

## 2020-2021

**Year-End Report**

30 October 2021

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# EXECUTIVE SUMMARY

#### Purpose

The report presents information about the Albemarle-Pamlico National Estuary Partnership’s completed and ongoing projects from October2020 through September 2021 under cooperative agreement *CE-0D20614 and CE- 0D95519.*

#### Cooperative Agreements

This report addresses actions funder EPA/NC-DEQ Cooperative Agreements CE-0D20614 and CE-0D95519 to support implementation of the management strategies recommended in APNEP’s 2012-2022 Comprehensive Conservation and Management Plan (CCMP) under the direction of the Leadership Council, as well as to support APNEP’s mission of identifying, protecting, and restoring the Albemarle-Pamlico region’s significant resources. The period of performance under this Cooperative Agreement CE-0D95519 is from October 1, 2019, through September 30, 2024. Work under Cooperative Agreement CE-0D20614 was concluded by September 30, 2021

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| --- | --- |
| **Principal Contacts** |  |
| **Leadership Council Chair** | **APNEP Director** | **EPA Project Officer** |
| **Dr. Kirk J. Havens** | **Dr. William L. Crowell, Jr.** | **Ms. Rachel Hart** |
| Virginia Institute of Marine Sci. | Albemarle-Pamlico NEP | US EPA, Region IV |
| P.O. Box 1346 | 1601 Mail Service Center | 61 Forsyth Street |
| Gloucester Point, VA 23062 | Raleigh, NC 27699-1601 | Atlanta, GA 30303 |
| (804) 684-7380 | (919) 707-8633 | (404) 562-9279 |

#### 2020-2021 Key Accomplishments

Key accomplishments from October 2020 through September 2021 are listed below. Additional details about these and other projects can be found in the Activities and Projects 2020-21 section of this document.

#### CCMP Focus Areas and Activities

APNEP continued its attention on CCMP focus areas and activities as directed by the Leadership Council during the January 2020 strategic planning meeting. These actions led to staff activities primarily focused on SAV, water quality, coastal habitats, and resiliency, all consistent with the 2012-22 CCMP and the APNEP mission.

###### Scientific and Technical Initiatives

Development of Integrated Monitoring Plan

With the input of APNEP’s Science and Technical Advisory Committee (STAC), staff developed a proof-of-concept Integrated Monitoring Plan whose initial scope focused on coastal submerged aquatic vegetation (SAV) and estuarine water quality factors that impact coastal SAV. The plan was accepted by the Leadership Council on March 11, 2021.

SAV Metric Report

APNEP published a report showing a net loss in the extent of high-salinity submerged aquatic vegetation (SAV) habitat in North Carolina’s sounds between 2006-2008 and 2013. While the data also confirm that the state possesses the largest acreage of seagrass along the east coast of the United States, around 100,000 acres, the overall extent of seagrass meadows in the Albemarle-Pamlico estuary decreased by 5,686 acres or 5.6% despite the availability of suitable habitat for expansion of the resource. Seagrass is declining worldwide; North Carolina is experiencing annual rates of seagrass loss at or below the global average. Learn more.

SAV Map Data Collection

During 2020-2021 APNEP coordinated with the N.C. Department of Transportation and other partners on the APNEP SAV Team to gather SAV data via aerial imagery and boat-based surveys. In addition to this information supporting the creation of an updated map of high-salinity SAV (seagrass) for the Albemarle-Pamlico Estuarine System, this effort in 2021 marked the initial implementation of APNEP’s monitoring plan by focusing on several indicator metrics reflecting the condition of the region’s coastal SAV resource. Learn more.

###### Water Quality

Research Study to Support Chlorophyll-*a* Standards for SAV Protection

To set SAV protection and restoration goals for the Albemarle-Pamlico Estuarine System and make the connection to needed nutrient and sediment load reductions, quantitative linkages between chlorophyll-*a* concentrations and SAV light requirements are needed. Under APNEP contract, UNC Institute of Marine Sciences staff has developed scientifically -defensible chlorophyll-*a* and turbidity threshold concentrations that when considered together are protective of SAV in high-salinity zones. This information will help guide the decisions made through the NC Nutrient Criteria Development Plan and the NC Coastal Habitat Protection Plan.

##### 2020-2021 Key Accomplishments

N.C. Nutrient Criteria Development Plan Support

APNEP staff and select STAC members are active in the N.C. Nutrient Criteria Development Plan process, now focused on the Albemarle Sound and Chowan River. Staff assisted the N.C. Division of Water Resources (NCDWR) with gaining a complete understanding of the system and recommended candidates for the Scientific Advisory Council who are experts in high- and low-salinity SAV, and SAV impacts on fish productivity. NCDWR has selected SAV as a biological indicator for the health of the Albemarle Sound and Chowan River. APNEP staff will continue to actively participate in the development of nutrient criteria in the Albemarle Sound and Chowan River until recommendations are accepted and approved by NCDWR and the US EPA.

###### Communications and Outreach

Continuation of Long-Term Watershed Outreach Projects

APNEP continued long-term support and funding for education and outreach projects “Shad in the Classroom” and the “Summer Teacher Institute” for 2020-2021, and initiated a new open request for proposal (RFP) process that will be used to fund targeted outreach and engagement initiatives. With input from APNEP’s Engagement and Stewardship Action Team, staff released the RFP during summer 2021 and convened an independent review committee of environmental education and outreach professionals to conduct the competitive evaluation and ranking process for FY21-22. Future funding for the previously-supported programs will be reevaluated alongside other submitted project proposals through the open RFP process. The process will enhance the program’s transparency, accessibility, and the evaluation of outputs/outcomes from funded projects.

* **Summer Teacher Institute:** In summer 2021, APNEP continued its long-term support for the Summer Teacher Institute, a multi-day environmental education professional development opportunity for the region’s educators led by the UNC-IE. The program has reached approximately 25 teachers annually since its inception in 2004. The institute was held in person this year. [Learn more.](https://apnep.nc.gov/resources/educators/summer-teacher-institute)
* **Shad in the Classroom (Virtual):** Long-term APNEP support for the N.C. Museum of Natural Science’s Shad in the Classroom program has resulted in this initiative reaching approximately 30 educators and their 1000-plus students annually since 2011. From 2010 (pre-APNEP funding) to 2018, the program has grown from 13 to 30 classrooms annually across the region. In 2021, the program was again conducted via the internet among students and educators. However, live shad fry were still released in area rivers as part of the event. Learn more.

