



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,

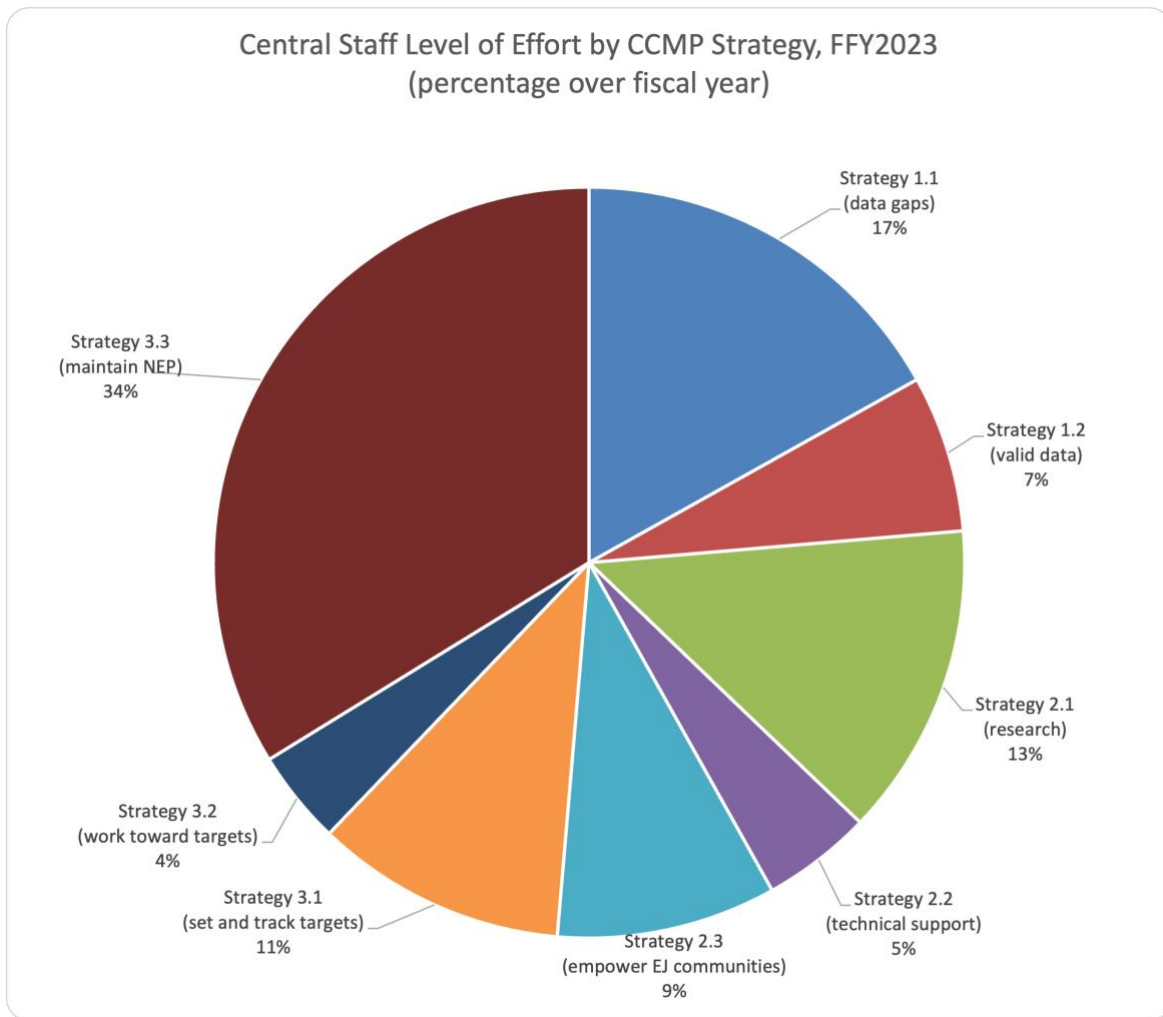


Figure 2. Central Staff Level of Effort (hours charged to S.320 Award) predicted for FFY2023; includes 51.2% of Senior Scientist's hours, 82% Director's hours, 8.5% Coastal Data Scientist's hours. Remainder are included in BIL FFY2023 workplan, DEP ISA (Coastal Data Scientist), and new RAE grant.

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.

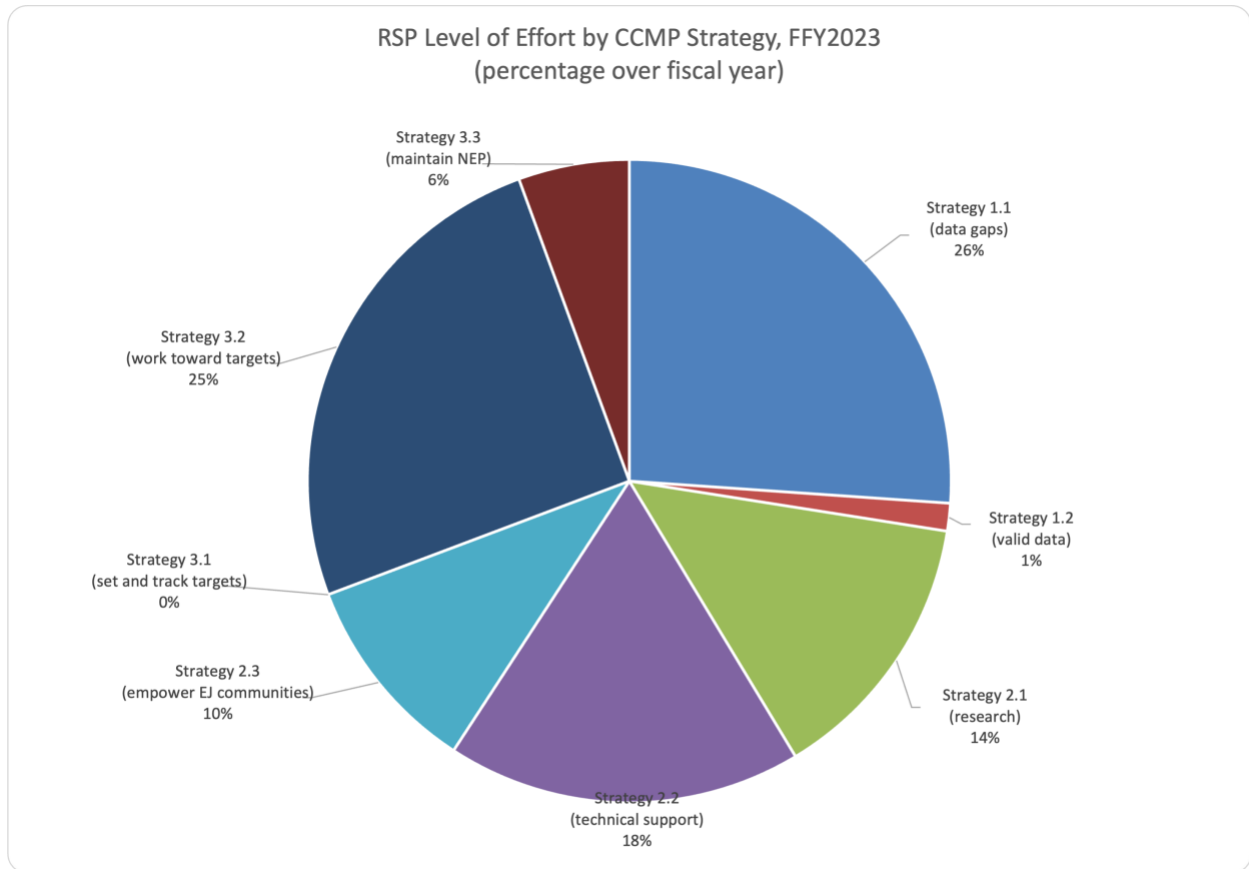


Figure 3. Regional Coordinator LOE allocated from RSP Subawards to each strategy (\$80,000 S.320 funds distributed per region).

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
<p>Watershed and coastal science education and outreach (South Shore, Lower North Shore, Cape Cod)</p> <p>50h SS 10h UNS \$4000 + 80h CC 30h LNS</p>	<p>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</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>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.</p>	<p>(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)</p>
<p>23 Connecting Coastal Communities (Central Staff)</p> <p>80h Director</p>	<p>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.</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>UMB</p>	<p>(Q1) outcomes from each of the 3rd 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.</p>

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

**MassBays Management Committee, Regional Service Provider, & Staff Updates
June – September 2022**

Management Committee Updates

Massachusetts Water Resources Authority

Contact: [Denise Ellis-Hibbett](#)

MWRA published the CSO Variance Receiving Water report for 2021:

<https://www.mwra.com/harbor/enquad/pdf/2022-09.pdf>

Regional Service Provider Updates

Upper North Shore – Merrimack Valley Planning Commission

Contact: Peter Phippen, pphippen@mvpc.org

• **Gather data on conditions and trends**

Water Quality:

- Beach sand microplastic samples collected in the spring were processed by students at Northern Essex Community College (NECC) as part of their curriculum. The data indicates that the beaches at the mouth of the Merrimack River collect significant microplastics. The dominant microplastic is Styrofoam.
- Water column microplastic samples collected in the spring were sent to University of New Hampshire for processing. Duplicate water samples at selected locations were collected for Triple Ring Technologies for their alpha testing microplastic water column sampling prototype. They will be joining us later this month for additional sample collection.
- MVPC has sought out several funding sources for the expansion of the Merrimack River CSO early alert system and is currently pursuing an EPA Sewer Overflow and Stormwater Reuse Municipal Grant through the Massachusetts Clean Water Trust. MVPC met with MRWC regarding the reconvening of the Merrimack River District Commission will continue to pursue the reinvigoration of this group.
- MVPC assisted Georgetown with a 604b application, secured an additional funding source for the Shawsheen River watershed-based plan, and finalized the sampling and analysis plan with the EPA and identified steering committee members for the Spicket River watershed-based plan.
- MVPC with their partners at Salem Sound Coastwatch and the Ipswich River Watershed Association have completed their FY22 MS4 municipal assistance grant; Municipal Stormwater Codes: A Regional Review for Northeast Massachusetts. MVPC is currently assisting the communities of Rowley, Boxford, Georgetown, and West Newbury with annual MS4 reporting.
- Merrimack Valley Stormwater Collaborative and Greenscapes partners have achieved the annual MS4 education and outreach initiatives for the 25 member communities.

Coastal Restoration

- In conjunction with Mass Audubon the RC is investigating options for protecting highly degraded marsh at Joppa Flats in the lower Merrimack River. The project would include the establishment of ribbed mussels to stabilize marsh bank structure and we are working with UMass Gloucester field station to test out various types of substrates on which to grow the ribbed mussels.
- The RC harvested and planted eelgrass at our restoration site in Middle Ground in June and August. Deep water eelgrass restoration continued through the summer at the Essex River eelgrass restoration site and will terminate for the year in a final multi-diver planting in

September. Divers also assisted in harvesting reproductive shoots which we are overwintering in flow-through saltwater tanks at the UMass field station in Gloucester. Seeds from those reproductive shoots will be planted at the Essex restoration site as part of the final transplant of the season. In addition, we have been working with MIT to determine the most effective eelgrass planting methods for survival under varying current conditions.

- Drone imagery has been collected at four large areas of the Great Marsh for further mapping marsh die-off locations and is being overlain in the Collector App for field checking. This imagery will also be used in the mapping the extent of large, suffocating accumulations of wrack throughout the marsh.
- MVPC has begun work on bylaw review for climate resiliency in participating municipalities with the goal of aiding in the implementation of climate resiliency focused language to relevant municipal codes
- **Manage invasive species**
 - The RC received a negative Request for Determination (RDA) from the Newbury Conservation Commission for fall Phragmites management in the Newbury marshes. The RDA was appealed by MassDEP, and we were notified that an NOI would be required. This determination came too late in the summer to allow for invasive Phragmites treatments in 2022 occur. The 15 Phragmites monitoring sites are in the process of being monitored. In conjunction, overall presence/absence reconnaissance of Phragmites throughout all treated open marsh areas in the Great Marsh is underway.
 - Invasive pepperweed field treatment was completed for several hundred acres of selected marsh.
 - Green crab management and research funding contracts are under development for Gloucester, Essex, Ipswich, Newbury, and possibly Rowley. Green crab monitoring will take place this fall.
- **Outreach and Education**
 - The RC is working with Governors Academy on new course design and integrating the school into the estuarine community as a result of creating a new coastal science center on the Parker River.
 - The Great Marsh Coalition Symposium will be on impacts of roadways on the salt marsh and will take place in person on November 3.
 - The RC published the third of quarterly installments for a local Cape Ann newspaper on “Notes from the Great Marsh”. This installment discussed invasive species and controls in the Great Marsh.
 - Through the North Shore Resiliency Task Force and its steering committee, we completed the RFP for the Assessment of Water Security and Resiliency Needs and Opportunities in the Ipswich River Watershed

Lower North Shore – Salem Sound Coastwatch

Contact: [Barbara Warren](#)

- **Gather data on conditions and trends**
 - Trained by Jill Carr and completing side scan sonar eelgrass mapping interpretation
 - Conducted monthly MIMIC data collection at 6 sites in Salem Sound
 - Surveyed Manchester’s Sawmill Brook for temperature to locate possible spring upwellings
- **Climate Change**
 - Second annual Preservation in a Changing Climate Conference at the Peabody Essex Museum, Sept. 12th and 13th: 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/>
 - Greening Gateway City – 2400 trees to be planted in Salem: Contract renewed with DCR to continue outreach to recruit tree planting in EJ neighborhoods
 - Remembrances of Climate Futures: plaques installed in Salem at SSU, NPS and downtown Salem; RC will continue to work with Thomas Starr, Art + Design Professor Northeastern University to finalize climate message signs in Marblehead, Lynn, Swampscott, Beverly
 - Peabody-Salem Multi-use Path along the North River: RC leading community engagement on this Municipal Vulnerability Preparedness Grant that has been continued into FY23 www.publicinput.com/ResilientNorthRiver
- **Reduce Stormwater Discharge**
 - Completed summer bacterial monitoring under SSCW’s Clean Beaches & Streams Program
 - Maintained Salem’s Commercial St and Winter Island rain gardens
 - Monitored salt marsh vegetation at Collins Cove Living Shoreline and Forest River Park for third year
 - Completed a DEP MS4 grant on Ordinance/Bylaw Review for LID Advancement and submitted a DEP MS4 grant proposal to advance LID web map tool and deployment of LID through improved bylaws/ordinances and regulations with MVPC and Greenscapes
 - Completed SSCW’s 2-year NOAA Marine Debris Prevention grant with high school interns who finished a compost video, installed more cigarette butt bins, and conducted more outreach to restaurants about our CoastSmart Restaurant Campaign
- **Technical assistance**: RC actively involved in the following:
 - Beverly’s Bass River and Salem’s Collins Cove to the Willows FY23 MVP applications were awarded
 - Still waiting to hear about CZM Coastal Resilience grant applications for The House of the Seven Gables and Marblehead
 - Styrofoam ban ordinance passed by Salem City Council
 - Member on Salem’s Flood Hazard Overlay District Ordinance and the Open Space and Recreation Plan Working Groups
 - Working with the City of Salem and members of the Massachusetts Tribe to construct a fishing weir in Cat Cove for one day of filming by Boston’s Museum of Science in October

Metro Boston – Northeastern University Marine Science Center

Contact: [Torrance Hanley](#)/[Jon Grabowski](#)

- **Gather data on conditions and trends (DATA)**
 - EDA 2.1: the previous RC (Hanley), the interim RC (Grabowski) have continued to work on EDA 2.1 and incorporating socioeconomic data with stressor and resource data in MassBays
 - KEEN: collected kelp habitat community data from long-term sites near Pumphouse and Canoe Beaches in Nahant. The Kelp Ecosystem Ecology Network aims to assess how climate change is negatively impacting kelp habitat in the Gulf of Maine and elsewhere around the globe.
- **Address data gaps (DATA)**
 - CZM Projects of Special Merit Grant: Interim RC and colleagues at the MSC have helped guide an undergrad and MS student that are working on seagrass edge delineation and mapping in ArcGIS. Project is led by Todd Callaghan (CZM) and Jill Carr (MassBays), assessing seagrass mapping techniques to inform management and planning.
 - Woods Hole Sea Grant: We are collaborating on a project with Colby College, TNC and regional stakeholders to assess how oyster farming methods relate to different environmental stressors, with the goal of informing sustainable aquaculture practices.
- **Education and Outreach (E&O)**
 - Boston Harbor Ecosystem Network (BHEN): in the process of planning our next semiannual meeting in late 2022 in November or December
 - Boston Harbor Habitat Atlas: We have begun the process of auditing the site to update dead links and other outdated information
- **Technical Support and Communication**
 - Metro Boston MassBays Regional Coordinator Opening: In the process of hiring a new RC for the region and have completed initial interviews of 4 candidates.
 - Conferences, Meetings and Workshops: interim RC participated in a 3-part workshop entitled Building Eelgrass Resiliency along the Mid-Atlantic and Southern New England Coast on June 2, 7, and 28

South Shore – North and South Rivers Watershed Association

Contact: [Sara Grady](#)

- **Address data gaps**
 - Water Quality Monitoring - Completed another successful season of Riverwatch monitoring with bacteria levels very low, presumably due to the drought; Coordinated conductivity monitoring grant (DEP WQMG) for multiple watershed organizations in eastern Massachusetts and deployed 6 loggers up- and downstream of Route 3 to detect road salt intrusion
 - Horseshoe Crab Surveys - Completed another successful season of horseshoe crab spawning surveys at Duxbury Beach
 - Marine Invasive Surveys - Returned to a volunteer-driven survey effort (vs. Sara plus interns) for the first time in years and conducted surveys at three dock locations and three intertidal locations.
- **Research to inform policy and actions**
 - Dam Removal Monitoring/Implementation -
 - Third Herring Brook: Coordinated project team to review feasibility study for Jacobs Pond fish ladder project and planned for next steps; solicited and received estimates for weir removal upstream of Peterson Pond Dam to be completed this year
 - South River: Attended a site visit for the Chandler Pond dam removal project
 - Indian Head River: Began work with new Indian Head River Restoration Coordinator to

bring together project partners for the removal of the Curtis Crossing/Luddams Ford and Cross Street Dams.

