

# A Blueprint for the Bays

*Comprehensive Conservation and Management Plan  
2023 – 2033*

**Attachments** (subject to updates 2023-2024)



**Massachusetts Bays**  
NATIONAL ESTUARY PARTNERSHIP

March, 2023

## Attachment 1

### A Fiscal Plan for MassBays National Estuary Program

#### *Report of the MassBays Finance Subcommittee, October 2018*

**Subcommittee Members:** Colin Van Dyke (Chair), Mark Fine, Andrew Gotlieb, Margherita Pryor, Kristin Uiterwyk, Samantha Woods

**Charge:**

At the January 10, 2018 MassBays Management Committee meeting, the Management Committee charged the ad hoc Finance Subcommittee with responsibility for carrying out the following:

1. Prepare a draft Fiscal Plan for discussion at the October 2018 Management Committee meeting that specifically addresses options and opportunities for diversified funding, including (1) potential partnership with Restore America's Estuaries, (2) strategies for securing directed state funding, and (3) establishing a affiliated fundraising non-profit. Supporting materials for Finance Subcommittee use include:
  - a. EPA Guidance for NEPs regarding components of a fiscal plan.
  - b. A 2014 draft Financial Approach prepared by MassBays' Executive Director (Attachment A).
  - c. Fiscal plans approved by EPA Region 1 and Headquarters for other NEPs.
  - d. Input from MassBays' EPA Region 1 Coordinator (garnered via calls and meetings).
2. Advise MassBays' Executive Director in responding to comments from the Management Committee (and others as needed) regarding MassBays' Fiscal Plan.
3. Review and approve a final Fiscal Plan to be submitted as an Appendix to MassBays' Comprehensive Conservation and Management Plan by October 2019.

**Principles:**

1. While the CCMP has been designed to allow for its implementation relying solely on §320 funds; its impact will be greater with additional resources: financial and in-kind support to MassBays directly, or indirectly through MassBays' existing and potential partners.
  - a. Example: MassBays has secured funding to support collaborative projects with DMF. In those cases, DMF provides state-funded services and in-kind match for those projects.
2. We must be careful to avoid cannibalizing existing sources of support. (MassBays v. RSPs and MassBays v. other agencies)
3. Further consideration must be given to obtaining increased financial support from the Commonwealth.

**Process:**

The Subcommittee met via two conference calls and two in-person meetings and provided regular updates to the Management Committee. The Subcommittee reviewed the following, described in more detail in the following sections:

- Funding history
- Federal funding predictability/reliability
- Expenditures history
- Funding options

- Direct funding versus leveraged resources
- Addressing constraints on funding diversification
- Recommendations

### Funding History

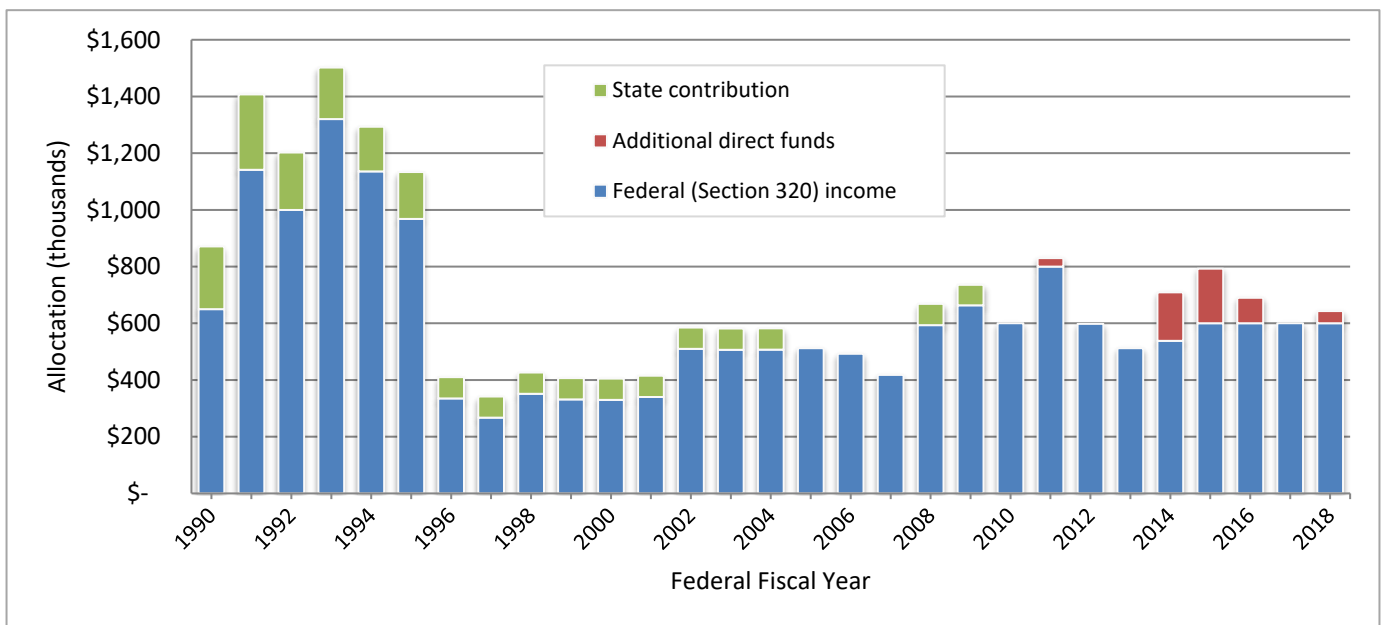
The Massachusetts Bays Program (now the Massachusetts Bays National Estuary Program) was launched in 1988 with \$2 million in fees resulting from a lawsuit brought against the state regarding polluted discharges to Boston Harbor. According to the settlement, these funds were to be used “to coordinate and fund projects dedicated to the restoration, protection, and environmental education for Boston Harbor and the Massachusetts Bay.” Subsequent legislation (MGL ch. 236, §7 [1988]) directed the \$2 million to be spent on:

projects to restore, protect, and improve the quality of Boston and Lynn harbors and Massachusetts, Buzzards and Cape Cod Bays, to increase understanding of the Bays and their resources and the effect of human activities upon them, and to encourage public involvement in activities which promote the harbors and Bays as living resources and public treasures for present and future citizens of the commonwealth of Massachusetts.

With these funds in hand, the Program led a major scientific research initiative to determine specific pollution problems in Boston Harbor. From 1988 to 1992, MassBays distributed \$1.6 million to researchers characterizing the major physical and biological features of Boston Harbor and Cape Cod Bay.

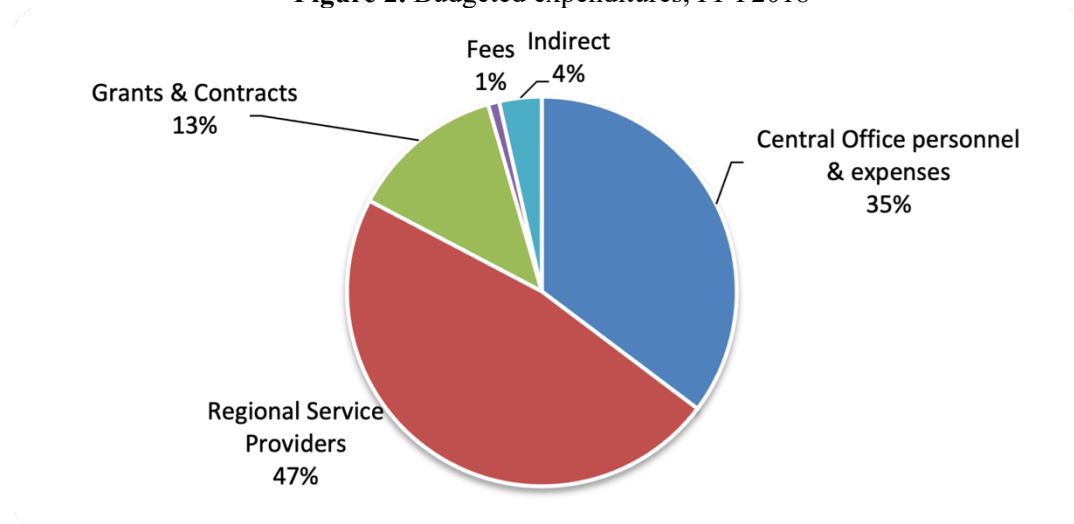
Meanwhile, MassBays applied for and received designation as a National Estuary Program in 1990. As an NEP, MassBays is eligible for funding from EPA under CWA §320. That funding has been relatively consistent since 1990. This is in contrast to state investments, which decreased over time until Federal Fiscal Year 2009 *et seq.*, when no funding was allocated to MassBays in the state budget (Figure 1).

**Figure 1.** Funding allocations to MassBays, Federal Fiscal Year (FFY) 1990-2018



MassBays' FFY2018 Workplan allocated \$643,000 income from EPA in the proportions illustrated in Figure 2 and as described below. This relative spending distribution has remained stable since 2013.

**Figure 2.** Budgeted expenditures, FFY2018



***Salaries and Fringe***

MassBays currently employs a full-time Executive Director and part-time (0.6FTE) Staff Scientist. In 2014, MassBays reallocated funding from Central Staff (a part-time [0.8FTE] outreach coordinator/Metro Boston RC) to fund a fifth RSP for the Metro Boston Region.

***Regional Service Providers***

Yearly grants to Regional Service Providers have varied from a high of \$68,207 each in FFY2006 (\$54,000 EPA funds, \$14,207 state funds) to a low of \$59,7500 each in FFY2010; RSPs have each received \$61,000/y since 2013.

***Grants & Contracts***

MassBays established a Research and Planning Grant program in 2011. The Management Committee formed a working group to evaluate the program and relaunched it as the Healthy Estuaries Grant Program in 2016. Between 2013 and 2018, disbursement of funds to municipalities, ngos, and other state agencies (note that state agencies are not eligible for the Healthy Estuaries Grant) totalled \$440,150.

***Fees/Shared agency expenses***

MassBays' annual budget provides up to one percent of the total §320 grant amount to CZM to offset costs of services including program-level fiscal management, computers and phones, day-to-day printing capacity, and internet access. Between 2013 and 2018, MassBays allocated a total of \$30,000 to cover these services, which are separate from those included in indirect charges described below.

***Indirect Charges***

Indirect charges allocate monies directly to the Commonwealth, to support state-level administrative and overhead costs. Each year the Executive Office of Environmental Affairs and the Department of Commerce/NOAA negotiate a rate for indirect charges (applied to salary and contractual line items). Expenses included in calculating yearly rate are partial salaries for the Secretary and his executive staff, as well as the Director of Legislative Affairs, Office of Counsel, Finance and Budget Officers, Human Resources, Information Technology, and Communications/Public Affairs (See Figure 3). The rate has

varied from 11.15% (FFY2018) to 36.27% (FFY2017) with an average of 18.01%. Between 2013 and 2018, EPA has contributed a total of \$139,966 to support positions similar to those listed in Figure 3.

**Funding options**

In 1994, MassBays commissioned a survey of possible means to finance implementation of the first CCMP.<sup>1</sup> The resulting report, *Financing the Massachusetts Bays Program Comprehensive Conservation and Management Plan*, was divided into three sections: Grants, Revenues, and Financing Mechanisms. While many of the suggested financing options included have been phased out or defunded since 1994, relevant suggestions are listed below.

**Federal Grants**

- EPA funding via DEP, e.g. funding under CWA §604(b) (mitigating nonpoint sources) and §319 (stormwater treatment and management). MassBays’ RCs work closely with municipalities to bring those funds to MassBays’ planning area. In Federal Fiscal Year 2017, for example, RCs reported on the following assistance to municipalities:

DEP 604b Water Quality grant, MS4 Municipal Assistance Grant ( <a href="https://www.mass.gov/service-details/grants-financial-assistance-watersheds-water-quality">https://www.mass.gov/service-details/grants-financial-assistance-watersheds-water-quality</a> )	Cape Cod: Cape Cod Commission (\$50,000)
DEP 319 grant program ( <a href="https://www.mass.gov/service-details/grants-financial-assistance-watersheds-water-quality">https://www.mass.gov/service-details/grants-financial-assistance-watersheds-water-quality</a> )	Cape Cod: Brewster (\$105,000) (Cape Cod)

- Federal grant programs like EPA’s environmental education grant program. MassBays Central Staff has applied for and secured funding from NOAA, though that agency is not mentioned in the 1994 document. Availability of funds for these programs is decreasing, however.

**State Grants**

- Environmental bonds. In 2018 MassBays’ Management Committee worked with the legislature to include \$660,000 per year as match to EPA’s §320 grant allocation. The bill was signed by the Governor, so the funds are authorized but not yet allocated. Any future advances will require advocacy by MassBays’ supporters.
- Municipal incentive grants; parks and watershed improvement grants. A contemporary equivalent to the Municipal Incentive Grants Program is the Municipal Vulnerability Program Grants, which have been targeted successfully by the RCs and municipal partners. During the 2017 and 2018 funding cycles, RCs assisted municipalities to secure more than \$1.5 million in state funds for projects aligned with the CCMP through the following programs:

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<sup>1</sup> Northbridge Environmental Management Consultants and the Massachusetts Bays Program Staff, *Financing the Massachusetts Bays Program Comprehensive Conservation and Management Plan: Federal, State, and Local Funding Sources and Mechanisms*, December 1994.

State Coastal Resiliency Grant Program ( <a href="https://www.mass.gov/service-details/coastal-resilience-grant-program">https://www.mass.gov/service-details/coastal-resilience-grant-program</a> )	Upper North Shore: Newbury (\$225,840), Essex (\$75,000), and Newburyport (\$122,695)
Coastal Pollutant Remediation Grant Program ( <a href="https://www.mass.gov/service-details/coastal-pollutant-remediation-cpr-grant-program">https://www.mass.gov/service-details/coastal-pollutant-remediation-cpr-grant-program</a> )	South Shore: Kingston (\$161,288) and Plymouth (\$175,000)
Massachusetts Municipal Vulnerability Preparedness (MVP) grant program ( <a href="https://www.mass.gov/municipal-vulnerability-preparedness-mvp-program">https://www.mass.gov/municipal-vulnerability-preparedness-mvp-program</a> )	Upper North Shore: Newbury, Ipswich, and Essex (\$60,000); Gloucester (\$107,044) Lower North Shore: Peabody (\$224,216), Peabody (\$243,400), Salem (\$345,000), and Manchester-by-the-Sea (\$88,180)
Cape Cod Commission District Local Technical Assistance (DLTA) grant ( <a href="http://www.capecodcommission.org/index.php?id=50">http://www.capecodcommission.org/index.php?id=50</a> )	Cape Cod: Wellfleet (\$20,000)
Massachusetts Environmental Trust ( <a href="https://www.mass.gov/orgs/massachusetts-environmental-trust">https://www.mass.gov/orgs/massachusetts-environmental-trust</a> )	Lower North Shore: Manchester-by-the-Sea (\$41,885)

**Private Funding**

- Foundation grants. Few private foundations will support government agencies.
- Corporate funds. Government agencies are not allowed under ethics laws to solicit corporate funds.

As is the case for many of the funding options included in this section, while MassBays has little direct access to private funding, our partners do have access and already take advantage of these resources. MassBays’ past efforts to establish an associated nonprofit “Friends” group as a means for accessing these types of funds for CCMP implementation was not successful for multiple reasons, including the crowded field of environmental nonprofits in Massachusetts.

In relation to this source of funding, the Subcommittee discussed Tampa Bay NEP’s partnership with Restore America’s Estuaries, a national nonprofit with a mission similar to the NEPs’. RAE solicits and distributes private funds for CCMP implementation in cooperation with the NEP. The funds do not flow directly to the NEP, but instead can be considered match in some cases, or at least leverage (see next section).

**Revenues**

- Taxes and fees. MassBays is not in position to propose these types of revenue streams, which require legislative action. Where our partnering agencies (e.g. DMF, DER, and DEP) already are supported by user fees and in-lieu-fees, MassBays can encourage spending to meet the CCMP’s goals. Two specific proposals in the 1994 document are a real estate transfer tax and mooring fees.

- Fines. EPA’s Supplemental Environmental Project program, through which monetary penalties are directed toward on-the-ground work, has become less and less accessible over the course of the past 20 years. For the most part, SEPs tend to be “surprises,” brought to the table by legal counsel rather than program staff.
- Corporate donations. Government entities are not allowed to accept corporate donations, though they can partner with business to achieve goals. MassBays has benefitted from a partnership with SeaTrac, for example, receiving free time on their new autonomous monitoring vehicle. Note that MassBays did not directly solicit this contribution (which could be a violation of ethics laws), but rather applied for the in-kind services via a competitive grant.
- Partnerships with academia. MassBays has applied for Federal grant monies with academic partners. College- and graduate-level interns (both paid and unpaid) have produced valuable products for MassBays. These benefits do not fall under the category of “revenues,” but instead can be in-kind match to the §320 funds.

### ***Financing Mechanisms***

- Special betterment or utility districts. Massachusetts’ process for establishing special districts across towns is complex and requires several steps for approval. Cape Cod (Barnstable County) has been successful in applying as a special district to generate revenues for land protection (through a real-estate transfer fee, the model for the state-wide Community Preservation Act enabling legislation) and most recently (pending legislative passage), habitat restoration (through a tax on local home rentals). MassBays has promoted stormwater utility districts in individual towns and regionally as a means to generate funds for stormwater management and infrastructure.
- Enterprise funds. Enterprise funds hold monies that are collected and spent separately from the general budget. The 1994 report provides Marblehead’s Harbor and Water Fund as a case study. Revenues include boat excise taxes and mooring fees, dockside storage fees, and space rental at the yacht club; expenditures include boat pump-out facilities, and dock operations and maintenance.
- Bonds and loans. The primary example of this type of financing is the State Revolving Loan Fund Program established under the CWA and administered by the states. Massachusetts’ Clean Water and Wastewater SRFs regularly receive requests for funding that outstrip available funds, due to the age of Massachusetts’ water infrastructure, and the extent of the need among the Commonwealth’s 351 cities and towns. Any loan application requires a dedicated source of funding for repayment, a significant hurdle for MassBays. These types of financing mechanisms are better left to the municipalities.

### ***Direct State Funding***

The Finance Subcommittee noted that the 1994 report did not address the significant role that could be played by the Commonwealth itself. MassBays, especially through its regional service model, provides consistent technical assistance to municipalities (including support in securing funding as detailed above under Federal Grants and State Grants, on a variety of issues, from stormwater management, to coastal habitat protection and restoration, to community education and outreach on coastal issues, and to goal-setting for local habitats and water quality. For example, MassBays reached 45 of the 50 communities in the MassBays region with training about stormwater management in 2015, and in 2016 we collaborated with MassDEP and MassDOT to provide 40 municipalities with grantwriting training.