Submerged Aquatic Vegetation Communications

* **SAV Economic Valuation:** APNEP contracted with the N.C. State University Center for Environmental and Resource Economic Policy (CEnREP) to fund an analysis of the economic value of SAV in the Albemarle-Pamlico region. The final report is available [here.](https://apnep.nc.gov/apnep-sav-team-metric-report-interactive-story-map)
* **SAV Press and Outreach:** In February 2021, a high-salinity SAV extent metric report was released along with an associated press release and StoryMap to help convey these findings to a general audience. This press release also led to external press for APNEP’s efforts in *Coastal Review Online*, WUNC, WITN, Public Radio East, and the Carolina Public Press. In addition, APNEP’s summer intern Abby McNaughton created infographics (one for the public, one for

##### 2020-2021 Key Accomplishments

local governments) and a webpage to assist with communications regarding the SAV economic valuation report (see above). She also assisted in developing and sharing a series of social media posts related to various SAV topics.

Water Quality Testing and Communications Projects

Central to APNEP’s mission as a program authorized by the Clean Water Act is protecting and restoring the Albemarle-Pamlico region’s waters. The Partnership funded in 2019-2020 several projects in support of this mission. Through support for Sound River’s Swim Guide program and N.C. Division of Marine Fisheries’ Recreational Water Quality Monitoring Program, APNEP is expanding the collection of water quality data for our region that prioritizes public health. Both programs monitor water quality with the primary goal of alerting local communities to potentially hazardous conditions, and the Swim Guide program with Sound Rivers has the added educational benefit of operating through citizen scientists. [Learn more.](https://apnep.nc.gov/our-work/monitoring/water-quality-monitoring)

###### Coastal Resiliency Initiatives

Tribal Coastal Resilience Connections

Using supplemental USEPA 320 funds designated to work with underserved and under-represented communities on climate resilience, APNEP partnered with the N.C. Commission of Indian Affairs (NCCIA), N.C. State University (NCSU), and Virginia Coastal Policy Center to work with tribal communities in the Albemarle-Pamlico region. The goal of this initiative is to develop a strategy for incorporating resilience into tribal planning and community engagement processes. The Tribal Coastal Resilience Team has been successful in generating research on tribal engagement in climate and resilience planning efforts throughout the U.S., launching a social media campaign, conducting outreach at conferences and events, and creating partnerships and building the groundwork for a sustainable program. A final report, which will include recommendations for the project’s second phase, is expected to be completed in December.

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

APNEP has participated on a Virginia Institute of Marine Sciences (VIMS)-led team on a NOAA-funded Coastal Resilience project which began in 2017. The project team developed a spatial analysis tool for Virginia local governments to identify opportunities and criteria for using Natural and Nature Based Features (NNBFs) that increase resilience to flooding and generate credits for local governments in water quality and hazard mitigation programs. APNEP has worked with the project team and other partners to evaluate the tool’s applicability in N.C. coastal localities as a possible extension of the guidance to areas beyond coastal Virginia. APNEP developed a scope of work to assess N.C. locality needs, built a template tool comparison database, and developed outreach materials and resources that N.C. local government staff can use to compare tools and the types of NNBFs that can meet their needs. APNEP has developed a contract with Wetlands Watch to complete this remaining phase of the project.

N.C. Executive Order 80 Implementation

APNEP staff continue to participate in activities stemming from implementation of the N.C. Climate Risk and Resiliency Plan (2020), including the Natural and Working Lands Stakeholder Team, Coastal Habitats and Pocosin Wetlands Subcommittees, and the Coastal Resilience Community of Practice. APNEP’s involvement in these efforts have led to identification of regional gaps and needs and integrating resilience activities with existing programs and initiatives, including working closely with N.C. Division of Marine Fisheries staff to develop actions that complement the goals and objectives of both APNEP’s CCMP and N.C. Coastal Habitat Protection Plan. In addition, the Tribal Coastal Resilience

##### 2020-2021 Key Accomplishments

Project (see above) stemmed from APNEP participation on various workgroups and committees. Staff continue to explore options to assist with implementation of the actions recommended in the Risk and Resiliency Plan.

Water Level Monitoring Stations (non-320 funds)

APNEP supported placement of additional N.C. Flood Inundation Mapping and Alert Network (FIMAN) remote monitoring stations in Newport, Carteret County and Slocum Creek near Havelock, Craven County, through the N.C. Division of Emergency Management. Data from gauges located within the Albemarle-Pamlico watershed increases real-time knowledge of flood conditions in the Albemarle-Pamlico region, as well as contributing to knowledge that can be used to address future water management actions in the watershed. Learn more.

U.S. Climate Alliance Project: Prioritizing Coastal Habitats and Carbon Resilience

APNEP participated on a United States Climate Alliance (USCA) project led by Duke University. The USCA grant was awarded in 2019 and is a multi-state effort that builds on North Carolina’s Executive EO80 Natural and Working Lands Initiative (see above). The project involved spatial analysis to map and prioritize coastal habitats that store carbon, enhance natural and human community resilience to coastal hazards, and support a variety of species. It is designed to support Atlantic Coast states that are engaged in resilience planning and working to incorporate blue carbon into their climate mitigation plans. The project included funds for a pilot project within a six-state region, and APNEP led development of a proposal, in coordination with VIMS, Old Dominion University (ODU), The Nature Conservancy, Chowan University, and Audubon, for an interstate pilot project with partners in Virginia and North Carolina. This project resulted in a GIS-based modeling tool that can be utilized by the Currituck Sound Coalition to assist in future planning reflect local community restoration priorities and goals. [Learn more.](https://nicholasinstitute.duke.edu/project/coastal-protection-and-blue-carbon-eastern-states)

###### Partnership-Building and Regional Coordination

N.C. Aquatic Nuisance Species Management Plan Committee Coordination

APNEP staff continued working with the N.C. Aquatic Nuisance Species Management Plan Committee over the year to revise the Plan for federal approval, and afterwards identify next steps for Plan implementation. This state plan for coordinated management, research, and outreach of aquatic nuisance species, once finalized and federally approved, will make N.C. 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 N.C. Learn more.

N. C. - Virginia Memorandum of Understanding (2020)

APNEP facilitated a renewed Memorandum of Understanding (MOU) between six environmental and natural resources agencies from N.C. and Virginia. The MOU, released in September 2020, builds upon the MOU signed in 2017and re-affirms the agencies’ commitment to foster interstate collaboration within the shared waterways of the Albemarle-Pamlico region. The MOU required a report on coordination, data-sharing, and assessment of interstate initiatives by March 2021, which was circulated to the agency designees summer 2021. A final recommendation regarding interstate joint-management strategies will be delivered to the signatories by December 2021.

