



Massachusetts Bays

NATIONAL ESTUARY PARTNERSHIP

Margherita Pryor
U.S. Environmental Protection Agency, Region 1
5 Post Office Square
Boston MA 02109

June 23, 2023

Dear Margherita:

We are pleased to submit Massachusetts Bays National Estuary Partnership (MassBays') application for funding to implement our Federal Fiscal Year 2023 Section 320 Workplan. MassBays staff and regional coordinators have significant accomplishments to report from this past year, and we look forward to continued and growing success over the next year.

MassBays' Management Committee reviewed and approved this application, and endorsed the tasks included as important steps toward implementing our CCMP. Please do not hesitate to contact us if you have any comments, suggestions, or concerns regarding the workplan.

Sincerely,

Pam DiBona
Executive Director
Massachusetts Bays National Estuary Partnership
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339-368-0608 (cell)

Juliet Simpson
Management Committee Chair

cc: Bob Chen, Interim Dean, UMass Boston School for the Environment

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Acronyms and Abbreviations

ANEP	Association of National Estuary Programs
APCC	Association to Preserve Cape Cod
BCG	Biological Condition Gradient
BHEN	Boston Harbor Ecosystem Network
BU	Boston University
CC	Cape Cod (MassBays Region)
CCC	Cape Cod Commission
CCCD	Cape Cod Conservation District
CCMP	Comprehensive Conservation and Management Plan
CCS	Center for Coastal Studies
CCWRRP	Cape Cod Water Resources Restoration Project
CPR	Coastal Pollution Remediation (CZM Grant Program)
CS	Central Staff (MassBays Boston Office)
CSA	Citizen Science Association
CSO	Coastal States Organization <i>or</i> Combined Sewer Overflow
CWA	Federal Clean Water Act
NEPCWG	National Estuary Program Coastal Watershed Grant Program
CZM	MA Office of Coastal Zone Management
DCR	MA Department of Conservation and Recreation
DEP	MA Department of Environmental Protection
DER	MA Department of Fish and Game, Division of Ecological Restoration
DMF	MA Department of Fish and Game, Division of Marine Fisheries
DPW	Department of Public Works
ED	Executive Director, MassBays
EDA	Estuary Delineation and Assessment
EJ	Environmental Justice
EPA	U.S. Environmental Protection Agency
ENHC	Essex Natural Heritage Commission
ESG	Ecosystem Services Gradient
ETT	Ecohealth Tracking Tool
FTE	Full-time Equivalent
GOMC	Gulf of Maine Council on the Marine Environment
IRWA	Ipswich River Watershed Association
ISA	Interagency Service Agreement
LGC	Local Governance Committee
LID	Low Impact Development
LNS	Lower North Shore (MassBays Region)
LOE	Level of Effort
MC	Management Committee
Mass Audubon	Massachusetts Audubon Society
MassBays	Massachusetts Bays National Estuary Partnership
MassDOT	MA Department of Transportation
MassDPH	MA Department of Public Health
MB	Metro Boston (MassBays Region)
MBL	Marine Biological Laboratory
MCCA	Massachusetts Coastal Condition Assessment
MET	Massachusetts Environmental Trust
MIT Sea Grant	MIT Sea Grant College Program
MMC	Massachusetts Marine Collective
MOP	Massachusetts Oyster Project
MOTN	Marine & Oceanographic Technology Network
MME	Massachusetts Marine Educators

Acronyms and Abbreviations, continued

MPG	Multipurpose Program Grant
MS4	Municipal Separate Storm Sewer Systems
MVP	Municipal Vulnerability Preparedness
MVPC	Merrimack Valley Planning Council
MWRA	Massachusetts Water Resources Authority
MRWC	Merrimack River Watershed Council
MyRWA	Mystic River Watershed Association
NECC	Northern Essex Community College
NEP	National Estuary Program
NEPORT	NEP On-line Reporting Tool
NERACOOS	Northeast Regional Association of Coastal and Ocean Observing Systems
NHDES	New Hampshire Department of Environmental Services
NOAA	National Oceanic and Atmospheric Administration
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NS	North Shore (LNS + UNS MassBays regions)
NSRWA	North and South Rivers Watershed Association
NU	Northeastern University
NUMSC	Northeastern University Marine Science Center
NWF	National Wildlife Federation
NWR	National Wildlife Refuge
O&M	Operations and Management Plan
ORD	Office of Research and Development, EPA
OST	Office of Science and Technology, EPA Headquarters
PFAS	Per- and Polyfluoroalkyl Substances
PIE-Rivers	Parker-Ipswich-Essex Rivers Restoration Partnership
PRNWR	Parker River National Wildlife Refuge
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RC	Regional Coordinator
RCC	Restoration Coordination Center (Cape Cod)
RPA	Regional Planning Agency
RSP	Regional Service Provider
SLL	Stone Living Lab
SLR	Sea Level Rise
SS	Staff Scientist, MassBays OR South Shore (MassBays Region)
SSCW	Salem Sound Coastwatch
SSL	Sustainable Solutions Lab
SSU	Salem State University
STAC	Science and Technical Advisory Subcommittee, MassBays
TNC	The Nature Conservancy
TTOR	The Trustees of Reservations
UHI	Urban Harbors Institute
UMB	University of Massachusetts Boston
UNH	University of New Hampshire
UNS	Upper North Shore (MassBays Region)
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WAA	Watershed Action Alliance
WBNERR	Waquoit Bay National Estuarine Research Reserve
WHOI	Woods Hole Oceanographic Institution
WWTP	Wastewater Treatment Plant

A. Summary

2022-2023 Progress and Accomplishments

In our annual **NEPORT reporting** to EPA for October 2021 through September 2022, MassBays submitted documentation of 587 acres of habitat restored, including eelgrass and salt marsh, and leveraged funding of more than \$3.4million during the NEPORT reporting period of October 1, 2021, through September 30, 2022. This translates to \$6 cash and in-kind support secured for every \$1 invested by EPA. Leveraged funds are in addition to the 1:1 non-federal resources put forward as direct match to EPA's funding under CWA §320.

This past year MassBays completed three major milestones which put us in excellent position to make significant progress over the next several years:

1. Submitted MassBays' CCMP, with approval from EPA Region 1 and concurrence from EPA HQ in March 2023.
2. Completed a five-year Program Evaluation process, including site visit in June 2023.
3. Established the NEP as a new Center in the School for the Environment at University of Massachusetts Boston, with staff transferred to the University in October 2022.

In addition, Central Staff and Regional Service Providers (RSPs) advanced innovative, model projects aligned with our CCMP goals:

- Central staff launched MassWaterR, an R-based package for data analysis and quality assurance, with funding from EPA's Exchange Network Grant Program Grant No. OS-83941701-1
- Central staff completed Massachusetts Coastal Condition Assessment efforts in MassBays' study area in partnership with MassDEP.
- The Cape Cod RSP provided timely, critical information to local health departments and the public about cyanobacteria blooms in Cape Cod waters.
- The Metro Boston RSP hired a new RC to convene the Boston Harbor Ecosystem Network and provide technical support to municipal and community partners.
- The South Shore RSP marked its sixth year of marsh monitoring with the help of private dock owners, to track vegetation changes.
- The Lower North Shore RSP assisted and partnered with local municipalities to secure more than \$1.8 million in state funding for local coastal and municipal resilience projects.
- The Upper North Shore RSP worked closely with the Ipswich River Watershed Association to assist five watershed municipalities in reviewing and revising existing bylaws to incorporate considerations of climate resilience.

See **Section B, Completed Major Projects**, for more detail on these and other accomplishments.

2023-2024 Proposed Work

Highlights of proposed new work for the coming year include:

- Convene partners to launch a Gulf of Maine campaign, to foster greater support for coastal resource management and restoration in the ecosystem. (Central Staff)
- Restart the Healthy Estuaries Grant Program after a brief hiatus, with funding under both §320 and BIL. (Central Staff)
- Establish MassBays' voice on social media, with the assistance of a communications professional based at APCC. (Central Staff)
- Carry out ground-truthing of eelgrass maps based on aerial photography through an Interagency Service Agreement with DEP. (Central Staff)
- Establish pond monitoring program under a three-year contract from Barnstable County, to cover the 890 freshwater ponds on connected via streams and groundwater to coastal embayments. (Cape Cod)
- Prioritize salt marsh units for restoration and protection based on six years' monitoring by volunteers, and recommendations developed by the Salt Marsh Working Group, the South Shore RSP will resurvey long-term transects and prioritize areas for action. (South Shore)
- Produce Story Maps documenting seagrass and shellfish restoration approaches and results of restoration efforts in Massachusetts. The products will be publicly available for use by researchers, resource managers, community members, and policy makers. (Metro Boston)
- Evaluate salt marsh conditions post restoration at the request of DER, and following a similar effort on Cape Cod (carried out by the Cape Cod RSP), for six restoration projects completed by DER on the North Shore. (Lower North Shore)
- Lead regional Hazard Mitigation Planning, developing a workplan, building modules to engage community members and decision makers in 10 municipalities, facilitating workshops and meetings, and preparing a draft Hazard Mitigation Plan to meet FEMA regulations. (Upper North Shore)

Specific proposed MassBays-wide and regional tasks are described in ***Section C, New and Ongoing Projects***.

Staffing and Management

MassBays' Management Committee sets priorities for the program, and fosters partnerships for diverse engagement in our work. Committee members include state and federal agency representatives, non-profit local and regional environmental groups, representatives of the private sector (environmental law), and academic and research institutions.

Director Pam DiBona is responsible for the overall management of the program, including reports to EPA and other funders, and staff supervision, including oversight of Regional Service Providers in line with contracts. In the coming year she will oversee preparation of the revised Communications Plan while pursuing new funding for CCMP implementation, especially from private foundations.

Senior Scientist Prassede Vella is MassBays' lead for all MassBays monitoring and technical reporting efforts. She coordinates the Healthy Estuaries Grant Program, staffs the Science and Technical Advisory Subcommittee to our Management Committee, and collaborates with institutional partners to generate data critical to MassBays CCMP implementation.

Coastal Data Scientist Jill Carr provides technical assistance to community-based monitoring groups across the MassBays planning area with training and new tools to make more quality data available, and leads MassBays' eelgrass monitoring, mapping, and restoration efforts.

Regional Service Providers (RSPs) connect MassBays with planning area communities organized under five regions: Upper North Shore, Lower North Shore, Metro Boston, South Shore, and Cape Cod. Under cooperative grants from MassBays, each RSP designates a Regional Coordinator, in turn responsible for identifying regional priorities consistent with the outcomes articulated in the CCMP, and implementing an annual workplan at the local level. For FFY2023, the following organizations will serve in this capacity:

- Merrimack Valley Planning Commission (MVPC)/MassBays Upper North Shore Region
- Salem Sound Coastwatch (SSCW)/MassBays Lower North Shore Region
- Northeastern University Marine Science Center (NUMSC)/MassBays Metro Boston Region
- North and South Rivers Watershed Association (NSRWA)/MassBays South Shore Region
- Association to Preserve Cape Cod (APCC)/MassBays Cape Cod Region

Finally, MassBays will administer the Urban Waters grant to Mystic River Watershed Association through a subaward with supplemental funds from EPA.

FFY2023 Budget Overview

A detailed budget request and narrative are included in **Section D**; a summary is included here:

Salary & fringe	\$ 226,744
Travel	\$ 5,075
Contractual	\$ 84,045
Other Direct Costs	\$ 518,972
Indirect	\$ 115,025
Total Request	\$ 950,000
Non-Federal Match	\$ 950,000

B. Completed Major Projects and Activities (July 1, 2022 to June 30, 2023)

MassBays' Workplan for FFY2022 was guided by the Goals and Strategies of our Interim CCMP (approved by EPA in March 2023)):

Goal 1. MassBays provides new resources to support research and management in the Bays.

Strategy 1.1 Make new data available, especially to address gaps in knowledge

Strategy 1.2 Support valid (QA/QC) data collection and use

Strategy 1.3. Analyze and present existing data in multiple formats to document baselines and trends

Goal 2. MassBays reaches all planning-area municipalities with actionable information about coastal habitats

Strategy 2.1 Support and conduct research to address gaps in knowledge and inform policy and actions regarding ecosystem conditions and functions

Strategy 2.2 Provide education, training, and technical support; share case studies (successful and not); and support collaboration and cooperation on specific topics

Strategy 2.3 Facilitate access to decision making forums, and increase influence on decision making by underserved communities

Goal 3. MassBays provides regular and locally informed State of the Bays reporting that reflects the unique characteristics of MassBays assessment units (embayments, rocky shore, barrier beach), and documents progress to inform local action and progress toward target conditions.

Strategy 3.1 Establish target (improved) water quality and habitat conditions tied to desired uses and ecosystem services, and document progress toward those targets.

Strategy 3.2 Guide local action to expand habitat and improve water quality according to targets

Strategy 3.3 Maintain MassBays' National Estuary Program status

Our work is closely aligned with the Clean Water Act Core Programs, which are:

- (1) establishing water quality standards
- (2) identifying polluted waters and developing plans to restore them (total maximum daily loads)
- (3) permitting discharges of pollutants from point sources (National Pollutant Discharge Elimination System permits)
- (4) addressing diffuse, nonpoint sources of pollution
- (5) protecting wetlands
- (6) protecting coastal waters through the National Estuary Program
- (7) protecting Large Aquatic Ecosystems.

The following list of accomplishments is organized according to the CCMP Strategies included in our CCMP and completed by June 30, 2023. Each project description includes the following:

Title

CWA core program: Per list (1-7) above

Objective: project-specific objective

Partners: Collaborators not directly funded by MassBays/\$320 funds

Status: as of June 2023

Accomplishments and Deliverables: completed products

In addition, quarterly updates from Central Staff and RCs (provided to the MC at each meeting) are included as Attachment 1.

Strategy 1.1 Make new data available, especially to address gaps in knowledge

Title	Implement MassBays Monitoring Plan (Central Staff)
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Compile data sets for MassBays' delineated embayments, toward the goal of comprehensive and specific State of the Bays reporting.
Partners	STAC, DEP, SSCW, SSU, CCS, CZM, ACASAK Technologies
Status	Year 3 completed; contract renewed for the final monitoring year: 25 sites in the Nantucket Sound, Vineyard Sound, Buzzards Bay and around the Islands.
Accomplishments and deliverables	
Implemented Year 2 of the MA Coastal Conditions Assessment (Year 2021)	Coordinated fieldwork including monthly survey (June-August) of Region B (Cohasset to Provincetown and the Outer Cape) to assess coastal conditions. During Year 3, work included water quality monitoring, sediment quality monitoring and taxonomic identification of benthic macroinvertebrates from 25 sites. Data have all been analyzed. Benthic infauna analysis was funded by the Massachusetts Ocean Trust Fund. Planning for Year 4 (25 sites, Region C) was initiated in the Spring in preparation for the field season.
Investigate nutrients in Salem Sound	A report of results and findings of a survey conducted in 2020 was submitted to EPA in 2022 including recommendations for next steps to inform further monitoring. The final report was submitted to EPA's Multipurpose Grant Program.

Title	Investigate microplastics in Ipswich Bay beach sand and water column (Upper North Shore)
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Estimate the reach and degree of microplastic pollution.
Partners	UNH, NECC, SSS, 8TGM
Status	In an effort to further refine and standardize water sampling procedures, modifications have been made to surface water SOPs to include more standardized sampling periods, set sampling locations, additional QA/QC procedures, and the collection of additional environmental variables. Over the next year, protocols will be rolled out across our team and collaborators.
Accomplishments and deliverables	
Recorded baseline conditions in Great Marsh beaches.	25 beach samples were collected in spring and fall of 2022 from five beaches across the Great Marsh from Salisbury to Wingersheak Beach. Samples were sent to Northern Essex Community College (NECC) for processing and analysis. NECC is using a new approach (NOAA, 2017) which will make processing more efficient and sensitive to detect smaller microplastic particles. The NECC lab is also integrating additional QA/QC to reduce and better measure possible contamination in sample processing methodology.
Recorded baseline conditions in Great Marsh waters	A total of 17 surface water samples were collected from locations across the Great Marsh System (Merrimack to Annisquam) during the summer of 2022. All surface water samples were sent to the University of New Hampshire (UNH) for processing and analysis, with results expected by the end of June 2023.