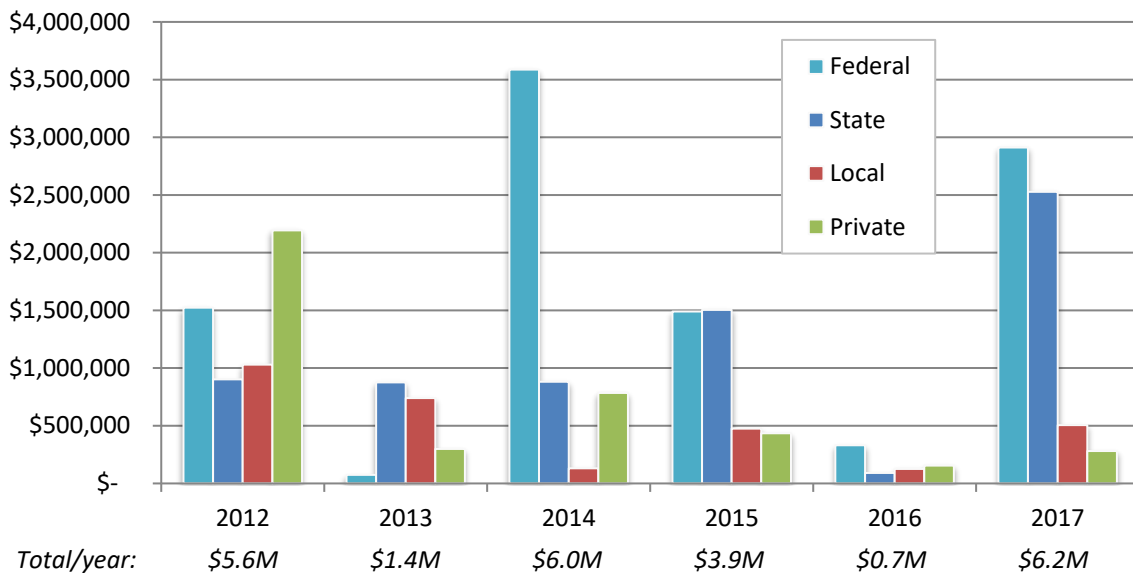
The Subcommittee asserts that Commonwealth operating and capital funds should be directed to MassBays in recognition of the role the NEP plays in providing local services. Such funds should be provided to fulfill the §320 match requirement of 1:1 funding from the NEP. Setting the stage for this investment, the Finance Subcommittee advocated for, and secured, a \$660,000 per year line item in the 2018 Environmental Bond Bill. The Finance Subcommittee asserts that Management Committee and Regional Service Provider representatives should advocate for the annual release of the designated funds. Such funds should be programmed with input from the Executive Director.

### Direct funding versus leverage

MassBays' Executive Director has suggested (see Attachment B) that MassBays' finance plan should not be focused entirely on securing monies to be brought in-house and redistributed. It should also establish means for tracking and reporting on outcomes gained through the significant leveraged resources MassBays gains to support CCMP implementation.

Each year, MassBays provides a tally of federal and state funds leveraged with §320 funds to EPA through the NEPORT system. Funds and in-kind resources move the region toward meeting the CCMP goals when RCs and staff work with municipalities to secure grant funding, recruiting volunteers to conduct monitoring and restoration, and work with state and federal agencies to prompt spending. Figure 4 illustrates leverage reported by MassBays from 2012-2017 where staff had a primary (leading), significant (active), or supporting (minor) role.

**Figure 4. Sources of Leverage, 2012-2017**





## **Recommendations**

[Note: The following recommendations should be articulated in the form of targets and measures, with level of effort associated with each.]

1. MassBays should have as a primary objective maintaining eligibility for §320 funding as a National Estuary Program.
2. MassBays should participate in efforts to ensure continued provisions for §320 funds in congressional budgets, especially through the Association of National Estuary Programs (ANEP). ANEP routinely generates letters of support from Members of Congress for continued funding of NEP, and though they are likely supportive, not all Massachusetts coastal Representatives or even both Senators have signed those letters. MassBays staff should provide information to both the Federal and State legislature regarding programming and funding needs; Massachusetts' DC lobbyist should be aware of NEP funding needs in Federal budget discussions. The Management Committee should also participate in this education and outreach effort to legislators.
3. MassBays should include "wish lists," or descriptions of what could be accomplished with additional funds, as a section in its annual workplan.
4. The Management Committee should advocate for operating and capital funds to support MassBays' work and to meet the required 1:1 match for §320 funds. MassBays should be included in the Green Budget proposal developed annually by a consortium of environmental nonprofits.
5. MassBays' matching funds should include in-kind support from agency partners like DMF, DEP, and DER (where those efforts are not already funded by Federal dollars).
6. MassBays should identify and quantify the benefits provided to local communities and the Commonwealth as a whole through technical support and local assistance efforts.
7. MassBays should continue to explore opportunities for partnerships that bring private funds to projects that advance its goals.
8. MassBays Regional Service Providers should explore potential local funding streams, like Community Preservation Act funds, mooring fees, and utility districts.
9. MassBays' EPA Region 1 Program Coordinator should bring NE NEPs' CCMPs to the table when negotiations about specific SEPs are underway.
10. MassBays should discuss with CZM and EEA the potential for and feasibility of corporate partnerships, emphasizing the need to make the partnerships mutually beneficial through press coverage, etc..
11. Education and outreach by MassBays should ensure that municipalities apply SRF loan monies to advance the CCMP goals.
12. EPA Region 1 and Headquarters should acknowledge the funding constraints on NEPs hosted by government agencies, and recognize leveraged resources as valid option for diversifying the sources of funding for CCMP implementation. MassBays should continue to document state and federal funds leveraged with EPA's §320 investment, even if EPA discontinues this reporting requirement.
13. While the CCMP is designed to be implemented based solely on EPA funding, the Management Committee should assist staff in maximizing the impact of the CCMP across the planning area. This requires maximizing MassBays' ability to secure additional project funds. In the course of discussions, the Subcommittee identified tasks and projects that are more easily described and more likely to be funded as stand-alone efforts. Several aspects of MassBays' cutting-edge effort to set out targets for individual embayments would be good candidates for proposals, for example, as well as the capacity-building efforts planned for the Citizen Monitoring Coordinators' Network.
14. The task of identifying additional funding and resources is challenging regardless of how MassBays is organized; its position in a state government agency creates additional constraints. The Management Committee should address constraints on diversification of funding, evaluate the extent to which those constraints are offset by the benefits by its position in a state government agency, and identify alternatives that would eliminate or mitigate those constraints without losing the benefits.

## **Attachment A** ***Toward a MassBays Finance Plan***

*Prepared 2014 by Pam DiBona for consideration by the Management Committee*

### **Finance Plan Requirement**

EPA, in its 2012 Program Evaluation Letter dated November 28 2012, directed MassBays, as a condition of meeting the Financial Element of the next evaluation (scheduled for 2017), to

“...have in place a Finance Plan or business plan that identifies new and diverse sources of funding. The plan could also include a call for Management Committee members and other partners to assist more than they do now in garnering other sources of funds or in-kind support...”

In addition, EPA’s 2016 Guidance for preparation of Comprehensive Conservation and Management Plans calls for a:

Finance strategy that will establish long-term financial sustainability to implement the CCMP through diverse resources and partners. The strategy can be a separate document or chapter or action in the CCMP. The strategy should discuss: a) priorities for funding; b) current funding and other support such as staff assignments, or in-kind partnering; c) short- and long-term resource needs; and d) proposed actions or strategies to maintain or garner new resources for CCMP implementation and their timeframe.

EPA Headquarters hosted a panel discussion about finance options at the annual gathering of NEPs in February 2013. All invited panelists represented NEPs that are stand-alone nonprofit entities; they shared suggestions for hosting fundraising events and silent auctions, collecting dues from Management Committee member organizations, establishing fees for service, and holding recreational events that require entry fees. Unfortunately, this session was less useful to those NEPs hosted by government agencies and universities, entities prohibited or otherwise restricted from taking advantage of these fundraising methods.

Following that meeting, MassBays and its sister programs have sought to provide EPA staff with insights into the varied financial structures encompassed by the NEPs. In preparation for the 2014 annual meeting, for example, I conducted a survey of NEPs to document fundraising potential among the programs, based on their structure. During the meeting, we shared the results of the survey (see figure attached) and hosted breakout conversations based on organizational sector to share commonalities and best practices (unfortunately EPA staff did not participate in the breakouts!). The bottom line: the potential fundraising capacity of NEPs is not equal across sectors, and so a one-size-fits-all fiscal plan will not serve all purposes.

This document examines how our current and future program funding can meet the spirit of EPA’s 2012 Program Evaluation letter and CCMP requirements in light of our own funding situation, and identify opportunities for project-based funding to address our CCMP goals.

### **Introduction and overview**

#### ***Objectives***

1. Hire one additional Central Staff person responsible for Outreach and Communications
2. Establish and maintain funding for monitoring data collection and analysis
3. Increase funding for Regional Service Providers
4. Increase funding for Healthy Estuaries Grant Program
5. Increase MassBays’ reported leveraged resources

### ***Steps toward meeting our objectives***

1. Strengthen and expand the scope of existing partnerships
2. Form new, larger-scale collaborations to support fundraising (including §320 allocations)
3. Carry out consistent and creative grantwriting

### **MassBays Finance Plan Objectives**

#### ***1. Hire one additional Central Staff person responsible for Outreach and Communications***

A primary function of MassBays, and a central goal of our CCMP, is to conduct outreach and share findings with decisionmakers at the state and local level. Our Regional Service Providers are excellent ambassadors to local governments and community groups, and we do not need to duplicate their efforts. Their work should be supported from the Boston office, however, with common messaging and materials. Our current staffing is not adequate to assist the RSPs in this way, nor do we have the capacity to carry results of MassBays-funded research efforts to state decisionmakers, or to share accomplishments and opportunities with the larger community. The recently launched monitoring network will require ongoing and increasing “care and feeding” as we secure funding (see below) to build regional capacity.

#### ***2. Establish and maintain funding for monitoring data collection and analysis***

The Clean Water Act directs NEPs to periodically document environmental trends and conditions. For MassBays, covering three bays and 47 sub-embayments along 1100 miles of Massachusetts coastline, this represents a massive undertaking that is beyond our reach. We have traditionally relied on sister government agencies to provide us with information about water quality, habitat condition, and species status. Government-led monitoring programs, however, are focused on regulatory need, and over time have encompassed a narrower set of parameters and geographic range, so MassBays has turned to citizen monitoring carried out by community-based environmental organizations. These groups have, by default, become the primary source of current water quality and pathogen data for most of our region. In addition to meeting the State-of-the-Bays reporting requirements of our funding, we seek to bring volunteer-generated data—which in many cases have been inaccessible to decisionmakers—to bear on policy and management decisions.

It is not sustainable, nor will we receive robust data sets, if we simply acquire others’ data sets and walk away. We must provide direct and in-kind support to these partners to ensure ongoing and reliable monitoring. When MassBays solicited input via the Citizen Monitoring Coordinators’ Summit, organizational needs ranged from tools for data management, to grantwriting to fund equipment and lab services, to assistance with statistical data analysis. In response, we have established a new MassBays Monitoring Network to meet these needs and support long-term monitoring in coastal watersheds.

#### ***3. Increase funding for Regional Service Providers***

The diversity of our NEP makes planning difficult, but it also represents opportunities. We have a ready-made testing ground for new approaches to habitat protection and restoration, with urban, suburban, and rural watershed land use; sandy, rocky, and marshy near-shore habitats; and a multitude of existing partners, from local nonprofits to academic and research institutions. MassBays can create and identify opportunities for joint grant proposals among the RSPs, and between RSPs and their regional stakeholders, to address priorities identified in the new CCMP. Partners’ programs funded through multi-partner grant proposals could be counted toward our fiscal planning goals, even if MassBays receives no direct funding, if we serve as facilitator of the partnership, and provide in-kind support to the effort.

#### ***4. Increase funding for Healthy Estuaries Grant Program***

MassBays' small-grant program is an important means for supporting local activities aligned with our CCMP to generate environmental improvements in our planning area. Previously called the "Research and Planning Grant Program," these funds have jump-started regional coalitions (e.g., the Herring Network), funded stormwater design and planning (e.g., Kingston's town-wide needs assessment and prioritization), and supported research relevant to state policy (e.g., impacts of docks and piers on salt marshes). In its first year as the Healthy Estuaries Grant Program, the focus was on characterizing local habitats (e.g., herring habitat preference in newly restored river systems) and the relationship of land use on water quality. In future years, the RFR will direct applicants to implement the CCMP, especially characterizing existing conditions, filling gaps in our understanding, and working toward ecosystem targets.

#### ***5. Increase MassBays' reported leveraged resources***

MassBays' Regional Service Providers consistently provide matching funds and in-kind support, and access to leveraged resources, for an average from 2003 to 2015 of \$9 for every \$1 granted by EPA. This is half of than the national average for NEP leveraging success. While this disparity is likely due to several factors, MassBays could increase this average – first by documenting leverage fostered through our Healthy Estuaries Grant, and in the future by catalyzing even more investment into meeting our CCMP goals. Obtaining formal commitments to implementing CCMP actions from partners would formalize leveraging.

Attachment 2

# Massachusetts Bays National Estuary Program Strategic Communications Plan

Cyndi Roy Gonzalez

PACER STRATEGIES, LLC [Company address]

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## **INTRODUCTION**

The Massachusetts Bays National Estuary Program's Strategic Communications Plan is designed to broaden awareness of MassBays' program, work and accomplishments and is intended to help implement its Comprehensive Conservation and Management Plan (CCMP). When successfully executed, this communications plan will help grow MassBays' audience and partnerships and help achieve its underlying mission to protect, restore and enhance the estuarine resources of Ipswich Bay, Massachusetts Bay and Cape Cod Bay.

This communications plan also responds to many of the findings and recommendations made by the U.S. Environmental Protection Agency in its 2017 Program Evaluation (PE). The EPA identified a number of areas for improvement in MassBays outreach and public involvement plans and program recognition.

This communications plan will allow the Management Committee to successfully address EPA's PE findings and help ensure that MassBays remains eligible for future funding authorized by the Clean Water Act.

The CCMP is an 8 to 10-year roadmap for achieving the organizational and programmatic goals identified by the Management Committee. Key to reaching those goals over time will be the continued engagement and support of a wide and diverse group of stakeholders. This communications plan identifies those stakeholders, the unique messages we believe will move them to action, the tools to deliver those messages and metrics for determining success.

## **COMMUNICATION PLAN GOALS AND OBJECTIVES**

The overall goals of the communications plan are to:

1. Broaden awareness of MassBays and its programs
2. Highlight scientific research, monitoring and management needs across the planning area.
3. Invite current and new partners to participate actively in implementing the CCMP

These goals will help MassBays achieve the organizational goals laid out in the CCMP:

- Position MassBays as a primary source for information about the conditions and trends in Ipswich Bay, Massachusetts Bay and Cape Cod Bay
- Increase the level of influence MassBays has on local decision making that recognizes the roles, functions and values of healthy habitats in the Bays

- Make MassBays a model program for management and planning that addresses diversity among estuaries

## **SITUATIONAL ANALYSIS**

MassBays staff has made great progress over the last few years in raising awareness of the organization and bringing clarity and cohesiveness to its vision, mission and branding. A new logo has given the organization a clear public identity and the mission and vision give the organization a succinct way to explain its work.

MassBays has also developed partnerships with organizations who are similarly concerned with protecting our waters and our environment and have worked creatively together to raise awareness of critical issues like the localized impacts of sea level rise, while at the same strengthening MassBays' identity and influence.

For example, MassBays participated in 2014 and 2015 in a Gulf of Maine-wide photo contest documenting the localized impacts of King Tides. When notified that the effort had not been funded in 2016, MassBays took the lead on creating a Massachusetts-specific partnership to raise awareness of the impact of the King Tide on local Massachusetts communities. The 2016 King Tide photos were uploaded by partners and citizens to Massachusetts Office of Coastal Zone Management's MyCoast website using a free smartphone MyCoast app, resulting in MassBays' name and mission being shared with citizens throughout the region and more than 200 photos shared each year.

MassBays has also been successful in increasing its visibility through the co-sponsorship of regional conferences with its Regional Coordinators. Each MassBays Regional Coordinator worked closely with partners to plan and implement conferences for stakeholders, on topics relevant to MassBays' goals and intended outcomes.

Conferences have included the *Annual Great Marsh Sea Level Rise Symposium*, which educates and informs the Great Marsh community on the local threat from sea level rise and potential mitigation; the *25<sup>th</sup> Anniversary Symposium: Finding Solutions to Our Coastal Challenges*, exploring local impacts and responses to climate change in the Lower North Shore region; *North Shore Resiliency Workshop* regarding tools and methods for engaging communities in successful coastal resiliency planning and implementation; *Colleague Tour and Reception* in the Metro Boston region to explore opportunities for partnerships and collaboration; the Cape Cod Coastal Conference and The Future of Water in Southeastern Massachusetts Conference among others.

While MassBays continues to make progress through these methods and others in raising awareness of its brand to a larger audience, there other elements of MassBays' organizational structure that make it challenging to deliver a cohesive message and share timely and important information and successes with key stakeholders.



As noted in the EPA's 2017 Program Evaluation, the current organizational structure, whereby MassBays is hosted by the Massachusetts Office of Coastal Zone Management, has created real and perceived challenges to MassBays' autonomy and its effectiveness. Press materials, social media and other key communications tools must be approved by CZM, the Executive Office of Energy and Environmental Affairs and the Governor's Office. This multi-layered approval process slows MassBays' ability to share important information and to receive the credit it needs to continue to raise its profile with key stakeholders. The state website and social media guidelines, also applied to MassBays, severely limit MassBays' ability to engage stakeholders and the public.

And while MassBays is hosted by CZM, MassBays does not receive any state funding that would allow MassBays to increase its communications capacity. With just one full-time staff and one part-time employee, MassBays does not have the personnel bandwidth to develop or execute on a successful communications strategy. Without a dedicated communications employee, MassBays will continue to struggle to deliver its message, increase its visibility and share its successes.

This plan recognizes those challenges and includes recommendations for remedying them in order for MassBays to reach its communications goals and successfully implement the CCMP.

## TARGET AUDIENCES

Support for the protection, restoration and enhancement of the MassBays area depends heavily on effective communications that are aligned with the concerns and goals of the intended audience. The general public, for example, may be more interested in the recreational opportunities afforded by the MassBays coastal areas, while local governments may be highly focused on the resiliency needs of their communities in the face of increasing evidence of the impacts of climate change. Communication efforts are intended to influence stakeholders and target audiences to support MassBays' objectives, which in turn will allow MassBays to meet the requirements set forth for NEPs within the Clean Water Act. Each target audience has different needs, issues and/or interests which require special messages delivered through various communications channels.

### **Internal Stakeholders/Audiences**

- Management Committee
- Regional Service Providers and Coordinators
- US EPA
- CZM/EEA

### **External Stakeholders**

- Municipal leaders and departments
- State and federal lawmakers and agencies
- Academia/Researchers
- Environmental advocacy organizations & NGOs
- Current and new funders
- General Public
  - Homeowners/renters
  - Developers
  - Recreationalists
  - Visitors/Tourists
  - Water commuters
  - Students
- Business community and industries
  - The Business Community as an Association
  - Aquaculture
  - Development
  - Fisheries
  - Real estate
  - Technology
- Media

## KEY MESSAGES

### Key Branding Message

To achieve the goal of increasing awareness of MassBays, we need a Key Branding Message. An overall Key Branding Message shares with its intended audience(s) who/what MassBays is and the value it provides. The General Value Proposition or Key Branding Message should clearly and concisely answer the question: **Who/What is MassBays?**

With an area encompassing more than 1,000 miles of coastline and 50 distinct communities, MassBays is unique from many of its NEP counterparts. Recognizing the diversity of the MassBays area, MassBays has employed a ground-up organizational model that relies on five regional coordinators and a small Boston-based central office. This model allows MassBays to most effectively achieve its goals for the entire area while still meeting the unique geographic needs of the various regions.