##### 2020-2021 Key Accomplishments

Currituck Sound Coalition

This initiative is being led by Audubon North Carolina and is a coalition of many of APNEP’s partner organizations. The idea behind the formation of the coalition is to increase collaboration and coordination on nature-based strategies that provide multiple benefits – flood risk reduction, storm protection, improved water quality, habitat, recreational opportunities, cultural heritage, etc. – for communities and wildlife in and around the Currituck Sound watershed. Together the coalition can effectively inform planning, advance policy, and lead on-the-ground projects that demonstrate the capacity of nature-based solutions to address the most pressing coastal challenges in northeastern North Carolina. APNEP staff participate on the Coalition’s Wetlands Working Group and worked with coalition partners to develop a pilot demonstration project for use in project prioritization discussed under the USCA project (see above). [Learn more.](https://pineisland.audubon.org/conservation/landing/alliance-currituck-sound)

NC Marine Debris Action Plan Development

APNEP staff continued to serve on the N.C. Marine Debris Advisory and Implementation Team that advises on and participates in implementing the N.C. Marine Debris Action Plan, which was completed in January 2020. This plan provides a strategic framework for prevention and removal of marine debris along the N.C. coast and inspires coordination, focus, and direction for the organizations and communities that address marine debris. A summary of 2020 accomplishments and a full report are available. Learn more.

Scuppernong Regional Water Study

In partnership with Washington and Tyrell Counties, APNEP submitted a grant application to the N.C. Water Resources Development Grant fund on behalf of Washington County in Fall 2019 to conduct a hydrologic study of the headwaters of the Scuppernong River, Lake Phelps, Pocosin Lakes National Wildlife Refuge, and surrounding land. The grant was awarded to Washington county in Fall 2020. APNEP continues working with these local governments who have requested assistance with addressing flooding and resilience planning. APNEP has been working to secure match commitments from project partners and identify potential technical partners that have the capacity to conduct the water budget and modeling work. The outcomes from the study will be utilized to build a more comprehensive, collaborative regional water management strategy for the northern Albemarle-Pamlico peninsula, which has been experiencing cycles of flooding and drought in an area that is highly vulnerable to sea level rise.

#  ACTIVITIES & PROJECTS 2020-2021

This year-end report provides an overview of the status of APNEP’s projects and activities since the last annual work plan was approved on May 20, 2020. Ongoing projects are those that began during or before the last fiscal year, and which APNEP expects to continue through the 2021-2022 fiscal year.

####  Identify: Research and Technical Assistance

###### Joint Graduate Fellowship in Estuarine Research

**Objectives:** Foster interest in research related to 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 (first awarded project began in 2016). The fellowship provides funding for a graduate student based in North Carolina to conduct applied research within the North Carolina portion of the APNEP management area. Fellows must conduct research that addresses focus areas identified in the NCSG Strategic Plan and APNEP CCMP.

Progress to Date:

* **2016-2020:** Fellows Liz Brown-Pickren, Stacy Zhang, Mollie Yacano, Erin Voigt, and Haley Plaas were funded through this Fellowship program. Learn more.
* **2021:** In January, fellow Stacy Trackenberg began studying how restored seagrass beds in coastal North Carolina are functioning as habitat for faunal communities across varying depths.
* **2021:** The call for applications for 2022 was announced in September 2021. Applications are currently under review and the fellow will be announced by early 2022.

###### Coastal Plain Ecological Flows Evaluation: Pilot Project (Phase II)

**Objectives:** Complete data compilation, field studies, and analysis needed to address data gaps in the coastal plain to identify surface flows needed to protect the ecological integrity of biota in coastal streams.

**Description:** APNEP has led an Ecological Flows Action Team since 2015 at the request of partners that participated in the N.C. Ecological Flows Science Advisory Board (EFSAB) to address data gaps and needs identified by members of EFSAB’s Coastal Ecological Flows Working Group. EFSAB was established in response to 2010 legislation directing the former N.C. Department of Environment and Natural Resources to develop hydrologic models for each river basin in North Carolina and determine the flows needed to maintain ecological integrity in surface waters. Learn more.

Progress to Date:

APNEP funded team co-lead Dr. Mike O’Driscoll and colleagues at ECU to conduct the Phase I study, Existing Data for Evaluating Coastal Plain Ecological Flows in the Albemarle-Pamlico Estuary Region, completed in 2018. The team met regularly throughout 2019-2020, focusing on addressing the recommendations in the Phase I report and developing a proposal for a Phase II Study to conduct pilot studies in selected watersheds and develop an evaluation process to inform development of ecological flows in the coastal plain. APNEP contracted with ECU to conduct work on the Phase II pilot study which began in spring 2021. ECU colleagues provided a status update to the Flows Team during summer 2021 and solicited input from the team on data compilation and data gaps, and sampling locations in the Trent River Watershed of the Neuse River Basin, and efforts towards stakeholder engagement.

###### Development of scientifically defensible chlorophyll-*a* standards for protection of SAV in the Albemarle-Pamlico Estuarine System

Objectives:

1. Calibrate an empirical model relating Secchi disk depth to attenuation of photosynthetically active radiation (PAR);
2. Validate a bio-optical model (the Biber et al., 2008) for predicting attenuation of PAR in both low and high salinity estuarine waters at locations throughout the Albemarle-Pamlico Estuarine System;
3. Use the validated bio-optical model or empirical relationships developed from Objective 2 to set thresholds for the maximum growing season average chlorophyll *a* that is protective of SAV habitats in low- and high-salinity zones;
4. Combine diffuse attenuation coefficient and bathymetry data sets from sites throughout the Albemarle-Pamlico Estuarine System to determine the potentially suitable habitat with respect to light under current chlorophyll-*a* levels and across a range of potential, future chlorophyll-a scenarios.

**Description:** To set SAV protection and restoration goals for the Albemarle-Pamlico Estuarine System and make the connection to needed nutrient and sediment load reductions, quantitative linkages between chlorophyll-*a* concentrations and SAV light requirements are needed. This project will develop recommendations for scientifically defensible chlorophyll- *a* standards that are protective of SAV for high- and low-salinity zones of the Albemarle-Pamlico Sound Estuarine System through four objectives listed above.

Progress to Date:

APNEP contracted with UNC-IMS to conduct the project and work began in April 2020. The draft final report was received on March 26, 2021; APNEP review is under way. Presentation of progress and findings were made to the N.C. NCDP Scientific Advisory Council on October 30, 2020 and March 31, 2021. The final report was received by APNEP staff, is under review and will be posted on the APNEP website this fall.

###### Calibration of a bio-optical model for low-salinity SAV in Albemarle-Pamlico Estuarine System

Objectives:

* 1. In collaboration with NC-DWR and the University of North Carolina Institute of Marine Sciences (UNC IMS), collect necessary paired chlorophyll-*a*, colored dissolved organic matter (CDOM), and photosynthetically active radiation (PAR) data from select N.C. Ambient Monitoring System (AMS) stations.
	2. Calibrate a bio-optical model for low-salinity SAV in the Albemarle-Pamlico Estuarine System using the data from Objective 1.
	3. Develop scientifically defensible chlorophyll-*a* standards for protection of low-salinity SAV.

