

**Implementation Workplan**  
July 1 2017 through June 30, 2018  
*Proposed to EPA July 2017*

**Challenges and Outcomes**

MassBays’ Management Committee has identified primary environmental and management challenges facing the Bays, which we are committed to addressing through this workplan. They include:

- Stormwater and wastewater discharges (SWW)
- Barriers to streamflow and tidal flushing (SF)
- Climate change (CC)
- Spread of invasive species (IS)

These challenges are exacerbated by management challenges: fragmented decisionmaking at multiple levels and the tendency of practitioners and researchers to operate in silos rather than across disciplines.

MassBays’ workplan for FFY2017 addresses both sets of challenges, with tasks aligned with the programmatic and organizational goals documented in Table 1. These goals have been adopted by the Management Committee and reviewed by EPA Region 1, and will form the basis of the Revised CCMP to be submitted to EPA Headquarters later this year.

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 (NPDES 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 sections provide detailed descriptions of projects by Challenge, beginning with projects that cut across multiple areas. Acronyms and abbreviations are listed on pages 19-20. Each project includes the following:

**Title**

*Objective:* project-specific objective

*Challenge:* as listed above: SWW, SF, CC, and/or IS. All projects are expected to address management challenges (fragmented decisionmaking and isolated practitioners) as well.

*Description:* Lead entity/staff, project components

*Status:* New or Ongoing

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

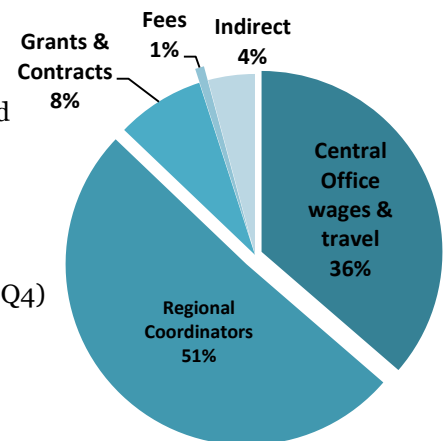
*Deliverables and Milestones:* products expected, along with the quarter (Q1-Q4) projected for completion

*Budget:* \$600,000 CWA §320 funds and non-federal match offered by RSPs

*Long-term Outcomes:* Project-specific outcomes

*CCMP Goal:* Per Table 1 (see page 21)

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



## **Program Planning and Structure**

### ***Comprehensive Conservation and Management Plan***

*Objective:* Complete the revision of MassBays' CCMP

*Challenges:* All

*Description:* MassBays' Executive Director will work closely with EPA Regional and Headquarters staff to ensure that the CCMP revision meets standards set out by final guidance (ongoing).

MassBays will:

- Work with EPA Region 1 to set out a “road map” for finalizing the CCMP.
- Work with a Management Committee Subcommittee to finalize a financial plan, including consideration of new funding sources.
- Work with the Management Committee's Science and Technology Advisory Subcommittee to finalize a monitoring plan.
- Develop a communications plan (see page 6 for details)
- Present a draft final CCMP to stakeholders including the Management Committee and EPA Region 1
- Submit the final CCMP to EPA.

*Partners:* MassBays Central Staff leads this effort. Partners include the Management Committee and Subcommittees, Regional Coordinators and their Local Governance Committees, CZM, and EPA Region 1.

*Deliverables and Milestones:* Revised CCMP submitted to EPA Headquarters for concurrence (Q4)

*Total \$320 funds:* 25% ED, 10% SS (salaries, fringe, and indirect costs)

*Long-term Outcomes:* Clear direction for MassBays for the next 10 years; established niche for MassBays in the crowded Massachusetts political/organizational structure around coastal issues and initiatives.

*CWA core program:* (6) protecting coastal waters through the National Estuary Program

### ***RSP Grant Program***

*Objective:* achieve CCMP goals

*Challenges:* All

*Description:* MassBays will secure assistance from partner-grantees to meet on-the-ground goals and implement strategies for engaging communities across the MassBays planning area.

*Partners:* Management Committee (proposal review)

*Deliverables and Milestones:*

- RSP contracts finalized (Q1)
- Deliverables and invoicing tracked (ongoing)
- LGCs convened (ongoing)

*Total \$320 funds:* 5% ED, 5% SS (salaries, fringe, and indirect costs); \$304,720 RSP grant funds

*Long-term Outcomes:* local engagement in MassBays' work

*CCMP Goals:* All

*CCMP Strategies:* All

*CWA core program:* (6) protecting coastal waters through the National Estuary Program

## **EPA Reporting**

*Objective:* To provide up-to-date accounting of MassBays' progress under CWA §320

*Description:* Pursuant to EPA Region 1 and Headquarters requests, MassBays will provide documentation of habitat restored and resources leveraged over FFY2017 through NEPORT.

*Partners:* RSPs

*Deliverables and milestones:*

- Interim prediction of habitat restoration (Q2)
- Final habitat and leveraging tallies (Q3)
- Project descriptions with photos for inclusion on the EPA website (Q3)

*Total §320 funds:* 5% SS (salaries, fringe, and indirect costs), RSP grant funds

*Long-term Outcomes:* Continued support for NEP based on documented impact

*CCMP Goals:* All

*CCMP Strategies:* All

*CWA core program:* (6) protecting coastal waters through the National Estuary Program

## **Resource Assessment and Restoration Tool**

*Objective:* Develop a means for monitoring progress toward restoration targets.

*Challenges:* All

*Description:* Following an extensive revision and update of the Estuary Delineation and Assessment (EDA) completed with FFY2016 funds, MassBays will:

- Establish environmental targets for the delineated assessment units.
- Apply a framework approach (such as the Biological Condition Gradient (BCG) developed by EPA [2006]) to interpret biological response to stressors and track progress toward targets.
- Share approach and outcomes with natural resource managers and NEPs.

*Partners:* RCs, LGCs, Management Committee Science & Technical Subcommittee, state and local agency representatives, EPA Region 1, EPA ORD, Northeastern University researchers

*Deliverables and Milestones:* Draft targets (Q1), target-setting workshop (Q2), finalized targets for embayment types (Q1), implement the BCG process to MassBays embayments (Q2-Q3), present approach and outcomes to natural resource managers (Q2 and ongoing)

*Total §320 funds:* 25% SS, 15% ED (salaries, fringe, and indirect)

*Long-term Outcomes:* measurable improvement in conditions at the local scale

*CCMP Goals:* MassBays provides key information about trends and conditions for research and management in Ipswich Bay, Massachusetts Bay, and Cape Cod Bay; MassBays reaches all planning-area municipalities with actionable information about estuaries; MassBays promotes measurable targets for restoration and protection that reflect unique local conditions and ecosystem capacities.

*CCMP Strategies:* Develop and implement methodology for comparison across embayments; Establish target (improved) conditions for each embayment type

*CWA core program:* (6) protecting coastal waters through the National Estuary Program

## **Communications Plan; Education & Outreach**

*Objective:* Increase awareness of MassBays' natural, educational/technical, and information resources.

