*This document contains overall and specific condition of the Massachusetts Bays Program from the National Estuary Program Coastal Condition Report. The entire report can be downloaded from*
***http://www.epa.gov/owow/oceans/nepccr/index.html***

# National Estuary Program Coastal Condition Report

# Chapter 3: Northeast National Estuary Program Coastal Condition, Massachusetts Bays Program

June 2007

# Massachusetts Bays Program



www.mass.gov/envir/massbays

## Background

The Massachusetts Bays cover more than 800 miles of coastline, from the tip of Cape Cod Bay to the New Hampshire border, and serve 50 coastal communities. The Bays' NEP study area encompasses about 1,650 $mi^2$ and is located at the southern end of the Gulf of Maine, a large coastal sea characterized by relatively cool water and large tidal ranges (MBP, 2004b). The Bays' NEP study area includes Cape Cod Bay, Massachusetts Bay, Boston Harbor, the Merrimack River, the North and South shores, and the portion of Ipswich Bay in Massachusetts. The watershed of the Massachusetts Bays covers more than 7,000 $mi^2$, with the majority of freshwater that flows into the Bays coming from the Charles and Merrimack rivers (Martin et al., 1996; MBP, 2004b).

Natural habitats in the Massachusetts Bays' watershed include freshwater and saltwater marshes, tidal flats, barrier island beaches, eelgrass meadows, rocky intertidal shores, and numerous small lakes and salt ponds. Outside of Boston Harbor, the Massachusetts Bays support a rich, healthy marine ecosystem. Local wildlife refuges and marine sanctuaries are home to whales, fish, and more than 300 species of birds

(Martin et al., 1996). Finfish caught in the Bays include bluefin tuna, Atlantic cod, winter flounder, Atlantic flounder, and Atlantic herring, and harvested shellfish species include soft shell clams, oysters, bay scallops, American lobster, and blue mussels.

More than 3.8 million people live in the Massachusetts Bays' watershed, and this number is growing. Pressures from human development exacerbate environmental problems by increasing stormwater runoff, sewage-related pollution, and the effects on fragile coastal habitats. In addition, the number of housing units on Cape Cod more than doubled between 1970 and 1990, from 65,676 to 135,192. This population growth is the equivalent of adding almost 10 new housing units a day for 20 years (ANEP, 2001c). Such development is producing more impervious surfaces, and as a result, increasing the stormwater volumes and velocities that the Bays must absorb.

Boston, the major shipping port in this estuary, generates $8 billion in annual revenues and supports 9,000 jobs (MBP, 2004b). Water-based economies for this NEP study area include tourism, commercial fisheries, and local marinas, which depend directly on the resources provided by the Massachusetts Bays. Boston Harbor is a center for numerous public resources, including the shipping industry, marine research institutions, whale-watching activities, and the Harbor Island Park system. The Massachusetts coast attracts visitors from all over New England to enjoy kayaking, sailing, surfing, and hiking. The Massachusetts Department of Public Health (MDPH) posts annual beach reports at http://www.mass.gov/dph/beha/tox/reports/beach/beaches.htm.

The Massachusetts Bays Program (MBP) was launched in 1988 to address threats to the health of the Massachusetts and Cape Cod bays. In 1990, EPA accepted the MBP into the NEP. To ensure that each of the MBP's 50 communities receives its share of attention, the program partners with watershed associations and regional planning agencies to provide regional coordinators in five subregions: Upper North Shore, Salem Sound, Metro Boston, South Shore, and Cape Cod (MBP, 2004b).

## Environmental Concerns

The Massachusetts Bays face a variety of environmental concerns, including increasing stormwater runoff, sewage-related pollution, and the effects of human development on fragile coastal habitats. These pressures threaten the health of the Massachusetts Bays and cause approximately 1,000 acres of the Bays' coastal and inland wetlands to be lost each year. Boston Harbor and the North Shore have historically also been affected by toxic contamination problems, including elevated levels of PAHs, copper, arsenic, lead, cadmium, mercury, chromium, nickel, zinc, PCBs, and pesticides. The status and trends of exploited fish stocks in the Massachusetts Bays is another primary concern of the MBP. Trawl surveys have helped identify declining trends in a variety of commercially important finfish (Martin et al., 1996). In addition, invasive species have caused significant economic impacts to industries that are dependent upon shellfish, groundfish, and coastal recreation. These impacts include the fouling of aquaculture facilities and the spread of diseases among native species.