- Eelgrass - Conducted fifth year of Eelgrass Blitz in Duxbury/Kingston/Plymouth Bays; started trainings for MassBays Project of Special Merit and assisted with a drone flight in Cohasset
- Blue Mussels - Worked with NSRWA intern to locate mussel settlement areas and potential source docks for mussel transplant near Fourth Cliff
Green Harbor - Participated on the Green Harbor Technical Committee and paddled Green Harbor River with CZM Regional Coordinator to measure and map salinity, dissolved oxygen, and Phragmites.
- Terrestrial Invasives - raised and released *Galerucella* beetles to combat purple loosestrife at Jacobs Pond
- **Technical support and communications**
 - Represent MassBays in Networks - Attended June NEERS meeting and continue to serve as Newsletter Editor, participated in Watershed Action Alliance and MassRivers Network meetings
 - Watershed and Coastal Science Education - Reviewed videos produced to educate students about different rivers and streams on the South Shore; presented to Pinehills Fishing Club about river herring, brook trout, and dam removal; produced podcasts on beach profiling and herring counts
- **Local action for habitat and water quality**
 - Adequate Streamflow - Provided weekly updates on Scituate water system projections to the Water Division to determine when a water ban would go into place and when streamflow might need to be cut off (streamflow was cut off months ahead of schedule, water ban went into place as projected)
 - Resilient Coastal Habitats and Communities - Presented at South Shore Climate Network on dam removal and stream resilience
- **Outreach and education/general**
 - Hosted three interns for the summer, who worked on diverse projects for the NSRWA and MassBays

Cape Cod – Association to Preserve Cape Cod

Contact: [Jo Ann Muramoto](#)

- **Gather data on conditions and trends**
 - Monitor cyanobacteria blooms:
 - Cyanobacteria thrive in waters that are warm and nutrient rich. This summer APCC conducted biweekly monitoring of cyanobacteria in nearly 120 ponds and lakes in the 15 towns on Cape Cod. Several ponds are located in the MassBays planning area on the north side of the Cape and include important diadromous fish habitat.
 - About 10% of ponds experienced cyanobacteria levels high enough to warrant posting an advisory to avoid contact with pond 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.
 - This year cyanobacteria risk categories were updated to reflect input from health agents, criteria from the MassDPH, and a new regional capability for toxin testing by the Barnstable County Department of Health and the Environment.
 - Toxin tests provide 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. A summary of toxin test results will be available later this fall when monitoring is completed. Webpage: <https://apcc.org/our-work/science/community-science/cyanobacteria/> .

- **Monitor Diadromous Fish Runs on Cape Cod**
 - On Cape Cod the 2022 volunteer herring count season represented a return to pre-COVID levels of effort, with volunteers counting herring at approximately 19 herring runs. Count data have been reviewed and sent to the DMF which will calculate estimated run sizes. Final results will be available later this fall.
 - Volunteer counts enable citizen scientists to collect valuable data on herring populations, provides information for restoration planning and assessment, and most of all builds public support for protection of herring habitat and populations. Webpage: <https://apcc.org/our-work/science/community-science/herring/> .
- **State of the Waters: Cape Cod** - The 2022 update of the *State of the Waters: Cape Cod* is underway. This will be the fourth year of this Cape-wide project to grade water quality in coastal embayments, ponds, and drinking water supplies. This project translates water quality data into easily understood pass-fail grades (i.e., Acceptable-Unacceptable). The goal is to raise public awareness of water quality issues and to motivate public action to improve and protect water quality. Each year APCC grades water resources using the most recent available data and will post results on our interactive map and website at <https://capecodwaters.org> . The project serves as a companion to the 208 Water Quality Plan for Cape Cod. Key partners include the Center for Coastal Studies, Cape Cod Commission, Buzzards Bay Coalition, towns, and watershed organizations.
- **Identify and implement coastal restoration, stormwater, and LID projects.**
 - **NEW – Cape Cod Freshwater Initiative:** In August Barnstable County authorized \$5 million to be distributed from ARPA funds to organizations proposing projects of regional significance with restoration of water quality as a priority. In addition, the County appropriated \$2.5 million for a Cape-wide pond monitoring and protection program modeled after the 208 Water Quality Management Plan for Cape Cod embayments. Funding represents a significant milestone for pond protection following years of work by the Commission and APCC to raise awareness of pond water quality issues. On Cape Cod, ponds, groundwater, and streams impact coastal water quality because they form an interconnected hydrological system that discharges to coastal waters. Nutrient pollution of freshwater ponds feeds groundwater pollution and vice versa. Most of the ponds on the north side of the Cape provide spawning habitat for river herring. For more information, visit the Cape Cod Commission website at <https://capecodcommission.org/our-work/cape-cod-freshwater-initiative/> and APCC's websites at: <https://apcc.org/our-work/education/freshwater-ponds/> and <https://capecodwaters.org> .
 - **Cape Cod Water Resources Restoration Project:** On 4/27/22 NRCS announced that \$42.5 million have been awarded to fund 21 restoration projects including salt marsh, fish passage, and stormwater projects. In 2021 APCC was contracted by the Cape Cod Conservation District to provide technical assistance and obtain input on towns priority projects. With town input, APCC prepared a list of prioritized projects. In January 2022, the District and local NRCS staff submitted a list of recommended priority projects to NRCS.
 - **Public Boat Ramp Stormwater Project:** This project, funded by an EPA SNEP grant, will enable APCC to work with 11 towns on Cape Cod to assess, prioritize, and plan for stormwater remediation at public boat ramps in ponds and coastal embayments for the purpose of improving water quality. Several boat ramps are in the MassBays planning area in the towns of Dennis and Brewster. Following input from towns and the public, 20 potential sites were assessed and prioritized for development of conceptual designs and permitting plans for up to

five sites. The next meeting to obtain input on conceptual plans will be in late fall. Website: <https://apcc.org/stormwater-management-at-public-boat-ramps/> .

- **Low-interest loans of 0% to 4% for septic system upgrades approved 9/8/22:**

- The Barnstable County Community Septic Management Program provides critical financing support to homeowners needing access to credit to upgrade septic systems and to connect to new sewers being built across the Cape. While the County program provided easily accessed credit, it charged a 5% interest rate that added pressure on low- and moderate-income borrowers who were most in need of the financing in the first place. At the urging of APCC which had proposed elimination of the interest rate, the Barnstable County Commissioners asked the Massachusetts Clean Water Trust for a 0% loan that would allow for the program to be revised to charge a variable interest rate from 0% to 4% based on borrower income. The Clean Water Trust approved the request on September 8, 2022. The revised County program will have a sliding scale interest rate. Borrowers with incomes up to 120% of Area Median Income (AMI) will be eligible for a 0% loan. Borrowers with incomes between 120% and 180% AMI will be eligible for a 2% loan. Borrowers whose incomes exceed 180% AMI will be eligible for a 4% loan. Barnstable County AMI in 2020 was roughly \$77,000 making 120% AMI around \$93,000 and 180% AMI is roughly \$138,000. Most of Cape Cod's nutrient pollution originates from septic systems. Upgrades to septic systems and connection to sewer lines are a homeowner expense that can be significant. While there has been great progress diversifying funding sources away from reliance on property taxes and lowering the cost of money through 0% loans and principal forgiveness, not much, until now, has been done to help mitigate the costs of sewer connection and septic upgrades. A new County program will be transformative and enormously helpful for working families and seniors doing their part to solve the water quality problems facing the region.

- **General activities**

The RC participated in the following MassBays meetings and projects:

- Management Committee meeting on 6/1/22;
- STAC meeting on 7/27/22;
- NEPORT reporting for FY22;
- Management Committee meeting on 9/14/22.

Staff Scientist

Prassede Vella (prassede.vella@mass.gov)

Address data gaps

- Coastal Acidification: The COAS system was deployed for the third time in May and has since been generating good data. Some minor issues were resolved. Staff Scientist and South Shore RC will be getting training from UMB on the sensor and volunteers will help with collection of discrete samples. Restarted conversations with Narragansett lab to analyze the samples including a slew of archived samples for TA currently stored at UMB. More info to follow.
- MA Coastal Condition Assessment:
 - 2021: Region A data for infauna from benthic sampling has been finalized and submitted in June and we have started preliminary analysis
 - 2022: Region B sampling has been conducted and finalized for June, July, and August. Some data have been submitted by Normandeau. Benthic infauna samples are in storage.
 - Successfully procured funds from the Ocean Trust Fund to enable sample sorting and identification.

- Salem Sound Study: (1) Final report of two-year monitoring in progress. Team will share with STAC and submit to EPA with recommendations for next steps will be included in the report.
- Hypoxia in Cape Cod Bay: Monitoring is being continued this season by the Cape Cod Study Fleet. Results from previous years were published earlier this year: [bg-19-3523-2022.pdf \(copernicus.org\)](#)
- Duxbury-Kingston-Plymouth:
 - Eelgrass Rapid Assessment: Survey was conducted during August. Team will be meeting for debrief. Led planning meetings and worked with team to make sure all aspects of the survey are in place prior to start. The team presented 2018-2021 surveys results to STAC in July and gathered a lot of helpful input and recommendations for next steps.
 - Working closely with EPA and Salem State U. to conduct water quality and sediment monitoring in DKP starting summer 2022. Sediment samples have been successfully collected in August by Brad Hubeny and his team, water samples will be collected between September and November due to some unavoidable delays. This will be a pilot year and we plan for a more comprehensive survey next summer to continue the investigation on eelgrass loss.

CCMP Goal 3 implementation

- Biological Condition Gradient:
 - Continued working with EPA to identify parameters related to ecosystem services to measure progress towards targets, currently using work by MyRWA and DCR in Belle Isle Marsh.
 - Working with EPA ORD to develop a BCG and target for diadromous fish habitat, using the latest data from DMF.
 - Provided overall summary to EPA HQ to show results before it is included in the CCMP document and to use as justification for continued funding for additional BCG work.

Program administration

- STAC news: (1) At its quarterly meeting in July, the DKP eelgrass team (Forest Schenk, Sara Grady, Jill Carr and Prassede Vella) (1) described the ongoing investigation to collect information to inform the causes of eelgrass habitat loss in DKP; (2) presented the results of the 4 years of the rapid assessment survey conducted by volunteers (2018-2021); and (3) solicited expert input and guidance on next steps to identify causes and implement management actions.

Coastal Data Scientist

Jill Carr (Jill.Carr@mass.gov)

Support valid (QA/QC) data collection and use

- Status of Exchange Network grant for water quality data analysis:
 - A beta version of our new R tools has been developed and will undergo beta testing by a group of 26 watershed groups and agency partners on Friday 9/16. The beta version meets the goals of the project, providing a robust and streamlined process for water quality data QA/QC and analysis.
 - To support tool use, we are in the process of developing a Community of Practice (CoP) forum, where users can go for technical support and collaboration on the tools.
 - Final products and training sessions will be rolled out in November.
- Provided technical support to watershed organizations on topics of WQX data formatting, using AquaQAPP to generate QAPPs, and on citizen science eelgrass monitoring in several watersheds.

Address data gaps

- Status of NOAA PSM eelgrass mapping project:
 - Successful completion of all field surveys in June-July 2022. Surveys included 19 different site surveys over a four-week period: eight drone flights, five side scan sonar surveys, hundreds of underwater photo-groundtruthing samples, one aerial airplane survey, and six days of diver

surveys. Data acquired for the project also involved obtaining satellite imagery across all study sites, which was accomplished by securing approval from NASA to use their small commercial satellite agreement for federally-funded research projects.

- Over the last two weeks, project partners from nongovernmental organizations were trained to conduct photointerpretation to analyze survey imagery for eelgrass. Training sessions took place over several sessions, including one all-hands [virtual session](#) on the concepts of remote sensing and eelgrass mapping; followed by four one-on-one sessions to provide training on use of tools within ArcGIS Pro and hands-on practice delineating eelgrass. Project partners will now use the next four weeks to conduct their analyses and return their eelgrass delineations to MassBays for continued analysis.
- With CZM's Communications team, developed a [StoryMap](#) describing the PSM project goals, methods, analysis and --best of all-- photos and videos from the field surveys.
- Assist in planning meetings for the design and functionality of a new Ecohealth Tracking Tool with subcontractor CEI, including leading analysis of historic eelgrass data as it pertains to target-setting.
- Conducted an eelgrass presence/absence survey in the Merrimack River estuary along with partners from MassDMF. A drop-camera protocol was used, alongside the web app iSeaGrass, in locations where depth and exposure were suitable and where spectral signatures indicated potential vegetation in satellite imagery. No rooted eelgrass was found; however, we did encounter some clues that it exists somewhere in the estuary (loose shoots as detritus on seafloor).
- Participate in steering committee for DKP cit sci eelgrass monitoring program. Along with the rest of the team, present an overview of the monitoring effort along with program results to STAC.

Convene and partner with others to support and improve monitoring outputs

- Continue co-leading plans with MIT SeaGrant to explore interactions between eelgrass and shellfish aquaculture. Solicit participants and guest speakers, develop agenda, and plan next steps for a roundtable meeting of scientists and resource managers dealing with aquaculture and eelgrass throughout the Gulf of Maine (to be held 11/15/22). At the roundtable, one researcher and one regulator from each state or province will give a lightning presentation about the body of knowledge in their state regarding interactions between aquaculture and eelgrass. The goal of this meeting is to increase awareness and collaboration on this topic, brainstorm priorities, and guide future research/outreach efforts. Future steps include engaging the aquaculture industry to gain their perspective, and later bringing together industry, science and management to discuss solutions.
- Lead the planning team for the second annual Merrimack River Monitoring Coordinators Roundtable, to take place 10/4/22 in a hybrid format. The meeting will include lightning presentation updates from every monitoring entity along the Merrimack and its tributaries from MA to NH, along with discussion about data gaps and trends.
- Contribution to a successful proposal with the National Parks Service for an eelgrass loss and recovery study in Wellfleet, with our data mining / exploration work to start in Fall 2023.

Executive Director

Pam DiBona (pamela.dibona@mass.gov)

Program Administration

- Continued weekly check-in meetings with Boston staff.
- Published the [Summer-into-Fall issue](#) of the MassBays e-newsletter which includes a Year in Review section.
- Implemented transition to hosting by UMass Boston (UMB), with the following activities:

- Established as a contingent worker to serve as PI for MassBays' applications.
- Finalized workplans and budgets for two grant applications to EPA submitted on time July 25th through the UMB Office of Research and Sponsored Programs process and grants.gov.
- Provided job descriptions and salaries for staff to UMB HR department; all staff have applied for their positions and the hiring process is underway.
- Secured on-campus office space (co-located with Urban Harbors Institute and Living on Earth), laptops and monitors, hybrid meeting technology
- Initiated process to transfer EPA Exchange Network grant (award through 9/24) from CZM to UMB.
- Confirmed that our Interagency Service Agreement with MassDEP for the Massachusetts Coastal Condition Assessment will be renewed with MassBays at UMB.
- Worked closely with CZM finance manager to plan and execute close-outs of subawards by the end of September; only one (under the EPA Exchange Network Grant award) will be re-established from UMB (other than those to be initiated with our new EPA awards).
- Developed a plan for ERG to develop page-specific templates for MassBays' new independent website, based on the Wordpress template also used by the Piscataqua Region Estuary Partnership (www.preestuaries.org).

Representing MassBays

- Participated in Board and External Relations Committee meetings for the Association of National Estuary Programs.
- Participated in Board and Finance Committee meetings of the Northeast Regional Association of Coastal and Ocean Observing Systems (NERACOOS).
- Attended a one-day UMB School for the Environment Strategic Planning meeting for faculty and Center directors at the Nantucket field station.

CCMP

Finalization

- Worked with EPA Project Officer Margherita Pryor to review activities listed in MassBays' revised CCMP, given how much we have already implemented.