*Description:* MassBays' outreach efforts are carried out at several levels: task-specific communications at the regional and full planning-area scale, overarching MassBays program information, and general-interest education and outreach about coastal natural resources. During the coming year, MassBays will respond to feedback shared by EPA during our Program Evaluation site visit with several actions, including developing a Communications Strategy aligned with CCMP goals, incorporating these varied levels of education and outreach, and especially investigating opportunities for engagement through social media within the confines of state policies.

A key effort this year will be to retain a consultant to develop a communications plan for MassBays that takes into account our unique structure, capacities, and constraints and includes effective means for generating and highlighting success stories.

Meanwhile, the following implementation initiatives will be carried out from the Boston office during the current fiscal year:

- Updating the MassBays website ([www.massbays.org](http://www.massbays.org)) to highlight current projects and programs.
- Directing all RSPs to ensure that their websites link directly and obviously to MassBays'.
- Preparing a 2106-2017 Annual Report.
- Producing e-newsletters for the Management Committee and general MassBays subscriber list.
- Collaborating with EPA Region 1 to host the annual EPA-National Estuary Program Technical Transfer Conference in November 2017.

Project-specific outreach efforts are described with their respective tasks, below. Highlights include:

- All RCs will participate in outreach to municipalities regarding tide gate maintenance and management.
- Boston staff and the Regional Coordinators have submitted proposals to present program-specific talks at the Coastal and Estuary Research Federation conference in November 2017.
- The Upper North Shore RC will present on and distribute final products of the NFWF Hurricane Sandy grant.
- The Lower North Shore RC will lead public education efforts about stormwater management for multiple towns.
- The Metro Boston RC will complete a draft of the Boston Harbor Habitat Atlas, including migrating to a new online platform.
- The Cape Cod RC will publish historic salt marsh monitoring data from flow-restored marshes.

RCs will also provide the following opportunities for local citizens to hear about the importance of natural resource protection and restoration:

- Great Marsh Sea Level Rise Adaptation Workshop (Upper North Shore)
- Underwater in Salem Sound Lecture Series (Lower North Shore)
- High School Marine Science Symposium (Metro Boston)
- NUMSC Film and Lecture Series (Metro Boston)
- NUMSC Annual Open House (Metro Boston)
- Watershed Stewardship Certificate Program presentations (South Shore)
- Cape Cod Coastal Conference (pending funding to WBNERR)
- State of the Cape's Waters Symposium (Cape Cod, proposed)
- Cape Cod ponds associations (Brewster, Barnstable, Orleans, etc.)

*Partners:* local nonprofits, municipal officials and staff, researchers, regional planners, high school students, interested lay audiences

*Deliverables and Milestones:* MassBays Communications Plan (Q4), updated MassBays website (Q2), Boston Harbor Habitat Atlas (Q3), presentations or posters at CERF 2017 (Q3), summary report and findings of salt marsh data compilation (Q4), lecture program listings, conference agendas, printed and online materials (ongoing)

*Total \$320 funds:* 25% ED, 10% SS (salaries, fringe, and overhead), RSP grant funds

*CCMP Outcomes:* MassBays provides key information about trends and conditions for research and management in Ipswich Bay, Massachusetts Bay, and Cape Cod Bay; MassBays provides technical assistance and action-oriented communications about the roles, functions, and values of healthy estuaries.

*CWA core program:* (5) protecting wetlands

*Long-term Outcomes:* Informed local response to climate change impacts

*CCMP Goals:* MassBays provides technical assistance and action-oriented communications about the roles, functions, and values of healthy estuaries.

*CCMP Strategies:* Revise and disseminate existing and new education and outreach materials, providing context and integrating multiple sources as needed; Provide education, training, and technical support; share case studies (successful and not); and support collaboration and cooperation on specific topics

*CWA core program:* (6) protecting coastal waters through the National Estuary Program

### **Monitoring Framework**

*Objective:* Meet requirements of the 2012 MassBays Program Evaluation; provide consistent reporting regarding the state of the bays.

*Challenges:* All

*Description:* MassBays will finalize a planning area-wide monitoring framework in Summer 2017. Building on that framework, MassBays will focus on:

- Compiling, vetting and analyzing data collected through existing monitoring efforts,
- Developing a process to address data gaps.
- Working closely with the Citizen Monitoring Coordinators' Network to bring together monitoring program coordinators to address data sharing.
- Develop an approach to address the technical needs identified by the MassBays Citizen Science Coordinators Network to ensure sustainability of the programs and the generation of quality data.
- Develop a web-based State of the Bays reporting system to share information on progress of selected indicators towards scientifically derived ecological targets or thresholds.

The project will be informed by region-specific needs as identified by the RCs (ongoing). For example, MassBays staff scientist will assist the Lower North Shore RC in identifying data gaps, determining monitoring parameters, and developing a 3-year monitoring plan for the region. The Lower North Shore monitoring plan will be in line with the MassBays-wide monitoring plan framework. This approach may later be applied to the other regions as applicable to ensure that the MassBays Monitoring Plan goals are met.

This work will continue to be guided by the Science and Technical Advisory Subcommittee and based on input from subject matter experts. The outcomes of the monitoring plan will inform ongoing target species and habitat research and monitoring efforts (see page 10) and the Healthy Estuaries Grant Program (see next item).

*Partners:* Citizen Monitoring Coordinators, DEP, EPA, RSPs

*Deliverables and Milestones:* MassBays monitoring plan framework reviewed by STAC, finalized, and approved by Management Committee (Q1); MassBays and monitoring program coordinators data sharing system in place (Q3); State of the Bays Reporting system in place (Q4); 3-year monitoring plan for MassBays and Lower North Shore with associated cost estimates and funding plans (Q3).

*Total §320 funds:* 25% SS, 5% ED (salaries, fringe, and indirect), RSP funding

*Long-term Outcomes:* Long-term monitoring in MassBays, in the larger national and regional context.

*CCMP Goals:* MassBays provides technical assistance and action-oriented communications about the roles, functions, and values of healthy estuaries; MassBays promotes measurable targets for restoration and protection that reflect unique local conditions and ecosystem capacities.

*CCMP Strategies:* Make new data available, especially to address specific gaps in knowledge; Analyze and present existing data in multiple formats to document baselines and trends; Support valid (QA/QC) data collection and application

*CWA core program:* (2) identifying polluted waters and developing plans to restore them

### **Healthy Estuaries Grant Program**

*Objective:* Improve understanding and extent of data available across MassBays' planning area.

*Challenges:* All

*Description:* MassBays will continue the Healthy Estuaries Grant Program. This will be the second round of funding for this small-grant opportunity.

*Deliverables and milestones:*

- Round 1 grant projects completed and closed out (Q3)
- RFR posted for 18-month projects (Q2)
- Proposals reviewed, grants awarded (Q3)

*Total §320 funds:* \$80,000 (FFY16 carryover), \$32,300 (FFY17); 10% SS, 5% ED (salaries, fringe, and indirect)

*Long-term Outcomes:* Expanded data sets and effective means for measuring improvements in MassBays' planning area

*CCMP Goals:* MassBays provides key information about trends and conditions for research and management in Ipswich Bay, Massachusetts Bay, and Cape Cod Bay; 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 toward target conditions.