Strategy 1.1 Make new data available, continued

Title	Monitor Cyanobacteria blooms (Cape Cod)
CWA Core Program	Protecting coastal waters through the National Estuary Program; Identifying polluted waters and developing plans to restore them
Objective	Collect actionable information on harmful cyanobacteria blooms for the public and decisionmakers.
Partners	EPA, towns of Brewster, Chatham, Barnstable, Dennis, Yarmouth, MA Department of Public Health, MA DEP, MET
Status	Outreach efforts have increased visibility of the problem that exists in many CC ponds as documented by volunteer monitoring.
Accomplishments and deliverables	
Municipal action taken in response to data and risk characterization	Biweekly monitoring in 130 ponds encompassed by 15 towns was carried out in summer 2022. Ponds experienced different levels of cyanobacteria at different times throughout the summer. About 10 percent of ponds experienced cyanobacteria levels high enough to warrant posting advisories to avoid contact with water, while over half of ponds experienced moderate levels posing a potential for concern (including risk to pets). Nearly all ponds also experienced low or acceptable levels at times. Cyanobacteria risk categories were updated to reflect input from health agents, criteria from the Massachusetts Department of Public Health, and a new regional capability for toxin testing by the Barnstable County Department of Health and the Environment. The result: 91 advisories, warnings, etc. published by municipal officials. The RSP's work and webpage (https://apcc.org/our-work/science/community-science/cyanobacteria/) was referenced in a Cape Cod Times article which will be a regular feature through the summer of 2023.
New capacity for toxin testing	Barnstable County Department of Health and the Environment now has capacity to carry out toxin testing, an additional assessment of health risk to follow up on APCC's monitoring of phycocyanin and composition used to predict toxicity. The new regional capability for toxin testing represents a significant milestone in quantifying health risks due to cyanobacteria HABs.
New opportunities for outreach and education of decision makers	APCC was asked to partner on two proposals involving cyanobacteria science, policy, and education: 1) George Mason University and Marine Biological Laboratory proposal to NIH to develop a cyanobacteria science-to-policy model to measure and convey public health risks to communities, using genetic sequencing and toxin testing of water samples. The model is intended to be transferable nationwide. 2) Woods Hole Center for Oceans and Human Health (WHCOHH) proposal to NSF and NIEHS (National Institute of Environmental Health Science) to provide outreach to the public, educators, and veterinarians concerning risks of cyanobacteria blooms to human and animal health. WHCOHH is affiliated with the Woods Hole Oceanographic Institution.

Strategy 1.1 Make new data available, continued

Title	Map Sea Level Rise-induced Marsh Platform Die-off Areas (Upper North Shore)
CWA Core Program	Protecting wetlands
Objective	Document impounded water and die-off using drone imagery and field surveys.
Partners	UNH, 8TGM
Status	Drone mapping has not proven to be an effective method to identify die-off locations due to limitations around resolution. In the future, mapping on foot will likely provide the best option for monitoring.
Accomplishments and deliverables	
New areas surveyed, ground-truthed for mapping	Marsh die-off mapping was conducted during the summer of 2022. Mapping of new locations was conducted by foot and boat. Mapping was completed in Salisbury, Newbury, Rowley, and Essex. Mapped locations were entered into GIS and data around aerial extent, percent cover, and vegetation composition was noted. Drone imagery from 2021 was also assessed and ground-truthed using monitoring data.

Title	Long-term Monitoring of Salt Marsh Vegetation Change (South Shore)
CWA Core Program	Protecting wetlands
Objective	Work with volunteers to monitor salt marsh vegetation changes through the Salt Marsh Sentinels program.
Partners	Private dock owners, SMWG
Status	2022 data and 6-year trends shared with multiple audiences
Accomplishments and deliverables	
SMWG priority action plan produced	Informed by these and other projects and with contributions from SS and UNS RCs, the regional working group generated a series of recommendations which were presented to the MC in December 2022.

Strategy 1.1 Make new data available, continued

Title	Horseshoe Crab Spawning Surveys (South Shore)
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Conduct horseshoe crab spawning surveys in Duxbury Bay to assess the population
Partners	DMF, volunteers
Status	2022 data were submitted, 2023 surveys were conducted, and data summary is in process.
Accomplishments and deliverables	
Reporting up-to-date	Data for the 2022 season were submitted to DMF.

Title	Water quality monitoring (South Shore, Lower North Shore)
CWA Core Program	Protecting coastal waters through the National Estuary Program; Identifying polluted waters and developing plans to restore them
Objective	Lead citizen monitoring in coastal waters to identify potential for remediation and source control.
Partners	EPA, MassDEP, municipalities
Status	2021 monitoring completed; plans for 2022 sampling season are in place.
Accomplishments and deliverables	
Riverwatch monitoring (SS)	Sampling at 10 sites for the 2022 season began in June 2022. New conductivity loggers were deployed, data retrieval underway.
Clean Beaches & Streams and tributary monitoring (LNS)	Water samples collected biweekly from June through August 2021 at up to 18 outfalls and streams for bacterial analysis following an approved 2020 QAPP; results published on SSCW website at https://www.salemsound.org/CB&S.html . Remediation efforts taken up by municipalities in response to the findings include a new project in Sawmill Brook (Manchester), new sewer lining in Salem along Loring Ave prompted by LNS reports of algae in the Forest River, and sewer replacement along Forest River in Salem.

Title	Marine Invasive Species Monitoring (Upper North Shore, Lower North Shore, South Shore)
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Monitor established field sites for non-native species in cooperation with CZM
Partners	CZM, volunteers
Status	Monthly monitoring conducted June-October 2022; data submitted to CZM
Accomplishments and deliverables	
Monitoring sites across MassBays' planning area	All monitoring was carried out as planned, including volunteer training, and photo-documentation of the Beverly Pier settle plates. New RC for UNS trained to lead this effort for their region.

Strategy 1.1 Make new data available, continued

Title	Monitor Diadromous Fish Runs (South Shore, Cape Cod)
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Provide local, state, and federal fisheries managers with population estimates of river herring at monitored runs to inform protection, restoration and management efforts. Monitoring by volunteers also supports citizen stewardship of runs.
Partners	DMF, NOAA Fisheries, Herring River Network, citizen volunteers
Status	Data submitted for 2022 runs; 2023 counting efforts were taken up by volunteers once again this year.
Accomplishments and deliverables	
2022 Herring run results reported (SS, CC)	Data submitted to DMF.
2023 counts carried out	Eight groups of volunteers were trained for CC monitoring at 14 sites; Six SS sites were monitored by more than 73 trained volunteers.

Strategy 1.2 Support valid (QA/QC) data collection and use

Title	2Support for Citizen Science Monitoring Efforts (Central Staff)
CWA Core Program	Identifying polluted waters and developing plans to restore them
Objective	Increase the value and use of citizen monitoring data for decision making across the region.
Partners	Monitoring Coordinators Network, CSA Data Quality and Metadata Working Group, MassRivers Alliance, DEP, EPA EN, EPA Region 1, Eastern Research Group, UMCES-IAN
Status	One-on-one assistance was provided to community-based groups and watershed organizations, as well as engagement in regional and national efforts. Training, outreach and technical support continues to promote use of AquaQAPP and MassWater, and the submission of data to WQX.
Accomplishments and deliverables	
Provide AquaQAPP outreach & track use	Presented at local and regional venues to demonstrate AquaQAPP and promote its use in developing Quality Assurance Project Plans. Provided demonstrations to other NEPs and state agencies about how to use and/or adapt the tool to their area (e.g., SNEP program, RIDEM). In the reporting period, 11 users from watershed groups used the tool to generate 13 unique QAPPs. Total tool usage to date includes 47 watershed group users generating 60 unique QAPPs.
EPA Exchange Network project: MassWater	Rolled out a new R package, <i>MassWater</i> , as part of Exchange Network funding for the project <i>Building Technical Capacity for Data Analysis & Visualization</i> . MassWater is a robust R-based package developed for analyzing and organizing surface water monitoring data collected by watershed associations and citizen science groups. The objective of the package is to automate and streamline quality control and exploratory analysis of data, and to format data for upload to the national Water Quality Portal via EPA’s Water Quality Exchange (WQX). MassWater was developed by MassBays and rolled out in January 2023, along with three regional training courses and a web-based Community of Practice forum. Through collaborating with EPA’s WQX team, improvements were made to the WQX structure to better accommodate community science data and protocols.
One-on-one tech support & training	Trained 28 different watershed organization scientists on the use of MassWater. Provided post-training and other technical support to 12 programs, including MassWater support, developing monitoring methods for eelgrass studies, developing research goals of a water monitoring program, serving on monitoring program steering committees, custom WQX training and import configuration development, and use of new seagrass monitoring tool (iSeaGrass).
Communication with Monitoring Coordinators	Revamped the Monitoring Coordinators Network from a static newsletter to an interactive web-based forum.

Strategy 1.2 Support valid (QA/QC) data, continued

Title	Marsh Wrack Evaluation and Mapping (Upper North Shore)
CWA Core Program	
Description/Objective	Determine impact of excessive wrack accumulation on marsh peat and other habitats; develop strategy to address wrack.
CCMP Outcomes	
Partners	UNH, NEMMC&WD
Status	A wrack impact study report is expected by June 30.
Accomplishments and deliverables	
Wrack mapping completed	Marsh wrack mapping was conducted during the fall and into the winter of 2022. Initial mapping was conducted at sites that were accessible by foot from roadways and in areas where barriers and impoundments create buildup of marsh wrack. Mapping was completed in Salisbury, Newburyport, Newbury, Rowley, Ipswich, Essex, and Gloucester.
Wrack characterization complete	Data regarding aerial extent, thickness, composition of impacted vegetation, and age of stand was recorded.

Strategy 2.1 Support and conduct research to address gaps in knowledge and inform policy and actions regarding ecosystem conditions and functions

Title	Increasing agency confidence in eelgrass maps used for project review and ocean planning
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Investigate eelgrass remote sensing techniques to quantify mapping and edge detection accuracy. (NOAA Project of Special Merit Grant funding)
Partners	Massachusetts Office of Coastal Zone Management (co-PI), Massachusetts Department of Environmental Protection, Massachusetts Division of Marine Fisheries, NSRWA, SSCW, MIT Sea Grant, NUMSC
Status	Field surveys, training, image interpretation, and data analysis have been completed. Reporting is in progress.
Accomplishments and deliverables	
Data acquisition	All field surveys were completed per the QAPP in June-July 2022, including 19 individual site surveys comprised of eight drone flights, five side-scan sonar surveys, 500+ underwater photo-ground-truthing station samples, one aerial airplane survey, and six days of diver surveys. Data acquisition also included obtaining satellite imagery across all study sites.
Data Analysis & Reporting	Image analysis was completed by trained partners in fall 2022. Data analysis and reporting are scheduled to be completed in July 2023.
Outreach	Introductory training for interpretation of remote sensing data is available to the public on MassBays' Youtube channel, presentations to peers re: findings are underway, and the project StoryMap continues to be updated (https://www.mass.gov/news/story-map-a-comparison-of-eelgrass-mapping-methods).

Title	Dam Removal Implementation and Monitoring: Peterson Pond, Veterans Memorial Park, Temple Street Dams (South Shore)
CWA Core Programs	Protecting coastal waters through the National Estuary Program
Objective	Work with regional communities and other partners to assess feasibility and seek funding for removal of dams and other barriers and collect ecological data pre- and post-restoration
Partners	NOAA Fisheries, DER, Towns of Marshfield and Duxbury: dam removal project technical assistance and management
Status	Peterson Pond dam removed; progress continues on others
Accomplishments and deliverables	
Peterson Pond Dam post-removal monitoring and fish ladder feasibility study completed	Progress reports provided to funding agency
Temple Street Dam (Marshfield & Duxbury) permitting	Initial data collection completed, and development of next steps underway

Strategy 2.1 Support and conduct research, continued

Title	Assess Coastal Acidification in Massachusetts (Central Staff, South Shore)
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Assess coastal acidification conditions in Duxbury Bay.
Partners	EPA, UMB, Town of Duxbury
Status	MassBays' coastal acidification monitoring system was deployed for the third year in 2022 to collect continuous pH and pCO ₂ data. Central Staff and RCs continue engagement with state and regional entities investigating potential impacts and responses.
Accomplishments and deliverables	
Ocean acidification monitoring system developed and deployed in Duxbury Harbor	Following further testing of the prototype system, the system was deployed in Duxbury Harbor in May 2022. Data were collected from May through September with very few interruptions. The system is currently waiting to be serviced. The data gathered over three summers are currently being analyzed and results will be published during this fiscal year. At the same time, MassBays will be planning next steps for the prototype system and continue supporting opportunities to expand coastal acidification research, monitoring, outreach and education.

Strategy 2.2 Provide education, training, and technical support; share case studies (successful and not); and support collaboration and cooperation on specific topics

Title	Support municipal and regional actions that promote resilient coastal habitats and communities through the use of nature-based solutions (All regions)
CWA Core Programs	All
Objective	Work with partners and communities to encourage planning for climate change including stormwater management and adoption of adaptation measures that promote resilient coastal habitats, especially via nature-based solutions.
Partners	Trustees, Tufts, UNH, BU, Mass Audubon, Northeast Coastal Coalition, LGCs, CCC, NOAA, WBNERR, CZM, IRWA, ECG, PRCWA, ENHC, MAPC, MassBays continues to be a key player in communication and outreach efforts, planning initiatives, and implementation of nature-based coastal management.
Status	MassBays continues to be a key player in communication and outreach efforts, planning initiatives, and implementation of nature-based coastal management.
Accomplishments and deliverables <i>Climate resilience</i>	
Regional meetings, workshops, and lectures (All regions)	All RCs and Central Staff hosted and/or participated in events describing the impacts of climate change, especially regarding sea level rise and more frequent and severe storms. For example, The Upper North Shore RC (Peter Phippen) worked with the Great Marsh Coalition and a range of collaborators to plan and successfully host the <u>2022 Great Marsh Symposium</u> . The symposium was held on November 3rd at Woodman's in Essex. The focus of this event was on the future of roadways through and within the marsh. Communities across the Great Marsh are starting to plan for a changing climate by seeking out solutions to reduce vulnerability of critical infrastructure, including flood inundated roads. The annual convening of policy makers, scientists, government personnel, non-profit representatives, teachers, artists, and community members facilitated through the Great Marsh Symposium allowed for comprehensive and inclusive discussion on the future of our Marsh roadways. The RC (Peter Phippen) presented at the symposium on a current road improvement project in Essex. <u>Second annual Preservation in a Changing Climate Conference</u> at the Peabody Essex Museum, Sept. 12th and 13 th : RC led a historical/environmental/climate change walking tour of the South River and NPS Derby Wharf and presented "Local Highlights of Climate Change Adaptation Strategies". Recordings at https://www.preservingsalem.com/
Conducted review of municipal bylaws re: support for climate resiliency (UNS)	Reviewed and revised stormwater, subdivision, and/or wetland bylaws for the following communities: Andover, North Andover, Boxford, Georgetown, and Salisbury. All reviews and revisions were done in collaboration with the towns and based both off of which bylaws/regulations each community was most concerned with, and which bylaws, if any, were out of compliance with the MS4 permit. Several communities will bring these revised bylaws to upcoming town meetings to be voted upon. All revisions were made with the intention to support low impact development, climate resiliency, and stormwater management.
Assisted with grant project scoping and applications (All regions)	All RSPs provided input and technical support to municipalities applying to climate change-focused grant programs, including EEA MVP, CZM Coastal Resilience, and SNEP (see Strategy 3.2 below)

<p>Participated in coastal resilience working groups (LNS)</p>	<p>RC was a team member on Salem’s Flood Overlay District and Climate Resiliency Overlay District Working Group, and Manchester-by-the-Sea’s Coastal Vulnerability Action Plan Steering Committee; <u>Public Access and Protection for the Marblehead Municipal Light Department and Adjoining Public Lands</u>: RC assisting the Town of Marblehead with project management and public outreach to advance design plans and permitting for infrastructure retrofits to reduce flooding impacts along the shoreline encompassing the Municipal Light Department and adjacent properties; <u>Preserving History: Assessments and Climate Adaptations at the House of Seven Gables</u>: RC providing project management and outreach with The House of Seven Gables to prepare an adaptation plan that identifies short-, medium-, and long-term actions to improve the resilience of its campus and buildings to anticipated changes in groundwater elevation, precipitation, storm intensity, and sea level rise.</p>
<p>Accomplishments and deliverables <i>Stormwater management</i></p>	
<p>Inventory of stormwater improvement opportunities at public boat ramps completed (CC)</p>	<p>RSP hired an engineering firm to assess and provide conceptual stormwater BMPs for 20 public boat ramp sites, which will be used to prioritize 5 sites for 75% plans. Eleven towns are participating, including several in the Cape Cod region who have public boat ramps in the MassBays area.</p>
<p>Reviewed and advised on municipal bylaws for LID (LNS)</p>	<p>With funding from DEP’s Municipal Assistance Grant Program, provided ordinance and bylaw review for LID advancement to 7 municipalities.</p>
<p>Completed Spanish-language LID maintenance videos (LNS)</p>	<p>Produced Spanish versions of six training videos previously developed by SSCW for DPW workers charged with maintenance of green infrastructure for stormwater management. Topics include rain gardens, high-performance biofiltration systems, catch basin inserts, and bioswales.</p>
<p>Supported municipal stormwater management actions (UNS, LNS)</p>	<p>Created a web-based model language toolkit (due June 30, 2023) which will aid communities in finding proper language during bylaw revision efforts centered around climate resiliency and stormwater mitigation. All model language will be compiled directly from municipalities existing bylaws. With Greenscapes, offered educational programming (Keeping Water Clean) to local area schools. The program specifically offers a chance for 5th graders, as well as parent volunteers and teachers, with five hands-on stations, to explore how water moves in our environment, how it is used, and how we can keep it clean and plentiful for the future. MVPC provided programming at 6 schools, educating over 300 students.</p>
<p>Convened Merrimack River Collaborative (formerly the Merrimack River District Commission) (UNS)</p>	<p>A major focus on reconvening the group was building partnerships with elected officials (Senator Tarr, Representative Shand, and Representative Hamilton), Local Leaders (Mayor Reardon), Community groups (Alliance of Climate and Environmental Stewards), other non-profit and not for profit agencies (Merrimack River Watershed Association, and Northern Middlesex Council of Governments). Through monthly meetings during 2022, the group conducted a SWOT analysis (strengths, weaknesses, opportunities, and threats), and developed an outreach plan to identify core team members and stakeholders. With the support of Senator Tarr and Representative Shand, the group also filed an Act to Create a Merrimack River Collaborative which has been referred to the committee on Environment and Natural Resources.</p>