Implementation

- Submitted a comment letter regarding a proposed Special Review Procedure for aquaculture in Massachusetts waters.
- Mined data relevant to needs of EJ communities in Falmouth and Plymouth as part of the NSF-funded "Connected Coastal Communities" project with UMB.
- Worked with MassBays staff and consultants to finalize and launch the MassBays Ecohealth Tracking Tool.
- Worked with Mystic River Ambassador to finalized materials for RCs with regard to EJ conditions in their regions, per EPA's EJ Screening Tool and EEA's EJ Mapping Tool.

**MassBays Management Committee, Regional Service Provider, & Staff Updates
October - December 2022**

Management Committee Updates

Massachusetts Water Resources Authority

Contact: [Denise Ellis-Hibbett](#)

- Recent MWRA publications:
 - 2021 Outfall Monitoring Overview: <https://www.mwra.com/harbor/enquad/pdf/2022-11.pdf>
- Upcoming public meetings:
 - Virtual Joint Meeting (MWRA, Cambridge and Somerville) on CSO Control Planning, December 15, 2022: <https://www.mwra.com/01news/2022/120122-csoplanningupdate.html>
 - Outfall Monitoring Science Advisory Panel annual meeting, late January, 2023: contact [Alexa Sterling](#) to be added to the EPA's mailing list to receive notice of the OMSAP meeting
- MWRA's annual Poster and Writing Contests for students in MWRA's service area are open. Entries must be postmarked by Wednesday, March 15, 2023. This year's theme is water conservation. <https://www.mwra.com/annual/contest/2023/pre/contestmain.htm>

Regional Service Provider Updates

Upper North Shore – Merrimack Valley Planning Commission

Contact: Peter Phippen, [pphippen@mvpc.org](mailto:ppphippen@mvpc.org)

● **Gather data on conditions and trends**

Water Quality:

- Fall beach sand microplastic samples collected with and for students at Northern Essex Community College (NECC) for processing as part of their curriculum. Six area beaches were sampled at the high beach wrack line for adding to the data set.
- The Merrimack River (2 samples) Essex River (2 samples) and the Annisquam River (1 sample) water column microplastics were collected using a Manta net this fall for processing. Triple Ring Technologies which is developing equipment for real time results joined our team for the Essex Bay samples to get a better handle on the process as they continue to develop microplastic water column sampling prototype. The surface water samples were sent to the University of New Hampshire to be processed. Incoming RC presented microplastic surface water data from 2021 and 2022 at the annual Merrimack River Water Quality Round Table event held at Northern Essex Community College which MVPC, MassBays, and the Merrimack River Watershed Coalition hosted.
- MVPC is also supporting efforts to reconvene the Merrimack River District Commission through holding monthly meetings with community groups, organizations, and key stakeholders to identify priority actions and projects across the watershed, as well as reinvigorate the push to file MRDC legislation with the state.
- MVPC received grant funding through the Community Compact Cabinet Efficiency and Regionalization grant to support improvement and expansion of the Early Alert Tool across the lower Merrimack River which will allow real time predictive modeling of the river's water quality after CSO events.
- MVPC continues to host monthly Stormwater Collaborative meetings during this quarter. Recent topics include MS4 annual reporting, drone imagery for DPW uses, and MVPC's regional hazard mitigation planning effort.

Coastal Restoration

- In conjunction with the Town of Essex the RC has been working to push forward the road be elevation/stream crossing upgrade along Apple Street. This project, currently going through permitting and final design, will not only bring the culvert up to Massachusetts stream crossing standards but will also raise the roadway up above the 100 year 2070 flood elevation. This is a coastal retreat project (Essex Causeway) which will allow emergency vehicle to access all parts of town in a flood event.
- The RC along with divers planted the eelgrass seeds that were over-summering in UMass Field Station saltwater tanks (recently closed up for the season), in Essex Bay. The final multi-diver deep water eelgrass shoot planting took place in September. Funding is currently secured and being pursued for spring season deep-water eelgrass planting as well as a pilot effort to develop and use a robotic crawler to plant eelgrass seeds and shoots.
- Large Marsh Wrack locations were mapped to determine a baseline of its extent. As a result of SLR, marsh wrack has been noted to have increased in recent years and accumulating for longer periods of time. It has also it has been noted that the wrack is smothering native vegetation and causing a ponding of water. Drone imagery has been collected at four large areas of the Great Marsh for further mapping marsh die-off locations and will be used to help locate accumulations of wrack throughout the marsh.
- Following previous efforts to review bylaws as part of the MS4 municipal assistance grant, MVPC has continued work with towns through an EEA Planning Assistance grant to take next steps and implement recommendations to improve climate resiliency. These revisions include edits to stormwater, zoning, subdivision, and wetland codes to enhance language surrounding low impact development, preservation of natural features, reduction of impervious surfaces, and climate resiliency.
- **Manage invasive species**
 - All 15 Phragmites monitoring locations (presence/absence and regrowth sites) in the Great Marsh was completed for 2022. As noted in the previous update there were no Phragmites treatments in the fall due to the late notification of permit requirements by DEP. In conjunction, overall presence/absence reconnaissance of all previously infested Phragmites treated in the open marsh was completed.
 - Green crab management funding was obtained is underway for Gloucester, Essex, Ipswich, Newbury, and possibly Rowley. Green crab monitoring at selected sites took place this fall.
- **Outreach and Education**
 - The RC and incoming RC continue to work with Governors Academy on new course design and integrating the school into the estuarine community. The Governors new coastal science center on the Parker River will be opening in the spring '23 and first ideas are to have them help out on beach sand microplastics and water quality sampling.
 - MVPC in association with Greenscapes has been conducting Keeping Water Clean educational programming for local 5th grade classes as part of the MS4 requirement. This fall, MVPC has conducted programming at 5 schools in the Merrimack and Upper North Shore region.
 - The RC published the fourth of quarterly installments for a local Cape Ann newspaper on “Notes from the Great Marsh”. This installment discussed the history of restoration in the Great Marsh.
 - The RC assisted personnel at Boston University in teaching a Field Studies class for students on eelgrass restoration and green crab management.
 - Key meetings attended and presentations: Trails and Sails field trip, History of the Great Marsh Smithsonian Rural Communities, Great Marsh Coalition annual meeting, Parker Ipswich Essex Rivers annual meeting, Merrimack River Water Quality Roundtable, Merrimack River Beach Alliance, North Shore Resiliency Task Force, Apple Street culvert/road raising field trip, MAS Salt Marsh Science

Seminar, Essex National Heritage Commission fall meeting, “Sand Breaking” press event at Reservation Terrace (dune creation from Merrimack River dredge materials, Nature Based Adaptation Forum, Regional Hazard Mitigation Plan Kick-off meeting.

Lower North Shore – Salem Sound Coastwatch

Contact: [Barbara Warren](#)

- **Gather data on conditions and trends**
 - Monitored salt marsh vegetation for long-term monitoring at Good Harbor Marsh in Gloucester and at Salem’s Collins Cove Living Shoreline and Forest River Park with Alison Frye
 - Completed collecting MIMIC data to share with CZM
 - Continued collecting Sawmill Brook temperature using in-situ HOBOS with Manchester Coastal Stream Team
- **Climate Change**
 - Public Access and Protection for the Marblehead Municipal Light Department and Adjoining Public Lands, MA CZM Coastal Resilience Grant FY23 & FY24, \$523,220: 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.
 - Preserving History: Assessments and Climate Adaptations at the House of Seven Gables, MA CZM Coastal Resilience Grant FY23 & FY24, \$509,919: 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.
 - Collins Cove to Willows Coastal Resilience Study, MVP FY23, \$234,565: RC conducting the outreach and engagement on this City of Salem project to assess vulnerability and risk of the study area to coastal and inland flooding. publicinput.com/CollinsCove2Willows
 - Peabody-Salem Multi-use Path along the North River, MVP continued into FY23: RC leading community engagement including involvement of the EJ community that has been continued into FY23 publicinput.com/ResilientNorthRiver
 - RC presented at the Gloucester TownGreen Webinar #2 Protecting the Good Harbor Ecosystem: Now and for Future Generations while Alison Frye led a walk at Good Harbor Marsh
 - RC presented at the National Trust for Historic Preservation PastForward conference
- **Reduce Stormwater Discharge**
 - 26 North Shore municipalities are members of the Greenscapes North Shore Coalition
 - What Not to Flush social media, videos, rack cards - greenscapes.org/what-not-to-flush
 - Letter of support for Hazard Mitigation Grant application: Salem Willow Avenue Trunkline Relocation Project
- **Education and Outreach**
 - Hosted an Endicott College intern this fall
 - School to Sea Program held salt marsh exploration for 420 6th grade students
- **Technical assistance**: RC actively involved in the following:
 - Working groups: Salem’s Flood Hazard Resilience Overlay District Ordinance, Open Space and Recreation Plan, and Salem Harbor Plan, Shetland Park Redevelopment
 - Served on a Community Open Space Advisory Group and submitted MEPA comment letter for [Leefort Terrace](#), Salem Housing Authority property for elderly and disabled households. Redevelopment will be moved out of the Chapter 91 filled tidelands and become a public open

space implementing a green infrastructure and climate resilient strategy. This decision makes it a model for redevelopment in Salem, the North Shore and coastal Massachusetts.

- Submitted a MEPA comment letter for the Salem Wind Port Expanded Environmental Notification Form, Crowley Wind Services, [Salem Offshore Wind Terminal](#)

Metro Boston – Northeastern University Marine Science Center

Contact: [Jon Grabowski](#)

- **Gather data on conditions and trends (DATA)**
 - Examined the impacts of the range expansion of black seabass and blue crabs on lobsters in the Gulf of Maine. Conducted experiments at the Marine Science Center, and will conduct field monitoring in 2023.
 - Processed kelp habitat community data from long-term sites near Pumphouse and Canoe Beaches in Nahant. The Kelp Ecosystem Ecology Network aims to assess how climate change is negatively impacting kelp habitat in the Gulf of Maine and elsewhere around the globe.
- **Address data gaps (DATA)**
 - [CZM Projects of Special Merit Grant](#): RC in combination with two students in his lab assisted with seagrass edge delineation and mapping in ArcGIS. Project is led by Todd Callaghan (CZM) and Jill Carr (MassBays), assessing seagrass mapping techniques to inform management and planning.
 - [Woods Hole Sea Grant](#): We are collaborating on a project with Colby College, TNC and regional stakeholders to assess how oyster farming methods relate to different environmental stressors, with the goal of informing sustainable aquaculture practices.
 - [NOAA CAFA](#): Submitted a proposal to investigate how coastal fishing communities will adapt to climate change in collaboration with the NOAA Northeast Fisheries Science Center. We are aiming to conduct interviews to help the industry better prepare and adapt to climate change impacts such as changes in species distributions and abundances. This information will be used to enhance the accuracy of NOAA ecosystem models such as Atlantis.
- **Education and Outreach (E&O)**
 - [Boston Harbor Ecosystem Network \(BHEN\)](#): Met with the advisory team to plan field trip and our next in person meeting, which will potentially focus on anadromous fish runs.
 - [Boston Harbor Habitat Atlas](#): We used the Boston Harbor Habitat Atlas for multiple Beach Sisters activities focused on watersheds and water pollution, and to bolster the students' familiarity with local habitats. Audience: middle and high school youth in Lynn.
- **Technical Support and Communication**
 - [Metro Boston MassBays Regional Coordinator Opening](#): We hired Dr. Diana Chin to be the next Regional Coordinator. Diana will start on January 31, 2023.
 - [Conferences, Meetings and Workshops](#): interim RC's lab participated in and presented at the World Seagrass Conference and International Seagrass Biology Workshop in August.
 - [City of Boston CSRM Planning Charette](#): Participated in the City of Boston's coastal storm risk management feasibility study planning Charrette, including recent discussions about East Boston.

South Shore – North and South Rivers Watershed Association

Contact: [Sara Grady](#)

- **Address data gaps**
 - [Water Quality Monitoring](#)
 - Assisted MassDEP WQMG coalition with data coordination for previous grant on conductivity monitoring and worked on new proposal for organizational monitoring support

- Kicked off 604b grant to monitor bacteria in the headwaters of the Indian Head River with the Town of Hanover
 - Analyzed Riverwatch data and wrote article for e-news
 - Summarized research on dilution of male specific coliphage to support shellfish bed opening proposal
- Monitor Diadromous Fish Runs - Attended and helped with Fall River Herring Network Meeting
- Coastal Acidification - Attended training on MassBays OCA logger in Duxbury
- Salt Marsh Change
 - Conducted dock surveys for Salt Marsh Sentinels project
 - Participated in the regional salt marsh working group
 - Attended two-day workshop on salt marsh restoration at Mass Audubon in Barnstable
 - Provided additional information to volunteer digitizing historical and current salt marsh aerials in North River and mapping marsh loss
 - Visited tidally restricted salt marsh in Scituate to discuss potential steps towards habitat improvement with local concerned citizens
- **Research to inform policy and actions**
 - Dam Removal Monitoring/Implementation
 - Third Herring Brook: Managed project to remove two stone weirs from the brook and place boulders to provide fish passage; Coordinated Jacob's Pond fish ladder project; Met with Sea Run Brook Trout Coalition and MassDFW to coordinate management of PIT tagging antenna
 - South River: Attended and spoke at public meeting about Temple Street dam removal plans; Coordinated consultants working on Chandler Pond dam removal feasibility study; Reviewed comments to MEPA on Veterans Memorial Park dam and scheduled a meeting with regional MVP coordinator
 - Indian Head River: Assisted with bid request and pre-bid site visit for Luddams Ford and State/Cross Street dams; Attended Indian Head Restoration Committee meeting
 - Eelgrass - Reviewed and made plans to revise 2022 Eelgrass Blitz report; Co-hosted Massachusetts Seagrass Group fall meeting with Cohasset Center for Student Coastal Research; Created outline maps of eelgrass bed extent in ArcGIS from aerial (airplane) photos for MassBays Project of Special Merit
 - Blue Mussels - Attended quarterly call with Department of Defense and Mass Audubon to report on project progress and plan for next quarter, to include coordination with Manomet Center and project permitting as needed
- **Technical support and communications**
 - Represent MassBays in Networks - Attended WHOI Sea Grant annual meeting, NEERS Fall Meeting, MassRivers Scientist Meeting; Participated in CERF Attendee Experience Committee (Social Media Chair)
 - Watershed and Coastal Science Education - Co-led field trip with INLY Montessori school to salt marsh and barrier beach habitats at the Spit; (Remotely) sat on a panel discussing the intersection of art and science at gallery opening in Boston (Nedret Andre at Beacon Gallery); Wrote article about Clean Water Act 50th Anniversary; Coordinated future salt marsh lecture for Water Watch Lecture Series
 - Attended local "protest" to inform the public about the closing of the shellfish beds in the North and South Rivers
- **Local action for habitat and water quality**

- Adequate Streamflow - Provided weekly updates on streamflow and reservoir status to Town of Scituate; Revised Interim Operational Plan to update streamflow guideline table and include recent adaptive management practices
- Resilient Coastal Habitats and Communities - Assisted with coordination of South Shore Climate Network meeting; Promoted beachgrass planting event at Peggotty Beach in Scituate; Awarded beach profiling volunteers with Citizen Science Volunteer of the Year awards at NSRWA Annual Meeting
- **Outreach and education/general**
 - Rescoped purple loosestrife management project to include an additional biocontrol site and educational signage
 - Participated in Straits Pond Technical Committee meeting (representing benthic ecology perspective)
 - Participated in Duxbury Beach Reservation Ecology Committee meeting
 - Reviewed Green Harbor tide gate water level data and previously collected salinity profiles

Cape Cod – Association to Preserve Cape Cod

Contact: [Jo Ann Muramoto](#)

- **Gather data on conditions and trends**
 - Monitor cyanobacteria blooms:
 - This summer APCC conducted biweekly monitoring of cyanobacteria in over 130 ponds and lakes in the 15 towns on Cape Cod. Many ponds are located in the MassBays planning area and provide diadromous fish habitat. 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. Local and state health officials accepted APCC's risk characterization and recommendations, as evidenced through **91 municipal actions (e.g., advisories, warnings)** taken in response to our data and risk characterization. Webpage: <https://apcc.org/our-work/science/community-science/cyanobacteria/>.
 - In collaboration with the University of New Hampshire, APCC conducted a proficiency test to evaluate our accuracy in identifying cyanobacteria. Identical samples were collected and analyzed by APCC, UNH scientists, and two commercial labs. Results show that identifications made by the first three agreed well, while the fourth differed markedly. The results validate APCC's methodology and overall data quality.
 - 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 transferrable 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.
 - Monitor Diadromous Fish Runs on Cape Cod