At the same time, the diversity of the regions and the de-centralized work model creates challenges when it comes to effectively branding and communicating what MassBays is and what the organization's value is. Based on conversations with each of the five regional coordinators, articulating the value of MassBays to their individual constituents can prove challenging depending on the audience and the discussion.

We will address some of these challenges in later sections of this plan and recommended ways to successfully address them.

Based on discussions with the MassBays staff, regional coordinators, Management Committee members and EPA Region 1 staff, it is evident that MassBays' chief value-add is as a **convener and collaborator** around issues of coastal habitat protection and restoration. Given its support by both the federal government (as funder) and state government (as host), MassBays is uniquely positioned to reach decision-makers at the highest levels. In addition, the de-centralized, regional organizational model of MassBays allows for more targeted outreach to local decision makers. While there are any number of federal, state and local agencies, non-profits and organizations that work on coastal habitat protection, the mission, model and mandate of MassBays makes it uniquely positioned to bring these various partners together to support and execute on protection and restoration efforts. Through education, data-sharing, grant-making, research and technical assistance, MassBays can be a primary resource for and an important influence on key decision makers.

Thanks to the broad makeup and guidance of the Management Committee, MassBays is also fortunate to have many key individuals and organizations represented as part of its organization. By engaging the Management Committee in implementation of MassBays' CCMP, MassBays stands alone in its ability to help ensure that the relevant and necessary organizations, authorities and decision-makers are working collaboratively to meet the stated goals.

To better reflect its General Value Proposition, as a starting point, Pacer Strategies recommends modest changes to MassBays' organizational name and its mission statement.

**Current Organizational Name:** Massachusetts Bays National Estuary Program

**Proposed Organizational Name:** Massachusetts Bays National Estuary Partnership

**Current Mission Statement:** The Massachusetts Bays National Estuary Program is dedicated to protecting, restoring, and enhancing the estuarine ecosystems of Ipswich Bay, Massachusetts Bay, and Cape Cod Bay. We facilitate partnerships to prompt local, state, and federal action and stewardship, by convening stakeholders on the local and regional level, providing scientific basis for management decisions, and working with decision makers to identify problems and solutions.

**Proposed Mission Statement:** MassBays National Estuary Partnership is dedicated to protecting, restoring, and enhancing Massachusetts coastal habitats. Working collaboratively with local, state and federal agencies and organizations, MassBays provides funding and technical support across 1,000 miles of coastline in 50 communities.

This name and mission statement and accompanying logo should be on nearly every single document, presentation, written or electronic communication and signage that is affiliated with MassBays. This includes information distributed by MassBays Central Office as well as that of the regional partners. All other past mission statements should be removed from materials.

### **Unique Value Proposition Messages**

Once it is clear to the target audience who and what MassBays is, it is important to deliver messaging that answers the second key question: **Why is MassBays important to me?**

For each audience, we need to deliver a uniquely-tailored message – an answer – that responds to their cares and concerns.

As part of its mission, MassBays provides research assistance, technical support and grant-making to partners to fulfill its mission of protecting, enhancing and restoring our coastal resources. To accomplish its work, MassBays has a multitude of stakeholders who share unique perspectives and are driven by different goals and outcomes.

MassBays has both internal and external critical audiences.

### **Key Messages for Internal Audiences**

MassBays' internal audiences include the following:

- The Management Committee

- EPA
- Regional Service Providers and Coordinators
- CZM/EEA

MassBays internal audiences are both the receiver of information as well as MassBays messengers. It is important that the internal stakeholders understand the goals, challenges and successes of the organization.

First and foremost, CZM/EEA, the Management Committee, EPA and regional partners should all know and support the MassBays mission statement. They should understand the General Value Proposition and Key Branding Message.

The regional coordinators are most often associated with their host organizations. While that is important in its own right, it's critical to the awareness-building effort of MassBays that the RCs are seen as part of MassBays. To achieve this goal, it is important that MassBays Central Office regularly shares information with these key audiences that can then in turn be shared with their unique stakeholder groups. RCs should receive regular (weekly, bi-weekly or monthly) updates on happenings from the Central Office, from each other and from other key partners. As a convener and collaborator, MassBays should be seen as the ultimate source of information on efforts related to the CCMP, grant opportunities, best practices and other coastal habitat-related news.

To execute on this goal, the RCs must also regularly share news and information from their regions with the Central Office in a formal, rather than ad-hoc, way so that they may be shared with other key audiences and stakeholders.

The regional service providers and Management Committee, in particular, are the key messengers for MassBays. They should see themselves and their organizations as integral to MassBays mission.

The internal audience (RCs and Management Committee) are unique in that they are both the receiver of MassBays' message as well as the deliverer. The messages below are intended to be the key messages that each of these groups use with their own stakeholders to explain their role with the MassBays organization and the value MassBays provides.

**KEY MESSAGE 1:** MassBays National Estuary Partnership is dedicated to protecting, restoring, and enhancing the Massachusetts coastal habitats. Working collaboratively with local, state and federal agencies and organizations, we provide funding and technical support across 1,000 miles of coastline in 50 communities.

**KEY MESSAGE 2 (For Regional Coordinators):** MassBays supports the work we do on the ground in this region by bringing together interested stakeholders and providing funding, technical support and hands-on assistance. For example: [Each regional service provider should have 3 specific projects they can point to that were made possible through MassBays support]

**KEY MESSAGE 3 (For Management Committee Members):** As a member of the MassBays Management Committee, our organization provides a forum for discussion about the critical issues affecting our coastal habitat. MassBays is dedicated to bringing together environmental and resource management agencies, nonprofit environmental groups, academic institutions, business interests, government agencies and other stakeholders to ensure the most coordinated and comprehensive approach to the protection, restoration and promotion of Massachusetts' coastal habitat.

### **Key Messages for External Audiences**

#### **Municipal Governments**

Successful implementation of the CCMP is predicated on local solutions to environmental challenges. The unique organizational structure of MassBays allows us to offer targeted technical assistance and hands on support to local communities.

In targeting municipal audiences - including municipal Boards of Health, Conservation Commissions, Planning Boards, Boards of Selectman, Public Works departments, Shellfish Constables and other key implementing agencies, MassBays should focus on the local and regional nature of the organization and on the value of the resources it provides – both technical assistance and funding opportunities.

**KEY MESSAGE:** MassBays' mission is to protect, restore and enhance our coastal habitats. We take a regional approach to our work. Supported by the EPA, we are a resource for local communities and provide assistance as municipalities undertake projects with significant environmental impacts. We have dedicated resources in each region of the MassBays planning area to help communities with things like project development, stormwater remediation design, plan review, permitting assistance, technical evaluations, planning, GIS support, and environmental analyses. We also support innovative approaches to coastal habitat protection by providing grant funding to communities each year.

#### **State and Federal Lawmakers**

State and federal policymakers are another key audience for MassBays and the successful implementation of the CCMP. Much like the messaging for municipal partners, state and federal policymakers and agencies should understand the unique value MassBays provides in its mission to protect, restore and enhance coastal habitat. This can help MassBays secure additional support and funding to carry out its mission.

By providing an informal, non-regulatory forum for agencies to share and receive information, MassBays can help government agencies improve their efficiency and make better-informed decisions that consider the environmental impacts of their work.

**KEY MESSAGE:** MassBays' mission is to protect, restore and enhance our coastal habitats. We take a regional approach to our work. We are supported by EPA and provide assistance to communities undertaking projects with significant environmental

impacts. We have dedicated resources in each region of the MassBays planning area to help communities with things like project development, stormwater remediation design, plan review, permitting assistance, technical evaluations, planning, GIS support, and environmental analyses. We also support innovative approaches to coastal habitat protection by providing grant funding to communities each year.

### **Academia/Researchers**

Given the many partners and stakeholders around the MassBays table, particularly through its Management Committee, MassBays can be a valuable partner to environmental researchers and academic institutions.

**KEY MESSAGE:** MassBays works collaboratively with local, state and federal policymakers to protect, restore and enhance our coastal habitats. Given our mission, our structure and our reach, we can help turn your research into action. We connect the decision makers with the science to help them make well-informed decisions that impact our coastal environment. In addition, MassBays supports research through grant funding opportunities.

### **Environmental Advocacy Organizations & NGOs**

As noted in the CCMP, cross-agency and cross-discipline communication and collaboration can be challenging. Many local, state and national organizations work in their own ways to protect and enhance our coastal habitats. By better coordinating these groups, MassBays can help ensure that resources and information are shared to produce positive, measurable outcomes. MassBays should position itself as a convener and collaborator with this audience rather than a competitor.

**KEY MESSAGE:** MassBays works collaboratively with local, state and federal policymakers to protect, restore and enhance our coastal habitats. Given our mission, our structure and our reach, we help bring together like-minded organizations to share research, resources and best practices. Given the makeup of our Management Committee that guides our work, we can help connect organizations with leading decision makers.

### **Current and new funders**

We believe that funders are most likely to fund specific initiatives and projects that align with their giving policies. Therefore, MassBays should promote the innovative work it does in each region of the state and stress the regional collaboration that occurs.

**KEY MESSAGE:** MassBays is an incubator for great ideas. We generate locally-based models for addressing environmental challenges and work with our regional partners to replicate success region-wide. Our work is guided by a diverse Management Committee made up of individuals representing environmental and resource management agencies, nonprofit environmental groups, academic institutions, business interests, and other important stakeholders. We connect science to action to produce desirable outcomes that contribute to the protection, restoration and enhancement of our coastal

habitat. We are supported by the EPA and reach a large, diverse area where projects reflect the local priorities of five unique regions.

### **Business Community**

The business communities within the MassBays planning area are a key constituency. Whether its resiliency efforts or success of coastal-dependent businesses, business leaders have a vested interest in the protection of coastal habitat. As such, local and regional businesses, Chambers of Commerce and other similar business organizations should be aware of and engaged with MassBays.

**KEY MESSAGE:** The work we do at MassBays directly impacts your businesses, your employees and your customers. We work with a broad coalition of stakeholders including environmental agencies and non-profits, municipalities, researchers and others to protect, restore and enhance the coastal habitat of our region. Working with our many partners and through our regional coordinators, we can help you and your businesses plan for things like climate change, environmentally smart development and sustainable business solutions.

**For Business Associations:** An association like a Chamber of Commerce or local Economic Development Group should understand that MassBays can help their members both individually through information sharing and grant-making but also through the work it does to improve resiliency efforts and local climate change impact mitigation that help the business community at large.

**Individual Industries:** Industries dependent on coastal resources should understand that MassBays is a partner in promoting and supporting the work they do. Fishing and tourism, in particular are two key industries that rely on the continued protection of coastal habitat. In addition, technology companies with products related to waterways could benefit from MassBays' broad network to test and implement their technology.

### **General Public**

Raising the public's awareness of MassBays can help create allies and supporters of MassBays work and help influence decision makers. The general public here includes the following:

- Homeowners/renters
- Recreationalists
- Visitors/Tourists
- Water commuters
- Students & educators

With this key audience, MassBays should focus on highlighting projects that serve to benefit the community. Knowing that projects are prioritized at the local and regional level can help make the general public more invested in the work and outcomes. Estuaries are a treasure for local communities, offering recreational activities, water activities, transportation, access to shellfish and other opportunities. Climate change, in



particular, is an issue that most people are aware of and a good opportunity to introduce the work that MassBays does.

**KEY MESSAGE:** MassBays, funded through your federal tax dollars, is working hand-in-hand with decision makers in your community to protect, restore and enhance coastal habitat. We're working to fight the local impact of climate change, which threatens our homes, our food supply, our transportation system and the recreational opportunities we enjoy. We are partners in protecting your communities today and for the future.

## THE MESSAGING TOOLBOX

To most effectively deliver its message to its intended audiences, MassBays should employ a mix of traditional and digital tactics.

Below are tools Pacer Strategies recommends for MassBays to raise its profile, deliver its messages and attract new partners.

### Website

The MassBays website should tell a story. It is a critical tool for raising awareness of the organization and allows MassBays to put its best face forward. The site is a primary resource for information and education and will likely deliver the first impression many of your target audiences have of the organization.

When we look at the website as a tool for delivering MassBays' messages, we consider how well it adheres to the following principles:

- Appearance
- Content
- Functionality/Usability

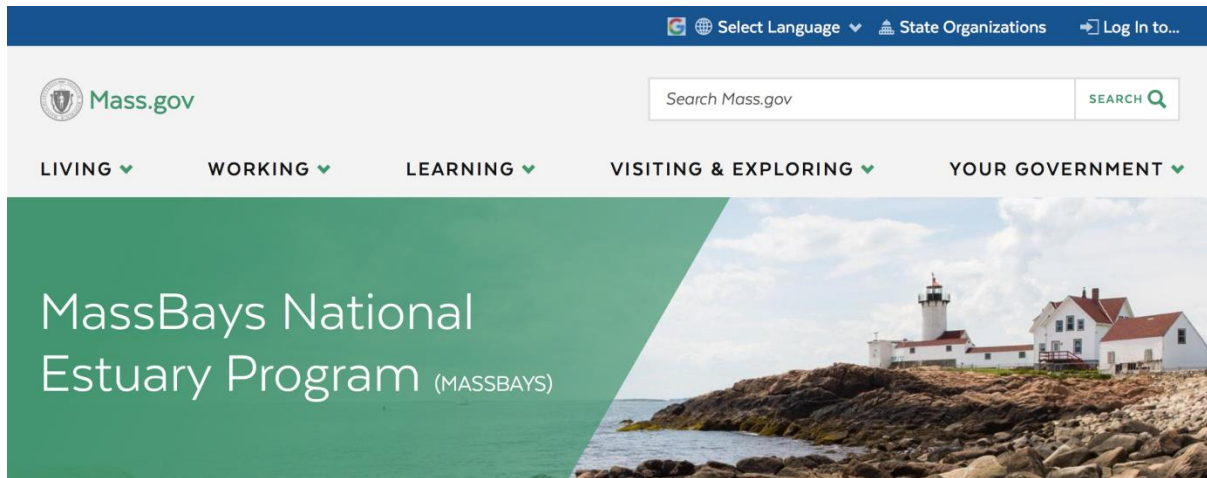
1. Appearance: You have one chance to make a first impression, right? Therefore, you want your website to be visually appealing, engaging and informative. An effective website should grab the eye, use meaningful images and be simple and easy to read.

Analysis: MassBays' current website contains a lot of great information, but is text-heavy, visually unappealing and difficult to navigate. The logo, which should appear prominently on the homepage, is small and haphazardly placed to the right side. When a user lands on the homepage, the first thing s/he finds is contact information for staff rather than a description and images that convey what MassBays is and does. Given that its mission is to protect and restore our estuaries and coastal habitat, it is natural that the homepage would feature pictures of those resources. However, the current site lacks high-quality, relevant photos, and simple, easy to understand description of what MassBays is. While the mission statement is included on the homepage, visually, it blends in with the rest of the text on the page and can be easily overlooked by a user.

Furthermore, the MassBays site is tied up in the structure of the Mass.gov portal. To the average user, MassBays appears to be a sort of state agency, which it is not. Because of that, MassBays' identity and brand is unclear to the user.

### MassBays Homepage

Lacks prominent logo, lacks eye-catching imagery, mission statement gets lost among the page, top tabs are not relevant to the organization.



MassBays is an EPA National Estuary Program dedicated to protecting, restoring, and enhancing the estuarine resources of Ipswich Bay, Massachusetts Bay, and Cape Cod Bay.

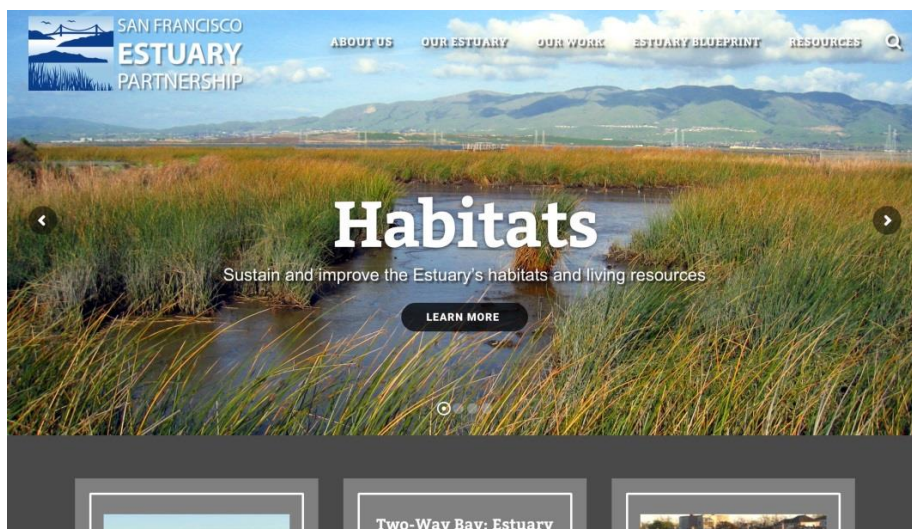
TELL US WHAT YOU THINK

## Contact Us

Examples of sites that successfully adhere to the appearance principles:

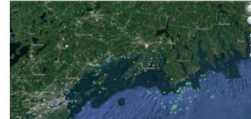
### San Francisco Estuary Partnership

Prominent logo, visually appealing with appropriate imagery to convey what the partnership cares about, menu tabs that explain further the work of the organization.



### Casco Bay Estuary Partnership

Prominent logo, visually appealing with appropriate imagery to convey what the partnership cares about, menu tabs that explain further the work of the organization.