## Population Pressures

The population of the 6 NOAA-designated coastal counties (Barnstable, Essex, Middlesex, Norfolk, Plymouth, and Suffolk) coincident with the MBP study area increased by more that 23% during a 40-year period, from 3.4 million people in 1960 to almost 4.2 million people in 2000 (Figure 3-27) (U.S. Census Bureau, 1991; 2001). This rate of population growth for the MBP study area is equivalent to the population growth rate of 24% for the collective NEP-coincident coastal counties of the Northeast Coast region. In 2000, the population density of these 6 coastal counties was 1,493 persons/mi$^2$, about 40% higher than the population density of 1,055 persons/mi$^2$ for the collective NEP-coincident coastal counties of the Northeast Coast region (U.S. Census Bureau, 2001). Population pressures for this NEP are likely to be high because this estuary serves a major metropolitan area and center for commerce, including major commercial fishing activities in these coastal communities.

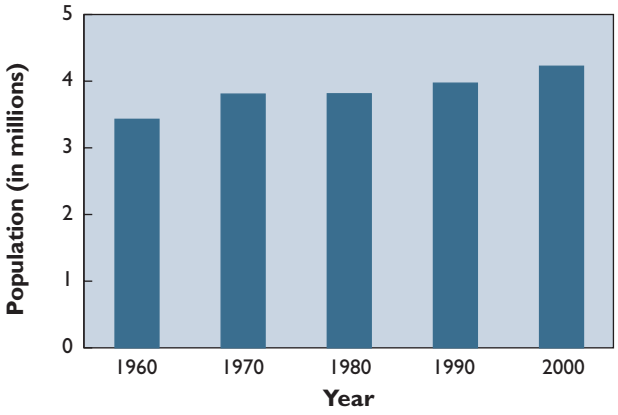


**Figure 3-27.** Population of NOAA-designated coastal counties of the MBP study area, 1960–2000 (U.S. Census Bureau, 1991; 2001).

## NCA Indices of Estuarine Condition—Massachusetts Bays

The overall condition of the Massachusetts Bays is rated fair based on the four indices of estuarine condition used by the NCA (Figure 3-28). The water quality index for the Bays is rated good; the sediment and benthic indices are rated poor (although fair may be more appropriate, see later discussions); and the fish tissue contaminants index is rated fair. Figure 3-29 provides a summary of the percentage of estuarine area rated good, fair, poor, or missing for each parameter considered. This assessment is based on data from 44 NCA sites sampled in the MBP estuarine area in 2000 and 2001. Please refer to Tables 1-24, 1-25, and 1-26 (Chapter 1) for a summary of the criteria used to develop the rating for each index and component indicator.