- On Cape Cod the 2022 volunteer herring count season represented a return to pre-COVID levels of effort, with volunteers counting herring at over 14 herring runs. Count data were reviewed and sent to the Massachusetts Division of Marine Fisheries which calculated estimated run sizes for 14 runs. Run size estimates for runs in the MassBays area (Cape Cod Bay side) are: Herring River, Wellfleet (47,384); Herring River, Eastham (1,327); Herring Brook, Eastham (823); Stony Brook, Brewster (39,839); Tom Mathews Pond, Yarmouth (0); and Pilgrim Lake, Orleans (10,987). In general it was not a good year for herring runs.
 - Volunteer counts enable citizen scientists to collect valuable data on herring populations, provides information for restoration planning and assessment, and most of all builds public support for protection of herring habitat and populations. Webpage: <https://apcc.org/our-work/science/community-science/herring/> .
 - State of the Waters Cape Cod: The 2022 update of the *State of the Waters: Cape Cod* is nearing completion. This will be the fourth year of this Cape-wide project to grade water quality in coastal embayments, ponds, and drinking water supplies. This project translates water quality data into easily understood pass-fail grades (i.e., Acceptable-Unacceptable). The goal is to raise public awareness of water quality issues and to motivate public action to improve and protect water quality. Each year APCC grades water resources using the most recent available data and will post results on our interactive map and website at <https://capecodwaters.org> . The project serves as a companion to the 208 Water Quality Plan for Cape Cod. Key partners include the Center for Coastal Studies, Cape Cod Commission, Buzzards Bay Coalition, towns, and watershed organizations.
- **Identify and implement coastal restoration, stormwater, and LID projects.**
 - Cape Cod Freshwater Initiative: In August Barnstable County authorized \$2.5 million for a Cape-wide pond monitoring and protection program modeled after the 208 Water Quality Management Plan for Cape Cod embayments. Funding represents a significant milestone for pond protection following years of work by APCC and the Cape Cod Commission to address pond water quality. Coastal water quality is impacted by water quality in ponds, groundwater, and streams that discharge to coastal waters. Nutrient pollution of ponds feeds groundwater pollution and vice versa. Most of the ponds in the Cape's MassBays area provide spawning habitat for river herring and discharge to embayments with water quality issues. In response to an RFP from Barnstable County, APCC submitted a proposal to conduct a Pond Monitoring Program for Cape Cod. For more information, visit the Cape Cod Commission website at <https://capecodcommission.org/our-work/cape-cod-freshwater-initiative/> and APCC's websites at: <https://apcc.org/our-work/education/freshwater-ponds/> and <https://capecodwaters.org> .
 - Cape Cod Water Resources Restoration Project: APCC staff are providing GIS mapping of restoration projects and monitoring of salt marsh restoration projects
 - Public Boat Ramp Stormwater Project: This project, funded by an EPA SNEP grant, will enable APCC to work with 11 towns on Cape Cod to assess, prioritize, and plan for stormwater remediation at public boat ramps in ponds and coastal embayments for the purpose of improving water quality. Several boat ramps are in the MassBays planning area in the towns of Dennis and Brewster. Following input from towns and the public, 20 potential sites were assessed and prioritized for development of conceptual designs and permitting plans for up to five sites. The next meeting to obtain input on conceptual plans will be in late fall. Website: <https://apcc.org/stormwater-management-at-public-boat-ramps/> .
- **Low-interest loans of 0% to 4% for septic system upgrades approved 9/8/22:**
 - The Barnstable County Community Septic Management Program provides critical financing support to homeowners needing access to credit to upgrade septic systems and to connect to new sewers being built across the Cape. While the County program provided easily accessed

credit, it charged a 5% interest rate that added pressure on low- and moderate-income borrowers who were most in need of the financing in the first place. At the urging of APCC which had proposed elimination of the interest rate, the Barnstable County Commissioners asked the Massachusetts Clean Water Trust for a 0% loan that would allow for the program to be revised to charge a variable interest rate from 0% to 4% based on borrower income. The Clean Water Trust approved the request on September 8, 2022. The revised County program will have a sliding scale interest rate. Borrowers with incomes up to 120% of Area Median Income (AMI) will be eligible for a 0% loan. Borrowers with incomes between 120% and 180% AMI will be eligible for a 2% loan. Borrowers whose incomes exceed 180% AMI will be eligible for a 4% loan. Barnstable County AMI in 2020 was roughly \$77,000 making 120% AMI around \$93,000 and 180% AMI is roughly \$138,000. Most of Cape Cod's nutrient pollution originates from septic systems. Upgrades to septic systems and connection to sewer lines are a homeowner expense that can be significant. While there has been great progress diversifying funding sources away from reliance on property taxes and lowering the cost of money through 0% loans and principal forgiveness, not much, until now, has been done to help mitigate the costs of sewer connection and septic upgrades. A new County program will be transformative and enormously helpful for working families and seniors doing their part to solve the water quality problems facing the region.

- **MassBays activities**

The RC participated in the following MassBays meetings and projects:

- Management Committee meeting on 9/14/22;
- STAC meeting on 7/27/22;
- NEPORT reporting for FY22;

Executive Director

Pam DiBona (pamela.dibona@umb.edu)

- **Program Administration**

- Continued weekly check-in meetings with Boston staff.
- Distributed a "change of address" announcement to MassBays e-newsletter subscribers.
- Implemented transition to hosting by UMass Boston (UMB), with the following activities:
 - Grants from EPA were received at UMB in September 2022 and finalized in October (BIL) and November (S.320).
 - All staff are UMB employees as of October 1/October 17, on time and with no gap in pay as we billed all salaries to the BIL grant. Funds will be reallocated to the S.320 grant, as well as the Project of Special Merit and Exchange Network grants once they are in place.
 - Received word from CZM that our FFY2021 EPA grant was fully expended as of October; requested final accounting for those expenditures.
 - Purchased office furniture, most of which is built and in place in our space in McCormack Building. All staff have new laptops, purchased by UMB.
 - Received required information from CZM to transfer EPA Exchange Network grant (award through 9/24) from CZM to UMB.
 - Connected UMB and DEP finance staff to establish the 2023 Interagency Service Agreement with MassDEP for the Massachusetts Coastal Condition Assessment.
 - Worked closely with UMB post-award staff to sort out BIL and S.320 Scopes of Work and budgets for subawardees. All subawards will be in place by the Management Committee meeting.

- **Representing MassBays**

- Attended an in-person meeting in Arlington VA hosted by NSF for grantees under the Networked Communities program.
- Participated in Board ad hoc Nominations Committee meetings for the Northeast Regional Association of Coastal and Ocean Observing Systems (NERACOOS). My term on this board is complete.
- Participated in the Coast Advisory Committee for the Trustees.
- Attended and presented at the Restore America's Estuaries Summit in New Orleans.
- Attended the Association of National Estuary Programs Board meeting.
- Participated in DEI-EJ trainings and discussions with EPA and NEPs.
- **CCMP**
 - Finalization - Completed and submitted a final draft CCMP to Region 1 EPA. Currently responding to final comments from EPA Headquarters prior to finalization.
 - Implementation - Advanced conversations with potential partners on multiple fronts, including:
 - With DEP, ground-truthing of eelgrass aerial photography and monitoring for TMDL development.
 - With the Sustainable Solutions Lab, Environmental Justice community engagement and support.
 - With the Region 1 NEPs, region-wide eelgrass restoration initiative.
 - With MWRA and NERACOOS, contributing to establishment of continuous monitoring via an existing buoy in Massachusetts Bay (Boston Buoy 44013).
 - With SFE, scoping an NSF proposal to follow up on the planning grant now in place.

Senior Scientist

Prassede Vella (prassede.vella@umb.edu)

Address data gaps

- Coastal Acidification: The COAS system was deployed in May and collected data through mid-September. The pH system then developed an issue that needs to be resolved. This means that we have data over three years, two of them for short periods, and these data can be used to help better understand the advantages of this system versus the traditional buoy systems. The future of the system will be discussed at the next STAC meeting.
- MA Coastal Condition Assessment:
 - Thanks to funding from the Ocean Trust Fund, we were able to conduct infauna sample sorting and identification for Region B. Results will be shared soon. Preparations will soon be underway to prepare for the final year of monitoring in 2023.
- Salem Sound Study: Final report of two-year monitoring in progress. Team will share with STAC and submit to EPA with recommendations for next steps will be included in the report.
- Hypoxia in Cape Cod Bay: Monitoring is being continued this season by the Cape Cod Study Fleet. Results from previous years were published earlier this year: [bg-19-3523-2022.pdf \(copernicus.org\)](https://www.copernicus.org/publications/bg-19-3523-2022.pdf). The survey was repeated this fall, but I will be checking in with the team regarding data.
- Duxbury-Kingston-Plymouth:
 - Following the Eelgrass Rapid Assessment: Survey was conducted during August, the team met recently to debrief. The report is underway, and the team will meet in January when the results are available.
 - Working closely with EPA and Salem State U. to conduct water quality and sediment monitoring in DKP starting summer 2022. Sediment samples have been successfully collected in August by Brad Hubeny and his team, water samples will be collected between September and November

due to some unavoidable delays. This will be a pilot year and we plan for a more comprehensive survey next summer to continue the investigation on eelgrass loss. Data and results are pending.

CCMP

- Developed attachment 1 describing the BCG and target setting process and submitted to EPA. The document will be shared with STAC.
- Revised Chapter 2 and other relevant pieces of the CCMP for submission.

Coastal Data Scientist

Jill Carr (Jillian.Carr@umb.edu)

Support valid (QA/QC) data collection and use

- Status of Exchange Network grant for water quality data analysis:
 - The beta version of our new R tool was tested by a group of 26 watershed groups and agency partners on Friday 9/16, and received praise and very useful feedback.
 - The final version, which incorporated feedback and other improvements, will be released before the end of the year and announced via newsletter.
 - A web-based Community of Practice (CoP) forum was developed as a place for tool users to go for technical support and questions. The CoP will be officially launched alongside the tool.
 - Three regional training sessions will be scheduled this winter to reach freshwater and coastal groups across Massachusetts. Trainings will take place in Western MA (January), Cape and South Shore (February) and Boston and North Shore (March); exact dates TBD.
- Provided technical support to watershed organizations on topics of WQX data formatting, using AquaQAPP to generate QAPPs, and on citizen science eelgrass monitoring in several watersheds.
- Launched a redesign of the MassBays Monitoring Coordinators Network, to transition from a static quarterly newsletter to a web-based forum on the Discourse platform. The forum provides a place for freshwater and coastal watershed groups to collaborate, pose questions, have discussions and find resources in an intuitive manner. Expected official launch is January 2023.
- Currently developing a website dashboard as part of MassBays' new website where all our tools and data viewers can easily be located. From this dashboard, users will also be able to get technical support using the tools.

Address data gaps

- Status of NOAA PSM eelgrass mapping project:
 - All field surveys were successfully completed in June-July 2022. Data have been undergoing rigorous QA/QC review, and analysis is now underway.
 - Project partners from nongovernmental organizations were trained to conduct photointerpretation to analyze survey imagery for eelgrass, and all but 1 partner completed their tasks as scheduled. When a complete dataset is in hand, the eelgrass delineations from each organization will be analyzed against each other and against the diver survey data.
 - The project [StoryMap](#) has been updated as needed.

Convene and partner with others to support and improve monitoring outputs

- Co-lead an effort with MIT Sea Grant to explore interactions between eelgrass and shellfish aquaculture. Hosted a well-attended and successful roundtable meeting for scientists and resource managers dealing with aquaculture and eelgrass on 11/15/22 (recording [here](#)). A follow-up survey was sent to participants to help guide next actionable steps, including a survey to Massachusetts aquaculturists, and documenting priority areas for research and management.
- Lead the planning team for the second annual Merrimack River Sampling Program Roundtable, which took place 10/4/22 in a hybrid format (meeting notes and presentations [here](#)). The meeting included lightning presentation updates from every monitoring entity along the Merrimack and its tributaries from MA to NH, along with discussion about data gaps and trends.

**MassBays Management Committee, Regional Service Provider, & Staff Updates
December 2022 - March 2023**

Management Committee Updates

Massachusetts Water Resources Authority

Contact: [Denise Ellis-Hibbett](mailto:Denise.Ellis-Hibbett@mwra.com)

- MWRA has many open positions: <https://mwra.applicantpro.com/jobs/>
- Our headquarters is moving later this spring from the Charlestown Navy Yard to Deer Island. Our new mailing address will be 190 Tafts Ave, Winthrop, MA 02152
- MWRA submitted its final Public Notification Plan as required under the new sewage notification law. The plan and information on how to sign up for notifications can be found here: https://www.mwra.com/harbor/html/cso_sso_reporting.htm

Marine Ocean Technology Network

Contact: Harlan Doliner

- The recently released USCG Climate Change Strategy provides an example of how a larger organization aims to change holistically to face the challenges ahead. [USCG CLIMATE CHANGE STRATEGIC OUTLOOK 2022 v17.indd \(defense.gov\)](https://www.uscg.mil/Portals/0/USCG%20CLIMATE%20CHANGE%20STRATEGIC%20OUTLOOK%202022%20v17.indd%20(defense.gov))

Regional Service Provider Updates

Upper North Shore – Merrimack Valley Planning Commission

Contact: Hanna Mogensen, hmogensen@mvpc.org

- **Gather data on conditions and trends**
 - In conjunction with the Town of Essex the RC has been working to push forward the road elevation/stream crossing upgrade along Apple Street. This project, currently going through permitting and final design, will not only bring the culvert up to Massachusetts stream crossing standards but will also raise the roadway up above the 100-year, 2070 flood elevation. This is a coastal retreat project (Essex Causeway) which will allow emergency vehicles to access all parts of town in a flood event. Project partners include MA Division of Ecological Restoration, MA Municipal Vulnerability Preparedness Program, and Massachusetts Environment Management Agency
 - The RC along with MVPC and Boston University is developing a project proposal to seek Department of Fish and Game In-Lieu Fee funding to enhance a historical eelgrass bed in Annisquam Harbor, Gloucester MA. The RC is actively working with the City as well as neighboring community groups to provide education about this effort, seek local knowledge and insight, and determine project details to ensure a successful outcome.
 - Assisted with successful application for eelgrass restoration work in the Great Marsh (50k awarded from New England Biolabs to Boston University).
 - Continued Salt Marsh wrack mapping using “Field Maps” in Salisbury, Newburyport, Newbury, Rowley, Ipswich, and Essex to determine the extent and impact of great levels of marsh wrack now accumulating as a result of SLR.
 - Began working with Merrimack River Watershed Association to identify priority restoration projects along the Merrimack River for Division of Ecological Restoration funding.
 - Submitted final report of the Hurricane Sandy Resiliency Grant 2

- Collaborated with Parker River National Wildlife Refuge to develop a proposal for Pepperweed and Phragmites management for the communities of Rowley, Newbury, and Newburyport.
- **Inform state policy and local action**
 - RC (previous and current) held the Annual Great Marsh Resiliency Task Force Meeting at the Parker River National Wildlife Headquarters in January. The Meeting featured ten speakers who provided updates on a diversity of conservation-related topics including invasive species management, native species restoration, marsh hydrology, sediment transport, large scale conservation efforts, and project permitting.
 - In January, legislation written by MVPC and RC was co-filed by Senator Burce Tarr and Representative Dawne Shand in the Massachusetts House and Senate to establish a Merrimack River Collaborative. This collaborative, led by MVPC, the Merrimack River Watershed Council, and the Northern Middlesex Council of Governments aims to coordinate the monitoring and improvement of water quality along the Merrimack River to enhance the health of river adjacent communities.
 - MVPC has continued working with towns through an EEA Planning Assistance grant to take next steps and implement recommendations to improve climate resiliency. These revisions include edits to stormwater, zoning, subdivision, and wetland codes to enhance language surrounding low impact development, preservation of natural features, reduction of impervious surfaces, and climate resiliency.
 - MVPC received grant funds from DEP MS4 municipal assistance program to continue supporting MS4 compliance in the region through the development of an interactive bylaw model language toolkit to support communities' goals to revise bylaws with proactive and compliant stormwater mitigation language.
 - Assisted communities of Salisbury, Merrimac, and Lawrence with Green Community annual reporting follow up questions from DOER and met with the Department of Energy Resources and the Town of Newbury to solidify next steps towards Green Community Designation, namely writing of their energy reduction plan.
 - RC assisted in the long-term monitoring streamflow of Alewife Brook anadromous fish run in Essex and is working with the Chebacco Lake Association to develop a comprehensive lake management plan and assist in their involvement into a 501(c)(3).
 - As a member of the North Shore Water Resiliency Task Force the RC assisted with the development of two RFPs for evaluating water supply alternatives and watershed assessment in the Ipswich River watershed.
- **Provide Education, training, and technical support**
 - RC conducted a half-day training with undergraduate students at the University of New Hampshire focused on processing surface water microplastic samples. The UNH Lab, led by Dr. Gregg Moore will oversee processing of the remaining 2022 surface water samples as well as the 2023 samples that will be collected this spring and summer.
 - RC along with previous RC met with faculty and staff at Northern Essex Community College to provide technical support and additional information around processing microplastic beach sand samples. The NECC lab, led by Dr Marguerite White-Jeanneau, will oversee processing of the remaining 2022 beach samples as well as the 2023 samples that will be collected this spring and summer.
 - RC participated on the SWIMMER Microplastics Panel at UMass Lowell to provide insight into local actions and concerns regarding microplastics in the Merrimack Valley.
 - MVPC in association with Greenscapes has been conducting Keeping Water Clean educational programming for local 5th grade classes as part of the MS4 requirement. Over the winter, MVPC

has conducted programming at 3 schools in the Merrimack and Upper North Shore region (Boxford, North Andover and Salisbury).