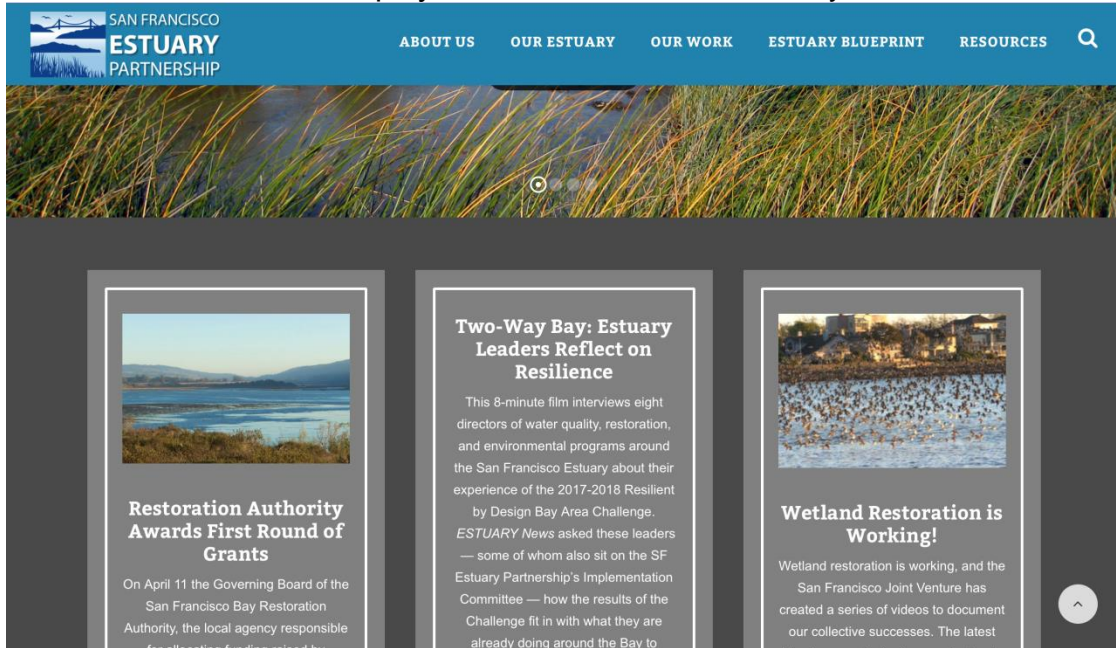
When we look at the sites from San Francisco and Casco Bay, we see that they share common characteristics:

- Beautiful, eye-catching images
- Prominent logo
- Menu tabs with relevant information
- Easy to read, simple text
- Rule of 3rds – both sites use an image that takes up ~ 2/3 of the homepage screen

2. Content: Your website tells your story. Website content should be clearly labeled and should be clear, concise and compelling. A text-heavy site can bore the reader – the more you can incorporate images, the easier it will be to hold a user's attention. Content should be up-to-date with significant news and announcements front and center.

Analysis: MassBays' current site contains a lot of relevant and important information. However, the content is displayed in such a way that it is difficult for the end user to find what s/he is looking for. Links are stacked one on top of the other in no discernable order, requiring the user to scroll (which, especially on a mobile platform, can be a turn off for users). Additionally, information does not appear on the site in a way that tells a story. For example, the leading information on the current homepage is staff contact information. A reader must scroll down nearly to the bottom of the website in order to learn that MassBays has recently awarded \$110,000 to partners through the Healthy Estuaries Grant – a key program that MassBays offers and could help create new partnerships. (Also note that the accompanying photo of the State House is not the most effective or engaging image).

Let's look at how content is displayed on the San Francisco Bay website:



- Menu tabs are clearly marked for users to access the information they are seeking
  - The three main news tabs in the center of the page tell the story of what SF Bays is working on. The information is presented in a visually appealing way and highlight SF Bay's success. Headlines are clear and concise, and images are relevant to the text.
3. Functionality/Usability: Does your website work? Broken links, out-of-date information, and unrelated information and tools will leave your user confused and frustrated and is likely to prompt them to leave the site. In a nutshell, everything on the site should work, and everything a user clicks should keep them engaged with MassBays.

Analysis: While MassBays' site generally meets the functionality standards, there are areas for improvement:

- Several links on the MassBays site that take users to a page that says "under development."
- The site map section explains to users that a new website process began in 2017 – well over a year ago.
- "Submit a proposal" is not a live link.
- The search box at the top right side of the page allows a user to search Mass.gov but not MassBays specifically, resulting in the generation of information that may be useless to your user

- The “contact form” is a useful tool for MassBays only if someone on staff receives the information submitted and uses it to improve the user experience. Otherwise, users who submit information but receive no response will likely be left with a poor impression of the organization.

These are just a few examples of the limited functionality of the current site. Anything displayed on the MassBays website should be complete (versus under development) or it is best to leave it off entirely. Information that is not relevant to MassBays or its partners should be left off the website.

Website Recommendation: MassBays is limited by the inflexibility of the current mass.gov platform. Pacer Strategies recommends that MassBays migrate off the system to its own web platform. Platforms like WordPress and Squarespace allow organizations to display their information in user-friendly, visually appealing ways that are intuitive and easy for staff or contractors to maintain. Given that MassBays is not a state agency, it should not be constrained by mass.gov’s limitations. Buzzards Bay Estuary Program, for example, has its own website managed outside of the mass.gov system. At least one state agency, MassDOT, also controls its own site.

On its own platform, MassBays could increase its use of images (including those of its staff and regional coordinators in addition to photos of coastal habitat), highlight the work of its regional partners, include video, and integrate social media among other features.

Finally, moving from the mass.gov portal would allow MassBays to address several concerns raised by EPA, including demonstrated autonomy from state government and better display of MassBays’ successes and achievements.

### **Regional Coordinators’ Websites**

Every regional coordinator’s host organization should be required as a condition of the partnership to prominently include MassBays’ logo, link to MassBays website, and a consistent way to talk about the partnership between the host organizations and MassBays.

### **Social Media**

“Content is fire and social media is gasoline.” – Jay Baer, President, Convince & Convert

Among the most important tools MassBays should have in its toolbox to disseminate its messages and share its information are dedicated social media channels including **Facebook**, **Twitter** and **Instagram**. Other platforms like YouTube and blogs may also be relevant but the three specific channels are a good place to start. In particular, they are each a good way to build awareness of the organization, make connections to key audiences, create and develop relationships, increase public support and identify potential donors.

A 2017 Pew Research Center survey<sup>1</sup> found that two-thirds of American adults get their news from social media platforms like Facebook, Twitter and YouTube. In our current environment, as more Americans become concerned with the impacts of climate change and other environmental challenges and protection efforts, MassBays should share its voice, its expertise and its work with those who engage in this type of public conversation. MassBays can either be present on social media or it can risk being ignored and unheard.

Analysis: MassBays currently lacks active and engaging social media platforms, creating not only a challenge to awareness-raising and information-sharing efforts but also creating the appearance that MassBays is an organization that has fallen behind the times.

While MassBays has a reserved Twitter account, it's bio lacks the organization's mission statement and relevant information. The account has just 4 tweets and 15 followers. It fails to project a sense of authority and expertise and risks projecting a poor image of the organization. Pacer Strategies recommends deactivating the current account until a decision has been made to actively use Twitter as a tool. If the Twitter reactivation occurs more than 30 days after the account is deleted, MassBays will have to create a new account. If the handle @MassBays is no longer available, we recommend using the handle @MassBaysNEP. MassBays has no other social media channels.

On a positive note, some of the Regional Coordinators' host organizations have social media platforms that could be used to help disseminate and amplify messages, campaigns and relevant MassBays news.

Social Media Recommendation: MassBays should create and maintain dedicated social media channels including Facebook, Twitter and Instagram. These channels should each be branded with the MassBays logo and mission statement, should be image-rich, and should be maintained and updated with new content on a regular basis (at least once a week for Facebook and Instagram, daily for Twitter). MassBays should have one staff member dedicated to maintaining the social media channels and should require its regional coordinators to contribute on a regular basis to content. Social media platforms should not be one way-streets. In addition to posting content, the dedicated staff member should take the time to engage with followers who comment on MassBays content, ask questions or offer ideas.

How do you use social media to deliver your messages and strengthen your connections with key audiences? Below, we look at several ways to do just that.

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<sup>1</sup> <https://www.reuters.com/article/us-usa-internet-socialmedia/two-thirds-of-american-adults-get-news-from-social-media-survey-idUSKCN1BJ2A8>

## **Social Media to Raise Awareness**

Social media is just that – social. It means you are connecting with audiences in a give-and-take sharing of information. When content is interesting, visually appealing and easy to understand, you are likely to engage more followers in your conversation.

According to Sprout Social, 97 percent of adults between 16-64 say they logged on to at least one social media platform in the last month.<sup>2</sup> Because so many of your target audiences are likely to be active on at least one social media channel, it's important to create and disseminate content across all platforms.

Here are a few ways to raise awareness of MassBays via social media:

- **Create compelling content** – MassBays and its partners have a wealth of information and data to share. Pulling out key information in current reports, sharing data visually with maps and infographics and Did You Know campaigns can give your growing audience a sense of who MassBays is and what it does. Regional coordinators should be required to provide easily postable content about what's going on in their regions on a regular basis to help populate the platforms.
- **Make content visually appealing** – This goes hand –in-hand with creating compelling content. The very mission of MassBays lends itself to creating beautiful and engaging images of coastal habitat, wildlife and the impacts of climate change. People are more likely to “like” and “share” your content – and remember the information – when included with an image.
  - A great example of this is the King Tides. Without images, the King Tides are interesting, but with images, people can see directly the impact these tides have on surrounding land, homes and familiar places.
  - Videos – videos can be a great way to show off the work in the field that regional coordinators are doing. When people can see the resources MassBays is working to protect, the work is no longer abstract.
- **Connect with followers who share similar interests.** To start growing your audience, connect with other users who share an interest in the work MassBays does. Start by connecting with MassBays' Regional Coordinator organizations and Management Committee members. Follow and like statewide environmental groups, local towns, state and federal lawmakers, tech companies, fishing industry groups, business associations and the like. Often times followers will return the favor by following you back, growing your audience and spreading



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<sup>2</sup> <https://sproutsocial.com/insights/social-media-statistics/>



your reach. Ask your audience to share your content on their own platforms. Over time, you'll grow your reach and increase MassBays' visibility.

- **Create and Join Mini Social Campaigns:** Creating or participating in week-long or month-long campaigns around a specific topic is a great way to boost your presence. You can schedule these campaigns around holidays, key dates or “designated weeks.” In September, for example, we celebrate Estuaries Week. MassBays should join in the campaign by posting images and facts relevant to Massachusetts estuaries. Using the hashtag **#EstuariesWeek**, MassBays can raise its awareness among users interested in learning more about the topic and can connect with potential new partners.



MassBays could also launch its own campaigns, encouraging the general public and partners to **share photos** of their favorites places in the MassBays area. Encouraging people to submit photos and a description of why they love that particular spot engages your audiences and helps create a connection to MassBays.

MassBays could also control the content of a campaign while highlighting a certain issue. For example, MassBays could do a week-long **#Invaders** campaign, raising awareness of invasive species in our estuaries and what MassBays is doing to fight invasive species. Regional coordinators should promote the campaign on their own social media platforms to maximize reach.

### **Using Social Media to Build Partnerships**

Because MassBays views itself as a convener and facilitator of partnerships, one of the best ways it can use social media is to create and strengthen key connections. MassBays should build into a social media strategy a plan for cross-promoting its partners. Promoting organizations and individuals who are targets for *new* partnerships is an important part of that strategy.

Cross promoting means giving “likes” to other organizations’ content, reposting relevant posts, promoting each other’s events, sharing news and tools from each other’s sites,

and recognizing and boosting each other's work. This allows MassBays to create and strengthen relationships with target audiences including environmental advocacy organizations and NGO, researchers and academic institutions, and decision makers while expanding its influence on social media.

There are natural social media partnerships for MassBays to pursue including the Regional Coordinators, grantees, environmental organizations with a focus on clean water, schools, marine-based businesses and more.

### **Other Digital Communications Tools**

In addition to an updated website and social media, there are other electronic tools MassBays can use to reach its intended audiences and help achieve its goals.

Email Branding: While email's primary purpose is to send and receive information, it should also be considered a marketing and branding tool. Pacer Strategies recommends that every MassBays staffer and regional coordinator include in their email signature the MassBays logo, website link and link to MassBays' social media.

Digital Digest: One of the goals laid out in the CCMP is to position MassBays as a primary source of information about conditions and trends of coastal habitat across the MassBays region. To be seen as a primary source, MassBays should send regular (weekly if possible) email communications to its network in the form of an easy to read digital digest. Similar to the quarterly MassBays newsletter, it could contain up-to-date links to upcoming events, a few news items and relevant news articles. Short summaries with links are likely to be the best format to engage readers.

Online CCMP Scorecard: To engage your audiences in the CCMP, Pacer Strategies recommends creating an online scorecard that gives stakeholders a regular update on progress.

Updated Downloadable FAQ (frequently asked questions) sheets: There are a number of great reference documents on MassBays current website but they are difficult to find and some are a few years out of date. Pacer Strategies recommends broadening the available reference materials to include updated downloadable MassBays fact sheets for use and distribution by Regional Coordinators, Management Committee members and external audiences who want to learn more or share information about the kind of work MassBays does. These fact sheets should be front and center on the MassBays website under a "Resources" or "Facts and Information" tab.

Fact sheets may include:

- The MassBays Story – basic info about MassBays and highlights of its successes
- Issue Briefs covering areas like Stormwater Management; Climate Change Resilience
- 5 Things You Can Do To Protect Your Estuaries
- All About Invasive Species

- Updated Stormwater Management Guide and other helpful guides for Municipal Officials

Videos: MassBays work is well-suited for images, whether it's photos or videos. MassBays should develop a series of short (2-5 mins) videos that can be featured on the website and shared with audiences and potential funders to better demonstrate the work MassBays does. For example, MassBays could produce a video showing an audience what eelgrass is, what problems result when eelgrass is lost, and how eelgrass is restored.

Grantees could also be asked to produce videos as part of their application process or as part of the contract to highlight the kinds of partnerships MassBays supports.

#### Web-Based Events Calendar

MassBays should host on its website a calendar of events occurring across the MassBays region. This calendar can be populated monthly by MassBays staff, regional coordinators and partners. Events do not need to be MassBays-sponsored but should be relevant to MassBays' mission.

#### Hack-a-thon Events

MassBays could partner with universities, students and researchers to host day-long hack-a-thon events using MassBays data. By sharing this data with "hackers," MassBays could create new apps, visualization and interesting tools for sharing its data with wider and relevant audiences.

#### Non-Digital Tools

In addition to the electronic tools above, MassBays should also target its audience through in-person events, press outreach and branding.

#### Press materials

Press releases and media kits allow reporters and editors to become familiar with MassBays as a resource for information about our estuaries and coastal habitat. All materials should be branded with the MassBays logo on MassBays-specific letterhead and should include boilerplate language that includes MassBays' mission. Press releases should be prominently featured on the MassBays website so that members of the media can easily access new and recent announcements.

Analysis: On the current MassBays website, news and announcements are located towards the bottom of the website, making them easily overlooked. The current press release looks to have come from the Executive Office of Energy and Environmental Affairs and the Office of Coastal Zone Management rather than MassBays. In addition, the media contact is a non-MassBays employee and there is no boilerplate description of what MassBays is. While a press release from the Governor's office may garner attention and raise awareness of the substance of the announcement, it presents a missed opportunity to raise awareness of MassBays and the work it does.

Based on conversations with MassBays staff, it is also apparent that MassBays, despite the fact that it is not funded by state government, is required to follow the media protocol of the current Administration. This protocol includes several layers of sign off and can result in the delayed release of timely information.

Recommendation: MassBays should be responsible for distributing its own press releases and announcements, and they should include contact information for a MassBays employee. Further, press releases should be printed on MassBays letterhead with MassBays boilerplate.

Regional coordinators should also be required to use MassBays boilerplate and letterhead when making MassBays-relevant announcements and include a quote from the MassBays Executive Director.

Finally, MassBays should create and maintain its own media database that includes contact information for local reporters across the entire MassBays region. By engaging those reporters, MassBays can position itself as a primary source of information on issues affecting the coastline.

## Events

### Tours for Media, Local Elected Officials, Students and the Public

One way to make the work MassBays does relevant and tangible to target audiences is to bring those audiences out in to the field. MassBays Regional Coordinators should host regular educational tours (monthly during good weather, for example) aimed at educating the media, the public and state and local elected officials about the estuaries and watersheds. These could be lunch-time tours on a boat, evening tours and info sessions with a BYO picnic dinner or tours centered around specific initiatives taking place in each of the regions.

### Bring the Bays to the People

To reach community members who may not be naturally inclined to participate in tours, MassBays Central Staff and Regional Coordinators should work together to bring the Bays to the people where they are. Consider touch-tanks at Town Hall or exhibit booths at already-established events like Farmers' Markets, Town Days, Earth Day events and the like. Some of the Regional Coordinators already have hands-on tools they use in schools to educate students about clean water. Bringing those tools to a wider audience can be an effective way to connect people to MassBays' work.

Along the same lines, MassBays should have access to an exhibit booth and materials that could be easily set up at events like business or trade association meetings, municipal association gatherings, and similar events where large members of the general public and decision-makers are likely to gather.

### Out of the Box Events

"Pop-Up" events are an increasingly popular way to bring awareness to brands and businesses. MassBays could partner with local business to host pop-ups to help raise

awareness of the MassBays brand while benefiting local businesses? Working with grantees like the Massachusetts Oyster Project, for example, MassBays could host an oyster shucking pop-up.

Based on conversations with Upper North Shore coordinator Peter Phippen, the invasive Green Crab is a culinary treasure just waiting to be discovered. MassBays could partner with a local restaurant on a special Green Crab dish that introduces local residents to the issue of invasive species in a fun and memorable way.

### Legislative Briefings

MassBays should both conduct its own annual legislative briefings for state lawmakers and staff as well as testify at legislative hearings where bills relevant to MassBays work are heard. Understanding the limits on direct lobbying, MassBays should use these briefings and hearings as opportunities to highlight ongoing work in the communities served by relevant state lawmakers. Similar educational briefings are regularly hosted at the State House and are most often sponsored by lawmakers from districts impacted by the organization’s work or lawmakers from a relevant committee (Joint Committee on Environment, Natural Resources and Agriculture, for example). These briefings could be billed as annual State of the Bays reports.

### Public Awareness Campaigns

Much of the work that MassBays does takes place right in the communities where target audiences live and work. Monitoring work and other in-the-field activities and projects should have signage to indicate that the project or ongoing work is supported by MassBays. Pacer Strategies recommends that all projects supported by MassBays include visible signage with MassBays’ logo and web address.

Signage templates can be uploaded to MassBays’ website and made to be downloadable by the relevant partners. Other NEPs have made similar signage available on their own websites. In addition, many of the regional coordinators host public awareness campaigns that should include MassBays’ logo and website on handouts and other publications.

### EXAMPLES:

The Casco Bay Estuary Partnership funded the creation of educational signs that provide a primer on the ecology and history of Casco Bay and encourage individuals to help protect water quality. The signs were created by Montgomery Designs, and they are on display in Bell Buoy Park on Commercial Street in Portland. Click on any of the signs to download a PDF.



## **Toolbox wrap-up**

Consistent branding and regular communication is key to increasing MassBays' visibility and generating new support for its work. Armed with diverse and creative tools, MassBays should be able to grow its reach and make significant progress toward its goals.

As noted in an earlier section of the Communications Plan, MassBays currently lacks the personnel resources to deliver on a robust communications strategy. To successfully create and execute the messaging toolbox discussed in this section, MassBays will need additional personnel resources. Those resources and recommended metrics for measuring the success of these tools are contained in the third section of the Communications Plan.

## **MASSBAYS' PARTNERSHIPS**

To achieve the goals set forth in the Comprehensive Conservation and Management Plan, MassBays must rely on a wide array of partners. Thanks to its current and ongoing efforts, MassBays already has a good working relationship with numerous stakeholders at the local, state and federal levels, in addition to non-profit partners, funders, researchers and others.

By implementing the messaging strategies discussed earlier in this plan, MassBays can continue to build upon that network, create new and exciting partnerships and potentially generate additional new revenue to deliver additional programming, technical assistance and education about efforts to protect, enhance and restore coastal habitat.

