have now been flown in the APNEP region in 2007 and 2012 with another coast wide round of flights being flown in 2019. The Department of Environmental Quality has also been able to help cover some costs of these flights and the photo interpretation that follows. The information generated from the flights and subsequent photographs will be used to help determine the trends regarding SAV coverage in the state's estuarine waters.
- A significant attempt to help restore oyster populations across the state has generated support from the NC General Assembly. Over \$1 million dollars has been appropriated over the past several budget cycles to help with the construction of new oyster sanctuaries, as well as increased cultch plantings for to help with commercial harvests. The NC Division of Marine Fisheries and Marine Fisheries Commission have also responded with a new Oyster Fishery Management Plan, which implements new safeguards when oyster populations drop

below certain thresholds during the commercial harvest season. APNEP's oyster study and action team played major roles in this process.

- For a number of years, DCM and DMF have been working with the Army Corps of Engineers for a General Permit for Living Shorelines. That GP was issued this year and should result in permits for living shorelines being easier to obtain, which will hopefully make them a more viable option versus bulkheads and hardened structures. This effort has been ongoing for more than 10 years. This activity is supported by APNEP long-running efforts to support living shorelines along the estuarine shoreline.

FY2019-2020 Plans:

Estimated Cost: Staff Time

Milestones:

- Effectiveness of implementation of the 2018-2020 CHPP Implementation Plan will be assessed in 2019. The 2020-2022 Implementation Plan will be created and the planning process will begin for the next CHPP revision, due in 2021.
- EO80 Natural and Working Lands Coastal Habitats Subcommittee Milestones:
 - Summer 2019: Facilitate meeting of the NWL Coastal Habitats Subcommittee and coordination with Duke on mapping and modeling.
 - Summer-Fall 2019: Develop Action plan for the NWL Coastal Habitats Subcommittee.
 - Winter 2019: Deliver Action plan to the NWL Stakeholder Committee for inclusion in the Climate Risk Assessment and Resiliency Plan.

APNEP's projects and initiatives related to SAV mapping and monitoring are strongly tied to CHPP implementation. See SAV Mapping and Monitoring project description for more information.

APNEP will continue to co-lead the Coastal Habitats Subcommittee (with DMF) of the NWL group and to evaluate resilience and carbon sequestration co-benefits that align with the goals of the CHPP and CCMP. It is anticipated that significant staff time will be needed to assist in leading the team and developing the subcommittee action plan and coordinating with the overarching Natural and Working Lands to ensure the action plan is included in the Climate Risk Assessment and Resiliency Plan required by Section 9 of NC Executive Order 80. Short term actions will be identified that may also require staff time, leverage, and resources to implement.

Using Natural and Nature-Based Features to Build Resilience to Storm-Driven Flooding Project

Objectives: To work with the Virginia Institute of Marine Sciences (VIMS) project team and partners to evaluate the applicability of tools for assisting coastal local governments and planners in determining suitable areas for natural and nature-based features (NNBFs) within North Carolina.

Description: APNEP is collaborating as a project partner on a [NOAA Coastal Resilience Grant](#) from NOAA awarded to VIMS. The project is focused on increasing the use of NNBFs to increase resilience of coastal communities to flooding caused by storms and extreme weather events and is designed to include interaction with local government officials as the target audience for project generated data and guidance. The project includes development of tools that allow local planners in coastal counties in Virginia to determine suitable areas to implement natural infrastructure.

Year(s):	2018 - present
Partners:	Virginia Institute of Marine Science, Virginia Coastal Policy Center, Wetlands Watch
Outputs/Deliverables:	Inventory and comparison of NC/VA data sources; workshops and meetings with partners in North Carolina
Outcomes:	Increase in incentives and tools for local governments and communities to utilize natural and nature-based features including living shorelines. Increase in the number of communities in the APNEP region that incorporate resilience and consideration of impacts from sea level rise and climate change into local planning processes.
FY2018-19 Cost:	Staff Time
Estimated Leverage:	TBD
CCMP Actions:	A2.2, B3.1, D3.3
CCMP Outcomes:	2a, 2b, 2c, 3a, 3b, 3d
CWA Core Programs Addressed:	(4) addressing diffuse, nonpoint sources of pollution, (6) protecting coastal waters through the National Estuary Program

Progress to Date:

APNEP staff are currently planning meetings and other outreach opportunities to solicit feedback from North Carolina agency personnel and other partners. This information will be used to develop an evaluation of opportunities and limitations to extend the project outputs beyond Virginia in 2019.

FY2019-2020 Plans:

Estimated Cost: Staff Time

Milestones:

- Spring/Summer 2019: VIMS staff will present about the project to the Living Shorelines Steering Committee and members of the Coastal Regional Resilience Workgroup. Coordination has been initiated with partners that house geospatial data (AGOL team, Division of Coastal Management, Natural Heritage Program) to compare data sources.
- Summer-Winter 2019: Continued targeted outreach and follow up discussions with potential project partners in North Carolina.

The project team will work with agency representatives to identify opportunities and criteria for using NNBFs to increase resilience to flooding and simultaneously generate credits for local governments in other resource management and hazard mitigation programs such as the National Flood Insurance Community Rating System, TMDL program for nutrient and sediment load reductions; and the stormwater management program. APNEP will work with the project team and other partners to evaluate applicability of the basic products in North Carolina coastal localities to plan for possible extension of the guidance developed in this project to areas beyond coastal Virginia.



Engage: Education and Public Outreach

Albemarle-Pamlico Estuary Highway Signs

Objectives: Educate the public in North Carolina about the location of the Albemarle-Pamlico watershed in relation to where they work, play, go to school, and vacation.

Description: As part of APNEP's commitment to increase public awareness of the Albemarle-Pamlico watershed and its biological and natural significance to the region, APNEP is seeking the services of the NC Department of Transportation for the manufacturing and installation of six Albemarle-Pamlico watershed signs to be placed throughout the North Carolina portion of the region.

Year(s): 2018-Present

Partners: North Carolina Department of Transportation

Outputs/Deliverables: Six signs installed at the intersections of major N.C. highways and the Albemarle-Pamlico watershed boundary.

Outcomes: Increased public's awareness of the Albemarle-Pamlico watershed.

FY2018-19 Cost: Up to \$36,000

Estimated Leverage: NCDOT maintenance to address normal wear and tear of the six signs in their respective locations.

CCMP Actions: Objectives D1 and D2.

CCMP Outcomes: All (indirect)

CWA Core Programs Addressed: (6) protecting coastal waters through the National Estuary Program

Progress to Date:

This contract has been fully executed and work is set to begin June 2019. The sign design is complete and NC DOT is currently under contract to produce the signs for install.

FY2019-2020 Plans:

Estimated Cost: N/A

Milestones:

- APNEP signage will be installed at six locations throughout the watershed: Orange County, Wake County, Johnston County, Sampson County and Onslow County.

All installs will be completed before October 1, 2019. NC DOT will have a maintenance agreement to perform updates, repairs, and relocation if necessary on all signs installed.

APNEP Action Team Facilitation

Objectives: To facilitate interagency and inter-organization communication related to priority issues in the Albemarle-Pamlico region, to improve cooperation and develop collaborative initiatives that accomplish shared goals.

Description: APNEP's initiatives are guided by input from a diverse group of regional partners and stakeholders. Action Teams have been created to address the management strategies elucidated in APNEP's CCMP. Each Action Team works toward implementation of several closely aligned management action in various environmental disciplines. Members include representatives from state, local, and federal government, nonprofits, and universities.

Year(s): Ongoing

Partners: [Varies: see Action Team webpages for partner organizations](#)

Outputs/Deliverables: Decisions about CCMP implementation priorities; improved communication between AP region environmental organizations

Outcomes: Implementation of the CCMP

FY2018-19 Cost: Staff Time

Estimated Leverage: \$25,500

CCMP Actions: All

CCMP Outcomes: All

CWA Core Programs Addressed: (4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program

Progress to Date and FY2019-2020 Plans:

Estimated Cost: Staff Time

Contaminant Management Action Team: The team met in October 2018 to discuss the direction of the Team. The last action supported by the team was solely dedicated to nutrient reductions. The 2018 reboot opted to include stronger emphasis on septic, and personal care products to the list of team priorities. The Team will reconvene in 2019 to prioritize contaminants of concern based on best available data.

Decision Support Tools Action Team: The team met in October 2018 to discuss conceptual models as a way to analyze data using APNEP selected indicators. The model will be accessible to everyone including scientists, management, policy makers and the general public. All model input will be distributed via the monitoring and assessment teams. In 2019 the Team expects a proof of concept for the model once all indicator reports are completed.

Ecological Flows Action Team: The Phase I draft report "Existing Data for Evaluating Coastal Plain Ecological Flows in the Albemarle Pamlico Estuary Region" was submitted to APNEP August 2018, delivered to the team for review, and presented at the October 2018 team meeting by Dr. Mike O'Driscoll of East Carolina University. The team discussed initial plans for

conducting Phase II, a pilot study. Team co-leads Dr. O'Driscoll and Bob Christian of ECU submitted draft recommendations moving forward including commitment of resources from APNEP and NCDEQ Division of Water Resources.

In 2019, the team will develop a detailed proposal for Phase II, which will consist of selecting at least two watersheds (one inner coastal plain; one outer coastal plain) for detailed pilot studies that focus on flow-ecology relationships, longer-term flow record analysis, and detailed water budgets to help develop a better understanding of the linkages between water use, meteorological conditions, and low flows and the ecological response to flow alteration (including flow, stage, and salinity aspects). Staff are currently following up on Team recommendations and will be scheduling a follow up meeting with the team in 2019 to further flesh out the Phase II proposal.