- MVP continues to host monthly Stormwater Collaborative meetings during this quarter. Recent topics include the Transportation Improvement Program and green infrastructure, regional ecological restoration projects, Greenscapes, and the MS4 program.
- RC is leading Regional Hazard Mitigation Update for ten communities in upper north shore. The effort officially kicked off with an informational webinar in December. Each community was tasked with forming their Local Hazard Mitigation Planning Team in January. Workshops have gotten underway in March. The first workshop guided communities through identifying the natural hazards that pose the largest risk to their communities. Hazard identification workshops have been held for three communities, with additional meetings scheduled throughout the month.

Key meetings attended: Monthly Merrimack River Collaborative Meeting, Great Marsh Coalition quarterly meetings, North Shore Water Resiliency Task Force Meeting, monthly DPW/Stormwater Collaborative meeting, Merrimack River Beach Alliance meeting, CZM-UMass Saltmarsh Working Group meeting, monthly Spicket River 604b team meeting, Invasive Plant Permitting Meetings for Great Marsh, PIE-Rivers quarterly meeting.

Lower North Shore – Salem Sound Coastwatch

Contact: [Barbara Warren](#)

- **Gather data on conditions and trends**
 - Photo-documentation of flooding on 12/23/2022
 - Preparing a Horseshoe crab community science survey
 - Planning for future eelgrass restoration techniques using seeding (WHOI grant with MassBays and DMF)
- **Climate Change**
 - Bass River District Resilience Plan, MVP Action Grant FY23, \$267,025: RC and Alison Frye (AF) working with Beverly to address flood resilience for the critical infrastructure and properties and protect active uses and facility assets if compromised by floodwaters. Flood intervention strategies may include enhancing open space, vegetative berms, shoreline plantings to maximize flood storage.
 - Public Access and Protection for the Marblehead Municipal Light Department and Adjoining Public Lands, MA CZM Coastal Resilience Grant FY23 & FY24, \$523,220: RC currently working with team to prepare MEPA permit and Public Involvement for Environmental Justice Populations. Presentations to the Marblehead Harbors and Waters Board, Marblehead Municipal Light Commission, and targeted EJ communities.
 - Preserving History: Assessments and Climate Adaptations at the House of Seven Gables, MA CZM Coastal Resilience Grant FY23 & FY24, \$509,919: RC working with team to plan working charrette to share findings and begin discussion of potential strategies for site design resilience.
 - Collins Cove to Willows Coastal Resilience Study, MVP FY23, \$234,565: RC, AF and team conducted an in-person public meeting and a virtual public meeting to gather local knowledge and share study H&H model and MC-FRM for the study area.
publicinput.com/CollinsCove2Willows
 - Peabody-Salem Multi-use Path along the North River, MVP continued into FY23: RC and AF had multiple meetings working on path alignment and bank stabilization.
publicinput.com/ResilientNorthRiver

- Manchester-by-the-Sea CZM Coastal Vulnerability Action Plan: RC is on the steering committee for this CZM grant to plan floodproofing and coastal resilience measures specifically for the Town Hall, Wastewater Treatment Plant and downtown commercial district.
<https://experience.arcgis.com/experience/6ee0fe71c97d43bfbd7506af980e92/>
- **Reduce Stormwater Discharge**
 - DEP Municipal MS4 grant to spearhead proactive stormwater compliance and mitigation in 30 north shore communities, includes interactive web-based resource to disseminate MS4 model code language and improve the Greenscapes “LID Viewer” – SSCW is working with its Greenscapes partners, MVPC and IRWA
- **Education and Outreach**
 - Presentations:
 1. “Saving our Shoreline 2023: Building Resilience across Salem Sound Communities” 1/18/23 at Underwater in Salem Sound Lecture Series <https://vimeo.com/796726396>
 2. “History of Collins Cove: 1700's to Present” <https://vimeo.com/795311593>
 - Keeping Water Clean school programs in 26 North Shore Greenscapes municipalities
- **Technical assistance**: RC actively involved in the following:
 - Working groups: Salem’s Flood Hazard Resilience Overlay District Ordinance, Open Space and Recreation Plan, and Salem Harbor Plan, Shetland Park Redevelopment
 - Member of the organizing committee for the annual Preservation in a Changing Climate Conference
 - AF finalizing “Residential Floats Reduce light availability for Eelgrass (*Zostera marina*) in Salem Harbor MA USA” manuscript with DMF and Jill Carr for publication

Metro Boston – Northeastern University Marine Science Center

Contact: [Diana Chin](#)

- **Education and Outreach**
 - Boston Harbor Ecosystem Network (BHEN): 1) Held Steering Committee meetings (February 15 and 17); 2) Planning for in-person BHEN semi-annual meeting (March 28) with a theme of Belle Isle Marsh, featuring invited speakers and panelists from MA Department of Conservation & Recreation, Woods Hole Group, City of Boston, and Friends of Belle Isle Marsh.
 - Sustaining our Seas Symposium at Museum of Science: Grabowski served on the advisory panel over the past year and helped organize this symposium (March 1) and the forums on sustainable seafood, wind energy, and climate induced species range shifts that the museum conducted over the past 9 months that were discussed at the symposium.
 - Boston Harbor Habitat Atlas: the Boston Harbor Habitat Atlas continues to be used for Beach Sisters activities focused on watersheds and water pollution, and to bolster the students’ familiarity with local habitats. Audience: middle and high school youth in Lynn.
 - New England Cooperative Research Summit: participated in a summit organized by the NOAA Northeast Fisheries Science Center on collaborative research between the commercial fishing industry and fisheries scientists (February 15).
 - Cooperative fisheries meeting: participated in a summit organized by the Conservation Law Foundation and the University of Massachusetts Dartmouth promoting collaborative research between the commercial fishing industry and fisheries scientists (January 4).

- American Lobster Initiative Summit: participated in the ALI lobster summit on February 6-7 where Grabowski led a session on promoting social-ecological coupled research on the lobster fishery focusing on how to better engage with the lobster fishing industry.
- **Technical Support and Communication**
 - Conferences, meetings, and workshops: 1) Participated in a meeting (March 7) with MA Department of Conservation & Recreation and Friends of Belle Isle Marsh to discuss current research and management landscape at Belle Isle Marsh; 2) Participating in Friends of Belle Isle Marsh annual meeting (March 12); 3) Participating in Zosterapalooza conference (March 29), featuring talks on the latest science of mapping, management, and climate change adaptation of eelgrass (*Zostera marina*).
- **Gather data on conditions and trends (DATA)**
 - Lobster Sea Grant Program: We are examining the impacts of the range expansion of black seabass and blue crabs on lobsters and the lobster fishery in the Gulf of Maine. This research uses experiments, field monitoring, and surveys of the lobster industry to assess their ecological knowledge.
- **Address data gaps**
 - Woods Hole Sea Grant: We are collaborating on a project with Colby College, TNC and regional stakeholders to assess how oyster farming methods relate to different environmental stressors, with the goal of informing sustainable aquaculture practices.
 - In collaboration with TNC, we are examining the degree to which oyster aquaculture provides important ecosystem services including enhancing water quality and providing habitat for fish and crustaceans. We are also conducting surveys of coastal communities throughout Massachusetts and the remainder of the eastern seaboard to examine barriers to aquaculture.

South Shore – North and South Rivers Watershed Association

Contact: [Sara Grady](#)

- **Address data gaps**
 - Water Quality Monitoring - Submitted a QAPP to EPA for the 604b-funded headwaters bacterial source tracking project in Hanover and nearby towns. Recently the lab that has tested bacteria for the NSRWA stopped testing water, so we are also trying to solve that issue, potentially by bringing more samples up to Quincy or by using the lab at the Cohasset Center for Student Coastal Research.
 - Monitor Diadromous Fish Runs - Solicited volunteers and conducted training for herring counts to start at the end of March and beginning of April on six South Shore streams.
 - Horseshoe Crabs Monitoring Program - Attended the DMF Horseshoe Crab Science Committee meeting and began planning surveys for this spring and summer.
 - Marine Invasive Species: Participated on the planning team for the August 2023 Rapid Assessment Survey, which will cover the Gulf of Maine.
 - Coastal Acidification - Attended training on MassBays OCA logger in Duxbury.
 - Salt Marsh Change - Gave a Water Watch Lecture on salt marshes along with a local GIS expert who had delineated marsh loss, and Danielle Perry of NOAA.
- **Support valid (QA/QC) data collection and use**
 - AquaQAPP/WQX - Assisted with organizing the South Shore MassWaterR workshop at the Center Hill Preserve
- **Research to inform policy and actions**
 - Dam Removal Monitoring/Implementation

- South River - Continued to move Temple Street Dam, Chandler Pond Dam, and Veterans Memorial Park Dam projects forward with consulting teams.
 - Indian Head River - Participated on the Indian Head River Restoration Committee led by our new staff member, Becky Malamut
- Eelgrass - hired intern for 2023 Eelgrass Blitz and began soliciting boats for the survey
- Blue Mussels - Completed a Final Report for Year 1 of the Department of Defense funding and began Year 2, which will focus on implementation of the pilot project to restore mussels at the mouth of the North and South Rivers
- **Technical support and communications**
 - Represent MassBays in Networks - Served as social media chair for the CERF 2023 Attendee Experience Committee and continued as newsletter editor for NEERS, attended MassRivers Scientist meetings, served on the Duxbury Beach Reservation Ecology Committee
 - Watershed and Coastal Science Education - Worked on an annual monitoring report for the NSRWA that will hopefully be out in April or May, coordinated with Cohasset Center for Student Coastal Research on engaging high school students in salt marsh research.
- **Local action for habitat and water quality**
 - Resilient coastal habitats and communities - Participated in and assisted with organization of the South Shore Climate Network
 - Host Technical Assistance - Hired two paid monitoring interns and a part-time volunteer field assistant for Summer 2023

Cape Cod – Association to Preserve Cape Cod

Contact: [Jo Ann Muramoto](#)

- **Task 1. Monitor cyanobacteria blooms.**
 - Planning for 2023 monitoring: Planning activities include reaching out to partners (towns, organizations) to confirm their interest in having APCC conduct monitoring this summer, and coordination with the Barnstable County Department of Health and the Environment and Massachusetts Department of Public Health (MDPH). The County Lab will continue to provide cyanotoxin testing on samples that APCC pre-identifies as being high-risk. MDPH will continue to accept APCC data to help inform their guidance for health agents. In general monitoring activities, communication, and reporting will follow procedures established in July 2022. Webpage: <https://apcc.org/our-work/science/community-science/cyanobacteria/>.
 - Second season of proficiency testing: In collaboration with Nancy Leland of Lim-tex and the University of New Hampshire, APCC will conduct a second season of proficiency testing to evaluate our accuracy in identifying cyanobacteria. Identical samples will be collected and analyzed by APCC, UNH scientists, and two commercial labs. Results from the first proficiency test in 2022 showed that identifications made by APCC, Nancy Leland, and one commercial lab agreed well, while the fourth differed markedly; the results validated APCC's methodology and overall data quality.
 - Hiring of staff and interns: APCC has hired a Project Manager who will manage two of our monitoring programs: the new Cape Cod Pond Monitoring Program established under the Cape Cod Freshwater Initiative and the ongoing Cyanobacteria Monitoring Program. APCC also hired a quality assurance staff person for cyanobacteria monitoring, an operations manager who will manage logistics and partnership agreements for both the Cyanobacteria and Pond Monitoring Programs, and interns.
- **Task 2. Monitor Diadromous Fish Runs on Cape Cod.**
 - Planning is underway for the 2023 herring run monitoring season. Volunteers are sought to count herring at more than a dozen herring runs, and training workshops will be held in various

- towns. Counts will begin on April 1 and go to June 1 or whenever herring stop migrating upstream. People can sign up to count herring at APCC's website at: <https://apcc.org/our-work/science/community-science/monitoring-program-volunteers/>
- Volunteer counts enable citizen scientists to collect valuable data on herring populations, provides information for restoration planning and assessment, and builds public support for protection of herring habitat and populations. Webpage: <https://apcc.org/our-work/science/community-science/herring/> .
 - **Task 6. State of the Waters: Cape Cod**
 - The 2022 update of the *State of the Waters: Cape Cod* was issued in January 2023 (<https://capecodwaters.org>). This year coastal embayments continued to show degradation due to eutrophication and the number of acceptable coastal embayments decreased to four Cape-wide resulting in the majority (90%) of the Cape's embayments being unacceptable. Despite having one more unacceptable embayment, Cape Cod Bay continues to be the only major water body where there are several acceptable embayments remaining. This is the fourth year of this Cape-wide project to grade water quality in coastal embayments, ponds, and drinking water supplies and to translate water quality data into easily understood pass-fail grades (i.e., Acceptable-Unacceptable). The goal is to raise public awareness of water quality issues and to motivate public action to improve and protect water quality. Each year APCC grades water resources using the most recent available data and will post results on our interactive map and website at <https://capecodwaters.org> . The project serves as a companion to the 208 Water Quality Plan for Cape Cod. Key partners include the Center for Coastal Studies, Cape Cod Commission, Buzzards Bay Coalition, towns, and watershed organizations.
 - **Task 7. Identify and implement coastal restoration, stormwater and LID projects.**
 - New Cape Cod Pond Monitoring Program, Cape Cod Freshwater Initiative: In January 2023 following a competitive bid process, APCC was awarded a contract from Barnstable County to conduct a new Cape Cod Pond Monitoring Program as part of the new Freshwater Initiative. The Pond Monitoring Program will involve monitoring 50 ponds seven times per year for three years for the purpose of evaluating effects of land use on pond water quality and identifying potential restoration options. The Freshwater Initiative, funded by Barnstable County in 2022, is led by the Cape Cod Commission and is modeled after the 208 Water Quality Management Plan for embayments. Pond water quality is relevant to coastal water quality because ponds, groundwater, and streams discharge to coastal embayments, most of which are nutrient impacted. Many ponds also provide spawning habitat for river herring. The Cape has a total of 890 freshwater ponds, most of which have not been monitored. For more information, visit the Cape Cod Commission website at <https://capecodcommission.org/our-work/cape-cod-freshwater-initiative/> and APCC's websites at: <https://apcc.org/our-work/education/freshwater-ponds/> and <https://capecodwaters.org> .
 - Cape Cod Water Resources Restoration Project: APCC staff and the RC participate in monthly coordination meetings with staff from the Cape Cod Conservation District, NRCS, and DER. Projects funded for 2022 are in progress, and planning for 2023 and 2024 is underway. Several salt marsh restoration projects in the MassBays area will be monitored this year and/or next. APCC staff are providing GIS mapping of restoration projects and monitoring of CCWRRP salt marsh restoration projects.
 - Public Boat Ramp Stormwater Project: This project, funded by an EPA SNEP grant, will enable APCC to work with 11 towns on Cape Cod to assess, prioritize, and plan for stormwater remediation at public boat ramps in ponds and coastal embayments in order to improve water quality. In 2022 an initial list of 20 potential boat ramps was narrowed down to the top seven highest priority sites. Development of permit designs for these seven boat ramps (including two

in the MassBays area in Sandwich and Dennis) will be completed by end of 2023 (<https://apcc.org/stormwater-management-at-public-boat-ramps/>).

- **Task 8. MassBays activities.** The RC participated in the following MassBays meetings and projects:
 - Management Committee meetings on 6/1/22 and 9/14/22;
 - STAC meeting on 7/27/22 and 1/19/23, including providing input for a proposed nearshore continuous monitoring program for coastal waters.
 - NEPORT reporting for FY22.

