

Buzzards Bay National Estuary Program

Implementation Activities

Federal FFY23 Funds Work Plan and Budget

Pursuant to Section 320 funding under

A Cooperative Agreement with the U.S. EPA

For work beginning July 1, 2023, to January 31, 2026

June 1, 2023

Revised June 20, 2023



Buzzards Bay NEP funding to the Kalisz Sea Lab Marine Science Center summer program has provided tuition waiver scholarships for New Bedford students in need, funded boat repairs, supplies, and materials to expand the curriculum, and field trips, including a whale watch and a trip to Cuttyhunk Island.

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Acronyms widely used in this report are summarized in Table 1.

Table 1. Abbreviations used in this work plan.

Acronym	Definition
BBAC	Buzzards Bay Action Committee
BBC	Buzzards Bay Coalition (or Coalition)
BIL	Bipartisan Infrastructure Law, a synonym for the IIJA
CCMP	Comprehensive conservation and management plan
CWA	Clean Water Act
CZM	Coastal Zone Management
EEA	Massachusetts Executive Office of Energy and Environmental Affairs
EPA	U.S. Environmental Protection Agency
IIJA	Infrastructure Investment and Jobs Act of 2021
MMA	Massachusetts Maritime Academy
NEP	National Estuary Program
NPDES	National Pollution Discharge Elimination System
QAPP	Quality Assurance Project Plan
SNEP	Southeast New England Program for Coastal Watershed Restoration
TMDL	Total Maximum Daily Load, or Loads (TMDLs)

Section 1: Introduction and Overview

Since the completion of the *Buzzards Bay Comprehensive Conservation and Management Plan* (CCMP) in 1991, the ongoing focus of the Buzzards Bay National Estuary Program (NEP) has been to support activities that help achieve the goals, objectives, and recommendations contained in the document. This mission was affirmed when the NEP Steering Committee approved the *CCMP 2013 Update* on November 26, 2013, in accordance with Section 320 of the Clean Water Act (CWA).

The U.S. Environmental Protection Agency (EPA) has made available to the NEP \$850,000 in the 2023 federal fiscal year (FFY23) CWA Section 320 funds. In addition, Region I has made available, through the Southeast New England Program for Coastal Watershed Restoration (SNEP), \$250,000 for NEP grants and targeted sub-awards that support the goals and objectives of SNEP. Thus, this year's work plan budget outlines \$1,100,000 in spending. Section 2 (FFY22 Tasks) summarizes activities and accomplishments of last year's work. Section 3 (FFY23 Tasks) of this work plan describes the tasks and activities planned with the use of federal FFY23 funds to meet NEP goals, and how the SNEP funds will be spent. Section 4 provides a detailed budget, and Section 5 summarizes the match to the grant. A summary of NEP Section 320 funding since 2015 is shown in Fig. 1 to provide some context.

Any grants or assistance from the Massachusetts Executive Office of Energy and Environmental Affairs (EEA) or Massachusetts Office of Coastal Zone Management (CZM) mentioned in this work plan are not considered match to this award unless expressly identified in the "Match to Cooperative Agreement" section in the final Cooperative Agreement. Mention of any non-match efforts by other agencies in this work plan are meant to demonstrate the collaborative or coordinating role of the NEP in achieving specific goals contained in the CCMP. For example, under the FFY23 Work Plan, CZM is providing \$5,000 toward the NEP's rental agreement in support of the South Coast Regional Coordinator housed in the NEP office, but this is federal funding, not contribute to match. In contrast, EEA is again waving its Core IT service fees (\$8,000 value), and these are state funding and considered match.

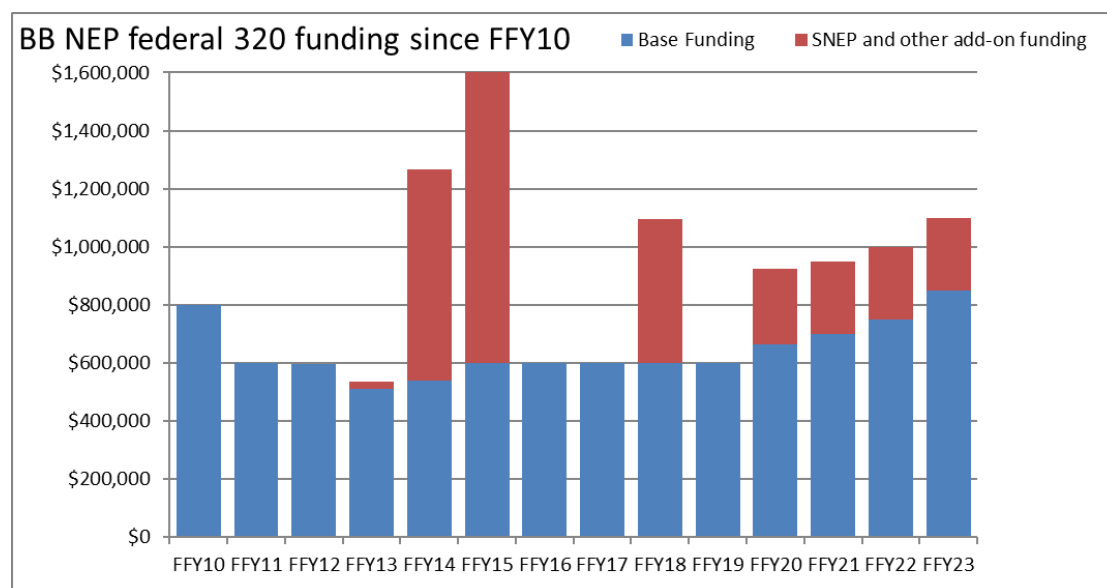


Fig. 1 NEP federal Section 320 base funding and add-ons since 2010.

Organization of this Work Plan

As noted above, Section 2 summarizes the outcomes of activities of previous tasks funded with last year's Federal Fiscal Year 2022 (FFY22) funds, and in a few instances, carryover FFY21 work plan tasks. In Section 3, we describe tasks undertaken with this year's (FFY23) funding. The target start date of this work plan is July 1, 2023, which is the start of the state fiscal 2024 year. The actual effective start date of this work plan depends also on when EPA approves the federal Cooperative Agreement and establishes the appropriate federal accounts, and the state does the same. In practical terms, this work plan principally covers staff activities for one year beginning in the summer of each year, but the Cooperative Agreement end date is set as January 2026 to accommodate the time needed award grants and subawards, and to provide sufficient time for those activities to be completed.

Section 3 follows EPA's recommended logic model to the greatest extent possible. In this effort, we have conformed to EPA's terminology defined as follows:

- Activities: NEP work plan projects.
- Partnerships: involvement of local community partner agencies, organizations and/or individuals.
- Outputs: products and services resulting from the work plan (i.e., deliverables).
- Short-term outcomes: changes in knowledge, learning, attitude, and skills; raising awareness amongst targeted NEP partners and stakeholder groups.
- Intermediate outcomes: changes in behavior, practice, decisions, and involvement among targeted NEP partners and stakeholder groups.
- Pressures: changes, positive and/or negative that may affect our ability to meet goals, deadlines or quantitative targets; and
- Long-term outcomes: Eventual expected results or changes in management, water quality, or living resources.

We also identify how the proposed activities support EPA core programs. We define these core programs here as: 1) strengthening water quality standards, 2) improving water quality monitoring, 3) developing total maximum daily loads (TMDLs), 4) controlling non-point source pollution, 5) strengthening NPDES permits (including MS4), 6) supporting sustainable wastewater infrastructure, 7) supporting CWA and state wetland protection efforts, and 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Besides these characterizations, we identify the specific CCMP Action Plans (2013 update) that are supported by each task. These action plans are:

- Action Plan 1: Managing Nitrogen Sensitive Embayments
- Action Plan 2: Protecting and Enhancing Shellfish Resources
- Action Plan 3: Managing Stormwater Runoff and Promoting LID
- Action Plan 4: Improving Land Use Management and Promoting Smart Growth
- Action Plan 5: Managing Onsite Wastewater Disposal Systems
- Action Plan 6: Managing Impacts from Boating, Marinas, and Moorings
- Action Plan 7: Protecting and Restoring Wetlands
- Action Plan 8: Restoring Migratory Fish Passage and Populations
- Action Plan 9: Protecting Biodiversity and Rare and Endangered Species Habitat
- Action Plan 10: Managing Water Withdrawals to Protect Wetlands, Habitat, and Public Water Supplies
- Action Plan 11: Managing Invasive and Nuisance Species

- Action Plan 12: Protecting Open Space
- Action Plan 13: Protecting and Restoring Ponds and Streams
- Action Plan 14: Reducing Beach Debris, Marine Floatables, and Litter in Wetlands
- Action Plan 15: Managing Coastal Watersheds and the Waterfront
- Action Plan 16: Reducing Toxic Pollution
- Action Plan 17: Preventing Oil Pollution
- Action Plan 18: Planning for a Shifting Shoreline and Coastal Storms
- Action Plan 19: Protecting Public Health at Swimming Beaches
- Action Plan 20: Monitoring Management Action, Status, and Trends
- Action Plan 21: Enhancing Public Education and Participation

Section 2: FFY22 Outcomes: Highlights & Accomplishments Cooperative Agreement CE-00A00887 through June 30, 2023

This section summarizes the status of tasks in last year's work plan activities and describes key accomplishments by the NEP and our partners, under U.S. EPA Cooperative Agreement CE-00A00887, which began July 1, 2022 will remain open to June 30, 2024, to allow for the closure of all outstanding grants and subawards that have not yet been completed. This work plan covered the transition to full normalcy after the COVID 19 pandemic and implementation of staff hybrid work schedules. Municipal grants, targeted subawards, salt marsh and TMDL studies, and the NEP's commitment to the Buzzards Bay Stormwater Collaborative were tasks that dominated staff time and focus.

FFY22 Work Plan Task 1 - Wetland Restoration and Open Space Protection and Restoration

Summary of activity July 1, 2022 - June 30, 2023

As we have done in the past, the NEP continued to work and collaborate with the Buzzards Bay Coalition (Coalition), area land trusts, and municipalities in our ongoing effort to protect and restore valuable wetlands and upland wildlife habitat throughout the Buzzards Bay watershed. Through this effort, the NEP provided maps, helped develop state and federal grant applications, wrote letters of partnership and support to granting agencies, and through the municipal grant program, provided mini-grant funds that help meet match requirements for leveraging grants from other programs. As required by U.S. EPA headquarters, the NEP reports on wetland and habitat protected or restored with support of the NEP in our annual Government Performance Results Act (GPRA) report submitted through the National Estu-

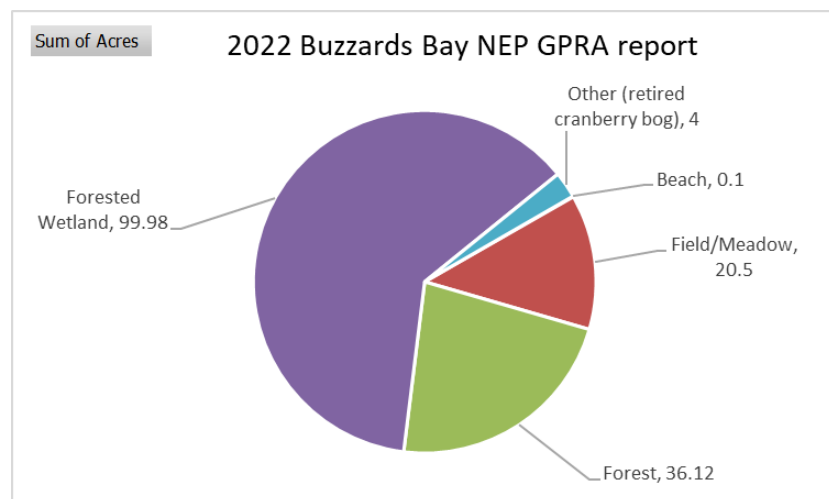


Fig. 2 Types of habitats reported in the 2022 GPRA report to EPA.

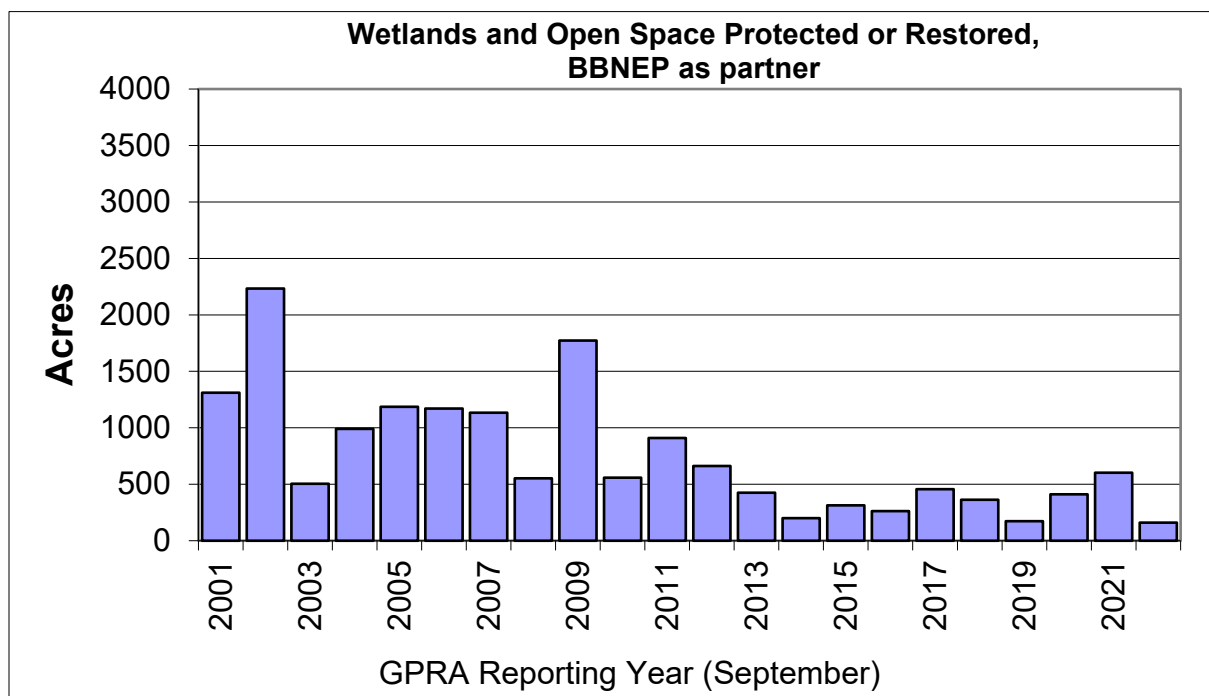


Fig. 3 Total wetlands and open space protected or restored since 2001 where the NEP provided funding or technical assistance.

ary Program Online Reporting Tool (NEPORT) each September.

The success of Buzzards Bay municipalities, the Coalition, and the area land trusts can be seen in the acres of open space and habitat protected or restored in which the NEP was appreciably involved through funding or technical assistance. Fig. 2 sums the acreage of the primary characteristic of the parcels protected and reported in the 2022 GPRA report to EPA. The total of 160.7 acres shown represent only those projects in the watershed in which the NEP provided some supporting role, mostly in the form of technical or financial assistance., Fig. 3 shows the amount of land protected with NEP technical or financial support since 2001.

The Coalition again had great success in the past year coordinating grant efforts on several projects in the Buzzards Bay watershed, many of which received supporting funding or technical support by the NEP in the last or previous fiscal years. The NEP directly funded four land protection projects (three of which the Coalition was a partner), totaling \$160,000, and these are described in the summary of our municipal grants (Fig. 4 highlights the funded Tinkham Pond Long Plain Road acquisition for the Mattapoisett River valley watershed.

The Coalition is a responsible steward of the lands they protect, and they encourage the public's use and enjoyment of their properties. Most recently, the Coalition partnered with the towns of Rochester, Mattapoisett, Fairhaven, Marion, and Acushnet to permanently protect 240 acres, spanning three towns, in the Mattapoisett River Valley. The land being protected is over the recharge area of a regionally important public drinking water supply aquifer associated with the Mattapoisett River. This partnership project will improve the long-term resilience of a critical regional water resource for tens of thousands of people from multiple municipalities in the face of climate change. The properties are primarily forested with some fields and wetlands, and they contain State-mapped core habitat, critical natural landscape, and priority habitat of rare species. The NEP provided a grant through its municipal grant program to purchase help protect these properties. This project is expected to be completed by the summer of 2023.

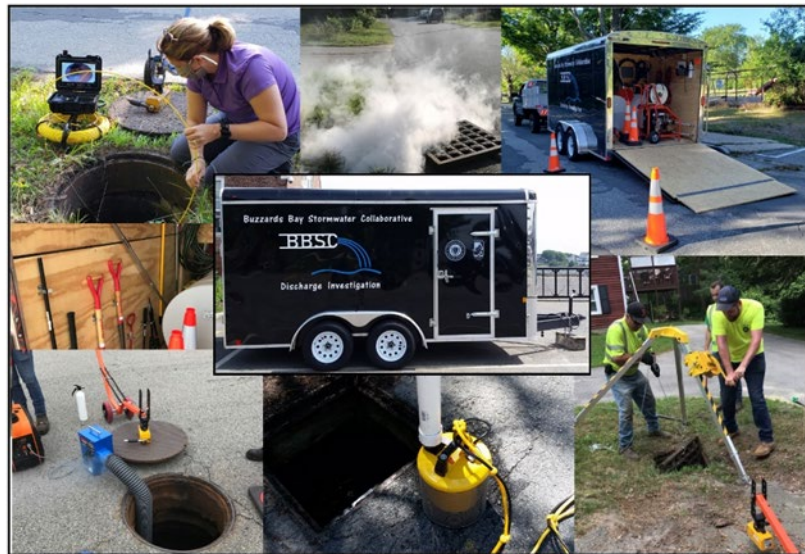


Fig. 4 Tinkham Pond and the lands to be protected on Long Plain Road in Mattapoisett. Additional information at this Buzzards Bay Coalition web page.

FFY22 Work Plan Task 2 - Stormwater Remediation and Technical Assistance

Summary of activity July 1, 2022 - June 30, 2023

The Buzzards Bay Stormwater Collaborative continues to assist eight Buzzards Bay watershed municipalities in conducting Illicit Discharge Detection and Elimination (IDDE). The NEP is the lead technical oversight, and the Massachusetts Maritime Academy (MMA) continues to act as the host for the program. There were no new grants for this fiscal year and the SNEP grant and the Department of Environmental Protection (DEP)



MS4 grant were successfully completed. The NEP continues to provide funds for laboratory testing of stormwater samples.

Fig. 5 Stormwater Collaborative IDDE trailer

This initiative remains a major time commitment of NEP staff during the past year. The NEP was not only one of the leads in founding the Stormwater Collaborative, but we were also responsible for many tasks, such as: training, GIS support, and data management. During the past year, the NEP continued to update monitoring guidance documents, and train students and staff in the program. Starting in 2023, the NEP has created an ISA to support the fulltime professional staff at MMA in support of the Collaborative. The NEP director worked with the MMA Marine Science, Safety, and Environmental Protection (MSSEP) Assistant Professor Kristen Osbourne to coordinate MMA and NEP efforts and to streamline the Collaborative budget. In addition,

NEP staff maintains a Geographic Information System (GIS) database, updating mapping features and incorporating the field investigations. The NEP also oversees the collection of water quality data and conducts quality assurance checks of the data. Both the GIS and water quality data are used to prepare MS4 permit materials for Stormwater Collaborative participants.

In May 2023, the NEP completed an update of the Quality Assurance Project Plan (QAPP). This comprehensive update documents the improvements in sampling and other IDDE procedures. This update adds MMA into the organizational structure of the Collaborative and enhances details for additional sampling parameters.

MMA remains the lead in completing Stormwater Collaborative tasks with guidance from the NEP. Along with the full time MMA staff person, this year ten cadets completed their cooperative assignment with the Stormwater Collaborative. The cadets gained valuable experience and can now enter the workforce with sought-after skills in stormwater activities.

The NEP was a partner on the first DEP grant in January 2020 which resulted in the specification and construction of the trailer and the development of the techniques for effective catchment investigations. The trailer continues to be an effective asset in comprehensive IDDE work. From July 2022 to June 2023 an additional 400 catchments have been evaluated. An illicit connection has been identified and corrected by the effected town and several smaller issues have been addressed throughout the watershed. Other Collaborative work includes 125 stormwater outfalls inventoried and over 75 stormwater samples collected. The [Buzzards Bay Stormwater Collaborative page](#) has additional information about the Stormwater Collaborative, and these and useful stormwater monitoring training videos are on the Stormwater Collaborative's [Monitoring Discharges page](#).

As this IDDE work continues, participating towns will eventually complete the bulk of their MS4 IDDE requirements. This is the case for the Town of Marion, so efforts have been directed to more GIS analysis to detect troubled sites and rate potential solutions. During the winter session, when field work was at a low, the Collaborative professional staff performed a GIS analysis for the Town of Marion. This analysis resulted in ranking outfall pipes and their catchments by environmental importance and then identified an approach to treatment.

The Stormwater Collaborative online map service introduced in January 2022 has expanded and improved this fiscal year. This ArcGIS Online map hosted by MMA provides a clearing house for all the data and mapping efforts collected to date. It complies with standards set by the MS4 permit for features required to be illustrated on a map. This map is an asset for the Stormwater Collaborative communities and provides a tool for them to evaluate their outfalls and catchments. Several towns now use this tool as their primary source of information.