Strategy 2.2 Provide education, training, and technical support... continued

Title	Support municipal and regional actions that promote resilient coastal habitats and communities through the use of nature-based solutions (All regions) continued
Accomplishments and deliverables <i>Habitat Restoration</i>	
Existing and potential mussel habitat mapped, protocol complete (SS)	Collaborative project with Mass Audubon included identifying private docks already hosting mussels along the mouth of the North and South Rivers, and locating target transfer sites
Invasive species removal (LNS, SS)	Volunteers assisted in raising and releasing beetles for purple loosestrife control at Jacobs Pond in Norwell (SS), pulling pepperweed (LNS)
Eelgrass restoration (UNS)	<p>Eelgrass monitoring was conducted at Middle ground during the summer and fall of 2022. Potential pilot sites in Plum Island Sounds and Salisbury were investigated, but no restoration effort was initiated as cursory investigation at selected locations was not satisfactory. A new collaboration was established with the UMass Gloucester Field Station to explore eelgrass propagation using seeds. Reproductive shoots were harvested and stored in flow through saltwater tanks over the summer. In the fall, seeds were planted in Plum Island Sounds and Essex Bay. Beds will be monitored this spring/summer and reproductive shoots will be harvested in June to continue this process.</p> <p>Additionally, a new potential eelgrass enhancement project was identified off of Lighthouse Beach in Gloucester, MA. This is a historical eelgrass site in which bed fragmentation has recently been observed. The RC, along with collaborators from Boston University held meetings with municipal employees (Harbormaster, shellfish warden, Sustainability Coordinator, Conservation Agent), as well as two community groups (Squam Rock Land Trust and Norwood Heights Beach Association) to provide information around this project opportunity. With the community excited and onboard with this enhancement opportunity, next steps moving into FY2024 will be to identify funding sources to support the project.</p>

Strategy 2.2 Provide education, training, and technical support... continued

Title	Mystic River Urban Waters Activities (MyRWA)
CWA Core Programs	Improved water quality
Objective	Coordinate federal, regional, and local contributions and activities in the Mystic River Watershed, providing communications and outreach support to Merrimack River communities, and assisting MassBays with EJ program development.
Partners	EPA, FEMA, USGS, HUD, Dept of Homeland Security, DEP, MRWC, MassBays RSPs, municipalities
Status	Mystic River Ambassador hired and established as a key point person in the network connecting Urban Waters activities in the watershed and beyond.
Accomplishments and deliverables	
Maintained operations of the Mystic River Urban Waters Federal Partnership	Drafted agendas, meeting minutes for planning meetings of the Steering Committee, met with individual Committee members to gain insights into the perceived value of its work, produced and distributed regular email updates and alerts; maintained regular check-ins with EPA Program Officer.
Coordinated Federal input to Mystic River initiatives	Conducted fact-finding interviews with other Urban Waters sites, met with federal partners to learn about case studies and regional efforts, while sharing ideas for collaboration at the state level.
Implemented local actions related to the “Trash Free Mystic” project	Organized cleanups, published data for the Virtual Trash Free Assessment (https://mysticriver.org/news/2022/3/31/visual-trash-assessments), produced awareness videos (https://fb.watch/clqUJ1MwEZ/), installed a trash boom and developed operations and maintenance plan under a NFWF grant.
Assisted with river stewardship events	Contributed to a suite of programs for Earth Month (https://mysticriver.org/news/earth-month-2022-invest-in-our-planet , including a 100+ person clean up at DCR’s Tolbert McDonald park; investigated potential microplastics monitoring program; provided support to the Mystic River Science Forum planning team.

Strategy 2.2 Provide education, training, and technical support... continued

Title	Presentations & Publications
CWA Core Programs	All
Objective	Share MassBays’ findings, projects, and expertise with multiple audiences
Partners	multiple
Status	MassBays continues to share case studies, products, and findings with local, regional, and national audiences.
Accomplishments and deliverables	
Central Staff outputs	<p><i>Presentations</i> <i>Eelgrass photo-interpretation training.</i> J.Carr. Virtual, August 25, 2022 <i>Drones, Satellites, Airplanes and Sonar Beams: How well do they perform at the meadow’s edge?</i> J.Carr. Presented at EPA annual eelgrass conference, March 2023, and upon invitation to the Texas Seagrass Monitoring Workgroup Summer Meeting, June 12, 2023. <i>AquaQAPP and MassWateR: streamlining QAPP creation, data analysis and data sharing.</i> J.Carr. Virtual, to SNEP Network Lunch and Learn, June 9, 2023. “You’re collecting water samples at 6am, but what is it all for?” Online slide presentation and in-person panelist (“S. 12: Empowering Volunteers: an Exploration of Promising Practices, Models, and Motivations). P.DiBona, C*Sci Annual Conference, Tempe AZ May 23, 2023. <i>Historical perspective of water monitoring and policy: Pre - passage of the Clean Water Act and beyond (Pt 1 and Pt2).</i> P. Vella. Session co-host at the 13th National Water Quality Conference, Virginia Beach, VA. April 2023. <i>MassWateR Training: R Tools for Water Quality Data Analysis.</i> J.Carr. Presented at UMass Amherst on January 24, 2023; Southeastern MA Pine Barrens Alliance Nature Center February 9, 2023; Essex County Greenbelt Association on March 24, 2023. <i>Introducing MassWateR: A New Open-Source Data Tool for Water Quality Monitoring Groups.</i> J.Carr. Presented at Northeast Aquatic Biologists Conference, February 15, 2023; and to the National WQX User Group monthly meeting by invitation, February 23, 2023. <i>MassBays NEP, A management and funding scheme for a complex system.</i> P. DiBona, presented to NROC quarterly meeting, April 13, 2023.</p> <p><i>Publications:</i> Monitoring Coordinators’ Network email newsletter [dates] Seto, I., N.T. Evans, J. Carr, K. Frew, M. Rousseau and F.R. Schenck (2023) Recovery of eelgrass <i>Zostera marina</i> following conversion of conventional block and chain moorings to conservation mooring systems in Massachusetts: context dependence, challenges, and management. Manuscript in preparation. Frye, A., E. Flaherty, F.R. Schenck, K. Frew and J. Carr (2023) Residential Floats Reduce Light Availability for Eelgrass (<i>Zostera marina</i>) in Salem Harbor, MA, USA. Manuscript in preparation.</p>

	<p>Logan, J.M., A. Boeri, J. Carr, T. Evans, E.M. Feeney, K.H. Ford, K. Frew and F. Schenck (2022) A Review of Habitat Impacts from Residential Docks and Recommended Best Management Practices with an Emphasis on the Northeastern United States. <i>Estuaries and Coasts</i> 45: 1189–1216.</p> <p>Stepenuck, K.F. and J. Carr (2022), Early Influence of the COVID-19 Pandemic on Volunteer Water Monitoring Programs in the United States and Canada. <i>J Am Water Resour Assoc</i>, 58: 1377-1387. https://doi.org/10.1111/1752-1688.13043</p>
Upper North Shore outputs	<p><i>Presentations:</i></p> <p>“Water Quality Monitoring in the Merrimack Valley” at the <i>Merrimack River Roundtable</i> Annual Conference held at Northern Essex Community College, cohosted by MassBays, Merrimack River Watershed Council, and Merrimack Valley Planning Commission (10/4/2022)</p> <p>“The Planner & Engineer Perspective” at the annual <i>Great Marsh Symposium</i> “Future of Roads throughout the Marsh”, hosted by the Great Marsh Coalition (11/3/2022)</p> <p>“Eelgrass Restoration in the Great Marsh” at Mass Audubon Salt Marsh Science Seminar (11/18/2022)</p> <p>“Apple Street Roadbed Elevation & Culvert Replacement Project” at <i>PIE-Rivers Annual Meeting</i> held at the Parker River National Wildlife Refuge (12/1/2022)</p> <p>“Municipal Codes: Conduits for Stormwater Management and Climate Resiliency” at <i>PIE-Rivers Annual Meeting</i> held at the Parker River National Wildlife Refuge (12/1/2022)</p> <p>“Invasive Phragmites Management and Control” at the <i>Annual Great Marsh Resiliency Task Force Meeting</i> held at Parker River National Wildlife Refuge, co-hosted by Senator Bruce Tarr and Merrimack Valley Planning Commission (01/27/2023)</p> <p>Participated on the SWIMMER Microplastics Panel at UMass Lowell to provide insight into local actions and concerns in the Merrimack Valley (02/17/2023)</p> <p>“Hazard Mitigation Planning and the Shawsheen” at the Municipal Vulnerability Planning Regional Community Meeting held at the Cormier Youth center, Co-hosted by the Town of Andover and Fuss & O’Neill (4/27/2023)</p> <p>“Collaborative Stormwater Management in the Merrimack Valley” at Watershed-Scale Climate Collaboration Conference held at Clark University, hosted by Massachusetts Ecosystem Climate Adaptation Network (5/3/2023)</p> <p>“History, Value and Restoration in the Great Marsh, MA” Historical Commission and the Essex Shipbuilding Museum (11/2022)</p> <p>Articles in Manchester Cricket newspaper: “Eelgrass Restoration Efforts in the Essex and Annisquam River” (3/2023), and “Salt Marsh Restoration Impediments in the Great Marsh” (9/2022)</p> <p>“Environmental Restoration in the face of Climate Change, Politics, Partners, and Permitting”, UMass Amherst for Environmental Leadership Challenge, (4/11/23)</p>

<p>Lower North Shore outputs</p>	<p><i>Presentations:</i> “Local Highlights of Adaptation Strategies” at the <i>Preservation in a Changing Climate</i> conference at Peabody-Essex Museum, cohosted by SSCW (9/12 - 9/13/22) “Preservation in a Changing Climate: Salem, Massachusetts Case Study” Past Forward Conference ’22 11/1-4/ 2022 Collins Cove to Willows Resilience Study” public forum #1 (11/29/2022) “Protecting the Good Harbor Ecosystem: Now and for Future Generations. Adaptation – Is it possible?” TownGreen Workshop #2 Gloucester (11/30/2022) “Saving our Shoreline 2023: Building Resilience across Salem Sound Communities” presented as part of <i>Underwater in Salem Sound</i> lecture series (1/18/23) Collins Cove to Willows Resilience Study” public forum #2 (2/27/23) “Marblehead Municipal Shipyard Resiliency Improvements Project” Harbors & Waters Board (1/9/23) and Municipal Light Department Board (3/7/23) “Leading the Way to a Healthier Sea and Shore” for Brooksby Village Senior Living (3/15/2023) “Marblehead Municipal Shipyard Resiliency Improvements Project” for MEPA EJ community (3/20/23) “Bass River Resilience Study Public Forum #1” (3/21/2023) Alison Frye presented “How to maintain your LID Stormwater Treatment Devices” Essex County Highway Association (5/11/23) “Horseshoe Crabs: An Ancient Species in the Modern World” presenter Alison Frye as part of <i>Underwater in Salem Sound</i> lecture series (4/19/23) “Peabody-Salem Resilient North River Riverwalk Study, MVP Project 25% design” (5/18/23) “Collins Cove to Willows Resilience Study” public forum #3 (5/23/23) “Water Quality Training” (5/30/23) “Adopt a Beach Training” (6/1/23) “Marine Invasive Species Training” (6/6/23) “Bass River Resilience Study Public Forum #2” (6/13/2023) presenter Alison Frye</p>
<p>South Shore outputs</p>	<p><i>Presentations:</i> “Making Salt Marshes More Climate Resilient” (with Tom Bell and Danielle Perry), Water Watch Lecture Series, February 2023 Horseshoe Crabs and Salt Marshes, Plymouth County Conservation District, February 2023 Tidmarsh Herring Count Training, March 2023 NSRWA Herring Count Training, March 2023</p> <p><i>Reports & Publications:</i> Tidmarsh Wildlife Sanctuary/Living Observatory 2022 Final Report – River Herring, January 2023 NOAA Final Report, Third Herring Brook Restoration, January 2023 2022 Final Report, DKP Eelgrass Monitoring, January 2023 2022 Final Report, MassAudubon/Department of Defense, Blue Mussels and Shorebirds, February 2023</p>

	<p>First Annual Citizen Science Monitoring Report, May 2023 https://www.nsrwa.org/download-our-first-annual-citizen-science-monitoring-report/ Clean Water Act e-news article, October 2022 “The Vegetation Situation: Protecting and Restoring Habitats”, NSRWA Newsletter October 2022 Water Quality Monitoring e-news article, November 2022 “Restoration and Resilience for the Future”, NSRWA Newsletter April 2022</p>
Cape Cod outputs	<p><i>Presentations:</i> 7/23/22: Stormwater and the Boatramp Stormwater Project, presentation to the Friends of Peters Pond in Sandwich, Kristin Andres and Jordan Mora. 9/24/22: “River Herring: Lessons from the Past” presentation to Brewster Historical Society Annual Meeting, Brewster Public Library, Brewster, JoAnn Muramoto. 10/19/22: “Native Plants and the Nature Connection”, Kristin Andres at Cotuit Library. 10/25/23: “Climate-wise Landscapes” presentation to Eastham Climate Action Committee, Eastham Public Library, Eastham, Kristin Andres. 11/22: Cape Cod Pond Network Zoom webinar meeting, APCC cohosted with Cape Cod Commission. 11/8/22 and 11/15/22: Andrew and Kristin speakers at Lifetime Learning Series at Eldredge Library about wastewater and stormwater. 1/4/23: Tidmarsh – Restoration story, cohosted Zoom presentation by Glorianna Davenport with Brewster Garden Club. 1/9/23: “How to Love Your Pond”, presentation to the 300 Committee Land Trust, Falmouth, Kristin Andres. 2/27/23: Cape Cod Pond Network Zoom webinar meeting, APCC co-hosted with Cape Cod Commission. 3/15/23: “Volunteer Counts of River Herring: Why and How”, presentation and training event at Mashpee Town Hall, Mashpee, Jo Ann Muramoto. 3/18/23: “Native Plants & the Nature Connection”, presentation to Wildlife Rehabilitators Association of MA annual conference, Kristin Andres. 3/21/23: “Volunteer Counts of River Herring: Why and How”, presentation and training event at Eastham Public Library, Eastham, Jo Ann Muramoto. 3/23/23: 2nd training event, “Volunteer Counts of River Herring: Why and How”, training event at Mashpee River, Mashpee, Jo Ann Muramoto. 3/28/23: “Volunteer Counts of River Herring” training event at Scargo Lake and Bound Brook, Dennis, Jo Ann Muramoto. 3/28/23: “Volunteer Counts of River Herring” training event at Stony Brook, Brewster, Jo Ann Muramoto. 3/29/23: “Volunteer Counts of River Herring” training event at Mill Creek, Sandwich, Jo Ann Muramoto. 4/10/23: “How to Love Your Pond”, presentation to Hinckley Pond Association, Kristin Andres. 4/20/23: “Climate-wise Landscapes” presentation to Truro Climate Action Committee, Kristin Andres. 5/11/23: APCC Film Event and panel discussion at Cape Cinema: <i>The Erie Situation</i>. 5/19/23: “Native Plants and the Nature Connection” presentation at Cotuit Library, Barnstable, Kristin Andres.</p>