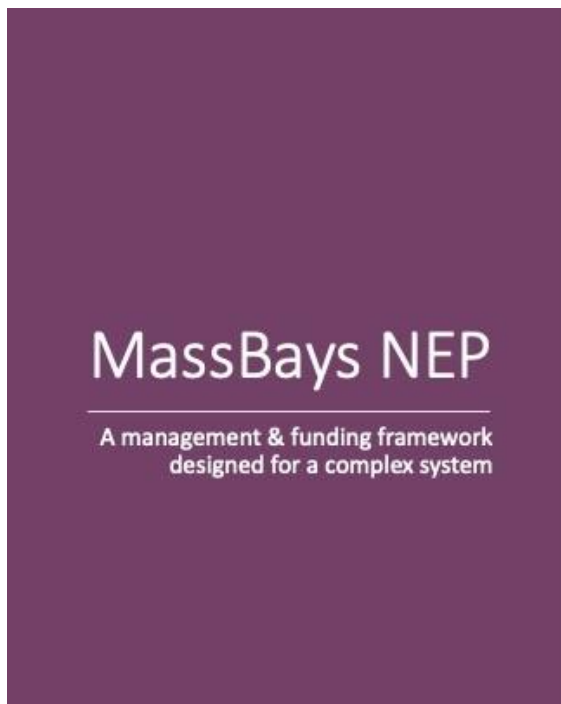
Executive Director

Pam DiBona (pamela.dibona@umb.edu)

- **Program Administration**
 - Continued weekly check-in meetings with Boston staff.
 - Scheduled an RC meeting for April 11, 2023
 - Closed out our 2018 Exchange Network grant (AquaQAPP, Ecohealth Tracking Tool) with EPA.
 - Implemented transition to hosting by UMass Boston (UMB), with the following activities:
 - An Interagency Service Agreement from CZM for work on the Project of Special Merit (eelgrass mapping) was signed; we await setup of a new account to allow Jill's time to be allocated to that.
 - All paperwork was submitted to EPA to reassign our Exchange Network grant (MassWaterR) to us at UMB. Meanwhile, filed paperwork for an internal Advanced Account, borrowing SFE funds to pay partners while we wait for EPA's approval.
- **Representing MassBays**
 - Attended the Association of National Estuary Programs External Relations and Executive Committee meetings.
 - Commented on the Commonwealth's State Hazard Mitigation & Climate Adaptation Plan, especially on sections regarding anticipated impacts on coastal habitats and coastal flooding.
 - Provided Letters of Acknowledgement to partners applying for NEP Coastal Watershed Grants in our study area.
 - Met with Merrimack River Watershed Coalition's Senior Scientist and new Executive Director to discuss their BIL-funded project. They will be extending the timeline (but not the budget) for their project to accommodate ongoing planning in the towns involved.
 - Met separately and jointly with DEP, EPA, and MWRA regarding a potential role for MassBays as convener of a new Outfall Monitoring Advisory Panel.
 - Met with Urban Harbors Institute, Sustainable Solutions Lab, and Stone Living Lab to discuss cross-pollination and potential joint programming.
- **Funding**
 - Worked with Prassede to submit a Letter of Interest to Restore America's Estuaries under the NEP Coastal Watershed Grant program, focused on prioritization of tide gates for removal or repair, and to convene regulatory agencies to scope permitting requirements for new tide gates.
 - Worked with Jill to submit a successful Letter of Interest to Woods Hole Sea Grant to pilot test an eelgrass seed collection and planting program.
 - Met with DEP to explore the possibility of providing ground-truthing of their eelgrass aerial photography and provided a draft budget. The scope of work is currently in negotiation.
 - Met with the Herring Pond Wampanoag Tribal Chairperson regarding a potential joint application to the National Fish and Wildlife Foundation's National Coastal Resiliency Grant program focused on Herring Pond in Plymouth. After consultation with Sara Grady, determined that much of the work they would like to see is already underway – subsequently proposed that

we help the tribe organize a forum to share specifics about those activities with them, with opportunities to contribute their own concerns and assistance to the town and local watershed group.

- **CCMP**
 - Responded to comments from EPA Headquarters as they consider concurrence with Region 1's approval. Presented a slide show to the Branch Chief describing MassBays' structure (see below) during a meeting with Management Committee Chair Juliet Simpson, MassBays' EPA Region 1 Program Officer Margherita Pryor, and Nancy Laurson (MassBays' HQ Program Officer). A response is due by March 15th.
- **Program Evaluation**
 - Drafted the first section of the PE Narrative, compiling outputs from our workplans between July 2016 and June 2021. Handed this off to the RCs, Senior Scientist, and Coastal Data Scientist for additional details and fact-checking.
- **Communications & Outreach**
 - Estimated level of effort required to provide MassBays with basic communications support, including website maintenance, producing quarterly newsletters, and launching and maintaining a new Instagram account. Working with APCC to determine whether MassBays may be able to fund some of their new communications staffer's time to provide those services.
 - Scheduled visits with Senator Markey, Congresswoman Clark, Congressman Lynch's staff during the NEP-EPA convening for March 21-23; awaiting confirmation from Congresswoman Trahan, Congressmen Keating and Moulton, and Senator Warren. Samantha Woods will join me for those meetings, where we will describe MassBays' work in their districts with thanks for their support.
 - Developed a two-page introduction to MassBays to share along with a similar document produced by the Association of NEPs for congressional visits. Kristin Uiterwyk provided input.



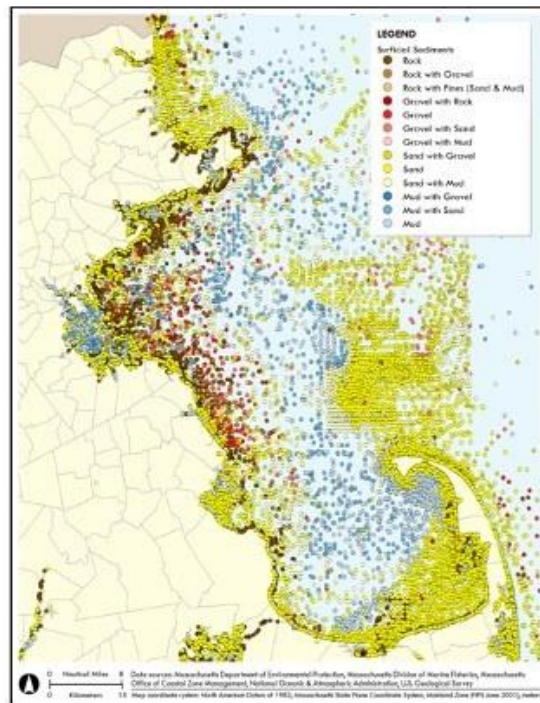
Organizational Chart

MassBays' priorities are informed by both local and regional stakeholders and experts.



Bays-wide Planning

MassBays' Central (Boston) Staff looks at the big picture, providing input to system-wide issues.

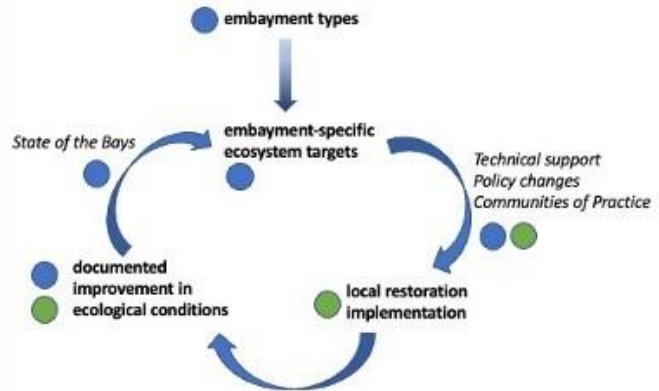


Bays-wide Planning

MassBays' Central (Boston) Staff looks at the big picture, providing input to system-wide issues.

For example...

CCMP Goal 3 Implementation



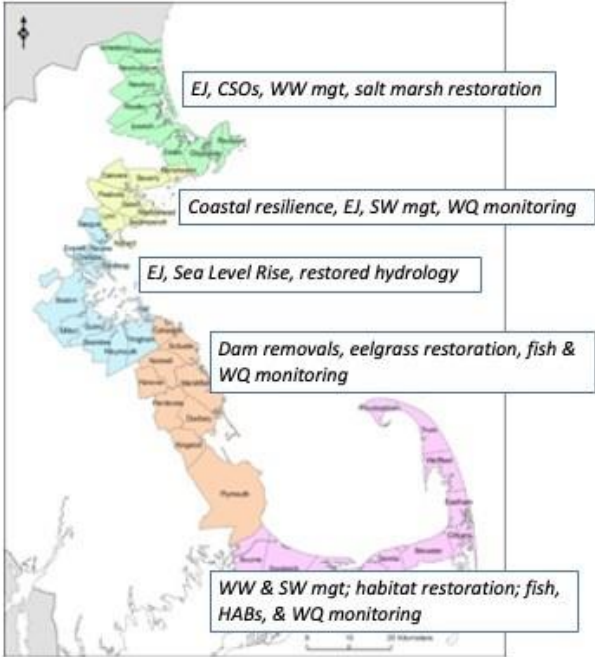
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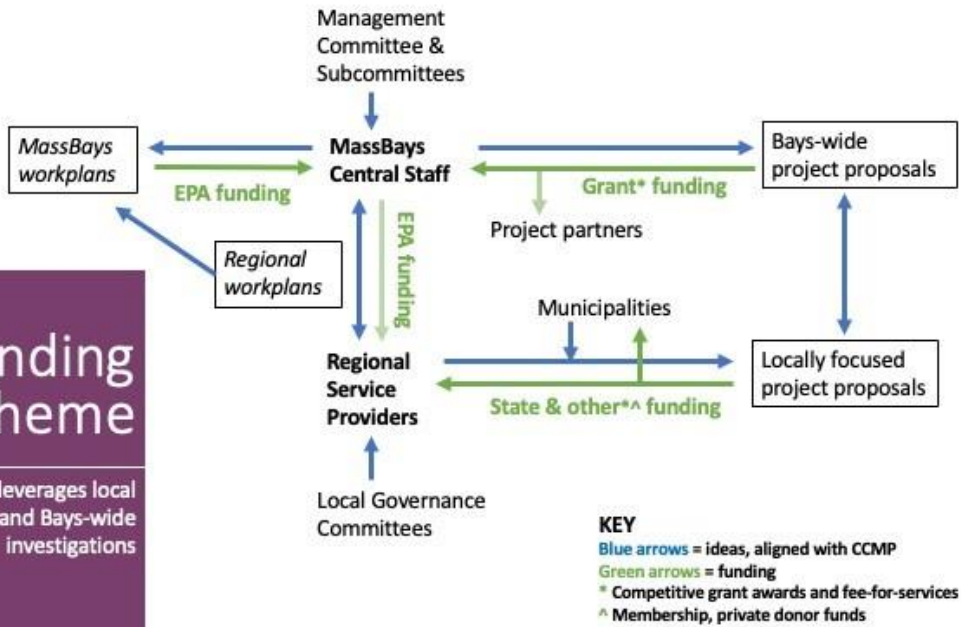
Regional Coordination

MassBays' local work is carried out town-by-town by Regional Service Providers



Funding Scheme

EPA funding leverages local investments and Bays-wide investigations



Coastal Data Scientist

Jill Carr (Jillian.Carr@umb.edu)

- **Support valid (QA/QC) data collection and use**
 1. Status of Exchange Network grant for water quality data analysis:
 - a. The final version of the [MassWater](#) data analysis tool was released on 1/20/23.

- b. A web-based [Community of Practice \(CoP\)](#) forum was launched. This is a place for tool users to find technical support, ask questions and resources.
 - c. Two regional training sessions were held, which reached freshwater and coastal groups across Massachusetts. Training sessions were conducted in Amherst on January 24 and Plymouth on February 9. Another training event will be held in Essex on March 24. Combined, the training had 39 registrants from watershed organizations.
 - d. Presented project at Northeast Aquatic Biologists Conference in Plymouth on 2/15.
- 2. Provided technical support to watershed organizations on topics of WQX data formatting, using AquaQAPP to generate QAPPs, and on citizen science eelgrass monitoring in several watersheds.
- 3. Launched a redesign of the MassBays Monitoring Coordinators Network, to transition from a static quarterly newsletter to a [web-based forum](#) on the Discourse platform. The forum provides a place for freshwater and coastal watershed groups to collaborate, pose questions, have discussions and find resources in an intuitive manner.
- 4. Currently working with a contractor to develop a website dashboard as part of MassBays' new website where all our web tools and data viewers can easily be located; and to migrate our myriad of apps and tools over to a common server for long term management.
- **Address data gaps**
 - 1. Status of NOAA PSM eelgrass mapping project:
 - a. All field surveys were successfully completed in June-July 2022. Data QA/QC assessment is complete, and analysis is now underway.
 - b. The project [Story Map](#) has been updated as needed.
 - c. The final report will be completed by 6/30/23.
 - 2. Address potential for seed-based eelgrass restoration:
 - 3. Invited to submit a full proposal to WHOI for a project titled: *Modeling and piloting a new seed-based approach to large-scale eelgrass restoration in Massachusetts*. This is a partnership with DMF to fill knowledge gaps pertinent to developing a state-wide seeding program. SSCW will also partner on seed experiments.
 - 4. Develop a proposal for BIL funds to build tank infrastructure to support an eelgrass seed bank. This is a partnership with DMF using the Cat Cove Marine Lab in Salem MA.
 - 5. Coordinating with 7 NEPs across New England to discuss regional eelgrass seeding and assisted migration. Currently conducting a Resources and Needs Assessment, which will be used to identify gaps and potential collaborative projects.
 - 6. Co-lead an effort with MIT Sea Grant to explore interactions between eelgrass and shellfish aquaculture. Currently analyzing industry survey responses, which will help guide the next actionable steps and prioritize areas for research and management.
- **Convene and partner with others to support and improve monitoring outputs**
 - 1. Provide guidance to CT DEEP, Peconic Estuary Partnership and EPA Region 2 / Long Island Sound Study regarding eelgrass mapping methodologies.
 - 2. Work with DMF, SSCW and others on two manuscripts in preparation:
 - a. Recovery of eelgrass *Zostera marina* following conversion of conventional block and chain moorings to conservation mooring systems in Massachusetts: context dependence, challenges, and management.
 - b. Residential Floats Reduce Light Availability for Eelgrass (*Zostera marina*) in Salem Harbor, MA, USA.

Senior Scientist

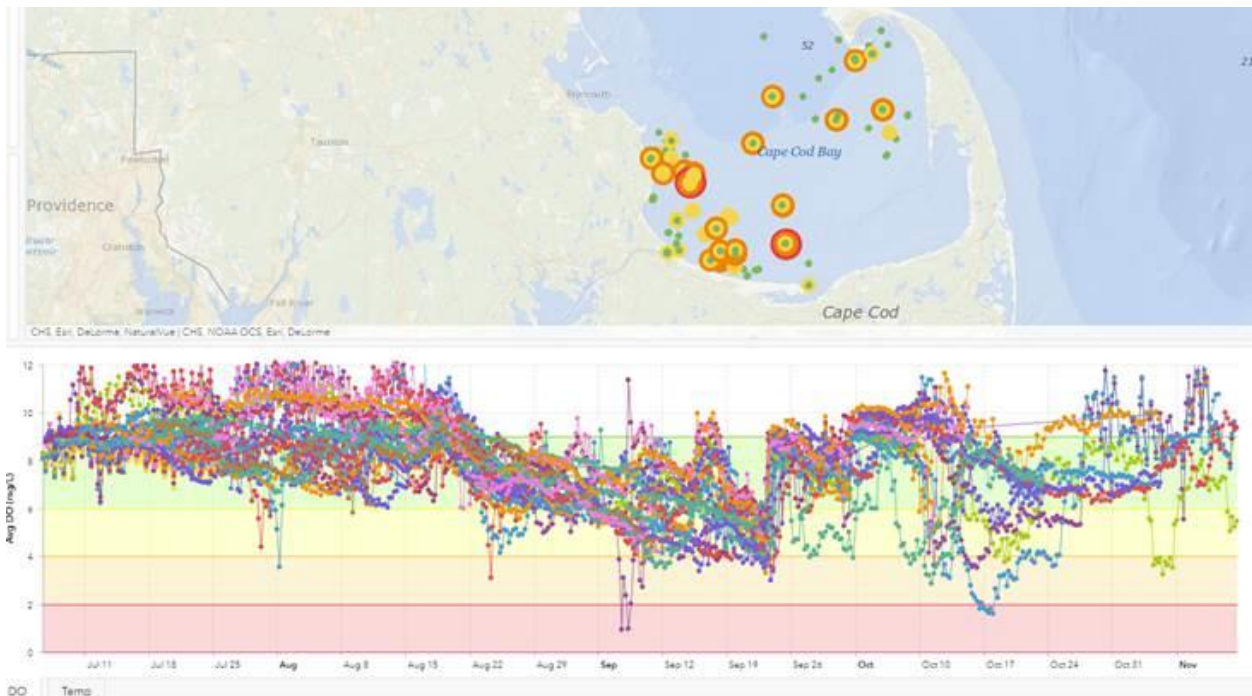
Prassede Vella (prassede.vella@umb.edu)

Address data gaps

- Coastal Acidification: The COAS system was deployed in May and collected data through mid-September. The pH system then developed an issue that needs to be resolved. Following attempts to address this issue on site, it was decided to bring the system back to the UMB lab to try to resolve it. The system will be brought back in the coming weeks. The future of the system will be discussed at the next STAC meeting.
- MA Coastal Condition Assessment: Preparations are underway for the 4th and final season of the MCCA. A new ISA will be made between DEP and MassBays at UMB. At the end of the season, MassBays and DEP will develop data analyses and a full report to answer questions put by the respective entities.
- Salem Sound Study: Final report of the 2020 monitoring including results and recommendations was submitted to EPA and shared with STAC. Report is available to MC members upon request. A full 2-year report (2019-2020) is in preparation and will be shared with MC and STAC.
- Continuous nearshore monitoring: STAC is collecting information about the needs for continuous monitoring in the estuaries and embayments in the MassBays study area. Information from the RCs, current studies etc. will be compiled in a “needs assessment” report that will be provided to STAC and discussed at the April meeting (date TBD).