*CCMP Strategies:* Support and conduct research regarding ecosystem functions to inform state policy and local action; Make new data available, especially to address specific gaps in knowledge

*CWA core program:* (2) identifying polluted waters and developing plans to restore them; (6) protecting coastal waters through the National Estuary Program

## **Target species and habitat research and monitoring**

*Objective:* Track long-term trends in conditions of critical species and habitats in MassBays

*Challenges:* All

*Description:* All RCs will take up sub-region-specific monitoring and assessment efforts to support CCMP goals and outcomes. Programs include:

### **Nutrients and plankton**

- Lower North Shore RC will initiate efforts to elucidate the nature of plankton-nutrient-turbidity interdependence in Salem Harbor and the larger estuary (new).
- Cape Cod RC will initiate a cyanobacteria bloom monitoring program for citizen groups, using monitoring protocols developed by EPA Region 1 (new).

### **Salt Marshes**

- Upper and Lower North Shore RCs will document and research causes of marsh edge erosion at two sites in Salem (ongoing).
- Cape Cod RC will summarize and report findings based on data gathered at more than 15 salt marshes restored over the period 2003 to 2014 (ongoing). This information will be made available to resource managers, particularly as climate change and sea level rise may affect coastal wetlands.
- Cape Cod RC will continue to assist Cape Cod Bay towns with restoration projects (e.g., Crosby Lane in Brewster) by providing grant-writing support, technical assistance and outreach. The RC will continue to build capacity of the Cape Cod Restoration Coordination Center and will utilize studies (salt marsh monitoring data, USGS sea level rise-aquifer study, APCC salt marsh migration study, CCS sediment budget studies, others) to assess restoration success and identify new restoration opportunities and approaches (ongoing).
- Lower North Shore, South Shore, and Cape Cod RCs will assist CZM in monitoring and mapping the boundary between low and high salt marsh to provide groundtruthing for SLAMM modeling and restoration planning (new and ongoing).

### **Eelgrass**

- South Shore RC will collaborate with DMF to assess potential causes of eelgrass loss documented via FFY2015 mapping, convening experts to discuss course(s) of action (new).

### **Shellfish and Arthropods**

- Upper North and South Shore RCs will participate in a New England-wide effort to document green crab density and habitat characteristics in Massachusetts, using standard protocols (new and ongoing).
- South Shore RC will conduct horseshoe crab spawning surveys in Duxbury Bay in April, May and June (ongoing)
- South Shore RC will continue enhancing mussel beds in the North and South Rivers and map shellfish species and abundance in the Gulf River (ongoing).

### **Fish**

- Cape Cod RC will work with a graduate intern to develop a video monitoring approach for monitoring juvenile herring outmigration (new).
- South Shore and Cape Cod RCs will continue to participate in the River Herring Warden Network to improve and implement best management practices relevant to conducting herring counts and managing fish ladders (ongoing).
- The South Shore and Cape Cod RCs will provide field assistance to MIT Sea Grant in their MassBays-funded effort to characterize herring utilization and preferences among habitats in the newly restored Tidmarsh Farms and comparison with pristine Eastham ponds (ongoing).
- The South Shore RC will participate in an effort to tag eastern brook trout in Third Herring Brook with transponders (new).

In a project that cuts across all habitat and species monitoring, Metro Boston RC will complete multiple layers of a Boston Harbor Habitat Atlas, including migrating to a new online platform. The atlas is a resource for connecting educators, students, and other interested lay people with natural resources in the Harbor, as well as information about the research that is underway, and the organizations working to protect and restore those resources (ongoing).

*Partners:* USACE, DMF, DER, CZM, NMFS, CCCE/WHOI Sea Grant, MIT Sea Grant, municipal staff, River Herring Warden Network, BHEN, local nonprofits, herring wardens, citizen-volunteers, Mass Audubon, CCS, UNH, EPA Region 1

*Deliverables and Milestones:*

- Seven Boston Harbor habitats available online via an interactive Atlas (Q4)
- *Nutrients and plankton*
  - design for plankton-nutrient-turbidity study (Q4)
  - Cape Cod report on cyanobacteria monitoring results, groups and actions taken as a result of monitoring data collected (Q4)
- *Salt Marshes*
  - draft report describing preliminary results of salt marsh monitoring data mining (Q3); final synthesis report and workshop (Q4)
  - report on results of marsh edge erosion monitoring and assessment (Q2)
- *Eelgrass:*
  - summary of expert workshop on eelgrass (Q3)
- *Shellfish and arthropods*
  - number of volunteers engaged in horseshoe crab spawning surveys (Q4)
  - Gulf River shellfish survey report (Q2)
- *Fish*
  - training sessions for volunteers (Q4)
  - reports and outreach materials regarding best practices for herring monitoring, (Q3)
  - results of first year of tagging (Q3)
  - plan for video monitoring juvenile herring outmigration (Q3)
  - 2017 season herring data submitted to DMF (Q2)
  - Reporting on 2- to 10-year data sets, re: run timing v. restoration (Q4)

*Total \$320 funds:* RSP grant funds and match

*Long-term Outcomes:* Well-informed resource management decisions

*CCMP Goals:* MassBays provides key information about trends and conditions for research and management in Ipswich Bay, Massachusetts Bay, and Cape Cod Bay; MassBays provides technical assistance and action-oriented communications about the roles, functions, and values of healthy estuaries.

*CCMP Strategies:* Support valid (QA/QC) data collection and application; Make new data available, especially to address specific gaps in knowledge

*CWA core program:* (6) protecting coastal waters through the National Estuary Program

### ***Support for Citizen Monitoring Efforts***

*Objective:* Increase the value of citizen monitoring data for decisionmaking across the region

*Challenges:* All

*Description:* In FFY 2016, MassBays convened a Citizen Monitoring Coordinators' Summit to identify specific needs for capacity-building among volunteer monitoring groups upon which we rely for data about trends and conditions in the Bays. MassBays will apply 320 funding to meet several of those needs, including:

- Communications training to share results with volunteers, decisionmakers, and the press (new).
- Facilitate discussion between EPA and DEP re: QAPP scope and review process (ongoing).



- Develop, in cooperation with the Citizen Science Association, guidance for citizen groups regarding data quality assurance (new).
- Technical assistance to secure funding, develop QAPPs, and analyze data (ongoing).
- “Match-making” between Monitoring Coordinators and research scientists to assist in formulating research questions and interpreting results (ongoing).
- Expanded access to training and information exchange via EPA and other webinars (ongoing).

In addition, MassBays will seek additional funding to support more resource-intensive capacity-building efforts. Pending this additional funding, we will undertake these new initiatives:

- Develop an online “QAPP generator” that will serve both EPA and DEP needs and provide a more straightforward path for citizen monitoring groups.
- Support access to an existing online data management platform on which Network members can store and analyze monitoring data.
- Investigate new technologies for collecting and compiling data in the field.
- Provide mini-grants to meet local needs, e.g., data input and archiving, conference registration fees.
- Investigate potential for reinvigorating EPA’s equipment lending library with new equipment and training.