**Description:** To set SAV protection and restoration goals for the Albemarle-Pamlico Estuarine System (APES) and make the connection to needed nutrient and sediment load reductions, quantitative linkages between chlorophyll-*a* concentrations and SAV light requirements are needed. APNEP previously contracted with the UNC IMS to conduct this analysis for both high- and low-salinity SAV. While the bio-optical model performed well for the high-salinity waters of the APES where it was originally developed, further calibration is needed to utilize the model for low- salinity SAV. Extensive compilation and review of available water quality data revealed limited measurements of the critical parameters CDOM and PAR in low-salinity waters of the APES that are necessary for further calibration of the bio-optical model. This project will collect these data, calibrate the model, and develop recommendations for scientifically defensible chlorophyll- *a* standards that are protective of SAV for low-salinity zones of the APES. These findings, in association with the findings for high-salinity SAV, will help guide the development of water quality management strategies for the protection of SAV, particularly through the N.C. Coastal Habitat Protection Plan and the N.C. Nutrient Criteria Development Plan.

Progress to Date:

**2021:** NCDWR began sampling in May. The project was placed under contract in summer 2021 and UNC-IMS started lab analyses of water samples. The project is scheduled to be completed June 2022.

#### Ecosystem Protection and Restoration


###### N.C. Aquatic Nuisance Species Management Plan Coordination

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

**Description:** The N.C. Aquatic Nuisance Species Management Plan (NC - ANSMP) 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, N.C. 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 state’s limited resources directed towards invasive species management, federal funding is critical to successful implementation of the NC-ANSMP. In support of the CCMP, APNEP staff and NC-DWR are co-leading a revision process of the NC - ANSMP by the plan’s Steering Committee with the end goals of renewing commitments for collaboration from state agencies and making N.C. eligible to receive federal funding for invasive species management.

Progress to Date:

APNEP staff provided feedback on the original NC – ANSMP that was adopted in 2015 and have been co-facilitating, along with NC Division of Water Resources, an update of the Plan through the NC-ANSMP Steering Committee in 2018-2021. APNEP staff will continue to co-facilitate the coordination of revisions to the NC–ANSMP in 2021, with the goal of having the N.C. Governor’s Office submit the revised Plan to the federal Aquatic Nuisance Species Task Force by early 2022. From there, APNEP staff will continue to work with the Plan’s Steering Committee towards implementing the NC-ANSMP in support of shared CCMP priorities.

###### N.C. Coastal Habitat Protection Plan Implementation Support

**Objectives:** To coordinate across N.C. state agencies to improve coastal habitats and to raise awareness about the importance of these habitats for N.C. fisheries.

**Description:** The N.C. 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 CHPP has assisted in creating an opportunity for agencies and commissions within NC-DEQ to work together on issues specific to fish habitat. While differences in scope, geography and mission exist, implementation of the CCMP and the CHPP are complimentary and APNEP staff ensure that both plans are implemented in a coordinated and integrated fashion. By statute, the CHPP must be reviewed and updated if needed every five years.

Progress to Date:

* APNEP’s projects and initiatives related to SAV mapping and monitoring are strongly tied to CHPP implementation. See SAV Mapping and Monitoring project descriptions for more information.
* To inform the CHPP Wetland Issue paper titled “Wetland Protection and Restoration through Nature-Based Solutions”, The DEQ CHPP Planning Team hosted a series of three virtual technical workshops on coastal wetlands in August of 2020. The three workshops were: 1) Coastal Wetland Mapping and Monitoring, 2) Coastal Wetland Threats and Conservation, and Coastal Wetland Restoration and Living Shorelines. APNEP CHPP staff were part of the planning team and assisted in facilitating the workshops. There were over seventy participants from state and federal agencies, non-government organizations and academia.
* APNEP staff were involved in the development of the 2021 CHPP Amendment and Issue Papers throughout 2020-2021. The draft CHPP update was released for agency and public review in the summer of 2021, and is scheduled for adoption by the three commissions in late November of 2021. APNEP staff were also involved in a series of webinars to create public outreach for the CHPP and to receive public comment on the amendment. APNEP also assisted with social media outreach to raise awareness about the CHPP and solicit comment on the draft plan.

###### Submerged Aquatic Vegetation Economic Valuation Study

**Objectives:** Estimate current economic values and projected economic losses relative to current SAV extent and potential SAV-loss scenarios over the next decade within the Albemarle-Pamlico Estuary. The study will include the values of select ecosystem services provided by SAV where data are readily available and modeling relationships between SAV abundance and economic value are well established.

**Description:** This contract funded an economic analysis of SAV in the Albemarle-Pamlico Estuary. Building upon a 2016 EPA-sponsored effort to value the ecosystem service of carbon storage and sequestration provided by SAV, this updated and expanded valuation of SAV will investigate the economic relationships of five ecosystem services provided by SAV: water quality improvements, recreational and commercial fisheries habitat, carbon sequestration, waterfowl habitat, and shoreline stabilization. The study’s findings are intended to 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 public.

Progress to Date:

Complete: The N.C. State University Center for Environmental and Resource Economic Policy (CEnREP) was chosen to conduct the study. APNEP formed a steering committee of SAV and resource economics expertise to guide CEnREP researchers. The project is complete, and the final report is available [here.](https://apnep.nc.gov/apnep-sav-team-metric-report-interactive-story-map) In addition, APNEP’s summer 2021 intern, Abby McNaughton, created infographics (one for the public, one for local governments) and a webpage to assist with communications regarding the SAV Economic Valuation report. She also assisted in developing and sharing a series of social media posts related to the SAV Economic Valuation Study and various SAV topics.

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

**Objectives:** 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 NNBFs within North Carolina.

**Description:** APNEP is a partner with VIMS, Wetlands Watch, and the Virginia Coastal Policy Center on this NOAA-funded Coastal Resilience project which began in 2017. The project team has developed a spatial analysis tool that will be shared with Virginia local governments to identify opportunities and criteria for using NNBFs that increase resilience to flooding and generate credits for local governments in resource management and hazard mitigation programs. APNEP is working with the project team and other partners to evaluate applicability of the tool in N.C. coastal localities to plan for possible extension of the guidance developed in this project to areas beyond coastal Virginia.

Progress to Date:

The project team completed the analysis and map viewer which is available on [ADAPTVA](https://urldefense.com/v3/__http%3A/cmap2.vims.edu/AdaptVA/adaptVA_viewer.html__;!!HYmSToo!JUXwhwQ_FLB0G8c89tTO6tIsYYkYVLEyCPb3snDpkCN3mbTnIEOE3-9JxbF0G3Cw3VHAYA$). The project team conducted outreach with Virginia localities throughout 2021. APNEP staff conducted virtual meetings and other outreach opportunities to solicit feedback from N.C. agency personnel and other partners throughout 2020-21, and participated in outreach events led by the project team. APNEP contracted with Wetlands Watch to compare the Virginia based tool with those that exist in North Carolina. They are also conducting a needs assessment and outlining resources that North Carolina local government staff can use to compare tools and the types of NNBFs that can meet their needs. Outreach for this portion of the project began summer 2021 is expected to be completed late 2021/early 2022. The scope of this effort is generally focused on our shared waterways with Virginia, and results will be included in future reporting done for the MOU.