Engagement and Stewardship Action Team: The Team met in October 2018 to discuss efforts to map implementation of the Team's CCMP actions, recommendations for continued funding for Shad in the Classroom and the Teacher Institute, and to provide feedback on criteria to evaluate ongoing requests for project funding. Since then, APNEP staff have presented the Team's recommendations to the Leadership Council and finalized/published the guidelines and criteria on the APNEP website.

Future actions of the Engagement and Stewardship Action Team depend on if continued funding for Shad in the Classroom and/or the Teacher Institute is approved by the Leadership Council. If funding is approved, future actions may include: (1) Development of a formal "mini-grants" program for ongoing project funding requests, (2) Development and communication of process/criteria that will be used to evaluate Shad in the Classroom and the Teacher Institute in the future, (3) Focusing on needs in Virginia (4) Focusing on development of a region-wide communications campaign centered around priority issues and integrating other CCMP actions, such as coastal resilience, ecotourism, ecological flows, fish consumption advisories, and/or citizen science, (4) Focusing on development and/or funding of citizen science initiatives that complement APNEP's Integrated Monitoring Strategy.

Freshwater Habitat and Fish Passage Action Team: CCMP actions associated with this Team are largely either opportunity-based (e.g., dam removal) or aligned with other APNEP teams and activities. Although this Team has not met for two years, opportunities to advance CCMP initiatives for anadromous fish have been pursued and supported by APNEP over the last year. APNEP staff have been participating on the Virginia Alosa Task Force (VATF) since December 2017. A Coordination Committee of the VATF is facilitated by APNEP to promote coordinated monitoring and management between NC and VA in shared waterways in support of the NC/VA MOU. This committee met in November 2018 and January 2019 and collaboration is underway for the 2019 spawning season.

This Team will be rebooted to reassess partner interest and to review existing or anticipated opportunities for CCMP implementation relative to associated CCMP actions. Prior to reconvening, a survey will be developed and issued to Team members to identify how current partner conservation and management priorities align with existing CCMP actions. The results of this survey will help focus Team efforts in the near term to achieve meaningful progress on

CCMP initiatives for anadromous fish. Additionally, APNEP will facilitate a meeting of the Coordination Committee of the VATF in summer of 2019 to review collaborative monitoring success during the 2019 spawning season. APNEP staff plan to also attend the next meeting of the larger VATF to help in fall/winter 2019.

Invasive Species Action Team: Implementation of CCMP actions associated with this Team are particularly challenging due to the scope of the problem and the overall lack of resources available for invasive species management. As such, APNEP initiatives on invasive species must be coordinated with ongoing initiatives by APNEP partners to strategically leverage resources and make meaningful progress. Although this Team has not met for two years, APNEP has made considerable progress towards CCMP implementation regarding invasive species. See information about the NC Aquatic Nuisance Species Management Plan and APNEP-NC Sea Grant Graduate Fellowship for details.

Depending on the length of the revision process currently underway by a Steering Committee for the NCANSMP, we anticipate this state plan being re-adopted by NCDEQ, NCWRC, and NCDA&CS in late 2019 and submitted by the Governor's Office for approval from the federal Aquatic Nuisance Species Task Force at either their November 2019 or May 2020 meetings. APNEP staff will continue to facilitate the NCANSMP Steering Committee, with meetings occurring approximately bimonthly over the next year until the plan's revisions are complete. APNEP will coordinate with DEQ Creative Services for formatting and production of the final plan. APNEP, through the DEQ Secretary's Office, will also coordinate the plan's re-adoption process and submission to the Governor's Office for consideration.

Submerged Aquatic Vegetation Team: The SAV Team's February 2019 workshop included SAV mapping discussions on (1) finalizing the 2013-2014 interpretations for high-salinity SAV, and (2) protocols to amend the 2006-2008 SAV map to correct some errors revealed during the 2013-2014 interpretation. Also, during this session, select team members have been compiling SAV policy position documents from key partner organizations. Their compilation will facilitate a review of regulatory consistency with the objective to promote SAV protection and restoration. The public release of the 2013-2014 SAV map will occur during this reporting period. The distribution and refinement of these maps will provide status and trends information to facilitate APNEP partners to protect and restore high-salinity SAV beds. APNEP plans to undergo a third-generation mission of image acquisition for high-salinity SAV during spring and fall 2019. If the acquisition is successful, we anticipate that because of process and capacity enhancements that interpretation and production of a third-generation map could occur during FY2019-2020.

Water Quality (LID) Action Team: The inaugural meeting of this team was held October 2018. Attendees felt that a LID cost-benefit analysis, which potentially could result in common guidelines for individual developers and towns working with local resources. Lofty goals for 2019 include completing a cost analysis for LID, APNEP providing funding information for communities, being more inclusive with local government personnel, and working with NCCF on a policy for state construction LID practices.

Living Shorelines Action Team (jointly facilitated with NC Coastal Federation): The Team met for the first time in July 2018 to communicate and collaborate on various actions by different partners concerning education and outreach, research, and incentives for the development of living shorelines in North Carolina. Since then, subcommittees have been formed and have met to discuss the various actions listed in a draft action document. The committee is working to finalize a living shoreline working strategy document that will guide the group in supporting sustainable management of estuarine shorelines through the promotion and expanded use of living shorelines. Members of the Action Team are participating with the NC Coastal Federation and Restore America’s Estuaries to organize and bring together experts in the field of living shorelines at the upcoming 2019 Living Shorelines Tech Transfer Workshop to be held in Beaufort October 8-9.

Oyster Habitat Restoration Action Team (externally facilitated by NC Coastal Federation): Over the past six to eight months, the Northern Oyster Action Team has recognized the need to set science-based oyster targets/goals for the update of the Oyster Blueprint. At the last meeting in April, the group took the first step towards developing science-based restoration goals for oysters in NC. The conversation focused on an important decision point – whether to continue to develop goals under the current Oyster Blueprint structure, which focuses on sanctuaries, cultch and commercial harvest, to develop a set of new goals based on desired services, things like larval output and the total value of the fishery.

Regional Coastal Resiliency Workshops and Summit

Objectives: Learn from local governments about their greatest challenges and needs to build resiliency and inform development of the State Climate Risk Assessment and Resiliency Plan under Executive Order 80. Share the latest information about climate science, impacts, and what other communities are doing in the region to adapt to changing conditions before and after disasters occur. Develop peer-to-peer networking opportunities to facilitate interdisciplinary understanding and collaboration on resilience issues at local and regional scales.

Description: APNEP is participating in a working group led by the NC Division of Coastal Management, North Carolina Coastal Federation, and partners. The team is conducting two Regional Resilience Workshops for local elected officials, local planners and local emergency managers in Elizabeth City and Wilmington.

Year(s):	2019-Present
Partners:	Division of Coastal Management, North Carolina Coastal Federation, NC Sea Grant, NC Division of Emergency Management, various regional Councils of Government
Outputs/Deliverables:	Summary of technical session and panel at WRRRI conference via a Soundings blog post; Assist partners with workshop and summit summaries for inclusion in the Climate Risk and Resiliency Plan; information to inform APNEP focus and resources and utilization of EPA funding
Outcomes:	Share resources and perspectives about how the state can and should support reducing risks to natural hazards and

climate change impacts and build long-term resilience for communities in coastal areas of North Carolina.

FY2018-19 Cost: Staff Time
Estimated Leverage: TBD

CCMP Actions: D3.3
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
CWA Core Programs Addressed: (4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program

Progress to Date:

APNEP organized technical sessions and panel discussion at the 2019 WRRRI Conference to help focus our involvement with this effort moving forward. Staff provided logistical support for the Northeast Regional workshop and will be assisting in organizing and facilitating a panel discussion at the Summit. Staff have developed more detailed proposals for use of EPA supplemental funds.

FY2019-2020 Plans:

Estimated Cost: Staff Time

Milestones:

- May-June 2019: Regional Workshops and Summit take place
- March 2020: NC DEQ Climate Risk and Resiliency Plan due
- October 2020: Completion of project identified by EPA supplemental funding.

In June 2019, a two-day event will be held in Havelock to synthesize what has been learned from the regional workshops. Information from the regional workshops and summit will be summarized and shared with workshop participants and included in the development of the Climate Risk Assessment and Resiliency Plan required by Section 9 of Executive Order 80. APNEP plans to utilize information and feedback from communities that participate in the workshops and summit to inform utilization of the supplemental funding for EPA (See *Assisting Underserved Communities with Incorporating Resiliency into Local and Regional Planning Processes* project.)

APNEP will continue to engage with the working group to inform where to focus our efforts to implement CCMP Action D3.3 and how best to utilize the supplemental funding from EPA. It is anticipated that significant staff time will be needed to coordinate with the working group and other partners as needed and to ensure grants and contracts are in place. Staff time is needed to assist with follow up from the workshops and summit. Staff will continue to coordinate to integrate relevant CCMP actions that support and involve local governments and with implementation of other programs including the CHPP.

Event Participation and Sponsorships

Objectives: To support regional partners in reaching shared goals, to leverage resources and transfer knowledge/skills within the Albemarle-Pamlico region

Description: APNEP supports regional outreach, networking, and knowledge/skill transfer events via sponsorship. Sponsorship funding generally falls between \$500-\$2500 and helps to leverage resources to reach shared goals and promote partnership opportunities. APNEP may participate in sponsored or non-sponsored events via tabling, environmental education activities, or logistical support.