Besides the Stormwater Collaborative support, the NEP aids towns on stormwater issues in several ways. First, we review stormwater designs proposed by towns for remediation projects, or at the request of a town board as part of local permitting or site plan review. Second, we prioritize stormdrain outfalls to assist municipalities in making management decisions, fund and assist in developing assessment reports and fund and develop stormwater remediation designs for high priority discharges. The NEP further helps towns prepare grant applications for federal and state monies to help fund implementation of these stormwater designs. Third, we assist towns to develop and implement stormwater management plans, like the Phase II MS4 National Pollutant Discharge Elimination System (NPDES) municipal plans. Finally, we work with town boards to adopt local stormwater regulations and Low Impact Development (LID) strategies.

In early April 2021, the NEP helped each of the towns prepare model grant proposals that will assist the towns in applying for state and federal funds to help construct the stormwater treatment facilities, which include green infrastructure like biofilter, sand filters, and swales. Support for grant efforts continue to fund the construction of these designs.

FFY22 Work Plan Task 3 - NEP Technical Assistance and Municipal Grant Program

Summary of activity July 2022 to June 2023

Through our grant and technical assistance programs, the NEP helps municipalities, and our other partners achieve the goals and objectives of the CCMP. On November 23, Baker-Polito Administration announced \$195,000 in federally funded grant awards for projects that will protect drinking water supplies, preserve important habitat, and address pollution from stormwater runoff in the Buzzards Bay watershed. The five grants to four towns, which are being matched by over \$132,000 in private contributions and in-kind services, are being awarded by the Buzzards Bay NEP through CZM, with funding from the SNEP. Funded projects include developing plans to treat stormwater pollution, purchasing 288 acres of land including sea run brook trout habitat, and protecting drinking water supply wells.

- Rochester – \$70,000 to work with the Towns of Mattapoisett, Fairhaven, Marion, and Acushnet, along with the Buzzards Bay Coalition, to purchase and permanently protect 240 acres of land important to protect the Mattapoisett River Valley aquifer. This land acquisition is part of a larger coordinated project that aims to protect thousands of acres in the Mattapoisett River Valley. The newly purchased land will protect a multi-town public drinking water supply resource, as well as wetlands, fields, forests, and habitat for fish and wildlife, and it will provide outdoor recreational opportunities for the public. In addition, the project will benefit the resiliency of the aquifer by preventing land use change and associated activities that impact water quality and disrupt groundwater recharge.
- Mattapoisett – \$35,000 to establish a strategic master plan for stormwater management in the Shipyard Lane area, which lies east of Mattapoisett Village and is a town priority for stormwater remediation. Stormwater runoff from this area discharges into Mattapoisett Harbor and contributes to shellfish bed closures. The town will inventory the existing infrastructure and develop a master stormwater plan specifically for the Shipyard Lane area. This master plan will serve as a vital planning tool for the design and construction phase. The project will focus on mapping the watershed to identify target areas for stormwater treatment prior to discharge into Mattapoisett Harbor.



Fig. 6 IDDE hands-on training at the Massachusetts Maritime Academy.

- Mattapoisett – \$35,000 to work with the Mattapoisett Land Trust to purchase and permanently protect two parcels of undeveloped land totaling 14 acres in the Brandt Island Cove area of Mattapoisett. The properties consist of forested wetlands and upland coastal forest and also contain important state-designated habitat, including habitat for rare species. The Mattapoisett Land Trust intends to create a trail system, which will connect to a larger network of trails, as well as a small parking area on the property to allow for public access.
- Westport – \$30,000 to work with the Buzzards Bay Coalition to purchase and permanently protect 25 acres of land associated with the headwaters of Snell Creek, a tributary of the East Branch of the Westport River. Snell Creek is one of only a handful of cold-water streams in Westport that support a native population of sea run brook trout, a climate-vulnerable species that is declining throughout its range due to land use changes, habitat loss, and interactions with non-native species. Coldwater streams, such as Snell Creek, and their habitats are particularly sensitive to temperature increases, which could greatly impact sea run brook trout populations. Protection of this property will ensure the vegetated shading of the stream remains, as well as protecting vital habitats, wetlands, and water quality of Snell Creek.
- Fairhaven – \$25,000 to work with the Buzzards Bay Coalition to permanently protect 9 acres of land that provide a key upland buffer to wetlands and that protect important wildlife habitats, including state-designated habitat. Protection of the land will also ensure existing saltmarsh can migrate to an undeveloped area as sea-level rise begins to flood adjacent low gradient, low elevation uplands. Once acquired, the land will be open to the public for passive recreational purposes and will provide coastal public access to outer New Bedford Harbor.

The NEP continued to assist municipalities and other partners with GIS analysis, proposal development, review of local projects, and training and support for municipal MS4 compliance. The NEP's Regional Planner also produced over 580 new or revised maps and fulfilled dozens of requests for data, calculations, or graphics to be used for newsletters, grants, etc. Numerous maps and GIS evaluations were prepared for the Coalition, area land trusts, and municipalities. Examples include municipal open space maps, Coalition fundraising maps and maps for their website, maps used by municipalities in open space reports and their grant applications, and for other purposes.

The NEP continues to work with the Coalition's Science Advisory Committee (SAC) and a team of scientists in Woods Hole to identify pressing issues related to climate change, nitrogen and toxic pollution, and the loss of wetlands habitat and living resources in Buzzards Bay.

The NEP continues to maintain the Buzzards Bay Action Committee (BBAC) website buzzardsbayaction.org (created by the NEP in 2012). At the request of the BBAC, the NEP Director posts documents, meeting announcements, presentations, and videos.

FFY22 Work Plan Task 4 - Program Oversight and Administration

Summary of activity July 1, 2022 - June 30, 2023

The NEP Executive Director and CZM Fiscal Officer ensured the proper administration of the EPA grant, other grants, and Interagency Service Agreements (ISA) awarded to the NEP. The NEP Regional Planner, who manages the municipal grant program, assists in grant tracking and some reporting requirements. The stormwater technical assistance staff help manage stormwater related grants. The NEP have worked in a hybrid work environment post COVID. All staff meets

at the office one day a week for collaboration purposes and meetings, with the remainder of the workdays spent working from home or in the office as needed by staff.

During the Fall of 2022, the NEP and Boston finance staff worked together to close out Cooperative Agreement FC00A00623 (federal award \$922,500; 7/1/2020 start date, ended September 30, 2022). In August 2022, the NEP submitted the GPRA report information to EPA as specified in the EPA Funding Guidance. The GPRA report for NEPs includes annual estimates of habitat and wetlands protected or restored, and annual estimates of funds leveraged in some way by the NEP. As a requirement of this agreement, the NEP provides information on the GPRA performance measures to EPA by their required date.

FFY22 Work Plan Task 5 - Buzzards Bay Citizens' Water Quality Monitoring

Summary of activity July 1, 2022 - June 30, 2023

The Coalition continued its nationally recognized Baywatchers water quality monitoring program (Fig 8), which began in 1992. The Baywatchers program is supported by the Commonwealth of Massachusetts, the NEP, citizens, Coalition dues, and other sources. The NEP continued to support the Coalition's Baywatchers program with a \$60,000 grant, and this award will end in December 2023. The Coalition's Baywatchers program, which began in 1992 under the direction of the NEP, remains one of the most effective volunteer-based water quality monitoring programs in the country. The data is being used as the basis for updates to the state's water quality assessment and integrated list of waters standards. It is also being used in models to develop watershed nitrogen TMDLs in Buzzards Bay embayment watersheds by the DEP's Massachusetts Estuaries Project. This work, together with efforts to help towns identify problem storm-water discharges and to support efforts for treatment through technical assistance and grants, directly supports EPA goals to better control non-point source pollution on a watershed basis.

During the 2022 season, the 31st consecutive season water quality data was measured weekly from May to September with more intensive nutrient sampling occurring every two weeks, in July and August. Recruited and trained 181 citizen volunteers that offered their time and energy (totaled more than 4,880 volunteer hours) to collect water quality data which assists environmental managers in setting priorities for the management and protection of Buzzards Bay. Water testing for physical parameters occurred in 30 major harbors on 22 days from May through September, from Westport to Woods Hole, the Elizabeth Islands and Vineyard Sound. Water collection for nutrients (laboratory analysis) held on 4 days Baywide between July and August in 2022 that resulted in 770 data points and 114 additional samples for total phosphorous from freshwater inputs. Data results were used to report on Bay health at the various Coalition outreach events, meetings with town resource managers, Coalition newsletters and e-news articles. In addition, the Coalition provides yearly data updates on the Coalition's water quality website www.savebuzzardsbay.org/bay-health and the data is used in the State of Buzzards Bay reports.

Besides Baywatchers water quality data, the Coalition installed and monitored 3 electronic river herring counters to important Bay rivers (Acushnet, Agawam and Wankinco) to get a more comprehensive view of recent Bay-wide declining populations within the watershed.

FFY22 Work Plan Task 6 - Environmental Indicators and Outcomes Tracking

Summary of activity July 1, 2022 - June 30, 2023

The Buzzards Bay Coalition published its [2022 State of Buzzards Bay](#) report in February 2023 (Fig. 7). The NEP contributed to the report in its analysis of shellfish bed closures and eelgrass

abundance in Buzzards Bay. The NEP analysis is based on DEP eelgrass GIS data and DMF shellfish closure maps and status reports to Buzzards Bay municipalities.

The NEP has been a member of the Coalition's SAC since its creation in 2014, and the NEP director attends the group's quarterly meetings and provides data and information at the request of the group. The SAC's focus is to identify research and monitoring program priorities, assist in Coalition grant application development, and review results of environmental indicator studies in Buzzards Bay. The group has continued to work with the town, state, and federal agencies to collect necessary water quality, habitat, and modelling data to support a permit application by the Town of Wareham to relocate the municipal wastewater facility outfall to the Cape Cod Canal. This work has been ongoing since 2018, a continuation of an earlier SNEP grant awarded by the NEP and supported by some water quality monitoring funding by the NEP in 2018.

FFY22 Work Plan Task 7 - Outreach and Education

Summary of activity July 1, 2022 - June 30, 2023

As a partner to the NEP on our work plan, the Coalition is the principal organization that targets outreach and education to the public. The Coalition undertakes outreach and education activities highlighting the condition and state of Buzzards Bay, progress toward restoration and protection goals, and its collaboration with the NEP in their activities. The Coalition also educates the public about its accomplishments to protect and restore water quality in Buzzards Bay and its surrounding watershed. Some major projects completed or initiated by the Coalition in 2022 include:

- **Initiation of the Marsh Island salt marsh restoration.** This project will restore approximately 11 acres of salt marsh along New Bedford Harbor in Fairhaven, lost almost a century ago. Once the project is completed, the restored marsh will be opened to the public with a trail that includes overlooks, a pedestrian bridge over the restored creek, and a small parking area.
- **Preservation of Doggett Brook Farm.** In May 2021, Buzzards Bay Coalition purchased and permanently protected the Doggett Brook Farm property. The Buzzards Bay NEP contributed to the effort with a small grant to the Town of Rochester. In 2022 the property was sold, and the Buzzards Bay Coalition stipulated two conservation restrictions on the property that limit development, protect farmland and water resources, and will allow for a public hiking trail down to the brook.
- **Buttonwood-to-Bay Project monitoring underway.** The Buzzards Bay Coalition undertook water sampling in Buttonwood Brook. The effort is part of a 5-year SNEP support targeted watershed grant. The NEP is providing technical assistance to the effort, and funded a stormwater treatment system at the Buttonwood Senior Center in the spring of 2023 that grew out of the effort.
- **Gooseberry Causeway Impact Study Launched.** The Buzzards Bay Coalition began a study of the effect of the Gooseberry Causeway on sand transport on Westport's East Beach. The causeway was constructed in the 1940s, and it was questioned whether removing the causeway might prove beneficial to reducing beach erosion. The study, undertaken by oceanographic scientists, will help answer this question.

Major public events undertaken by the Coalition during 2022 to 2023 include:

The Coalition led dozens of Bay Adventures with more than 1,000 participants. Many of these activities are undertaken at the Coalition's Onset Bay Center. The Coalition renewed its 4th and 5th grade school programs in the New Bedford school system's Sea Lab, which includes field

trips to Cuttyhunk Island. In addition, at the Onset Bay Center, through a partnership with MMA, four cadets spent the summer teaching and mentoring young boaters. Other events included Beachcombing at Onset Bay (March 2023), Fishermen's Clambake (August 2022), and a dozen earth month activities (April 2023; see this [web page](#)).

The Coalition also held its 17th Annual Watershed Ride on October 3, 2022. Over 400 cyclists participated by pedaling across the watershed to show their support for clean water. The event was supported by 100 volunteers and raised more than \$317,000 to support the Coalition's education, conservation, research, and advocacy work.

On June 18, 2022, the Coalition held its 29th annual Swim for Buzzards Bay fundraising event. A 1.2-mile open water swim across Outer New Bedford Harbor, the Swim is the Coalition's signature outdoor event. Nearly 200 swimmers participated and raised \$185,000 to support the Coalition's work to protect clean water, conserve land and educate youth and adults across the Buzzards Bay region.

The Coalition also produces brochures, fact sheets, press releases, and other events about citizen action to protect and restore Buzzards Bay. Some information on upcoming events is at <http://www.savebuzzardsbay.org/events/>. Information on past events may be found at <https://www.savebuzzardsbay.org/news/>.

During 2022 and 2023, the NEP continued to update its website buzzardsbay.org and subdomain Stormwater.BuzzardsBay.org. The stormwater subdomain [interactive map](#) was updated to include 2022 data and [updated town reports](#).

The BBAC continues to be a strong partner with the NEP in guiding the Buzzards Bay municipal grant program and in holding monthly meetings on special topics. Information about meetings can be found on the BBAC's website buzzardsbayaction.org, which is managed and maintained by the NEP.

Since 1989, the NEP has been training Conservation Commission members on how to delineate wetlands in cooperation with the Massachusetts Association of Conservation Commissions ([MACC](#)). Retired NEP Wetlands Specialist John Rockwell has continued to provide these training sessions with support of the NEP. The support consists of printing and distributing various wetland training guides and brochures developed by Rockwell during his tenure at the NEP (go to our [wetland delineation training](#) web page to view them; Rockwell continues to volunteer to maintain and update the documents on this page).

The NEP's support to the New Bedford Sea Lab Program represents an expansion of the NEP's efforts to support marine science education in Buzzards Bay.



Fig. 7 Baywatchers data was used and summarized in the 2022 state of Buzzards Bay report.

FFY22 Work Plan Task 8 - Other Specialized Technical Assistance

Summary of activity July 1, 2022 - June 30, 2023

The NEP is also continuing to work with the Buzzards Bay Coalition to monitor salt marsh losses in Buzzards Bay including technical guidance on monitoring marsh loss, training on the use of surveying equipment by Coalition staff and interns and providing GPS support on the various salt marsh studies. The NEP is also a partner with the Coalition on their 5-year targeted watershed grant from SNEP to support water quality improvements in Apponagansett Bay from pollution reduction efforts along Buttonwood Brook. Support included map preparation, stormwater data, and historical aerial interpretation (Fig. 8). The NEP is continuing to assist the Town of Bourne and the Coalition on a watershed loading analysis to Red Brook Harbor, and the NEP

began a similar loading analysis for Apponagansett Bay in Dartmouth. The Buzzards Bay NEP prepared the watershed loading component of the QAPP, which was approved by DEP and EPA in 2023. The NEP completed its preliminary loading assessment early 2023.



Fig. 8 A portion of the Buttonwood Brook watershed, 1938 (left) vs 2022 (right).

FFY22 Work Plan Task 9 - Technology Transfer to Other Estuaries

Summary of activity July 1, 2022 - June 30, 2023

The NEP Director participated in various online NEP meetings sponsored by the Association of National Estuary Programs (ANEP) and EPA. The NEP Director continued to work with EPA and RAE to guide SNEP. The NEP Director is a member of the SNEP Steering Committee and Policy Committee, and on the Steering Committee of the newly formed SNEP technical assistance group. The NEP Executive Director continued to guide partners to participate and secure funds from SNEP.

The NEP Executive Director and Regional Planner help maintain grant award information on the [Massachusetts CZM Grant Viewer](#). The CZM Grant Viewer is an interactive map of grants awarded by CZM and the NEP. It includes grants awarded throughout the CZM Coastal Watershed, representing a strong investment in clean estuaries, resilient coasts, and healthy habitats.

FFY22 Work Plan Task 10 - Website Maintenance and Innovation

Summary of activity July 1, 2022 - June 30, 2023

The NEP continued to maintain an independent website to promote new approaches, receive feedback, communicate successes, track trends in water quality, monitor performance of government in implementing the CCMP, express the views and concerns of the NEP Steering Committee, create a forum for new initiatives and ideas of our partners, and support other obligations and tasks identified in this work plan.

The NEP Director continued to maintain and update the program's WordPress website (buzzardsbay.org). In addition, as noted in the outreach and education task in more detail, the NEP continues to maintain two subdomain websites. The first was the climate.buzzardsbay.org, launched in June 2013 to consolidate the NEP's climate related initiatives on one website. The second, <http://stormwater.buzzardsbay.org>, is the subdomain for the Stormwater Collaborative that was launched in 2016. In May 2022, the NEP updated the stormwater interactive map data-

base, where information about pipes, catch basins, and stormwater discharges, including water quality data can be downloaded by town officials and the public.

Besides the NEP websites, the NEP continues to maintain the BBAC's website, buzzardsbayaction.org. Their page is updated with stories, photos, videos, and presentations to meet the needs of that organization as requested by the BBAC Executive Director.

FFY22 Work Plan Task 11 – Scientific collaboration on nitrogen TMDLs, climate impacts, and water quality impacts on natural resources.

Summary of activity July 1, 2022 - June 30, 2023

The NEP collaborated with area scientists to publish results from the previous year's climate tasks and long-term trends including assessing impacts of climate change on water quality. As part of this task, the NEP conducted GIS analyses of watershed land use, including several onsite systems, occupancy rates, land use types, estimates of impervious area, lawn area, extent of sewerage, and agriculture. Specific accomplishments included:

- Provided assistance evaluating the Coalition's water quality data set.
- Updated the stormwater monitoring guide in support of the Stormwater Collaborative.
- Refined the shellfish bed closure history in Buzzards Bay embayments, including calculation of acre days closed based on the duration of seasonal closures.
- The NEP continued support to the Stormwater Collaborative and MMA to continue the stormwater network mapping and discharge monitoring program with Buzzards Bay municipalities.

The NEP continued its work as a partner on a 604(b)(3) grant to the Town of Bourne to undertake a TMDL analysis for the Pocasset Harbor Estuary Complex (Fig 12). The work commenced

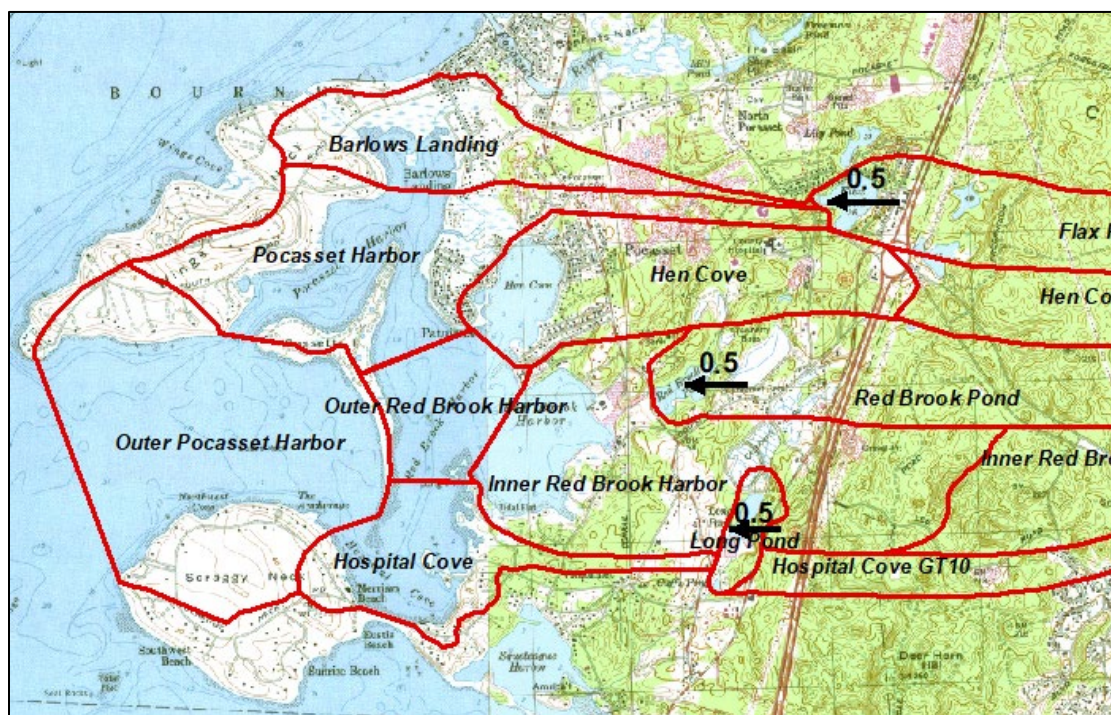


Fig. 9 Pocasset Harbor Estuary Complex subwatersheds adopted by the NEP in support of the TMDL study.

in 2021, and in 2022 the Coalition completed a QAPP for the study. The Project has been delayed to 2024 to allow for the collection of benthic flux data funded under this work plan.