*Partners:* RSPs, Management Committee, Citizen Monitoring Coordinators’ Network, Citizen Science Association Data Quality and Metadata Working Group, DEP, EPA Region 1

*Deliverables and Milestones:* DEP-EPA meeting (Q1), QA/QC guidance (Q3), technical assistance and matchmaking (ongoing), communications training (Q3), applications for supplemental funding (ongoing)

*Total \$320 funds:* 20% ED, 10% SS (salaries, fringe, and indirect), \$500 (travel, meeting supplies); RSP grant funds

*Long-Term Outcomes:* New structure and supports for citizen monitoring efforts, increase in valid data applicable to resource management questions.

*CCMP Goal:* MassBays provides key information about trends and conditions for research and management in Ipswich Bay, Massachusetts Bay, and Cape Cod Bay.

*CCMP Strategies:* Make new data available, especially to address specific gaps in knowledge; Provide education, training, and technical support; share case studies (successful and not); and support collaboration and cooperation on specific topics; Support valid (QA/QC) data collection and application

*CWA core program:* (6) protecting coastal waters through the National Estuary Program

## **Challenge: Stormwater and wastewater discharges (SWW)**

### **Stormwater and wastewater management technical support, education, and outreach**

*Objective:* Provide technical support and outreach materials and services to municipalities to improve quality of stormwater and wastewater discharges.

*Description:* All RCs will promote stormwater best management practices, especially green infrastructure alternatives. Specific efforts include facilitating the following:

- Cape Cod RC will assist the new Cape Cod Stormwater Coalition to identify and address municipal stormwater needs, build partnerships, provide outreach, obtain resources for stormwater managers and publicize successes (new and ongoing)
- Cape Cod RC will facilitate information sharing between towns and the County regarding wastewater, stormwater and water quality management, and serve on the Cape Cod Commission’s 208 Water Quality Plan Monitoring Subcommittee (which provides recommendations for monitoring wastewater management options).

- South Shore RC will work with MAPC and MassDOT to assess and prioritize stormwater improvements along Route 3 to protect and improve the North, South, Eel, and Jones Rivers, as well as Town Brook (ongoing).
- North Shore RC will facilitate the community-based *Greenscapes* program focusing on MS4, pet waste messaging for residents and low-impact development for municipal boards and developers (ongoing).
- Upper North Shore RC will provide technical assistance to members of the Merrimack Valley Stormwater Collaborative regarding MS4 stormwater management compliance and best management practices (ongoing).
- Metro Boston RC will support Neponset River Watershed Association’s efforts to characterize and educate stakeholders about threats to water quality in the Lower Neponset River, particularly as related to sewage discharge by the City of Boston (new).
- Metro Boston RC will participate in the Mystic River Watershed Initiative's Steering Committee, which aims to coordinate efforts related to improving water quality and enhancing open space, particularly in the environmental-justice communities that border the lower stretch of the river (ongoing).
- All RCs will identify and take advantage of opportunities to promote and implement LID in local communities (new and ongoing).
- Lower North Shore RC will train volunteer “beachkeepers” to remove marine debris and monitor their adopted area for resource degradation through the Adopt-a-Beach program. Adopted areas include beaches, islands and river banks (ongoing).

*Partners:* Municipal staff, boards/commissions, and elected officials, local nonprofits, regional planning agencies, MassDOT, private contractors, EPA Region 1

*Deliverables and Milestones:*

- Documentation of support to the Cape Cod Stormwater Coalition, South Shore Water Coalition, and Greenscapes communities (Q4)
- Documented municipal investment (membership dues) in Greenscapes (Q1)
- Education and outreach products regarding stormwater and LID that can be used across MassBays and by other NEPs (Q3)
- List of LID education, outreach, and grant assistance offered (Q4), implementation of at least one LID demonstration site in the Lower North Shore (Q4)
- Expert-vetted educational fact sheet about water quality issues in the Lower Neponset River developed and distributed (Q2)
- List of Adopt-a-Beach training sessions and clean up events, map of beaches, islands and river bank adopted. (Q4)

*Long-term Outcomes:* Near-shore water quality that supports healthy coastal ecosystems and sustainable human uses.

*CCMP Goal:* MassBays provides technical assistance and action-oriented communications about the roles, functions, and values of healthy estuaries

*CCMP Strategies:* Revise and disseminate existing and new education and outreach materials, providing context and integrating multiple sources as needed; Provide education, training, and technical support; share case studies (successful and not); and support collaboration and cooperation on specific topics

*CWA core program:* (4) addressing diffuse, nonpoint source s of pollution

### **Stormwater and wastewater mitigation to support temporal and spatial expansion of estuarine habitat**

*Objective:* Applying increased acreage and duration of open shellfish beds and reduced frequency of harmful algal blooms as indicators of receiving water quality

*Description:* South Shore and Cape Cod RCs will work with partner communities to pursue stormwater and wastewater improvements in locations important for shellfishing and recreation.

Lower North Shore RSP will investigate feasibility of shellfish restoration in Salem Sound (new).

Metro Boston RC will support efforts to better understand and address causes of the die-off of clams

in Boston Harbor (ongoing). Cape Cod RC will pilot test three types of cyanobacteria monitoring kits (on loan from EPA's Chelmsford Lab) to monitor cyanobacteria blooms to detect and document cyanobacteria blooms in streams, ponds and lakes, assessing their utility for providing useful and actionable information for the public and decisionmakers (new). All actionable information to guide restoration will be provided to municipalities, MassBays, and state and federal agencies.

*Partners:* South Shore and Cape Cod towns, DEP, DMF, CRC, CCC, DER, NRCS, EPA Region 1

*Deliverables and Milestones:*

- Grant application(s) for stormwater improvement efforts aligned with DMF-approved priority list for South Shore and Cape Cod shellfish beds (Q3)
- List of Cape Cod-based projects, criteria for projects, recommendations, outcomes (Q4).
- Draft report describing preliminary results of cyanobacteria monitoring (Q3).
- Memo documenting an assessment of habitat suitability for shellfish in Salem Sound.
- Workplan for assessing clam die-off in Boston Harbor (Q2).

*Long-term Outcomes:* Increased acreage and resilience of coastal habitats

*CCMP Goals:* MassBays provides key information about trends and conditions for research and management in Ipswich Bay, Massachusetts Bay, and Cape Cod Bay; MassBays provides technical assistance and action-oriented communications about the roles, functions, and values of healthy estuaries

*CCMP Strategies:* Guide local action to increase habitat and improve water quality according to targets; Support and conduct research regarding ecosystem functions to inform state policy and local action

*CWA core program:* (4) addressing diffuse, nonpoint sources of pollution

## **Water quality monitoring and remediation**

*Objective:* To reduce bacterial contamination in Category 4 and 5 303d-listed waters

*Description:* Both the Lower North Shore and South Shore RCs will continue to lead volunteer water quality monitoring programs. The Clean Beaches & Streams Program (Lower North Shore) will identify bacterial pollution with biweekly summer water testing for *Enterococcus* at stormwater outfalls and streams, and notify the appropriate authorities of the results. The Riverwatch Program (South Shore) also consists of biweekly monitoring during the summer months, also for fecal coliform and *Enterococcus* for comparison with (shell) fishing and swimming standards.