New to the CCMP is a focus on Climate Change and Environmental Justice. With an eye on strengthening MassBays' impact in these areas, we focus on developing new partnerships with like-minded organizations and individuals in these key areas. In addition, because many of these relationships are made and maintained at the regional level, we recommend some additional partnerships for MassBays' central office to explore.

This section outlines broadly the partnerships MassBays should work to develop. With this framework, MassBays could develop a more specific and targeted list in consultation with key members of the Management Committee, Regional Coordinators and staff.

### **Current decision-makers and internal partners**

- Management Committee
- Regional Coordinators
- Municipal officials including planners, conservation commissions, harbor masters, public works departments and similar municipal offices
- State and federal agencies, including CZM

### **External Partners**

- Local and regional environmental organizations including watershed associations, citizens' monitoring groups
- Research institutions and universities
- Healthy Estuaries grantees

### **Prospective Partners to Target to Help Raise Awareness of MassBays**

- **Educators** – MassBays currently has an informal partnership with educators through the New England Ocean Science Education Collaborative. MassBays should explore partnering more directly with NEOSEC members and/or other similar organizations focused on educating the public about oceans, watersheds and coastal habitat.

- **Neighborhood Associations** – In coastal communities, MassBays could partner with Neighborhood Associations to bring greater awareness to the challenges facing coastal habitat and work together to generate educational tools for the community.
  
- **Issue-Specific Organizations** including Climate Change and Environmental Justice Groups
  - Conservation Law Foundation
  - GreenRoots
  - New England Environmental Justice Foundation
  - Alternatives for Community and Environment
  - Environmental League of Massachusetts
  
- **Trade Associations**
  - Massachusetts Municipal Association
  - Local Chambers of Commerce or Chamber subcommittees
  - Mass Marine Trades Association
  - Massachusetts Lobstermen’s Association
  - Environmental Business Council of New England
  - Massachusetts Harbormasters Association
  - Massachusetts Shellfish Officers Association
  
- **Funders**
  - Foundations including Barr, Island Foundation (focused on environmental justice)
  - The State – MassBays at one time received state funding, yet today there is no state financial support. While MassBays is housed within a state agency and follows the rules and policies of state agencies, there is no dedicated state funding for the organization. Pacer Strategies strongly recommends that MassBays seek dedicated state funding through the annual budget. There are a number of ways to do this, including an annual earmark for MassBays or a dedicated earmark for regional partners, specifically dedicated to MassBays activities. Because MassBays is currently constrained in its ability to directly request state funding, this would require either a new host for MassBays or approval and cooperation from the Executive Office of Energy and Environmental Affairs. As a state-hosted program, MassBays is constrained in its ability to request state funding. The Management Committee should seek authorization and cooperation from EOEEA to communicate with state and local lawmakers with regard to funding and programming. (See lawmakers section below). Without this support, MassBays should explore host organizations outside of government that will provide the funding and flexibility it needs to be successful over the long-term.



- **Local, State and Federal Lawmakers**
  - Conduct educational briefings at the State House with relevant lawmakers/aides on the work MassBays is doing. These could be done in conjunction with CZM or EOEEA if it would make it easier to organize.
  - Given that MassBays' existence depends on the EPA, it's important that MassBays communicate with federal lawmakers on a regular basis. We recommend providing quarterly updates via email to members of the Congressional Delegation. In addition, MassBays should add the delegation and its key staff to its email lists.
  - While much of the work MassBays does is in partnership with municipal agencies, MassBays should also ensure that the decision makers (i.e., elected leaders) are aware of the work MassBays is doing in their areas. Educational briefings similar to those recommended at the State House could be conducted regionally.

In addition to the partnerships above, we recommend a review of the organizations and individuals included in the original Management Conference convened by MassBays in its early years. The Conference included nearly 300 representatives from federal, state, and local government agencies, regional planning agencies, various user groups, public and private institutions, and the general public. This review creates an opportunity to re-engage former partners and identify new ones.

To properly develop and maintain these relationships will require additional work by MassBays staff and regional coordinators. Therefore, Pacer Strategies recommends MassBays hire a full-time employee or contract worker who can identify specific organizations for partnership, schedule meetings, create and execute events and communicate regularly with all partners.

## COMMUNICATIONS RESOURCES & METRICS

### Communication Roles

Clearly defined communications roles are essential for the successful delivery of the communication strategy. The communication objectives set out in this strategy will only be achieved if all contributors deliver on their actions.

### Current Challenges:

- MassBays' Central Office has just one FTE and one part-time employee to oversee the entirety the work of the sprawling MassBays region. MassBays' current resources are insufficient to deliver on a robust communications strategy.
- While the regional structure of MassBays is intended to ensure a local approach to managing and protecting coastal habitat and communicating with key local stakeholders, the lack of centralization around communications makes it challenging to deliver a clear message about MassBays across the entirety of the region.
- While MassBays is not a state agency, the organization has been instructed to follow the media relations protocols of Coastal Zone Management, which has resulted in delayed responses to media and missed opportunities to promote good work done by MassBays.

### Recommendations:

1. Hire a MassBays Communications and Outreach Manager

To deliver fully on this plan, Pacer Strategies recommends MassBays immediately engage a full-time communications and outreach manager. The manager's primary responsibilities would include:

- Executing on the strategies outlined in this communications plan;
- Serving as the primary liaison with regional partners regarding MassBays communications efforts;
- Identifying opportunities for media coverage;
- Responding to media inquiries;
- Proactively communicating with key stakeholders via the tools outlined in the toolbox section and respond to public inquiries;
- Planning and executing workshops, programs, and public events
- Serving alongside the Executive Director as chief spokesperson for MassBays

The communications manager should plan, manage, review and deliver the communications strategy and should take the lead in ensuring MassBays' branding elements are in place on all communications.

The communications manager should final editorial sign-off on all communications (e.g. publications, videos, online material, press material, website and social media) and should be the chief liaison with any outside communications vendors.

## PUBLICATIONS /PROMOTIONAL MATERIAL

The communications manager should:

- lead on the production of all publications and promotional material
- primarily create and write content, along with the regional coordinators and MassBays central office
- plan, manage, edit and produce visual and written content and documents
- draft all talking points, public reports and other public materials

## DIGITAL

The communications manager should:

- coordinate content and manage website, e-newsletter, videos
- primarily write content, with responsibility for region-specific news to be led by regional coordinators
- maintain, review and regularly update the website
- lead on and manage social media presence

## MEDIA

The communications manager should:

- develop and coordinate media plans in coordination with regional partners
- coordinate content and write news releases with input from partners
- serve as point of contact with CZM and EOEEA regarding media activities
- Draft op-eds, letters to the editor, bylined articles

## OUTREACH

The communications manager should:

- Serve as a public representative of MassBays at relevant workshops, conferences, legislative briefings and other meetings as appropriate
- Communicate regularly with the MassBays Communications Subcommittee about ongoing communications activities

Short of hiring a Communications and Outreach Manager, MassBays should retain a communications consultant to draft and edit written and digital materials, manage social media and liaise with the Regional Partners, Management Committee and Key Stakeholders to deliver on key parts of the Communications Strategy.

## 2. Engage a website developer

As discussed earlier in this plan, MassBays should give strong consideration to migrating off the mass.gov web portal and create its own website, maximizing MassBays' ability to share its story. MassBays should immediately engage a web developer who can create a new website for MassBays by early 2019.

## 3. Create clear information-sharing and communications protocols.

As identified earlier in the plan, one of the main challenges to creating a defined brand for MassBays is the de-centralized model through which MassBays does its work. Based on discussions with Regional Coordinators, there are varying degrees to which announcements and activities are linked to MassBays.

Information Sharing: To help create a more cohesive MassBays brand, Regional Coordinators should share a set number of activities each month that can be promoted through MassBays social media, newsletters, and other communications tactics.

Pacer Strategies also recommends that MassBays central office communicates more formally and regularly (once or twice per month) with the Regional Partners and Management Committee via email updates.

### Publications and Press materials

All press releases, reports and other public documents highlighting work carried out with MassBays funding should include the MassBays logo. Drafts should be shared with the Executive Director before dissemination. Management Committee members should always receive a copy of the public materials. Press releases, reports and other public materials prepared by MassBays Central Office should likewise be shared with Regional Partners and Management Committee.

In summary, much of the success of MassBays' communications efforts will depend on clearly defined roles and responsibilities within the organization. Such roles and responsibilities can help ensure timely, accurate dissemination of information and position MassBays to grow its brand.

## **METRICS**

To measure the success of MassBays' communications efforts and make necessary adjustments, MassBays must put in place metrics for measurement.

While there are recommended targets for each measurement category below, Pacer Strategies recommends identifying a current baseline for each measurement tool first. This is an important task that should be undertaken and completed in Year 1. The Communications Manager should an analysis of current measurements including website statistics, reciprocal links, media coverage, email opens and engagement,

newsletter audiences and engagements. Social media baselines should be established at the end of Year 1 as MassBays does not currently use social media channels.

Below are the measurements and specific targets. Targets may be adjusted based on current baselines, and should be revisited annually to maintain a robust communications effort.

Communication objectives	Measures	Targets
<p align="center"><b>Broaden awareness of MassBays and its programs</b></p>	<ul style="list-style-type: none"> <li>• <b>Website statistics</b> including number of visits and then how visitors behave once on the website</li> <li>• <b>Social Media statistics</b> including numbers of new followers and the reach of messages</li> <li>• Number of <b>reciprocal links</b> on appropriate websites</li> <li>• <b>Media Coverage</b></li> <li>• <b>Email</b> open and click rate</li> </ul>	<ul style="list-style-type: none"> <li>• Increase number of website visitors by 50 percent each year of the CCMP</li> <li>• Grow Facebook, Twitter and Instagram followers by 10 percent each year of the CCMP</li> <li>• 5 new reciprocal links per year</li> <li>• 3 press releases per year, picked up by news outlets</li> <li>• 2-5 percent increase in email open rate per year</li> </ul>
<p align="center"><b>Highlight scientific research, monitoring and management needs across the planning area.</b></p>	<ul style="list-style-type: none"> <li>• Number of stakeholders at workshops/conferences</li> <li>• Number of stakeholders signed up to receive e-newsletters</li> <li>• E-newsletter statistics -open rate, click through, forwards</li> <li>• Number of grant applications received</li> <li>• Dissemination of best practice tools, guides and other published</li> </ul>	<ul style="list-style-type: none"> <li>• Increase by 10 percent the attendees at workshops and conferences each year of the CCMP</li> <li>• Increase by 5-10 percent the number of stakeholders signed up to receive newsletters</li> <li>• Increase by 2-5 percent the open rate of e-newsletters</li> <li>• Increase by 20 percent the number of Healthy Estuaries grant applications received</li> <li>• Meet with 3-5 new stakeholder groups/decision makers throughout the entire MassBays region each year</li> </ul>

	<ul style="list-style-type: none"> <li>materials</li> <li>Number of decision makers and stakeholders MassBays collaborates with *define successful collaboration</li> </ul>	<ul style="list-style-type: none"> <li>MassBays-created materials cited or referenced by an increased number of stakeholders</li> </ul>
<p><b>Invite current and new partners to participate actively in implementing the CCMP</b></p>	<ul style="list-style-type: none"> <li>Number of local decision makers engaged in meetings and discussions re: CCMP</li> <li>Public participation</li> <li>Number of funders</li> <li>Leverage reported to EPA via NEPORT</li> </ul>	<ul style="list-style-type: none"> <li>Increase by 2 per year the number of new local decision makers, state elected officials or federal agencies reached by MassBays in each region</li> <li>Increase by 3 per year the number of public organizations that partner with MassBays *define successful partnership</li> <li>Increase by 1-2 per year the number of new funding partners</li> <li>Increase by 25 percent the amount of funding support from current funders.</li> <li>Increase by 10 percent the leverage reported to EPA</li> </ul>

**COMMUNICATIONS SEQUENCING**

There are many components of this plan that will take time and resources. In light of that, Pacer Strategies recommends MassBays sequence some of the communications efforts in the first year(s) of the CCMP.

**January – June, 2019**

- Retain communications consultant
- Begin hiring process for communications manager
- Engage a website developer
- Update all materials with logo and mission statement
- Create and begin using social media channels
- Update email newsletters

- Introductory outreach to new partners
- Plan for upcoming workshops

### **June – December, 2019**

- Onboard communications manager
- Launch one new public awareness campaign
- Introductory meetings with policymakers
- Host workshops with focus on engaging new and returning partners

## CONCLUSION

The work MassBays is undertaking to protect our oceans and coastal habitat is vital to the future of Massachusetts and all who live and work here. It's important to make the public, policymakers and stakeholders aware of MassBays' efforts and feel connected to its mission.

As MassBays' embarks on the next chapter for the organization and its work, this comprehensive strategic communications plan should guide its communications and outreach efforts. MassBays should share its success stories and its critical research with as many of its intended audiences as possible and continually engage with its audiences to help it reach its goals and fulfill its mission.

Communications plans are intended to be flexible and should be regularly adjusted and updated to reflect organizational realities, needs changes and progress. We recommend annual reviews of this plan and periodic updates to ensure it remains a reliable roadmap over the life of the CCMP and MassBays' work.

###



# Attachment 3

## Monitoring Framework for the MassBays National Estuary Partnership

### **Massachusetts Bays National Estuary Partnership Comprehensive Conservation and Management Plan**

2021



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# 1. Introduction

Massachusetts Bays National Estuary Partnership's (MassBays) 2020 Comprehensive Conservation and Management Plan (CCMP) seeks to fulfil MassBays' mission *to empower 50 coastal communities protect, restore, and enhance their coastal habitats.*" The MassBays planning area, including its coastal zone and watersheds, has historically been used for a variety of commercial, residential, recreational, and agricultural activities. Stakeholders from different backgrounds and across all five regions of the planning area have identified a central environmental issue with multiple manifestations: "[c]oastal habitat degradation and loss of biodiversity characterized by altered hydrology, impaired water quality, vulnerability to climate change, increasing numbers of invasive species, and habitat fragmentation."

Beginning with MassBays' initial CCMP in 1996, significant actions were taken to address specific environmental concerns. For example, the construction of a wastewater treatment plant, separation of many combined sewers, and the relocation of the outlet to offshore waters have served to vastly improve water quality in Boston Harbor and surrounding watersheds, enhancing the wellbeing of communities whose livelihood is dependent on it.<sup>1</sup> However many water bodies within the MassBays planning area are still facing environmental challenges. Excess bacteria in the water render beaches unfit for swimming. In 2018 elevated bacteria and rainfall (typically associated with elevated bacteria) accounted for 95% of beach postings for poor water quality.<sup>2</sup> Contaminants in stormwater, accidental discharge of untreated sewage, and similar incidents lead to closure of shellfish beds. In 2018, 422 legal notices were distributed for sanitary reclassification, rainfall closures and re-opening, paralytic shellfish poisoning events, Vibrio closures, oil spills, and more typical emergency closures (e.g. extreme rainfall, and sewage discharge).<sup>3</sup>

A key requirement of National Estuary Programs under Section 320 of the Clean Water Act is to document the effectiveness of efforts designed to improve or preserve the environmental integrity of estuarine resources and share the results via a "State of the Bays" report. This requires an understanding of the natural variability of the ecosystem. A key piece of the CCMP is the development of a monitoring framework strategy to document progress toward the desired environmental outcomes that MassBays stakeholders have identified:

- Improved habitat continuity and hydrology
- Improved water quality
- Restored natural communities
- More resilient coastal habitat

Under Goal 3 of the CCMP, MassBays has taken up a multi-faceted process to set target conditions related to these outcomes for each of the 44 embayments in the planning area. This document provides a framework for identifying existing data sets, supporting ongoing monitoring efforts, prompting new monitoring, and analyzing and interpreting the results in relation to those targets.

Traditionally MassBays has reported on the State of the Bays by coordinating updates from partners and stakeholders across different levels of government, academia, non-profits, and municipalities. A State of

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<sup>1</sup> <http://www.mwra.com/harbor/html/bhrecov.htm>

<sup>2</sup> <https://www.mass.gov/doc/2018-annual-beach-report/download> (page 3)

<sup>3</sup> <https://www.mass.gov/doc/2018-dmf-annual-report/download>

the Bays report or conference was organized every 5 years featuring writers or speakers that provided a wealth of information that made these reports and presentations a success. A major challenge to MassBays' ability to fully report on the State of the Bays, however, is the lack of a continuous and coordinated data collection system across the Bays. This is due to a variety of reasons, including financial and personnel constraints among federal, state, and local government agencies. Existing monitoring programs are separate and distinct, often with a limited scope. Although these programs provide valuable information on the condition of the system they were developed to study, inconsistent approaches limit the availability of data that can be integrated into more comprehensive assessment and reporting.

The MassBays Monitoring Framework is a supplemental technical document of the CCMP. It describes MassBays' approach to integrate data from multiple monitoring programs to support State of the Bays reporting. It also describes how MassBays will address data gaps by providing support to citizen scientists to improve existing programs and create new programs that generate data that can be used for decisionmaking.

## 2. Goals and Objectives

Since its designation as a National Estuary Program in 1990, MassBays has supported scientific research, monitoring, and management actions through technical support, direct funding, and partnerships. Most recently, MassBays engaged local, regional, and statewide stakeholders to develop goals and strategies for inclusion in the CCMP. Each strategy encompasses actions and activities designed to improve local environmental conditions toward the desired outcomes listed previously (Improved habitat continuity and hydrology, improved water quality, restored natural communities, more resilient coastal habitat).

The goals of the MassBays Monitoring Framework are to:

- Document trends in water quality and the health of living resources to measure progress towards targets and better characterize conditions in the Bays;
- Understand causes of impairment, inform responsive action, and assess the effectiveness of the management actions implemented under the CCMP;
- Inform research and modeling efforts by providing data on spatial and temporal variability of environmental conditions and providing regular and locally informed State of the Bays reporting;
- Communicate with the public and decision-makers;
- Enable adaptive management.

To ensure direct alignment to the CCMP and MassBays' mission, the MassBays Monitoring Framework takes up these key questions:

- *Are the goals and objectives of the CCMP being met?*
- *Is the health of the Bays improving?*
- *Are natural/living resources restored/protected?*

### 3. The MassBays Planning Area and its Estuaries

For a full description of the planning area geomorphology, please refer to the CCMP, Chapter 2. The following sections summarize the primary drivers of environmental conditions in the Bays and MassBays' approach to documenting those.

In the 1990s, Massachusetts invested in capacity-building among community watershed groups, and many of them continue to provide leadership in their watersheds with regard to river health. Beginning in 2008 with the Commonwealth's Oceans Act, Massachusetts has consistently invested in ocean planning. With those two efforts flanking (but generally not directly addressing) the near-shore environment, MassBays has chosen to focus on this dynamic ecosystem. MassBays has deliberately and meticulously defined its planning area using ecosystem-based landward and seaward boundaries, rather than municipal or political boundaries. Geospatially available data provided a glimpse into the relative ecological condition of estuaries within Ipswich, Massachusetts, and Cape Cod Bays. This approach helps MassBays focus its efforts and resources to address estuarine management (conservation and restoration) priorities as directed in the CCMP.