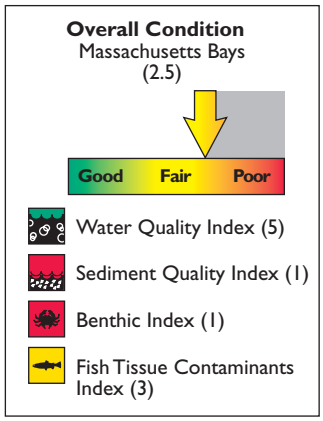


**Figure 3-28.** The overall condition of the MBP estuarine area is fair (U.S. EPA/NCA).

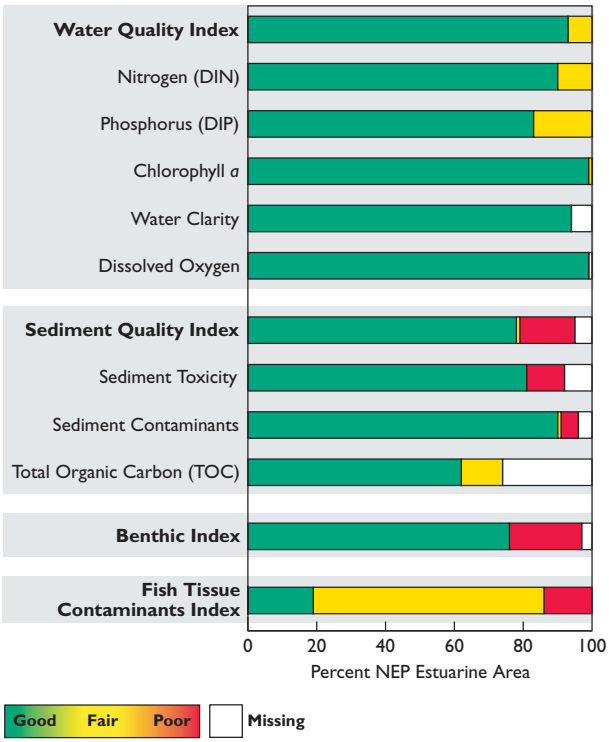


**Figure 3-29.** Percentage of NEP estuarine area achieving each rating for all indices and component indicators — Massachusetts Bays (U.S. EPA/NCA).

## Water Quality Index

The water quality index for the Massachusetts Bays is rated good (Figure 3-30). The Massachusetts Bays have one of the best ratings for water quality among the Northeast Coast NEP estuaries, with 93% of the Massachusetts Bays' estuarine area receiving a good rating for water quality. This index was developed using NCA data on five component indicators: DIN, DIP, chlorophyll *a*, water clarity, and dissolved oxygen.

### *Dissolved Nitrogen and Phosphorus*

The Massachusetts Bays are rated good for DIN concentrations. Ninety percent of the estuarine area was rated good for DIN concentrations, 10% was rated fair, and none of the area was rated poor. The Massachusetts Bays are also rated good for DIP concentrations because 83% of the estuarine area was rated good for this component indicator and 17% of the area was rated fair. None of the estuarine area was rated poor for DIP concentrations.

***Chlorophyll a*** | The Massachusetts Bays are rated good for chlorophyll *a* concentrations. Of the estuarine area, 99% and 1% were rated good and fair, respectively, and none of the estuarine area was rated poor for chlorophyll *a* concentrations.

***Water Clarity*** | The water clarity rating for the Massachusetts Bays is good. None of the estuarine area was rated poor for water clarity, and 94% of the area was rated good. NCA data on water clarity were unavailable for 6% of the MBP estuarine area.

***Dissolved Oxygen*** | The Massachusetts Bays are rated good for dissolved oxygen because 99% of the estuarine area was rated good for this component indicator. No area of the Bays was rated poor for dissolved oxygen concentrations, and NCA data on dissolved oxygen concentrations were unavailable for only 1% of the MBP estuarine area.