Year(s): Ongoing
Partners: Varies
Outputs/Deliverables: Event sponsorship
Outcomes: CCMP implementation, increased visibility and improved partner relationships
FY2018-19 Cost: \$8,500
Estimated Leverage: \$30,000

CCMP Actions: All
CCMP Outcomes: All
CWA Core Programs Addressed: All

Progress to Date:

- 2018 Hyde, Seek, and Discover (Environmental education, ~120 K-5 students reached)
- 2018 Rising - A Conversation about Coastal Change (Tabling, Lead a panel discussion, ~75 people reached)
- 2018 SciREN Triangle (Tabling, ~50 teachers reached)
- Tidewater Screening and Panel Discussion (Logistical support, ~200 people reached)
- 2018 Environmental Educators of NC Conference (Sponsorship, Keynote address, ~50-75 people reached)
- 2019 Water Resources Research Institute Conference (Tabling, Sponsorship, Organized a technical and participatory session~100 people reached)
- 2019 SciREN Coast (Tabling, ~45 teachers reached)
- 2019 Coastal Envirothon (Environmental education, ~100 6-8th grade students reached)
- 2019 NC Oyster Summit (Tabling, Sponsorship, ~25 people reached)

FY2019-2020 Plans:

Estimated Cost: \$8000

- Kids River Fest with Sound Rivers Inc. (\$1000 Sponsorship)
- 2019 Hyde, Seek, and Discover (Environmental education)
- 2019 SciREN Triangle (Tabling)
- 2019 Environmental Educators of NC Conference (\$1000 Sponsorship)
- 2019 National Estuaries Week Event
- 2019 NC Sea Grant Coastal Conference
- 2020 SciREN Coast (Tabling)
- 2020 Water Resources Research Institute Conference (\$1000 Sponsorship, Tabling)
- 2020 Coastal Envirothon (Environmental education)
- 2020 NC Oyster Summit (Tabling, Sponsorship)

Public Outreach: Digital and Print Media Development

Objectives: Increase awareness of and access to APNEP and partner resources, increase knowledge and understanding of Albemarle-Pamlico region issues and promote environmental stewardship behaviors.

Description: APNEP produces a wide variety of communications materials to improve the Partnership's ability to reach different audiences, including its partner organizations, local government, the general public, and scientists and researchers. APNEP accomplishes this through print and digital materials, including its website, social media platforms, blog, e-newsletter, and printed fact sheets and brochures.

Year(s):	Ongoing
Partners:	Varies
Outputs/Deliverables:	Regularly updated print and digital communications materials
Outcomes:	Increased understanding of the issues affecting the Albemarle-Pamlico region and awareness of APNEP's role in the region
FY2018-19 Cost:	Staff Time
Estimated Leverage:	\$300
CCMP Actions:	All
CCMP Outcomes:	All
CWA Core Programs Addressed:	(4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program

Progress to Date:

In FY2018-2019, APNEP staff developed a new long-term Engagement Strategy for the Partnership. The Engagement Strategy tackles (1) Partner Engagement, (2) Public Outreach, and (3) Communications, presenting a detailed vision for how APNEP would like to conduct its communications and outreach efforts going forward.

In addition, in March 2019 APNEP launched a new website, with an updated look and feel and updated content. This new website is mobile-friendly and designed to meet accessibility standards. APNEP also developed an interactive ArcGIS Online-based map of 2012-2018 funded projects, with information about partnerships, funding amounts, and project details. This map is embedded prominently on the new APNEP website.

FY2019-2020 Plans:

Estimated Cost: \$1000

Milestones:

- May 2019: Annual Work Plan redevelopment complete
- Summer-Fall 2019: New printed materials complete

APNEP staff have begun working on the development of new printed materials for APNEP, including fact sheets for different audiences, rack cards, bifold for general public, and potentially on materials related to specific priority issues (SAV, coastal resiliency, aquatic invasives, etc.). Staff will be working with NCDEQ's Creative Services department to design these new materials, which will be used at partner meetings, sponsorship/networking events, outreach events, and at other events as needed.

In addition, APNEP staff are working to redevelop the Partnerships' Annual Work Plan to both better align it with EPA Guidance and to create a product that can serve as a public-facing document for those interested in APNEP's progress and plans. The first iteration of this redevelopment will occur in 2019, with plans to further improve the Work Plan based on EPA and partner feedback in subsequent years.

APNEP will be continuing to improve and maintain its new website, including its GIS map of past projects and its Soundings blog. Social media platforms, e-newsletter, and other digital products will be updated on a consistent and ongoing basis. As needed, APNEP staff will develop digital and print materials to accompany and illustrate any State of the Sounds reports that are published in 2019 and 2020.

Shad in the Classroom

Objectives: Engage students in hands-on learning about American Shad and Albemarle-Pamlico region river basins, foster environmental stewardship and understanding of watershed connections, contribute to the restoration of American Shad within the Neuse River Basin, inspire a new generation of biologists and ecologists.

Description: The Shad in the Classroom project provides teachers with the training, resources, and support to raise American Shad from eggs to fry in their classrooms, and then release those fry into the Neuse basin. In doing this, students are able to learn about water quality issues, watershed connections, and aquatic ecosystems through hands-on activities and outdoor education. Teachers are also able to utilize extension activities facilitated by the Shad in the Classroom program, including fish dissections, gyotaku (fish printing), and other lesson plans. In addition, raising and releasing shad contributes to the US Fish and Wildlife Service's and NC Wildlife Resource Commission's goals for restoring American Shad populations in these river basins. The collaborative project provides students with an understanding of the scientific process, an inspiration for careers in science, and a desire to protect our waterways.

Year(s): 2011-Present

Partners: NC Museum of Natural Sciences (Lead), US Fish and Wildlife Service, NC Wildlife Resources Commission, NC State University, East Carolina University

Outputs/Deliverables: American Shad fry released into the Neuse River in conjunction with USFWS and NCWRC restoration efforts, ~30 educators/year trained on rearing and releasing American Shad, 1000+ students participating/year

Outcomes: Increased community involvement in water quality and habitat protection

FY2018-19 Cost: \$ 20,000
Estimated Leverage: \$ 11,000

CCMP Actions: D2.1, D2.2, D2.3
CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3b
CWA Core Programs Addressed: (4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program

Progress to Date:

Shad in the Classroom reaches over 1000 students each year through 20-30 classrooms that participate in the program. This initiative has consistently grown since its inception, with demand that outstrips the program's capacity to accommodate additional classroom participation. The limiting factor for the program's growth is staff capacity - currently, the program is coordinated by one part-time staff member and it has reached the limits of that person's ability to manage the program. APNEP's funding supports the salary of this staff member, and in addition APNEP staff provide assistance with egg deliveries to schools and shad release day events.

American Shad were chosen as the fish species for the program because they have cultural and historic importance in eastern North Carolina, and there are active efforts by the NC Wildlife Resources Commission to restore their populations in the Roanoke and Neuse river basins. While Shad in the Classroom doesn't contribute significantly to population restoration efforts, it raises awareness about the issue.

Program outputs (2009-2018) include:

- 216 classrooms reached
- 13,764 students reached (2013-2018)
- 100% positive evaluation of workshops and overall program
- Growth of program from 13 classrooms in 2010 (pre-APNEP funding) to 30 classrooms in 2018
- 30 NC counties participating in the program (21 in APNEP region)

FY2019-2020 Plans:

Estimated Cost: \$20,000

Milestones:

- April-June 2019: Shad delivered to classrooms, raised, released. Extension education activities coordinated. Hatchery field trip for teachers. Evaluations returned from classrooms and summary of program completed.
- July-September 2019: Communication with interested teachers for 2020 program. Data entry and analysis of student survey.
- October-December 2019: Applications distributed, supplies inventoried, tanks retrieved and/or refurbished, planning for 2020 season begins.
- January-March 2020: Applications were reviewed, and teachers selected, supplies purchased, teacher training session scheduled and facilitated, shad weeks scheduled with USFWS, NCWRC, classrooms, extension educational activities coordinated.

- April-June 2020: Shad delivered to classrooms, raised, released. Extension education activities coordinated. Hatchery field trip for teachers. Evaluations returned from classrooms and summary of program completed.

The Shad in the Classroom program plans to continue in 2020 as it has in 2019.

Summer Teacher Institute

Objectives: To increase teacher knowledge of watershed science, provide resources to teach watershed science, and increase teacher confidence in utilizing immersive, hands-on, inquiry-based, and outdoor-focused curricula in their classrooms.

Description: Since 2004, APNEP has worked with partner organizations to offer a multi-day professional development opportunity for teachers in the Albemarle-Pamlico region that focuses on the development of skills and knowledge in environmental education methods that support teachers in integrating the outdoors into their curricula. The immersive experience varies each year depending on identified topic and grade level needs but includes 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 watershed resources. Teachers are able to participate in authentic outdoor learning experiences, including exploration of maritime forest, estuary, and salt marsh ecosystems.

Year(s): 2004 - Present

Partners: UNC Institute for the Environment (Lead), NC Museum of Natural Sciences, NC Coastal Federation, US Environmental Protection Agency, NC Sea Grant, NC Aquariums

Outputs/Deliverables: Approximately 25 teachers trained in hands-on, outdoor environmental education, water quality, and watershed curricula

Outcomes: Increased use of environmental education curricula in North Carolina schools

FY2018-19 Cost: \$ 20,000

Estimated Leverage: \$ 11,000

CCMP Actions: D2.1, D2.2, D2.3

CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3b

CWA Core Programs Addressed: (4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program

Progress to Date:

Each summer since 2004, APNEP has supported a Summer Teacher Institute for educators that focuses on estuarine and water quality education. The specific grade level(s) and goals of the program vary each year and are based on identified needs and gaps in current professional development opportunities for educators in the Albemarle-Pamlico region. The UNC Institute for the Environment is the longtime facilitator of this institute, and in 2017 and 2018 incorporated the

summer institute into a year-long professional development program called ExPLORE NC that targeted 4th and 5th grade teachers. Both the Teacher Institute and larger ExPLORE NC program showed educators how to utilize place- and inquiry-based learning strategies to help students learn about North Carolina's rivers, coasts, and watersheds. The main themes of the program are (1) learning from the headwaters to the ocean, (2) involvement of scientists and experts, and (3) integration of new and existing instructional materials/EE resources.