FFY22 Work Plan Task 12 – Salt Marsh Loss Assessment Collaboration with Coalition and Runnel Study with Coalition and Woodwell Climate Center

Summary of activity July 1, 2022 - June 30, 2023

The NEP and our non-profit partner organization, the Coalition, continued to study salt marsh die-off and runnel studies in Buzzards Bay. In the summer of 2022, the NEP Director helped train new seasonal Coalition interns and staff on the use of a Leica Laser Leveler for the precise measurement of elevations within the salt marsh and converted GPS data to generate marsh vegetation-elevation profiles. Throughout the fall of 2022 to 2023, the NEP Director collected new GPS data of transect markers and benchmarks and updated the GIS database of features for the salt marsh study, including new midpoint parkers and other features not previously surveyed. Some of the work funded by a SNEP grant was published in a Salt Marsh report posted on the Coalition's [website](#) (Fig. 10). The NEP also participated in several online meetings of salt marsh investigators sponsored by CZM.

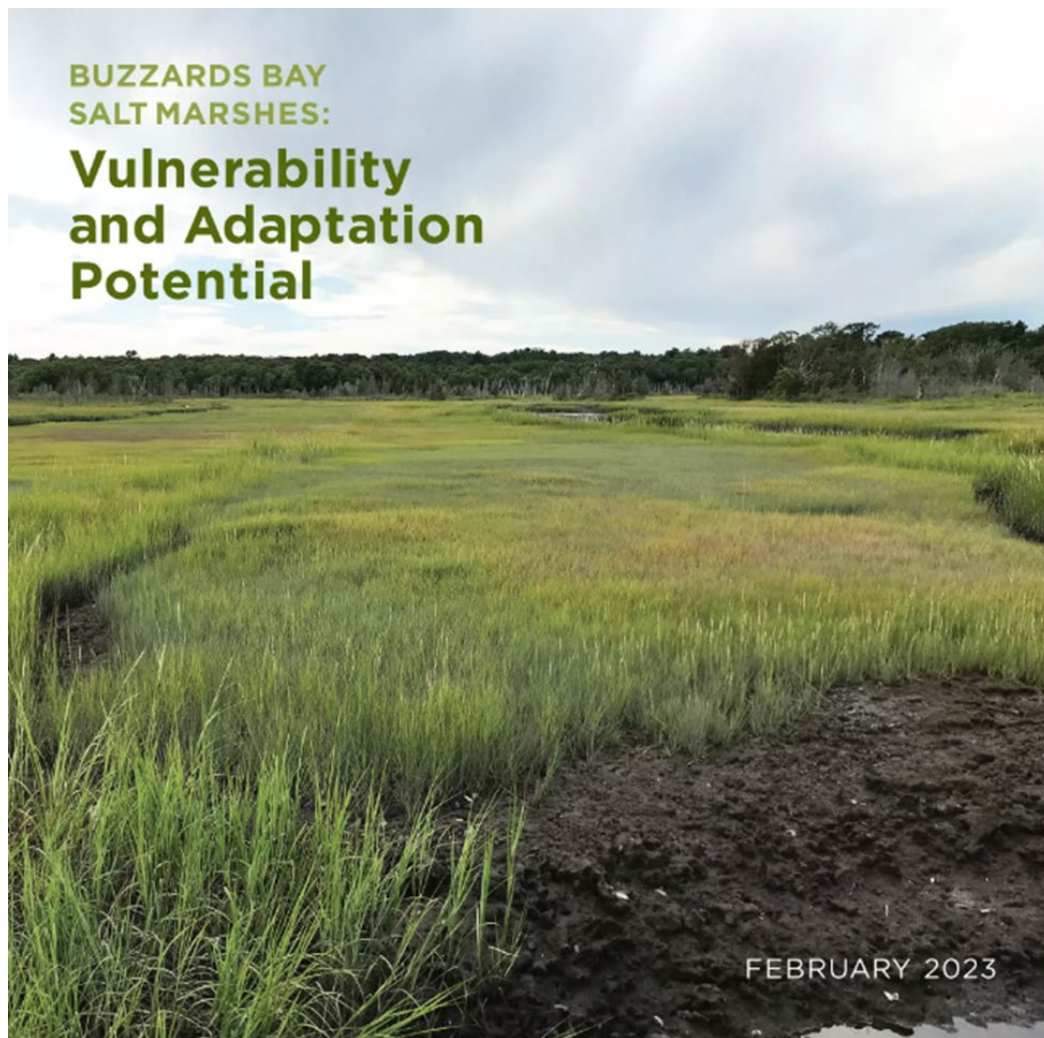


Fig. 10 The NEP was a key contributor to the Buzzards Bay Coalition's report Buzzards Bay Salt Marshes: Vulnerability and Adaptation Potential.

The NEP continued to oversee the creation and implementation of the UAV salt marsh monitoring subaward to UMass Dartmouth. In March 2023, the QAPP for this project was approved, and monitoring using drones and some new equipment commenced in the late spring and early summer of 2023.

This task supported several CWA core programs indirectly including elements: 2) improving water quality monitoring, 4) controlling non-point source pollution on a watershed basis, 6) supporting sustainable wastewater infrastructure and CWA and state wetland protection efforts, and climate adaptation related priorities.

FFY22 Work Plan Task 13 – Technical Assistance to Support Coastal Resiliency and Municipal Vulnerability Preparedness.

Summary of activity July 1, 2022 - June 30, 2023

The NEP provided maps and guidance to Buzzards Bay municipalities seeking Coastal Resiliency and Municipal Vulnerability Preparedness grants and provides support to the CZM South Coast Regional Coordinator in promoting the program. In the summer of 2022, the State of Massachusetts announced these grants to Buzzards Bay municipalities:

Mattapoisett - Reopening Old Slough Road for Vehicle Travel in Emergencies - Year 2, \$585,000

The Town of Mattapoisett will finalize design plans, permit, and construct improvements to Old Slough Road, which will be used as an emergency route for vehicles traveling between the Point Connett and Angelica Point communities. These communities are currently accessed by Angelica Avenue, a single, low-lying road that is threatened by flooding from coastal storms and sea level rise.

New Bedford - West Rodney French Boulevard Beach Nourishment - Finalize Permitting, Design Plans and Contract Document Preparation, \$150,830

The City of New Bedford will complete environmental permitting and prepare final design plans and contract documents for the future construction of the West Rodney French Boulevard beach nourishment project. The proposed nourishment will help provide erosion protection to critical infrastructure located in the roadway.

Wareham - Resilient Main Street, \$199,918

The Town of Wareham will develop a conceptual plan for implementable adaptation measures that can reduce flood risk to the Main Street commercial district. The project will increase public understanding of the vulnerability of the area and explore nature-based solutions.

Mattapoisett, Fairhaven, Marion, Rochester & Acushnet – Mattapoisett River Valley Water Supply Resilience Project, \$4,500,000

This project will protect 240+ acres spanning the towns of Mattapoisett, Acushnet, and Rochester and protecting the aquifer (and increasing its resilience to climate change) associated with the Mattapoisett River Valley which provides drinking water supply for the 3 towns plus Marion and Fairhaven. The 5 towns plus Buzzards Bay Coalition and the Mattapoisett River Valley Water Supply Protection Advisory Committee have formed a regional partnership to successfully accomplish the project.

Fairhaven – Climate Change Vulnerability Assessment, \$40,000

The Fairhaven Climate Change Vulnerability Assessment is a planning-level study intended to evaluate the coastal vulnerability and risk of municipal infrastructure and natural resources for exposure to sea level rise and coastal storms. The goal of the project is to develop data on likely

scenarios and degrees of potential impact in vulnerable areas, and to assist in the prioritization of assets for future adaptation planning and design.

FFY22 Work Plan Task 14 - Targeted Grant Sub-awards (Carryover Tasks)

Summary of activity July 1, 2022 - June 30, 2023

1) CCMP Climate Vulnerability Assessment Support (Coalition, \$10,000): This subaward task was identified in the FFY21 work plan. The NEP had set aside \$10,000 for this task, made available by EPA headquarters Climate Ready Estuaries program, to support Coalition staff to host meetings and workshops with key stakeholders, synthesize responses, and prepare graphics associated with climate and pollutant trends in Buzzards Bay. Because of COVID-19, the NEP deferred this project to 2021 and 2022. The outcome of the effort was included in the NEP's climate assessment drafted on June 30, 2022, with the draft final sent to EPA in March 2023 to close out the task.

FFY22 Work Plan Task 14 - Targeted Grant Sub-awards

Summary of activity July 1, 2022 - June 30, 2023

Final reports or summaries were provided for the FY2022 subawards Buzzards Bay Coalition Monitoring, Sea Lab Support, UMass Salt Marsh UAV study, and the Woodwell River Monitoring Program. The University of Massachusetts Dartmouth (UMD) completed its QAPP for the drone monitoring work and EPA approved QAPP in March 2023.

2022 Leveraged Funding (Federal FFY22 Work Plan funds)

Each September, the NEP submits to EPA, as part of our Government Performance Reporting Act requirements, a summary of state, federal and local dollars and in-kind services leveraged by the NEP or leveraged by our partners with technical support by the NEP, in support of the implementation of the CCMP. Some funds are leveraged through the municipal grant program; other funds are leveraged through other grant programs with our partners. For the period October 1, 2021, to September 30, 2022, the NEP's leveraged funds in the primary, significant, or support category totaled \$2,663,343, \$1,071,500, and \$0 respectively (Table 1).

Table 2. Summary of NEP role in leveraged funds, GPRA September 2022

NEP Role	Total leveraged
Primary	\$2,663,343
Significant	\$1,071,500
Support	\$0
Grand Total	\$3,734,843

We will report our FFY22 2022-2023 leveraged estimates to EPA in the fall of 2023.

Section 3: FFY23 Funds: Proposed Work Plan Activities July 1, 2023 – January 31, 2026.

In the sections below, we provide details of the specific tasks and actions expected in the coming year. Highlights of these activities include 1) closing out past grants and reissuing any residual grant funds, 2) continuing technical support for the Stormwater Collaborative, 3) technical assistance to municipalities on MS4 and other issues, and 4) continued collaboration with area scientists, the Coalition, and other partners on land use and water quality data sets to guide management action. This year's funding utilizes \$850,000 in NEP base funding, and \$250,000 in a Region I SNEP add-on for targeted projects, for a total of \$1,100,000. Expenditures utilizing SNEP funds are summarized in Table 3.

Table 3. Use of SNEP funds

Task	Amount
Municipal Grant Program	\$164,252
Sea Lab Support	\$25,889
UMass Dartmouth UAS imagery salt marsh loss study	\$49,016
Benthic flux study for TMDL (\$46,000, balance from base funding)	\$10,843
Total	\$250,000

FFY23 Work Plan Task 1 - Wetland Restoration and Open Space Protection and Restoration

Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024): (Status: ongoing)

As we have done in the past, the NEP will continue to work and collaborate with the Coalition, area land trusts, and municipalities, in our ongoing effort to protect and restore valuable wetlands and upland wildlife habitat throughout the Buzzards Bay watershed. Through this effort, the NEP will continue to provide maps, help develop state and federal grant applications, and conduct land use analyses. Work related to this task will be principally generated through meeting requests for technical assistance by area lands trusts, municipalities, and the Coalition in their efforts to receive grant funds from other sources.

Responsible Partners and Their Role(s):

The Coalition, municipalities, and area land trusts are key partners in our combined efforts. These land trusts are vitally important in the development of grant applications, and in building local financial and political support for new initiatives. These non-profits also work with private landowners to become partners in these protection efforts. The NEPO provides mapping, GIS analysis, and funding to our partner efforts.

NEP Staff:

Principal Staff involved in these tasks: Regional Planner will provide technical support to the Coalition, municipalities, and area land trusts. Additional support will be provided from other NEP staff, with guidance from the Executive Director, as well as with input from the Coalition Executive Director, municipalities, and area land trusts. The Executive Director and Regional Planner complete the GPRA report. The NEP grant programs help fund these efforts.

How the Project Supports the CCMP and Work Plan Goals:

Wetlands and habitat protection and restoration in the wetland action plans and the land use management action plans principally. (Sub-element: Habitat, Water Quality, Living Resources, Healthy Communities. Program goal: Ecosystem Restoration & Protection)

How the Project Supports the CWA

This task supports CWA core programs 7) supporting CWA and state wetland protection efforts, and 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Outputs, Products, or Deliverables:

1. Grant applications to state and federal grant programs by us or our partners with our support. Grant awards by the NEP to our partners.
2. The NEP may provide support to towns to produce materials for updating local open space plans (which expire every seven years).
3. The permanent protection of new open space with wetlands and other important habitat in the Buzzards Bay watershed through conservation restriction or purchase in fee.
4. Annual GPRA reports on wetland and habitat protected or restored will be submitted through the NEPORT website.

Milestones:

1. Report to EPA each September via GPRA report on the NEPORT website. Other projects and activities as financial or local interest opportunities arise. Projects undertaken with technical support from the NEP. Maps or analyses prepared for area land trusts or other partners as needed and upon request.

Estimated Budget:

Staff time to meet requests for technical assistance. Roughly, \$700 in office supplies and paper, and printer ink are projected to be expended on the production of maps, brochures, and outreach information.

Leveraged Funding and Support:

Municipal land protection and restoration projects leverage considerable resources and match to the NEP. The Coalition has successfully leveraged considerable state, federal, municipal funds and resources, as well as private donations, in their efforts to protect and restore habitat and wetlands. Only a fraction of those leveraged funds are attributed as match to these NEP's Cooperative Agreement with EPA

Outcomes:**Short-term**

Increased state and federal funding to local land protection and habitat restoration efforts.

Increased number of habitat acres protected and restored, including geographic information systems location data.

Intermediate

Increased number of wetland and habitat related actions in the CCMP that have been completed. Increased leveraging of resources committed to NEP activities or towards implementation of CCMP goals and recommended actions. Increased number of acres of protected open land through purchase or easement.

Long-term

CCMP Goal: Long-term increase of high-quality wetlands and coastal habitat in the Buzzards Bay watershed.

FFY23 Work Plan Task 2 - Stormwater Remediation and Technical Assistance

Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024): (Status: on-going)

Stormwater management and support to the Stormwater Collaborative will remain a special focus area for the NEP. Stormwater Collaborative financial support is now contained in the Buzzards Bay Bipartisan Infrastructure grant. The NEP renegotiated an agreement with MMA to accommodate a change in faculty oversight and policies at the college. The new agreement covers both the compensation of the Stormwater Coordinator position to oversee student work in the field and the faculty and administration costs for Collaborative management and overseeing work agreements between MMA and the towns. This new arrangement removes much of the budget uncertainty of the program and promotes efficiency and better town participation. The Buzzards Bay NEP staff support to the Stormwater Collaborative remains part of the NEP base grant.

The town funding to the Cooperative (\$79,000 last year), will now be directed exclusively to the costs of students working in the program, travel expenses, the costs of supplies, and equipment maintenance and upgrades. This new arrangement will make municipal participation in the Stormwater Collaborative more attractive, as the town will get more field time for their funds. The students work with municipal public works staff to conduct the field work of inspecting storm drain network infrastructure. The municipal agreement budget will fund six full-time students during the summer, and four part time students in both the spring and fall. The field crews under the supervision of the Stormwater Coordinator will sample stormwater, GPS structures, inventory outfalls, and continue detailed structure inspections. During the upcoming work plan period, the NEP staff will continue to guide the program, train participants, process data and GIS, and work with the towns to meet their MS4 requirements. The NEP funds the testing of samples that meets quality control standards according to an [EPA approved QAPP plan](#).

The Stormwater Collaborative work includes the management and update of an [interactive stormwater network map website](#) using ArcGIS Online (with the license provided by MMA). The work plan for this fiscal year includes a major update to the GIS that supports the Stormwater Collaborative. This update will streamline information processing to the online map and provide data storage for details that are being observed in the field. Another initiative for this year is to expand the functionality of the online map that will include more search features, sampling data, and a dashboard interface.

The NEP's stormwater technical assistance program has clear measurable benefits including identification of potential illicit stormwater discharges, the creation of catchment and drainage system maps, and a water quality data management system to assist in municipal storm drain maintenance and stormwater issue tracking. In addition to the Stormwater Collaborative program support, the NEP aids towns on stormwater issues in several ways. First, we review stormwater designs proposed by towns for remediation projects. Second, we help towns prepare grant applications for state and federal monies to help fund remediation of priority sites. Third, we provide guidance on the development and revision of local stormwater regulations and LID strategies. The NEP's outreach of support and frequent communication keeps stormwater issues at the forefront of municipal priorities to protect water quality in Buzzards Bay.

How the Project Supports the CCMP and Work Plan Goals:

Principally Stormwater Management, Shellfish Management, and Wetlands and Habitat action plans, secondarily Land Use, On-Site Septic System management plans.

How the Project Supports the CWA

This task supports these CWA core programs: 1) improving water quality monitoring, 2) developing strategies to meet Buzzards Bay TMDLs (for bacteria), 3) controlling non-point source pollution on a watershed basis, 4) strengthening NPDES permits, and 5) supporting sustainable wastewater infrastructure, 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Responsible Partners and Their Role(s):

On the Stormwater Collaborative Initiative, our principal partners on these projects are the Buzzards Bay watershed municipalities and their public works departments and the MMA. For on-site specific projects, DPWs will be the principal collaborator in developing the site-specific stormwater designs, as will municipal boards, districts, and environmental groups. Other partners may arise during project revisions, collaborations related to Massachusetts Environmental Policy Act (MEPA) permit submissions, or projects commencing that are of regional significance.

NEP Staff:

As described above, about 80% of the full-time and part-time Stormwater Specialists' time will be dedicated to tasks associated with the Stormwater Collaborative, with the balance of time related to broader stormwater management goals and services to municipalities not yet participating in the Stormwater Collaborative.

The part-time Stormwater Specialist will conduct the stormwater design reviews and will assist in the implementation of stormwater regulations. The Stormwater Specialists and Executive Director will develop state and federal grant applications and attend meetings as needed. The NEP Director also oversees staff in implementing the program.

Outputs, Products, or Deliverables:

1. Oversee and guide the Stormwater Collaborative stormwater network mapping and discharge monitoring program.
2. Maintenance of the Stormwater Collaborative water quality database.
3. Maintenance of the Stormwater Collaborative GIS database.
4. Coordination of Stormwater Collaborative activities.
5. General local stormwater initiative products include stormwater plan updates, review and analysis of stormwater calculations.
6. Develop engineering designs for three or four priority sites in the Buzzards Bay watershed.
7. Provide stormwater grants or provide technical assistance to municipalities in their efforts to secure funding for stormwater designs.
8. Work with towns to adopt improved stormwater regulations and policies, and compliance with MS4 permits.

Milestones:

In fall of 2022, assist MMA to complete reports and data submission requirements under their grant. The NEP will assist municipalities upon request to prepare documents and information to help them meet MS4 submission requirements and program deadlines. Project-specific timelines will be defined by meetings with the towns relating to best treatment strategies, the diagnosis of potential illicit connections, or MS4-specific submission deadlines.

For the general stormwater technical and financial assistance program, most products and activities in this technical assistance program are developed and are completed as needed on an ad hoc basis, and as permit applications are submitted, or as towns express interest and have match available to apply for federal and state grants. Some activities are defined by stormwater grants in the Buzzards Bay municipal grant program. Other specific milestones arise from projects already initiated.

Estimated Budget:

The costs for these tasks in terms of NEP staff time are estimated at more than \$315,000 (salary + fringe + indirect), or 60% of personnel costs. The MMA work will continue with nearly half funded through municipal contracts. Other expenditures in this task include about \$1,500 of the program's Supplies budget.

Outcomes:

Short-term

Stormwater Collaborative Initiative: maintain database structures to meet needs, collect samples, implement management oversight, investigate illicit discharges, update mapping products, update databases, and implement program control measures.

General stormwater technical and financial assistance program: Increased citizen and government actions to protect and restore water quality and living resources in Buzzards Bay and its surrounding watershed through the implementation of the CCMP.

Intermediate

Stormwater Collaborative Initiative: With the continued funding of the program, we hope to add additional towns as participants and work to include more municipal staff in the program, to make them more self-sufficient in implementing monitoring and mapping programs, and to identify illicit discharges. This outcome will require local training to expand municipal self-reliance. Continue to transfer more management of the program responsibilities to municipalities.

General stormwater technical and financial assistance program: Increased leveraging of resources committed to NEP activities or towards implementation of CCMP goals and recommended actions.

Long-term

Stormwater Collaborative Initiative: Eventual independence of Buzzards Bay municipalities from NEP management and oversight or stormwater monitoring and mapping obligations.

General stormwater technical and financial assistance program: Actions taken to protect and restore water quality and living resources in Buzzards Bay and its surrounding watershed through the implementation of the CCMP.

Pressures affecting outcomes

Stormwater Collaborative Initiative: Sufficient funding from municipalities to fully fund the program remains a challenge.

Stormwater Design Development: The NEP can handle requests for technical assistance depending upon workload and ongoing projects.

General stormwater technical and financial assistance: These efforts are also dependent on local interest and local match availability on site specific projects. The NEP can handle requests for technical assistance depending upon workload and ongoing projects.

FFY23 Work Plan Task 3 - Municipal Grant Program

Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024): (Status: ongoing)

The NEP has set aside \$164,252 of the \$250,000 add-on SNEP funds to support the Buzzards Bay Municipal Mini-grant Program. The NEP will release a request for proposals in September 2023. Any unawarded Round 2 BIL funds will be included in this grant round.