####  Engage: Education and Public Outreach

###### APNEP Action and Monitoring/Assessment Teams Facilitation

**Objectives:** Facilitate interagency and inter-organization communication related to priority issues in the Albemarle-Pamlico region, improve cooperation and develop collaborative initiatives that accomplish shared goals and development of APNEP’s monitoring plan.

**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 actions in various environmental disciplines. Members include representatives from state, local, and federal government, nonprofits, and universities.

**Progress to Date**

APNEP continued its attention on CCMP focus areas and activities as directed by the Leadership Council during the January 2020 strategic planning meeting. These actions led to staff activities primarily focused on SAV, water quality, coastal habitats, and resiliency, all consistent with the 2012-22 CCMP and the APNEP mission. Teams that met during the reporting period include Ecological Flows, Living Shorelines, and SAV team. Progress reports can be found under the relevant topic areas.

###### Building Climate Resilience Capacity in Albemarle-Pamlico Region Tribal Communities Project

**Objectives:** Support tribal communities in the Albemarle-Pamlico region with considering climate risk and resiliency into tribal planning and community engagement processes.

**Description:** APNEP utilized supplemental Section 320 funding from the EPA and worked with representatives from tribal communities in the Albemarle-Pamlico region and the coastal plain of Virginia and North Carolina to develop a strategy for incorporating resilience into tribal planning and community engagement processes. The proposal seeks to build capacity for tribal communities to actively engage in federal, state, regional, and local planning efforts that impact Indigenous people, recognizing considerations and perspectives that are unique to tribal communities.

**Progress to Date**

APNEP contracted with the N.C. Commission of Indian Affairs and N.C. State University to conduct the project in spring 2020. Though COVID has changed the engagement approaches originally outlined in the proposal, the Tribal Coastal Resilience Connections Team has been successful in generating research on tribal engagement in climate and resilience planning efforts throughout the U.S., launching a social media campaign, conducting outreach at conferences and events, and building the groundwork for a sustainable program. The team is highlighting success stories from coastal tribal communities in and adjacent to the APNEP region as well as those throughout Turtle Island to build awareness around what is working well and could be replicated. The team worked on a climate-risk analysis with the Meherrin Indian Nation and the Climate Service and will share the results with tribal members who wish to implement similar work in their own communities.

APNEP participates as a team member and assists with the Facebook page, Tribal Coastal Resilience Connections, that was launched fall 2020. APNEP organized and facilitated a panel discussion highlighting the team’s work at the May 2021 Carolinas Integrated Science Assessment (CISA) Climate Resilience Conference. A final report for the first phase of the project is pending, and the team will include recommendations for the second phase including additional funding approved by the Leadership Council in the FY21-22 workplan. Staff will also ensure that recommendations from the project are incorporated into reports and workplans that result from the VA/NC MOU.

###### 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.

Progress to Date:

* 2021 I Heart Estuaries (social media)
* 2021 National Estuary Week (social media)
* 2021 Carolinas Integrated Science Assessment (CISA) Climate Resilience Conference (sponsorship; hosted a session on the Tribal Coastal Resilience project; hybrid, 39 virtual and 15 in person)
* 2021 CHPP webinars

###### Prioritizing Coastal Habitats and Carbon Resilience Project

**Objectives:** Support Atlantic coast states that are engaged in resilience planning and working to incorporate blue carbon into their climate mitigation plans.

**Description:** APNEP participated on a United States Climate Alliance (USCA) project to expand work led by Duke University for the NC-DEQ Natural and Working Lands sub-teams that were established to support N.C. Governor’s Executive Order #80. The project is a multi-state effort that includes APNEP partners in Virginia and other Atlantic coast states. The project involves spatial analysis to map and prioritize coastal habitats that store carbon, enhance resilience to coastal hazards, and support a variety of species.

Progress to Date:

APNEP led development of a proposal, in coordination with VIMS, ODU, TNC, Chowan University, and Audubon, for an interstate pilot project (the grant had funding for a local project) with partners in VA & NC, which resulted in a GIS-based modeling tool that can be utilized by the Currituck Sound Coalition to assist in future planning reflect local community restoration priorities and goals. NCDEQ DMF staff utilized information from the project in updates to the CHPP.

###### 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, and 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 fry into the Neuse basin waters. In doing this, students 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, including fish dissections, gyotaku (fish printing), and other lesson plans. Raising and releasing shad contributes to the U.S. Fish and Wildlife Service’s and N.C. 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.

**Progress to Date:**

In 2021, the program was again conducted via the internet among students and educators. However, live shad fry were still released in area rivers as part of the event. APNEP staff aided with egg deliveries to schools but opportunities to participate in shad release day events continued to be limited due to COVID restrictions.

* October-December 2020: Applications distributed, supplies inventoried, tanks retrieved and/or refurbished, planning for 2021 season begins.
* January-March 2021: Applications reviewed, teachers selected, supplies purchased, teacher training session scheduled and facilitated, shad weeks scheduled with USFWS, N.C. WRC, classrooms, and extension educational activities coordinated.
* April-June 2021: Shad delivered to classrooms, raised, and released. Extension education activities coordinated. Hatchery field trip for teachers. Evaluations returned from classrooms and summary of program completed. A final report is pending.

###### Summer Teacher Institute 2021

**Objectives:** 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. This 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 can participate in authentic outdoor learning experiences, including exploration of maritime forest, estuary, and salt marsh ecosystems.

Progress to Date:

UNC Institute for the Environment is the longtime facilitator of this institute. The Summer Teacher Institute was held in person in 2021, the final report is pending.

###### Virginia-North Carolina Memorandum of Understanding Implementation

**Objectives:** Facilitate and strengthen partnerships between North Carolina and Virginia state agencies and other partners; identify shared goals for Albemarle-Pamlico region watersheds and contribute to projects that work towards those goals.

**Description:** APNEP facilitated a renewed Memorandum of Understanding (MOU) between six environmental and natural resources agencies from North Carolina and Virginia. The MOU, released in September 2020, builds upon the MOU signed in 2017 and re-affirms the agencies’ commitment to foster interstate collaboration within the shared waterways of the Albemarle-Pamlico region.

**Progress to Date**

Designees from both states met approximately quarterly in 2020-21. Staff from APNEP and the Virginia Department of Conservation and Recreation, Natural Heritage Division were designated to lead coordination and facilitation of MOU implementation, with assistance from the Virginia Deputy Secretary of Natural Resources. The MOU required a report on coordination, data-sharing, and assessment of interstate initiatives by March 2021, which was circulated to the agency designees summer 2021. A final recommendation regarding interstate joint-management strategies is due to the signatories by December 2021.

Progress was also made on a Governor-level agreement to elevate the status and recognition of the importance of the Albemarle-Pamlico ecosystem both regionally and nationally. A draft agreement agreed to by the designees was is currently under review by the Governor’s offices in both states. However, as of this reporting, discussions regarding the Governor’s agreement were stalled.