	<p>6/5/23: Cape Cod Pond Network Meeting, APCC cohosts with Cape Cod Commission.</p> <p><i>Reports & Publications</i></p> <p>“2022 State of the Waters: Cape Cod” report, posted at https://capecodwaters.org</p> <p>“Natural Cape Cod Landscaping”; fact sheet - “About Your Septic System & planting on or around the components”</p> <p>APCC’s Eco-landscape Audit Program – new program meeting with property owners and providing recommendations on how to make their property more climate-wise, manage stormwater, conserve water, support pollinators and plant more native plants.</p> <p>APCC Rain Barrel Program – ongoing program making rain barrels available for purchase through Upcycle Products – repurposed food barrels.</p> <p>Draft QAPP for APCC Cyanobacteria Monitoring Program, 2022-ongoing. Lenny Pitts and Karen Malkus-Benjamin.</p> <p>APCC Annual Report for 2021, July 2022. Includes MassBays as an APCC program partner.</p>
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In addition, MassBays is represented on the following networks and advisory groups:

- Chair, Gulf of Maine Council for the Marine Environment (Senior Scientist)
- Co-lead MA Seagrass Working Group (Coastal Data Scientist)
- MA Seagrass Working Group (SS, MB)
- NERR Science Collaborative Advisory Board (Director)
- Trustees’ Coast Strategy Advisory Committee (Director)
- NERACOOS Executive Committee (Senior Scientist)
- NROC Ocean and Ecosystem Health Committee (Senior Scientist)
- PIE Rivers Steering Committee, North Shore Water Resilience Task Force (UNS)
- Salt Marsh Working Group (UNS, MB, SS)
- Ocean Science Advisory Council (MB)
- River Herring Network (SS, CC)
- Barnstable County Coastal Resources Subcommittee (CC)
- New England Estuarine Research Society (SS)
- Mass Rivers Alliance (SS)
- Coastal and Estuarine Research Federation (SS)

Strategy 2.3 Facilitate access to decision making forums, and increase influence on decision making by underserved communities

Title	Increasing awareness of environmental justice issues
CWA Core Program	Protecting coastal waters through the National Estuary Program
Description/Objective	Highlighting local examples of inequitable distribution of adverse and beneficial environmental impacts for multiple audiences
Partners	WAA, NOAA, Mashpee Wampanoag tribe, UMB, SSL, Wellesley College
Status	New resources produced by the Mystic River Ambassador will scaffold new initiatives in the coming year(s).
Accomplishments and deliverables	
Region-specific EJ materials produced (MyRWA)	Mystic River Ambassador worked closely with MassBays ED to develop a format and content for a series of EJ reports to inform RSP plans for community engagement. The reports combine EJ Screen, EEA EJ Maps, and demographic information, along with lists of organizations already working in the area on similar issues.
Talking Trash for Clean Oceans Teen Program (LNS)	Four high school interns to be funded by NOAA for projects focused on sustainable practices for restaurants (“CoastSmart Restaurants”), home composting (“Composting 101”), and promoting proper disposal of cigarette butts (“Butt Bins”).
Produced materials for the Diversity Committee of the <i>Evolution in Changing Seas Research Coordination Network</i> (MB)	Network-generated deliverables include: 1) Virtual Lab Meeting Training Program, which pairs mentees from historically marginalized groups with mentors in the field; 2) profiles of junior and senior members to facilitate networking and collaborations among academic and non-academic partners; 3) creating educational activities and career development pages, with the goal of having a comprehensive list of resources for educators and students; 4) organizing/facilitating discussion of diversity, equity, and inclusion in evolution and marine science for Summer 2022 Integration and Training Workshop for students and early career scientists
Engaged in national- and state-level planning and assessment of DEI/EJ efforts (MB, Central Staff)	NUMSC participated in an NEP-EPA working group for mutual support and information exchange about effective approaches and tools for increasing DEI (and EJ awareness) within NEP structures and programming. Presented options for tools and assistance to the NEPs in February 2022, including use of EPA’s EJ Screen.

Strategy 3.1 Establish target (improved) water quality and habitat conditions tied to desired uses and ecosystem services

Title	Development of a Biological Condition Gradient Framework for Estuaries in MassBays. (Central Staff)
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	Use the BCG framework to set and measure progress towards targets for improvement in estuarine ecosystem conditions.
Partners	STAC, EPA Region 1, EPA ORD, EPA OST
Status	Estuarine habitat condition targets identified and endorsed by the MC, metrics proposed and accepted for tracking progress toward the targets. Targets are included in the CCMP.
Accomplishments and deliverables	
Resource-stressor categories	Following the finalization of ecotypes and long-term habitat targets, MassBays developed a list of key indicators to measure progress towards targets over time. These indicators were partly informed by the resource-stressor embayment categories developed by the Northeastern University team in fall 2021.
Target habitat extent and conditions (“habitat goals”) shared publicly	BCG-derived targets for salt marsh, eelgrass, and tidal flats were endorsed by the MC in June 2021 and included as a specific layer with a description of the process in the ETT (soft launch June 30, 2022). Work on diadromous fish spawning habitat was started in Fall 2022. The targets were incorporated in the recently finalized CCMP in February 2023.

Strategy 3.2 Guide local action to expand habitat and improve water quality according to targets

Title	Direct assistance to secure project funding
CWA Core Program	Protecting coastal waters through the National Estuary Program
Objective	MassBays provides assistance with project scoping, grant writing, and project implementation to advance local efforts aligned with the CCMP.
Partners	Municipal staff, other project-specific partners
Status	All entries below were submitted with CS and/or RC assistance. Central Staff and all RCs continue to engage with municipal partners to secure project-specific funding.
Accomplishments and deliverables	
Central Staff outputs	<p>April 2023: “Optimizing local tide gate operations and management to restore salt marsh hydrology” successful proposal submitted to RAE, \$233,460</p> <p>April 2023: “Modeling and piloting a new seed-based approach to large-scale eelgrass restoration in Massachusetts” full proposal submitted to WHOI, \$337,366</p> <p>May 2023: “Building Capacity for Restoration: Herring River Watershed Restoration Collaborative” pre-proposal submitted to NFWF America the Beautiful funding opportunity, \$1,031,184</p>
Cape Cod outputs	<p>10/22: “Building the Cape Cod Satellite Imagery Network for Cyanobacteria Monitoring” proposal to work with NOAA to test use of remote sensing satellite data to screen ponds for cyanobacteria monitoring. Submitted to private foundation.</p> <p>12/7/22: “Proposal for Cape Cod Pond Monitoring Program Consultant” proposal to conduct 3-year monitoring program to monitor 50 ponds Cape-wide. Submitted to Barnstable County.</p> <p>5/23: “Piloting an Innovation II: Satellites and Pond Monitoring for Cyanobacteria” – proposal for second year of using remote sensing satellite data to screen ponds for cyanobacteria monitoring. Submitted to private foundation.</p>
South Shore outputs	<p>4th Cliff Mussels, Mass Audubon/Dept of Defense, \$10,820, 2023</p> <p>Chandler Pond dam removal feasibility study, Bill Earley, \$58,300, 2022-2023</p> <p>DEP WQ Monitoring Grant, MassDEP, \$13,525, 2023</p> <p>Eaglemere Foundation for GIS Field Tech, Eaglemere Foundation, \$20,000, 2022-2024</p> <p>Estuary Explorers, Dufault Foundation, \$6,000, 2023</p> <p>Anonymous Foundation River Restoration Capacity, Anonymous Foundation, \$1,000,000, 2023-2025</p> <p>Grow Native and FISH School Youth Climate Action Toolkits, Battelle Foundation, \$25,000 , 2023</p> <p>Jacobs Loosestrife CPC, Town of Norwell , \$5,323 , 2023</p> <p>Veolia Eelgrass, MassDMF , \$6,995 , 2023</p>

Metro Boston outputs	Saugus Pines River Advocacy for Regional Resilience (SPRARR) Project Continuation – FY24 MVP Action Grant – City of Revere, City of Lynn, Town of Saugus, City of Everett, City of Malden – \$210,000 with 25% in-kind match with staff hours from communities
Lower North Shore outputs	<p>Marblehead Municipal Light Department and Adjoining Public Lands Coastal Resilience Design and Permitting, CZM Coastal Resilience Grant FY23 – 24, \$523,000, match \$169,000, total \$692,000 serving as project manager with the Town Planner</p> <p>The House of the Seven Gables Coastal Resilience Grant FY23-24 \$509,919, match \$94,323, total \$604,242, providing technical assistance</p> <p>Peabody-Salem Resilient North River Corridor & Riverwalk Project, MVP Action Grant FY22 - FY23 \$150,000 serving on the project team and conducting outreach and engagement</p> <p>Beverly Bass River District Resilience Plan, MVP FY23, \$200,000, match \$67,545, total \$267,025 serving on the project team and conducting outreach and engagement</p> <p>City of Salem/Collins Cove to Willows Resilience Study, MVP Action Grant FY23 \$234,565, match \$78,257, total \$312,822, serving on the project team and conducting outreach and engagement</p> <p>Salem Greening Gateway City Program, EEA – DCR FY23 \$15,000, Salem’s non-profit partner recipient conducting outreach to EJ neighborhoods</p> <p>Manchester Coastal Vulnerability Plan, CZM Coastal Resilience Grant FY23 \$175,132, serving on advisory committee</p> <p>Resilient Together The Point, Coastal Resilience Grant FY 23-24, \$203,000</p>
Upper North Shore outputs	<p>Merrimack River Early Alert Tool, Community Compact Cabinet Efficiency and Regionalization grant program FY23-24, \$75,000, serving as project manager</p> <p>MS4 Compliance, DEP MS4 Municipal Assistance Program, FY23 \$70,500, match \$10,000, total \$80,500 serving as project manager.</p> <p>Eelgrass Restoration Work in Great Marsh, New England Biolabs, FY23 \$50,000, providing technical assistance</p> <p>Regional Hazard Mitigation Plan Update, FEMA Building Resilient Infrastructure and Communities (BRIC), FY22-23 \$55,7500, match \$19,250, total \$75,000</p> <p>Bylaw Review for Climate Resiliency, Executive Office of Energy & Environmental Affairs Planning Assistance Grant, FY 2022-2023 \$68,000, match \$33,500, total \$101,500, serving as project manager.</p> <p>Merrimack Restoration Partnership, Department of Ecological Restoration Partnerships Program, FY23-24 \$46,000, Lower Merrimack River Sub-Regional Coordinator, serving as project vendor</p> <p>Great Marsh Restoration Funds, MA Division of Marine Fisheries, Marsh Wrack mapping and impact assessment, Norwood Point and Essex River eelgrass (shoots and seed) restoration, green crab monitoring and Phase1 of white paper, beach sand and water column microplastics collection and assessment. FY23, serving as project manager</p>

Strategy 3.3 Maintain MassBays’ National Estuary Program status

Title	Establish MassBays as a Center within the School for the Environment at UMass Boston (Central Staff)
CWA Core Program	Protecting coastal waters through the National Estuary Program
Description/Objective	MassBays implements transition to a new host institution, creating new opportunities for diversification of our funding and communications efforts.
Partners	UMB, SFE, CZM, EEA
Status	Transition complete, though MassBays awaits novation of an EPA Exchange Network Grant to UMB; ongoing salary & fringe expended to keep the project on track (MassWaterR) were applied to S.320 in the meantime.
Accomplishments and deliverables	
Files, funds transferred	Worked closely with EEA IT and UMB IT to transfer Sharepoint files and emails. Gained Department status for fiscal accounting and grant applications.
HR, Office space and computers	Shared office with single desks, laptops supplied in McCormack building, adjacent to the Dean and other SFE staff and administration
Establish communication with legislative offices	Director made initial contact with legislators for education and outreach consistent with Federal guidelines during a visit to Washington DC in March and via email.
Apply for new funding for implementing the CCMP	Applied for funding from RAE (successful), WHOI Sea Grant (in review), and NFWF (unsuccessful), all grantors not previously accessible to MassBays. Director is working with UMB development staff to identify other sources. While initial conversations with the Provost led us to assume an indirect rate of 52.5% would be applied, on further investigation they determined that most of MassBays’ work falls under the “Public Service/Other” F&A rate of 36.4%
MassBays stand-alone website launched	An in-process version of the website (www.massbays.org) was presented to the MC on June 14, 2023.

C. New and Ongoing Projects and Activities (July 1, 2023 to June 30, 2024)

Strategies and Outcomes

MassBays' work over the coming year will implement components of our Interim CCMP and contribute to the following Outcomes:

- A. Sustainable NEP
- B. Improved habitat continuity and restored hydrology
- C. Improved water quality
- D. Resilient coastal habitat, including nature-based coastal protection
- E. Restored natural communities
- F. Robust interagency and interdisciplinary collaboration and partnerships
- G. Well-informed, multisector input to decision making which includes underserved communities

Our proposed work with funding under Federal Fiscal Year 2022 is aligned with and driven by the following Goals and Strategies described in the CCMP:

Goal 1. MassBays provides new resources to support research and management in the Bays.

Strategy 1.1 Make new data available, especially to address specific gaps in knowledge

Strategy 1.2 Support valid (QA/QC) data collection and use

Goal 2. MassBays reaches all planning-area municipalities with actionable information about coastal habitats

Strategy 2.1 Support research to inform policy and actions

Strategy 2.2 Technical support and communications

Strategy 2.3 Increase influence of underserved communities on decision making

Goal 3. MassBays provides regular and locally informed State of the Bays reporting that reflects the unique characteristics of MassBays assessment units (embayments, rocky shore, barrier beach) , to document progress and inform local action and progress toward target conditions.

Strategy 3.1 Establish target (improved) water quality and habitat conditions tied to desired uses and ecosystem services, and document progress toward those targets

Strategy 3.2 Guide local action for expanded habitat and improved water quality

Strategy 3.3 Maintain MassBays' National Estuary Program status

Our proposed tasks are also closely related to the Clean Water Act Core Programs, which are:

- (1) establishing water quality standards
- (2) identifying polluted waters and developing plans to restore them (total maximum daily loads)
- (3) permitting discharges of pollutants from point sources (National Pollutant Discharge Elimination System permits)
- (4) addressing diffuse, nonpoint sources of pollution
- (5) protecting wetlands
- (6) protecting coastal waters through the National Estuary Program
- (7) protecting Large Aquatic Ecosystems.

The figures below depict estimates of the Level of Effort (LOE) to be expended toward each Strategy. The division of labor between the Boston office (Central Staff) and regional partners (RSPs) is evident when the two are compared. During the coming year, the Director (see Figure 2) will focus on meeting requirements under the NEP Funding Guidance (Strategy 3.3), including working with our Communications Subcommittee to update the strategic communications plan, the Nominations & Governance Subcommittee to evaluate our SOPs and MC make-up, and re-establishing a Finance Subcommittee. She will also finalize and lead implementation of MassBays' Equity Plan (Strategy 2.3), while working to leverage additional funding for CCMP implementation. The Senior Scientist will be focused on Strategy 3.1, working with EPA ORD to set targets for diadromous fish habitat, Strategy 3.3, finalizing our Science & Monitoring plan, and managing the Healthy Estuaries Grant Program. The Coastal Data Scientist's time will be funded primarily through the FFY23 BIL award, and an ISA with DEP to conduct ground-truthing of eelgrass maps,

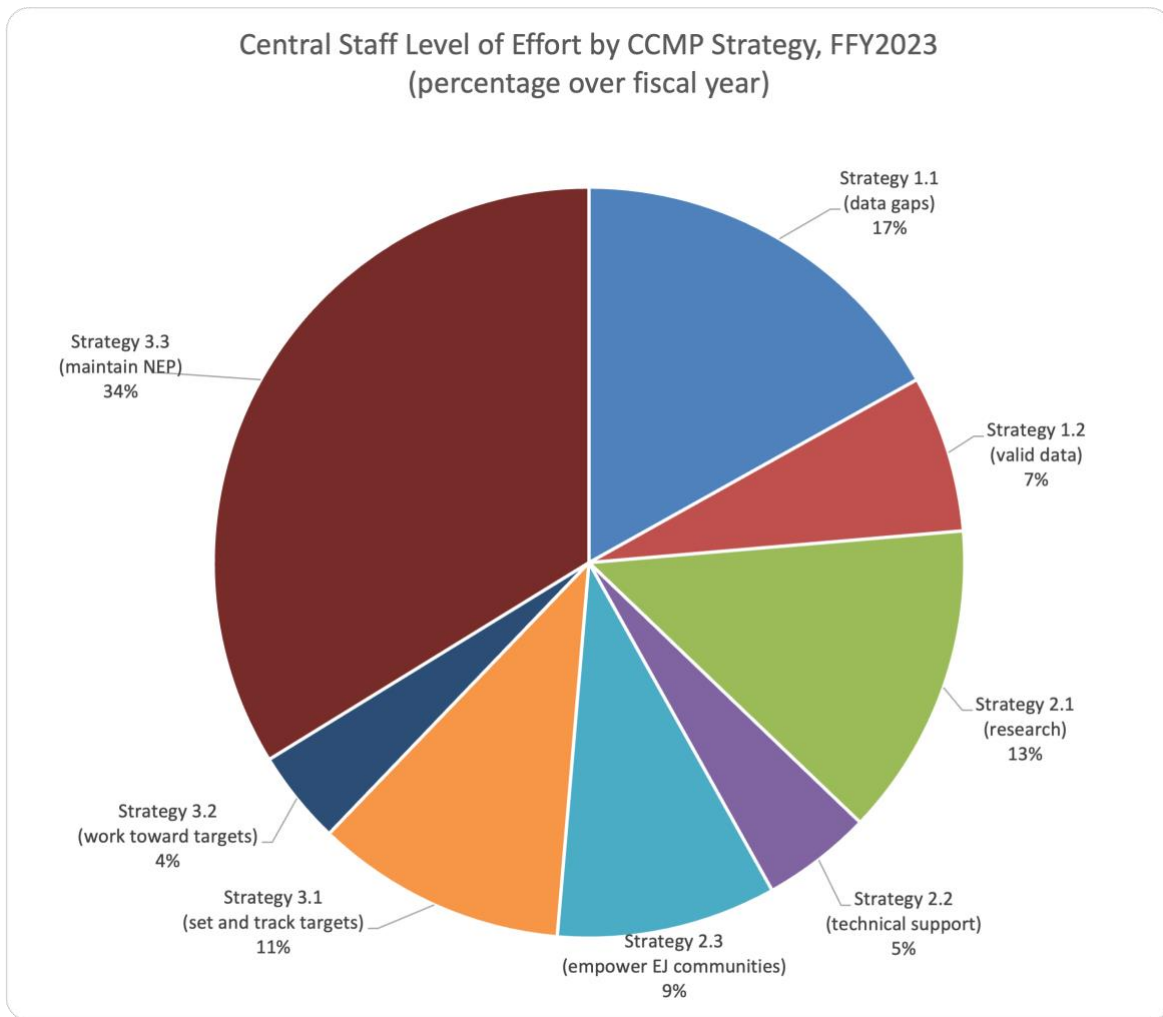


Figure 2. Central Staff Level of Effort (hours charged to S.320 Award) predicted for FFY2023; includes 51.2% of Senior Scientist's hours, 82% Director's hours, 8.5% Coastal Data Scientist's hours. Remainder are included in BIL FFY2023 workplan, DEP ISA (Coastal Data Scientist), and new RAE grant.