The 1100 mile coastline extending from the town of Salisbury on the New Hampshire border to the town of Provincetown at the tip of Cape Cod is characterized by a variety of habitats that are mainly controlled by land use and land cover, hydrological conditions and salinity levels, as well as geological and physical setting and exposure to wind and wave action. MassBays has defined five sub-regions for management purposes:

- Upper North Shore is dominated by the Great Marsh, which is the largest salt marsh north of Long Island Sound and is fed by the Parker-Ipswich-Essex river system. The Merrimack River, at the northern boundary of the planning area, is the largest source of freshwater to the Bays and played a historic role as a focal point of the U.S. Industrial Revolution. Both the Great Marsh and the Merrimack River are characterized by important habitats and species that play a vital role in these ecosystems.
- Lower North Shore which includes Salem Sound and the shoreline around the towns of Swampscott, Saugus and Nahant, is a densely urbanized watershed with more than 65% impervious cover. Significant loss of saltmarsh (<65.5 acres left in Salem Sound) and eelgrass (81% loss in Salem Harbor) have taken place over the past several decades because of urban spreading and concomitant increase in pollution.
- Metro Boston is heavily urbanized and characterized by around 50% impervious cover (EDA, 2017) and significant water transport, shipping, and recreational usage of Boston Harbor. The primary rivers leading to Boston Harbor (the Charles and the Mystic) are dammed, thereby providing limited freshwater input. Ecologically significant salt marsh areas can be found just on the outskirts of Boston including Rumney Marsh to the north and marshes at the mouth of the Neponset River to the south.
- South Shore suburban development adjacent to the metro Boston region gives way to rocky intertidal shores, transitioning into wetlands and sandy beaches and dune systems.

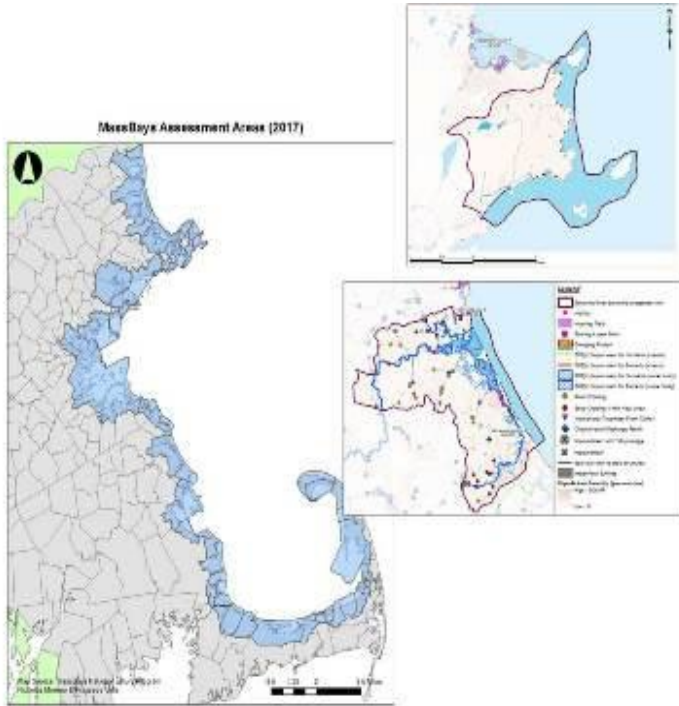
- Cape Cod Bay shores are dominated by sandy coves, dunes, barrier beaches and tidal flats, the results of a terminal moraine. Cape Cod Bay receives most of its freshwater input from groundwater inflow rather than from surface water (rivers). There, nutrient input conveyed by groundwater discharge often exceeds riverine input (Slomp and Van Cappellen 2004).

The following section describes the approach used to characterize and assess estuarine embayments and inter-estuarine areas to develop the Ecosystem Delineation and Assessment (EDA2.0), how the EDA 2.0 tool is being used to categorize estuarine embayments into classes, and how targets will be established to measure progress towards improved environmental conditions and ecosystem health in the estuaries.

### **3.1 Ecosystem Delineation and Assessment**

As described in detail in the CCMP the geomorphology of MassBays creates rich and diverse ecosystems along the coast. In order to get a glimpse into the relative ecological condition of these complex estuaries, MassBays applied ecosystem-based landward and seaward boundaries to define 69 assessment areas between the towns of Salisbury and Provincetown.

Broadly, the assessment areas include 44 estuarine embayments and 21 inter-estuarine areas (defined as linear intertidal shoreline and barrier beaches). In general, the landward boundaries of estuarine embayments that are significantly influenced by riverine input were based on the furthest extent of tidal influence geospatially depicted in wetland and jurisdictional maps for Massachusetts. In the few cases where the embayments had no riverine input, the proximal area of influence was determined using topography. The inter-estuarine areas were delineated using topography, mainly at the sub-basin scale. The Cape Cod region is groundwater-dominated, and the hydrologic basis cannot be delineated using surface topography. Instead, its delineation was primarily based on the groundwater contributing areas (GWCAs) data layer developed by the U.S. Geological Survey (USGS) and by the U.S. Environmental Protection Agency (EPA) (Geosyntec, 2017).



**Figure 1: Map of assessment units. Insets show an inter-estuarine area (top) and an estuarine embayment (bottom)**

The 10-meter bathymetric contour was generally applied as the seaward boundary of the assessment areas. This depth encompasses the photic zone, which includes many of the near-shore marine ecological resources of interest, and therefore approximates an ecologically informed boundary (Geosyntec, 2017). Detailed descriptions of how the boundaries were selected and what datasets were used are provided in 2017 MassBays Ecosystem Delineation and Assessment, Geosyntec Consultants, Inc.

Characterization of the assessment areas is based on carefully chosen attributes that describe the estuary and potential stressors. These include extent of tidal flats, salt marsh, eelgrass beds, shellfish habitat, and shorebird habitat, number of nesting sites, length of anadromous fish passage, , size of impervious area,

volume of stormwater and waste water discharge, percent land use change, population density, water quality conditions, designated shellfish growing area classification, and number of fish barriers and stream crossings. The attributes were selected based on a set of criteria including requirements that data are readily available; data are QA/QC'd, data are collected on an ongoing basis, and data have an approved QAPP.

The resulting Estuarine Delineation and Assessment, now the Ecosystem Delineation and Assessment (EDA 2.1) lays the groundwork for MassBays to compile information on water quality and habitat condition and identify restoration and conservation needs. MassBays developed an interactive story map to allow users to get a closer look at their embayment of interest. The map, available on the MassBays website,<sup>4</sup> shows ecological resources and anthropogenic conditions for each assessment area.<sup>5</sup>

### 3.2 Establishing Environmental Targets

Since 2018 MassBays has been working on an ambitious project (developed as Goal 3, Strategy 3.1 in the CCMP): establishing target (improved) water quality and habitat conditions for the 47 embayments in the planning area.<sup>6</sup> Strategy 3.2 is to guide local action to expand habitat and improve water quality according to these targets.

Figure 2 illustrates the activities MassBays is taking up under these two strategies. The steps include:

<sup>4</sup> <https://www.mass.gov/service-details/ecosystem-delineation-and-assessment>

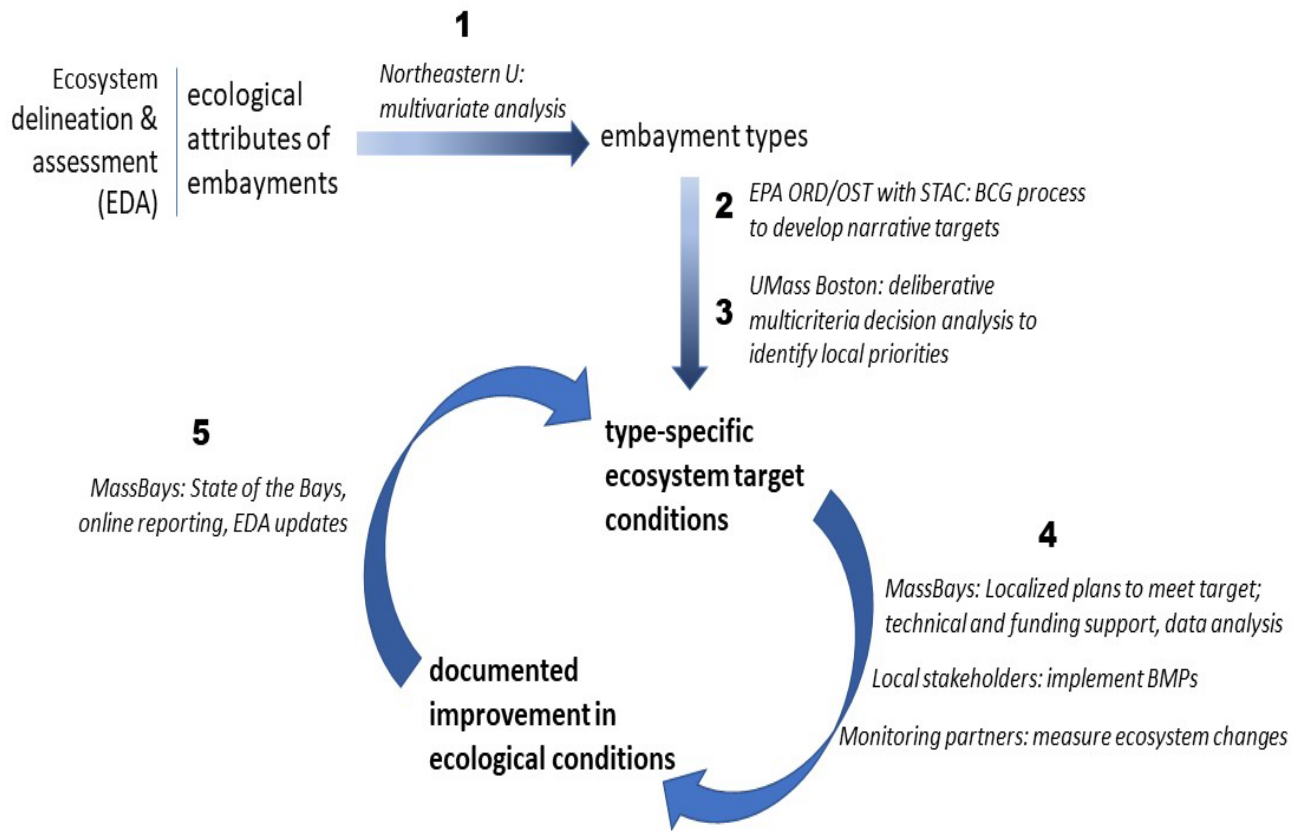
<sup>5</sup> <https://mass-eoea.maps.arcgis.com/apps/MapSeries/index.html?appid=1b4ed0e72ccd4942a78b6ae36d6f6f36>

<sup>6</sup> MassBays will expand target-setting to the inter-estuarine areas using lessons learned in this initial effort focused on estuaries.

1. Northeastern University researchers utilized data from the EDA to conduct a multivariate analysis and split the 47 embayments into four categories.
2. EPA scientists from the Office of Research and Development (ORD) and Office of Science and Technology (OST) are working with MassBays' Science & Technical Advisory Subcommittee (STAC) to apply the Biological Condition Gradient framework (Cicchetti et al. 2017). This tool considers the impact of specific stressors on ecosystem health. A significant outcome of this work will be habitat-specific target conditions for each ecological class, informed by existing conditions (e.g., current seagrass coverage) and restrictions (e.g., the physical shape of the embayment). The indicators for which targets will initially be established include water quality parameters like dissolved oxygen and nutrients, eelgrass extent, salt marsh extent, and anadromous fish counts and run (habitat) continuity.
3. Researchers at the University of Massachusetts Boston (UMB) will lead stakeholders from each embayment class in a deliberative multicriteria decision analysis. Identifying and defining the connections between biological conditions in the embayments and the ecosystem services they provide, is a critical step in garnering support for future actions by MassBays and its partners, as it has been in other restoration efforts (DeAngelis et al., 2020). With information from local stakeholders regarding their priorities for future conditions, and what they are willing to commit to realize the benefits of those improvements, MassBays will be well-situated to work with municipalities to reach those targets.
4. Embayment-specific targets generated via steps 1-3 will drive on-the-ground efforts by MassBays and its partners to mitigate the impact of stressors and improve local conditions. MassBays' Regional Coordinators and Central Staff will engage municipal, nonprofit, and state partners to develop and implement best management practices and restoration efforts. Monitoring results are an important piece of the puzzle and will provide information on whether the management actions and decision-making (as outlined in the CCMP) are having the desired results for improved ecosystems. The MassBays Monitoring Framework is focused on this aspect of the overall process – identifying embayments where monitoring is conducted, gaps that need to be addressed, and the proposed approaches to address these gaps.
5. Under Section 320 of the Clean Water Act, MassBays is required to report regularly on the conditions of the estuaries. Step 5 establishes frequent and regular reporting on the condition of the Bays that depends directly on data gathered from monitoring programs in the planning area, in addition to other work, through online data-sharing and regular State of the Bays reports. Monitoring data will not only provide scientific information on the ecology of the Bays but will also help measure the effectiveness of the management actions taken as part of the implementation of the CCMP.



Figure 2. Process flow chart for CCMP Goal 3, Strategies 3.1 and 3.2.



## 4. Environmental Monitoring in MassBays

Currently there is no comprehensive monitoring program run by the State or other entities that monitors water quality and/or habitat condition across the entire Massachusetts coastline, or even the MassBays planning area. However, several monitoring programs gather data on a local geographical scale that includes one or more embayments. A few of these programs are managed by government entities but the majority are run by community-based environmental organizations and implemented by citizen scientists. In order to fulfill the goals of the CCMP MassBays has turned to nonprofit, citizen-led efforts which are the primary source of current water quality and pathogen data for most of the planning area.

These efforts carried out by agencies and citizen science groups provide a wealth of data that will allow MassBays to monitor trends in estuarine condition across the Bays over time. As indicated earlier, the purpose of this document is not to describe each monitoring program in detail, but rather to summarize the nature of the programs whose data will be incorporated into the MassBays Monitoring Framework to report on the State of the Bays. Nevertheless, a list of programs by embayment is provided in Appendix 1.

### 4.1 Government Monitoring Programs

In Massachusetts there is currently no continuous comprehensive statewide monitoring program. The largest program conducted by state government entities in the estuaries and marine waters is administered by the Massachusetts Water Resources Authority (MWRA) which monitors areas in Boston Harbor and northern Massachusetts Bay for impacts from the Deer Island Wastewater Treatment Plant. Massachusetts Department of Public Health monitors bathing waters for pathogens and the Massachusetts Division of Marine Fisheries (DMF) monitors shellfish growing areas across the state and collects temperature data in association with species-specific programs such as the lobster program.

Over time, large government-run programs have shrunk as the scope of their investigations has narrowed substantially. At the same time, under Section 302 of the Clean Water Act, MassBays is tasked with reporting on the environmental health of the bays. Lacking the resources to conduct a full-scale comprehensive monitoring program, and understanding that such a program may not be appropriate across all the planning area, given its size and diversity, MassBays is turning to citizen scientists as a strong emerging resource that has been gathering data for a long time and its expansive capacity rarely tapped into.

### 4.2 Monitoring Coordinators' Network

In order to foster a strong partnership with citizen science groups, MassBays established the Monitoring Coordinators' Network. The goals of the Network are: (1) to bring volunteer-generated data to bear on policy and management decisions; and (2) to support citizen monitoring groups in meeting their own goals for volunteer recruitment and training, data collection and analysis, sharing of results with their audiences, and long-term sustainability of the monitoring program.

This network of about 45 watershed groups was convened in 2016 to discuss the primary challenges faced by non-profit environmental organizations and how MassBays can provide support including sharing information with audiences and improving the quality of data collection and analysis efforts. In

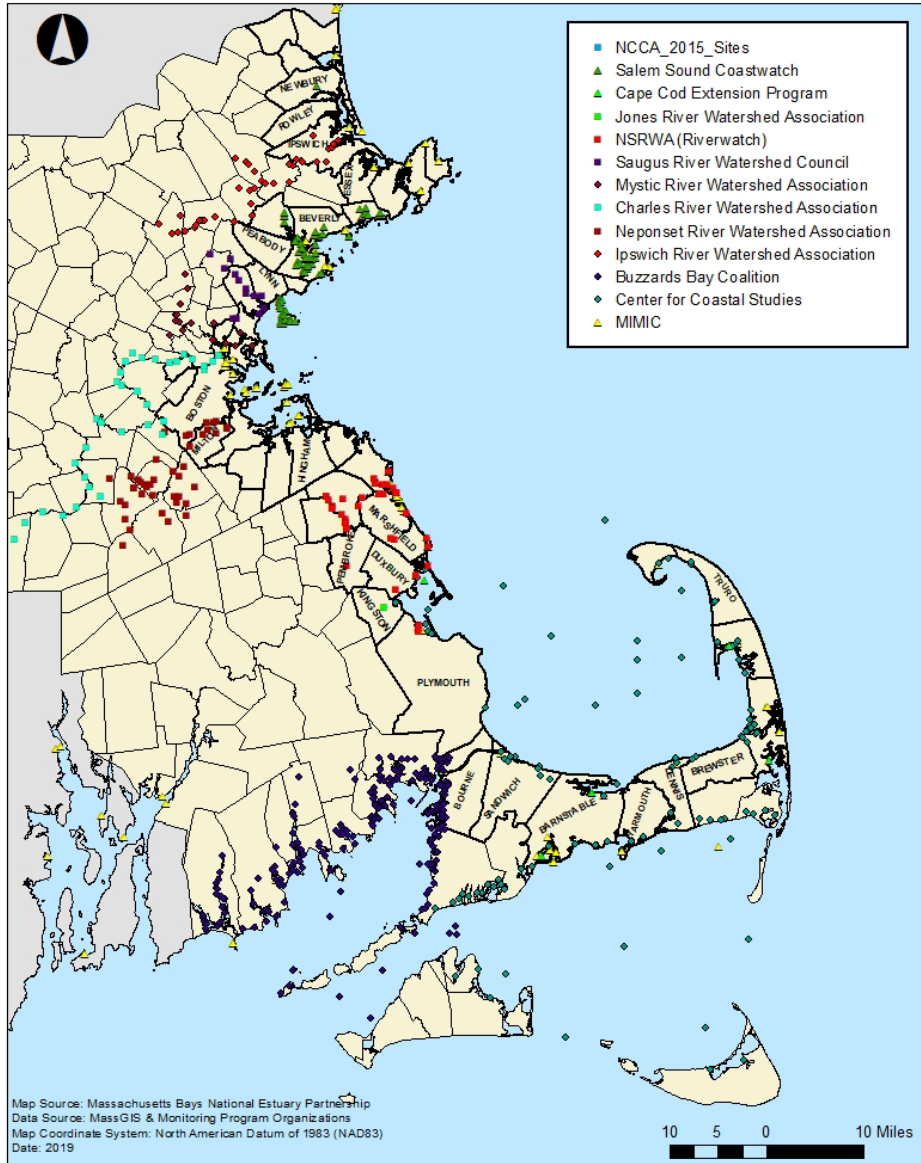
response to a survey conducted by MassBays to identify priority needs by monitoring groups, program coordinators indicated needs in three areas: program design and planning; data management and analysis; and interpretation and dissemination of results. The survey also revealed a need for support in development of Quality Assurance Project Plans (QAPP) and writing successful grants to obtain funding.