Research on causes of water quality deterioration

- Hypoxia in Cape Cod Bay: Monitoring for hypoxia in by the Cape Cod Study Fleet was conducted in 2022. See data and dashboard on [Tracking dissolved oxygen with the Cape Cod Bay Study Fleet and DMF | Mass.gov](#) Select “this season” for the whole 2022 season (the other two time frame options won’t display any data as the loggers are all out of the water now). The data displayed are 6-hour averages. According to DMF’s Tracy Pugh, some periods of hypoxic conditions were observed this year. However, all were brief and only a couple of very short term (couple of hours) dips into the severely hypoxic range were noted. The graph and map below show the daily data from July – Nov 2022 data.



- Duxbury-Kingston-Plymouth: The report for the 2022 survey was prepared by Sara Grady. Unfortunately, due to logistical challenges the 2022 data were limited, and it is difficult to make conclusions. The steering committee is currently working to address issues in order to have a more complete survey in 2023.

STAC meetings

- At the January STAC meeting, members discussed the top priorities where STAC can provide technical assistance to MassBays:
 - Continuous nearshore water quality monitoring – RCs responded to a first set of questions on where they think continuous monitoring is needed most. Following a discussion, a second survey was conducted (results being compiled and will be summarized for discussion at the April STAC meeting)
 - Revision of the MassBays monitoring framework – this document will be revised to include the latest tools and other work developed by MassBays
 - Developing EDA 3.0 - to update datasets and develop a new “story map”
 - Developing applications of Ecosystem Services Gradient (ESG) and Biological Condition Gradient (BCG) approach (diadromous fish habitat) – in progress
- Next meeting – April 2023 (TBD)

**MassBays Management Committee, Regional Service Provider, & Staff Updates
April to June 2023**

Management Committee Updates

Massachusetts Water Resources Authority

Contact: [Denise Ellis-Hibbett](#)

- EPA and MassDEP issued draft Deer Island NPDES Permits on May 31. EPA will be holding a Public Briefing and Hearing on July 12, 7:00 pm and 8:00 pm respectively. Comments can also be submitted at any time in writing, by August 30. For more information, see:
 - § EPA's webpage: <https://www.epa.gov/npdes-permits/epas-permit-massachusetts-water-resources-authority-mwra-deer-island-treatment-plant#2023-press-releases>
 - § MassDEP's webpage: <https://www.mass.gov/doc/public-notice-draft-npdes-surface-water-discharge-permit-mwra-deer-island-treatment-plant-ditp/download>
- MWRA headquarters moved from the Charlestown Navy Yard to Deer Island. Our new mailing address is 33 Tafts Avenue, Boston, MA 02128 (not 190 Tafts Ave, Winthrop, MA 02152 as noted in the last update)
- Coming soon:
 - Summary of CSO Receiving Water Quality Monitoring in Upper Mystic River/Alewife Brook and Charles River Report, for 2022. Due July 15. Will be posted here: <https://www.mwra.com/harbor/enquad/trlist.html>
 - DEP will publish for public comment (likely in August) Draft CSO Variance extensions for the Charles River and Alewife Brook/Mystic River

MA Division of Marine Fisheries

Contact: [Kate Frew](#)

- MA DMF staff continue efforts to identify suitable locations for future eelgrass restoration with funding from the MassDFG ILF Program. This work includes the assessment of available data layers in GIS to determine potential suitable planting locations; monitoring light, temperature, and sediment characteristics at locations identified as potentially suitable from the GIS assessment; and permitting, planting, and monitoring test plots where field monitoring suggested suitability. This past spring we planted a test plot in Duxbury. The team will complete the 1-month monitoring next week. Two additional test plots were planted off of Bourne.
- Final annual monitoring of the 1/2-acre eelgrass restoration site at Middle Ground in Salem is planned for July using diver surveys and side scan sonar. This is the first In Lieu Fee funded eelgrass restoration project in Massachusetts.
- Annual monitoring of HubLine and Sculpin artificial reefs in Boston Harbor is planned for July.
- Providing the past 10 years of HubLine kelp data to Jarrett Byrnes at Umass Boston to update the KelpTime database. The goal of the project is to assess the global state of kelp forests using time series data.
- Provided technical review comments for Salem Wind Port, Essex River Dredging, herbicide treatment of Charles River, and Piers Park in East Boston.

Regional Service Provider Updates

Upper North Shore – Merrimack Valley Planning Commission

Contact: Hanna Mogensen, hmogensen@mvpc.org

- **Gather data on conditions and trends (data gaps)**
 - Collaborated with the Merrimack River Watershed Association to finalize the Merrimack Restoration Partnership Implementation plan which identified restoration projects along the Merrimack River and its tributaries. Began next steps of drafting Merrimack Restoration Partnership scope of work for next year to help communities advance priority projects.
 - Prepared for 2023 Field season: Established sampling plans and standard operating procedures for microplastic sampling, visited long-standing field sites to monitor marsh change, expanded marine invasive species monitoring sites, set up volunteer trainings and technical trainings.
 - Attended MassBays led MassWaterR training to learn about water quality monitoring and data entry into State database.
 - Began collaborating with the Merrimack River Watershed Association to assist with their regional water quality monitoring program. As part of this work, RC completed water quality training session and conducted two monthly monitoring periods (May and June) at the Northern end of Plum Island.
 - Completed spring microplastic surface water sampling in Great Marsh (N=15). Samples have been sent to the University of New Hampshire where they will be processed over the summer and fall months.
 - Worked with the Parker River National Wildlife Refuge to receive approval from DEP to manage Pepperweed and Phragmites for the communities of Rowley, Newbury, Ipswich, and Newburyport. Attended Regional Pepperweed Management strategy session and map tutorial meeting in preparation for upcoming field season.
 - Began spring green crab monitoring and management work within Essex Bay.
 - Continued monitoring historic marsh edge erosion sites in Essex Bay and Plum Island Sound.
- **Inform state policy and local action**
 - MVPC, through the Greenscapes coalition, has finalized an interactive bylaw model language toolkit to support communities' goals to revise bylaws with proactive and compliant stormwater mitigation language. The toolkit will be made available on the MVPC website by the end of June.
 - Legislation to establish the Merrimack River Collaborative that was co-filed in January was heard at a public hearing by the Joint Committee on the Environment and Natural Resources in April. MVPC and RC submitted written support of this bill and provided oral testimony, along with collaborators from the Northern Middlesex Council of Governments, Merrimack River Watershed Council, and City of Newburyport.
 - Assisted the Town of Boxford with finalizing their Open Space and Recreation Plan
 - Worked with Greenscapes coalition to produce and edit annual MS4 education and outreach deliverables, including a new set of 12 monthly social media postings.
 - RC along with MVPC hosted a Legislative Open House. Members of the Massachusetts State House of Representatives and Senate were able to enjoy breakfast together and discuss key regional issues with the agency's programmatic and administrative teams.
- **Provide Education, training, and technical support**

- RC reconvened the Eight Towns and the Great Marsh (8TGM) local governance committee following successful recruitment of new members to ensure comprehensive representation across coastal communities. Meetings were held monthly in March, April, and May. The group worked to identify common challenges, concerns, and actions around coastal habitat protection and management to lay a foundation for the group.
- RC continued to work with faculty and students at Northern Essex Community College to provide technical support and additional information around processing microplastic beach sand samples. The NECC lab, led by Dr Marguerite White-Jeanneau, oversaw collection of spring 2023 samples (n= 5 sites) and will conduct all in-lab analysis.
- RC met with Governor’s Academy to explore opportunities for student involvement in marsh monitoring, specifically microplastics monitoring along the Parker River.
- RC met with Ipswich High School Science teachers to discuss student coastal research projects.
- MVPC continues to host monthly Stormwater Collaborative meetings during this quarter. To support broader education around PFAS and expected federal guidelines, a joint stormwater collaborative meeting was held with Northern Middlesex Council of Governments (NMCOG). Josie Ahlberg, Legislative Analyst with the Massachusetts Municipal Association, was invited as the featured speaker to share an overview of the challenges and future management of PFAS in public drinking water supplies.
- RC continued to support 10 communities with updating the Regional Hazard Mitigation Plans. In March, three sub-regional workshops were held to establish outreach & engagement plans for the process, as well as identify natural hazards within each community. In May, communities completed the next step by identifying their critical lifelines.
- RC attended training on the MVP 2.0 pilot program to support communities in applying for the grant. Letters of support for MVP action grants were also provided to three communities in the region.
- MVPC attended and presented at MassECAN annual meeting on stormwater bylaw reviews and revisions as an example of a successful regional collaboration.
- **Key meetings attended:** Bi-Monthly Merrimack River Collaborative Meeting, Great Marsh Coalition quarterly meetings, North Shore Water Resiliency Task Force Meeting, monthly DPW/Stormwater Collaborative meeting, Merrimack River Beach Alliance meeting, monthly Spicket River 604b team meeting, Invasive Plant Permitting Meetings for Great Marsh, PIE-Rivers quarterly meeting, 8TGM monthly meetings, MassBays Quarterly Science and Technical Advisory Committee (STAC) Meeting, Essex National Heritage Commission Bi-Annual meeting, Passive Sediment Augmentation Feasibility study kickoff meeting, MAPC “Water, Water Everywhere” Meeting, monthly DER Restoration Partnership meeting, MassECAN annual meeting.

Lower North Shore – Salem Sound Coastwatch

Contact: [Barbara Warren](#)

- **Gather data on conditions and trends**
 - Conducting Horseshoe crab community science trainings and a population survey
 - Continued monitoring in Manchester’s Sawmill and Cat Brooks for cold water fisheries
 - Regional Salt Marsh Post-Restoration Monitoring (DER FY23) began reconnaissance and a data inventory assessment for six North Shore salt marshes
- **Climate Change**

- Bass River District Resilience Plan, MVP Action Grant FY23, \$267,025: RC and Alison Frye (AF) working with Beverly to address flood resilience for the critical infrastructure and properties and protect active uses and facility assets if compromised by floodwaters. Flood intervention strategies may include enhancing open space, vegetative berms, shoreline plantings to maximize flood storage. Conducted stakeholder interviews, a walk & talk, and a Bass River Paddle.
- Public Access and Protection for the Marblehead Municipal Light Department and Adjoining Public Lands, MA CZM Coastal Resilience Grant FY23 & FY24, \$523,220: RC conducted public Involvement for Environmental Justice Populations as part of the MEPA permit submission. Presentations and walk & talk for EJ neighborhood and Marblehead Select Board.
- Preserving History: Assessments and Climate Adaptations at the House of Seven Gables, MA CZM Coastal Resilience Grant FY23 & FY24, \$509,919: RC is project advisor for Gables and consulting team that is developing near- and long-term strategies for site resilience, which included a day-long charette.
- Collins Cove to Willows Coastal Resilience Study, MVP FY23, \$234,565: RC, AF and team conducted an in-person public meeting and 2 walk & talks to gather local knowledge and share study H&H model and MC-FRM for the study area. publicinput.com/CollinsCove2Willows
- Peabody-Salem Multi-use Path along the North River: MVP FY22-23: RC and AF had multiple meetings working on path alignment and bank stabilization. Public engagement included virtual meeting, clean up and seining the river, and 2 walk & talks publicinput.com/ResilientNorthRiver
- Manchester-by-the-Sea CZM Coastal Vulnerability Action Plan: RC is a member of the steering committee for this CZM grant to plan floodproofing and coastal resilience measures specifically for the Town Hall, Wastewater Treatment Plant, and downtown commercial district. <https://experience.arcgis.com/experience/6ee0fe71c97d43bfbd7506af980e92/>
- Writing a CZM Coastal Resilience grant FY24-25 for Winter Island Park bank erosion and terrestrial plant invasive species management due to increasing climate impacts.
- **Reduce Stormwater Discharge**
 - Trained 12 volunteers and began Clean Beaches & Streams bacterial monitoring June - Aug
 - Maintaining Salem Commercial St and Winter Island rain gardens with volunteers
 - Maintaining the Collins Cove Living Shoreline – 5/18/23 with 30 volunteers
 - Completing DEP Municipal MS4 grant to spearhead proactive stormwater compliance and mitigation in 30 north shore communities, includes interactive web-based resource to disseminate MS4 model code language and improve the Greenscapes “LID Viewer” – working with its Greenscapes partners, MVPC and IRWA
- Writing a capacity building CZM Coastal Habitat and Water Quality grant FY24 to showcase the Commercial Street rain gardens
- **Manage Invasive Species**
 - Held a training at Winter Island Park 6/6/23 for marine invasive species and began MIS monitoring five sites across the Sound (MIMIC)
 - Assessed the spring pepperweed situation and began pulling it with volunteers and staff
 - Assisted with bittersweet removal at coastal properties
- **Education and Outreach**
 - Held six clean ups totaling 109 volunteers who removed more than 990 pounds of debris
 - Conducted 16 public events
 - Conducted an Adopt a beach training for new volunteers
 - Organized and participated in an Indigenous Fish Weir Day with Thomas Greene of the Massachusetts tribe for fifty 5th graders from Salem’s Bentley School

- Conducting community outreach to Salem Environmental Justice neighborhoods under the Greening Gateway City Program (DCR) that offers to plant free trees with the promise to water them for a minimum of two years
- Underwater in Salem Sound lectures were recorded and available online or from salemsound.org
 - [Horseshoe Crabs: An Ancient Species in the Modern World](#)
Presented by Alison Frye, SSCW Associate Director, on April 19th, 2023
 - [What's Happening at Cat Cove Marine Lab – Past, Present, and a Very Bright Future](#)
Presented by Mike Armstrong, Deputy Director of Massachusetts Division of Marine Fisheries (MADMF) at Cat Cove Marine Laboratory, on March 15th, 2023
- **Technical assistance:** RC actively involved in the following:
 - Working groups: Salem's Flood Hazard Resilience Overlay District Ordinance, Open Space and Recreation Plan, Shetland Park Redevelopment, and the Point Resilient Together climate resilience study
 - Member of the organizing committee for the annual Preservation in a Changing Climate Conference, September 12, 2023
 - Continue to work with Thomas Starr, Art + Design Professor Northeastern University finalize climate message signs in Marblehead, Lynn, Swampscott, Beverly, Salem on his [Remembrances of Climate Futures Project](#)

Metro Boston – Northeastern University Marine Science Center

Contact: [Diana Chin](#)

● **Education and Outreach**

- [Boston Harbor Ecosystem Network \(BHEN\)](#): 1) Held two BHEN Steering Committee meetings; 2) Coordinated two in-person BHEN semi-annual meetings (March 28, May 23) - first spring meeting centered on Belle Isle Marsh, featuring invited speakers and panelists from the MA Department of Conservation & Recreation, Woods Hole Group, City of Boston, and Friends of Belle Isle Marsh; second spring meeting centered on diadromous fish runs and dam removal as a habitat restoration tool, featuring invited speakers from the MA Division of Marine Fisheries, Back River Watershed Association, Town of Weymouth, Mystic River Watershed Association, and Charles River Watershed Association; 3) Organized field trip to Watertown Dam in collaboration with Charles River Watershed Association to discuss the results of a recent feasibility study completed for removal of the dam, paired with a CRWA site walk later that evening.
- [Boston Harbor Habitat Atlas](#): The Boston Harbor Habitat Atlas continues to be used for Beach Sisters activities (audience: middle and high school youth in Lynn) focused on watersheds and water pollution, and to bolster students' familiarity with local habitats.

● **Technical Support and Communication**

- [Grant support](#): Provided a Letter of Support for a FY24 MVP Action Grant to renew funding for the Saugus Pines River Advocacy for Regional Resilience (SPRARR) coalition of the municipalities of Lynn, Revere, Saugus, Everett, and Malden.
- [Conferences, meetings, and workshops](#): 1) Participated in training workshop on the MassWaterR package; 2) Provided input at STAC meeting on potential locations and data usage for continuous water quality sondes in the planned monitoring array; 3) Attended Zosterapalooza conference, featuring talks on the latest science of mapping, management, and climate change adaptation of eelgrass (*Zostera marina*); 4) Participated in meeting of the MA Seagrass group to discuss ongoing and planned eelgrass monitoring and restoration initiatives in the state; 5) Met

with Town of Weymouth Conservation Commission representative for a tour of sites in the Fore River, Back River, and Hingham Bay areas; 6) Attended a public meeting organized by SPRARR to discuss results of the Saugus/Pines River Regional Watershed Vulnerability Assessment and Regional Adaptation Plan; 7) Met with the Mystic River Ambassador regarding delineation of environmental justice communities in the Metro Boston region; 8) Participated in a boat tour of the Boston Harbor Islands and Boston waterfront (led by MA Office of Coastal Zone Management, National Park Service, and Woods Hole Group) to discuss research and assessment of cobble berms as a nature-based approach for shoreline resilience.

- **Gather data on conditions and trends (DATA)**

- Lobster Sea Grant Program: We are examining the impacts of the range expansion of black sea bass and blue crabs on lobsters and the lobster fishery in the Gulf of Maine. This research uses experiments, field monitoring, and surveys of the lobster industry to assess their ecological knowledge.