RSPs (Figure 3) are focused on local implementation and progress toward improved habitat and water quality conditions, through direct support for community-based actions.

MassBays is looking forward to a year in which we will see significant progress on both the MassBays-wide and regional level.

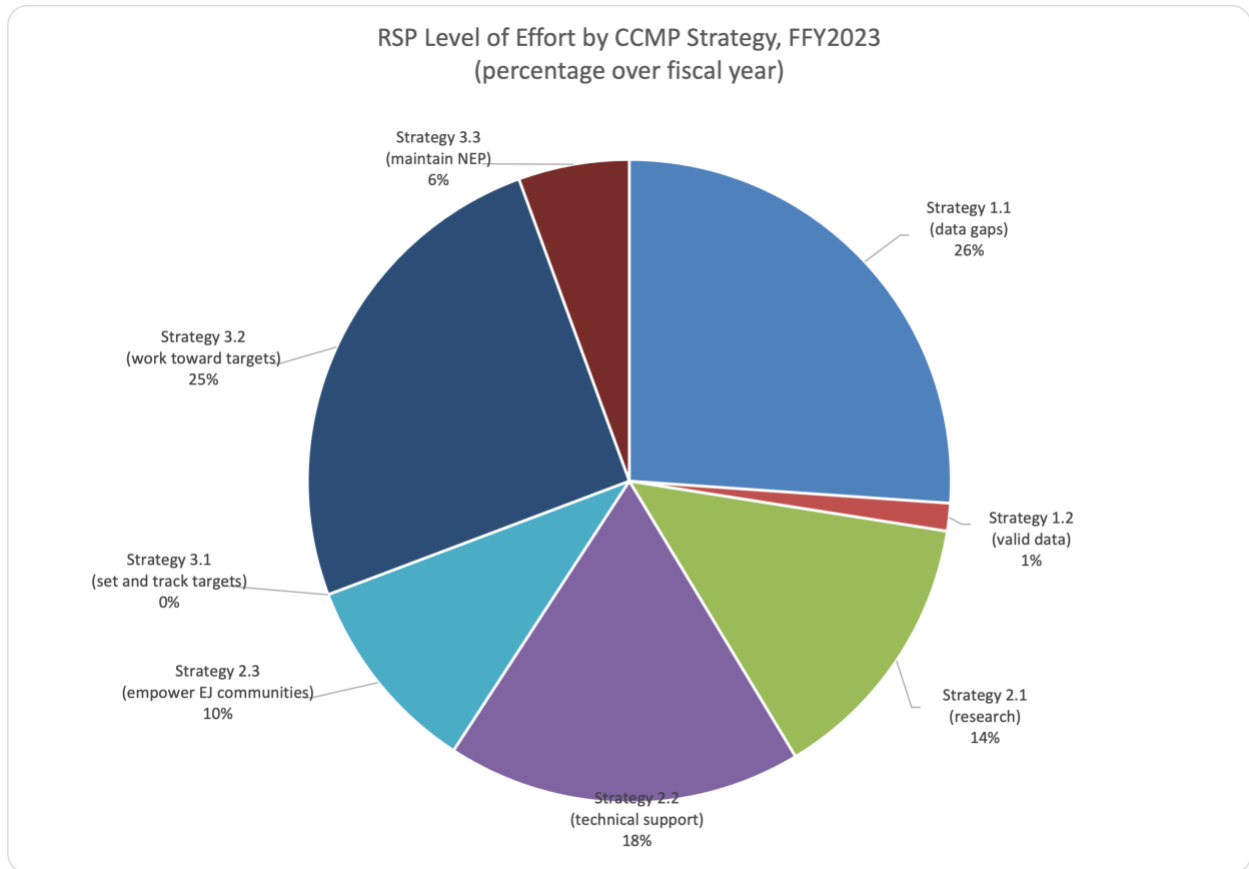


Figure 3. Regional Coordinator LOE allocated from RSP Subawards to each strategy (\$80,000 S.320 funds distributed per region).

The tables of proposed activities below, organized according to MassBays’ CCMP Strategies, include the following:

Title (Region), Budget/LOE: Activity name and MassBays geographic region in which it will be carried out, and non-s.320 funding and/or LOE (hours) to be committed by Central Staff or RSP (for region-specific projects)

Description: Status (New or Ongoing), project activities and objectives

CWA Core Program: Per list (1-7) above

CCMP Outcome: Per list (A-G) above

Partners: Collaborators not directly funded by MassBays/\$320 funds

Timeline & Deliverables: Product(s) expected, and the quarter (Q1-Q4) projected for their completion

Strategy 1.1: Make new data available, especially to address specific gaps in knowledge

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
<p>Monitor Cyanobacteria blooms (Cape Cod)</p> <p>\$5000 + 100h</p>	<p>Ongoing Since FY18 APCC has monitored cyanobacteria in lakes and ponds that discharge to estuaries and serve as diadromous fish spawning habitat. The goals are to collect actionable information on harmful cyanobacteria blooms (HCBs), to raise public awareness of the risks posed and motivate action to improve water quality to alleviate, reduce or eliminate HCBs. Monitoring data are translated into actionable information expressed as low, moderate, or high risk. In FY24 APCC’s goals are to: continue monitoring of ponds in all 15 towns, partnering with Barnstable County’s Department of Health and the Environment which is providing toxin testing of high-risk samples, support action by the Barnstable County Health Agents Committee and individual health agents, and motivate action to protect and improve water quality to reduce the threat of HCBs.</p>	<p>(2) Identifying polluted waters and developing plans to restore them; (6) Protecting coastal waters through the National Estuary Program</p> <p>(C) Improved water quality</p> <p>(F) Robust interagency and interdisciplinary collaboration and partnerships</p> <p>well-informed, multisector input to decision making which includes underserved communities</p>	<p>EPA R1, Barnstable County Dept of Health and Environment, 15 Cape Cod towns; local watershed and pond associations.</p>	<p>(Q4) List of training sessions, number of participants, training materials, Train and supervise staff and interns re: protocol, collect and analyze data, (Q1-4) Cyanobacteria Risk Communication plan (reviewed annually and updated as needed); APCC’s Cyanobacteria Monitoring Program webpage and interactive map of results, other deliverables TBD; Outreach provided to regional networks and underserved communities (e.g., presentations, information, reports, etc.), recommendations, plans, or other examples of actions to improve water quality to reduce the threat of HCBs</p>
<p>Microplastics Sampling (Upper North Shore)</p> <p>\$20,000, 100h</p>	<p>Ongoing Refine a comprehensive sampling plan and collect environmental surface water and beach sand microplastic samples from locations throughout the Great Marsh System (Merrimack River, Plum Island Sound, Essex Bay, and Annisquam River)</p>	<p>(4) Addressing diffuse, nonpoint sources of pollutants</p>	<p>NECC, UNH, 8TGM, volunteers, Triple Ring Technologies (consultant)</p>	<p>(Q1-Q2) Finalized sampling plan and samples collected from selected Great Marsh surface waters and beaches, (Q3) data tables, (Q4) draft annual report, laboratory SOP</p>

Strategy 1.1 continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Revise Monitoring Framework (Central Staff) 100h CS	New Revise and update the monitoring framework to reflect habitat targets. Reframe as a Monitoring Framework and Science Plan that includes research needs.	(6) Protecting coastal waters through the National Estuary Program (C) Improved water quality	STAC	(Q2) Draft revised and updated Monitoring Framework and Science Plan; (Q3) Final revised document incorporating input from STAC and others as needed.
Marsh health in the face of sea level rise (Upper North Shore) \$30,000 + 100h	Ongoing Complete three-pronged approach to monitor and assess impact of SLR on coastal saltmarsh ecosystem: <u>Marsh Edge Erosion Monitoring on Plum Island Sound</u> : conduct additional mapping to update the erosional/deposition status of marsh bank and marsh edge in the creeks and rivers of Plum Island Sound and Essex Bay to determine future living shoreline potential. <u>Marsh Wrack Evaluation and Mapping</u> : Use map of wrack accumulation developed from previous workplan to further examine wrack accumulating on the marsh in areas of upland edge, pannes, and woody vegetation. Assess role of wrack on vegetation die-off. <u>Map Platform Die-off</u> : Impounded water on the marsh platform from increased inundation from SLR is evidenced by small vegetation die-off areas where differences in marsh elevation exist. Review and ground-truth aerial imagery of die-off locations	(5) Protecting wetlands (B) Improved habitat continuity and restored hydrology	Marsh Edge Erosion: Boston University, ETGM Marsh Wrack: UNH, NEMMC&WD Marsh Die off: UNH, Drone contractor	(Q1) Marsh wrack monitoring protocol to assess long-term trends and potential impacts (Q2) annual data update re: erosion throughout Plum Island and Essex Bay, (Q3) final, ground-truthed map of die-off locations, final reports and maps of marsh edge erosion, wrack, and die-off

Strategy 1.1 continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Monitor diadromous fish runs (South Shore, Cape Cod) 150h SS \$7000 + 140h CC	<p>Ongoing Provide local, state and federal fisheries managers with population estimates of river herring at monitored runs to inform protection, restoration and management efforts. RCs will support citizen monitoring of fish runs by providing partners and volunteers with training, data management, QA/QC, reporting, and other assistance. Monitoring data will be translated into recommendations for restoring and protecting diadromous fish habitat, and restoration successes will be documented as they occur.</p>	(6) Protecting coastal waters through the National Estuary Program (B) Improved habitat continuity and restored hydrology	DMF; NOAA; Woods Hole Sea Grant; CCCE, River Herring Network; South Shore towns; 12 Cape Cod towns; local NGOs	(Q1-4) Participate in River Herring Network annual conference and/or other events as held, (Q1) Provide input to target-setting for diadromous fish habitat, (Q2) Final data report for Spring 2023 herring counts submitted to DMF, (Q2-Q4) Recruit and train volunteers for Spring 2024, including reports on Spring 2023 herring counts, (Q4) document volunteer effort to conduct Spring 2024 herring counts; CC: synthesis report of Cape Cod herring count data from 2007 – 2023, including information on changes in run sizes over time, recommendations for monitoring, restoration, and protection.
Water quality monitoring (South Shore) \$11,425 + 175h	<p>Ongoing Citizen monitoring in coastal waters to identify potential for remediation and source control, through the Riverwatch program in the North and South Rivers and other short-term water quality monitoring efforts. Conduct bacterial source tracking in North River Headwaters with Town of Hanover.</p>	(2) Identifying polluted waters and developing plans to restore them (C) Improved water quality	Volunteers; Towns of Duxbury, Kingston, Plymouth, Norwell, and Hanover	(Q1) Riverwatch volunteer monitoring completed, (Q2) bacterial source monitoring results provided to MassDEP and included in outreach efforts

Strategy 1.1 continued

<p>Bacteria Monitoring: Clean Beaches & Streams and Upstream Tributary Sampling (Lower North Shore)</p> <p>\$2000 + 52h</p>	<p>Ongoing Identify sources of pathogen pollution to Massachusetts' waters, specifically Salem Sound and its tributaries, particularly illicit sewage discharges and faulty sewer and stormwater systems and promote their remediation. Activities include biweekly summer water testing for <i>Enterococcus</i> at outfalls and streams and sharing data with municipal staff to prompt action.</p>	<p>(2) Identifying polluted waters and developing plans to restore them</p> <p>(C) Improved water quality</p>	<p>Manchester Coastal Stream Team, Volunteers</p>	<p>(Q1) Report on bacterial levels for 15 - 18 outfalls or streams, results published on SSCW website, (Q3) current and historic monitoring data uploaded to WQX, (Q1-4) List of remediation actions taken up by municipalities.</p>
<p>Assessing water quality and presence of sea brook trout (Lower North Shore)</p> <p>\$1000 + 52h</p>	<p>Ongoing Continue a citizen monitoring program to record temperature Sawmill Brook & Cat Brook in Manchester-by-the-Sea and sample environmental DNA (EDNA) for sea brook trout, herring, and rainbow smelt. Support cold water fisheries DEP efforts.</p>	<p>(2) Identifying polluted waters and developing plans to restore them</p> <p>(C) Improved water quality</p> <p>(E) Restored natural communities</p>	<p>Manchester Coastal Stream Team</p>	<p>(Q2) Temperature, EDNA data collected; (Q3-4) summary of results and recommendations for subsequent years; data shared with DEP.</p>
<p>Monitor Cape Cod lakes and ponds (Cape Cod)</p> <p>\$14,000 + 280h</p>	<p>New In 2022 Barnstable County approved the Freshwater Initiative to monitor Cape Cod's ponds and lakes. The goals of the pond monitoring program are to help communities to better protect and manage our ponds by collecting water quality data to characterize pond conditions, to understand the effects of watershed development and other stressors, and to inform pond protection and management strategies. The Cape Cod Commission contracted APCC to monitor 50 ponds Cape-wide from</p>	<p>(2) Identifying polluted waters and developing plans to restore them; (6) Protecting coastal waters through the National Estuary Program</p> <p>(C) Improved water quality</p> <p>(F) Robust interagency and interdisciplinary</p>	<p>Cape Cod Commission, Barnstable County, 15 Towns on Cape Cod, and watershed and pond organizations.</p>	<p>(Q1-Q4) List of project team meetings, recommendations, and other projects; Documentation of Ponds Network participation and outreach to members, and CCC technical advisory committee participation and outcomes; (Q4) Results of 2023 data collection: list of ponds monitored, summary of results and recommendations, and list of ponds to be monitored in 2024; training for implementation of Ponds QAPP and any</p>

	<p>2023 through 2025, monitoring each pond seven times per year from April through October. Criteria for selecting ponds to monitor include: size, depth, data gaps, public access, herring runs, other pond characteristics, geographic considerations, and town priorities. Roughly 20% of ponds to be monitored contain herring runs and spawning habitat, so the monitoring program will provide information to evaluate effects of pond water quality on diadromous fish habitat and estuarine water quality. Tasks include designing and implementing a regional pond monitoring strategy, updating the Ponds QAPP with the goal of designing a monitoring program sustainable over the long term, and providing input for a regional database on pond restoration and remediation approaches.</p>	<p>collaboration and partnerships</p> <p>well-informed, multisector input to decision making which includes underserved communities</p>		<p>recommendation for updating the QAPP</p>
<p>Coastal Acidification Monitoring and Management (Central Staff)</p> <p>20h Senior Scientist</p>	<p>Ongoing Monitor coastal acidification conditions in Duxbury Bay, a hotspot for shellfish aquaculture industry in Massachusetts. The system needs to be serviced and the pH sensor examined to address a mechanical issue. Once available, the system will be redeployed.</p>	<p>(6) Protecting coastal waters through the National Estuary Program</p> <p>(C) Improved water quality</p>	<p>Town of Duxbury, UMB, EPA ORD, volunteers</p>	<p>(Q2-Q3) Outcome of viability assessment of continuing sampling with this system; (Q4) Report of findings from water quality sampling and assessment and list of outreach events/number of participants; (Q4) Doctoral thesis data analysis by UMass Boston student and first technical report</p>