Lack of funding and staff capacity has resulted in some monitoring groups being unable to continue their data gathering programs. By working closely with citizen science groups, MassBays is working to help them build capacity to collect and share quality data and information and to have the data available for robust State of the Bays reporting. The steps taken to address these needs are described in more detail in Section 5.

### **4.3 Current Monitoring Programs in the MassBays Planning Area**

As described in Section 3.2, MassBays' CCMP requires careful monitoring and analyses of data collected to track changes over time relative to ecosystem targets. The planned reporting, both online and via State of the Bays events and documents, will serve to inform local and state managers and decisionmakers about the condition of embayments within their jurisdiction so that they are able to better identify priorities for improvement, conservation, and restoration. For example, data on deteriorating water quality in an embayment will alert decisionmakers to respond to and address stormwater issues, perhaps by designing and implementing BMPs. Then, over time, as data from targeted monitoring show steady improvement in water quality conditions, shellfish beds within the embayment may be deemed suitable for harvesting by DMF.

MassBays has compiled a comprehensive list of monitoring programs conducted in the planning area. Detailed information on each program was gathered in 2016 primarily through a survey of monitoring groups and agencies. 25 government agencies and watershed associations responded to the survey. Metadata gathered on each monitoring program includes: name of program, organization, location, water body monitored, primary goal of the program, parameters measured, availability of an approved QAPP, information on data management and analysis, and information on data sharing and availability. The inventory was shared with MassBays' Regional Coordinators and MassBays' Management Committee who provided feedback as well as information on additional efforts which may have been overlooked. The list of programs and related information are currently being updated.



**Figure 3. Coastal Citizen Monitoring Programs in Massachusetts, 2019**

Because monitoring programs within the MassBays planning area vary widely in geographic scope and capacity, MassBays applied a set of screening criteria to identify the programs that can produce regular, robust data which will provide information on trends and changing conditions in the estuaries. An important asset that a monitoring program needs is the availability of an approved QAPP that improves the confidence level in the data for use by MassBays for State of the Bays reporting. Monitoring encompasses water quality, habitat, and species diversity and abundance, all useful to MassBays' efforts to track changing conditions in the Bays, measure the effectiveness of management actions, and prioritize management needs. The programs selected to be included in the MassBays Monitoring Framework are administered by government agencies, academia, and local watershed groups (some of which may not have approved QAPPs yet).

The sections below describe the types of monitoring programs currently underway within the MassBays planning area. This list is not exhaustive. Data from some of these programs as well as others will be incorporated into the MassBays Monitoring Framework after rigorous QA/QC. A list of monitoring programs implemented in Massachusetts is provided in Appendix 2.

#### 4.3.1 Water and sediment quality monitoring

##### MassBays-wide monitoring programs

*National Coastal Condition Assessment:* EPA administers the National Aquatic Resource Surveys (NARS) which are collaborative programs between EPA, states, and tribes designed to assess the quality of U.S. waters using a statistical survey design. Coastal waters are surveyed every five years through the National Coastal Condition Assessment (NCCA), a coastal monitoring program with rigorous quality assurance protocols and standardized sampling procedures designed to produce national and regional estimates of coastal condition.<sup>7</sup> The NCCA program gathers data on water quality, sediment quality, and toxic contaminants in fish tissue. In 2015 MassBays administered the probabilistic survey on behalf of the Commonwealth of Massachusetts and had the opportunity to participate in the allocation of 52 sampling stations, ensuring MassBays had adequate representation in the survey. Although the survey is only conducted every five years, MassBays can look at long-term trends in environmental conditions.

*Massachusetts Coastal Condition Assessment:* The Massachusetts Coastal Condition Assessment (MCCA) is a probabilistic survey for coastal/estuarine/marine waters. The Massachusetts Probabilistic Monitoring & Assessment Program (MAP2) is a component of the Massachusetts Department of Environmental Protection (MassDEP)'s water monitoring strategy that uses randomly selected sites or waterbodies to provide an unbiased assessment of water quality throughout Massachusetts. Section 305(b) of the Clean Water Act requires states to report on the condition of all waters in their respective state. MAP2 will focus on coastal/estuarine/marine waters between 2020 and 2023. Considering the shared needs and responsibilities between the respective programs, MassDEP and MassBays formed a partnership to conduct a probabilistic MCCA that meets the needs and responsibilities of both programs.

The overall goal of the MCCA is to provide an unbiased assessment of designated uses, specifically aquatic life, and water quality trends and conditions in Massachusetts coastal/estuarine/marine waters determined from future surveys. This goal will be achieved by collecting physico-chemical and biological data at 90 probabilistically selected stations between 2020 and 2023, providing statewide coverage over three years. Monthly water and sediment data will be collected at each station (June-August) to reach this goal. Presence/absence and percent cover of eelgrass (where possible) will also be recorded.

*Massachusetts Beaches Monitoring Program:* The Massachusetts Department of Public Health administers a beach monitoring program under federal and state law. During the bathing season, weekly samples are collected from over 500 marine public beaches sampling points across Massachusetts and analyzed for Enterococci. Similarly, data are collected from freshwater (riverine) and analyzed for Enterococci and E. coli. Sample exceedances may result in beach closures and the public is notified. These data will help inform MassBays on the presence of pollution discharge into the embayments.

*Fisheries Program:* The Massachusetts Division of Marine Fisheries (DMF) implements several monitoring programs that include collection of temperature data associated with target species surveys. Data are collected from seafloor stations as well as estuarine and riverine benthos (May – October).

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<sup>7</sup> <https://www.epa.gov/national-aquatic-resource-surveys/ncca>

Over 7 million records have been collected since 1986. Data are QA/QC'd and compiled by the Fisheries Habitat Program into a dataset that is publicly available.

### **Embayment-specific monitoring programs**

There are several embayment-specific programs in the MassBays planning area. These programs will be integrated into the MassBays Monitoring Framework based on the location of the monitoring stations and the scope of the program. MassBays continues to work closely with some of these groups to expand sampling into the estuarine part of the watershed and into the embayment. This section provides a brief description of some of these programs.

*Massachusetts Bay Monitoring Program:* Massachusetts Water Resources Authority (MWRA) has been managing a comprehensive monitoring program in Boston Harbor and Massachusetts Bay to monitor potential impacts of discharge of treated sewage effluent into the Bay since 1995. Data show trends in water quality over time in response to a set of questions. Data are used to inform revisions of the monitoring program, mainly sampling stations. Water and sediment samples are collected from May through October from a major part of Massachusetts Bay, including Boston Harbor and Broad Sound up to Salem Sound. Field work and analysis follow protocols laid out in an approved QAPP and reports on data gathered are discussed with MWRA's Outfall Monitoring Science Advisory Panel (OMSAP) and provided to EPA and are publicly available.

For the past several years, MWRA has observed consistently improving conditions in water and sediment conditions at stations proximal and distal to the outfall. Due to these positive results as well as in response to increasing research on emergent contaminants, MWRA has recently initiated discussion on the possibility of shifting its monitoring focus to respond to more urgent needs and evolving conditions. Discussions are still underway at the time of this report.

*Cape Cod Bay Monitoring Program:* The Center for Coastal Studies (CCS) in Provincetown has been monitoring Cape Cod Bay since 2006, making it the longest-running and only Cape Cod Bay-wide monitoring program. It includes over 60 nearshore stations and 11 offshore stations in the MassBays planning area sampled every two weeks from May through October. Sampling is a collaborative effort between CCS and several volunteer citizen scientists. Key indicators of environmental health (i.e. nutrients, chlorophyll, temperature and turbidity) are analyzed at the CCS laboratory. These data represent critical information about long-term trends of changing conditions in Cape Cod Bay. In 2019, CCS data as well as data from Buzzards Bay Coalition and other smaller organizations were used by the Association to Preserve Cape Cod (MassBays' Regional Service Provider in Cape Cod) to assess the health of Cape Cod waters. A report and associated reporting system were developed to help communities understand the water quality problems they face and the actions that are needed to address these problems.<sup>8</sup>

*Offshore Buoy Network:* Several buoys are located offshore but still within the coastal zone and collecting data relevant to the estuaries. Buoys deployed by NOAA and NERACOOS collect real-time continuous meteorological data as well as temperature and salinity from various locations in Massachusetts Bay (Boston Harbor) and Cape Cod Bay. These data are streamed to the NERACOOS website where they are publicly available. These datasets will provide valuable baseline data on the outer areas of estuarine embayments within MassBays.

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<sup>8</sup> State of the Waters: Cape Cod <https://capecodwaters.org/>

## **Watershed monitoring programs**

As mentioned previously, several non-profit/local groups conduct monitoring in their respective watersheds. Most of the monitoring is implemented in the freshwater segment of the watershed, but some groups also monitor the estuaries. These monitoring programs vary in scope and extent, mainly depending on issues and priorities of concern and resources available. Water samples, mostly collected between May and October by citizen scientist volunteers, are analyzed for nutrients and pathogens. In addition, in situ measurement of dissolved oxygen, temperature, and salinity, provides data on water column conditions.

### **4.3.2 Habitat monitoring**

Habitat monitoring in MassBays is focused mainly on eelgrass, shellfish beds, and salt marsh. These programs are conducted to answer specific questions rather than to carry out a comprehensive assessment through long-term baseline data collection. The data will be incorporated into the MassBays Monitoring Framework as available for specific embayments and analyzed accordingly.

#### **Eelgrass Monitoring**

Eelgrass (*Zostera marina*) is a critical marine habitat and has been the center of many studies and restoration efforts. The MassDEP Eelgrass Mapping and Monitoring Program was initiated in 1994. The statewide mapping effort was conducted in phases between 1994-2012 following standard protocols using aerial surveys and ground truthing in specific areas. An assessment of data collected between 1994-2006 concluded that eelgrass is in a state of statewide decline (Costello & Kenworthy, 2011). A detailed report and viewer are available online.<sup>9</sup>

Since 2006, DMF has conducted research, monitoring, and restoration of eelgrass in Massachusetts. In 2014, DMF and MassBays coordinated to develop a protocol for photointerpretation of MassDEP aerial images using eelgrass data collected by acoustic surveys. This method will generate more reliable information on changing eelgrass conditions in embayments. Monitoring of an eelgrass bed in Beverly, MA, is conducted regularly as part of the international SeagrassNet program that collects data to track trends in seagrass conditions worldwide. Starting in 2013, DMF divers have conducted annual monitoring using the SeagrassNet protocol at four eelgrass reference beds (Marblehead, Boston, Broad Sound, and Nahant). Conditions and changes in these natural areas are compared to transplanted sites to determine restoration success. Acoustic mapping of restoration and reference beds was conducted in 2018 in order to determine the vegetated areas and patchiness of both types of meadows (DMF 2018)<sup>10</sup>.

Acoustic mapping of eelgrass beds by DMF, with support from EPA and MassBays, has yielded information about eelgrass bed extent and condition in Salem Sound and Duxbury-Kingston-Plymouth Bays. In 2018, MassBays and DMF developed a rapid assessment protocol for eelgrass monitoring to be implemented by citizen scientists, with support from EPA. Data from annual assessments conducted in August (eelgrass growing season) in conjunction with less frequent acoustic monitoring (e.g. every 3 years) will allow scientists and managers to observe changing areal extent and spatial variability of eelgrass in this embayment. This protocol may be adopted for implementation in other embayments by citizen science groups. Results of the 2018 study at 250 locations were published in Carr et al. 2018 (2019 results are forthcoming).

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<sup>9</sup> <https://www.mass.gov/guides/eelgrass-mapping-project>

<sup>10</sup> <https://www.mass.gov/doc/2018-dmf-annual-report/download>

## **Saltmarsh Monitoring**

*Saltmarsh Sentinel Project:* Salt marsh monitoring is conducted by various agencies, academia and organizations to answer specific questions. CZM established sentinel sites in three salt marsh locations in 2017 to collect long-term biological and physical data at permanent transects at two locations within MassBays' planning area (Barnstable and Essex). Also beginning in 2017, North and South Rivers Watershed Association has been working with 20 volunteer dock owners to document vegetation presence and changes along established points in the North River and South River estuaries. The goal is to assess changes in saltmarsh extent and community composition over time. Several agencies and research facilities also conduct monitoring and research on saltmarsh ecosystems in the MassBays planning area, for example the Plum Island Estuary LTER, Northeastern University, The Trustees of Reservations, and others.

These long-term monitoring programs will provide MassBays with important information regarding changing conditions in these local settings, providing guidance for decision-making across the Bays. Importantly, saltmarsh extent will serve as a target indicator in the Biological Conditions Gradient process.

### **4.3.3 Species Monitoring**

Several monitoring programs in the Bays are focused on a single species or a group of species. The programs cover different geographic scopes, from one embayment to the entire MassBays planning area. An in-depth assessment of these programs will be conducted in order to better understand how these data may be used to enhance reporting on conditions in the Bays. Species data that are based on approved protocols and QAPPs will be integrated to build knowledge of trends in key species that may serve as indicators of conditions in the estuaries. Standard protocols will be used and described in the MassBays Monitoring QAPP.

## **Shellfish**

The Shellfish Program is administered by DMF. Two methods are applied to control harvesting access: classification and status. Every year, multiple water samples are collected from over 300 shellfish growing areas and analyzed for fecal coliforms. If water quality results trend towards permanent improvement or impairment, the shellfish growing area's classification is upgraded/downgraded. The status of a growing area (open or closed) is adjusted in response to sudden changes in water quality resulting from emergency or unexpected conditions. Changes in the classification of the shellfish growing areas may serve as an indicator of water quality conditions in an embayment.

## **Phytoplankton**

In response to harmful algal threats, DMF's Shellfish Program has been monitoring phytoplankton for several years. On the north shore, qualitative monitoring was conducted with weekly PSP (paralytic shellfish poison) sampling between April and November until 2016. Since 2017, year-round sampling is conducted in the four primary regional stations in Newburyport, Ipswich, Essex, and Gloucester. Additional samples are collected as needed at various times and locations in response to elevated *Pseudo-nitzschia* counts and PSP toxicity. On the south shore, qualitative sampling has been conducted.



Since 2017 quantitative monitoring has replaced the qualitative monitoring that has regularly co-occurred with PSP monitoring.<sup>11</sup>

### Horseshoe crabs

In April, May and June, North and South Rivers Watershed Association, MassBays' Regional Service Provider on the South Shore, coordinates a group of trained dedicated citizen scientists to count and tag horseshoe crabs (*Limulus polyphemus*) individuals during the spawning season on Duxbury Beach. This monitoring program has been taking place since 2008. Data are reported to DMF; since 2012, data from tagged animals have been shared with the U.S. Fish and Wildlife Service.

### Fish

#### *Diadromous fish*

- Alewife (*Alosa pseudoharengus*) and blueback herring (*Alosa aestivalis*) are commonly referred to as river herring. In response to declines in river herring populations in Massachusetts harvesting has been banned since 2006. As a result, management goals to restore river herring populations include monitoring programs. DMF's Diadromous Fish Project<sup>3</sup> includes at least one station targeting spawning run counts and biological data for each of the major coastal drainage areas. Additionally, DMF and local partners use electronic or video technologies to record spawning run counts at 12 river systems. In 2018, a total of 46 rivers in 34 municipalities were monitored by citizen scientists in Massachusetts<sup>12</sup> including several in MassBays. Some of these efforts are coordinated by MassBays' Regional Coordinators who train volunteers to count herring in the runs. In addition, the Massachusetts River Herring Network established through funding by MassBays (2011) is instrumental in supporting efforts to restore river herring populations to their former numbers. At the end of the season, the data are submitted to DMF. These data will be available to MassBays and integrated into the MassBays Monitoring Framework.
- American Shad (*Alosa sapidissima*): DMF monitors American shad in cooperation with Massachusetts Division of Fisheries and Wildlife (MassWildlife) each spring/summer at the Essex Dam fish lift on the Merrimack River in Lawrence, MA. This area now serves as a source of shad larvae, which are then raised at the U.S. Fish and Wildlife Services (USFWS) hatchery in Nashua, NH. Historically, the Charles River was populated by large numbers of shad which over the years have dropped drastically. Since 2006 the Charles River Watershed Association has been working with DMF and USFWS to help restore the shad population to pre-development levels. Since 2011, the released shad have returned each year to the Charles River to spawn. Improved tracking techniques are beginning to provide a fuller picture of the challenges facing the American shad in the Charles River.
- Rainbow Smelt (*Osmerus mordax*): Rainbow smelt population declines since the 1980s prompted DMF to initiate spawning run monitoring using in-stream fyke nets in 2004. This monitoring continues as an annual data series to provide a relative index of abundance and size and age data. The project presently maintains four stations, three of which are in the MassBays planning area: Parker River (Newbury), Fore River (Braintree), and Jones River (Kingston)<sup>3</sup>.

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<sup>11</sup> <https://www.mass.gov/doc/2018-dmf-annual-report/download>

<sup>12</sup> <https://www.mass.gov/doc/2018-dmf-annual-report/download>

- American Eel Young-of-Year (*Anguilla rostrata*): DMF has been monitoring the spring migration of Young-of-year (YOY) eels in the Jones River (Kingston) using a Sheldon trap since 2001 and in the Essex River (Essex) with a fyke net since 2014 to contribute to a coastwide index of eel population relative abundance. DMF also monitors eight eel ramps that are installed in coastal rivers to provide eel passage over barriers. The majority of ramps are managed cooperatively with local groups and outfitted with a collection tank to evaluate the performance of the eel ramp and the potential to use the location as a monitoring station for census counts of YOY or older eels<sup>3</sup>.

*Fish Resource Assessment Program:* Since 1978, DMF has implemented an annual fish trawl survey. In May and in September, DMF conducts trawling within Massachusetts coastal waters and collects abundance and/or biomass data for fish, squid, whelks, and crabs<sup>7</sup>. Although the trawling gear cannot be used in very shallow estuarine areas, the data are still useful to MassBays especially as data on trends in fish biodiversity, abundance, and juveniles can inform on the condition in the embayments. This program will be incorporated into the MassBays Monitoring Framework if it enhances the information on estuarine conditions.

*Fisheries Species Surveys:* DMF conducts yearly surveys on targeted species, mainly American lobster (*Homarus americanus*) and Winter flounder (*Pseudopleuronectes americanus*). Because of their estuarine habitat preference, population data of these and similar species may reflect water quality conditions in the embayments where they inhabit. Although the scope of the survey is for fishery management, the data will still provide long-term trends on embayment condition for the past several decades.

#### 4.4 Gap Assessment

At first glance it may seem that most embayments across the MassBays planning area have some form of monitoring underway (Figure 3). However, MassBays' 2016 survey of monitoring programs served to highlight gaps in data and information in a number of embayments that are not immediately apparent. Survey results revealed that some embayments have (almost) never been monitored, while monitoring programs in others have been discontinued from lack of funding and/or staffing.

Depending on their objectives, existing programs in the embayments vary in geographic scale, frequency and timing of sampling, methods used, data collected, and parameters measured, making it difficult to compare conditions among different embayments. Not all programs collect samples under approved QAPPs, which makes it difficult to assess the reliability and confidence level of the data collected. In some cases, the parameters collected may not be suitable to meet the program objectives or answer the main questions, resulting in wasted efforts. Lack of staff or volunteers often result in data sheets filed away in cabinets for years, and the data never shared.