As part of this commitment, APNEP and partners continued to participate in related efforts, including participation in the USCA Coastal Habitat Project, Currituck Sound Coalition, and VIMS NNBF Coastal Resilience projects discussed elsewhere. Staff continue coordination and communication with partners including the City of Virginia Beach, Back Bay Restoration Foundation, and Lynhaven River Now to discuss opportunities for coordination and collaboration. Staff have also been participating in a roundtable led by Virginia Representative Luria to discuss federal support and resources for the shared waterways. An additional meeting is scheduled November 2021.

####  Monitor: Estuarine System Status and Trends

###### Integrated Monitoring Plan & Ecosystem Indicator Development

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

**Description:** APNEP continues to facilitate the establishment of an integrated monitoring plan 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 build upon the preliminary plan established during this evaluation period. Upon completion, the Plan will provide resource managers and other partners with cost and information quality alternatives that will facilitate the selection of a set of monitoring network protocols.

Progress to Date

In 2017, APNEP convened seven Monitoring and Assessment Teams 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 start of 2019, each Team had identified a prioritized list of indicators and metrics. 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. With the input of APNEP’s Science and Technical Advisory Committee (STAC), staff developed a proof-of-concept Integrated Monitoring Plan whose initial scope focused on coastal SAV and estuarine water quality that impacts coastal SAV. The plan was accepted by the Leadership Council on March 11, 2021.

###### Coastal Submerged Aquatic Vegetation Mapping and Monitoring

**Objectives:** Monitor and map the extent, spatial cover class, and percent cover of coastal SAV in the Albemarle-Pamlico region.

**Description:** In coastal waters of the APNEP region, SAV is widely recognized as serving many important ecological functions. Other than APNEP’s efforts, there are no long-term SAV monitoring programs 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 coastal SAV monitoring via various platforms, including remote sensing and boat-based protocols.

Progress to Date

Since 2004, APNEP has participated in and often led the facilitation of a statewide SAV partnership that has collaborated to achieve the long-term goal of determining the location of the region’s underwater grasses and trends in their overall extent and spatial cover classes. Monitoring coastal SAV is important because among other benefits it can serve as an indicator of estuarine habitat condition. The Partnership has taken steps towards assessing the extent of underwater grasses. APNEP’s SAV Team published a baseline SAV map in 2011 using data from aerial surveys from 2006 through 2007, as well as a second map based on high-salinity SAV survey data in 2013 and published in 2019. APNEP plans to produce by September 2021 a high-salinity SAV map based on 2019-2020 aerial surveys.

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 been established throughout the Pamlico River and Neuse River Estuaries. A final report on low-salinity sentinel site monitoring in Albemarle Sound and Neuse River Estuary (associated with National Fish & Wildlife Federation funding) was submitted in March 2020. COVID-19 precluded boat-based SAV monitoring in low- salinity waters during the 2020 field season.

A significant milestone was achieved in the first quarter of 2021 with the completion of an APNEP SAV monitoring plan, which supports beginning in Spring 2021 (1) the acquisition of four boat- based metrics to complement the traditional metric “extent by spatial cover class”: maximum depth distribution, species presence, relative abundance, macroalgae presence and absence; (2) conducting annual surveys on a portion of the region (sub-region) rather than surveying the entire region every five-to-seven years; (3) bi-seasonal (spring and fall) surveys for high-salinity SAV; (4) single-season (summer) surveys for low-salinity SAV in 2022.

###### Recreational Water Quality Monitoring

**Objectives:** Monitor and test bacterial concentrations in coastal recreational waters, inform the public about any dangers to public health.

**Description:** APNEP continues to provide bridge funding to the NC-DMF Recreational Water Quality Monitoring Program for the continuation of water quality monitoring near recreational areas since funding for the program from the U.S. EPA was decreased in 2014. 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, which informs the public about how bacteria enter coastal waters and what actions can help prevent it.

Progress to Date:

Funding from APNEP has assisted NC- 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. The continuation of monitoring at these sites protects public health and ensures that a long-term data collection effort is continued. Monitoring data from these sites provides a continuous, long-term dataset to study trends in water quality within these estuarine areas.

1. Since October 1, 2019, with a total of 27 swimming sites sampled 19 times throughout the year with APNEP funding. Three sites were sampled 31 times throughout the year.
2. Sampling will be weekly during the swimming season and all water quality data will be available on the NC-DMF website as soon as sample analysis is completed.

###### Swim Guide Citizen Science Program

**Objectives:** By organizing this community-oriented, volunteer-driven water monitoring program, Swim Guide helps to empower Eastern North Carolina residents to participate in stream monitoring, be active in restoration, and to be informed of potential environmental health concerns.

**Description:** APNEP funds Sound Rivers, Inc. to organize Swim Guide, a regional, citizen science water quality monitoring program. Swim Guide fills 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 (see above). Swim Guide engages and educates the community, helps to identify sources of bacteria pollution, and notifies the public of health concerns when using the Neuse and Tar-Pamlico rivers and streams.

Progress to Date

Through the Swim Guide program, Sound Rivers was able to engage with thousands of members of the public each week through posting results and volunteer efforts.

# SUPPLEMENTAL PROJECTS (NON-320 FUNDS)

###### APNEP was successful in obtaining additional North Carolina state funds during 2020-2021 and reported to the EPA via the NEPORT website..

###### Water Level Monitoring Stations

**Objectives:** Additional water-level monitoring stations within the Albemarle-Pamlico watershed. **Description:** Each station is equipped with meteorological monitoring equipment and maintained by N.C. 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 and will inform local governments, citizens, and low-lying communities who are subject to storm surges in how to plan for future events. Since sea-level rise will influence these impacts, as well as saltwater intrusion into freshwater streams, the gauges will allow for maximum safety of citizens and protection of natural resources.

Progress to Date

APNEP contracted with N.C. Department of Emergency Management to install additional water- level monitoring stations in the Albemarle-Pamlico region’s coastal plain in Newport, Carteret County, Slocum Creek near Havelock, Craven County. Data from gauges located within the Albemarle-Pamlico watershed increases real-time knowledge of flood conditions in the Albemarle-Pamlico region, as well as contributing to knowledge that can be used to address future water management actions in the watershed. Learn more.

###### SAV Aerial Images and Analysis

**Objective:** Map North Carolina’s coastal SAV using aerial imagery.

**Description:** In 2019 and 2020, NC-DEQ provided APNEP with funds to support acquisition of new aerial images and conduct analysis of the data collected and to reassess previous data interpretations. APNEP under cooperative agreement with N.C. Department of Transportation acquired aerial imagery of submerged aquatic vegetation. NC-DMF staff provided the photo interpretation and ground truthing necessary to analyze the photographic data.