Strategy 1.1 continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Salt Marsh Vulnerability Assessment and Restoration (South Shore) 250h	Ongoing Work with volunteers to monitor salt marsh vegetation changes through the Salt Marsh Sentinels program; participate in the Massachusetts Salt Marsh Working Group (SMWG) and its Sea Level Rise Subcommittee. New Resurvey long-term salt marsh transects and create a prioritization of marsh units for restoration and protection	(5) Protecting wetlands (D) Resilient coastal habitat, including nature-based coastal protection	Dock owners, SMWG, UMass Amherst (pending funding)	(Q1-4) Participate in SMWG, (Q2) Report on findings and participation of dock owners in collection of salt marsh data, data report on transect re-surveys, (Q4) Draft prioritized list and map of marsh units and their status
Outfall Monitoring Science Advisory Panel (Central Staff) 100h (Senior Scientist, Director)	New (pending permit) Convene a Science Advisory Panel that evolves from the existing OMSAP to incorporate WWTP and other NPDES permit discharges and has a wider purview. Panel would track monitoring program required in permit and provide MassBays with data to address gaps.	(6) Protecting coastal waters through the National Estuary Program (C) Improved water quality	SAP members (TBD)	(Q1) outcome of discussion with current OMSAP; prospectus outlining SAP structure, goals, and expected outcomes; (Q3-Q4) SAP set up. (Timing depends on the issuance of the dual EPA/MassDEP permit)
Horseshoe crab spawning surveys (South Shore) and population survey (Lower North Shore) 60h SS 52h LNS	Ongoing Conduct horseshoe crab spawning surveys in Duxbury Bay to assess the population and inform resource management. New Establish community monitoring from April through October to learn more about the local population survey of the horseshoe crab	(7) Protecting large aquatic ecosystems (E) Restored natural communities	DMF, Town of Duxbury, Duxbury Beach Reservation Inc., Mass. Horseshoe Crab Advocates Steering Committee, volunteers	(Q1) 2023 SS field work completed, and data submitted to DMF; number of LNS volunteers trained; (Q3) LNS summer monitoring results, (Q4) 2024 Spring surveys completed with volunteers

Strategy 1.1 continued

Title (Region) , Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
<p>Monitoring Marine and Wetland Invasive Species (North Shore and South Shore)</p> <p>\$1000 + 52h LNS 48h UNS \$5000 + 105h SS</p>	<p>Ongoing Monitor established field sites for non-native species in cooperation with CZM’s MIMIC program, conduct training for monthly monitoring from July to October 2023 and share results with CZM and the public. LNS also monitors long-term settle plates at the Beverly Pier to understand fouling organisms. SS will assist the Town of Norwell with managing purple loosestrife at Jacobs Pond and participate in the 2023 Rapid Assessment Survey. UNS will update their monitoring protocol and data tracking system to a digital platform.</p>	<p>(7) Protecting large aquatic ecosystems</p> <p>(E) Restored Natural Communities</p>	<p>CZM, volunteers</p>	<p>(Q1, Q4) number of volunteers trained per season (Q2) MIMIC data submitted to CZM, along with photodocumentation of Beverly Pier settle plate fouling (LNS); photos and data from beetle release and monitoring in Jacobs Pond (SS); outputs from Rapid Assessment Survey (SS); and digital format for data management (UNS)</p>

Strategy 1.1 continued

Title (Region) Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Water Quality and Benthic Communities Monitoring in Salem Sound (Central Staff, Lower North Shore) 240h Senior Scientist 50h LNS	Ongoing report on and analyze results of 2019-2020 nutrient monitoring and benthic community assessment program in Salem Sound.	(6) Protecting coastal waters through the National Estuary Program (C) Improved water quality	CZM, SSU, volunteers	(Q2) Draft technical report provided to STAC for input; Final report with results of expert review and recommendations for next steps; (Q3-Q4) List of priorities and plan to implement (e.g., investigate high phosphates in Salem Sound).
Massachusetts Coastal Condition Assessment (Central Staff) \$158,000 +160h Senior Scientist	Ongoing Coordinate water quality, sediment, and benthic monitoring survey in the nearshore of Massachusetts over the time period 2020-2023. Parameters include measures of water quality, sediment quality and benthic communities from a total of 90 sites. The data serve to inform MassBays' State of the Bays reporting under CWA §320 and DEP's required reporting under CWA §109.	(2) Identifying polluted waters and developing plans to restore them (C) Improved water quality	DEP, STAC, Normandeau Consultants	(Q1) Field work to collect data from Region C; (Q2) Results for Year 4 (2023) data compiled; (Q3) Development of draft report of the 4-year study and review by STAC; (Q4) Final report with findings, recommendations and next steps distributed

Strategy 1.2 Support valid (QA/QC) data collection and use

Task Title (Region) Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Support use of AquaQAPP and data upload to WQX (Central Staff, Metro Boston, South Shore, Cape Cod) 100h Coastal Data Scientist 20h MB \$2100, 20h SS 20h CC	Ongoing Support monitoring groups in the use of AquaQAPP, increase accessibility to new and historic data generated by watershed groups by providing training and support to facilitate data upload to EPA's WQX framework New SS will work with coalition of watershed associations to host a MassWateR/WQX workshop	(2) Identifying polluted waters and developing plans to restore them (6) Protecting coastal waters through the National Estuary Program (C) Improved water quality	EPA Exchange Network, EPA Region 1, DEP, Citizen Science Association, Coastal Monitoring Coordinators' Network, other ngos	(Q3) NSRWA data uploaded to WQX and available for viewing via the ETT (Q4) List of organizations that received one-on-one AquaQAPP and WQX support; (Q4) List of groups supported via training, materials; (Q3) Status report re: RSP data uploaded to WQX, (Q4) Citizen data highlighted via the State of the Bays/ETT
Build technical capacity for data analysis and visualization (Central Staff) EPA Exchange Network funds 100h Coastal Data Scientist	Ongoing Provide training, outreach and support for Community of Practice for new R-based package (MassWateR).	(6) Protecting coastal waters through the National Estuary Program (C) Improved water quality	EPA Exchange Network, DEP, ACASAK Aquatic Monitoring Technologies	(Q1) Monitor and respond to CoP requests for help. (Q2) plan additional trainings (Q3-Q4) conduct training, outreach, and reporting efforts

Strategy 2.1 Support research to inform policy and actions

Task Title (Region) Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Quantifying Phytoplankton and Turbidity in Salem Harbor (Lower North Shore) 52h	Ongoing Devise actions in response to results of research on phytoplankton community structure funded through the Healthy Estuaries Grant Program.	(2) Identifying polluted waters and developing plans to restore them (C) Improved water quality	SSU	(Q1-2) List of remediation alternatives and strategies, (Q3) Attendee list and outcomes of a meeting for local, state, and federal stakeholders to convey results and recommendations, (Q4) Agenda and sign-in sheet for a public lecture
Health Estuaries Grant Program (Central Staff) 200h Senior Scientist	Ongoing 2024-2026 round of Healthy Estuaries Grants will be made available.	(6) Protecting coastal waters through the National Estuary Program Improve understanding and extent of data available across MassBays' planning area.	EPA	(Q2) Call for proposals issued; (Q3) List of recommended awardees; (Q4) Contracts and scopes of work for each awardee.
Regional post- restoration salt marsh monitoring (Lower North Shore) \$25,000 + 200h	New Conduct post-restoration monitoring and reporting for six completed DER salt marsh restoration projects on the North Shore	(5) Protecting wetlands (E) Restored Natural Communities	DER	(Q1-Q2) Documentation of vegetation and salinity monitoring, including data, field notes, and photos; (Q3) Inventory of all existing pre-and post-restoration monitoring data; (Q4) Final report modeled on similar effort conducted by Cape Cod RC

Strategy 2.1 continued

Task Title (Region) Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
<p>Investigating eelgrass conditions, water quality, and sediment characteristics in Duxbury-Kingston-Plymouth Bays (Central Staff, South Shore)</p> <p>240h Senior Scientist, Coastal Data Scientist \$7000 + 140h SS</p>	<p>Ongoing Implement the annual eelgrass rapid assessment with citizen scientists to monitor eelgrass extent and condition, and inform efforts to determine the causes of local eelgrass loss.</p> <p>Conduct water quality monitoring and sediment core analysis to collect information on physical conditions that may be contributing to the losses.</p>	<p>(6) Protecting coastal waters through the National Estuary Program</p> <p>(7) Protecting large aquatic ecosystems</p> <p>(E) Restored natural communities</p> <p>(C) Improved water quality</p>	<p>DMF, Duxbury Bay Maritime School, Town of Plymouth, Volunteers, EPA Region 1 (Chelmsford Lab), SSU</p>	<p>Eelgrass rapid assessment survey: (Q1, Q3) Actions and highlights of steering committee meetings (CS); (Q1-Q2) Number of volunteers trained, training materials, photo documentation (SS), (Q2) Technical report of findings and recommendations; data updated to include 2023 data and shared; consider development of a five-year assessment of eelgrass conditions and recommendations; (Q3-Q4) plan for 2024 assessment.</p> <p>Water and sediment quality: (Q1-Q2) Conduct monthly water quality monitoring (June – November) and sediment sampling (July); Sample analysis;(Q2) Data analysis and meetings to discuss findings from 2022 and 2023; (Q3) Report of 2022-2023 findings and recommendations for next steps; Plan for 2024.</p>

Task Title (Region) Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Increasing agency confidence in eelgrass maps used for project review and ocean planning (Central Staff) 90h Coastal Data Scientist	Ongoing Finalize analysis, reporting and outreach for project that correlates eelgrass edge-of-bed determinations generated by remote sensing methods (drone, satellite, side-scan sonar, and fixed-wing aerial mapping) with divers' assessments to support more accurate mapping of the resource to inform policies and protective actions.	(7) Protecting large aquatic ecosystems (E) Restored natural communities	NOAA, CZM, DMF, DEP, MIT Sea Grant	(Q1) Complete reporting deliverables, present results at scientific conferences.
Climate resilient eelgrass restoration 50h Coastal Data Scientist	New Convene NEPs across the east coast toward a strategy for eelgrass restoration that incorporates climate resiliency, participate in other working groups focused on the same.	(6) Protecting coastal waters through the National Estuary Program 7) Protecting large aquatic ecosystems	NEPs across the region, NPS, EPA	(Q1) Meeting notes, spreadsheet of NEP needs and resources. (Q1-4) Collaboration and development of strategy.

Strategy 2.1 continued

Task Title (Region) Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Monitor and restore blue mussels (South Shore) \$10,000 + 75h	Ongoing Multi-year restoration program for mussels in the near subtidal and low intertidal to benefit migratory shorebirds and restore a crucial hard-bottom species at the mouth of the North and South Rivers	(7) Protecting large aquatic ecosystems (E) Restored Natural Communities	MassAudubon, US Air Force (Hanscom/4 th Cliff), Texas A&M University	(Q1) List of docks hosting mussels and owner-participants with their typical timing for dock removal, protocol for mussel transplant, (Q3) annual report to funding agency (Hanscom/Mass Audubon) and outreach re: transplanting results
Investigating aquaculture-eelgrass interactions to inform policy (Central Staff, Metro Boston) 60h Coastal Data Scientist 320h MB	Ongoing Analyze results of investigations conducted with FFY22 funding, and prioritize research goals pertaining to eelgrass and aquaculture interactions. Pursue research and partnerships. New (MB) Scope, develop, and submit a collaborative proposal for research funding on interactions between eelgrass and recreational/commercial bivalve species to inform policies that may enhance synergies among eelgrass restoration efforts, fisheries, and the aquaculture industry	(7) Protecting large aquatic ecosystems (G) Well-informed, multisector input to decision making which includes underserved communities	MIT Sea Grant, DMF, TNC	(Q1) Prioritized list of next steps and potential research projects, (Q2 - Q3) further develop and identify funding sources to implement the highest ranking ideas with greatest support from advisors, (Q4) Proposal submitted
Regional Hazard Mitigation Planning (Upper North Shore) \$40,000 + 400h	New Lead effort to update regional FEMA Hazard Mitigation Plan (HMP). Establish a workplan, build modules, facilitate workshops and meetings with 10 communities across the North Shore to update their regional HMP.	(7) Protecting large aquatic ecosystems (G) Well-informed, multisector input to decision making which includes underserved communities	Local Municipal Hazard Mitigation Planning Teams, MEMA	(Q1) Project workplan, timeline, and 10 Hazard Mitigation Planning modules for use by local teams; (Q1-Q4) sign-in sheets from meetings with local teams, completed modules; (Q3-Q4) draft regional HMP.

Strategy 2.2 Provide education, training, and technical support; share case studies (successful and not); and support collaboration and cooperation on specific topics

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
MassBays State of the Bays planning and outreach (Central Staff) 200h	New (postponed from FFY22) Building on the ETT, plan and implement the State of the Bays water quality and habitat assessment, report(s), and outreach activities	All CWA core programs All CCMP outcomes	CZM, DER, DMF, DEP, MWRA, Mass Rivers Alliance, Management Committee, Towns, regional scientific and policy partners	1) State of the Bays Symposium or other public launch of the ETT, incorporating findings of the ESG
Local priority program development and education and outreach, to increase awareness of MassBays' work (UNS, MB) 200h UNS 160h MB	New Efforts to be undertaken by new RCs to establish and bolster new and existing regional partnerships, explore priorities, and identify projects and potential funding sources for those. Assess LGC membership and engagement to expand the audience for and increase awareness of MassBays' mission and work.	All CWA core programs All CCMP outcomes	Municipalities, nonprofits, businesses, and government agencies	(Q1-4) Quarterly updates regarding local initiatives and progress, (Q4) List of potential new BHEN Steering Committee members, and evidence of reinvigorated 8TGM including evaluation of sector- and community-specific representation, (Q4) FY25 workplans that reflect input from LGCs,

Strategy 2.2, continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
<p>Greenscapes, Merrimack Valley Stormwater Collaborative (North Shore)</p> <p>\$67,500 + 100h LNS \$8,500 + 40h UNS</p>	<p>Ongoing Create and disseminate outreach information, activities, and materials on stormwater management to <i>Greenscapes</i> member communities and Stormwater Collaborative members, in support of DPW directors and stormwater coordinators. UNS: Facilitate meetings, maintain website of the Merrimack Valley Stormwater Collaborative (MVSC) to provide support to DPW Directors and Stormwater Coordinators working to meet NPDES MS4 permit requirements (UNS).</p>	<p>(2) Identifying polluted waters and developing plans to restore them</p> <p>(C) Improved water quality</p>	<p>IRWA, MRWC, more than 27 municipalities</p>	<p>(Q1) List of Greenscapes communities, (Q2-3) MS4 Outreach and Education (via webinars, lectures, personal assistance), (Q1-Q4) Stormwater Collaborative meeting agendas and attendee lists, (Q1-4) “Keeping Water Clean (KWC)” school program, list of on-demand presentations delivered (“Why Stormwater Matters,” “Greenscapes 101,” “Slow the Flow” or other agreed upon topic); Updated SW Collaborative website</p>
<p>Adopt a Beach and Talking Trash for Clean Oceans (Lower North Shore)</p> <p>\$5000 + 50h</p>	<p>Ongoing Work with the public and schools to build marine debris awareness and institute behavior changes. Projects include conducting <i>Adopt a Beach</i> trainings, supporting volunteer “Beachkeepers,” hosting community service projects, and educating the public of the seriousness of plastic litter on land and in the oceans</p>	<p>(6) Protecting coastal waters through the National Estuary Program</p> <p>(E) Restored natural communities</p>	<p>Volunteer Beachkeepers, Talking Trash school program</p>	<p>(Q1-Q4) List of volunteer trainings and numbers of volunteers, (Q3) List of community service projects, (Q3) report on litter reduction projects implemented in cooperation with restaurants, (Q4) List of relevant publications and presentations for public audiences</p>