For example, the Merrimack River Watershed Council (MRWC) conducted a monitoring program in the Massachusetts area of the Merrimack River, including the estuary. The Merrimack River is the largest river that discharges into the MassBays planning area. The river is surrounded by a highly urbanized and industrial watershed with numerous non-point sources as well as discharge from treatment plants and other infrastructure. The river is classified for impairments by zinc and phosphates. At the same time, parts of the river serve as essential habitat for Atlantic sturgeon. Previously, Joppa Flats at the mouth of the river was populated by eelgrass beds which have since disappeared (Novak, pers. comm.). Between 2008 and 2012, MRWC collected monthly water quality data, mainly temperature, salinity, DO, and fecal coliforms. In addition, nutrient data (nitrates, phosphates, and ammonium) were collected during 2011.

However, when funding ceased after 2012, MRWC was forced to discontinue its monitoring program. Over the last decade, government agencies have conducted targeted sampling tied to MS4 and other regulatory programs, but to date no comprehensive ambient monitoring program has been reinstated. MassBays, through its Regional Service Provider for the Upper North Shore, is laying plans to help MRWC and surrounding communities develop a comprehensive monitoring plan and secure resources to implement the plan.

## **5. MassBays Monitoring Framework Approach**

The goal of the MassBays Monitoring Framework is to develop an approach for comprehensive data collection and analysis that will help MassBays integrate data from existing, qualifying programs in order to track changes in spatial and temporal conditions in the Bays. Where geographic or monitoring gaps exist, MassBays will work to identify the reasons for these gaps and will work with local groups and relevant agencies to address them.

As described in Section 4, monitoring programs within MassBays target varied aspects of environmental monitoring. The majority of the programs monitor water quality. Some programs also look at sediment quality while others track abundance and population dynamics of specific species. This section describes the approach by which MassBays will seek to support the gathering of statistically and scientifically robust data for measures relevant to the CCMP, use the data to track and report on changes in estuarine conditions, and use the results to communicate to stakeholders and to leverage support for decision-making and actions that will address environmental concerns.

### **5.1 Qualifying Monitoring Programs**

In order for data generated by monitoring programs in the MassBays planning area to be incorporated into the State of the Bays reporting, the data need to be, at a minimum: (1) collected and analyzed based on an approved QAPP, (2) based on state or federal standard methods or equivalent alternatives; and (3) available in a consistent and usable format. In addition, data need to be statistically and scientifically robust and datasets should include a minimum set of parameters depending on the scope of the program.

Monitoring programs administered by government agencies or conducted by academia for research purposes operate under approved QAPPs and generate statistically reliable data, for example, Massachusetts Bay Monitoring Program (MWRA), Beach Monitoring Program (DPH), and Cape Cod Bay Monitoring Program (CCS).

Through the 2016 survey of monitoring programs, MassBays identified and evaluated citizen-generated datasets and defined two tiers: (1) A Tier 1 program holds datasets that cover water quality (at a minimum) in one or more embayments, is based on a state- or federally formally approved QAPP, uses methods or protocols approved by state or federal agencies, and maintains electronic data files. (2) A Tier 2 program collects data from one or more embayments, but data are not collected according to a QAPP. MassBays will focus its efforts to help and support local groups so that the monitoring programs they implement will generate usable and informative data.

Most local groups, in both Tier 1 and Tier 2, conduct monitoring programs which typically collect samples from one embayment. The majority of the sampling stations are located in the freshwater part

of the watershed but some of the programs have stations in the estuarine parts as well. MassBays will seek to expand sampling in the estuaries by all partners and will continue to work closely with the program managers to encourage sampling in the estuary with technical support and assistance in obtaining funding. The goal is to gain adequate numbers of sampling stations to provide data for analyses and reach statistically reliable conclusions about conditions in the given embayment. The sections below describe briefly some of the steps that will be taken by MassBays to provide this support to community-based monitoring groups.

### 5.1.1 Quality Assurance Project Plan

Developing a QAPP was identified as one of the bigger challenges faced by local monitoring groups. In order to be state or federal-approved, a QAPP must include specific elements: include description of a statistically robust sampling design, have a stated purpose addressing clearly identified questions, include data quality objectives, and have a data QA/QC and management strategy.

To assist monitoring groups that do not meet these requirements, MassBays is working with MassDEP, EPA and Eastern Research Group (ERG) to develop a master QAPP and an associated open-source, web-based tool (AquaQAPP) that guides users in the development of a QAPP and help improve citizen monitoring data quality for use by decisionmakers. This tool will streamline the current process for producing QAPPs, support QA/QC development, and establish consistent data collection methods across MassBays. The tool's flexible design will allow it to be adapted to the needs of stakeholders and users. The tool will be registered with EPA's Reusable Component Services<sup>13</sup> and EPA's Developer Central.<sup>14</sup>

AquaQAPP allows users to develop a QAPP for monitoring marine and freshwater quality and marine and freshwater benthic sediment chemistry and benthic infauna. Preset parameters allow users to create a QAPP that is state and federally pre-approved. Standard operating procedures (SOPs) were compiled by MassBays from agency-developed or approved sources, to provide field sampling guidance to volunteer monitoring groups.

### 5.1.2 Where and when to sample

Sampling design is a critical component of generating data that address the initial concern, whether an interest in general health of the system, or suitability for recreational use. Depending on the objective of the monitoring program, either a random or targeted sampling design will be applied to identify sampling stations. Sampling stations are frequently located at points that are more accessible from land or by small boat. Although some of these stations may not always be optimally located to capture water quality status or changing conditions, samples from long-established programs will be valuable because of the extent of data on temporal variability available.

Most monitoring programs focus on the time period between May and October, when weather conditions permit easier access to waterbodies for sample collection. Depending on the issue being addressed, this period is also the most appropriate to observe changing conditions over several years, as this is the most active growing period in the Massachusetts climate. Within this time period, groups monitor at varying frequencies, often depending on capacity and needs. Most samples are collected every 2 to 4 weeks. If enough samples are collected to provide statistically robust results, the data will be useful to show changing conditions over time.

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<sup>13</sup> [www.epa.gov/rcs](http://www.epa.gov/rcs)

<sup>14</sup> For more information on this project, visit <https://www.mass.gov/info-details/exchange-network-project>

For specific monitoring, wet and/or dry samples may be required. This entails the need to have staff or volunteers available to collect samples at the appropriate time and deliver to the laboratory for analysis within a set period of time that does not exceed holding time.

### 5.1.3 What and how to sample

Most monitoring groups measure basic water quality parameters including temperature, salinity and dissolved oxygen. Several groups monitor pathogens. The larger monitoring groups also collect data on nutrients and chlorophyll depending on the sampling area and scope of the monitoring program. MassBays will work with monitoring groups to provide technical support where needed to ensure that a basic set of water quality parameters are measured. This will enable MassBays to look at changes within individual embayments and compare across embayments, thereby providing information for State of the Bays reporting and to guide management actions. The parameters measured are selected based on the issue that a monitoring group is addressing and the questions it is trying to answer. Categories may include nutrient sampling (in areas close to outfalls and to non-point discharge), pathogen sampling (in areas close to septic systems), among others.

Benthic sampling including sediment characterization and chemistry, and identification of infauna assemblages may also be conducted, especially by larger monitoring organizations with adequate resources for the specialized analyses required. These data are valuable in characterizing the health of benthic ecosystems in the MassBays planning area. Embayment health and condition may be correlated to the state of eelgrass beds where these exist. However, in embayments where habitat is not suitable for eelgrass growth (e.g. due to sediment type or exposure), benthic community structure and sediment condition are often used to track changing conditions.

Information on the specific methods used to collect and analyze samples is important for integration of the data into MassBays State of the Bays reporting. If a group wants their data used by decision makers, they should collect and measure samples according to state and/or federally approved standard procedures. MassBays will work with the program's monitoring coordinator to develop a QAPP for agency review. The QAPP development process includes consideration of sample and data QA/QC. Monitoring groups that have existing approved QAPPs will already have QA/QC process in place. Even those groups that do not have an approved QAPP may still be using standard field SOPs, and if so, would likely already be implementing these measures and it will be a simpler matter to develop a QAPP. The 2016 survey results indicate that the majority of monitoring programs are already following standard field and laboratory SOPs which could make their data usable for MassBays' purposes.

## 5.2 Addressing Data Gaps

Data gaps across the MassBays planning area range from watersheds/embayments that have no long-term comprehensive monitoring program, to programs that have a limited focus, to monitoring programs that are not operated under an approved QAPP. MassBays will address data gaps through several avenues, for example MassBays will:

- 1) Provide support to existing monitoring groups to expand spatial and temporal coverage, for example sampling in estuarine waters, conducting sampling based on a statistically robust sampling design, and sampling for additional parameters that address concerns more directly.
- 2) Initiate baseline monitoring tailored for a specific area to support longer-term assessments. For example, in 2019 MassBays led a survey to collect data on nutrient dynamics in Salem Sound. In

2020 MassBays will continue this sampling and expand to include a benthic assessment. These preliminary data will be used to shape a long-term monitoring program in Salem Sound that can be handed over to the MassBays Regional Coordinator and local communities.

- 3) Support groups that want to implement new monitoring programs or restart discontinued programs in their embayments. MassBays can provide guidance on the appropriate sample and analysis plans to address their needs as well as collect data that will provide MassBays with information about ecosystem health. For example, a local group in Duxbury Bay is currently exploring the possibility of establishing a monitoring program in the embayment. MassBays provides guidance regarding potential research and monitoring approaches to fill data gaps. In the case of Duxbury Bay, potential investigations include identifying the causes of extensive eelgrass loss, building on monitoring that has been conducted by CCS since 2006, and expanding sampling site coverage into Kingston and Plymouth Bays.
- 4) Provide grant-writing support to obtain funding for monitoring programs. MassBays' Healthy Estuaries Grant program provides an opportunity for monitoring groups to collect data for specific purposes, including addressing knowledge gaps. MassBays encourages groups to use funding under this grant to propose projects that will assist groups in identifying monitoring goals and establish capacity needs.

### 5.3 Making Data Available

As indicated previously, the capacity of monitoring groups will impact how the data are used and shared. Several watershed organizations with ongoing monitoring programs share their data through their websites. Data analysis, including graphics that summarize changing conditions, are often provided as a best practice for retaining volunteers. (West and Pateman, 2016). Some groups also upload their data to government portals such as EPA's WQX where data may be shared and downloaded by other entities.

Not all groups, however, have the capacity needed to maintain a robust data management system. Smaller groups have reported to MassBays that their data are entered into spreadsheets and saved to different computers; others keep years-old, hand-filled field sheets stored in boxes or file cabinets. In response to this obvious need for support with data analyses and sharing, MassBays is implementing a plan to upload citizen monitoring data into EPA's WQX database. By leveraging the available tools and components from EPA such as WQX web templates, and with support from MassBays' Circuit Rider, citizen groups will develop capacity to use customized templates so that their data can be downloaded and utilized for a variety of purposes. Finally, MassBays is partnering with the Massachusetts Rivers Alliance to support data sharing with multiple audiences to meet their own organizational goals.

### 5.4 Adaptive Monitoring

Once MassBays defines targets for specific ecosystem indicators (eelgrass extent, saltmarsh extent, fish runs, and water quality index), data provided by multiple monitoring programs described above will be analyzed to measure changes relative to those targets. The analysis will inform local efforts to improve water quality and ecosystem health, as well as State of the Bays reporting through a MassBays Eco-health Tracking System. This online system will provide stakeholders and the general public with

information on estuarine conditions in the MassBays planning area on a more tailored and frequent basis than the five-year reports required by EPA.

Comprehensive and holistic analysis of longer-term datasets will also inform decision makers and monitoring groups about additional monitoring which may be needed as conditions change. MWRA's outfall monitoring program is a model for this approach: the quasi-governmental agency has been monitoring numerous parameters in Boston Harbor for 20 years. Over time, improving conditions triggered MWRA to revise data collection frequency in some stations, and advisors to the program have stated that it may be time to shift attention to emergent contaminants which had previously not been monitored.

Applying an adaptive monitoring approach supports flexibility. While certain basic parameters such as temperature will always be tracked, and certain key locations will always be monitored for baseline conditions, MassBays' priorities are likely to evolve over time according to changing conditions. With climate change, for example, increased stormwater discharge, continued coastal acidification, and more coastal erosion are expected. Already, increased eelgrass loss and marsh flooding are being observed. With data in hand, MassBays can work with partners to redirect resources and efforts to where there are most needed.

## 6. DATA MANAGEMENT AND ANALYSIS

Three main challenges will need to be addressed as MassBays collects data from a variety of sources: (1) scope and scale of data collected; (2) availability and accessibility of data; and (3) data quality.

*Scope and scale:* Monitoring programs across the MassBays planning area are varied in their geographic and time scope. Integrating multiple datasets will require several QA/QC steps prior to data analysis and interpretation for data standardization.

*Accessibility:* Data collected by government entities are usually either available online or upon request. MassBays' 2016 survey of citizen scientist groups revealed that only some citizen-generated datasets are readily accessible. Data sharing is restricted partly due to the format in which data are stored and partly because some community-based monitoring groups are reluctant to share data they lack the resources to analyze.

*Quality:* A survey focused on Cape Cod nonprofit organizations in 2014 (n=25) revealed that while some organizations have approved QAPPs, others use protocols that may not meet the standards required by regulators. Some groups have never conducted statistical analyses of their data alongside a trained scientist or with an accredited institution. These findings are consistent with subsequent investigations by the Massachusetts Rivers Alliance and the New England Interstate Water Pollution Control Commission (NEIWPC).

To document steps taken to address these challenges, and to carry out this Monitoring Framework, MassBays will develop a QAPP for secondary data. The MassBays Monitoring QAPP will include a comprehensive data management and analysis plan describing in detail how secondary data will be checked, analyzed, and integrated into the MassBays Monitoring Framework for State of the Bays reporting. The MassBays Monitoring QAPP will be submitted to EPA for review and approval.

## 7. REPORTING

Effective dissemination and reporting is the primary goal of the MassBays Monitoring Framework. The results of data analyses using the Framework and according to the MassBays Monitoring QAPP will be shared with multiple audiences, including local residents, nonprofit partners, federal, state, and local agencies and other decisionmakers, and academic researchers. The reporting methods are listed below, with the intended audience(s) indicated.

*Regional Symposia:* Each of MassBays' Regional Service Providers periodically reports on local trends and conditions. The Cape Cod Coastal Conference Great Marsh Symposium, State of Salem Sound Symposium, Boston Harbor and Islands Science Symposium, and the Watershed Action Alliance of Southeastern Massachusetts's biennial conference bring together community members, researchers, nonprofit environmental groups, and state and local decisionmakers to share knowledge of the local resources, and the results of monitoring, restoration, and conservation actions taken over the previous year.

*Online reporting:* In 2019, MassBays' Cape Cod Regional Service Provider initiated a State of the Waters report based on data collected by monitoring programs in Cape Cod Bay, Buzzards Bay, and Nantucket Sound. With input from an expert advisory group, APCC integrated data from these programs to develop a water quality index for Cape Cod. The resulting report has been covered extensively by the press, and desired water quality improvements have been incorporated into the Cape Cod Commission's regional planning.

With funding from the EPA Exchange Network, MassBays will work CEI to develop a MassBays Ecohealth Tracking Tool to integrate data from across the planning area and provide assessments of progress toward habitat and water quality targets to multiple audiences in a user-friendly interface. The process will include compiling and analyzing monitoring data from various monitoring groups downloaded from EPA's WQX Portal, and designing a MassBays-specific, web-and map-based visualization of water quality, indicating both current conditions and longer-term trends towards established targets. The audience for the online tool is broad, and MassBays and its Regional Service Providers will use it as a starting place for prompting action among community members, municipal staff and elected officials, and state agencies to support on-the-ground efforts to improve ecosystem conditions.



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## Appendix 1: Water Quality Monitoring Programs

The list includes embayments with water quality monitoring programs in Massachusetts. The list is being revised, confirmed and updated and therefore may not be exhaustive.

<b>Estuarine Embayment</b>	<b>Organization</b>	<b>ongoing water monitoring</b>
ALL/VARIOUS	MA Division of Marine Fisheries	shellfish growing areas
		temperature
	MA Department of Public Health	bathing water quality
<b>UPPER NORTH SHORE REGION</b>		
Merrimack River	Merrimack River Watershed Council	None (only research)
	U.S. EPA	water quality program
Parker River	Parker River Association	Parker River Clean Water
Rowley River		
Ipswich River	Ipswich River Watershed Association	Riverwatch
Plum Island Sound	PIE LTER	Research
Essex River/Essex Bay		
Annisquam River		
Gloucester Harbor		
<b>LOWER NORTH SHORE REGION</b>		
Salem Sound	Salem Sound Coastwatch	Clean Beaches & Streams
Manchester Harbor		
Danvers River		
Forest River/South River/Salem Harbor		
Marblehead Harbor		
Saugus River/Pines River/Lynn Harbor	Saugus River Watershed Council	Saugus River Monitoring Program
<b>METRO BOSTON REGION</b>		
Belle Isle Creek/Winthrop Bay		
Chelsea Creek/Mystic River/Charles River	Charles River Watershed Association	Charles River Monitoring
	Mystic River Watershed Association	Mystic River Water Monitoring
Neponset River/Dorchester Bay	Neponset River Watershed Association	Citizen Water Monitoring Network
Boston Harbor	Massachusetts Water Resources Authority	Harbor and Bay Marine Program
Blacks Creek/Quincy Bay		

<b>Estuarine Embayment</b>	<b>Organization</b>	<b>Ongoing water monitoring</b>
<b>SOUTH SHORE REGION</b>		
Back River/Fore River/Hingham Bay		
Weir River/Straits Pond		
Cohasset Harbor		
Scituate Harbor		
North River/South River	North & South Rivers Watershed Association	Riverwatch
Back River/Bluefish River/Duxbury Bay	Center for Coastal Studies	Cape Cod Marine Program
	Cape Cod Cooperative Extension	Marine Monitoring Program
	North & South Rivers Watershed Association	
Jones River/Kingston Bay	Jones River Watershed Association	None (herring counts)
	Center for Coastal Studies	Cape Cod Marine Program
Eel River/Plymouth Bay	Center for Coastal Studies	Cape Cod Marine Program
Ellisville Harbor		
<b>CAPE COD BAY (ALL)</b>	Center for Coastal Studies	Cape Cod Marine Program
	Barnstable County DPH	Beach Water Quality Program
Sandwich Harbor		
Scorton Creek		
Barnstable Harbor	Cape Cod Cooperative Extension	Marine Monitoring Program
Chase Garden Creek		
Sesuit Creek/Sesuit Harbor		
Quivett Creek		
Paine's Creek/Stony Brook		
<b>Estuarine Embayment</b>	<b>Organization</b>	<b>ongoing water monitoring</b>
Namskaket Creek/Little Namskaket Creek		
Boat Meadow Creek/Rock Harbor		
Mayo Creek/Wellfleet Harbor/Herring River	Friends of Herring River	project-based
	Cape Cod Cooperative Extension	Marine Monitoring Program
Pamet River/Little Pamet River		
Provincetown Harbor		