*Partners:* volunteers, EPA Region 1 (Stormwater Equipment Toolbox)

*Deliverables and Milestones:* Bacterial levels for 14 - 22 outfalls or streams and results from stream assessments published on SSCW website (Q1), results of bacterial analysis for 10 sites on the North and South Rivers published on NSRWA website (Q2)

*Long-term Outcomes:* Improved conditions to support habitat restoration

*CCMP Goals:* MassBays provides key information about trends and conditions for research and management in Ipswich Bay, Massachusetts Bay, and Cape Cod Bay; MassBays provides technical assistance and action-oriented communications about the roles, functions, and values of healthy estuaries

*CCMP Strategies:* Make new data available, especially to address specific gaps in knowledge; Support valid (QA/QC) data collection and application

*CWA core program:* addressing diffuse, nonpoint sources of pollution

## **Promote science-based wastewater management on Cape Cod**

*Objective:* The Cape Cod RC will continue to work with partners to promote regional science-based wastewater management that effectively improves water quality and habitats, by:

- Providing input to the Cape Cod Commission's 208 Water Quality Plan Monitoring Subcommittee that provides recommendations for monitoring wastewater management options (ongoing).
- Providing coordination, outreach or other technical assistance to communities to help them address coastal water quality issues related to wastewater or stormwater (ongoing).
- Promoting information-sharing between towns and the County regarding wastewater, stormwater and water quality management through support of CRC activities (ongoing).
- Utilizing results of the new cyanobacterial monitoring program to build support for improving water quality (new).

*Partners:* CCC, 35 Cape Cod-based nonprofits, CRC, EPA Region 1, towns.

*Deliverables and Milestones:* Outreach materials, meeting notes, technical input to 208 Monitoring Subcommittee or other deliverables to be determined. (Q1-Q4)

*Long-term Outcomes:* Improved near-shore water quality

*CCMP Goal:* MassBays provides technical assistance and action-oriented communications about the roles, functions, and values of healthy estuaries

*CCMP Strategies:* Revise and disseminate existing and new education and outreach materials, providing context and integrating multiple sources as needed; Provide education, training, and technical support; share case studies (successful and not); and support collaboration and cooperation on specific topics

*CWA core program:* (6) protecting coastal waters through the National Estuary Program

## **Challenge: Barriers to streamflow and tidal flushing (SF)**

### **Support restoration of streamflow and tidal flushing**

*Objectives:* Improve salt marsh and wetland conditions, improve stream continuity to support diadromous and anadromous fish migration, through removal or improved management of dams, tide gates, and inadequately sized culverts, and improved water resource management.

*Challenges:* All

*Description:* MassBays has observed an increase in local initiatives to improve flood management, which often are associated with improvements in habitat. MassBays staff and RCs will bring habitat considerations to infrastructure discussions, providing technical support and information about state agency resources available for habitat improvements. Specific initiatives include:

- Metro Boston RC will participate efforts to assess the suitability of an artificial reef to be constructed with dredged material at Gallops Island in Boston Harbor (ongoing)
- MassBays will team up with CZM to present findings of the tide gate inventory, as well as the online web map, to municipal staff and regional planning agencies. As part of these information-sharing sessions, CZM and MassBays RCs will offer technical support to municipal staff for infrastructure management that protects and improves salt marsh and other estuarine habitats. Outreach will draw from economic analyses sponsored by DER, which estimated the benefits of stream barrier removals<sup>1</sup> (new).
- Cape Cod RC will continue to assist Cape Cod Bay towns with flow restoration projects (e.g., Pamet River, Mayo Creek, and Herring River salt marsh restorations, Scargo Lake herring run restoration) by providing grant-writing support, technical assistance and outreach (ongoing)

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<sup>1</sup> "Community Benefits of Stream Barrier Removal Projects in Massachusetts: Costs and Benefits at Six Sites," MA Division of Ecological Restoration, 2015. Accessed May 9, 2017 at <http://www.mass.gov/eea/docs/der/pdf/phase-iii-benefits-from-stream-barrier-removal-projects.pdf>

- The Cape Cod RC will continue to assist towns and the CRC with planning and implementation of the Cape Cod Water Resources Restoration Project if NRCS obtains a second round of federal funding for this restoration program that addresses impaired salt marshes, impaired fish runs and stormwater discharges that impact shellfish beds.
- The South Shore RC will document and communicate the impacts of water use on natural systems, with suggestions for water use reduction for private companies and homeowners.
- South Shore RC will work with the Towns of Scituate (First Herring Brook) and Norwell and Hanover (Third Herring Brook) to maintain ecologically appropriate flows within the context of municipal water demand and implement the results of the towns' previous state-funded sustainable water management initiative grants (ongoing).
- South Shore RC will work with all regional communities and partners to assess feasibility of and seek funding for removal of dams and other barriers and collect ecological data pre- and post-restoration for multiple structures on Mill Pond, Third Herring Brook, Bound Brook, Jones River, and Town Brook (new and ongoing).
- Metro Boston RC will continue to support the Town of Braintree's efforts to work with DMF to assess feasibility of removing the Armstrong Dam in the Fore River watershed (pre-restoration) (new).
- South Shore RC will participate on the technical team for the Green Harbor tide gate improvement and monitor changes in the Green Harbor River estuary (ongoing).
- Lower North Shore RC will assist Manchester-by-the-Sea in an effort to remove or replace a tide gate in the town center, providing new passage for fish and public access to a newly restored stream (new).
- As a Steering Committee member and a Municipal Committee member of the Parker, Ipswich, Essex River Restoration Work Group, the Upper North Shore RC will assist identified priority sites in communities to improve barriers to flow (ongoing).
- Metro Boston RC will participate in efforts to promote effective tide gate management at sites in Saugus, Revere, and Quincy (new).

*Partners:* DER, DEP, NOAA, USGS, and EPA Region 1; USACE, CRC, CCC, CCCD, NRCS, DMF, municipalities including Norwell, Hanover, Marshfield, Duxbury, Scituate, Cohasset, Plymouth, and Braintree

*Deliverables and Milestones:* Technical support for improved management, repairs, and perhaps removal (ongoing), documentation of restoration successes. Outreach materials regarding South Shore municipal water use patterns (Q3), reporting on South Shore municipal action taken to improve streamflow (Q4), Technical support for prioritization, management and potential implementation of undersized culverts/barriers to flow in the Parker, Ipswich and Essex watersheds (Q3), list of Cape Cod projects advanced through grantwriting or technical assistance (Q4), reporting on Manchester's municipal action taken to improve streamflow (Q1, Q3), at least one grant proposal to advance dam removal at any of the proposed sites (Q4)

*CWA core program:* (6) protecting coastal waters through the National Estuary Program

*Long-term Outcomes:* Improved and restored in-stream and estuarine habitat due to active, informed tide gate management, abutting development, and rising sea levels; dam and culvert repairs or removals; and water usage patterns that takes into account natural resources.