<p>Support municipal and regional actions that promote resilient coastal habitats and communities through the use of nature-based solutions (Upper North Shore, Lower North Shore, South Shore, Cape Cod)</p> <p>\$15,000 + 100h UNS \$30,000 + 200h LNS 100h SS \$1000 + 20h CC</p>	<p>Ongoing Work with partners and communities to encourage planning for climate change and adoption of municipal bylaws and adaptation measures that promote resilient coastal habitats, and use of nature-based solutions. Activities include providing assistance to review stormwater, wetland, zoning, and subdivision bylaws and regulations as they relate to LID, green infrastructure, and climate resiliency; convening municipal staff for joint outreach and education efforts, including the South Shore Climate Group; securing funding via MVP and Coastal Resilience grant programs and plan and implement those projects, especially Duxbury Beach Reservation beach profiling; and sharing lessons learned.</p>	<p>(5) Protecting wetlands</p> <p>(6) Protecting coastal waters through the National Estuary Program</p> <p>(D) Resilient coastal habitat, including nature-based coastal protection</p>	<p>NSF, EEA, CZM, MAPC, DEP, IRWA, UMB, Upper and Lower North Shore, Metro Boston, South Shore, and Cape Cod municipalities and NGOs, especially Marblehead and Salem</p>	<p>(Q1) Model bylaw language for climate resiliency (UNS); (Q4) List of communities assisted and the assistance provided, (Q3) MassBays newsletter article describing one case study and lessons learned (Q3-4) At least two letters of support for municipal proposals, and list of grants submitted with RC assistance, (Q4) List of and links to presentations and publications produced, and outcomes of grants implemented with RC assistance.</p>
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Strategy 2.2 continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
<p>Maintain the Mystic River Urban Waters Federal Partnership and coordinate Federal input to Mystic River initiatives (Mystic River)</p> <p>312h</p>	<p>Ongoing Coordinate the quarterly meetings of the EPA-convened Mystic River Watershed Steering Committee. This task will include working with the planning subcommittee to develop an agenda, secure speakers, secure a location for the event, facilitate the technical and logistic aspects of meeting, record and distribute minutes and attendance, and support any active sub-committees. Represent the partnership by participating on regular conference/video calls organized by EPA, the Urban Waters Learning Network, and/or other Federal Partners</p> <p>Provide timely responses to EPA HQ and EPA Region 1 on information requests pertaining to the Urban Waters Federal Partnership.</p> <p>Developing a work plan with estimated hours and level of effort for the above tasks to be updated periodically with EPA Region 1 and MyRWA to allow for evolving projects and priorities of EPA Region 1, and the Urban Waters Program</p>	<p>(2) Identifying polluted waters and developing plans to restore them</p> <p>(C) Improved water quality</p>	<p>EPA, DEP, USGS, HUD, FEMA, NOAA, DHS, Mystic River Watershed municipalities</p>	<p>(Q1-4) Agenda and sign-in sheets for quarterly meetings, quarterly updates on activities taken up in response to EPA requests, quarterly Mystic River Urban Waters workplans</p>

Strategy 2.2 continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Plan and coordinate Federal input to Mystic River initiatives (Mystic River) 416h	New Review work proposed in the Partnership’s Action Agenda, as well as identifying partnership and collaborative opportunities, and building and maintaining strong relationships with federal partners.	(2) Identifying polluted waters and developing plans to restore them (C) Improved water quality	EPA, FEMA, HUD, USGS, NOAA, DHS, and others TBD	(Q1-Q4) Documentation of in-person or virtual meetings with representatives of Federal agencies to learn about case studies and regional efforts, and share ideas for collaboration at the local level, (Q2) Summary of dialogue, lessons, and examples from other Urban Waters locations (data collected in 2022-2023)
Provide watershed and coastal science education (Mystic River, Merrimack River) 416h MyRWA	Ongoing Maintain public communications platforms and watershed-specific e-newsletters, providing regular updated and useful information to partners engaged in the stewardship of the Mystic River watershed and the Merrimack River watershed.	(7) Protecting large aquatic ecosystems (G) Well-informed, multisector input to decision making which includes underserved communities	EPA, FEMA, HUD, USGS, DEP, MRWC, Mystic and Merrimack River municipalities	(Q1-Q4) Update the EPA Region 1 Watershed Initiative website (www.epa.gov/mysticriver) and other relevant pages, quarterly reports to the Mystic River Watershed Steering Committee, Quarterly e-news to Merrimack River watershed community

Strategy 2.2 continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
<p>Support and implement local actions to improve conditions in the Mystic River Watershed (Mystic River)</p> <p>520h</p>	<p>New Facilitate on-the-ground projects that result in environmental improvements consistent with goals of US-EPA, MassBays, and MyRWA through the work of the Mystic River Ambassador. Activities include leading the Trash Free Mystic project, assisting with river stewardship events, expanding public access to the river, assisting with water quality reporting for the Boston Harbor watersheds, and assisting with educational programs for area youth.</p>	<p>(2) Identifying polluted waters and developing plans to restore them</p> <p>(C) Improved water quality</p> <p>(G) Well-informed, multisector input to decision making which includes underserved communities</p>	<p>EPA, DEP, Mystic River Watershed municipalities</p>	<p>(Q4) annual summary of activities and outcomes associated with research, coordination, project management, and outreach on the ‘Trash Free’ Mystic project; annual summary of assistance provided for engagement of volunteers and metrics associated with the volunteer stewardship program; annual summary of assistance provided to Mystic Steering Open Space and Mystic Greenways Program and qualitative description of progress toward expanded public access and improved open space; annual summary of assistance to MyRWA, US-EPA, and regional partners (NepRWA and CRWA), including compilation of water quality monitoring report card announcements and distribution of report card data; annual summary of education provided to youth</p>

Strategy 2.3 Provide access to, and increase influence on decision making by underserved communities

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
<p>Public outreach and education about climate change, its impacts, and adaptive measures (Lower North Shore)</p> <p>\$3000 + 100h</p>	<p>Ongoing Increase general climate change literacy and knowledge about coastal resiliency in the region, involving EJ populations wherever possible. Activities will include public lectures and art installations, teacher training on climate change, School to Sea program in EJ communities, and (pending funding) implementation of three state grants in Salem and Marblehead. (<i>Marblehead Municipal Light Department and Adjoining Land, The House of the Seven Gables Climate Resilience Assessment and Adaptation, and Resilient Together: The Point</i>)</p>	<p>(6) Protecting coastal waters through the National Estuary Program</p> <p>(G) Well-informed, multisector input to decision making which includes underserved communities</p>	<p>Lower North Shore towns and cities, House of Seven Gables, SSCW volunteers</p>	<p>(Q1-Q3) Public programs presented: “Preservation in a Changing Climate” and “Remembrance of Climate Futures”; (Q1-4) quarterly reports on outreach to EJ communities in Salem and Marblehead, including School-to-Sea programming at the Salem YMCA summer program and Salem Public School District;(Q4) list of events, photo-documentation of wave tank and other educational resources in use; (Q2-4) Summary of activities under grants as funded</p>
<p>Support municipal and regional coastal projects using nature-based solutions (Metro Boston)</p> <p>160h</p>	<p>Ongoing Assist and/or collaborate with municipalities in implementing habitat protection and restoration practices, informed by diverse stakeholders, including EJ communities.</p>	<p>(6) Protecting coastal waters through the National Estuary Program</p> <p>(D) Resilient coastal habitat, including nature-based coastal protection</p> <p>(G) Well-informed, multisector input to decision making which includes underserved communities</p>	<p>Relevant BHEN partners, SRWC, SPRARR in Saugus</p>	<p>(Q4) Dates and locations, number of participants for at least three coastal habitat site visits; documentation of support (e.g., letters of support) for municipal implementation proposals, including grant program, proposed partners, and requested amount; documentation of assistance provided to the SRWC in exploring restoration and conservation needs in the watershed</p>

Strategy 2.3, continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Watershed and coastal science education and outreach (South Shore, Lower North Shore, Cape Cod) 50h SS 10h UNS \$4000 + 80h CC 30h LNS	Ongoing Engage diverse learners in watershed and coastal science education, bring new audiences to MassBays’ mission, participate in classroom and field professional development for teachers	(6) Protecting coastal waters through the National Estuary Program (G) Well-informed, multisector input to decision making which includes underserved communities	Marshfield Community Television, Norwell Community Television, CCSCR, MassAudubon; Barnstable County Coastal Resources Subcommittee, Cape Cod Commission, State of the Waters Advisory Committee, Ponds Network; EPA SNEP, Cape Cod Cooperative Extension, River Herring Network, DMF, NOAA Restoration Center, WBNERR, EEA EJ Office, and others.	(Q1-4) documentation of accommodation and outreach to support new participation by EJ communities, (Q3) SS Annual science monitoring report (focused on citizen science), Cape Cod Coastal Conference report (if held); (Q4) List of events/presentations, videos and podcasts, and publications produced about coastal topics, including links to Estuarine Gradient podcasts (SS) and schools/classrooms provided with Keeping Water Clean programming (UNS)
23 Connecting Coastal Communities (Central Staff) 80h Director	Ongoing As part of the NSF Smart and Connected Communities planning grant underway with UMB, facilitate a third workshop with each of the two underserved communities (Herring Pond Wampanoag tribal community [Plymouth] and the Cape Verdean community in Falmouth), and then a fourth, joint workshop to bring both groups together.	(2) Identifying polluted waters and developing plans to restore them (G) Well-informed, multisector input to decision making which includes underserved communities	UMB	(Q1) outcomes from each of the 3 rd workshops, (Q2) Outcomes of the joint workshop, (Q3) Determination of whether the group (including the community members) will make a full proposal for implementation funding from NSF under the same funding program.

Strategy 2.3, continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
<p>Advancing meaningful engagement in decision making among EJ communities (Central Staff, All Regions)</p> <p>160h Director 416h MyRWA 80h MB 50h SS \$1000 + 20h CC</p>	<p>New Aligned with MassBays’ Equity Plan, and with materials and insights developed with the Mystic River Urban Waters team, engage EJ communities in activities and outreach efforts, e.g., field trips, Ask-Me-Anything sessions, orientations to state agencies and their roles, and/or hands-on assistance with local habitat or water quality investigations.</p>	<p>(2) Identifying polluted waters and developing plans to restore them</p> <p>(G) Well-informed, multisector input to decision making which includes underserved communities</p>	<p>EPA and EEA EJ Offices, MyRWA, UMB, Local and regional ngos working with EJ and underserved communities, especially the Herring Pond Wampanoag community (CS, SS)</p>	<p>(Q1) CS: pursue implementation of ideas uncovered through an NSF-funded exploration of environmental priorities of the Herring Pond Wampanoag tribe; (Q2) CS: examples or list of outreach materials, training, and/or other support provided to the RCs; (Q1-Q4) MyRWA: provide platform for engagement across partners, identify projects to address EJ communities’ priority issues, and assist MassBays with mapping and tracking under the BIL Equity Plan. RCs: documentation of outreach and support provided to EJ communities relative to projects taken up under this workplan, and proposed projects in those communities.</p>

Strategy 3.1 Establish target (improved) water quality and habitat conditions for each embayment tied to desired uses and ecosystem services

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
<p>\Develop targets for diadromous fish habitat extent and condition (Central Staff)</p> <p>80h Senior Scientist</p>	<p>New (postponed from FFY22) Establish 2050 habitat goals to support diadromous fish migration, spawning, and feeding for MassBays embayments.</p>	<p>(6) Protecting coastal waters through the National Estuary Program</p> <p>All CCMP outcomes</p>	<p>EPA ORD, STAC, DMF, River Herring Network, MIT Sea Grant, Comprehensive Environmental</p>	<p>(Q1) Finalize historical data analysis; (Q2) Develop draft targets; Convene STAC subgroup and invite subject matter experts to discuss proposed targets and metrics; (Q3) Diadromous fish habitat data layer, including targets, incorporated into the ETT</p>
<p>\Review, update and expand utility of EDA (Central Staff, Metro Boston)</p> <p>200h Senior Scientist</p>	<p>New Conduct comprehensive revision and update of EDA to develop EDA 3.0. Add new variables to support examining relationships among stressor, resource, and socio-economic factors, and identify priorities for environmental justice and restoration</p>	<p>(6) Protecting coastal waters through the National Estuary Program</p> <p>All CCMP outcomes</p>	<p>STAC, EPA ORD</p>	<p>(Q1) Produce scope of work for EDA 3.0; (Q2) List of stressor, resource and socioeconomic metrics and associated datasets, new and existing that need updating; (Q3) Shapefiles and characterization of each by EDA assessment area; STAC review; (Q4) Revise/Develop new MassBays EDA Story Map; List of potential areas for restoration to benefit EJ communities; Resource-stressor category statistical analysis.</p>
<p>Develop Data Visualization Tool (Central Staff)</p> <p>100h</p>	<p>New (pending funding) Select a platform for better visualization of embayments at the ecotype, habitat, and stressor level for internal and external users.</p>		<p>STAC, EPA OST</p>	<p>(Q2) Plan outline including tools that need to be included for cleaning up visuals additional data, and optional platforms; (Q4) Final Data Visualization Tool launched and linked to ETT.</p>

Strategy 3.1, continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Ecosystem Services Gradient assessment for Estuaries in MassBays (Central Staff) 120h	New (postponed from FFY2022) ESG -based characterization of MassBays coastal habitats to facilitate relevant education and outreach to local stakeholders	(6) Protecting coastal waters through the National Estuary Program All CCMP outcomes	STAC, EPA, UMB	Timing depends on EPA project in Saugus River, which will result in coastal-ecosystem ESG. Combined with outcomes from focus groups engaged during FFY2021 workshops, MassBays will produce messaging for use with communities that connects priority ecosystem services with CCMP habitat targets.
Merrimack River Water Quality Improvements (Upper North Shore) \$40,000 + 100h	Ongoing Establish and implement regional goals to improve water quality on the Merrimack River. Oversee and provide administrative and technical support to MRC and its members in collaboration with the Merrimack River Watershed Council (MRWC) and Northern Middlesex Council of Governments (NMCOG).	(2) Identifying polluted waters and developing plans to restore them (G) Well informed, multisector input into decision making which includes underserved communities	MWRC, NMCOG, Merrimack watershed communities and legislative delegation, NECC, WWTPs, Merrimack River recreational users	(Q4) Expanded and improved web-based Early Alert Monitoring Tool which identifies CSO events in Massachusetts available to all MVPC communities ; (Q3) Agenda and participant list for the annual Merrimack River Water Quality Roundtable, (Q4) Documentation of regular MRC meetings

Strategy 3.2 Guide and assist local action to expand habitat and improve water quality according to targets

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Publish Seagrass and Oyster Restoration Story Maps (Metro Boston) 320h	New & Ongoing Update or construct and disseminate Story Maps presenting seagrass and shellfish restoration projects in Massachusetts to inform future efforts by scientists, practitioners, stakeholders, and policymakers	(7) Protecting large aquatic systems (E) Restored natural communities	BHEN, others TBD	(Q3) Summary tables of interview responses from shellfish and seagrass restoration practitioners, Seagrass Story Map available online; (Q4) Draft Shellfish Story Map with list of revisions made based on stakeholder (BHEN) feedback; (Q4) Shellfish Restoration Story Map available online
Maintain adequate streamflow in First Herring Brook (South Shore) 25h	Ongoing Support the Town of Scituate in efforts to maintain downstream flow	(7) Protecting large aquatic systems (B) improved habitat continuity and restored hydrology	Town of Scituate	(Q3) Report on previous year's data in outreach materials
Implementation and Monitoring of Dam Removals (South Shore) 200h	Ongoing Work with regional communities and other partners to assess feasibility and seek funding for removal of dams and other barriers and collect ecological data pre- and post-restoration	(7) Protecting large aquatic systems (B) improved habitat continuity and restored hydrology	Sea Run Brook Trout Coalition, Trout Unlimited, MassDFG, Hanover Mall, NOAA Fisheries, US FWS, MassDER, Towns of Norwell, Marshfield, Duxbury, Hanover, and Pembroke	(Q4) Fish ladder design and permit for Jacob's Pond (Norwell); Data to inform plans for Temple Street Dam, Chandler Pond Dam, and Veterans Memorial Park Dam (Marshfield & Duxbury); Progress report on feasibility of Luddams Ford Dam removal (Hanover and Pembroke); Progress report on restoration plan for Herring/Monument River System (Plymouth and Bourne)

Strategy 3.2, continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Finalize Boston Harbor Habitat Atlas (Metro Boston) 200h	Ongoing Update and add to the interactive Atlas depicting locations, background educational information about the habitats, past and ongoing research efforts, and opportunities to participate in habitat protection, especially metadata for habitat layers and updates to special topics section.	(6) Protecting coastal waters through the National Estuary Program All CCMP outcomes	BHEN	(Q4) Fully functioning Atlas available online
Greening Gateway Cities Program (Lower North Shore) \$15,000 + 50h	Ongoing Serve as outreach partner for Salem’s Greening Gateway City program, promoting progress toward the program goal of planting 2400 trees in EJ neighborhoods.	(7) Protecting Large Aquatic Ecosystems (E) Restored natural communities	Salem Tree Commissioner, DCR	(Q1-4) Number of trees planted, mapping distribution on public and private property; (Q4) List of education & outreach actions, including via social media
Marsh ecosystem resiliency (Upper North Shore) 25h	New Work with a diverse group of technical experts to craft a competitive grant application to fund full-scale restoration work throughout the Great Marsh System. Actions may include: Thin Layer Placement, Runneling and marsh microtopography, eelgrass restoration, sediment transport modeling.	(5) Protecting wetlands (B) improved habitat continuity and restored hydrology (E) Restored natural communities	BU, UNH, NWF, Mosquito control	(Q1) A comprehensive, joint restoration proposal submitted to NOAA, (Q3) site plan, documentation of engagement with community, list of permit applications submitted or pending, (Q3-Q4) (pending funding) project plan with goal posts