From 2012-2018, 145 4th-12th grade teachers were reached through the program (approximately 20 teachers/year) and:

- Through these educators, over 50,000 students have been indirectly reached since 2012
- These educators have come from 19 counties in the APNEP region and 47 counties in North Carolina overall

The ExPLORE NC program (2017-2018) had up to 50 contact hours per teacher per year.

Outcomes from pre/post surveys showed:

- Increased knowledge of local ecosystems and watershed science ($p < 0.05$)
- Increased confidence in using the outdoors to teach required curriculum ($p < 0.05$)
- Increased science teaching and outdoor science teaching self-efficacy beliefs ($p < 0.05$)
- Increased awareness and use of local EE resources

Other outcomes:

- Teacher knowledge of/enrollment in the NC Environmental Education Certification Program
- Creation of outdoor classrooms
- Increased knowledge of and enrollment in other EE professional development opportunities
- Seeking grant funding to improve outdoor/EE resources

FY2019-2020 Plans:

Estimated Cost: \$20,000

Milestones:

- July 2018: Summer Teacher Institute takes place
- April 30, 2019: Applications due for 2019 Summer Teacher Institute
- July 2019: Summer Teacher Institute takes place

The 2019 Summer Teacher Institute, *At Water's Edge*, will take place in July at the Trinity Center in Salter Path, North Carolina. The Trinity Center is the location of many previous Institutes and is located within walking distance of maritime forest, salt marsh, and beach ecosystems. Discussions between UNC Institute for the Environment and APNEP staff resulted in the target audience for the Teacher Institute being shifted to 8th-12th grade science teachers, both because the past few years have targeted 4th-5th grade teachers. In addition, the cessation of additional (non-APNEP) funding for the year-long ExPLORE NC program means that targeting teachers who already have a science-specific knowledge base will be more effective for building skills during the Teacher Institute.

During this four-day teacher institute, 8th -12th grade science teachers will explore and compare several unique coastal ecosystems through inquiry-based, hands-on activities, evaluating human impacts on these systems alongside scientists and expert environmental educators. Teachers will

gain updated content knowledge and instructional resources designed to foster student learning of watershed science and stimulate awareness of actions that promote watershed stewardship. Content and activities are aligned with the NC Essential Standards for 8th Grade Science, Earth/Environmental Science and AP Environmental Science. [At Water's Edge Webpage](#)

VA-NC Memorandum of Understanding Implementation

Objectives: To facilitate and strengthen partnerships between North Carolina and Virginia state agencies; to identify shared goals for AP region watersheds and contribute to projects that work towards those goals.

Description: In 2017, APNEP facilitated the development and signing of a Memorandum of Understanding (MOU) between the NC Department of Environmental Quality, NC Department of Natural and Cultural Resources, and Virginia Secretary of Natural Resources that would foster interstate collaboration within the Albemarle-Pamlico region to manage for healthy ecosystems and communities. The MOU replaces an earlier version that was signed in 2001.

Year(s): 2017 - present

Partners: NC Department of Environmental Quality, NC Department of Natural and Cultural Resources, Virginia Secretary of Natural Resources

Outputs/Deliverables: New partnerships and activities in VA and NC focused on protecting and restoring the region

Outcomes: Increased capacity to address CCMP implementation

FY2018-19 Cost: Staff Time

Estimated Leverage: TBD

CCMP Actions: All

CCMP Outcomes: All

CWA Core Programs Addressed: (2) identifying polluted waters and developing plans to restore them, (4) addressing diffuse, nonpoint sources of pollution, (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program

Progress to Date:

The MOU has assisted NCDEQ, NCDNCR, and VADNR in coordinating with APNEP to improve the water quality and ecological health of the states' shared river basins flowing into Albemarle Sound. The MOU specifically calls for tackling regional issues such as nonpoint source pollution, restoring fish passage and spawning habitat, and controlling invasive species. Agencies have also explored opportunities to assist state, regional, and local governments in incorporating climate change and sea level rise considerations into their planning processes.

As part of this commitment, APNEP and partners have been actively working to revitalize our efforts in Virginia, with current emphasis in the following areas:

- **Stewards of the Southern Watersheds:** In 2018, APNEP helped to organize the [North Landing River Albemarle Sound Estuarine Symposium](#) in Virginia Beach, which aimed to foster partnerships between Virginia and North Carolina stakeholder groups on topics

important to both states. APNEP has continued to engage with the city, presenting at their summer sea level rise symposium series on “North Carolina’s Connections to the Southern Watersheds of Virginia”, participating in information sharing sessions for local government and planners in northeastern North Carolina hosted by the city and Virginia Sea Grant, and inviting these partners to speak and participate in a panel at APNEP organized and sponsored sessions at the 2019 WRRRI conference titled “Sharing Lessons Learned with North Carolina and “Planning for Resilience in Coastal North Carolina and Beyond.” APNEP is also currently assisting partners with development of educational materials and participating in information sessions to educate residents and regional stakeholders about the portion of Virginia's watersheds that flow into Albemarle Sound.

- **Virginia ALOSA Task Force Committee facilitation:** APNEP helped to organize and chair meetings of the Virginia Alosa Task Force (VATF) Coordination Committee to encourage coordination of VATF members from Virginia and North Carolina on monitoring and management of anadromous fish (herring and shad) in interjurisdictional waters. The group is working together to share information regarding monitoring in the Albemarle drainage and explore opportunities for coordination and assistance.
- **Using Natural and Nature-Based Features to Build Resilience to Storm-Driven Flooding:** APNEP is a partner on a NOAA Coastal Resilience Grant led by the Virginia Institute of Marine Sciences that aims to expand the use of natural and nature-based features as a means of building coastal resilience to storm driven flooding. More information can be found within the detailed description of this project in the continuing projects section.
- **Healthy Waters Initiative:** APNEP is working with the Virginia Department of Cultural Resources, Natural Heritage Program and other partners to explore opportunities to implement the Chowan Healthy Watersheds Plan and protect conservation land in the Virginia’s Southern Watersheds. APNEP staff have also continued to attempt to engage with partners to support and reinstate the Albemarle Chowan Watershed Roundtable (inactive since 2017) with limited success; a champion in Virginia will be needed to reboot this effort, coordinate, and administer VA based roundtable funding for the Southern Watersheds.

FY2019-2020 Plans:

Estimated Cost: Staff Time

Milestones:

- July 2019: Southern Watersheds Workshop takes place

APNEP staff are currently working with partners from Lynnhaven River Now and other Virginia-based environmental organizations to organize a “Southern Watersheds Workshop” for Virginia teachers located in the river basins that flow into Albemarle Sound. The workshop will take place in July 2019.

APNEP staff are also continuing to participate in and help to chair the Virginia ALOSA Task Force Coordination Committee and seeking support to implement the Chowan Healthy Waters Initiative. APNEP will also be working with partners and stakeholders to evaluate the feasibility in North Carolina of the local government tools developed for the VIMS “Natural and Nature-Based Features” grant in 2019-2020.

APNEP has drafted a concept proposal for a Governor’s Agreement and will continue to engage with partners to identify areas of focus and opportunities for project implementation moving forward.



Monitor: Estuarine System Status and Trends

Integrated Monitoring Strategy & Ecosystem Indicator Development

Objectives: To facilitate the development and implementation of an integrated monitoring network through the guidance of regional monitoring and assessment teams, to assess the value of information for measuring ecosystem and CCMP implementation outcomes.

Description: 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 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.

Year(s): 2017 - Present

Partners: [See list of members on each Monitoring and Assessment Team](#)

Outputs/Deliverables: List of indicators and metrics for the Albemarle-Pamlico region, Integrated Monitoring Strategy

Outcomes: Improved understanding of the status and trends of Albemarle-Pamlico estuarine system, detection of environmental changes in support of CCMP implementation

FY2018-19 Cost: Staff Time

Estimated Leverage: TBD

CCMP Actions: E1.1, E1.2, E1.3, E2.1, E2.2

CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d

CWA Core Programs Addressed: (6) protecting coastal waters through the National Estuary Program

Progress to Date:

In 2017, APNEP convened seven Monitoring and Assessment Teams (Air Resources, Aquatic Fauna, Human Dimensions, Submerged Aquatic Vegetation, Terrestrial Resources, Water Resources, Wetland Resources) 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. By the end of 2018 each Team had identified a prioritized list of indicators and metrics. In early 2019, APNEP staff synthesized the priorities of each Team to create an overall list of “high priority/Tier 1” indicators and metrics to monitor in the region. High priority metrics

were those (1) identified as a Team priority, (2) with data currently available, and (3) with an identified path to data analysis and indicator report publication.

FY2019-2020 Plans:

Estimated Cost: TBD

Milestones:

- October 2019: initial draft strategy featuring a subset of APNEP ecosystem outcome indicators (EOIs) that together link to all 12 ecosystem outcomes. The draft report will also feature some stressor and management indicators. Ready for Science and Technical Advisory Committee review.
- April 2020: Final draft strategy featuring a more complete set of APNEP EOIs, stressor, and management indicators. Ready for Management Conference review.