Progress to Date

* Fall 2020: NC-DOT in October acquired aerial imagery for two test areas in Core Sound and Pea Island area, respectively.
* Spring 2021: NC-DOT acquired aerial imagery for the Bogue sub-region on two separate occasions, mid-April and mid-June. NC-DMF completed photo interpretation of the southern half of the spring 2020 aerial survey.
* Fall 2021: NC-DOT acquired aerial imagery for the Bogue sub-region in early October.

###### 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 and Tyrrell Counties. The outcomes from the study will be utilized to build a more comprehensive approach to regional water management to create a water budget for the northern Albemarle-Pamlico peninsula.

**Description:** The N.C. Division of State Parks requested assistance from APNEP (formally in April 2018 via the Leadership Council) to serve as a neutral, science-based partner and convene a steering committee to develop an approach for a regional hydrologic study. The study’s purpose is to determine a regional water budget that can serve as a decision support tool to guide future potential water management implementation actions in collaboration with 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, as well as concerns from local communities regarding N.C. Division of State Parks and U.S. FWS 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 that is extremely vulnerable to flooding. This study will provide for more water monitoring in the watershed, update existing water management plans, and inform future water management strategies, including improving regional drainage efficiency and building regional resilience.

**Progress to Date**

In partnership with Washington and Tyrell Counties, APNEP submitted a grant application to the NC Water Resources Development Fund on behalf of Washington County in Fall 2019 and received notification of a grant award in Fall 2020. APNEP continues to work with these local governments who have requested assistance with technical and grant administrative capacity to address flooding and resilience planning. APNEP has developed a Memorandum of Agreement to outline its roles and responsibilities as a project partner, and has been working to secure match commitments from project partners and identify potential technical that have the capacity to conduct the water budget and modeling work.

**ADMINISTRATION & PROGRAM IMPLEMENTATION**

Administrative Costs

Overall administration costs under the federal grant during FY2020-21 are estimated at $476,551 and include staff salaries, interns, benefits, longevity pay, equipment, supplies, office and office and storage space rent, IT services and phone, and training and development. Temporary employees added for contract or specific project support were paid under the budgeted amount for the project.

Indirect Costs

An indirect rate of 15.7% of all salaries supported by this federal grant under the FY2020-21 *Negotiated Indirect Cost Agreement* between NC-DEQ *and the U.S. EPA*. The total estimated indirect costs were $57,949 based on the indirect rate for the grant-supported salaries.

Personnel

Presently a majority of APNEP staff are housed at the APNEP office in Raleigh within the N.C. DEQ Headquarters. This site houses the Director, Program Scientist, Program Manager, Policy and Engagement Manager, Quantitative Ecologist, and Communications and Outreach Specialist. The APNEP field office in Washington, N.C. houses the Coastal Habitats Coordinator. The Watershed Manager is collocated with the National Estuarine Research Reserve at the NOAA Laboratory in Beaufort, N.C.

In the past, the Virginia Department of Environmental Quality has provided personnel to support CCMP implementation, however this position (currently vacant) is not covered under program administration as it occurs at no additional cost to the program. Staff from the Virginia Department of Conservation and Recreation Natural Heritage Program have been assisting with support for the VA-NC Memorandum of Understanding.

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

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 public. This position manages the post-CCMP grants and associated contracts, provides staff support to the APNEP Leadership Council 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 U.S. EPA §320 Grant and coordinates and manages APNEP contracting and associated activities within NC-DEQ. 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 Leadership Council 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 Leadership Council 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. 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. She returned to graduate school in the fall of 2020 but continues in a part-time capacity at present.

Quantitative Ecologist

The Quantitative Ecologist 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 provides coordination and support to local governments and state agencies to enhance CCMP implementation. The position also directs coordinated implementation of the CHPP with three N.C. Commissions: Coastal Resources, Marine Fisheries, and Environmental Management. Jimmy Johnson has served in this role since January 2006. *This position is funded by NC-DEQ 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 APNEP advisory committees and workgroups and monitoring and assessment efforts. The position works cooperatively with the N.C. National Estuarine Research Reserve in Beaufort, N.C. Additionally, the position also works towards implementation of the CHPP with the APNEP Coastal Habitats Coordinator. Trish Murphey served in this position from January 2018 to September 2021. As of September 30, 2021, the position is vacant. The program plans to fill the vacancy in the coming months. This position is funded by N.C.DEQ and provides a portion of the non-federal match for the U.S. EPA §320 grant funds.

### TRAVEL

National Estuary Programs may use U.S. EPA §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 public and of environmental and public interest organizations, business or industry representatives, academics, scientists, and technical experts.

* U.S. EPA §320 funds and matching funds may be used to cover costs associated with attending conferences, meetings, workshops, or events that advance CCMP implementation. 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 U.S. EPA §320 funds for travel, NEPs should use the least expensive means of travel whenever possible.
* U.S. EPA §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 APNEP’s core staff are required to participate in all meetings called on behalf of the NEPs by U.S. 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.

2020-21 Travel

APNEP staff attended a few meetings and conferences using the allotted travel funds and specific project funds or administration costs. COVID-19 restrictions impacted in-person staff and partner interactions greatly in 2020-21. As a result, the Partnership incurred less costs than normal associated with travel during the year. Some travel costs may be associated with specific projects 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 | 10/1/20to9/ 30/21 | Routine Program Activities/ meetings/ projects/workshops/ conferences/ fieldwork/ MC meetings | APNEP area | 1,500 |
|  |  |  |  |  |
|  |  |  |  |  |
|  | Total\* $ 1,500 |

*\*Estimated to September 30, 2021*

### NON-FEDERAL COST-SHARE (MATCH)

Summary of Match Requirements

As Partnership host (grant applicant), NC-DEQ intends to provide $662,500 for the required 1:1 non-federal matching funds from October 1, 2020 to September 30, 2021. This match was provided through:

Summary of Non-federal State Match

In-kind Positions (salaries and benefits) $ 194,884

Water Quality Improvement Project(s) Expenditures: $ 467,616

TOTAL: $ 662,500

1. **In-kind Services**: NC-DEQ intends to provide $194,884 as part of the required 1:1 non-federal match for federal fiscal year October 1, 2020 to September 30, 2021. This match will be provided for staff support (salaries and benefits) by the Coastal Habitats Coordinator and Watershed Manager positions (see “Personnel” above). The match positions are responsible for program administration, support, community involvement and guiding implementation of the CCMP and CHPP, as well as other Albemarle-Pamlico watershed issues.
2. **In-kind Project Expenditures Non-federal Match:** The NC-DEQ intends to provide $467,616 as part of the 1:1 non-federal match for federal fiscal year October 1, 2020 to September 30, 2021. The expenditure of these non-federal funds will be provided through water quality improvement projects in one or more of the river basin areas within APNEP’s programmatic jurisdiction. The projects will be administered by the N.C. Division of Water Infrastructure.

Division of Water Infrastructure

The N.C. Division of Water Infrastructure provides financial assistance for projects that improve water quality. Programs within this agency 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.