*CCMP Goals:* MassBays provides technical assistance and action-oriented communications about the roles, functions, and values of healthy estuaries.

*CCMP Strategies:* Support and conduct research regarding ecosystem functions to inform state policy and local action; Provide education, training, and technical support; share case studies (successful and not); and support collaboration and cooperation on specific topics

*CWA core programs:* (5) protecting wetlands, (6) protecting coastal waters through the National Estuary Program

## **Challenge: Climate Change (CC)**

### **Coastal acidification monitoring**

*Objective:* To characterize coastal acidification in MassBays

*Description:* MassBays will collect real-time data on pH and pCO<sub>2</sub> as well as other water column parameters. MassBays staff scientist coordinated with EPA Office of Research and Development (Narragansett) to collect and analyze water samples for total alkalinity and dissolved organic carbons (FFY17 onward). MassBays staff scientist and RC (South Shore) will coordinate with UMass Boston to provide training to a group of volunteers who will help with the maintenance of the system. Additionally MassBays continued to be an active partner in the regional effort to engage stakeholders in ocean acidification awareness through the Northeast Coastal and Ocean Acidification Network. MassBays' Staff Scientist will lead work to deploy and maintain a dock-based observation system to monitor coastal acidification in Duxbury Bay (South Shore) as part of a growing EPA Office of Research and Development network. With funding received from EPA and local support coordinated by the South Shore RC, MassBays will collect real-time data on pH and pCO<sub>2</sub> as well as other water column parameters. MassBays staff scientist will coordinate with the RCs to explore similar opportunities in other regions within its planning area. MassBays will continue to be an active partner in the regional effort to engage stakeholders in ocean acidification awareness through the Northeast Coastal and Ocean Acidification Network as well as the NEP Coastal Acidification Network (ongoing).

*Partners:* UMass Boston, U.S. EPA Atlantic Ecology Division (Narragansett Lab), Town of Duxbury; additional towns (pending funding of proposal submitted to MIT Sea Grant in coordination with UMass Boston).

*Deliverables and Milestones:*

- Coastal Observation System in Duxbury deployed (Q2)
- five volunteers trained (Q2)
- data collected (Q3-Q4)

*Long-term Outcomes:* Information about coastal acidification is available for efficient and successful shellfish aquaculture in MassBays.

*CCMP Goals:* MassBays provides new resources for research and management in the Bays; MassBays will be an important influence on local decisionmaking that recognizes the roles, functions, and values of healthy habitats in the Bays

*CCMP Strategies:* Make new data available, especially to address specific gaps in knowledge; Support and conduct research regarding ecosystem functions to inform state policy and local action

*CWA core programs:* (6) protecting coastal waters through the National Estuary Program

### **Climate change resilience in MassBays salt marshes**

*Objective:* To document current conditions and monitor changes in salt marsh characteristics and develop best practices for salt marsh protection in response to climate change impacts.

*Description:* MassBays' planning area encompasses thousands of acres of salt marsh, including the Great Marsh, the largest contiguous marsh north of New York. This important estuarine habitat is under threat not only from development on the landward side, but sea level rise, increased stormwater runoff, and higher-intensity storms that come from climate change. MassBays RSPs will undertake several tasks to assess marsh responses to these changes and test adaptive measures to be shared across the region. They include:

- Upper North Shore RC will oversee final year components and reporting for native marsh vegetation restoration, subtidal vegetation restoration, and sediment and salinity modeling under Hurricane Sandy SLR resiliency activities.

- Cape Cod and Upper North Shore RCs will lead thin-layer deposition pilot programs in the Great Marsh and Cape Cod. The Cape Cod RC will work with WBNERR and an intern to evaluate feasibility of TLD for restoring Cape Cod salt marshes at risk due to sea level rise, and will identify potential criteria and sites for future TLD pilot tests (new).
- Upper North Shore RC will help the town of Newbury measure sediment accretion rates in local fronting marshes, to support prioritization of responses that will protect natural resources and engineered structures (new).
- Upper North Shore RC will support the Marsh Edge Erosion Task Force initiative to collect data and identify priority stressors, including wave action, bioturbators, SLR, and excessive nutrients, at sites in Plum Island Sound, Essex Bay, and Salem Sound (ongoing).
- Lower North Shore RC will monitor salt marshes at Good Harbor Marsh (Gloucester), Juniper Cove (Salem) and Old Creek Marsh (SSU Salem) and Thissel Marsh (Endicott College) using citizen science protocols to monitor long-term climate change impacts on salt marshes from SLR (ongoing).
- South Shore RC will establish and conduct long-term monitoring of vegetation change, including conversion of high marsh to low marsh and brackish marsh to salt marsh to document the impact of sea level rise at sites selected in consultation with CZM (ongoing) as well as through aerial photography (as available) and a volunteer monitoring program based at private docks along the North and South Rivers (new).
- Upper North Shore RC will work with the Great Marsh Resiliency Partnership to investigate the extent and severity of impairments (spatially and ecologically) for both artificial impounding and excessive drainage conditions throughout the Great marsh. These effects have negative implications for future marsh resilience to sea level rise. Several experimental restoration methods will be piloted (including runnels and ditch mitigation) and the RC is engaging regulators to determine the most efficient and effective steps for implementation (new).

*Partners:* NWF, Parker River NWR, BU, MassAudubon, IRWA, Woods Hole Group, UNH/Jackson Laboratory, MBL, CCS, WBNERR, Great Marsh communities, CZM, DEP, ACOE, BU, UNH, NWF, USFWS, BU, Parker River NWR, MBL, PIE-LTER, Northeast MA Mosquito Control and Wetlands District Cape Cod National Seashore, SSCW, DER, CZM, DMF, Friends of Good Harbor, UNH, SSU, Endicott College, and the Towns of Newbury, Scituate, Marshfield, Norwell, Hanover, and Pembroke, Nahant

*Deliverables and Milestones:* Sediment accretion data collection and analysis (Q1-3) and draft report (Q4); marsh edge erosion seasonal measurements (Q1, Q3), GIS mapping of Plum Island Sound and Essex Bay banks and erosion (Q4), report on suspected primary causes of marsh edge erosion (Q4); maps and preliminary surveys of vegetation on the North and South Rivers (Q3); report of findings and photos of monitoring efforts in Gloucester, Salem, and Beverly (Q2), Cape Cod report on initial assessment of potential TLD sites and criteria, and outreach materials presentations (Q3)

*Long-term Outcome:* Adoption of environmentally sound responses to climate change impacts on coastal marshes based on scientific research; healthy and resilient coastal marshes

*CCMP Goal:* MassBays provides technical assistance and action-oriented communications about the roles, functions, and values of healthy estuaries.