Recreational Water Quality Monitoring

Objectives: To monitor and test bacterial concentrations in coastal recreational waters and inform the public about any dangers to public health.

Description: APNEP continues to provide bridge funding to the NC 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 what actions can help prevent it.

Year(s):	2014 - Present
Partners:	NC Division of Marine Fisheries
Outputs/Deliverables:	Enterococci bacteria data for approximately 30 recreational water quality testing sites
Outcomes:	CCMP Implementation, integrated monitoring strategy
FY2018-19 Cost:	\$ 9,000 (extended and renewed for another year) total \$18,594
Estimated Leverage:	\$ 283,000
CCMP Actions:	D2.3, E1.1, E2.1, E2.2
CCMP Outcomes:	1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
CWA Core Programs Addressed:	(4) addressing diffuse, nonpoint sources of pollution, (6) protecting coastal waters through the National Estuary Program

Progress to Date:

In 2014 the APNEP Policy Board (now Leadership Council) directed the Program to provide bridge funding for the NC DMF Recreational Water Quality Monitoring Program after funding for the program from the EPA were decreased. Since then, funding from APNEP has assisted DMF in its recreational water quality monitoring efforts for 30 sites in the Albemarle-Pamlico region - 20 of

which are located at public beaches or near popular summer camps. These continuation of monitoring at these sites both protects public health and ensures that a long-term data collection effort (since 1997) is continued. Monitoring data from these sites provides a continuous, long-term dataset to study trends in water quality within these estuarine areas.

FY2019-2020 Plans:

Estimated Cost: \$9,600

Milestones:

- Approximately 90 samples will be collected through September 30, 2019 with an approved contract extension.
- The new contract will begin October 1, 2019 with a total of 27 APNEP swimming sites sampled 19 times throughout the year. Three sites will be sampled 31 times throughout the year
- Sampling will be completed on a weekly basis during the swimming season, all water quality data will be available on the website as soon as sample analysis is completed.

NC DMF will continue routine water quality monitoring with in the Albemarle Pamlico watershed. APNEP will continue to fund NC DMF's Recreational Water Quality Monitoring Program in FY2019-2020. There will be no changes to funding amount or number/type of stations monitored.

Submerged Aquatic Vegetation Mapping and Monitoring

Objectives: To monitor and map the extent and density of submerged aquatic vegetation (SAV) in the Albemarle-Pamlico region.

Description: In coastal waters of the APNEP region, submerged aquatic vegetation (SAV) is widely recognized as serving many important ecological functions. Other than APNEP's efforts, there are no long-term SAV monitoring programs yet established in the region that can provide reliable quantitative data on the status and trends of this resource. Thus, APNEP continues to lead and support the monitoring of submerged aquatic vegetation (SAV) in the Albemarle-Pamlico region via various platforms, including remote sensing and boat-based protocols.

Year(s): 2005 - Present

Partners: East Carolina University, NOAA, NC Division of Marine Fisheries, NC National Estuarine Research Reserve, NC Department of Transportation, NC Division of Water Resources, UNC-Wilmington, NRCS

Outputs/Deliverables: Maps of SAV extent and density; report on status and trends of this resource

Outcomes: New information for decision-makers

FY2018-19 Cost: \$49,717

Estimated Leverage: \$25,000

CCMP Actions: A1.1, E1.1, E2.1

CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d

CWA Core Programs Addressed: TBD

Progress to Date:

Since 2001, an Albemarle-Pamlico SAV partnership has collaborated with the long-term goal of determining the location of the region's underwater grasses and trends in their overall extent and density. Monitoring SAV is important because among other benefits it serves as an indicator of overall water quality. The partnership has taken steps towards assessing the extent of underwater grasses in the region. APNEP's SAV Team in 2011 published a baseline SAV map using data from aerial flights during 2006 through 2008, and in 2019 are finalizing and publishing a second map based on data from 2013 through 2014.

To address challenges in tracking "hidden" SAV in turbid lower-salinity waters and to detect significant trends more quickly (including changes in species composition), APNEP began coordinating a SAV Sentinel Network in 2014. The sentinel network combines boat-based sonar and video technology with in-water observations to track SAV at stations dispersed throughout the sounds. The boat-based protocols were tested on Albemarle Sound in 2014 and the first installment of sentinel stations occurred there in 2015. Subsequent stations have now been established near the mouths of Pamlico and Neuse Rivers. Newly established stations are monitored on a regularly basis, a full report is expected by October 1, 2019.

FY2019-2020 Plans:

Estimated Cost: \$50,000 (carryover)

Milestones:

- The SAV Team will use data from the 2006-2008 and 2013-2014 SAV maps to begin development of a report on the status and trends of the resource. These two maps, used together, will help the group to analyze how the extent and density of underwater grasses has changed over the past half-decade as well as determine if there are any areas where SAV is disappearing. APNEP and its partners will use this information to develop protection and restoration strategies for SAV and fish species in the region.
- Development of a coordinated SAV Monitoring Strategy
- Continued Sentinel Network monitoring in established stations, expansion of stations into lower-salinity (Currituck Sound and Back Bay) and higher-salinity waters.
- SAV flights and establishment of sentinel stations in select higher-salinity waters during late September and October 2019, interpretation of aerial images to produce third-generation map.

2019-2020 NEW AND PROPOSED PROJECTS

The following proposed projects and activities for October 1, 2019 through September 30, 2020 continue to guide, support, and implement the 2012-22 CCMP and the APNEP mission.

CCMP Implementation Projects

(ongoing undesignated category with new projects approved by Management Conference/ Implementation Advisory Committee)

Objectives: Targeted CCMP Implementation Projects

Description: The APNEP staff and Leadership Council will work with the Advisory Committees, associated Teams and partners to identify projects that need financial support or administrative support from APNEP for CCMP implementation. A group composed of the Leadership Council and STAC will evaluate the requests and administer the funding for priority projects and activities until the Implementation Advisory Committee is established. 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 develop projects to implement the CCMP. As funds become available from carryover of the past year, they may be transferred to this category of projects for the time period of October 1, 2014 - September 30, 2020. In addition to these funds, a total of \$65,000 is allocated to ongoing projects.

Partners: TBD

Outputs/Deliverables: Partnership building, CCMP implementation

Outcomes: CCMP implementation

FY2019-20 Cost: \$ 7,442

Estimated Leverage: \$ 7,442

CCMP Actions: TBD

CCMP Outcomes: TBD

CWA Core Programs Addressed: TBD

Aquatic Invasive Species Citizen Science Strategy Development

Objectives: To contribute to the implementation of the NC Aquatic Nuisance Species Management Plan via assessment of existing outreach efforts; to create and begin implementation of a citizen science strategy.

Description: APNEP will be working with a summer intern and with the members of the NC Aquatic Nuisance Species Management Plan Committee to conduct an assessment of current outreach and communications efforts targeting aquatic nuisance species in North Carolina. The intern will also create a citizen science strategy for APNEP to use in addressing aquatic invasives in the Albemarle-Pamlico region.

Partners: NC DNCR, NC DEQ, NC DA&CS, The Nature Conservancy, US Fish and Wildlife Service

Outputs/Deliverables: Assessment of outreach and communications efforts, citizen science strategy

Outcomes: Implementation of the NC Aquatic Nuisance Species Management Plan, Increased data about aquatic invasives in the Albemarle-Pamlico region

FY2019-20 Cost: \$2,000

Estimated Leverage: TBD

CCMP Actions: A2.1, B2.6, D1.3

CCMP Outcomes: 2b, 2c, 3a

CWA Core Programs Addressed: (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program

SAV Communications Campaign

Objectives: To increase awareness of the value of submerged aquatic vegetation (SAV) in the Albemarle-Pamlico region and specifically in Bogue Sound among recreational fishermen.

Description: As part of a Master’s in Journalism thesis from the UNC-Chapel Hill Journalism School, Abigail Brewer worked with APNEP to develop a communications campaign, including messaging, blog posts, social media posts, and a feature article, to increase appreciation of SAV in Bogue Sound by local fishermen. APNEP will be working to implement this campaign in conjunction with other SAV-related efforts in 2019 and 2020.

Partners: TBD

Outputs/Deliverables: Published blog posts, articles, and social media posts showcasing the importance of SAV

Outcomes: Increased awareness of and appreciation for SAV within the campaign’s target audience

FY2019-20 Cost: \$500

Estimated Leverage: \$1,000

CCMP Actions: B2.2

CCMP Outcomes: 2b

CWA Core Programs Addressed: (6) protecting coastal waters through the National Estuary Program

SUPPLEMENTAL FUNDING (NON-320 FUNDS) AND ASSOCIATED PROJECTS

APNEP Estuarine Work Boat

Objectives: Purchase and utilize new work boat.

Description: APNEP is purchasing a new Bateau 23-foot power boat, motor and trailer with the purpose of increased field work for APNEP staff and partners to assist with SAV ground truthing, water quality sampling, and watershed restoration needs. APNEP plans to expand boat-based monitoring of SAV and water quality sampling in 2019. The large 3,000-mile program area necessitates the need to have one boat stationed in the north and one stationed in the south. State funds have been appropriated to cover the purchase.

Status: In progress

Partners: NC Department of Environmental Quality

Outputs/Deliverables: Boat to be delivered to NC DEQ before July 1, 2019

Outcomes: Sampling boat will be housed in the southern reaches of the watershed and used for ground truthing and monitoring.