How the Project Supports the CCMP and Work Plan Goals:

Depending upon the specific municipal projects funded, this task has the potential to address numerous CCMP goals, an particularly Action Plan 1: Managing Nitrogen Sensitive Embayments, Action Plan 2: Protecting and Enhancing Shellfish Resources, Action Plan 3: Managing Stormwater Runoff and Promoting LID, Action Plan 4: Improving Land Use Management and Promoting Smart Growth, Action Plan 5: Managing Onsite Wastewater Disposal Systems, Action Plan 6: Managing Impacts from Boating, Marinas, and Moorings, 8: Restoring Migratory Fish Passage and Populations, Action Plan 15: Managing Coastal Watersheds and the Waterfront, Action Plan 16: Reducing Toxic Pollution, Action Plan 17: Preventing Oil Pollution, and Action Plan 18: Planning for a Shifting Shoreline and Coastal Storms, Action Plan 19: Protecting Public Health at Swimming Beaches.

How the Project Supports the CWA

Depending upon the specific municipal project funded, this task has the potential to address several CWA core programs directly or indirectly, including 1) strengthening water quality standards, 2) improving water quality monitoring, 3) developing TMDLs, 4) controlling non-point source pollution, 5) strengthening National Pollution Discharge Elimination System (NPDES) permits (including MS4), 6) supporting sustainable wastewater infrastructure, 7) supporting CWA and state wetland protection efforts, and 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Responsible Partners and Their Role(s):

Buzzards Bay municipalities are the applicants to the municipal grant program and the lead for implementing this task. Other partners, like the Buzzards Bay Coalition and Land Trusts often assist municipalities with their applications. The CZM South Coast Regional Coordinator, housed in the NEP offices, will also support project development by Buzzards Bay municipalities, and to encourage participation in the Buzzards Bay Municipal Grant Program and other state programs. The NEP staff do this when the grant application is not active.

NEP Staff:

Principal Staff involved in these tasks includes the Regional Planner who oversees grants and contracts, Executive Director, CZM, and the stormwater specialists, who help guide the stormwater engineering services contract.

Outputs, Products, or Deliverables:

Scopes developed, contracts awarded, press releases prepared, website updated with projects, projects overseen, projects completed, match documents received, and contracts closed.

Milestones:

1. RFR announced in September, grants awarded in November, grants terminate by June 2025.

Estimated Budget:

The municipal grant program has been allotted \$164,252. Any unexpanded funding from previous grant rounds will be rolled into this solicitation.

Outcomes:***Short-term***

Award of grants and the completion of work by June 2025 at the latest.

Intermediate

Continued collaborations and partnerships sustained to ensure the development of new projects and designs for future funds including those funded by other state and federal grant programs and local sources.

Long-term

Sustained local and state commitment to continued implementation of projects that will protect and restore water quality and living resources in Buzzards Bay and its surrounding watershed through the implementation of the CCMP and serving all populations within municipalities.

Pressures affecting outcomes

There are two additional principal issues that can delay this effort. First, the state may delay the award or release of funds for various reasons. Second, municipalities may have problems meeting grant schedules for various reasons and request extensions in their grant agreements. Grants are generally set for completion within a year, with extensions to 18 months if needed.

FFY23 Work Plan Task 4 - Program Oversight and Administration***Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024): (Status: on-going)***

The NEP Executive Director and CZM Fiscal Officer ensure administration of the EPA and other grants and ISAs awarded to the NEP.

The NEP will submit complete GPRA report information to EPA as specified in the EPA Funding Guidance. The GPRA report for NEPs includes annual estimates of habitat and wetlands protected or restored, and annual estimates of funds leveraged in some way by the NEP. As a requirement of this agreement, the NEP will provide information on the GPRA performance measures to EPA by their required date.

How the Project Supports the CCMP and Work Plan Goals:

Supports all program activities.

How the Project Supports the CWA

This task supports core program 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Responsible Partners and Their Role(s):

The NEP parent agencies of CZM and EEA are responsible for the fiduciary and financial reporting requirements of the NEP.

NEP Staff:

Principal Staff involved in these tasks: NEP Executive Director and Regional Planner (for municipal grants), with additional support from the CZM financial officer and CZM.

Outputs, Products, or Deliverables:

1. Financial reports to EPA.
2. Preparation of work plans, cooperative agreements, grant amendments.
3. Steering Committee meetings needed to review the work plan.
4. Performance reports to EPA.

Milestones:

1. Account draw downs and reports as needed and required.
2. GPRA and leveraging reports due to EPA annually in September 2023.
3. Draft FFY23 work plan sent to Steering Committee in April/May 2024.
4. Approved Cooperative Agreement sent to EPA in June 2024.
5. EPA finalize award by 30 July 2024.
6. Close out of previous work plan by December 2024.

Estimated Budget:

The only costs are NEP staff time.

Outcomes:

Short-term

Meet all reporting and programmatic deadlines.

Intermediate

Increase and improve upon the information that the Buzzards Bay community leaders, environmental managers, scientific and education community, Commonwealth of Massachusetts, federal officials, and the public has for making management actions related to the restoration, protection, and sustainable use and enjoyment of Buzzards Bay and its watershed.

Long-term

Increased citizen and government actions to protect and restore water quality and living resources in Buzzards Bay and its surrounding watershed through the implementation of the CCMP.

Pressures affecting outcomes

Few pressures will affect this task but delays in completion of grant awards may result in a request to EPA to extend a Cooperative Agreement.

FFY23 Work Plan Task 5 - Buzzards Bay Citizens' Water Quality Monitoring

***Planned Project/Activity Purpose and Description (January 1, 2024 - December 31, 2024):
(Status: ongoing)***

With its support from the NEP, the Commonwealth of Massachusetts, citizens, Coalition dues, and other sources, the Coalition will continue its nationally recognized water quality monitoring program which costs roughly \$250,000 annually. The NEP is providing \$65,000 in this year's budget for that task (Task 3 of the sub-award to the Buzzards Bay Coalition). The NEP will continue to provide technical support to Coalition staff in implementing the Monitoring Program. The NEP and the Coalition will continue to use data to advocate for nitrogen management in Buzzards Bay Watershed communities and to evaluate trends in Buzzards Bay. The data is also used by DEP's Massachusetts Estuaries Project in the development of TMDLs. The Commonwealth of Massachusetts for several years has provided between \$50,000 and \$150,000 annually towards this program that was used as match to our program.

The NEP director will continue to participate in the Coalition SAC workgroup, which continues to work on several tasks, including a recommended monitoring and modeling requirements for any potential new wastewater outfalls that would be allowed under a changed state law that would enable such new outfalls.

How the Project Supports the CCMP and Work Plan Goals:

This task principally supports Action Plan 1: Managing Nitrogen Sensitive Embayments, Action Plan 2: Protecting and Enhancing Shellfish Resources, Action Plan 4: Improving Land Use Management and Promoting Smart Growth, Action Plan 5: Managing Onsite Wastewater Disposal Systems, Action Plan 19: Protecting Public Health at Swimming Beaches, Action Plan 20: Monitoring Management Action, Status, and Trends, Action Plan 21: Enhancing Public Education and Participation.

How the Project Supports the CWA

This task supports these core programs: 1) strengthening water quality standards, 2) improving water quality monitoring, 3) developing TMDLs, and 4) controlling non-point source pollution on a watershed basis and CWA and state wetland protection efforts.

Responsible Partners and Their Role(s):

The Coalition is the lead for the water quality program and is responsible for meeting state and federal QAPP requirements. They are also the lead on the SAC, but the NEP Director is also a member of that committee and can provide technical and material support for some of their activities. The NEP Regional Planner provides GIS products in support of the water quality monitoring program. The NEP Executive Director coordinates with the Coalition Executive Director, and the Coalition's newly established SAC, on needed program support, and provides technical assistance and guidance on biannual water quality and related State of the Bay products.

NEP Staff:

Principal Staff involved will be the NEP Executive Director, Regional Planner, and other NEP staff as required.

Outputs, Products, or Deliverables:

1. Annual data disks provided to the NEP.
2. Updates posted to Coalition and NEP website.
3. Electronic rainfall database maintained for evaluating impacts to water quality.

Milestones:

1. Though not required under a grant, the Coalition will share the water quality data for the summer of 2022 monitoring in September of 2023.

Estimated Budget:

A total of \$65,000 of Section 320 funds will be awarded to the Buzzards Bay Coalition under this Cooperative Agreement. The Coalition's budget for the monitoring program is approximately \$250,000, much of which is used as match.

Outcomes:

Short-term

Increased information availability for use by Buzzards Bay community leaders, environmental managers, scientific and education community, Commonwealth of Massachusetts, federal offi-

cials, and the public to make better management decisions and actions related to the restoration, protection, and sustainable use and enjoyment of Buzzards Bay and its watershed. Increase involvement of citizens to protect the natural resources of Buzzards Bay by actively empowering people to get involved and make a difference in the sound management and restoration of the Bay's resources.

Intermediate

Improved public and governmental understanding of Buzzards Bay environmental issues, increased productivity of partners needing information or Buzzards Bay documents, and increased public and financial support for action to protect and restore Buzzards Bay. The advancement in knowledge on the effects of nitrogen pollution and documentation of the condition of localized water quality throughout Buzzards Bay harbors in relation to nutrient loads from the watersheds. Provide external water quality data for the DEP to assess water body health and develop cleanup plans for impaired waters.

Long-term

Maintain, and ideally increase, the number of acres of eelgrass habitat in Buzzards Bay through reduced nitrogen loading. Meet nitrogen action plan goals: 1. Ensure that beneficial water uses will not be lost, nor will ecosystems be adversely affected by excessive contributions of nitrogen to any embayment within Buzzards Bay; 2. Restore any beneficial water uses and ecosystems lost or impacted by the excessive contribution of nitrogen to any embayment within Buzzards Bay.

Pressures affecting outcomes

The Coalition is considering implementing a program to freeze certain samples for certain analyses as allowed for under the existing QAPP, if social distancing procedures or other policies cannot be implemented during the July-August sampling period. This may affect turnaround time in receiving data and data analysis from the Coalition's analytical laboratory.

FFY23 Work Plan Task 6 - Environmental Indicators and Outcomes Tracking

Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024): (Status: on-going)

The U.S. EPA requires an assessment of environmental “outputs” and “outcomes,” and a method to measure achievement of outputs and outcomes in our efforts to implement the CCMP, and to meet our overarching goal to protect and restore water quality, wetlands, and habitat in Buzzards Bay and its surrounding watershed. The NEP defines environmental outcomes and preliminary indicators through its annual GPRA submissions.

The NEP submitted its first GPRA report to EPA in October 2003 and continues to submit this information annually. To a large degree, the NEP will measure this work plan's outputs and outcomes based on annual reporting of work plan tasks completed, CCMP recommendations implemented, remediation projects completed, and our GPRA/environmental indicators reporting. Each work plan will contain a summary of tasks and measurable outcomes accomplished over the previous year, and tasks ongoing through program extensions.

Because a new Coalition *State of the Bay* report is not due until January 2027, the NEP will continue to internally track certain indicators like shellfish closure statistics and eelgrass cover summaries under this work plan. Even when a state of the Bay report is not completed in a particular year, the Buzzards Bay Coalition continues to update its website with bay health index data. Other data tracked by the NEP include stormwater discharges, tracking of CCMP accom-

plishments, and the ongoing tracking of protected open space and new land acquisitions (GPRA data).

In addition to these requirements, NEP staff will fulfil any reporting required under the BIL/IIJA funding.

How the Project Supports the CCMP and Work Plan Goals:

All Action Plans to a degree, but particularly Action Plan 20: Monitoring Management Action, Status, and Trends, and Action Plan 21: Enhancing Public Education and Participation.

How the Project Supports the CWA

This task may indirectly support any of these CWA core program: 1) strengthening water quality standards, 2) improving water quality monitoring, 3) developing TMDLs, 4) controlling non-point source pollution on a watershed basis, 5) strengthening NPDES permits, 6) supporting sustainable wastewater infrastructure and CWA and state wetland protection efforts.

Responsible Partners and Their Role(s): (Status: ongoing)

The Coalition is a key partner in this effort and is the lead in the collection and tracking of several data sets. The Massachusetts Division of Marine Fisheries is the lead agency in collecting and assessing shellfish closures, and provides this data to the NEP. The NEP coordinates closely with DMF in creating Buzzards Bay GIS shellfish bed closures.

NEP Staff:

Executive Director.

Outputs, Products, or Deliverables:

1. Annually updated shellfish bed closure maps for Buzzards Bay posted at the program's annual summary shellfish closure web page.
2. The Coalition updates in online health index data each winter.
3. GPRA reports submitted to EPA.
4. Stormwater monitoring data published online at least annually.

NEP Milestones:

1. Shellfish bed closure map through 2023 updated by January 2024.
2. GPRA submitted September 2023 for the previous work plan period,

Estimated Budget:

For NEP tasks, the only section 320 funds are NEP staff time. Because the state of the Bay report was completed in 2022, little effort is required under this task.

Outcomes:

Short-term

Increased information availability for use by Buzzards Bay community leaders, environmental managers, scientific and education community, Commonwealth of Massachusetts, federal officials, and the general public to make better management decisions and actions related to the restoration, protection, and sustainable use and enjoyment of Buzzards Bay and its watershed.

Intermediate

Improved public and governmental understanding of Buzzards Bay environmental issues, increased productivity of partners needing information or Buzzards Bay documents, and increased

public and financial support for action to protect and restore Buzzards Bay. The advancement in knowledge on the effects of nitrogen pollution and documentation of the condition of localized water quality throughout Buzzards Bay harbors in relation to nutrient loads from the watersheds.

Long-term

Increased citizen and government actions to protect and restore water quality and living resources in Buzzards Bay and its surrounding watershed through the implementation of the CCMP.

Pressures affecting outcomes

Unanticipated demands on staff time, particularly those of the NEP director, will have the greatest impact on this task.

The NEP continues to track various environmental indicators on its website including shellfish bed closures ([shellfish closure web page](#)) and eelgrass abundance. The Buzzards Bay eelgrass estimates are based on DEP databases, and our own interpretation of aerial photographs in areas not covered by DEP's analysis. These data will be used during the Coalition's quadrennial *State of the Bay* report, likely next issued January 2027.

FFY23 Work Plan Task 7 - Outreach and Education

Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024) (ongoing):

Most of the activities under this task are met by the Coalition, but an important element is the Buzzards Bay NEPs partnership. With respect to the NEP, our outreach and education efforts principally focus on reaching out to the public thorough the program's website, or through more directed efforts in support of municipalities through training workshops, participation in public meetings, and preparation of brochures, meeting with residents on site specific projects, and handouts as requested by towns. Some of these specific actions are included in other tasks of this work plan.

The NEP will continue its support for the two annual Wetlands Delineation Workshops and special request workshops (as needed) conducted by the Massachusetts Association of Conservation Commissions ([MACC](#)). These workshops are conducted by retired NEP wetlands specialist, John Rockwell, who does the workshops on a pro bono basis.

Since the 1990s, to avoid redundancy of public outreach efforts in the face of diminishing funds and staff resources, the NEP relies on public outreach of the Coalition¹. The Coalition will continue to undertake outreach and education activities highlighting the condition and state of Buzzards Bay, progress toward restoration and protection goals, and collaboration with the NEP in their activities. These activities include the July Swim Buzzards Bay event, the October Buzzards Bay Watershed Ride, their annual meeting, press events, and various publications, including the annual report to their members.

The Coalition will continue to maintain their website. The Coalition will also continue its advocacy efforts through their various programs.

¹ This strategy was formalized in a 2005 Memorandum of Understanding between the NEP, Coalition, and the BBAC.

The BBAC continues to hold monthly meetings inviting relevant speakers and hosting workshops for MCZM and the NEP as needed. They have also expanded their website to include recent actions and accomplishments such as their Earth Day activities.

How the Project Supports the CCMP and Work Plan Goals:

To a degree, this task supports many action plans, but especially meets Action Plan 21: Enhancing Public Education and Participation.

How the Project Supports the CWA

This task will principally support this CWA core program: 4) controlling non-point source pollution on a watershed basis but may also indirectly support 1) strengthening water quality standards, 2) improving water quality monitoring, 3) developing TMDLs, 5) strengthening NPDES permits, 6) supporting sustainable wastewater infrastructure and CWA and state wetland protection efforts.

Responsible Partners and Their Role(s):

The Coalition and the BBAC are our principal partners, but we may collaborate with other organizations such as the Massachusetts Association of Conservation Commissions. The NEP may also periodically prepare articles and notes for CZMail, an e-newsletter hosted by CZM. The BBAC promotes increased awareness in their municipalities' intra-town networking.

NEP Staff:

Principal Staff involved will be the NEP Executive Director and other NEP staff as required.

Outputs, Products, or Deliverables:

Coalition and NEP websites. Coalition newsletter, flyers, posters, press releases, and reports to their members and residents about actions to protect and restore Buzzards Bay.

Improve NEP website information, brochures, and flyers. Help update the BBAC website. Provide wetlands delineation materials and [web page](#).

Milestones:

Both the Coalition and BBAC have established schedules to meet their own goals and guidelines and are not included in this work plan.

Estimated Budget:

The only section 320 fund costs are the NEP staff time, and occasional costs for light refreshments and/or meals served at meetings, conferences, training workshops and outreach activities (events), consistent with 41 CFR 301-74.7, and as approved by the Director.

Outcomes:

Short-term

Increased information availability for use by Buzzards Bay community leaders, environmental managers, scientific and education community, Commonwealth of Massachusetts, federal officials, and the general public to make better management decisions and actions related to the restoration, protection, and sustainable use and enjoyment of Buzzards Bay and its watershed.

Intermediate

Improved public and governmental understanding of Buzzards Bay environmental issues, increased productivity of partners needing information or Buzzards Bay documents, and increased public and financial support for action to protect and restore Buzzards Bay.

Long-term

Increased citizen and government actions to protect and restore water quality and living resources in Buzzards Bay and its surrounding watershed through the implementation of the CCMP.

Pressures affecting outcomes

However, many of the Coalition outreach efforts around specific projects may be canceled, such as the Buzzards Bay Swim. Like all other tasks, unanticipated demands on staff time can also affect which outcomes are met.

FFY23 Work Plan Task 8 - Specialized Technical Assistance

CCMP/Work Plan Goals:

Various action plans including nitrogen management, stormwater management, land use planning, and open space protection.

How the Project Supports the CWA

This task may directly or indirectly support any of these CWA core program: 1) strengthening water quality standards, 2) improving water quality monitoring, 3) developing TMDLs, 4) controlling non-point source pollution on a watershed basis, 5) strengthening NPDES permits, 6) supporting sustainable wastewater infrastructure and CWA and state wetland protection efforts.

Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024) (ongoing):

This task includes technical assistance of NEP staff to municipalities, non-profits, other agencies, and the public to meet the goals of the CCMP. Because the CCMP is a non-regulatory document, most recommendations are directed toward municipalities because they have the greatest authority. Whether certain activities are initiated depends upon our partners' capacity to address specific growth-related and non-point source pollution problems facing the bay and watershed. Consequently, the NEP provides this assistance on an ad hoc. This technical assistance primarily focuses on specific initiatives funded or managed by the NEP but can include a wide range of CCMP issues and management topics. Work under this task is provided based on the availability of staff, and at the direction of the NEP director to ensure that technical assistance efforts continue to meet the needs and goals of the NEP.

Responsible Partners and Their Role(s):

Key partners in this effort include the Coalition, the BBAC, Buzzards Bay municipalities, CZM, and other state and federal agencies.

NEP Staff:

All NEP staff work on these projects as needed or required.

Outputs, Products, or Deliverables:

1. Provide specialized technical assistance to municipalities to promote low impact development, remediate stormwater discharges, and adopt stormwater management strategies, promote better management of on-site septic systems and innovative wastewater systems;

improve local wetlands and habitat protection, manage nitrogen loadings, prepare and adopt open space plans.

2. Identify new local actions needed to support the development of the updated CCMP.
3. Encourage towns to take actions that support the updated CCMP.
4. Promote LID and Smart Growth strategies and stormwater management in Buzzards Bay communities.
5. Help towns develop concepts, remediation strategies and help prepare grant applications to implement programs and projects to implement CCMP recommendations.
6. Promote better management of on-site wastewater systems and use of innovative technologies.
7. Help municipalities improve local wetlands and habitat protection through regulatory and non-regulatory approaches.

Milestones:

Depends on future projects that cannot be anticipated at this time.

Estimated Budget:

The only costs are NEP staff time.

Outcomes:

Short-term

Increased information availability for use by Buzzards Bay community leaders, environmental managers, scientific and education community, Commonwealth of Massachusetts, federal officials, and the public to make better management decisions and actions related to the restoration, protection, and sustainable use and enjoyment of Buzzards Bay and its watershed.

Intermediate

The advancement in knowledge on the effects of nitrogen pollution and documentation of the condition of localized water quality throughout Buzzards Bay harbors in relation to nutrient loads from the watersheds.

Long-term

Increased citizen and government actions to protect and restore water quality and living resources in Buzzards Bay and its surrounding watershed through the implementation of the CCMP.

Pressures affecting outcomes

We provide technical assistance on a first come first serve basis and as allowed by available staff time.