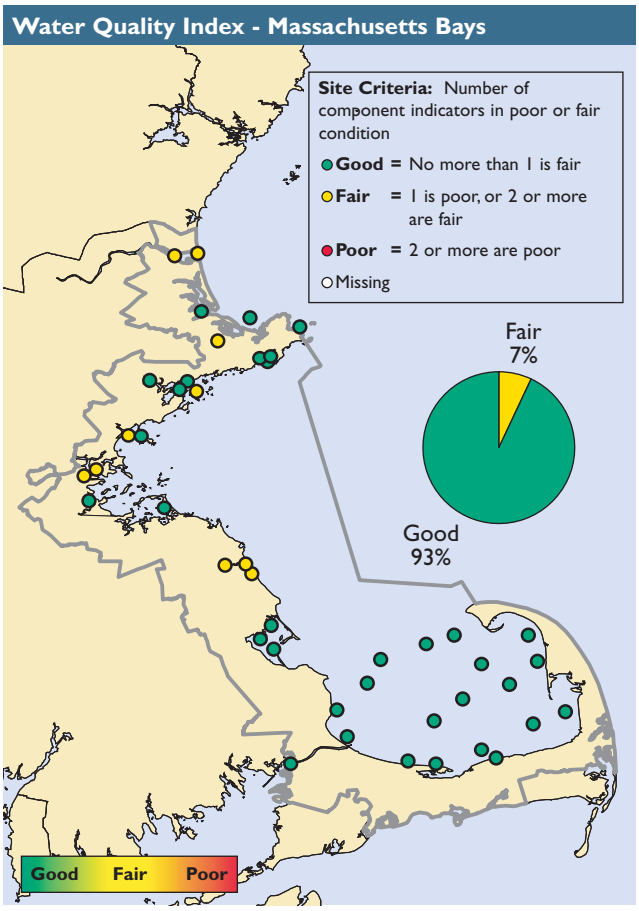


**Figure 3-30.** Water quality index data for the Massachusetts Bays, 2000–2001 (U.S. EPA/NCA).

## Sediment Quality Index

The sediment quality index for the Massachusetts Bays is rated poor, with 16% of the Bays' estuarine area classified as poor, just slightly higher than the 15% threshold used to define this category (Figure 3-31). This index was developed using NCA data on three component indicators: sediment toxicity, sediment contaminants, and sediment TOC. Sediment toxicity was evident at four sites (11% by area); however, these sites did not coincide with areas of sediment contamination. High concentrations of sediment contaminants were found at just two Boston Harbor sites, reflecting a legacy of pollution that stems from several decades of abuse. Moderate sediment contaminant concentrations were found at three additional sites, in total comprising about 5% of the Bays' estuarine area—a relatively minor record of contamination compared with other Northeast Coast NEP estuaries. TOC levels for the Bays were typical for the Northeast Coast region. The sediment quality rating of poor for the Massachusetts Bays largely reflects the absence of overlap in sites impaired for each of the three component indicators. A fair rating for the Massachusetts Bays may be a better assessment of sediment quality.

***Sediment Toxicity*** | The sediment toxicity rating for the Massachusetts Bays is poor. Eleven percent of the estuarine area was rated poor, and NCA data on this component indicator were unavailable for 8% of the MBP estuarine area.

***Sediment Contaminants*** | The Massachusetts Bays are rated fair for sediment contaminant concentrations. Approximately 5% of the estuarine area was rated poor, 1% of the area was rated fair, and 90% of the area was rated good for this component indicator.

***Total Organic Carbon*** | The Massachusetts Bays are rated good for sediment TOC. Sixty-two percent of the estuarine area was rated good for TOC concentrations, 12% of the area was rated fair, and none of the area was rated poor. NCA data on this component indicator were unavailable for 26% of the MBP estuarine area.

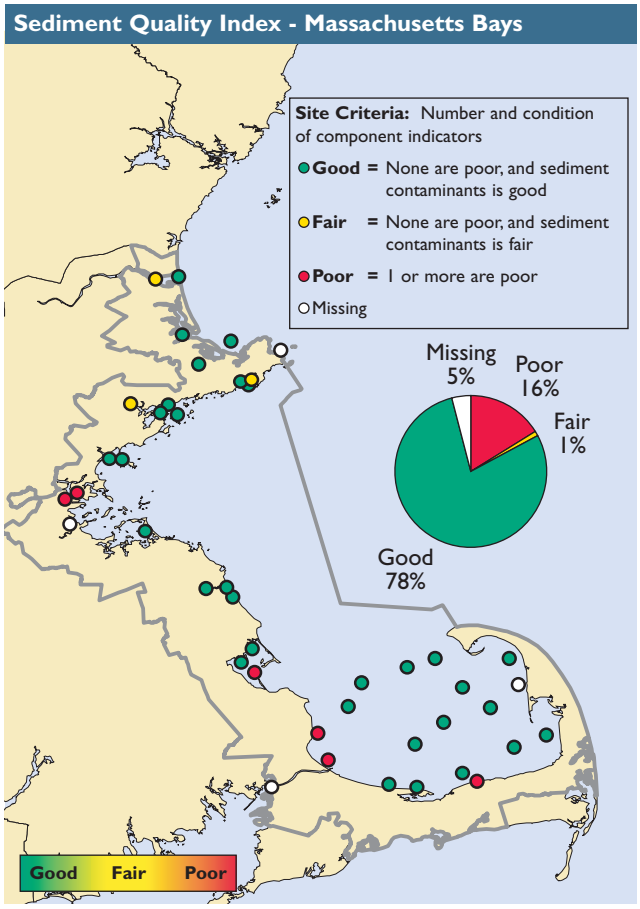


**Figure 3-31.** Sediment quality index data for the Massachusetts Bays, 2000–2001 (U.S. EPA/NCA).

Digging for clams (Rick Balla).