FY2019-20 Cost: \$43,118 (Provided by NC DEQ)

Estimated Leverage: TBA

CCMP Actions: B2.2, C3.3, E1.1

CCMP Outcomes: 2a, 2b, 2c, 3a, 3b, 3c, 3d

CWA Core Programs Addressed: (6) protecting coastal waters through the National Estuary Program

Assisting Underserved Communities with Incorporating Resiliency into Local and Regional Planning Processes

Objectives: Support communities in the APNEP region that have expressed a need for technical and logistical assistance with considering resiliency into their long-range planning processes.

Description: In support of an initiative led by APNEP's host agency, NCDEQ, to develop a risk and resiliency plan for North Carolina, APNEP will utilize funding from EPA to help underserved communities develop and implement risk and resiliency plans. APNEP will work with partners including NC Sea Grant and the Division of Coastal Management to identify targeted communities in the APNEP region that need assistance and develop strategies for assisting them or determine if broader regional approaches are feasible. APNEP would utilize funding for the following: a) Develop tools and resources for communities such as a template for conducting risk assessments and development of resiliency plans; b) Offer mini-grants to communities that participate for implementation projects; c) Host additional facilitated workshops as needed to assist in the development the coastal portion of the statewide risk and resiliency plan. APNEP will utilize information gathered from Coastal Resilience workshops and summit regarding needs of

underserved communities and work with the Coastal Resiliency Workgroup to flesh out a detailed proposal for these funds.

Status: In progress
Partners: NC Sea Grant, NC Division of Coastal Management, TBD
Outputs/Deliverables: TBD
Outcomes: Increase in the number of communities in the APNEP region that incorporate resilience into local planning processes.

FY2019-20 Cost: \$25,000 (EPA Region IV Supplemental 320 Funding)
Estimated Leverage: At least \$25,000

CCMP Actions: D3.3
CCMP Outcomes: 1a, 1b, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
CWA Core Programs Addressed: TBD

Monitoring of Submerged Aquatic Vegetation in Roanoke and Neuse River Basins (NC) - Ongoing

Objectives: Monitor submerged aquatic vegetation in the Roanoke and Neuse River Basins.

Description: 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 (ECU) 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 has conducted shore-normal transects for seasonal and inter-annual comparisons. In addition, monitoring sites have been added to the sentinel sites. Underwater video and single-beam SONAR will be used to identify the presence of SAV along these transects at both types of surveys.

Status: In progress; will be complete 9/30/19
Partners: East Carolina University
Outputs/Deliverables: Sentinel station monitoring to include monitoring data in ecosystem assessment (technical) and environmental indicator report card (non-technical).
Outcomes: Information from this project will be used to increase our understanding of factors controlling SAV distribution and abundance.

FY2019-20 Cost: Staff Time
Estimated Leverage: \$53,211

CCMP Actions: E 1.1, E1.2, E2.1, E2.2
CCMP Outcomes: 1a, 1b, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d
CWA Core Programs Addressed: (6) protecting coastal waters through the National Estuary Program

Sentinel Network Monitoring of Submerged Aquatic Vegetation in Roanoke and Neuse River Watersheds (NC)

Objectives: Obtain multiyear baseline data for assessing SAV status and trends in two sub-regions of an SAV sentinel network

Description: In 2016, APNEP received \$75,000 in grant funding from the National Fish and Wildlife Foundation to support the development of submerged aquatic vegetation (SAV) as 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.

Status: In progress

Partners: East Carolina University

Outputs/Deliverables: Sentinel station monitoring to include monitoring data in ecosystem assessment (technical) and environmental indicator report card (non-technical).

Outcomes: Information from this project will be used to increase our understanding of factors controlling SAV distribution and abundance. schools

FY2019-20 Cost: Staff Time

Estimated Leverage: \$75,000

CCMP Actions: E1.1, E1.2, E2.1, E2.2

CCMP Outcomes: 1a, 1b, 1c, 1d, 1e, 2a, 2b, 2c, 3a, 3b, 3c, 3d

CWA Core Programs Addressed: (6) protecting coastal waters through the National Estuary Program

2019 SAV Mapping & Analysis

Objective: Map North Carolina's submerged aquatic vegetation (SAV) using aerial imagery.

Description: APNEP has a cooperative agreement with NC Department of Transportation (DOT) for aerial imagery and mapping of the Albemarle Pamlico submerged aquatic vegetation beds. The Division of Marine Fisheries (DMF) will provide the photo interpretation and ground truthing necessary to analyze the photographic data. NC DOT will conduct flight paths along coastal areas of North Carolina to map SAV. The project consists of aerial imagery and photogrammetry acquisition of digital aerial imagery with global positioning system work. The imagery will include GPS data, DOT will perform aerial triangulation, topographic mapping and planimetric mapping. DMF will further correlate the data with ground truthing information as well as noting weather conditions. The map will provide for planning, protection, and policy for restoring SAV within the Albemarle Pamlico watershed.

Status: In progress

Partners: NC Department of Environmental Quality, NC Department of Transportation

Outputs/Deliverables: Map of SAV for the entire APNEP region

Outcomes: Data verified map of SAV through the APNEP region. The map will be used for protection of vital SAV habitat and also the restoration of SAV habitat.

FY2019-20 Cost: \$130,000 (Provided by NC DEQ)

Estimated Leverage: TBD

CCMP Actions: B2.2, C3.3

CCMP Outcomes: 2a, 2b

CWA Core Programs Addressed: (6) protecting coastal waters through the National Estuary Program

Scuppernong Regional Water Management Study

Objectives: Develop a collaborative approach for conducting a hydrologic study of the headwaters of the Scuppernong River, Lake Phelps, and the surrounding land in Washington County. The outcomes from the study will be utilized to build a more comprehensive approach to regional water management in order to create a water budget for the Albemarle-Pamlico peninsula.

Description: The Division of State Parks requested assistance from APNEP (formally via the Leadership Council April 2018) in serving as a neutral, science-based partner to convene a steering committee to develop an approach for a regional hydrologic study. The purpose of the study is to determine a water budget for the region that can serve as a decision support tool to guide future potential water management implementation actions in collaboration with regional stakeholders including conservation land managers, local governments, other state and federal agencies, and private landowners. The need for the study was prompted by cycles of flooding and drought and concerns from local communities regarding NCDPR and USFWS water management and hydrologic restoration activities on lands they manage in the region. The study will also consider impacts from climate variability and sea level rise in an area particularly vulnerable to flooding, as the land areas lay 1.5 meters above sea level at its highest point. The economy of the region is inherently linked to the state of natural resources in this low-lying area. This study will provide for more water monitoring in the watershed, help update existing water management plans, and help inform future water management strategies, including improving regional drainage efficiency and building regional resilience.

Status: In progress; APNEP submitted a proposal for funding from the Water Resources Development Grant fund and was notified May 2019 that the project was recommend for funding. APNEP will be working to identify the appropriate local government entity to administer the funding and determining our role in facilitating implementation of the project with partners.

Partners: NC Department of Environmental Quality, NC Department of Agriculture and Consumer Services, Washington

County, NC Division of State Parks, U.S. Fish and Wildlife Service, NC Cooperative Extension, others TBD

Outputs/Deliverables: Engineering and feasibility study to evaluate flood risk and future planning needs; Stakeholder engagement process; scenario-based models and visualization / interactive stakeholder engagement tools such as augmented reality sandboxes, web-based maps and data portals.

Outcomes: Water budget for Washington County, basis for development of collaborative regional water management strategies

FY2019-20 Cost: \$25,000

Estimated Leverage: \$399,547

CCMP Actions: A3.1, B2.3, C2.3

CCMP Outcomes: 2a, 2b, 3d

CWA Core Programs Addressed: (5) protecting wetlands

Water Level Monitoring Stations

Objectives: Establish at least three water level monitoring stations within the Albemarle Pamlico watershed.

Description: Each station will be equipped with meteorological monitoring equipment and maintained by NC Emergency Management’s Flood Inundation Mapping and Alert Network (FIMAN). The data derived from the project will be used to address future water management actions across the watershed. The information will inform local governments, citizens, and low-lying communities who are subject strong storm surges in how to plan for future events. Sea-level rise will influence these impacts, as well as salt water intrusion into freshwater stream, the gages will allow for maxim safety of citizens and resources.

Status: In progress

Partners: NC Department of Environmental Quality, NC Emergency Management, NC Department of Transportation, US Fish and Wildlife

Outputs/Deliverables: Flood gage installation with monitoring equipment to include water level sensor, multi-weather parameter sensor, cellular transmission, battery/solar charging system and geodetic control monuments. Data collected will be analyzed and a flood inundation library will be developed.

Outcomes: An interactive FIMAN will be produced with real times storm surge information that will be used to inform local communities of flood inundation risk.

FY2019-20 Cost: \$80,000 (Provided by NC DEQ)

Estimated Leverage: \$120,000

CCMP Actions: B2.3, C2.3

CCMP Outcomes: 2a, 2b, 3a, 3b, 3d

CWA Core Programs Addressed: (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program

ADMINISTRATION AND PROGRAM IMPLEMENTATION

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 federal and state resource management agencies that relate to CCMP implementation, APNEP mission, and the Albemarle-Pamlico estuarine system. Additional interactions occur with local and regional governments as appropriate. 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 federal, state, and local agencies on a local, basin-wide, regional or statewide basis and require staff involvement and interactions.

Host Entity

The North Carolina Department of Environmental Quality currently serves as the host entity for the Office and the partnership. The Office was moved to NC DEQ's Office of the Secretary in March 2018. The Department is responsible for assisting with administrative and fiscal management of the APNEP-EPA cooperative agreement, which provides federal funds for APNEP. The Department's efficiency of operation and support of the Management Conference plays a key role in the success of APNEP, including assisting in the administration of the cooperative agreement and other funding sources.