*CCMP Strategies:* Make new data available, especially to address specific gaps in knowledge; Analyze and present existing data in multiple formats to document baselines and trends; Support and conduct research regarding ecosystem functions to inform state policy and local action

*CWA core program:* (6) protecting wetlands

### **Municipal coastal resiliency/living shorelines**

*Objective:* Assist municipalities in implementing coastal resiliency and living shoreline initiatives

*Description:* Each RSP will work with their region's municipal decisionmakers to document, present, and support action on adaptive responses to potential effects of rising sea level and other climate change impacts. Specific efforts include:

- Metro Boston RC will participate in the Metropolitan Area Planning Council's Metro Mayors' Coalition's Climate Preparedness Task Force.
- Metro Boston RC will support efforts to assess the vulnerability of the regional food distribution center in Chelsea (from which produce is distributed to all of New England and some mid-Atlantic states).
- Metro Boston RC will assist with coordinating the Boston Harbor protection feasibility study, which aims to assess the potential for engineered solutions to protect the City of Boston from sea level rise and predicted future storm surge (ongoing).
- Metro Boston RC will support efforts to stabilize the shoreline at Canoe Beach in Nahant, hosting a workshop on best practices in pre- and post-monitoring of such projects for stakeholders (new).
- Cape Cod RC will continue to work with the USGS and partners to communicate the results of a study of SLR impact on groundwater and translate the results into public outreach materials, policies and adaptation measures relating to wastewater and stormwater management, effects on streams and wetlands, planning, and land use (ongoing).
- Upper North Shore RC will continue efforts to establish and expand eelgrass beds in Essex Bay (ongoing) and Plum Island Sound (new).
- Upper North Shore will work with the City of Newburyport to implement protection strategies for SLR vulnerable municipal assets (ongoing).
- Lower North Shore RC will work with the City of Salem to plan and implement green infrastructure - living shorelines projects identified over the past years' joint efforts (ongoing).
- Lower North Shore RC will serve on the Manchester Coastal Resiliency Advisory Group, providing technical assistance, data collection and outreach support. Additional municipalities will be invited to establish similar groups (new and ongoing).
- Lower North Shore RC will provide technical support to Marblehead to produce a municipal vulnerability assessment, and to Beverly to address impacts of sea level rise on municipal sewer pump stations (new, both pending state grant funding).
- Metro Boston RC will assist Braintree in their state-funded coastal resiliency effort (new).
- The Cape Cod RC will provide outreach, technical assistance, grant-writing, assist CCC to develop a matrix of coastal adaptation measures as part of the Commission's NOAA-funded project to build the Cape's coastal resiliency (ongoing).
- Cape Cod RC will continue to assist CRC to develop recommendations for County Commissioners for improving coastal resiliency (ongoing).
- South Shore RC will work with the Town of Scituate to support and implement shoreline protection efforts (ongoing).

*Partners:* USGS, CCC, TNC, CRC, CZM, UMass Boston, Woods Hole Group, Arcardis, WHOI, Boston, Braintree, Scituate, Salem, Manchester-by-the-Sea, and Beverly staff and residents; Tighe & Bond; NWF, BU, the Eight Towns and the Great Marsh Committee, SCA, and area volunteers.

*Deliverables and Milestones:* Recommendations for adaptation measures (Q4), at least one public presentation (Q4). 1.5 acres of eelgrass planted (Q1-2), eelgrass restoration report (Q4), grant applications; recommendations, outreach products (Q4), written and presented case studies on lessons learned (Q4); Metro Boston workshop on best practices for monitoring shoreline protection projects (Q3); Boston Harbor protection stakeholder presentation/discussion with the Boston Harbor Ecosystem Network (Q2), living shoreline assessment project development for portion of Newburyport coastal shoreline (Q4)

*Long-term Outcomes:* Municipal and regional plans to respond to sea level rise, stakeholders engaged in efforts to expand living shorelines for habitat protection and storm/sea level rise impact mitigation.

*CCMP Goal:* MassBays provides technical assistance and action-oriented communications about the roles, functions, and values of healthy estuaries.

*CCMP Strategies:* Revise and disseminate existing and new education and outreach materials, providing context and integrating multiple sources as needed; Provide education, training, and



technical support; share case studies (successful and not); and support collaboration and cooperation on specific topics  
*CWA core program:* (6) protecting coastal waters through the National Estuary Program

## **Challenge: Spread of Invasive Species (IS)**

### **Invasive species mapping, treatment, and control**

*Objective:* To control emergent and existing *Phragmites* stands, control invasive pepperweed and purple loosestrife, and devise controls for green crabs.

*Description:* Several of the RCs will continue efforts to control and eradicate invasive species that reduce ecosystem value of habitats:

- South Shore RC will share experience and expertise with managing purple loosestrife using *Galerucella* beetle release with resource managers and conservation organizations, including the Lower North Shore RC (new).
- Upper North Shore RC will conduct ongoing efforts to monitor and control *Phragmites*, first assessing previously treated areas prior to seasonal treatment to determine the effectiveness of 2015 treatments and to provide an estimate for the treatment contractor for bid purposes. The RC will continue to seek treatment permissions from owners of property previously identified to contain *Phragmites* stands, and hire contractors to treat invasive *Phragmites* throughout the marsh (ongoing).
- Upper and Lower North Shore RCs will lead pepperweed education and removal efforts to limit its spread as part of a New England-wide community-based mapping and control effort. Activities will consist of mapping, volunteer training to conduct pepperweed pulling, and chemical treatment (ongoing).
- Upper North Shore RC will develop a management plan to reduce the impacts of crab population may include a human consumption marketing strategy to sustainably reduce populations level into the future (new).

*Partners:* BU, MassAudubon, Parker River NWR, MA-NH-ME Invasives Group, property owners, municipalities, WAA, USFWS, local nonprofits, NE Mosquito Control District, SCA, Great Marsh Revitalization Task Force, DMF

*Deliverables and Milestones:* documentation of beetle releases and success of control in release locations in the Lower North Shore (Q3), map of *Phragmites* remaining on the high marsh platform in the Great Marsh (Q4), report on contractors' treatment activities and results (Q2), documentation of volunteer efforts (Q3), maps of treated sites in all regions (Q4), reports on green crab-related monitoring efforts (Q2), draft green crab management/marketing plan (Q4),

*Long-term Outcomes:* Improved habitat value

*CCMP Goals:* MassBays provides key information about trends and conditions for research and management in Ipswich Bay, Massachusetts Bay, and Cape Cod Bay; MassBays promotes measurable targets for restoration and protection that reflect unique local conditions and ecosystem capacities.

*CCMP Strategies:* Analyze and present existing data in multiple formats to document baselines and trends; Support valid (QA/QC) data collection and application

*CWA core program:* (6) protecting coastal waters through the National Estuary Program

### **Marine invasive species monitoring**

*Objective:* maintain state-wide database (MIMIC) of introduced species; support triennial Rapid Assessment Survey of New England waters.

*Description:* Working with citizen monitoring groups, North Shore and South Shore RCs will monitor multiple established field sites for non-native species. Data are provided to CZM program for inclusion in online coastal maps and region-wide reporting.

*Partners:* CZM, MIT Sea Grant, Gulf of Maine Research Institute, Mass Audubon, volunteers  
*Deliverables and Milestones:* Photo documentation of monitoring (Q2); data submitted to CZM MIMIC coordinator (Q2); Rapid Assessment field dates (Q4)

*Long-term Outcomes:* Increased understanding of the transport, population dynamics, and impacts of invasive species, early detection of newly arriving invasive species.