## Benthic Index

The benthic index for the Massachusetts Bays is rated poor. As measured by the Shannon-Weiner Diversity Index, 21% of the Massachusetts Bays estuarine area received a poor rating because of an unsatisfactory degree of benthic diversity, just slightly greater than the threshold used to define this category (Figure 3-32); therefore, a designation of fair for the Massachusetts Bays may be a better assessment for benthic quality.

## Fish Tissue Contaminants Index

The fish tissue contaminants index for the Massachusetts Bays is rated fair (Figure 3-33). Of the 20 fish samples analyzed, 17 were collected from Cape Cod Bay, and nearly 80% of the analyzed samples had moderate or high levels of PCBs.

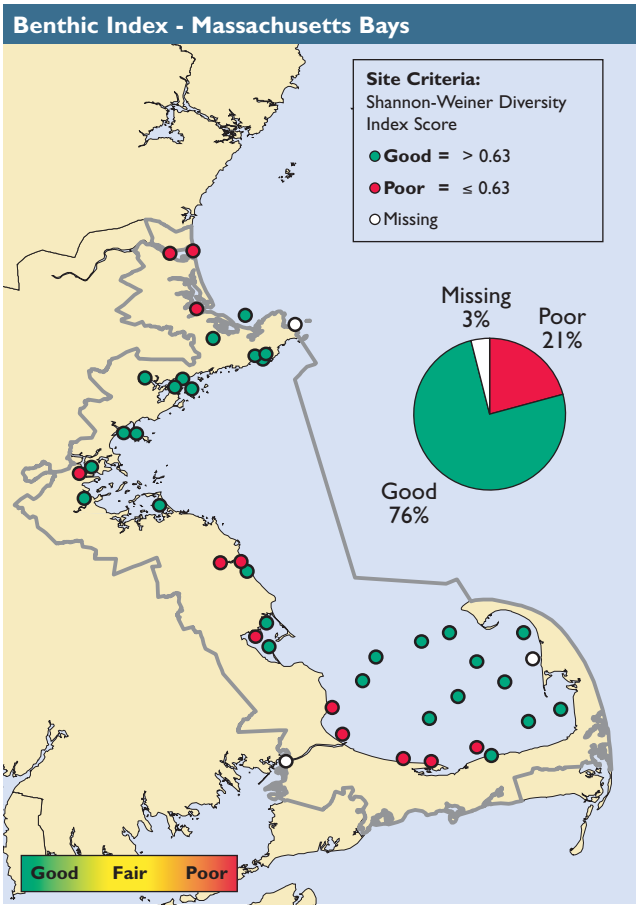


**Figure 3-32.** Benthic index data for the Massachusetts Bays, 2000–2001 (U.S. EPA/NCA).

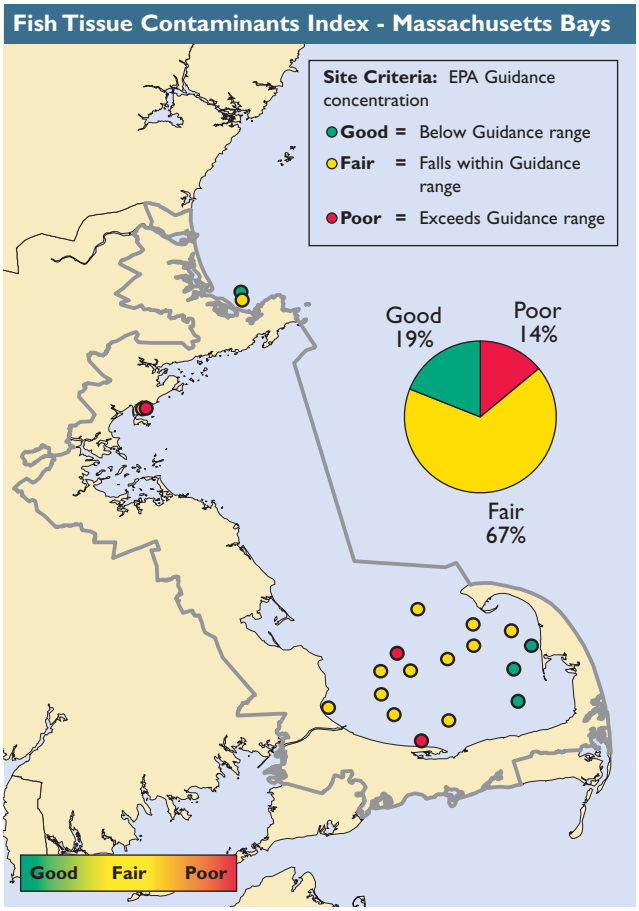


**Figure 3-33.** Fish tissue contaminants index data for the Massachusetts Bays, 2000–2001 (U.S. EPA/NCA).

# Massachusetts Bays Program Indicators of Estuarine Condition

## Water and Sediment Quality

The Massachusetts Water Resources Authority (MWRA) has collected water quality data in Massachusetts and Cape Cod bays for the Harbor and Outfall Monitoring Program since 1992. This water quality monitoring program includes continuous vertical profiles of temperature, salinity, dissolved oxygen, chlorophyll *a* (fluorescence), beam attenuation, and irradiance, ranging from the water surface to within 1.6 feet of the bottom at each site. Discrete samples from three to five different depths were collected for nutrient analyses (all forms of nitrogen and phosphorus), total suspended solids, chlorophyll *a*, and dissolved oxygen. Samples were also collected for phytoplankton and zooplankton species enumeration at representative sites throughout the Massachusetts Bays (Libby et al., 2005).

In September 2000, the MWRA terminated effluent discharges to Boston Harbor outfalls and redirected the discharges offshore via a 9.5-mile outfall to the Massachusetts Bays. Total nitrogen has decreased by 34% since the discharges to Boston Harbor were redirected, and there has been a 6% increase in mid-summer dissolved oxygen levels in near-bottom areas. Chlorophyll *a* levels decreased slightly during 2001 after the outfall relocation offshore, but increased slightly in 2002 (MBP, 2004b).