Administrative Costs

Overall administration costs during 2019-20 are estimated at approximately \$460,123 and include six staff FTE salaries, and interns, along with benefits, longevity pay, equipment, supplies, office and office and storage space rent, IT services and phone, and training and development.

Indirect Costs

Under the 2019-20 *Draft Negotiated Indirect Cost Agreement* between NC DEQ and the US EPA, the NC Division of Water Resources indirect rate is 14.7% of all salaries supported by this federal grant. Estimated indirect costs will be \$52,934 based on the indirect rate for grant-supported salaries.

Personnel*

Presently the APNEP staff consists of the APNEP office in Raleigh, with the Director, Program Scientist, Program Manager, Policy and Engagement Manager, Ecosystems Analyst, and Communications and Outreach Specialist. The APNEP office in Washington, NC houses the Coastal Habitats Coordinator. The APNEP office in Beaufort, NC houses the Watershed Manager. 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 additional cost to the program.

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.

Program Manager

The Program Manager assists in the administration of the 320 Grant and coordinates and manages 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; develops tracking mechanisms for performance measures and CCMP implementation efforts; and provides staff support to the Policy Board and Advisory Committees. Heather Jennings has been the Program Manager since June 2018.

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, and works with program staff to engage in new CCMP implementation actions. It also provides staff support for the Management Conference and serves as a liaison on various external working groups. Stacey Feken has served in this role since March 2016.

Communications and Outreach Specialist

The Communications and Outreach Specialist coordinates APNEP's digital and print communications efforts, as well as managing the Partnership's education and outreach initiatives. The position also supports field/boat-based work with APNEP and its partners. Kelsey Ellis served as Program Associate in this role from May 2017 to September 2018, and as Communications and Outreach Specialist from September 2018 until the present.

Ecosystems Analyst

The Ecosystems Analyst coordinates with staff and contributing scientists and managers to assess the environmental health of 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 Action Teams and Monitoring & Assessment Teams, and managing the program's GIS functions. Dr. Tim Ellis has served in this role since March 2017.

Coastal Habitats Coordinator (Non-federal Match)

This position serves 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. The position also works also directs coordinated implementation of the NC Coastal Habitat Protection Plan (CHPP) in with the Coastal Resource Commission, the Marine Fisheries Commission, and the Environmental Management Commission. Jimmy Johnson has served in this role since January 2006. *This position is funded by NCDEQ and provides a portion of the non-federal match for the CWA §320 grant funds.*

Watershed Manager (Non-federal Match)

The primary purpose of this position is to assist APNEP in CCMP implementation. The position supports support to APNEP advisory committees and workgroups and monitoring and assessment efforts. The position works cooperatively with the NC National Estuarine Research Reserve in Beaufort, NC. Additionally, the position also works towards implementation of the CHPP with the APNEP Coastal Habitats Coordinator. Trish Murphey has served in this role since January 2018. *This position is funded by NCDEQ and provides a portion of the non-federal match for the CWA §320 grant funds.*

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

TRAVEL

National Estuary Programs may use CWA §320 funds and matching funds to cover the cost of travel by staff and/or stakeholders from other NEPs or watershed organizations who collaborate with the NEP on issues of common interest. Stakeholders may include members of the general public and of environmental and public interest organizations, business or industry representatives, academicians, scientists, and technical experts.

- CWA §320 funds and matching funds may be used to cover costs associated with attending conferences, meetings, workshops, or events that advance CCMP implementation. CWA Section 320 funds also may be used to cover the cost of projects described in the annual work plan and the cost of renting facilities.
- Note that when using CWA Section 320 funds for travel, NEPs should use the least expensive means of travel whenever possible.
- CWA §320 and matching funds may not be used to cover the travel costs of Federal employees.

APNEP, the Management Conference, and EPA consider personal, face-to-face contact essential for information sharing and technology transfer. As part of the federal grant requirements to attend EPA-NEP meetings, each NEP is required to allocate minimum of \$10,000 as travel funds for program activities, enhancement, education, and outreach support. APNEP intends to use budgeted travel funds to support:

- 1) Management Conference, Action Team, Monitoring and Assessment Teams, and Ad-Hoc committee meetings,
- 2) Participation in watershed stakeholder meetings, workshops and conferences relevant to CCMP implementation
- 3) Participation in national or regional NEP and EPA meetings
- 4) Participation in international, nation, regional, and local workshops or conferences

- 5) Travel to other NEPs or communities to provide peer-to-peer technical assistance
- 6) Travel to other NEPs or watersheds for assistance
- 7) Travel by NEP staff or stakeholders from other NEPs or watershed programs to provide NEP with assistance

Travelers may include Management Conference members, Action Team members and Monitoring and Assessment Team members, citizens, and members of environmental or public interest organizations, business or industry representatives, academicians, scientists or technical experts as determined appropriate by the APNEP Director.

As a requirement of this grant agreement, a member of the APNEP core staff are required to participate in all meetings called on behalf of the NEPs by the EPA.

Food

While most travel funds are associated with staff, management conference members, and action team participants, travel funds and funds associated with specific workplan projects, APNEP funds awarded as grants or contracts may 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 APNEP Director.

2018-19 Travel

APNEP staff attended a number of meetings and conferences using the allotted travel funds and specific project funds or administration costs. Some travel costs may be associated with specific projects, as such and travel costs are budgeted/reported for those projects not listed specifically as travel. Rates are listed in the table below. Below is a summary of these activities that have occurred or are currently planned for the year:

Personnel	Date	Purpose	Location	Cost *
APNEP Staff/ Management Conference	10/1/1 8 to 9/ 30/19	Routine Program Activities/ meetings/ projects/ workshops/ conferences/ fieldwork/ MC meetings	APNEP area	7,900
Crowell	3/2019	Spring EPA/NEP Meeting	Washington, DC	2,100
TBD	9/2019	Fall NEP Meeting	Delaware	2,000
			Total*	\$ 12,000

**Estimated to September 30, 2019*

2019-20 Projected Travel

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. 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) projects and contracts, consistent with 41 CFR 301-74.7, and as approved by the APNEP Director and through the NCDEQ travel approval processes.

NC DEQ TRAVEL RATES *

Item	In-State	Out of State	Overnight Trip	Day Trip
Breakfast	\$ 8.40	\$ 8.40	Depart Office before 6:00 AM	Depart before 6:00 AM; Extend workday by 2 hours
Lunch	\$ 11.00	\$ 11.00	Depart Office by 12:00 Noon; Overnight return after 2:00 PM	NA
Dinner	\$ 18.90	\$ 21.60		Depart before 5:00 PM; Return after 8:00 PM; Workday extended by 3 hours
Hotel	\$ 71.20	\$ 84.10		NA

* current rates, rates in A-P region often exceed posted rate

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.

2019-20 Projected Travel

Personnel	Date	Purpose	Location	Estimated Cost
APNEP Staff, Management Conference, and Volunteers	10/2019 – 9/2020	Normal program activities	Albemarle-Pamlico region	\$10,000
APNEP Staff	2020	EPA/NEP National Spring Meeting	Washington, DC	\$2,000
				\$12,000

NON-FEDERAL COST-SHARE (MATCH)

Summary of Match Requirements

NCDEQ intends to provide \$625,000 for the required 1:1 non-federal match for time period of October 1, 2019 to September 30, 2020. This match will be provided through:

- 1) **In-kind Services:** The North Carolina Department of Environmental Quality (NCDEQ) intends to provide \$188,862 as part of the required 1:1 non-federal match the period of October 1, 2019 to September 30, 2020. This match will be provided by staff support from the Coastal Habitats Coordinator and Watershed Manager positions. The match positions are responsible for program administration, support, community involvement and guiding implementation of the APNEP CCMP and the NC Coastal Habitat Protection Plan (CHPP) and other A-P watershed issues.

<u>POSITION</u>	<u>FTE</u>	<u>SALARY</u>	<u>EFFORT</u>	<u>Match</u>
Coastal Habitats Coordinator	1	72,265	1.0	72,265
Watershed Manager	1	67,371	1.0	67,371
		Benefits*	2.0	<u>49,226</u>
Total In-Kind Service Match:				\$ 188,862

** Benefits are based on Social Security (7.65 %) & Retirement (18.44 %) of position's annual salary, plus Medical Insurance Plan rate of \$6,104 per year.*

- 2) **In-kind Project Expenditures Non-federal Match:** The NCDEQ intends to provide \$436,138 as part of the 1:1 non-federal match for the period of October 1, 2019 to September 30, 2020. 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 NC 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 Positions (salaries and benefits)	\$ 188,862
Water Quality Improvement Project(s) Expenditures:	<u>\$ 436,138</u>
TOTAL:	\$ 625,000

LEVERAGE FUNDS

APNEP actively seeks alternative funding sources for partnership activities and projects to fulfill CCMP goals. In addition, APNEP pursues additional avenues for collaborating with partners to assist in targeting program funds towards CCMP and basin-wide goals. Where possible, APNEP works 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 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 Estuarine 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.

2018-19

During the Oct. 1, 2018- Sept. 30 2019 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 2018 to the EPA *NEPORT* database for the time period of October 1, 2016 to September 30, 2017. Staff are awaiting the final leverage numbers for that time period, however it expected to exceed 10 dollars for every dollar provided by the federal grant

2019-20

In 2019-20, APNEP will continue to seek additional avenues for collaborating with various 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.

PARTNERSHIPS

APNEP Office

The main APNEP office is located within the Secretary's Office of the NC Department of Environmental Quality in Raleigh, North Carolina, with additional program personnel in Washington and Beaufort, North Carolina. The Virginia Department of Environmental Quality also provides support through a position in Virginia Beach, Virginia.