FFY23 Work Plan Task 9 - Technology Transfer to Other Estuaries

Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024): (Status: on-going)

The NEP Director anticipates attending both the spring and fall NEP national meetings. The U.S. EPA requires NEP attendance at out-of-state conferences, particularly the spring and fall NEP meetings. Because of financial limitations, only the NEP Director will attend these meetings. The NEP Director also participates in the Coalition's SAC. Additionally, the NEP Director participates in the SNEP. The NEP Director will also, from time to time, provide technical assistance to

other NEP directors, the Association of National Estuary Programs, and other national programs in efforts to communicate the benefits of protecting and restoring national estuaries.

How the Project Supports the CCMP and Work Plan Goals:

All CCMP actions to some degree.

How the Project Supports the CWA

This task principally supports CWA core program 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Responsible Partners and Their Role(s):

The Coalition and the NEP send the appropriate staff to these meetings, or participate in collaborative NEP conference calls, webinars, training events, and meetings.

NEP Staff:

The NEP Executive Director or his designee will attend the fall 2023 and spring 2024 NEP meetings and participate in conference calls, web meetings, and communication efforts. Other NEP staff may attend meetings as required by the Executive Director.

Outputs, Products, or Deliverables:

1. Attendance at NEP meetings.
2. Presentations at out of state meetings.
3. Information transfer to Buzzards Bay communities.
4. Informational materials to area legislators.

Milestones:

Attendance of fall 2023 and spring 2023 EPA-NEP meeting (in Washington DC) at a minimum. Staff may also attend other national conventions (on planning, wetlands, and stormwater as budget, availability, and staff time allows, and as allowed by state policy.)

Estimated Budget:

The travel budget (\$3,600) covers the expenses of one out-of-state meeting, as well as all in-state travel of staff.

Outcomes:

Short-term

Information and lessons from Buzzards Bay transferred to other entities.

Intermediate

Increased involvement of citizens to protect the natural resources of Buzzards Bay by actively empowering people to get involved and make a difference in the sound management and restoration of the Bay's resources.

Long-term

Increased citizen and government actions to protect and restore water quality and living resources in Buzzards Bay and its surrounding watershed through the implementation of the CCMP.

Pressures affecting outcomes

Unanticipated budget shortfalls can require elimination of out-of-state travel.

FFY23 Work Plan Task 10 - Website Maintenance and Innovation

Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024): (Status: on-going)

The NEP shall continue to maintain an independent website (Buzzardsbay.org) to assist the NEP to promote new approaches, receive feedback, communicate successes, track trends in water quality, performance of government in implementing the CCMP, express the views and concerns of the NEP Steering Committee, create a forum for new initiatives and ideas of our partners, and support other obligations and tasks identified in this work plan. The website is also used to post results of the bay indicators, data in support of the Coalition's *State of the Bay* reports, archival reports, and post procurement notices and grant announcements. In addition to our own website, the NEP designed and continues to maintain the BBAC's website, buzzardsbayaction.org. Their page is updated with stories, photos, videos, and presentations at the request of the BBAC.

How the Project Supports the CCMP and Work Plan Goals:

Supports all activities, in particular Trends, Action Plan 21: Enhancing Public Education and Participation.

How the Project Supports the CWA

This task does not directly support any CWA core programs but may indirectly support 2) improving water quality monitoring, 4) controlling non-point source pollution on a watershed basis, 6) supporting sustainable wastewater infrastructure and CWA and state wetland protection efforts, and 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Principal Staff involved in these tasks:

Executive Director, Regional Planner.

Responsible Partners and Their Role(s):

The NEP coordinates with the Coalition to ensure that each of our indicator and tracking pages are consistent where we provide overlapping information.

NEP Staff:

The NEP Executive Director is the web master and principal author of the website. Other NEP staff contribute to the site with specific documents and materials, and review.

Outputs, Products, or Deliverables:

1. Posting of new web pages and documents.
2. Update of existing web pages.
3. Modify all pages and documents to meet state and federal requirements for accessibility of the site for those with disabilities including W3C, WAI, and Section 508 compliance.

Milestones:

Updates and postings as need or required.

Estimated Budget:

The only costs are NEP staff time.

Outcomes:

Short-term

Improved public and governmental understanding of Buzzards Bay environmental issues, increased productivity of partners needing information or Buzzards Bay documents, and increased public and financial support for action to protect and restore Buzzards Bay.

Intermediate

Increased citizen and government actions to protect and restore water quality and living resources in Buzzards Bay and its surrounding watershed through the implementation of the CCMP.

Long-term

Assists in advancing all CCMP goals

Pressures affecting outcomes

Creation of new pages limited by time availability of the Executive Director (web manager) to add new information and links.

FFY23 Work Plan Task 11 - Scientific collaboration on nitrogen TMDLs, climate impacts, and water quality impacts on natural resources

Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024):

The NEP will continue to work with the Coalition and area scientists to complete and publish findings related to the Coalition's water quality data set and land use changes in Buzzards Bay and other collaborations involving area scientists. In 2021, the NEP partnered with the Coalition and the Town of Bourne to receive 604(b) funding from MassDEP to conduct a TMDL assessment for Red Brook Harbor Phinneys Harbor Complex in the town of Bourne. The NEP has agreed to complete several tasks for this assessment (at no cost), including conducting GIS analyses of watershed land use, and nitrogen loading modeling based on the number of onsite systems, determining occupancy rates for census data, determining land use types including estimates of impervious area, lawn area, extent of sewerage, and agriculture. This work has been ongoing, and in 2023, the Coalition developed and had the QAPP for this project approved. The NEP wrote the land use loading element of the QAPP. The work is scheduled for completion by the Coalition in December of 2023.

How the Project Supports the CCMP and Work Plan Goals:

This task principally supports Action Plan 1: Managing Nitrogen Sensitive Embayments, but also Action Plan 7: Protecting and Restoring Wetlands, and Action Plan 2: Protecting and Enhancing Shellfish Resources.

How the Project Supports the CWA

This task supports several CWA core programs directly or indirectly including elements: 2) improving water quality monitoring, 4) controlling non-point source pollution on a watershed basis, 6) supporting sustainable wastewater infrastructure and CWA and state wetland protection efforts, and climate adaptation related priorities, 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Principal Staff involved in these tasks:

Executive Director.

Responsible Partners and Their Role(s):

The NEP coordinates with the Coalition, and the SAC to ensure that the findings derived from the water quality datasets and precipitation and climate records are sound.

NEP Staff:

The NEP Executive Director is the lead on this effort. Other NEP staff contributes to the effort with specific documents, data entry, and review.

Outputs, Products, or Deliverables:

1. Posting of new web pages and documents in support of the effort.
2. Production of data set that meets EPA, NEP, and Coalition and collaborating researcher goals and needs.
3. Issuance of a report on the history of wastewater loading to Buzzards Bay.

Milestones:

Updates and postings as need or required.

Estimated Budget:

The only costs are NEP staff time.

Outcomes:***Short-term***

Improved Coalition water quality data set that can be imported into other applications, and incorporates necessary QA records, information, and metadata.

Intermediate

Increased utility of the data set for more expedited development of water quality health index scores and facilitated joining to GIS data.

Long-term

Increased utility and use of the dataset by independent researchers.

Pressures affecting outcomes

Work on the data set limited by time availability of the Executive Director.

FFY23 Work Plan Task 12 - Salt Marsh Loss Assessment and Runnel Study Collaboration with Coalition***Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024): (Status: on-going)***

The NEP and our non-profit partner organization, the Coalition will continue to study salt marsh die-off in Buzzards Bay. The NEP has installed the needed elevation benchmarks and will continue to document transect elevations and tidal elevations and will continue to interpret changes in marsh boundaries in historical photographs during 2023 and 2024. The data will be used to verify the remote sensing data and collect additional water quality data and document specific damage associated with crab grazing, storm damage and several other marsh indicators. The NEP continues to be the lead on the GIS analysis. This effort will follow and refine draft marsh

monitoring protocols developed by DEP and CZM under an EPA Wetlands Program Development grant awarded last year. The NEP will support the studies also through Light Detection and Ranging (LiDAR) analysis²

To support this task, the NEP has set aside \$49,016 for an ISA with UMass Dartmouth for continued UAV imagery monitoring under an EPA approved QAPP to support the salt marsh loss study (see subawards section in Task 14). The imagery will be processed to provide both orthorectified imagery and photogrammetric processing to generate a digital elevation model to be used in ArcGIS. Pixel size for both products will be less than 0.1 meters.

This task supports several CWA core programs indirectly including elements: 2) improving water quality monitoring, 4) controlling non-point source pollution on a watershed basis, 6) supporting sustainable wastewater infrastructure and CWA and state wetland protection efforts, and climate adaptation related priorities.

How the Project Supports the CCMP and Work Plan Goals:

Principally supports Action Plan 18: Planning for a Shifting Shoreline and Coastal Storms, and Action Plan 7: Protecting and Restoring Wetlands.

How the Project Supports the CWA

This task supports several CWA core programs indirectly including elements: 2) improving water quality monitoring, 4) controlling non-point source pollution on a watershed basis, 6) supporting sustainable wastewater infrastructure and CWA and state wetland protection efforts, and climate adaptation related priorities, and 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Principal Staff involved in these tasks:

Executive Director, Coalition Staff, Coalition SAC subgroup (Anne Giblin, Chris Neill, Linda Deegan are among the principals).

Responsible Partners and Their Role(s):

The NEP coordinates with the Coalition, and the SAC to ensure that the findings derived from analysis are sound.

NEP Staff:

The NEP Executive Director is the lead on this GIS component of the effort. Other NEP staff may contribute to the effort with specific documents, data entry, and review.

Outputs, Products, or Deliverables:

1. Posting of new web pages and documents in support of the effort.
2. UMass Dartmouth unmanned aerial system salt marsh surveys in the Fall of 2022 or summer of 2023.
3. Production of GIS data sets that meets EPA, NEP, Coalition, and collaborating researcher goals and needs.
4. Issuance of a report on the history of salt marsh boundary changes at the selected sites and like causes prepared by the Coalition and Science Advisory principals.

² See <http://climate.buzzardsbay.org/marsh-migration-methods.html>

5. Incorporation of marsh loss into future Buzzards Bay *State of the Bay* reports (as a narrative element). The Coalition prepares these reports with NEP support, and changes in salt marsh area or condition are not currently reported. In future reports the Coalition will report findings from periodic aerial surveys of marsh condition (narrative element).

Milestones:

The summer monitoring season is expected to be complete by October 1, 2022. GIS coverage of key historical aerial surveys will be completed by December 30, 2023. Other updates and web postings as need or required.

Estimated Budget:

NEP staff time, principally the Director.

Outcomes:

Short-term

Baseline vegetation and elevation data monitored at a minimum of 10 previously monitored reference sites. Improved GIS data set of existing and historical marsh boundaries. Data set that can be imported into other applications, and incorporates necessary QA records, information, and metadata.

Intermediate

Increased utility of the data set for more expedited analysis of saltmarsh loss. A report on the potential or likely cause of marsh loss in each of the 10 sites.

Long-term

Increased utility of salt marsh change dataset that can be used by independent researchers.

Pressures affecting outcomes

For the NEP task, limited by time availability of the Executive Director. At the Coalition, the efficacy and efficiency of the salt marsh field monitoring and sampling protocols.

FFY23 Work Plan Task 13 - Technical Assistance to Support Coastal Resiliency and Municipal Vulnerability Preparedness

Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024):

In August 2022, the Commonwealth of Massachusetts announced the award of \$32.8 million in Municipal Vulnerability Preparedness (MVP) grant funding, and in September 2022, another \$12.6 million in Coastal Resiliency Program (CRP) grant funds were awarded. The NEP has been providing technical support to Buzzards Bay municipalities and CZM on priority needs in the Buzzards Bay watershed based on past sea level rise studies and technical analyses conducted previously by NEP or other entities. This technical assistance included developing maps, analyses, and information that can be used to support Buzzards Bay municipal applications.

How the Project Supports the CCMP and Work Plan Goals:

Principally supports Action Plan 18: Planning for a Shifting Shoreline and Coastal Storms.

How the Project Supports the CWA

This task supports several CWA core programs directly or indirectly, including 6) supporting sustainable wastewater infrastructure, 7) supporting CWA and state wetland protection efforts, and 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Principal Staff involved in these tasks:

NEP Executive Director and Regional Planner; and collaboration with the CZM South Coast regional coordinator.

Responsible Partners and Their Role(s):

As has been done in the past, the NEP director will coordinate with the CZM South Coast Regional Coordinator to provide technical support for the development of proposal concepts for future state grant reports. Technical support will include LiDAR data, watershed, and land use GIS analysis in support of applications, guidance on the development of tasks and project budgets, and other activities that would support Buzzards Bay municipality participation in these grant programs.

Outputs, Products, or Deliverables:

Production of maps, data, and information that will support municipal applications to the CRP and MVP grant programs.

Milestones:

Work on this project would be performed upon request on an ad hoc basis. At the start of the Cooperative Agreement, an announcement would be sent from the NEP to all applicable boards about the availability of NEP technical support for municipal applications to the CRP and MVP grant programs. The announcement will include back links to the NEP website with existing interactive maps and datasets relevant to municipalities that support this task.

Estimated Budget:

NEP staff time. A minimum of \$55,675 in grants are estimated to be awarded to Buzzards Bay municipalities from the CRP and MVP programs during this work plan period, and they are expected to be used as cash match to this Cooperative Agreement. Both programs are state funded.

Outcomes:

Short-term

Increased number of municipal applications to the CRP and MVP grant programs.

Intermediate

Increased number of awards from the CRP and MVP grant programs from Buzzards Bay municipalities.

Long-term

Increased coastal resiliency and municipal vulnerability preparedness within the Buzzards Bay watershed.

Pressures affecting outcomes

For the NEP, limited by time availability of the Executive Director, and programmatically, local commitment of staff to support and application, and the level of competition for state grant funds.

FFY23 Work Plan Task 14 - Targeted Grant Sub-awards

Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024):

This work plan has five targeted subawards. The Coalition water quality monitoring effort is also described in Task 5. The other four subawards are described here. For discretionary subawards

utilizing SNEP funds, the NEP has adopted a policy with a goal to limit indirect costs for discretionary subawards by encouraging recipients to waive costs above program goals. This policy is established to maximize the cost-effectiveness of federal funds and to help justify the subaward process. For discretionary subawards, the following policies will apply pursuant to the federal cooperative agreement for this work plan.

- **Entities without a federally negotiated indirect cost rate agreement:** Indirect costs of sub-awardee recipients are limited to 10% of the total direct costs. Any unreimbursed indirect expenditures, if from a non-federal source, may be reported by the sub-awardee as match in their close-out report to the Buzzards Bay NEP.
- **Entities with a federally negotiated indirect cost rate agreement:** Under 2 CFR 200.306(c), sub-awardee recipients with approved federally negotiated indirect cost rates may use unrecovered, unreimbursed, or waived indirect costs that exceed the NEP's goal of limiting indirect costs to 26% of Modified Total Direct Costs, as defined by 2 CFR 200.68, as match in their close-out report to the Buzzards Bay NEP.

Sub-award 1: Continued Collaboration with UMass Dartmouth Salt Marsh Unmanned Aircraft System Surveys (\$49,016)

Under this initiative, the NEP will continue its partnership with UMass Dartmouth to continue both a senior studies project and a graduate student research project to using Unmanned Aircraft System Surveys to map changes in salt marsh boundaries, vegetation, and elevations according to an EPA approved QAPP. The elevation monitoring will involve sophisticated photogrammetry software and field elevation surveys of control points. Additional details of the monitoring effort are contained in Appendix B, subaward 1.

How the Project Supports the CCMP and Work Plan Goals:

This subaward principally supports Action Plan 7: Protecting and Restoring Wetlands, Action Plan 9: Protecting Biodiversity and Rare and Endangered Species Habitat, and Action Plan 18: Planning for a Shifting Shoreline and Coastal Storms.

How the Project Supports the CWA

This task supports several CWA core programs including CWA and state wetland protection efforts, and climate adaptation related priorities. including priority 7) supporting CWA and state wetland protection efforts, and 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Sub-award 2: Continued Monitoring Nitrogen Inputs to Buzzards Bay from Coastal Rivers (Woodwell Climate Research Center, \$45,948)

The NEP will continue to support nitrogen loading monitoring of major rivers in Buzzards Bay for a third year by the Woodwell Climate Research Center established stage gauges on ten Buzzards Bay Rivers (see details in Appendix B, subaward 2). In the follow-up study, Woodwell will continue monitoring these rivers to better understand the factors that drive these patterns. Specifically, the Woodwell Center will: (1) continue stage recordings from this river network for one year from July 1, 2023 to June 30, 2024; (2) improve stage-discharge curves for each river by augmenting field measurements of discharge in each river across a range of high and low flows when those flow variations are present; (3) sample concentrations of different dissolved and particulate nitrogen and phosphorus forms twice monthly during May through October and monthly during November through April for one year from July 1, 2023 to June 30, 2024.

How the Project Supports the CCMP and Work Plan Goals:

This subaward principally supports Action Plan 1: Managing Nitrogen Sensitive Embayments, but also Action Plan 7: Protecting and Restoring Wetlands, Action Plan 9: Protecting Biodiversity and Rare and Endangered Species Habitat, and Action Plan 13: Protecting and Restoring Ponds and Streams.

How the Project Supports the CWA

This task supports several CWA core programs including climate adaptation related priorities and other CWA elements including 1) strengthening water quality standards, 2) improving water quality monitoring, 3) developing TMDLs, 4) controlling non-point source pollution, 7) supporting CWA and state wetland protection efforts, and 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Sub-award 3: Buzzards Bay Coalition Baywatchers Support (\$65,000)

This proposal would fund continuation of the Baywatchers program in Buzzards Bay during January 1, 2024 - December 31, 2024. The Baywatchers program is largely funded by membership donations, Coalition fundraising events, like the Buzzards Bay Swim, and in the past has received direct state funding. The funds requested will help ensure core elements of the Baywatchers program continue. These funds will be used to support Baywatchers long-term monitoring program. This amount will support a portion of salary for the Coalition's Director of Monitoring Programs who runs the program - training volunteers, handling equipment repair and calibration, coordinating with the analytical laboratory, performing quality assurance, etc. – or the COALITION's Science Director acting in that role. Additional details of the monitoring effort are contained in Appendix B, subaward 1.

How the Project Supports the CCMP and Work Plan Goals:

This subaward principally supports Action Plan 1: Managing Nitrogen Sensitive Embayments, but also Action Plan 20: Monitoring Management Action, Status, and Trends.

How the Project Supports the CWA

This task supports several CWA core programs including CWA Section 303d and 604, as well as climate adaptation related priorities. It supports several CWA enumerated elements including 1) strengthening water quality standards, 2) improving water quality monitoring, 3) developing TMDLs, 4) controlling non-point source pollution, 5) strengthening NPDES permits (including MS4), and 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Sub-award 4: Benthic Flux Monitoring in Red Brook Harbor to Support TMDL Development (\$46,000)

The primary aim of this project is to quantify the seasonal flux of nutrients between the sediments and their overlying waters at selected stations in Red Brook Harbor. Because the sediments can contribute a significant amount of nitrogen to the water column, it is essential to quantify this amount so that there is an accurate nutrient budget that can be used when developing a TMDL. This work builds on previous projects in Red Brook Harbor and completes the scientific information needed for developing a TMDL. The scientific data collected and analyzed across all these studies will provide a holistic view of ecosystem health and will support the development of an evidence based TMDL. The TMDL will provide the Town of Bourne with information about how much nitrogen reduction will be required and where to prioritize actions. This actionable information will allow the Town of Bourne to plan for how best to meet the TMDL and restore water quality in the Red Brook Harbor system.

How the Project Supports the CCMP and Work Plan Goals:

This subaward principally supports Action Plan 1: Managing Nitrogen Sensitive Embayments, but also Action Plan 20: Monitoring Management Action, Status, and Trends.

How the Project Supports the CWA

This task supports several CWA core programs including CWA Section 303d and 604, as well as climate adaptation related priorities. It supports several CWA enumerated elements including 1) strengthening water quality standards, 2) improving water quality monitoring, 3) developing TMDLs, 4) controlling non-point source pollution, 5) strengthening NPDES permits (including MS4), 6) supporting sustainable wastewater infrastructure, 7) supporting CWA and state wetland protection efforts, and 8) protecting coastal waters and large aquatic ecosystems through the NEP.

Sub-award 5: New Bedford Sea Lab Buzzards Bay NEP Partnership, Marine Education Support to Environmental Justice Communities, Year 3 (\$25,889)

The Commonwealth of Massachusetts, through the Executive Office of Energy and Environmental Affairs, maintains a policy of Environmental Justice to better serve the environmental needs of the Commonwealth's most vulnerable residents. Similarly, as noted by the U.S. EPA's Environmental Justice Office, EPA's goal is to provide an environment where all people enjoy the same degree of protection from environmental and health hazards and equal access to the decision-making process to maintain a healthy environment in which to live, learn, and work. An important pathway toward both these state and federal goals is the participation and education of vulnerable youth populations. These individuals will become tomorrow's stewards of the environment, and a strong foundation in science and natural ecosystems is essential for them to make informed decisions about the environment as adults, and to be the caretakers of our future.

While the New Bedford School Department has made great strides in bringing in minority, language isolated, and financially disadvantaged students into the program, the greatest single need identified by Sea Lab Facilitator Simone Bourgeois is the need to provide tuition waivers to families who cannot pay for the tuition. Beyond this dire need are specific unmet program expenses and initiatives that will broaden the programs. This New Bedford Sea Lab Buzzards Bay NEP Partnership is designed to meet these needs. The intent of this proposed work plan is two-fold. 1) to match privately funded school tuition waivers to Sea Lab (and thereby leverage future private donations) and 2) fund specific equipment, curricula expansion and program needs.