*CCMP Goal:* MassBays provides key information about trends and conditions for research and management in Ipswich Bay, Massachusetts Bay, and Cape Cod Bay.

*CCMP Strategies:* Provide education, training, and technical support; share case studies (successful and not); and support collaboration and cooperation on specific topics;

*CWA core program:* (6) protecting coastal waters through the National Estuary Program

## Acronyms and Abbreviations

ANEP	Association of National Estuary Programs
APCC	Association to Preserve Cape Cod
BHEN	Boston Harbor Ecosystem Network (formerly Boston Harbor Habitat Coalition)
BU	Boston University
CCC	Cape Cod Commission
CCCD	Cape Cod Conservation District
CCMP	Comprehensive Conservation and Management Plan
CCS	Center for Coastal Studies
CRC	Barnstable County (Cape Cod) Coastal Resources Commission
CRE	Climate Ready Estuaries Program, EPA
CWA	Federal Clean Water Act
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
EDA	Estuary Delineation and Assessment
EPA	Environmental Protection Agency
FTE	Full-time Equivalent
GOMC	Gulf of Maine Council
IRWA	Ipswich River Watershed Association
ISA	Interagency Service Agreement
LGC	Local Governance Committee
LID	Low Impact Development
MassAudubon	Massachusetts Audubon Society
MassBays	Massachusetts Bays National Estuary Program
MassDOT	MA Department of Transportation
MBL	Marine Biological Laboratory
MEMA	Massachusetts Emergency Management Agency
MET	Massachusetts Environmental Trust
MIT	Massachusetts Institute of Technology
MS4	Municipal Separate Storm Sewer Systems
MVPC	Merrimack Valley Planning Council
MWRA	Massachusetts Water Resources Authority
NCCA	National Coastal Condition Assessment
NEOSEC	New England Ocean Science Education Collaborative
NEP	National Estuary Program
NERACOOS	Northeast Regional Association for Coastal and Ocean Observing Systems
NFWF	National Fish and Wildlife Foundation
NMFS	NOAA National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NRCS	Natural Resources Conservation Service
NSRWA	North and South Rivers Watershed Association

*Acronyms and Abbreviations, continued*

NU	Northeastern University
NUMSC	Northeastern University Marine Science Center
NWF	National Wildlife Federation
NWR	National Wildlife Refuge
ORD	Office of Research and Development, EPA
PE	Program Evaluation
PIE-LTER	Plum Island Estuary Long-Term Ecological Research
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RC	Regional Coordinator
RPA	Regional Planning Agency
RSP	Regional Service Provider
SCA	Student Conservation Association
SLR	Sea Level Rise
SSCW	Salem Sound Coast Watch
SSU	Salem State University
SWIM	Safer Waters in Massachusetts
TNC	The Nature Conservancy
UNH	University of New Hampshire
USACE	United States Army Corps of Engineers
USFWS	United States Fish and Wildlife Service
USGS	United State Geological Survey
WAA	Watershed Action Alliance
WBNERR	Waquoit Bay National Estuarine Research Reserve
WHOI	Woods Hole Oceanographic Institution

**Table 1. CCMP-FFY17 Workplan Alignment**

<b>Goals</b>	<b>Outcome</b>	<b>Strategies</b>	<b>Planned Actions (2017-2018)</b>
<p><i>Organizational: MassBays will be a primary source for information about trends and conditions in Ipswich Bay, Massachusetts Bay, and Cape Cod Bay.</i></p> <p><i>Programmatic: MassBays provides new resources for research and management in the Bays.</i></p>	<p><i>Habitat conditions described via targeted communications strategy, including State of the Bays reporting</i></p>	<p><i>Make new data available, especially to address specific gaps in knowledge</i></p>	<p>Monitoring Framework (p.5); Healthy Estuaries Grant Program (p.6); Target species and habitat research and monitoring (p.7); Support for citizen monitoring efforts (p.8); Water quality monitoring and remediation (p.11); Coastal acidification monitoring (p.14); Climate change resilience in MassBays salt marshes (p.14)</p>
		<p><i>Analyze and present existing data in multiple formats to document baselines and trends</i></p>	<p>Monitoring Framework (p.5); Climate change resilience in MassBays salt marshes (p.14); Invasive species mapping, treatment, and control (p.17)</p>
		<p><i>Support valid (QA/QC) data collection and application</i></p>	<p>Monitoring Framework (p.5); Target species and habitat research and monitoring (p.7); Support for citizen monitoring efforts (p.8); Water quality monitoring and remediation (p.11); Invasive species mapping, treatment, and control (p.17)</p>
<p><i>Organizational: MassBays will be an important influence on local decisionmaking that recognizes the roles, functions, and values of healthy habitats in the Bays.</i></p> <p><i>Programmatic: MassBays reaches all planning-area municipalities with actionable information about coastal habitats.</i></p>	<p><i>A majority of MassBays municipalities implement habitat protection and restoration practices.</i></p>	<p><i>Support and conduct research regarding ecosystem functions to inform state policy and local action</i></p>	<p>Healthy Estuaries Grant Program (p.6); Stormwater and wastewater mitigation to support temporal and spatial expansion of estuarine habitat (p.10); Support restoration of streamflow and tidal flushing (p.12); Coastal acidification monitoring (p.14); Climate change resilience in MassBays salt marshes (p.14)</p>
		<p><i>Revise and disseminate existing and new education and outreach materials, providing context and integrating multiple sources as needed</i></p>	<p>Communications, Education &amp; Outreach (p.4); Stormwater and wastewater management technical support, education, and outreach (p.9); Promote science-based wastewater management on Cape Cod (p.12); Municipal coastal resiliency/living shorelines (p.15)</p>
		<p><i>Provide education, training, and technical support; share case studies (successful and not); and support collaboration and cooperation on specific topics</i></p>	<p>Communications, Education &amp; Outreach (p.4); Support for citizen monitoring efforts (p.8); Stormwater and wastewater management technical support, education, and outreach (p.9); Promote science-based wastewater management on Cape Cod (p.12); Support restoration of streamflow and tidal flushing (p.12); Municipal coastal resiliency/living shorelines (p.15); Marine invasive species monitoring (p.18)</p>
<p><i>Organizational: MassBays will be a model program for management and planning that addresses diversity among estuaries.</i></p> <p><i>Programmatic: 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 toward target conditions.</i></p>	<p><i>Measurable progress toward target conditions across the MassBays planning area</i></p>	<p><i>Develop and implement methodology for comparison across embayments</i></p>	<p>Resource Assessment and Restoration Tool (p.3)</p>
		<p><i>Establish target (improved) conditions for each embayment type</i></p>	<p>Resource Assessment and Restoration Tool (p.29)</p>
		<p><i>Guide local action to increase habitat and improve water quality according to targets</i></p>	<p>Stormwater and wastewater mitigation to support temporal and spatial expansion of estuarine habitat (p.37)</p>