Significantly high levels of mercury have been found in sediments collected from Gloucester, Salem, and Boston harbors (MBP, 2004b). In 2004, mercury was detected in fish at levels warranting a statewide fish consumption advisory for both marine fish and freshwater fish in Massachusetts' lakes and ponds (U.S. EPA, 2005a). Public health concerns related to consumption of fish and shellfish are also being addressed through the measurement of trace metal and organic chemical concentrations in winter flounder and lobster. In addition, an ongoing project evaluates the bioaccumulation of contaminants using caged mussels deployed each summer at key locations in the Boston Harbor/Massachusetts Bay system (Wisneski et al., 2004). The impact of contaminants on the soft-bottom benthic community in the Bays is analyzed through a sampling program in both Boston Harbor and Massachusetts Bay, with annual sampling conducted at 8 sites in the Harbor and more than 20 sites in the Bay. In addition to conventional benthic community analysis, sediment-penetrating camera systems and video imagery are used to evaluate bottom conditions (Williams et al., 2005).

## Habitat Quality

The MBP and the Massachusetts Office of Coastal Zone Management (Massachusetts CZM) are conducting research routinely to measure conditions in coastal wetlands on Cape Cod. In 1997, the Wetland Health Assessment Toolbox (WHAT) multi-metric protocol was developed to help estimate the overall ecological quality of wetlands habitat. The WHAT technique is a comprehensive evaluation of wetlands health

before and after constructed improvements are implemented. Indicators used to evaluate wetlands habitat include water chemistry, adjacent land use, tidal influence, vegetation, aquatic macroinvertebrates, avifauna, and fish. The data collected are synthesized by the Massachusetts CZM research team to produce an overall wetlands health rating for each salt marsh site (MBP, 2000).