How the Project Supports the CCMP and Work Plan Goals:

This subaward principally supports Action Plan 21: Enhancing Public Education and Participation.

How the Project Supports the CWA

Public Education is vital to generate support efforts to achieve the goals of all CWA core programs. This task also supports Justice 40 goals.

FFY23 Work Plan Task 15 - CCMP update

Planned Project/Activity Purpose and Description (July 1, 2023 - June 30, 2024):

The Buzzards Bay CCMP was last updated November 26, 2013. According to the U.S. EPA *National Estuary Program Comprehensive Conservation and Management Plan Revision and Update Guidelines* issued May 3, 2016:

Revisions involve a significant change. For example, a CCMP Revision could be driven by: 1) new CCMP goals, as directed by the Management Conference, 2) new information obtained through monitoring that would require revisiting and changing the actions in a CCMP; or 3) an expansion of the study area. A Revision would also be necessary in cases where original CCMPs have not yet been revised. Minor changes to action plans or insertion of a few new actions would be considered an Update. Reformatting, streamlining or reorganizing core actions to reflect new ways of accomplishing original CCMP goals would also be considered an Update.

Over the course of this work plan, the NEP will assess the best format in which to update the CCMP in 2023 and develop a draft document.

How the Project Supports the CCMP and Work Plan Goals:

Supports all CCMP action plans and work plan goals.

How the Project Supports the CWA

The CCMP supports directly or indirectly all CWA core programs.

Principal Staff involved in these tasks:

NEP Executive Director is the lead, with all NEP staff contributing, with additional collaboration with the CZM South Coast regional coordinator.

Responsible Partners and Their Role(s):

The NEP will reach out to partners in a similar way as was conducted through the Climate Change Vulnerability Assessment, through online workshops, and online feedback forms. The update will also be a topic for the Buzzards Bay Coalition's Science Advisory Committee, and the BBAC.

Outputs, Products, or Deliverables:

Production of maps, data, and information to support the effort. At least four meetings will be held with project partners. The NEP will use Google Forms to obtain online feedback.

Milestones:

In the fall of 2023, the NEP will incorporate recommendations from the Climate Vulnerability Assessment in the chosen CCMP update format, and a draft of the document will be posted online. Meetings and forums will be held on the updated document in January through March 2024. The CCMP update with endorsement from the NEP Steering Committee will be submitted to EPA by June 2024.

Estimated Budget:

Existing NEP staff time.

Outcomes:

Short-term

Completion of the 2023 CCMP update. Incorporation of the Climate Change Vulnerability Assessment recommendations. Meeting CCMP update requirements.

Intermediate

Increased involvement and participation of the public.

Long-term

Improvements to the CCMP that meet the long-term goals of the program to protect and restore water quality and living resources in Buzzards Bay and its surrounding watershed through the implementation of the CCMP.

Pressures affecting outcomes

Demands from other projects and overcommitments of NEP staff.

Section 4: Budget Summary and Explanation

This work plan is to support a new Cooperative Agreement. The work plan budget is summarized in Table 4 and the pie chart in Fig. 11, according to EPA grant categories. Supplemental details of the budget are contained in Table 5, the indirect cost calculations are shown in Table 6, and the SF424 application summary table (including match) is shown in Table 7.

Table 4. Federal FFY23 BUDGET DETAIL (Award = \$1,100,000; \$850,000 base funding + \$250,000 SNEP add-on)

Category/Item	Subtotal	Total
PERSONEL		\$408,709
Joe Costa, Executive Director	\$127,838	
Sarah Williams, Regional Planner	\$108,146	
Kevin Bartsch, Stormwater Specialist	\$117,459	
Bernadette, Taber Stormwater Specialist 20/h week	\$55,266	
FRINGE (rate= 43.36% plus 2.45% payroll tax)		\$187,230
TRAVEL* (in state + out of state) (see note a)		\$3,600
CONTRACTUAL		\$0
OTHER (includes sub-awards)		\$439,904
Program Operations (rent, utilities, cleaning)	\$43,799	
Municipal Grants	\$164,252	
Buzzards Bay Coalition Monitoring	\$65,000	
Sea Lab Support	\$25,889	
UMass Salt Marsh UAV study	\$49,016	
Woodwell CRC River Monitoring Program	\$45,948	
BBC/MBL Ecosystems Center Red Brook Benthic Flux Sampling	\$46,000	
SUPPLIES		\$2,340
TOTAL DIRECT		\$1,041,783
INDIRECT** (rate = 14.04%, see cost table)		\$58,217
TOTAL		\$1,100,000

*Travel estimate is based on the actual in-state and out-of-state expenditure from other years and new projections, and inclusion of the Spring 2024 meeting in Washington DC. Most of the travel is done within the Buzzards Bay watershed (site visits or partner meetings), with additional agency partner meetings in Massachusetts, Rhode Island (mostly for SNEP meetings), and tech transfer meetings in New England and include the following: 1) Executive Director: 1 national meeting, 2 NE tech transfer meetings, 7 in-state and watershed partner meetings, 30 in-state site visits; 2) Regional Planner: 2 state and watershed partner meetings, 2 site visits; 3) Stormwater Specialist (Full-Time Employee): 1 NE tech transfer meeting, 5 state and watershed partner meetings, 40 site visits; 4) Stormwater Specialist (Half-Time Employee): 2 state/watershed partner meetings, 15 site visits.

** There is an 14.04% charge on "Personnel," "Contractual," plus selected expenditures in the "Other" category (detail in Table 5).

Table 5. OTHER Program Operations detail

Category	Amount
rent (includes \$5,000 offset from CZM)	\$30,940
cleaning	\$3,380
utility electric	\$960
utility gas	\$600
water/sewer	\$630
alarm system	\$360
repairs, maintenance (copy/printer, etc.)	\$417
Phone, internet	\$0
Core technology, single audit, etc. chargebacks	\$4,620
Printer/Copier/Scanner lease	\$1,892
Other Total	\$43,799

Table 6. Indirect Costs Table

Category	Amount
PERSONEL	\$408,709
CONTRACTUAL	\$0
OTHER Program Operations sub elements	
cleaning	\$3,380
alarm system	\$360
Selected chargebacks (MMARS IT & Core Tech)	\$2,200
Indirect Base total	\$414,649
Indirect rate 14.04% (0.1404)	
Total Federal Indirect share	\$58,217

Table 7. SF424 Grant Summary by EPA Category Including Match

EPA Grant Category	Federal	Non-Federal	Total
PERSONNEL	\$408,709	\$238,238	\$646,947
FRINGE	\$187,230	\$0	\$187,230
TRAVEL	\$3,600	\$1,700	\$5,300
SUPPLIES	\$2,340	\$0	\$2,340
CONTRACTUAL	\$0	\$345,247	\$345,247
OTHER	\$439,904	\$478,755	\$918,659
TOTAL DIRECT	\$1,041,783	\$1,063,940	\$2,105,723
INDIRECT	\$58,217	\$36,060	\$94,277
TOTAL	\$1,100,000	\$1,100,000	\$2,200,000

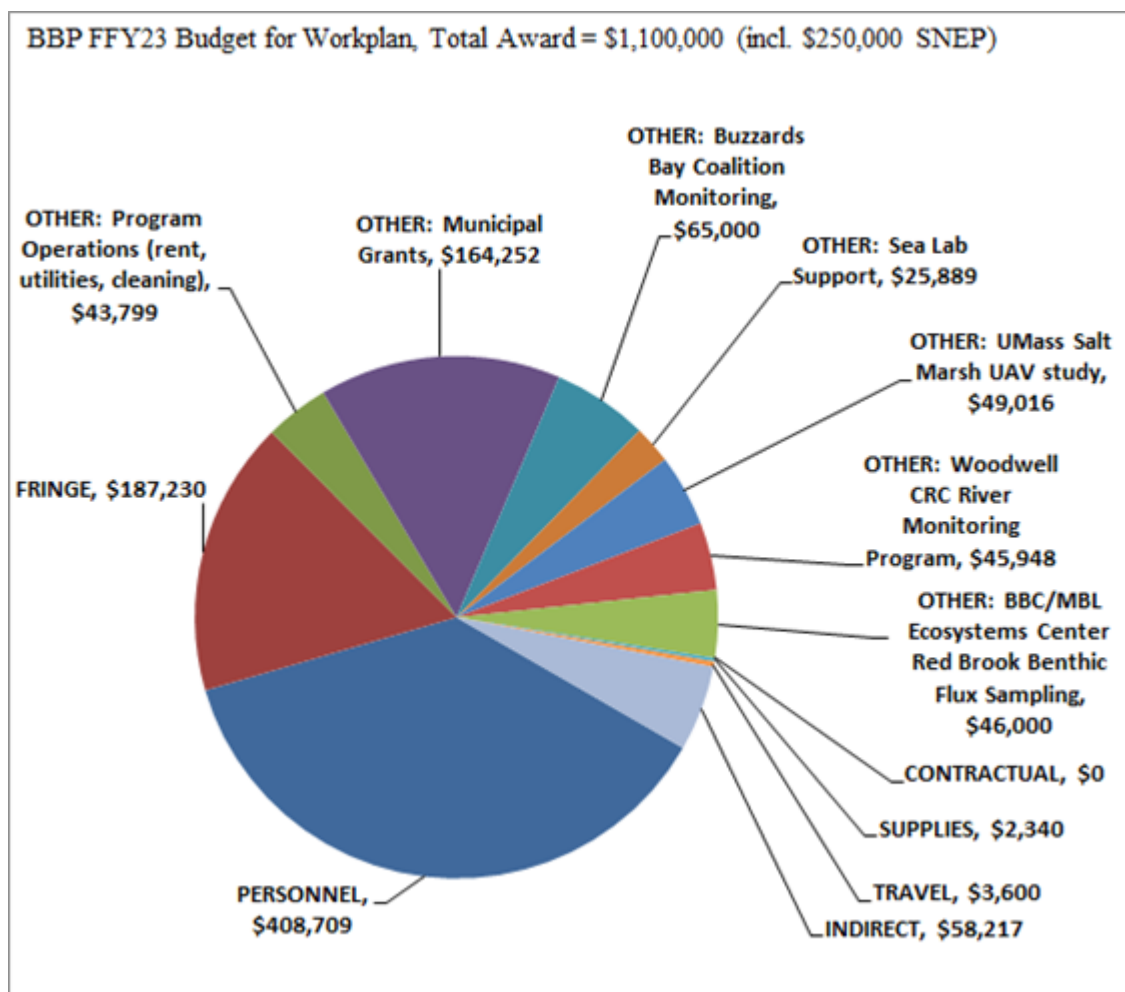


Fig. 11 Pie chart showing FFY22 budget by EPA budget categories and tasks.

Section 5: Match to the Cooperative Agreement

Below is a summary of the \$1,100,000 match that is being provided to meet the match requirement under this Cooperative Agreement to the Commonwealth. The largest portion of the match is provided by the Coalition programs followed by the municipal grant program. The Coalition, which last year had an operational budget of over \$3.5 million, works in a close partnership with the NEP on several tasks, including application of the water quality testing program, and work in support of wetland and habitat protection and restoration. The Coalition also provides a vital role in assisting communities to develop applications to the Buzzards Bay municipal grant program. Another important contributor to the match total is the cash and in-kind contributions from the member communities of the BBAC. These collaborations have led to a very high rate of leveraging in our municipal grant program and continue to represent one of the cores of the match to our cooperative agreement. The match is characterized in different ways in Table 8 and Table 9.

1) Coalition Water Quality Monitoring Program (\$241,247)

For the past decade, the Coalition secured nonfederal funds through grants, members' dues, state earmarks, and donations to support its water quality monitoring program and related outreach. The cost of the core elements of this monitoring program, excluding citizen volunteer time, exceeds \$250,000 per year, and includes staff time, contractual laboratory testing services, publications, web services, and supplies. We have limited the match to this Cooperative Agreement to just the estimated volunteer time of \$191,247 based on 2022 participation of 181 volunteers contributing 4880 volunteer hours x \$39.19 (COALITION correspondence for volunteer time hours, value of volunteer time for Massachusetts rates at independentsector.org/value-volunteer-time-methodology/ for the 2020). Added to this is a \$50,000 earmark to from the legislature which the NEP supports.

2) Municipal support to BBAC (\$25,000)

The municipalities of Buzzards Bay pay \$25,000 per year in dues assessments to the BBAC to support projects to implement the CCMP. These funds pay the costs of a part-time Executive Director, defray organization costs, helped fund a school education pilot program, and pay for meeting and workshop expenses.

3) In kind participation of BBAC meetings and workshops (\$5,738)

Municipal official participation in BBAC and NEP meetings (assume 10 meetings; average 9 non-federal people per meeting, 0.75 hours average meeting time, and an \$85/h loaded salary rate (includes fringe and indirect).

4) Other Coalition support: education and land conservation programs (\$234,200).

The Coalition's annual operational budget exceeds \$1.4 million and includes a wide range of activities that compliment this work plan. These activities include public education and outreach initiatives and publications, water quality data management updates for their website, in-stream monitoring program, oil spill area contingency plan updates with municipal officials, newsletters and events that include the cost of director, outreach staff, and communication costs. The Coalition also has a vigorous land protection program to encourage bay-focused watershed land protection, empower local land trusts, and educate private landowners about land conservation options. These efforts are supported by foundation and donor-supported programs, include several staff members, and has outreach costs. Expenditures under this program by the Coalition, especially land acquisition, continue to represent a large portion of this non-profit's expenditures. The activities support a key goal of the CCMP - the protection of wetlands, habitat, and open space to protect water quality, and living resources. Publicly accessible open space also helps build sup-

port for other environmental initiatives of both our programs. The applicable matching amounts support and coincide with the NEP tasks identified in this work plan and represents portions of Coalition staff salaries working on these tasks.

The NEP is a key partner with the Coalition in these efforts, and each year, we prepare hundreds of maps and other products, and conducting GIS land use evaluations for targeted acquisitions. Our support is integral in the Coalition's outreach for their program and has helped the passage of municipal town meeting legislative articles in support of conservation land acquisitions.

5) CZM Coastal Resiliency and Municipal Vulnerability Grant programs (\$55,675)

Grants awarded by CZM for projects in the Buzzards Bay watershed.

6) Match to the municipal grant program (\$380,000)

Based on past multipliers, the NEP expects to receive \$380,000 in match toward the \$111,355 in municipal grants awarded. Match to any roll over grant funds will only apply to the previous Co-operative Agreement.

7) Municipal funds provided to the Stormwater Collaborative (\$79,000)

Based on last year's support, MMA will receive \$79,000 from Buzzards Bay municipalities to fund co-op students participating in the effort to map stormwater networks and monitor storm-water discharges.

8) EEA waiver of chargebacks (\$10,080)

Beginning in 2020, EEA has assumed the costs of phone and data/internet services to the NEP using state funds since 2020.

9) Subaward Match (\$69,060)

UMass Dartmouth is matching their award 100% (\$49,016). Woodwell, and MMA are waiving their full indirect rates, contributing \$14,010 and \$6,050 respectively.

Table 8. Summary of proposed match.

Proposed match	Personnel	Fringe	Contractual	Other	Supplies	Travel	Indirect	TOTAL
1. Coalition WQ Monitoring Program (1)			\$241,247					\$241,247
2. BBAC dues			\$25,000					\$25,000
3. BBAC, other municipal meetings, workshops (5)	\$5,738							\$5,738
4. Other Coalition Support (2)	\$232,500					\$1,700		\$234,200
5. CZM Coastal Resiliency and Water Quality grant programs (4)				\$55,675				\$55,675
6. Municipal match to Buzzard Bay NEP grants (3)				\$380,000				\$380,000
7. Municipal cash to storm-water collaborative contracts, MS4 grants			\$79,000					\$79,000
8. EEA waiver of Core Services charge back (0.96%)				\$10,080				\$10,080
9. Subaward match				\$33,000			\$36,060	\$69,060
Total	\$238,238	\$0	\$345,247	\$478,755	\$0	\$1,700	\$36,060	\$1,100,000

Table 9. Summary of Match by Category and Source

Category	State	Other (non-profit)	Local (municipalities)	Total
Personnel	0	\$232,500	\$5,738	\$238,238
Fringe	0	\$0	\$0	\$0
Travel	0	\$1,700		\$1,700
Supplies	0	\$0		\$0
Contractual	0	\$241,247	\$104,000	\$345,247
Other	\$65,755	\$33,000	\$380,000	\$478,755
Indirect	0	\$36,060	\$0	\$36,060
TOTAL	\$65,755	\$544,507	\$489,738	\$1,100,000

Section 6: Reprogramming of FFY22 Funds

The FFY22 two-year work plan was submitted in May 2021 and approved by EPA in June 2021. After the work plan commenced, several tasks needed revision. First, the planned solicitation for contractual engineering services set to commence last fall was abandoned (funding was in the "Contractual" grant category, \$75,000). During the summer of 2021, stormwater designs the NEP developed at three sites under an earlier Cooperative Agreement were not funded with state or local funding, and Stormwater Collaborative towns were not ready to commence development of new designs. Consequently, this funding was deferred to March 2022 as a municipal minigrant program for stormwater and wastewater engineering services and MS4 support (funding moved to the "Other" grant category; see this [web page](#)).

Because of this decision, funding for the first task for the UMass Dartmouth subaward, which was dependent upon the development of new stormwater designs (the focus of the first task in the UMass proposal), was reconfigured to wholly fund the second task in the UMass Dartmouth subaward, that of innovative monitoring approaches using Unmanned Aerial Systems to document salt marsh loss from climate change and other factors. The budget also increased from \$43,719 to \$49,411, utilizing funds created by reductions of indirect from moving funds from Contractual to Other.

Finally, the March 2022 stormwater and engineering municipal grant request for proposals received only one response. Rather than wait to re-release all the funds in some later municipal grant RFR, the NEP initiated a new subaward with the New Bedford Public School Systems to strengthen our work with Environmental Justice communities. A portion of these funds (\$27,496) funded the *New Bedford Sea Lab Buzzards Bay NEP Partnership Marine Education Support to Environmental Justice Communities* that commenced July 1, and which is renewed for a second year in this work plan.

Given that Cooperative Agreement CE-00A00887-0 totaled \$1.9 million, this programming did not require a formal grant amendment.

Section 7: NEP Staff

Dr. Joe Costa is Executive Director of the NEP. Besides overseeing and administering the Program, he provides technical assistance on nitrogen loading assessment and management, water quality analysis, watershed planning, build-out analysis, data analysis, and software support. His research in marine ecology, particularly nitrogen loading effects on eelgrass beds and coastal ecosystems has been put to use in the Coalition's citizen monitoring program and the NEP's nitrogen management approach. The director is also the program's web manager.

Kevin Bartsch is one of the NEP's Stormwater Specialists (full-time). He has a master's degree in Watershed Science and over 20 years of experience in GIS data development and modeling. Kevin has a wealth of knowledge in utility (water, wastewater, electric) infrastructure, asset management, soil erosion, natural resource management, and open space protection. At the NEP, Kevin works with municipalities and the MMA to create a comprehensive stormwater GIS and management program. Kevin also volunteers as a board member and is former Director and President of the Wareham Land Trust.

Bernadette Taber is one of the NEP's Stormwater Specialists (part-time, 0.53 FTE). A long-time former employee of the USDA Natural Resource Conservation Service detailed to the NEP office since 1991, Bernie re-joined the NEP after leaving federal service in 2015. Bernie evaluates and develops engineering solutions for stormwater remediation in both agricultural and urban environments. Bernie has reviewed many engineering plans at the request of Buzzards Bay mu-

municipalities and has developed the preliminary stormwater and habitat restoration designs identified in collaboration with Buzzards Bay municipalities and their contractors.

Sarah Williams is the NEP's Regional Planner (full time). She aids municipalities on land use and watershed planning, land conservation, buildout analysis, habitat restoration, and mapping as well as some of the administrative functions of the Project. She is a coordinator between the towns and the NEP on our Municipal Grant Program and prepared the NEP's regional open space plan. Sarah was also a former member of the Fairhaven-Acushnet Land Preservation Trust and Fairhaven Conservation Commission and brings this valuable experience to bear on her activities.

Appendix B. Subaward Proposals

Subaward 1: Collaboration with UMass Dartmouth Use of Unmanned Aerial Systems to Monitor Salt Marsh Loss from Climate Change and Other Factors, Year 2 (\$49,016)

Subaward 2: Determining Nutrient Inputs to Buzzards Bay from Coastal Rivers (\$45,948)

Subaward 3: Buzzards Bay Water Quality Monitoring (\$65,000)

Subaward 4: Benthic Flux Monitoring in Red Brook Harbor to Support TMDL Development (\$46,000)

Subaward 5: New Bedford Sea Lab Buzzards Bay NEP Partnership Marine Education Support to Environmental Justice Communities (\$25,889)

Subaward 1:

Collaboration with UMass Dartmouth Use of Unmanned Aerial Systems to Monitor Salt Marsh Loss from Climate Change and Other Factors, Year 3

Proposed Work

The University of Massachusetts Dartmouth (UMD) will work with the Buzzards Bay NEP for a second year to conduct salt marsh surveys in Buzzards Bay for the evaluation of vegetation, edge loss and elevation. UMD will perform the surveys utilizing Unmanned Aircraft Systems (UAS) having had experience with the operation and video footage processing of DJI Phantom 4 Pro quadcopters. They will process raw footage using 3D photogrammetry software to generate Digital Surface Models (DSM) and georectified true color imagery. UMD will use existing NGS rod benchmarks on each side along with BBNEP owned surveying equipment to set control points prior to each UAS survey. BBNEP will provide training on the use of their surveying equipment for setting control points. The UAS survey will be overseen by a FAA licensed operator, and UMD will be responsible for obtaining any additional licenses when operating in the vicinity of any airport.