Strategy 3.2 continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Pepperweed Management and Control (North Shore) \$1000 + 52h LNS	Ongoing Physical pulling of pepperweed to restore native high marsh community and coastal resilience in Ipswich, Rowley, Newbury in the Great Marsh, and in Salem Sound communities	(5) Protecting wetlands (E) Restored natural communities	Volunteers, Parker River NWR, MassAudubon	(Q1) List and map of prioritized sites, (Q3) Map of pepperweed sites with list of areas monitored and/or treated, with status (presence-absence removal), (Q4) Number of trained volunteers & volumes pulled
Eelgrass Restoration (Upper North Shore) \$20,000 + 75h	New Seek funding to restore/enhance eelgrass bed in Gloucester, MA via seeding; engage volunteers and citizen stewards to establish protective measures.	(7) Protecting Large Aquatic Ecosystems (E) Restored natural communities	BU, volunteers	(Q2) Submitted application for funding (ILF, NOAA), interim report with photodocumentation of pilot seed-based restoration in Gloucester, (Q3) Letters of support, joint protection agreements agreed to by partnering community groups, (Q4) interim report on the pilot project, with a final restoration work plan.
Next steps to protect eelgrass in Salem Sound (Lower North Shore) 200h	Ongoing Enhance estuarine seagrass habitat by informing management efforts to reduce stressors impacting seagrass habitat, including habitat fragmentation and shading from docks and piers (2021-2022 Healthy Estuaries Grant).	(7) Protecting large aquatic ecosystems (E) Restored natural communities	Salem & Marblehead harbormasters, Conservation Commissions, private dock owners, DMF, EPA, USACE, NOAA, SSCW volunteers	(Q4) Peer-reviewed journal article describing findings re: the impact of docks and floats on eelgrass; (Q1-Q4) Contribute to follow-up on study to <i>Increase Confidence in Eelgrass Maps for Project Review</i> , conduct eelgrass seed germination study (with CS, pending funding)

Strategy 3.2 continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Promote LID (Lower North Shore, South Shore) 200h LNS 25h SS	Ongoing Promote and implement LID and stormwater green infrastructure, maintain Commercial Street and Winter Island rain gardens in Salem (LNS).	(4) Addressing diffuse, nonpoint sources of pollution (C) Improved water quality	Greenscapes North Shore Coalition, municipalities, DEP	(Q4) List of presentations and publications, as well as technical assistance and grant support provided, (Q1-4) Photo-documentation of flood/storm conditions at rain gardens (LNS); (Q2-4) Document use of LID maintenance videos (produced with FY21 CZM CPR grant funds) by local DPW departments (LNS); (Q1-4) Documented support for stormwater improvement projects, especially MS4 outreach activities
Identify and implement coastal restoration, stormwater mitigation and low-impact development projects (Cape Cod) \$9,000 + 180h	Ongoing Identify and implement priority projects with partners, as part of APCC's Restoration Coordination Center (RCC) activities.	(2) Identifying polluted waters and developing plans to restore them (4) Addressing diffuse, nonpoint sources of pollution (C) Improved water quality (E) Restored natural communities	Cape Cod towns, CCCD, NRCS, DER, CZM, DMF, CCC, CCCE,	(Q1-4) Each quarter, provide the following: <ul style="list-style-type: none"> • list of communities assisted, and type of assistance provided (e.g., grantwriting assistance, monitoring, training, other) • list of outreach and training events activities and audiences (e.g., towns, communities, networks, organizations, interns, volunteers, etc.) • list of proposals submitted with assistance from RC • list of priority projects and actions taken to identify and pursue means for implementation

Strategy 3.2 continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Merrimack Restoration Collaborative Upper North Shore) \$30,000 + 75h	New work with the Merrimack Restoration Collaborative and DER to identify and advance priority restoration projects across the Merrimack River watershed	(2) Identifying polluted waters and developing plans to restore them (4) Addressing diffuse, nonpoint sources of pollution (C) Improved water quality (E) Restored natural communities	DEP, MRWA, municipalities	(Q1) list of priority ecological restoration projects in region, (1-Q4) interim progress reports, (Q4) final workplan and timeline for individual projects selected, and
State of the Waters: Cape Cod (Cape Cod) \$26,000 + 520h	Ongoing APCC will continue to work with partners to maintain and update a comprehensive program to report on the condition of the Cape’s coastal and fresh waters and their problems, causes, and possible solutions. Water quality grades will be evaluated each year using the most recent data available and results will be reported via an annual report presented at APCC’s annual meeting, via an interactive online map, and other outlets. The goal is to promote public action to protect and restore water quality, through a Water Action Plan with recommendations for protection and restoration of water quality.	(6) Protecting coastal waters through the National Estuary Program (C) Improved water quality (F) Robust interagency and interdisciplinary collaboration and partnerships	CCS, Buzzards Bay Coalition, CCC, UMass Dartmouth, WBNERR, Cape Cod towns	(Q1) Source WQ data from 2022 monitoring in coastal waters, fresh water bodies, groundwater, drinking water, and other water resources, including in underserved communities (Q2) Final report for 2023 (grades up to and including 2022 as available), (Q1-Q4) Dates and attendees lists from Advisory Committee meetings, (Q2-Q4) List of presentations and publications, updated Action Plan to include reports on successes and progress in protecting and improving water quality, (Q3-Q4) update website (https://capecodwaters.org), (Q4) Document engagement with SNEP and CCC to assist CS in uploading water quality data to WQX

Strategy 3.3 Maintain MassBays' National Estuary Program Status

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Review and update MassBays SOPs (Central Staff) 80h Director	New Work with Nominating and Governance Subcommittee to update MassBays' SOPs according to needs under the new host setting and CCMP Goals.	(6) Protecting coastal waters through the National Estuary Program All CCMP Goals	MC members	(Q1) Convene Subcommittee to draft changes, (Q2) present proposed updates to MC at the September meeting, (Q3) finalize SOPs and take actions as directed.
Update MassBays' 2018 Strategic Communications Plan (Central Staff) 160h Director	New Work with Communications Subcommittee to review and revise the 2018 Plan according to needs under the new host setting and CCMP Goals.	(6) Protecting coastal waters through the National Estuary Program All CCMP Goals	MC members, UMB Communications team	(Q2) Convene Subcommittee to review the existing plan, and share the same with UMB staff; (Q2) draft changes; (Q3) present to the MC at the December meeting, and finalize.
MassBays Communications implementation (Cape Cod) 372h	New APCC Communications staff person will assist MassBays Central Staff with communications plan implementation	(6) Protecting coastal waters through the National Estuary Program All CCMP Goals	MassBays program partners	(Q1) Update of 2018 strategic communications plan sections focused on social media, photo collection established, plan for social media rollout; (Q4) Links to quarterly newsletters produced, trends and audience engagement metrics from social media postings.
MassBays Regional Coordinator Workshop (Metro Boston, Central Staff) 160h MB 40h Director	New Organize a workshop day featuring the MassBays Regional Coordinators and central staff to facilitate extended information exchange on current projects and identify potential cross-region collaborations and/or joint proposals	(6) Protecting coastal waters through the National Estuary Program All CCMP Goals	RSPs	(Q2) List of potential collaborations and/or joint proposals, including grant program and project partners

Strategy 3.3 continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Convene and support the Local Governance Committees for input on MassBays workplans, and provide input for reporting to EPA. (All Regions)	Ongoing Meet the requirements of S.320 Funding Guidance provided by EPA, soliciting community stakeholder input to prioritize yearly workplans to implement the CCMP.	(6) Protecting coastal waters through the National Estuary Program All CCMP Goals	LGCs	R (Q1-4) Updates on activities and progress, attendance at quarterly MC meetings; (Q2-3) NEPORT submissions to MassBays; (Q1-4) Acknowledgement of EPA/ MassBays support noted on RSP websites and (as relevant) outreach materials and publications; (Q4) End-of-year reports on progress and proposed ongoing and new activities for FFY23 developed with input from EJ/underserved communities, and LGCs
Convene STAC and support the Chair and committee that provides input and assistance to MassBays on science and research matters. 40h (Senior Scientist)	Ongoing Convene quarterly meetings of STAC and topic subgroups as needed to provide discussion and input on topics that support MassBays work in its estuaries.	(6) Protecting coastal waters through the National Estuary Program All CCMP Goals	STAC	(Q1-Q4) Meeting summaries, agenda and materials; List of participants.
Increase support for and status of the National Estuary Program in the Gulf of Maine (Central Staff) 450h (Director)	New Convene GOM partners to engage in outreach and education of legislators at the state and federal level, private foundations and philanthropists, and others to establish financial support and increased capacity for coastal habitat protection and restoration in the Gulf of Maine.	(6) Protecting coastal waters through the National Estuary Program All CCMP Goals	Gulf of Maine NEPs, Marine Sanctuaries, National Parks, NERRs, Sea Grants, Coastal Programs, GOMC, and universities and NGOs (including development offices)	(Q1) Agenda and list of attendees at a GOM-wide discussion re: need for region-specific investments, (Q2) Draft outreach materials and list of target audience(s), (Q4) final materials to be shared via a “Gulf of Maine On the Hill” event or other agreed-upon launch of a campaign to meet project goals

Strategy 3.3 continued

Title (Region), Budget + LOE	Description	CWA core program CCMP outcome	Partners	Timeline & Deliverables
Represent MassBays on relevant networks (Central Staff, all RCs)	<p>Ongoing Lead and/or provide input to existing working groups and networks conducting work on topics relevant to MassBays’ desired outcomes and/or with the potential to advance CCMP implementation.</p> <ul style="list-style-type: none"> • 	<p>(6) Protecting coastal waters through the National Estuary Program</p> <p>7) Protecting large aquatic ecosystems</p> <p>All CCMP Goals</p>		(Q4) List of networks that include MassBays as a member, along with specific outputs of those networks

D. Budget

MassBays is requesting reimbursement of pre-award costs, up to 90 days, for the work included in this plan.

Narrative

These notes refer to **Table 2, MassBays National Estuary Program Proposed Budget, FFY2023.**

Assumptions – Section 320 funding allocation to MassBays will be \$850,000. An additional \$100,000 will be granted for the Mystic River Watershed Association under the Urban Waters Program.

Proposed Spending

Salaries for three staff: Director (0.82FTE), Staff Scientist (0.512FTE), and Coastal Data Scientist (.085FTE). The remainder of staff salaries will be funded under BIL, as described in a separate workplan, and other supplemental funding (RAE, EPA Exchange Network Grant, and an ISA from DEP).

Fringe benefits: Fringe benefits are negotiated annually between the Commonwealth of MA, UMB and the Department of Health and Human Services (DHHS). Fringe benefits are costs associated with employee related expenses including health plan, pension plan, and workman's compensation expenses among others. UMB has four fringe rates in accordance with the University's FY2022 Fringe Benefits and Payroll Tax Rates memorandum and NICRA.

Rate #1 General Fringe, 37.46%

Rate #2 Health and Welfare, \$33 Bi-weekly/FTE

Rate #3 Payroll Tax, 1.97%

Rate #4 Worker's Compensation Insurance, 0.26%

These rates are applied based on the personnel appointment type, benefitted/non-benefitted status, period of service and salary rates. In this case the appointment, benefits status, period of service and applicable rates are as follows:

Personnel	Appointment	Period of service	Applicable Rates
PI Pam DiBona	Professional Benefitted	Calendar	Rates 1, 2, 3, 4
Senior Scientist Prassede Vella	Professional Benefitted	Calendar	Rates 1, 2, 3, 4
Coastal Data Scientist Jill Carr	Professional Benefitted	Calendar	Rates 1, 2, 3, 4

Contractual

- Online app hosting. MassBays will move all of our online tools (AquaQAPP, iSeaGrass, TIDEGateway) to one hosting service. Cost is \$29.75/month. Domains for our website (massbays.org and massbays.com) and all tools (ERR, TIDEGateway, iSeaGrass, AquaQAPP) cost \$72/month.

Other Expenses

- Regional Service Providers. This year we request a total of \$418,972 to come from the \$320 base grant monies for RSP support. This includes an additional \$18,972 for communications assistance from APCC. RSP Budgets and justifications are included in Table 6.
- Mystic River Watershed Association/Urban Waters Program. Pending allocation of up to \$100,000 supplemental funds through EPA's Urban Waters Program (\$50,000 per year),

MassBays will award those funds to MyRWA to carry out activities aligned with that program, including salary for a Mystic River Ambassador to ensure alignment of MyRWA activities across Federal entities and MassBays' CCMP. Budget and justification is included in Table 6.

- Meetings and refreshment costs. MassBays will provide light refreshments (\$5.55 per person) for our 25 MC members for an annual in-person Committee meeting, and will expend up to \$1505 for publications, printing, and communications materials recommended under the new Strategic Plan.

Travel (see Table 3)

We propose new funding of \$5075 for the following:

- NEP national meetings
 - Fall Technical Transfer Meeting, to take place in Portland OR in association with the Coastal & Estuarine Research Federation Conference (Central Staff/1 traveler)
 - Spring 2024 Annual Meeting, Washington DC (Director/1 traveler)
- Regional meetings, workshops, and site visits
 - CCMP implementation oversight, regional education & outreach workshops, grantee site visits, etc., MassBays-wide
- NE Regional NEP meetings
 - Visits for collaboration and joint programming discussions, New England-wide (Director and Staff Scientist)

Indirect Charges

The University of Massachusetts Boston has a Facilities and Administrative overhead rate of 36.4%, which is a federally negotiated indirect cost rate agreement between University of Massachusetts Boston and the Department of Health and Human Services effective 10/02/2020. The indirect rate is charged to expenditures relating to direct costs. For FFY23, no indirect costs are charged against the RSP or MyRWA subawards, as they will be continuing under this supplemental award.

Matching Funds

Subgrantees. Regional partners, in their scopes of work to serve as RSPs to MassBays, identify sources of match for the program. Direct match of at least 50% is required; this year a total of \$251,520 is offered by the RSPs (Table 4).

Program Match. Several of the RSPs have also identified a substantial cash and in-kind match, from funding sources and activities linked directly to the implementation of the CCMP. They have offered a total of \$275,802 program for FFY23 (detailed in Table 4). Sources of match offered include revenue from membership, state and local grants, private foundations, etc., as well as the work of staff within these organizations on projects specifically related to our estuarine restoration and conservation efforts. Mystic River Watershed Association will provide \$105,000 match to their Urban Waters subaward of \$100,000.

In addition (Table 5), \$8880 in-kind services are anticipated from Management Committee and Subcommittee members not already accounted for in the RSP match; MassBays will receive \$217,289 in state funds this fiscal year from DEP for implementation of the Massachusetts Coastal Condition Assessment and ground-truthing for eelgrass mapping. MWRA has offered \$80,000 in-kind match from their efforts in Massachusetts Bay as well. These items total \$317,678.

Total match offered is \$950,000, or 100% match, comprised of the following non-Federal categories:

State: \$346,203

Local: \$67,500

Other (including in-kind labor): \$536,297

Table 2. MassBays National Estuary Program Proposed Budget, FFY2023

FFY23 Section 320 Grant Application Massachusetts Bays National Estuary Program Proposed Expenditures	
Personnel	
subtotal, salaries	\$ 158,228
Fringe benefits	
subtotal, fringe	\$ 67,011
total, salaries+fringe	\$ 225,239
Travel	
ANEP, EPA meetings, local site visits (Table 3)	\$ 5,075
subtotal, travel	\$ 5,075
Supplies	
meeting, outreach supplies	\$ 1,644
subtotal, supplies	\$ 1,644
Contractual	
Healthy Estuaries Grant Program	\$ 82,824
online hosting service charges	\$ 1,221
subtotal, contractual	\$ 84,045
Other	
Regional Service Providers (5 subawards)	\$ 418,972
Mystic River Watershed Association (Urban Waters Program)	\$ 100,000
subtotal, other	\$ 518,972
Total Direct	\$ 834,975
Indirect	
36.4% (salaries+fringe, travel, supplies, contracts)	\$ 115,025
subtotal, indirect	\$ 115,025
Total Request, FFY23	\$ 950,000
Matching funds	
Direct match	\$ 309,041
Subawardee Direct and Project-specific match	\$ 640,959
Total Match, FY22	\$ 950,000

Attachment 1

Quarterly Program Updates, July 2022 to June 2023