- **Address data gaps**

- Woods Hole Sea Grant: We are collaborating on a project with Colby College, TNC and regional stakeholders to assess how oyster farming methods relate to different environmental stressors, with the goal of informing sustainable aquaculture practices.
- In collaboration with TNC, we are examining the degree to which oyster aquaculture provides important ecosystem services including enhancing water quality and providing habitat for fish and crustaceans. We are also conducting surveys of coastal communities throughout Massachusetts and the remainder of the eastern seaboard to examine barriers to aquaculture.

South Shore – North and South Rivers Watershed Association

Contact: [Sara Grady](#)

- **Address data gaps**

- Water Quality Monitoring - Prepared for NSRWA's annual Riverwatch summer water quality monitoring and began collecting samples for the 604b-funded Headwaters bacterial source tracking program with NSRWA's water quality monitoring intern. Partnered with Cohasset Center for Student Coastal Research for bacterial analysis. Made purchases of water quality monitoring equipment funded by the MassDEP Water Quality Management Grant. Assisted Herring Ponds Watershed Association with streamflow measurements to determine nutrient loading.
- Monitor Diadromous Fish Runs - Coordinated volunteer river herring counts on six South Shore streams
- Horseshoe Crabs Monitoring Program - Coordinated 16th year of horseshoe crab spawning surveys in Duxbury Bay in partnership with Mass. Division of Marine Fisheries. Participated in the Horseshoe Crab Advocacy Group and the Horseshoe Crab Scientific Committee.
- Marine Invasive Species: Assisted with planning of 2023 Rapid Assessment Survey to take place in August. Planned local marine invasives surveys to begin in late June in partnership with Mass. Coastal Zone Management.

Salt Marsh Change - Planned summer transect monitoring in partnership with Cohasset Center for Student Coastal Research and Scituate High School. Participated in the regional Salt Marsh Working Group. Began preliminary work towards a South Shore Salt Marsh Prioritization, including applying for funds from the NEP Coastal Watersheds Grant.

- **Research to inform policy and actions**

- Dam Removal Monitoring/Implementation
 - [Third Herring Brook] Completed final report for NOAA funding that supported removal of Tack Factory and Peterson Pond dams. Discussed fish ladder design and permitting with

Town of Norwell. Planted trees along stream to restore cover after winter weir removal project.

- [South River] Conducted visit to Temple Street dam removal site with project partners to discuss design and permitting. Reviewed proposals to the Massachusetts Municipal Vulnerability Preparedness Grant program.
- [Indian Head River] Participated in Indian Head River Restoration Committee and supported River Restoration Coordinator
- Eelgrass - Planned surveys, submitted 2023 scope of work, and assisted eelgrass intern with contacting boat captains and volunteers.
- Blue Mussels - Discussed relationship between blue mussels and shorebirds with experts, researched mussel restoration methods and permitting requirements, applied for funding to work with Scituate High School students on project implementation (not funded)
- Other: Completed Level 1 Coordinator certification for North Atlantic Aquatic Connectivity Collaborative and led NSRWA's Fish Habitat and GIS Field Technician in culvert surveys for shadowing requirements. Worked with NSRWA interns to monitor purple loosestrife and *Galerucella* beetles and relocate *Galerucella* to new management location.
- **Technical support and communications**
 - Represent MassBays in Networks - Chaired Coastal and Estuarine Research Federation 2023 conference Social Media Committee, continued as New England Estuarine Research Society Newsletter Editor, participated in MassRivers Science discussions, served on Duxbury Bay Reservation Ecology Committee
 - Watershed and Coastal Science Education - Completed 2022 Monitoring Report, participated in Tidmarsh Wildlife Sanctuary BioBlitz, assisted NSRWA Educator with program content.
- **Local action for habitat and water quality**
 - Adequate Streamflow: Provided data analysis to Town of Scituate to better understand how to balance ecological and municipal water demand and maintained streamflow loggers in First Herring Brook
 - Resilient Coastal Habitats and Communities: Participated in review meeting for Duxbury Bay dune ecology management project.

Cape Cod – Association to Preserve Cape Cod

Contact: [Jo Ann Muramoto](#)

- **Task 1. Monitor cyanobacteria blooms.**
 - 2023 monitoring is underway: This season APCC will monitor cyanobacteria in approximately 120 ponds in 14 towns. APCC continues to partner with the Barnstable County Department of Health and the Environment and the Massachusetts Department of Public Health (MDPH). The County Lab will continue to provide cyanotoxin testing on samples that APCC pre-identifies as being high-risk. MDPH will continue to accept APCC data to help inform their guidance for health agents. Monitoring, data interpretation, reporting, and communication will follow procedures established in July 2022. Web page: <https://apcc.org/our-work/science/community-science/cyanobacteria/> .
 - Second season of proficiency testing: In collaboration with Nancy Leland of Lim-tex and the University of New Hampshire, APCC will conduct a second season of proficiency testing to evaluate our accuracy in identifying cyanobacteria. Identical samples will be collected and analyzed by APCC, UNH scientists, and two commercial labs. Results from the first proficiency test in 2022 showed that identifications made by APCC, Nancy Leland, and one commercial lab agreed well, while the fourth differed markedly; the results validated APCC's methodology and overall data quality.

- New staff and interns: New hires include a Project Manager to manage both the Cyanobacteria Monitoring Program and our new Cape Cod Pond Monitoring Program; a cyanobacteria QA director, and five interns.
- **Task 2. Monitor Diadromous Fish Runs on Cape Cod.**
 - 2023 volunteer herring run counts completed: Following training events held in March, volunteers counted herring at 18 herring runs, including seven on Cape Cod Bay. Counts began on April 1 and went to June 1. APCC's website data entry system enables rapid entry and turn-around of results. So far numbers look generally better than last year. Visit <https://apcc.org/our-work/science/community-science/monitoring-program-volunteers/>
- **Task 6. State of the Waters: Cape Cod**
 - 2023 update of the *State of the Waters: Cape Cod* is underway (<https://capecodwaters.org>). This will be the fifth year of this Cape-wide project to grade water quality in coastal embayments, ponds, and drinking water supplies using easily-understood pass-fail grades. The goal is to raise public awareness of water quality issues and to motivate public action to improve and protect water quality. Each year APCC grades water resources using the most recent available data and will post results on our interactive map and website at <https://capecodwaters.org>. The project is a companion to the 208 Water Quality Plan for Cape Cod. Key partners include the Center for Coastal Studies, Cape Cod Commission, Buzzards Bay Coalition, towns, and watershed organizations.
- **Task 7. Identify and implement coastal restoration, stormwater and LID projects.**
 - New Cape Cod Pond Monitoring Program, Cape Cod Freshwater Initiative:
 - In January 2023 APCC was awarded a 3-year contract from Barnstable County to conduct a new Cape Cod Pond Monitoring Program as part of the new Freshwater Initiative. The Freshwater Initiative, funded by Barnstable County in 2022, is led by the Cape Cod Commission and is modeled after the 208 Water Quality Management Plan for embayments. The Cape has 890 freshwater ponds, most of which have not been monitored. The goal is to evaluate the effects of land use on pond water quality and identify potential restoration options. Pond water quality is relevant to coastal water quality because ponds, groundwater, and streams discharge to coastal embayments, most of which are nutrient impacted. Many ponds also provide spawning habitat for river herring.
 - APCC will monitor 50 ponds seven times per year for three years. In this period, the 50 ponds were selected using criteria developed by the Commission, APCC, and a scientific advisory group, and monitoring got underway. Monitoring parameters include temperature, pH, conductivity, salinity, Secchi disk depth, nutrients, and chlorophyll. The Center for Coastal Studies, a state-certified lab, is providing nutrient analyses. For more information, visit the Cape Cod Commission website at <https://capecodcommission.org/our-work/cape-cod-freshwater-initiative/> and APCC's websites at: <https://apcc.org/our-work/education/freshwater-ponds/> and <https://capecodwaters.org>.
 - Restoration Coordination Center (RCC):
 - In March APCC received a significant grant from a foundation which enabled APCC to hire a third staff person for the Restoration Coordination Center. Funding will enable the RCC to expand our restoration activities.
 - Cape Cod Water Resources Restoration Project (CCWRRP): APCC staff continue to coordinate with staff from the Cape Cod Conservation District, NRCS, and DER. Projects funded for 2022 and 2023 are in progress, and project planning for 2024 is underway. Several salt marsh restoration projects in the MassBays area will be monitored this year and/or next. APCC is providing GIS mapping of restoration projects and monitoring of CCWRRP salt marsh restoration projects.

- **Public Boat Ramp Stormwater Project:** Under a grant from EPA SNEP, APCC is working with 11 towns to assess, prioritize, and plan for stormwater remediation at public boat ramps in ponds and coastal embayments in order to improve water quality. In 2022 an initial list of 20 potential boat ramps were narrowed down to the top seven highest priority sites. Permit designs for these seven boat ramps (including two in the MassBays area in Sandwich and Dennis) will be completed by end of 2023 (<https://apcc.org/stormwater-management-at-public-boat-ramps/>).
- **NOAA Habitat Restoration Grants:** In preparation for anticipated NOAA funding notices expected this summer and fall, APCC staff are evaluating potential restoration projects for a proposal(s). Projects being considered so far involve fish passage and/or salt marsh restoration.
- **Task 8. MassBays activities.** The RC participated in the following MassBays meetings and projects:
 - Management Committee meetings on 3/15/23 and 6/14/23;
 - EPA Performance Evaluation meeting on 6/14/23;
 - Regional Coordinators meeting on 4/11/23;
 - STAC meeting on 5/4/23.

Executive Director

Pam DiBona (pamela.dibona@umb.edu)

- **Program Administration**
 - Continued weekly check-in meetings with Boston staff.
 - Convened Nominations and Governance Subcommittee via Zoom to begin review of MassBays' SOPs
- **CCMP**
 - Received concurrence from EPA HQ and final approval of the CCMP on March 27th.
- **Program Evaluation**
 - Submitted final Program Evaluation Narrative to EPA on April 19th in preparation for the June site visit. Responded to written questions via written response and an online meeting with the evaluation team.
- **Representing MassBays**
 - Attended C*Sci 2023 from May 22-26 in Tempe AZ to present our work to the national/international citizen science community. Lots of great connections and good ideas resulted! Slides: https://docs.google.com/presentation/d/10XV7J7Ht6j_aA_cZbTDePRQMiD-0iwiC/edit?usp=sharing&oid=116746224178483235202&rtpof=true&sd=true
 - Attended the Association of National Estuary Programs' External Relations and Executive Committee meetings.
 - Attended the Commonwealth's State Hazard Mitigation & Climate Adaptation Planning meetings.
 - Discussed the merits of a potential role for MassBays as convenor of a new Outfall Monitoring Advisory Panel with DEP and the current OMSAP Chairperson.
 - Attended meetings of the UMass Boston Centers and Institutes, a regular gathering to exchange information, ideas, and concerns with UMB Administration.
- **Funding**
 - Worked with Senior Scientist to submit a full proposal in response to an invitation from Restore America's Estuaries under the NEP Watershed Grant program. Received word June 8th that the project, focused on prioritization of tide gates for removal or repair, and convening regulatory agencies to scope permitting requirements for new tide gates will be funded in full (\$233,460 over 3 years).

- Finalized a scope of work and budget, and ushered an ISA through DEP and UMB processes to provide services to DEP to provide ground-truthing of their eelgrass aerial photography.
- Worked with Buzzards Bay Coalition restoration staff to submit a joint Letter of Interest to the National Fish and Wildlife Foundation's America the Beautiful Grant program to establish a watershed restoration collaborative for the Herring River/Herring Pond in Bourne and Plymouth. The proposed budget includes a new staff person for the Herring Pond Wampanoag Tribe focused on environmental issues.
- **Communications & Outreach**
 - Met with APCC communications staff to scope and finalize level-of-effort for support to MassBays. Their subaward for FFY23 S.320 funding includes \$18,972 for this work.
 - With Samantha Woods, made visits to staff of Senator Markey, Senator Warren, Congresswoman Clark, Congresswoman Trahan, and Congressman Lynch's staff during the NEP-EPA convening for March 21-23. All were pleased to hear about MassBays' work and expressed interest in site visits in their districts.

Coastal Data Scientist

Jill Carr (Jillian.Carr@umb.edu)

- **Support valid (QA/QC) data collection and use**
 1. Status of Exchange Network grant for water quality data analysis:
 - a. The final version of the [MassWaterR](#) data analysis tool was released on 1/20/23. A new release (version 2.1.0) was finalized and sent out to partners on 6/6/23.
 - b. A web-based [Community of Practice \(CoP\)](#) forum was launched. This is a place for tool users to find technical support, ask questions and resources.
 - c. Three full-day regional training sessions were held in Amherst, Plymouth, and Essex. Combined, the training had 39 registrants from freshwater and coastal watershed organizations.
 - d. The tool was presented to a national WQX User Group during their monthly meeting, as well as at the Southern New England Program (SNEP) Lunch-and-Learn webinar series.
 2. Provided technical support to watershed organizations on topics of WQX data formatting, using AquaQAPP to generate QAPPs, and on citizen science eelgrass monitoring in several watersheds.
 4. Currently working with a contractor to develop a website dashboard as part of MassBays' new website where all our web tools and data viewers can easily be located; and to migrate our myriad of apps and tools over to a common server for long term management.
- **Address data gaps**
 1. Status of NOAA PSM eelgrass mapping project:
 - a. All field surveys were successfully completed in June-July 2022. Data QA/QC assessment is complete, and analysis is now underway.
 - b. The project [Story Map](#) has been updated as needed.
 - c. The final report will be completed by 6/30/23, reporting is currently underway.
 2. Address potential for seed-based eelgrass restoration:
 3. Invited to submit a full proposal to WHOI for a project titled: *Modeling and piloting a new seed-based approach to large-scale eelgrass restoration in Massachusetts*. This is a partnership with DMF to fill knowledge gaps pertinent to developing a state-wide seeding program. SSCW will also partner on seed experiments.
 4. Kick off a BIL-funded project titled *Building infrastructure to support seed-based eelgrass restoration* to build tank infrastructure to support an eelgrass seed bank. This is a

partnership with DMF using the Cat Cove Marine Lab in Salem MA, and with Salem State University to fund a technician for daily lab support.

5. Coordinating with 7 NEPs across New England to discuss regional eelgrass seeding and assisted migration. Currently scoping proposal ideas for funding to implement a field sampling protocol.
 6. Developed a field protocol with EPA for professional and community scientists to collect eelgrass reproductive phenology data (flowering shoot density, seed maturity timing, and seed density). Distributed to NEPs across New England, and several other eelgrass practitioner partners, to implement this summer.
 6. Co-lead an effort with MIT Sea Grant to explore interactions between eelgrass and shellfish aquaculture. Currently analyzing industry survey responses, which will help guide the next actionable steps and prioritize areas for research and management.
- **Convene and partner with others to support and improve monitoring outputs**
 1. Provide guidance to CT DEEP, Peconic Estuary Partnership and EPA Region 2 / Long Island Sound Study regarding eelgrass mapping methodologies.
 2. Plan and host Spring 2023 meeting of the Massachusetts Seagrass Working Group.
 3. Present to Texas Seagrass Workgroup on best practices for eelgrass remote sensing mapping.
 4. Work with DMF, SSCW and others on two manuscripts in preparation:
 - a. Recovery of eelgrass *Zostera marina* following conversion of conventional block and chain moorings to conservation mooring systems in Massachusetts: context dependence, challenges, and management.
 - b. Residential Floats Reduce Light Availability for Eelgrass (*Zostera marina*) in Salem Harbor, MA, USA.

Senior Scientist

Prassede Vella (prassede.vella@umb.edu)

Address data gaps

- **MA Coastal Condition Assessment:** Preparations are underway for the 4th and final season of the MCCA. A new ISA has been developed between MassDEP and UMass Boston, as well as a contract with Normandeau. At the end of the season, MassBays and DEP will develop data analyses and a full report to answer questions put by the respective entities.
- **Continuous nearshore monitoring:** A draft “needs assessment” report which is the first step in developing continuous monitoring network in the estuaries and embayments in the MassBays study area was shared with STAC and discussed in detail at the quarterly meeting in May. Input from STAC was incorporated into a final document which was shared with STAC before this meeting. Started conversation with potential collaborator, and we hope to have more on that to share with STAC at the next meeting in July/August (date TBD).

Research on causes of water quality deterioration

- **Duxbury-Kingston-Plymouth:** Planning is ongoing for the 2023 season – monitoring will take place in August in Duxbury-Kingston-Plymouth. At the same time the steering committee is also starting to think about what we can do with these data to inform us of trends in eelgrass growth and health and to augment the investigation. MassBays and EPA will be collecting water quality data between June and October/November from five sites to get a sense of current water quality conditions.

STAC meetings

- Discussed draft “needs assessment” document for continuous monitoring.
- Next meeting – July/August 2023 (TBD)

Other

- Co-hosted session on *Historical perspective of water monitoring and policy: Pre - passage of the Clean Water Act and beyond (Pt 1 and Pt.2)* at the 13th National Water Quality Monitoring Conference in Virginia Beach, VA, April 2023.