Under this agreement UMD will deliver DSM and georectified true color imagery for eleven salt marsh sites twice a year, totaling twenty (20) surveys. Timing of the surveys will be decided jointly by BBNEP and UMD. The eleven site names and locations are as follows:

1. Little Bay North/Little Bay South, Fairhaven
2. Mattapoissett Neck, Mattapoissett
3. Hammett Cove, Marion
4. Little Harbor Beach, Wareham
5. Wings Neck, Bourne
6. Patuisset Marsh, Bourne
7. Herring Brook, Falmouth
8. Sippewissett Marsh, Falmouth
9. Ocean View Farm, Dartmouth,
10. Westport Town Farm, Westport
11. Demarest Lloyd State Park Dartmouth

Budget

The total budget for this project is \$49,016 as per the table below. The University will waive a portion of its 59% overhead for this project, which will be used toward match.

Itemized Budget

Category	rate	units/ amt	rate	Sub total	Total
		<i>9-month</i>	<i>months</i>		
A. SALARIES & WAGES (Senior Personnel)		<i>Salaries</i>	<i>per year</i>	Year 2	
1. Dan MacDonald		<i>157,701</i>	<i>0.20</i>	\$3,504	
Total Senior Personnel				\$3,504	
B. SALARIES & WAGES (Other Personnel)	Base				
4. Graduate Student (Annual Rate - Units = Month)		<i>26,700</i>	<i>7</i>	\$15,575	
3. Technician (Annual Rate - Units = Month)		<i>60,000</i>	<i>0.5</i>	\$2,500	
5. Undergraduate Students (per student semester)	2100	<i>2,100</i>	<i>3</i>	\$6,300	
Total Other Personnel				\$24,375	
Total Salaries & Wages					\$27,879
FRINGE BENEFITS					
Payroll Taxes (Faculty Summer)	1.94%			\$68	
Summer Payroll (Grad Students)	1.94%			\$76	
Total fringe					\$914
Total Salaries, Wages, & Fringe Benefits				\$28,793	
D. PERMANENT EQUIPMENT					
Total Equipment					\$0
E. TRAVEL Trips(Faculty/Grad Student)					
Field Work Travel			0	\$720	
Total Travel					\$720
G. Other Direct Costs					
1. Materials and Supplies					
Hardware				\$3,500	
Computational Resources				\$1,000	
2. Publication Costs/Page Charges				\$0	
5. Subawards (Summer)				\$0	
a. Tuition (in-state) *		<i>\$6,500</i>		\$6,500	
b. Other Fees				\$0	
Total Other				\$6,500	
Total Other Direct Costs					\$11,000
H. Total Direct Cost				\$40,513	
INDIRECT EXEMPTIONS				\$6,500	
SUBCONTRACT ALLOWANCE				\$0	
MODIFIED TOTAL DIRECT COST (MTDC)				\$34,013	
I. Total Indirect Costs (59% MTDC)			\$20,068		
Allowed Indirect Costs (25% MTDC)					\$8,503
Unmet Indirect Costs provided as match			\$11,565		
K. Total amount of this request					\$49,016

Subaward 2:

Determining Nutrient Inputs to Buzzards Bay from Coastal Rivers, Year 3

Woodwell Climate Research Center Scope of Work

Background

The regular sampling of water chemistry of the coastal rivers flowing into Buzzards Bay that began in March 2021 is yielding new insights into the magnitude and controls of the nitrogen and phosphorus that reach the Bay through river discharge. Nitrogen and phosphorus arriving in the water discharged through coastal rivers is one of the major sources of these nutrients to Buzzards Bay¹. Because nutrient loads result from both concentration and total water fluxes, it is important to understand these flow-concentration relationships. These relationships likely vary across the geology of Buzzards Bay rivers that ranges from rivers draining sand aquifers, sand-infilled river valleys, and wetland-rich glacial valleys with more near-surface bedrock². Because climate change will bring increasingly variable precipitation to the Northeast U.S.³, understanding the dynamic flow-influenced responses of river discharge and concentrations will be critical to understanding the controls on river-borne sources of nutrients to Buzzards Bay.

With support from the Buzzards Bay NEP, the Woodwell Climate Research Center established stream and river discharge and chemistry sampling stations in 13 locations (Table 2). Two additional rivers are gauged by the U.S. Geological Survey as part of the Waters Resources of the United States⁴ network (Table 1). In March 2021, in the same 12 rivers, the Woodwell Center began sampling water chemistry monthly (during November to April) and twice monthly (during May to October). One stream (Buttonwood Brook, which drains part of urban New Bedford and Dartmouth) was added to this network in March 2022 as part of a Southern New England Program Pilot Watersheds Project at the Coalition). Stage recorders on all these streams provide measurements every 30 minutes. The data from the Woodwell and Coalition gages are downloaded and quality checked monthly. The data from the USGS gages are downloaded periodically and combined into the same Buzzards Bay Rivers database.

Interesting findings from sampling include: (1) predominance of dissolved organic nitrogen (DON) over the inorganic forms (nitrate and ammonium) in the largest rivers with substantial areas of wetland floodplains; (2) higher concentrations of nitrate over DON in two small streams (Angeline Brook, Red Brook); (3) much lower concentrations of nitrate in the four rivers draining cranberry farming areas (Sippican, Weweantic, Wankinco, Agawam) compared with groundwater fed rivers on Cape Cod or in the groundwater-dominated Red Brook, and (4) almost uniformly low concentrations of phosphate. We also found that concentrations of major solutes tended to drop during high water flows, indicating dilution by rainwater rather than flushing of solutes from soils or impervious surfaces. This is important because it suggests that higher flows associated with the intense rainfalls that are projected to become more frequent in a future climate will not result in large increases to nutrient loads.

Proposed work

We propose continue monitoring these rivers to better understand the factors that drive these patterns. Specifically, the Woodwell Center will: (1) continue stage recordings from this river network for one year from July 1, 2023 to June 30, 2024; (2) improve stage-discharge curves for each river by augmenting field measurements of discharge in each river across a range of high

and low flows when those flow variations are present; (3) sample concentrations of different dissolved and particulate nitrogen and phosphorus forms twice monthly during May through October and monthly during November through April for one year from July 1, 2023 to June 30, 2024.

Methods

Chemical analyses will include ammonium, nitrate, dissolved organic nitrogen, particulate organic nitrogen, phosphate, and total phosphorus in river water. Rating curves will be developed by measuring discharge monthly with a SonTek FlowTracker2 hand-held flow meter in smaller rivers or a tow-across StreamPro acoustic doppler current profiler in larger rivers. Stage recorders are Onset Hobo MX-2001 dataloggers. We will use the combination of flow and concentrations to estimate total nitrogen and phosphorus loads in river discharge for the 12 rivers. Annual loads will be calculated from discharge and concentrations using LOADEST and other similar data and modeling approaches⁵. All methods will follow those described in the QAPP developed for this project⁶.

Budget

Category	rate/calculation	Amount
<i>Salaries and wages</i>		
Chris Neill	0.50 months for project direction	\$7,926
Research Assistant I	3.25 months for field, data, and laboratory work	\$12,750
Fringe benefits		\$11,372
<i>Travel</i>	Local travel to field sites in personal vehicles	\$1,769
<i>Materials and supplies</i>		
Laboratory supplies	Includes sample bottles, reagents for analyses	\$2,650
<i>Indirect costs</i>	Calculated at 26% of total direct costs	\$9,481
Total		\$45,948

1. Williamson, S. G., J. E. Rheuban, J. E. Costa, D. M. Glover and S. C. Doney. 2017. Assessing the impact of local and regional influences on nitrogen loads to Buzzards Bay. *Frontiers in Marine Science* 3, article 279.
2. Stone, J. R., B. D. Stone, M. L. DiGiacomo-Cohen and S. B. Maybee. 2018. Surficial materials of Massachusetts—A 1:24,000-scale geological map database. USGS Scientific Investigations Map 3402, US Department of Interior, US Geological Survey, Reston, VA. 58 pp.
3. Horton, R., G. Yohe, W. Easterling, R. Kates, M. Ruth, E. Sussman, A. Whelchel, D. Wolfe, and F. Lipschultz. 2014. Chapter 16: Northeast. Pages 371 to 395 in *Climate Change Impacts in the United States: The Third National Climate Assessment*, J. M. Melillo, T. C. Richmond, and G. W. Yohe (Eds), U.S. Global Change Research Program, 371-395. doi:10.7930/J0SF2T3P.
4. United States Geological Survey. 2023. Water Resources of the United States. Data portal for water resources. Available at: <https://www.usgs.gov/mission-areas/water-resources/data>.
5. Runkel, R. L., C. G. Crawford and T. A. Cohn. Load Estimator (LOADEST): A FORTRAN program for estimating constituent loads in streams and rivers. *Techniques and Methods Book 4*, Chapter A5. USGS, Reston, VA.
6. Neill, C. 2022. Quality Assurance Project Plan for Monitoring Flow and Chemistry of Streams and Rivers Draining to Buzzards Bay. Quality Assurance Project Plan. Grant Number EPA 00A00623, QA Tracking Number 22049.

Table 2. Location of stream and river stage measurements and water quality sample collection.

ID	Stream or River	Site Description	Latitude	Longitude	Watershed Area (ha)*	Activity
1	West Westport River	On wooden footbridge on Sakonnet Preservation Association Sakonnet Preserve in Little Compton, RI adjacent to Gray's Mill Pond parking lot on Adamsville Rd., Westport, MA,	41.55687	-71.12770	2,334	Stage and water chemistry
2	Angeline Brook	On Barnett property about 60 m south of Cornell Road, Westport, MA	41.54974	-71.10526	864	Stage and water chemistry
3	East Branch Westport River	On Westport Conservation Trust Mill Pond Preserve off Reed Rd., Westport, MA.	41.62538	-71.05985	10,433	Stage and water chemistry
4	Paskamansett River	River crossing of Russells Mill Rd., Dartmouth, MA. USGS gauge.	41.58528	-70.99083	6,639	Water chemistry only
5	Acushnet River	Adjacent to wooden footbridge in Buzzards Bay Coalition Sawmill Preserve, Acushnet, MA, off Mill Rd., New Bedford, MA	41.68400	-70.91891	4,408	Stage and water chemistry
6	Mattapoisett River	River crossing of River Rd. at stone bridge, Mattapoisett, MA. USGS gauge.	41.65989	-70.83677	6,346	Water chemistry only
7	Tripps Mill Brook	On Mattapoisett town land, stream crossing of Acushnet Rd., Mattapoisett, MA,	41.67926	-70.84685	988	Stage and water chemistry
8	Sippican River	On Rockwell property, Marion, MA, river crossing of County Rd., Marion MA,	41.73424	-70.77491	7,199	Stage and water chemistry
9	Weweantic River	On Town of Wareham Westgate Conservation Area, river crossing of Papermill Rd., Wareham, MA,	41.77980	-70.76339	12,597	Stage and water chemistry
10	Wankinco River	On Town of Wareham property at former Tremont Nail Factory, river crossing of Elm Rd., Wareham, MA,	41.76715	-70.72201	4,031	Stage and water chemistry
11	Agawam River	On Wareham Land Trust property, river crossing of eastbound Cranberry Highway, Wareham, MA,	41.76240	-70.67644	4,151	Stage and water chemistry
12	Red Brook	On Trustees Lyman Reserve, upstream of stream crossing of Head of the Bay Rd., Plymouth, MA,	41.76556	-70.63444	1,060	Stage and water chemistry

* Watershed areas provided by Sarah Williams, Buzzards Bay NEP.



Figure 1. Image of staff gauge setup in the West Westport River on the border of Westport, MA and Little Compton, RI. Data are downloaded with a Bluetooth connection to a tablet.

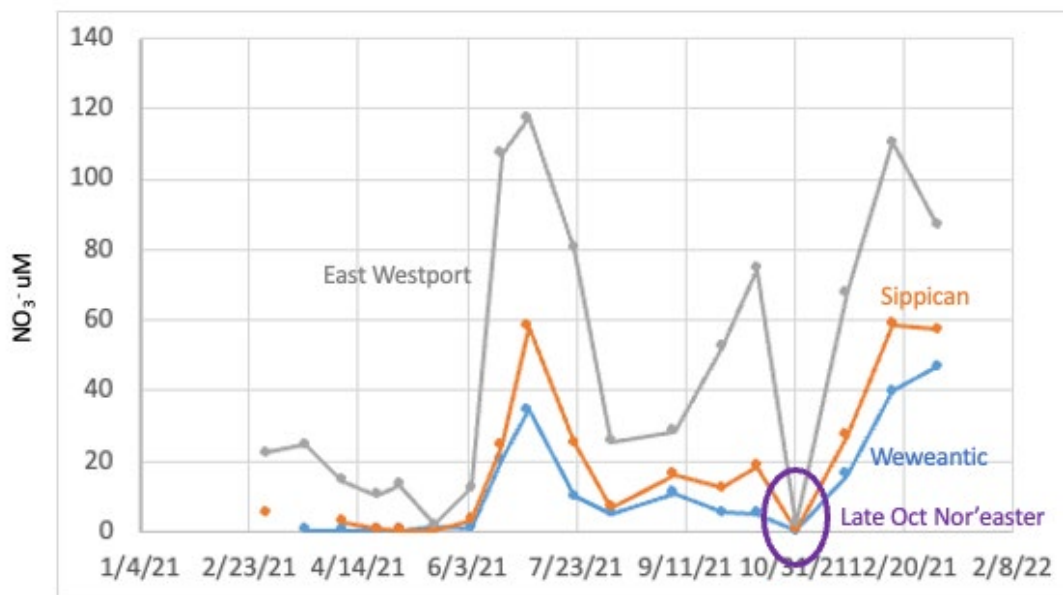


Figure 2. Concentration of nitrate (NO_3^-) measured during one year in the Weweantic, Sippican and West Westport Rivers.

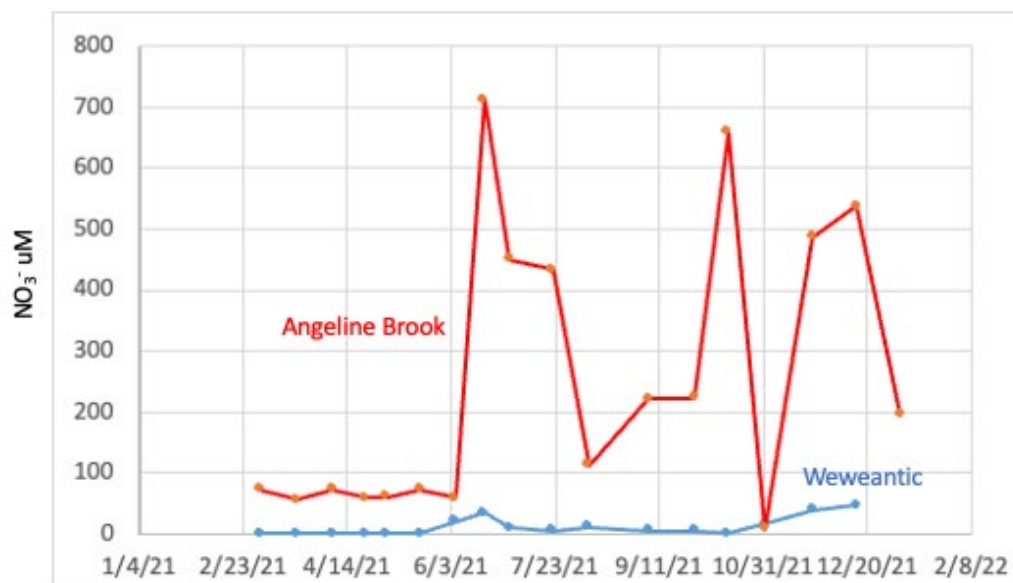


Figure 3. Concentrations of NO_3^- in the Weweantic River and Angeline Brook in Westport.



Subaward 3: Buzzards Bay Water Quality Monitoring

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Project Description

This proposal would fund continuation of the Baywatchers program in Buzzards Bay during January 1, 2024 - December 31, 2024, using NEP federal fiscal year 2024 funds. The Baywatchers program is largely funded by membership donations, Coalition fundraising events, like the Buzzards Bay Swim, and in the past has received direct state funding. The funds requested will help ensure core elements of the Baywatchers program continue.

Description of Environmental Impairment/Project Need

Nitrogen pollution is a critical threat to Buzzard Bay's ecological health, as described in the CCMP. Nitrogen pollution causes increased algae growth that reduces water clarity and oxygen levels, reduces shellfish and other biodiversity, can degrade salt marsh habitat, and degrades the recreational value of the Bay. Because of nitrogen pollution, eelgrass coverage in Buzzards Bay has declined by about 50% since the 1970s, and iconic bay scallops are now extremely rare. According to the Massachusetts Year 2022 Integrated List of Waters, over 40 water body segments around Buzzards Bay are impaired because of excess nitrogen. Restoring and preserving water quality will require effective management based on accurate information. The Coalition's Baywatchers monitoring program was designed to assess nutrient-related Bay health, documenting the impact of nitrogen pollution on the Bay's harbors and coves.

For over 30 years, Baywatchers has collected basic water quality, nutrient, and algal pigment information around Buzzards Bay during the summer months and educated the public on their local water quality. Since 1992, this effort has directly engaged over 1,000 citizen scientists and has resulted in an impressive dataset of long-term trends of the ecological health of over 200 locations around the Bay.

Proposed Activities

The \$65,000 requested for this task would be used to support Baywatchers long-term monitoring program. This amount will support a portion of salary for the Coalition's Director of Monitoring Programs who runs the program - training volunteers, handling equipment repair and calibration, coordinating with the analytical laboratory, performing quality assurance, etc. – or the Coalition's Vice President for Bay Science acting in that role. The funding will enable the collection of water quality monitoring data principally during the 2024 calendar year to continue the existing Bay-wide long-term record. With the help of trained volunteers, basic water quality measurements of dissolved oxygen, temperature, salinity, and water clarity will be made about every five days beginning in late May through mid-September. Samples may also be collected on four dates in July and August for analysis of the full suite of nutrients as well as algal pigments. All samples will be collected and analyzed in accordance with a QAPP that has already been approved by DEP and EPA.

Expected Environmental Benefits of Proposed Work

One of the first actions to be implemented from the original CCMP was the initiation of water quality monitoring. This underscores the importance of monitoring as the foundation for actions that improve environmental health. For over 30 years, Baywatchers water quality data has been critical for preserving and restoring coastal waters around Buzzards Bay. The data has been used repeatedly since 2002 in

the development of the MassDEP's Integrated List of Waters. A water body's inclusion on the Integrated List of Waters as an impaired water body is the first step to restoration because it compels DEP to develop a nutrient reduction plan known as a TMDL. Baywatchers data has been used in the development of all the nitrogen TMDLs for impaired embayments around Buzzards Bay. DEP and EPA have used the data when setting nitrogen limits for municipal and private wastewater treatment plants through the NPDES and Massachusetts Groundwater Discharge permit processes. For example, Baywatchers data led to EPA establishing a total nitrogen permit limit for the Wareham Wastewater Treatment Facility, which resulted in an over 50% decrease in the annual total nitrogen concentrations in the Agawam River where the Wareham Wastewater Treatment Facility discharges. The data has been also used by municipal government to justify new regulations, bylaws, or reduction of nutrients loads.

Budget

Category	Amount
Salaries	\$46,191
Fringe (18.51%)	\$8,550
Indirect (18.74%)	\$10,259
Total	\$65,000

Match

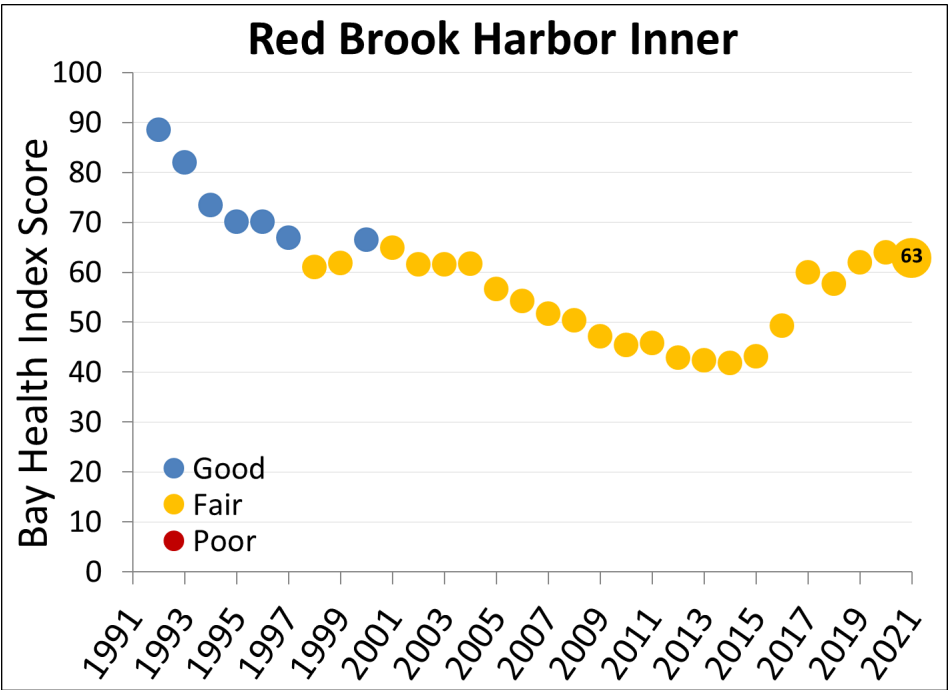
The Coalition will provide an in-kind match of \$65,000 from private foundations and donations that is used to support additional salaries and to purchase test kits, supplies, and monitoring equipment to support the monitoring effort. We recognize also that the Buzzards Bay NEP credits Baywatchers volunteer time toward their federal match requirement.