Many tidal marshes in this estuary system are impacted by road and highway construction and maintenance activities. Because of these impacts, the MBP's Wetland Restoration Program has attempted to coordinate with the Massachusetts Highway Department on construction and maintenance operations in coastal areas. Since 1994, nearly 35 wetland-restoration projects have been completed in the watershed, totaling more than 450 acres of wetlands. The MBP has a variety of ongoing efforts to restore wetland acreage, which provides valuable nursery and spawning grounds for fisheries and helps improve water quality. Most habitat-restoration projects have focused on restoring tidal flows, removing fill, regrading marsh topography, building creeks and pools, and suppressing the invasive reed *Phragmites australis*. The Great Marsh region along the northern shore of Massachusetts contains a tremendous wealth of aquatic habitats. Human activities that have degraded habitat value in the Great Marsh include the channelization of streams, restriction of tidal flows, and obstruction of fish passages (MBP, 2004b). The MBP has been working with other agencies and private partners to help restore and incorporate fishways in the Bays to allow river herring and shad to travel upstream for spawning. The MBP has also helped write several successful grants that have generated hundreds of thousands of dollars for fishway repair and restoration on the South Shore (NSRWA, 2005).

The MBP is helping the Massachusetts CZM develop an eelgrass health assessment index to expand monitoring of this productive habitat within the Bays. Mooring-chain scarring and dredging are two primary causes of eelgrass habitat loss in the Massachusetts Bays. The extent of nutrient over-enrichment and the subsequent reduction in water clarity impacting eelgrass habitats is another important stressor that the MBP is currently evaluating with its partners; however, there is insufficient data on eelgrass coverage to truly quantify changes over time within the Bays' system. Eelgrass is expected to recolonize Boston Harbor due to substantial improvements in water quality (MBP, 2004b).

Permanently protected open space in the watershed provides valuable remaining habitat areas because these spaces cannot be developed or converted for other uses in the future. The Massachusetts Office of Geographic and Environmental Information collects data on how much open space is maintained in the watershed. Nearly 25% of land within the 50 communities of the MBP are protected from development (MBP, 2004b). The MBP's Healthy Habitats Initiative is a multi-faceted approach to resource management that links habitat protection with land-use planning. The goal of this three-year initiative is to protect critical habitat and unique community character by helping towns preserve open space, protect wetlands, prevent stormwater impacts to water quality, and manage coastal resources (MBP, 2000). The MBP has also helped develop the Green Neighborhoods Program, which promotes habitat protection through development clustering and implementation of good local and subregional land-use practices.


Human activities are restricted in some areas that provide nesting habitat for threatened bird species (Jamal Kadri).

*Massachusetts Bays Program*

HIGHLIGHT

## Monitoring and Ecological Assessment of the Massachusetts Bays Ecosystem

The Massachusetts Bays are part of the larger Gulf of Maine; therefore, many of the conditions that prevail in the Gulf proper are significant to setting the conditions for Massachusetts Bay, and subsequently, Cape Cod Bay. Details about the influence of the Gulf of Maine on the physical setting of the Bays were published in an early 1990s report to the MBP (Geyer et al., 1992). The results of the probabilistically based sampling effort help to provide the regional context necessary for understanding the integrity of the Massachusetts Bays. The good NCA water quality index rating for the Bays reflects, in part, the extensive flushing by the Gulf of Maine.

This regional perspective is important for understanding the fate and transport of contaminants, as well as for evaluating the strength of local impacts. For the past 15 years, the MBP and Massachusetts CZM have monitored concentrations of chemicals in blue mussel (*Mytilus edulis*) tissue as part of the larger Gulf of Maine Gulfwatch Program. Organized and administered by the Gulf of Maine Council on the Marine Environment, Gulfwatch has mussel-sampling sites around the Gulf of Maine, from Nova Scotia to Cape Cod. Some contaminants measured by the program, such as mercury, show a broad regional input (e.g., atmospheric deposition), whereas other contaminants show clear, localized impacts (e.g., PAHs in blue mussel tissue from selected sites in Boston Harbor). Gulfwatch data are accessible at http://www.gomoos.org/chameleon/gulfwatch.