Management Conference

Leadership Council

This Leadership Council 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 Leadership Council 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 Leadership Council 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 Leadership Council, 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 in 2004 to provide independent advice to the Leadership Council and the Implementation Committee on scientific and technical issues, including ecosystem assessment and monitoring, in support of CCMP implementation.

Implementation Advisory Committee

Currently and ad-hoc Implementation Advisory Committee consisting of the Executive Committees of both of the Leadership Council and the leadership of the Science and Technical Advisory Committee work to choose projects for funding as needed. A future Implementation Advisory Committee will be comprised of representatives from the CCMP implementation action teams (see below), each of which will advance a discrete set of related CCMP actions after APNEP determines a priority approach to CCMP implementation.

Action Teams

APNEP has established a number of CCMP Implementation Action Teams focused on implementing the objectives and actions in the CCMP. Additional teams will be established before 2019. 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.

Monitoring and Assessment Teams

Two of the four phases of APNEP's adaptive management cycle, "Monitoring" and "Assessment", help ensure that stakeholders have regular, reliable decision support as to whether CCMP outcomes and actions are being achieved. To leverage program capacity and promote partner collaboration when implementing these two crucial phases, APNEP established in 2008-2009 six resource monitoring and assessment teams whose missions each addressed a major sub-system of the Albemarle-Pamlico regional ecosystem. Throughout 2017 and into early 2018, all teams were reactivated after a significant hiatus.

Other Partnerships

In general, APNEP is considered a boundary organization, or an organization that facilitates collaboration and information flow between diverse research disciplines and between the research and public policy community. As such, APNEP engages its partnering organizations and the public to improve awareness and understanding of environmental issues facing the Albemarle-Pamlico region. The various methods of APNEP engagement are discussed in greater detail in the recently finalized [APNEP Engagement Strategy](#).

Much of this coordination occurs through relationships built through our partner network, independent of whether or not partners are participating on an APNEP team. APNEP is actively tracking issues of interest to the program and providing support where feasible, such as the proposed changes to the Waters of the United States Rule and impacts to wetlands, Chowan algal blooms, offshore oil drilling, impacts to communities due to flooding and sea level rise, and fisheries issues such as shrimp trawling and tracking development of the mariculture industry and ensuring balancing with protection native oyster and SAV habitat. Engagement associated with these issues has led to providing letters of support for partners applying for grants, submitting formal comments through the Leadership Council, providing technical advice and support to agency management, funding and logistical assistance, and hosting workshops to convene technical experts to highlight and provide a forum to discuss the issues.

APNEP staff also regularly participate in external workgroups and committees to expand our reach, facilitate regional collaboration, and reciprocate volunteer involvement. Where possible, APNEP seeks to prioritize projects that align with the complimentary missions of these external workgroups. Staff also actively seek opportunities to integrate external workgroup projects with APNEP Action Teams projects. These teams include:

- Watershed Stewardship Network
- Interagency Watershed Restoration and Improvement Team (WRIT)
- Albemarle Commission Balancing Nature and Commerce
- Southeast Aquatic Resources Partnership
- Atlantic States Marine Fisheries Commission Habitat Committee
- Atlantic Coastal Fish Habitat Partnership
- Oyster Steering Committee

- Carolina Wetlands Association
- Sentinel Landscapes
- NOAA Sentinel Sites Cooperative
- Cape Fear River Fish Passage Committee
- Office of Environmental Education Interagency Working Group
- Nutrient Criteria Development Team
- Currituck Sound Alliance
- Onslow Bight Forum
- E080 Agency Teams (Council Designee Interagency Team, Coastal Resiliency Workgroup, Natural and Working Lands, etc.)

APPENDIX A: 2012 CCMP GOALS AND OUTCOMES

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

Ecosystem Outcomes:

1. Waters are safe for personal contact.
2. Designated surface and ground water supplies are safe for human consumption.
3. Surface hydrologic regimes sustain regulated human uses.
4. Fish and game are safe for human consumption.
5. 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:

1. The biodiversity, function, and populations of species in aquatic, wetland, and upland communities are protected, restored, or enhanced.
2. The extent and quality of upland, freshwater, estuarine, and near-shore marine habitats fully support biodiversity and ecosystem function.
3. 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:

1. Appropriate hydrologic regimes support ecological integrity.
2. Nutrients and pathogens do not harm species that depend on the waters.
3. Toxics in waters and sediments do not harm species that depend on the waters.
4. Sediments do not harm species that depend on the waters.

APPENDIX B: 2012-2022 CCMP ACTIONS

IDENTIFY

- A1.1 Facilitate the mapping of significant ecological, bathymetric, geologic, demographic, and cultural features.
- A1.2 Facilitate the refinement and use of online conservation planning tools.
- A2.1 Facilitate the development of protocols and conduct rapid assessments to determine presence and potential threat of invasive species.
- A2.2 Create and improve projections of land use and climate change related impacts on the regional ecosystem.
- A2.3 Support research on adapting to impacts associated with climate change and sea level rise.
- A2.4 Facilitate risk assessments of targeted personal care and pharmaceutical products in the aquatic system.
- A3.1 Assess the effectiveness of policies and regulations to minimize wetland loss.
- A3.2 Assess the effectiveness of policies and regulations regarding riparian buffers.
- A3.3 Develop and refine ecological flow requirements for each major river.

PROTECT

- B1.1 Minimize the introduction of toxics from targeted sources.
- B1.2 Minimize the introduction of pathogens from targeted sources.
- B1.3 Facilitate the protection of natural riparian buffers to reduce runoff.
- B1.4 Facilitate the development of state and local policies that support the use of low impact development.
- B1.5 Facilitate⁵ Facilitate the use of best management practices on agricultural and silvicultural lands.
- B2.1 Facilitate¹ Facilitate the development and implementation of an integrated freshwater habitat protection strategy.
- B2.2 Develop and implement a submerged aquatic vegetation (SAV) protection strategy.
- B2.3 Facilitate the development of incentives for protection and management of targeted natural communities and habitats.
- B2.4 Facilitate the development of policies to minimize dredge and fill activities in naturalized areas and sensitive habitats.
- B2.5 Facilitate protection of designated anadromous fish spawning areas and inland primary nursery areas from marina impacts.
- B2.6 Minimize and rapidly respond to the introduction of invasive species through the development and implementation of integrated prevention and control strategies.
- B3.1 Assist local governments in the development of incentives for protecting natural shorelines.
- B3.2 Develop and distribute educational materials encouraging landowners to protect natural shorelines.
- B3.3 Facilitate the development of requirements for living shoreline stabilization projects that optimally protect estuarine aquatic and shoreline habitats while minimizing regulatory requirements.

RESTORE

- C1.1 Establish contaminant management strategies for waters not meeting water quality standards.
- C1.2 Facilitate the implementation of existing contaminant management strategies.
- C1.3 Facilitate the restoration of riparian and estuarine shorelines.
- C1.4 Reduce unregulated discharge from wastewater treatment systems.
- C1.5 Facilitate voluntary retrofitting of existing development and infrastructure to reduce runoff.
- C2.1 Facilitate the development and implementation of coordinated landscape-scale hydrological restoration strategies.
- C2.2 Facilitate the development of incentives to replace hardened estuarine shorelines with living shorelines.
- C2.3 Facilitate the hydrologic restoration of floodplains and streams.
- C3.1 Develop and refine integrated invasive species eradication and control strategies.
- C3.2 Develop and implement a coordinated wetland restoration strategy.
- C3.3 Develop and implement a submerged aquatic vegetation restoration strategy.
- C4.1 Install fish ladders and eel-ways on existing dams and other permanent barriers.
- C4.2 Facilitate the removal of dams, culverts, and other in-stream barriers.
- C4.3 Restore degraded anadromous fish spawning habitats.
- C4.4 Facilitate research to improve fish passage.
- C5.1 Construct new oyster habitats.
- C5.2 Reduce the adverse impacts of harvests to existing oyster habitat.
- C5.3 Facilitate research to improve oyster restoration technologies and methods.

ENGAGE

- D1.1 Communicate the importance of stewardship and offer opportunities for volunteerism to further APNEP's mission.
- D1.2 Facilitate efforts to improve collaborations to protect and restore ecosystem processes.
- D1.3 Coordinate outreach and engagement efforts regarding the impacts of invasive species.
- D1.4 Coordinate outreach efforts regarding the proper application of fertilizers to reduce nutrient runoff.
- D1.5 Increase opportunities for public access to waterways, public lands, and trails.
- D2.1 Provide and promote opportunities for outdoor experiences that connect individuals with the Albemarle-Pamlico ecosystem.
- D2.2 Provide environmental education training opportunities for educators in the region.
- D2.3 Increase public understanding of the relationship between ecosystem health and human health advisories relating to water, fish, and game.
- D3.1 Develop and implement a strategy to improve decision-makers' understanding of the costs and benefits of environmental protection, restoration, planning, and monitoring.
- D3.2 Facilitate the development and implementation of basinwide water management plans to ensure no less than minimum in-stream flows are maintained.

- D3.3 Provide assistance to state, regional, and local governments to incorporate climate change and sea level rise considerations into their planning processes.

MONITOR

- E1.1 Facilitate the development and implementation of an integrated monitoring network through the guidance of regional monitoring and assessment teams.
- E1.2 Assess the value of information for measuring ecosystem and CCMP implementation outcomes.
- E1.3 Facilitate the expansion of volunteer monitoring into a core element of the integrated monitoring network.
- E2.1 Facilitate the design and content acquisition of a regional database based on partners' data and information needs.
- E2.2 Develop and maintain an online resource that clearly conveys regional information in support of ecosystem-based management.