### LEVERAGE FUNDS

APNEP actively seeks alternative funding sources for Partnership activities and projects to support 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 APNEP has not been the primary catalyst for a project or 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 Albemarle-Pamlico 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 N.C. Clean Water Management Trust Fund, the N.C. Clean Water State Revolving Fund Program, and the N.C. Conservation Reserve and Enhancement Program.

2020-21

During the 2020 federal fiscal year (October 1, 2020 - September 30, 2021), 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 2021 to the EPA *NEPORT* database. Totals are pending.

# PARTNERSHIP ENTITIES

#### Host

The main APNEP office is located within the NC-DEQ Office of Secretary in Raleigh, N.C., with additional personnel in Washington and Beaufort, N.C. In the past, the Virginia Department of Environmental Quality provided support through a position to working with APNEP, but the position is currently vacant. Staff from the Virginia Department of Conservation and Recreation Natural Heritage Program have been assisting with support for the VA-NC Memorandum of Understanding.

#### Management Conference

Leadership Council

The Leadership Council is the main advisory body for APNEP and the Management Conference. It was established by a N.C. 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 maintain 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

The 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

As recommended by the Leadership Council during their January 2020 Strategic Planning Meeting, the function of the Implementation Advisory Committee will be carried out by the Executive Committees of both Leadership Council and the STAC. The Executive Committees thus will evaluate those CCMP implementation projects whose funding exceeds the $5,000 threshold for funding project decisions by staff only. The future of an independent Implementation Advisory Committee lies in a new Executive Order regarding the structure of the Management Conference.

Action Teams

APNEP has established several Action Teams focused on implementing CCMP objectives and actions. 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. For 2021-22, the active Action Teams receiving staff facilitation priority will be those who most closely align with the focus areas as directed by the Leadership Council.

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 (MATs) whose missions each addressed a major sub-system of the Albemarle-Pamlico regional ecosystem. For 2021-22 the MATs receiving staff facilitation priority will be those who most closely align with the further development of the monitor plan and the focus areas (SAV, Water Quality, Coastal Habitats, & Resilience) as directed by the Leadership Council.

#### 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 APNEP Engagement Strategy.

Much of this coordination occurs through relationships built via our partner network, independent of whether partners are participating on an APNEP team. APNEP is tracking issues of interest to the Partnership and providing support where feasible, such as Chowan algal blooms, offshore oil drilling, impacts to communities due to flooding and sea level rise, and fisheries issues. Engagement associated with these issues has led to letters of support for partners applying for grants, formal comments through the Leadership Council, technical advice and support to agency management, funding and logistical assistance, and hosting workshops to convene technical experts.

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 Team projects.

## APNEP Contracts and Grants Summary Table

**Completed Projects**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Activity Category** | **CCMP Actions Addressed** | **Program Title** | **320 Funds** | **Match Funds** | **Total** |
| Engage | D3.3 | Duke USCA Project: Prioritizing Coastal Habitats/Carbon Resilience | $0 | N/A | TBD |
| Outreach | A2.1, B2.6, D1.3 |  Aquatic Invasive Species Communication & Outreach Strategy Development |  $2,000 |  N/A |  $2,000 |
| Monitor | D1.1, D2.1, D2.3, D3.1, E1.3 |  Swim Guide |  $9,500  |  $14,304 | $23,804 |
| Identify | A1.1, B2.2, C1.1, C1.2, C3.3, E1.1 | Development of scientifically defensible chlorophyll-*a* standards for protection of SAV in the Albemarle-Pamlico Estuarine System | $24,751 | N/A | $24,751 |
| Protect & Restore | B2.2, C3.3 | SAV Economic Analysis | $68,193 | $0 | $68,193 |
| Engage | D3.3 | Building capacity for Climate Resilience in Albemarle-Pamlico Region Tribal Communities | $27,500 | $27,500 | $55,000 |
| Monitor | E1.1, E1.2, E1.3, E2.1, E2.2 | Integrated Monitoring Plan & Ecosystem Indicator Development | $0 | $2,441 | $2,441 |
| Monitor | D2.3, E1.1, E2.1, E2.2 | Recreational Water Quality Monitoring | $18,594 | $283,000 | $301,594 |

**Ongoing Projects**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Activity Category** | **CCMP Actions Addressed** | **Program Title** | **CWA 320 Funds** | **Match Funds** | **Total** |
| Identify | A3.3, D3.2, E2.2 | Coastal Plain Ecological Flows Evaluation: Phase II  | $50,000 | TBA | $50,000 |
| Identify | A2.1, B2.6, C3.1, D1.3, D2.1 | APNEP-N.C. Sea Grant Joint Graduate Fellowship in Estuarine Research | $5, 000 | $5,000 | $10,000 |
| Protect & Restore | A2.1, B2.6, C3.1, D1.3 | N.C. Aquatic Nuisance Species Management Plan Coordination | $0 | $6,103 | $6,103 |
| Protect and Restore | A1.1, A2.3, A2.4, B1.3, B1.4, B1.5**,** B2.2, B3.2, B3.3, C1.3, C1.4, C1.5, C2.2, C3.2, C4.2, C5.1, C5.2, C5.3, D1.2, D1.4, E1.2 | N.C. Coastal Habitat Protection Plan Implementation Support | $0 | $24,000 | 24,000 |
| Protect & Restore | A2.2, B3.1, D3.3 | Using Natural and Nature-Based Features to Build Resilience to Storm Driven Flooding Project | $0 | $27,000 | $27,000 |
| Engage | All | APNEP Action Team Facilitation | $0 | $12,000 | $12,000 |
| Engage | All | Event Participation & Sponsorship | $8,500 | $30,000 | $38,500 |
| Engage | All | Public Outreach & Print Media | $0 | $300 | $300 |
| Engage | D2.1, D2.2, D2.3 | Shad in the Classroom | $20,000 | $11,000 | $31,000 |
| Engage | D2.1, D2.2, D2.3 | Summer Teacher Institute | $20,000 | $11,000 | $31,000 |
| Monitor | A1.1, E1.1, E2.1 | SAV Mapping & Monitoring | $0 | $74,717 | $74,717 |
| Protect & Restore | All | Undesignated CCMP Implementation Projects | $7,442 | $7,442 | $14,884 |

**APNEP Leverage Projects**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Activity Category** | **CCMP Actions Addressed** | **Program Title** | **CWA 320 Funds** | **Match Funds** | **Total** |
| Monitor | B2.2, C3.3, E1.1 | APNEP Estuarine Workboat | $0 | $43,118 | $43,118 |
| Monitor | B2.2, C3.3 | 2019-20 SAV Aerial Images and Analysis | $0 | $180,000 | $180,000 |
| Monitor | A3.1, B2.3, C2.3 | Scuppernong Study | $0 | Pending | Pending |
| Monitor | B2.3, C2.3 | Water-Level Monitoring Gauges | $0 | $120,000 | $120,000 |