Subaward 4: Benthic Flux Monitoring in Red Brook Harbor to Support TMDL Development

Concise Statement of the Problem

Background

The Red Brook Harbor system, located in the Town of Bourne on the western side of Cape Cod, is home to Cape Cod’s largest full-service marina and Hen Cove beach. As revealed by water quality monitoring data collected since 1992 by the Buzzards Bay Coalition, the water quality of Red Brook Harbor has declined over the last 25 years (see graph below and additional data attached). The monitoring data (approximately weekly measurements of dissolved oxygen, temperature, salinity, and water clarity acquired from late May to late September, and nitrogen and chlorophyll measurements taken on four dates in July and August) have tracked declining water quality through the Bay Health Index score for inner Red Brook Harbor. The Bay Health Index score is calculated by combining data including dissolved oxygen, water clarity, nitrogen levels, and the abundance of algae. The water quality decline is a result of excessive nitrogen loading from non-point pollution sources, including wastewater from septic systems, road runoff, and lawn fertilizers. In the last few years, water quality has rebounded somewhat, although it remains classified as only "fair".



Issue

Because of nitrogen pollution, Red Brook Harbor including Hen Cove and Pocasset Harbor (see attached map) are all listed as impaired for estuarine bioassessments and fecal coliform on the Massachusetts 2018/2020 303(d) Integrated List of Impaired Waters and draft 2022 303(d) Integrated List of Impaired Waters. Red Brook Harbor is also listed as impaired for nutrient/eutrophication biological indicators and additional impairments for dissolved oxygen and total nitrogen have been added to Pocasset Harbor in the draft 2022 303(d) Integrated List of Impaired Waters. Parts of the Red Brook Harbor system have been on the 303(d) list for over 10 years (Pocasset Harbor, MA95-17 was added in 2010). The impaired status of these areas requires development of a TMDL for nitrogen input to Red Brook Harbor. A TMDL, the quantity of nitrogen loading that an estuary can sustain and still meet wa-

ter quality standards, outlines the sources of nitrogen to the estuary and provides guidance on how much nitrogen loading from these sources should be reduced. This information is critical for the Town of Bourne as it develops management plans to restore water quality in Red Brook Harbor.

To develop nitrogen TMDLs, the Massachusetts Department of Environmental Protection (MassDEP) uses a site-specific approach of gathering information and performing modelling of each estuary. This scientific foundation for nitrogen TMDLs has been developed in many southeast Massachusetts estuaries through the Massachusetts Estuaries Project (MEP). However, a MEP report was not completed for Red Brook Harbor and MassDEP does not have a timeframe for creating one. Building on previous 604b projects, this project would supply critical information needed for TMDL development.

Project Need and Justification

There is a clear need to develop a TMDL for the Red Brook Harbor system. Parts of the Red Brook Harbor system have been on the 303(d) list for over 10 years (Pocasset Harbor, MA95-17 was added in 2010). The Red Brook Harbor system is a heavily used recreational area that includes a popular town beach, two private marinas, and an island that is a popular attraction for boaters who use it as a picnic and beach destination. The residents of Bourne deserve to have these popular waters meet water quality standards.

MassDEP has no plan for finishing the remaining science needed for a Red Brook Harbor TMDL. This project will fill this void and create the remaining science needed to develop a TMDL. Furthermore, as towns are asked to comply with recently proposed revisions to Title 5 regulations, it is vital that towns have information that can be used in creating watershed plans. There is not municipal wastewater infrastructure in the watershed of the Red Brook Harbor system, so meeting water quality goals will require addressing wastewater from septic systems.

This proposed project builds on previous projects in which the benthic habit, water quality, watershed loading, and hydrodynamic conditions in Red Brook Harbor were or are being assessed. In the proposed project, we will develop the last piece of missing information for forming the scientific foundation for a nitrogen TMDL for the Red Brook Harbor system. Specifically, we will assess the benthic flux in the Red Brook Harbor system to determine whether the sediments in Red Brook Harbor are a negative or positive source of nutrients on the system. Benthic communities in shallow marine ecosystems often play a significant role in nutrient cycling so it is critical to account for their role. This information will be incorporated into the watershed loading and hydrodynamic model in order to account for nitrogen cycling between the water column and the sediments.

PROJECT GOALS AND APPROACH

Project Description

This project is a partnership between the Town of Bourne, the Marine Biological Laboratory, and the Buzzards Bay Coalition. The Town of Bourne will provide support for project outreach. The Marine Biological Laboratory (MBL) is a world-renowned research institution that will serve as the technical lead. The Buzzards Bay Coalition will provide technical and outreach support. The project partners will survey the sediments in the Red Brook Harbor system to assess whether they are a source or sink of nutrients to the water column.

Nitrogen enters the Red Brook Harbor system predominantly in highly bioavailable forms from the surrounding upland watershed from sources including septic systems, road runoff, lawn fertilizers, and cranberry agriculture. Nitrate and other bioavailable forms become incorporated into plankton and the marine food-web and with some deposited onto the surficial sediments. Once organic particles become incorporated into surface sediments they are decomposed by the natural animal and microbial commu-

nity. This process can take place both under oxic (oxygenated) or anoxic (no oxygen present) conditions. It is through the decay of the organic matter with its nitrogen content that bioavailable nitrogen is returned to the water column. This recycled nitrogen adds directly to the eutrophication of the estuarine waters in the same fashion as watershed inputs.

In some systems that have been investigated by the Massachusetts Estuaries Project, recycled nitrogen can account for about one-third to one-half of the nitrogen supply to phytoplankton blooms during the warmer summer months. It is during these warmer months that estuarine waters are most sensitive to nitrogen loading. Failure to account for the site-specific nitrogen balance of the sediments and its spatial variation from the tidal creeks and basins will result in significant errors in determination of the threshold nitrogen loading to the Red Brook Harbor system. In addition, since the sites of recycling can be different from the sites of nitrogen entry from the watershed, both recycling and watershed data are needed to determine the best approaches for nitrogen mitigation.

This project seeks to quantify the seasonal flux of nutrients between the sediments and their overlying waters in the Red Brook Harbor system. This will be done by collecting sediment cores at 12 locations throughout the Red Brook Harbor system. The stations will be selected to provide a holistic assessment of benthic nutrient flux across inner and outer areas; however, the focus will be on the inner areas which suffer from higher levels of nutrient impairment and eutrophication. Station locations will be informed by historic water quality sampling and water sampling to be undertaken during the project period. The water quality sampling will be performed by the Buzzards Bay Coalition under their existing QAPP. The sediment cores will be transported to the MBL laboratory, where flux incubations will be performed on intact cores. This approach, utilizing laboratory incubations of relatively undisturbed cores, is a widely accepted method of estimating benthic nutrient fluxes and has been used successfully in previous surveys in New England including Squeteague and Phinneys Harbors in Bourne.

The results will be described in a technical report, a summary report designed for a general audience, and will be shared with relevant town boards and interested citizens such as the Pocasset Water Quality Coalition.

Project Goals

The primary aim of this project is to quantify the seasonal flux of nutrients between the sediments and their overlying waters at selected stations in Red Brook Harbor. Because the sediments can contribute a significant amount of nitrogen to the water column, it is essential to quantify this amount so that there is an accurate nutrient budget that can be used when developing a TMDL. This work builds on previous projects in Red Brook Harbor and completes the scientific information needed for developing a TMDL. The scientific data collected and analyzed across all these studies will provide a holistic view of ecosystem health and will support the development of an evidence based TMDL. The TMDL will provide the Town of Bourne with information about how much nitrogen reduction will be required and where to prioritize actions. This actionable information will allow the Town of Bourne to plan for how best to meet the TMDL and restore water quality in the Red Brook Harbor system.

SCOPE OF SERVICES: TASKS/DELIVERABLES SUMMARY

OBJECTIVE / TASK #1: Develop Project QAPP

SUMMARY: The project team will develop a project QAPP that details the methodology to be used and the specific stations to be sampled. The Buzzards Bay Coalition will collect water quality samples under an existing QAPP that will be used to help inform where to collect samples. The benthic flux methods will be modeled off of those used in the Massachusetts Estuaries Project and the Apponagansett Bay SNEP Pilot Watersheds project.

Both Rachel Jakuba and Anne Giblin have experience writing QAPPs and were involved with the writing of the QAPP for the Apponagansett Bay SNEP Pilot Watersheds project, which was approved by MassDEP and EPA.

PERSONNEL: Rachel Jakuba (BBC), Anne Giblin (MBL)

DELIVERABLE PRODUCT(S): A) QAPP approved by EPA and MassDEP

OBJECTIVE / TASK #2: Perform field survey and collect sediment cores

SUMMARY: The Buzzards Bay Coalition's boat the R/V Baykeeper under the direction of Captain Jeff Smith will be used to access twelve sites in the Red Brook Harbor system. Each site will be sampled for sediment cores and seawater. Cores will be collected by SCUBA divers or using a pole core where diving is not practical. Seawater collected from near bottom will be filtered immediately and used in the laboratory to replace the water overlying the cores collected for flux measurements. Characterization of in situ conditions will be accomplished using a YSI Pro DSS Sonde to measure the dissolved oxygen, temperature, and salinity of near-bottom water.

PERSONNEL: Anne Giblin (MBL), Jeff Smith (BBC), Rachel Jakuba (BBC)

DELIVERABLE PRODUCT(S): A) List of samples collected
B) Field datasheets

OBJECTIVE / TASK #3: Laboratory and Data Analysis

SUMMARY: After collection, sediment cores will be returned to the laboratory, where flux incubations will be performed on intact cores. Fluxes are estimated from concentration changes over time. MBL will generate data for ammonium, nitrate/nitrite, phosphate, silica, and dissolved oxygen. MBL has had extensive experience with these types of measurements. The results of the incubations will be described in a technical report.

PERSONNEL: Anne Giblin (MBL), Jane Tucker (MBL)

DELIVERABLE PRODUCT(S): A) Electronic file of raw data
B) Technical report describing results

OBJECTIVE / TASK #4: Information Synthesis and Sharing

SUMMARY: The results of this project are interesting on their own, but their true value comes from their incorporation into the existing 604b project that pairs watershed nitrogen loading with a hydrodynamic model. The benthic flux measurements will provide a key input of how much nitrogen loading, if any, occurs from the sediments into the water column. The results of this project will be shared with the scientist performing the hydrodynamic model. The project results will be summarized into a summary report designed for a public audience. Results will be shared with relevant town boards (e.g., Conservation Commission, Select Board) and interested citizens such as the Pocasset Water Quality Coalition.

PERSONNEL: Rachel Jakuba (BBC)

DELIVERABLE PRODUCT(S): A) Summary report of results
B) Copies of emails sharing benthic flux data with hydrodynamic modeler

Project Budget

The itemized project costs are described below. The Benthic Flux Assessment by the Marine Biological Laboratory will not move forward without external funding. The Buzzards Bay Coalition has secured foundation funding for and is committed to performing the water quality monitoring, outreach, and providing the technical support for the Benthic Flux Assessment.

Description	Cost
Benthic Flux Assessment	
• Marine Biological Laboratory	\$46,000
○ Benthic Flux Analysis – QAPP development, benthic core sampling and analysis, reporting	\$2,000
• Buzzards Bay Coalition	
○ Benthic Flux Technical Support – QAPP development, field support with R/V Buzzards Baykeeper, coordination with 604b scientists	
Outreach	
• Buzzards Bay Coalition	\$3,000
○ Outreach support – development of text for summary report for public audience, meetings with town officials	
• Graphic Design	\$2,000
○ Graphic design – design and layout of summary report for public audience	
• Printing	\$3,300
○ Printing – full color printing of summary report	
Water Quality Monitoring	
• Buzzards Bay Coalition	\$8,600
○ Discrete Water Quality Sampling – summer 2023 dissolved oxygen and nutrient monitoring costs for Red Brook Harbor, Hen Cove, Pocasset Harbor Benthic Flux Analysis – QAPP development, benthic core sampling and analysis, reporting	
• Buzzards Bay Coalition	
○ Continuous Water Quality Sampling – summer 2023 dissolved oxygen and conductivity logger supply and staff costs in Red Brook Harbor	\$6,100
Total Amount:	\$71,000
External Match:	\$25,000
BBNEP Request:	\$46,000

Project Benefit

This work builds on previous and existing 604b projects in Red Brook Harbor and will determine how much nitrogen is released from sediments into the water column. This is critical information needed to determine the pollutant load reductions necessary to meet water quality standards and develop a TMDL. The TMDL will provide the Town of Bourne with information about how much nitrogen reduction will be required and where to prioritize efforts. This actionable information will allow the Town of Bourne to plan for how best to meet the TMDL and restore water quality in the Red Brook Harbor system. Parts of the Red Brook Harbor system have been on the 303(d) list for over a decade. The Red Brook Harbor system is a heavily used recreational area and the residents of Bourne deserve to have clean water that meets water quality standards in this popular area. This project is an important step towards making that a reality.

Environmental Justice

This project is in the Red Brook Harbor system watershed. Within that watershed there is an environmental justice community based on income. This population has a median household income that is 36.2% of the Massachusetts median income. In 2019, the group represented approximately 500 households and around 800 people. This grant will benefit this environmental justice population by supporting the development of a clean-up plan for the Red Brook Harbor system. Having clean water at the closest public beach will provide excellent recreation opportunities to a community that may have difficulty accessing recreational opportunities further from home.

Locus Map

The Red Brook Harbor system includes sections where long-term water quality monitoring has occurred (stations indicated with yellow dots).



Fig. 12 Locus map with proposed benthic flux monitoring stations.



Subaward 5: New Bedford Sea Lab Buzzards Bay NEP Partnership Marine Education Support to Environmental Justice Communities, Year 3 (FFY2023)

Background

The Sea Lab Marine Science Education Center is New Bedford Public Schools' (NBPS) marine and aquatic educational summer- school program supported through tuition and the Local Education Agency. Sea Lab is located on the Fort Rodman Peninsula, New Bedford, MA, close to the City's public beaches. Since 1968, third grade students through sophomores in high school, who present with an interest in the ocean sciences, have attended Sea Lab's six-week program. The curricula are cumulative from Level One - through Level Seven. Science curricula developed covers oceanography, limnology, meteorology, geology, marine biology, and chemistry as they relate to the marine environment. Course work includes boating skills (Fig. 1) laboratory work (Fig. 3) and field studies (Fig. 2) along the Massachusetts and Rhode Island coastlines. As noted on the program's website³, teaching materials are developed to achieve a balance between the introduction of basic scientific concepts and the discussion of observable phenomena with a focus on high interest, hands-on, intensive study designed to appeal to the serious student. Simone Bourgeois, Sea Lab Facilitator, has noted the program's emphasis is on experiential learning, with science content classes complemented by field studies and hands-on activities, focusing on scientific inquiry and observation⁴. The Program has been nationally recognized with past support from National Oceanic and Atmospheric Administration and the Naval Research Center. The curricula include collaboration with area universities, and Sea Lab students have had the opportunity to participate in on-going scientific research.

One of the most fundamental elements of the Sea Lab program is its focus to provide educational equity for all NBPS students. Scholarship funding helps to intro-



Fig. 1. Sixth graders are exposed to sailing experiences. Additionally, they are exposed to the utilization of sextants, marlinspike seamanship, along with the historical significance of sailing vessels.

³ <https://sealab.newbedfordschools.org/>

⁴ <https://www.newbedfordguide.com/sea-lab-marine-science-program-new-bedford-students-sea/2021/10/26>

duce minorities and economically disadvantaged youth of New Bedford with environmental studies, looking at ecosystems from a scientific perspective, experiencing their first time visiting the ocean, and learning the historical significance of environmental stewardship of the city in which they live.

As noted in the Buzzards Bay Coalition's 2019 B-Wet initiative⁵, outdoor recreation has long suffered from an "adventure gap"⁶ that excludes minorities and the economically disadvantaged from these programs. As noted in the New Bedford Public School's 2021 budget, 66.1 percent of New Bedford students are economically disadvantaged, 40.4 percent do not have English as the first language, and 60.2 percent are minorities⁷. In 2021, 325 students participated in the Sea Lab program.

To participate in this voluntary summer program, the families of resident children must pay \$400 tuition plus certain field trip fees. This tuition covers the costs of teacher salaries, some supplies, and some field trip costs. Sea Lab is also supported by a parent/teacher organization, the Sea Lab Keel, which raises money to buy and repair equipment, defray the costs of field trips, provide snacks for the children, purchase trophies and awards, and award scholarships to Sea Lab alumni as they go off to college. Several other individuals and organizations provide support to keep the Sea Lab program viable.



Fig. 3. Fifth graders learn to marine ecosystems through classroom and laboratory exercise.

Project Goals

The Commonwealth of Massachusetts, through the Executive Office of Energy and Environmental Affairs, maintains a policy of Environmental Justice to better serve the environmental needs of the Commonwealth's most vulnerable residents. Similarly, as noted by the U.S. EPA's Environmental Justice Office, EPA's goal is to provide an environment where all people enjoy the same degree of protection from environmental and health hazards and equal access to the decision-making process to maintain a healthy environment in which to live, learn, and work. An important pathway toward both these state and federal goals is the participation and education of vulnerable youth populations. These individuals will become tomorrow's stewards of the environment, and a strong foundation in science and natural

⁵ <https://www.savebuzzardsbay.org/news/three-year-b-wet-grant-will-fund-outdoor-exploration-for-new-bedford-students/>
https://www.earthisland.org/journal/index.php/articles/entry/closing_the_adventure_gap_by_getting_inner_city_kids_outdoors/

⁷ [FY21 Preliminary Budget Book 7.06.20.pdf \(sharpschool.com\)](#).



Fig. 2. Eight graders participate in field studies and trips to study different types of ecosystems.

ecosystems is essential for them to make informed decisions about the environment as adults, and to be the caretakers of our future.

While the New Bedford School Department has made great strides in bringing in minority, language isolated, and financially disadvantaged students into the program⁸, the greatest single need identified by Sea Lab Facilitator Simone Bourgeois is the need to provide tuition waivers to families who cannot pay for the tuition. Beyond this dire need are specific unmet program expenses and initiatives that will broaden the programs. This New Bedford Sea Lab Buzzards Bay NEP Partnership is designed to meet these needs. The intent of this proposed work plan is three-fold. 1) to match privately funded school tuition waivers to Sea Lab (and thereby leverage future private donations) and 3) fund specific equipment, curriculum expansion, and program needs.

Project Scope

In this third year of the program, the Buzzards Bay NEP will continue its collaboration with New Bedford Public School System for a second year. The work described in this proposal will be funded as a Cooperative Agreement sub-award in the form of a reimbursement contract between the Commonwealth of Massachusetts and the City of New Bedford Public Schools with the following tasks.

Task 1. Tuition Waivers. The core task under this agreement is to bring disadvantaged students into the program. The cost of tuition to participate in the program equals the cost of one month's food budget for many families. The NEP will match privately funded tuition to disadvantaged students from the previous year, up to \$16,000. The value of this task will equal forty \$400 tuition waivers or some equivalent value of partial tuition awards.

Task 2. Material and Supplies for Curriculum Expansion. Items may include testing equipment, supplies, plastic bottle reduction program, and other costs. Additional details are in the budget table.

Task 3. Field Trip support. Past field trips included whale watches and study of the Cuttyhunk Island ecosystem.

⁸ Applications are available in Spanish and Portuguese.

These costs by tasks in the attached work plan and budget are approximate as the number of scholarships and field trips costs varies each year varies, which affects the supplies and materials budget.

Project Benefit

Goals of the Sea Lab tuition Scholarship program includes providing educational equity, develop environmental caretakes, develop and preserve Earth's marine and aquatic water systems, and help students develop an understanding of how marine/aquatic system affect Earth and Space Sciences, Physical Science, Technology & Engineering, and Life Science. This project meets state and federal Environmental Justice goals and helps the NEP meet Justice40 goals, by directly expanding the pool of disadvantaged students that can participate in the program. The project also directly meets goals in the Buzzards Bay Comprehensive Conservation and Management Plan Action Plan 21: Enhancing Public Education and Participation⁹. Specifically, this project meets Goal 21.1. To expand the public's knowledge of the natural resources and water quality of Buzzards Bay and surrounding watershed and the threats they face¹⁰. As noted in this Action Plan, "contributing to the problem, people, first as children, then as adults, may not have been educated about concepts like groundwater flow, pollution pathways in local watersheds, how wastewater is treated and disposed, or the connection between ground and surface waters."

Year 3 Work Plan and Budget

(attached)

⁹ <https://buzzardsbay.org/newccmp/newccmp-education.pdf>

¹⁰ Objective 21.1. To better convey concepts of watersheds and the flow of water from precipitation along the land surface and in the ground. Objective 21.2. To better convey an understanding of pollution sources and pathways in the environment. Objective 21.3. To improve the public understanding of human and natural effects on plant and animal populations and ecosystems.