Wetland condition is another indicator of ecological integrity that the MBP and Massachusetts CZM are currently developing for application in the Massachusetts Bays. To date, there has been little systematic effort to measure, document, and describe the condition of coastal and inland wetlands in Massachusetts; however, since 1995, the MBP and Massachusetts CZM have been actively working on projects to advance wetland-assessment methods and approaches. Currently, the MBP and Massachusetts CZM are working with EPA on a three-phase coastal wetlands assessment project in selected study areas of Massachusetts and Rhode Island, exploring the potential for a more comprehensive national effort and possible alignment with the NCA surveys. An important component of the project is the development and application of a Rapid Assessment Method (RAM). Requiring both remotely sensed and on-site procedures and taking about half a day to conduct, the RAM generates data on some 22 indicators. In 2004, 23 randomly selected sites were evaluated with the RAM (see map), and another 24 sites are being examined. Some of the initial project findings indicate that increased development and land-use intensity in the 500-foot buffer zone around a salt marsh site correspond with higher abundances of invasive species, lower extent of high marsh, increased marsh fragmentation, and decreased connectivity to associated habitats (Personal communication, Carlisle, 2005). Volunteer groups are also employing assessment methods to understand the condition of selected estuarine marshes in their regions. Salem Sound Coastwatch and the Association to Preserve Cape Cod use the methods contained in a *Volunteer's Handbook for Monitoring New England Salt Marshes* (developed by the Massachusetts CZM and MBP, and available on the Web at http://www.mass. gov/czm/volunteermarshmonitoring.htm).

Lastly, the Merrimack River to the north of Massachusetts Bay is important to the biology, chemistry, and mixing within the estuarine system (Manohar-Maharaj and Beardsley, 1973). Menzie-Cura & Associates (1991; 1995) demonstrated the importance of contaminant loading from the Merrimack River to the Bays. The USGS is currently leading a team of partners that includes MBP/Eight Towns and the Bays (a Local Governance Committee for the Bays), the U.S. Army Corps of Engineers (USACE), and the Massachusetts DEP to characterize the dispersion of wastewater discharges from the Merrimack Estuary into Massachusetts Bay.


Study area and salt marsh sites randomly selected and evaluated in 2004 for the current MBP and Massachusetts CZM wetland assessment project (Massachusetts CZM and MBP, 2004).

## Living Resources

The MBP does not use a formal set of indicator species to evaluate the health of fish and wildlife ecosystems in the Massachusetts Bays, but it does support the monitoring efforts of state agencies for both indigenous and invasive species populations across the system. Several endangered and threatened species are dependent on the Bays' habitats, including the North Atlantic right whale, blue whale, fin whale, sei whale, humpback whale, Kemp's ridley sea turtle, shortnose sturgeon, roseate tern, loggerhead sea turtle, and piping plover (Martin et al., 1996). The right whale population has been slow to rebound, with only a 2.5% growth rate per year (MBP, 2004b). The Stellwagen Bank National Marine Sanctuary is one of the most critical areas in the North Atlantic for whales, dolphins, and porpoises. Other areas of the Massachusetts Bays attract a large diversity of bird species; the Parker River National Wildlife Refuge is a barrier island habitat for more than 300 avian species, including snowy owls, Canada geese, egrets, storm petrels, and cormorants (Martin et al., 1996). Despite modest efforts at restoration, it appears that river herring population levels are substantially below historic levels and well below the production capacity of spawning habitats in lakes and ponds of the Massachusetts Bays' watershed (Purintan et al., 2003). Populations of smelt and alewives have also declined in recent years. Landings of shellfish have declined in several towns along the Massachusetts Bays' coastline, and 15 towns north of Boston Harbor are closed to shellfishing (MBP, 2004a).

Two invasive species of particular concern in the Bays are the Asian shore crab and the Pacific tunicate, which can impact the health of the scallop fishery (MBP, 2004b). Recent activities to help control marine invasive species have included surveys of marine habitats and pathways for the introduction of invasive species; public awareness campaigns; analyses of regional legislation for invasive species; and workshops on response strategies for aquatic pests. More than 26 invasive species of plants and invertebrates were found in a 2000 survey of the Massachusetts Bays (MBP, 2004b).

## Environmental Stressors

Some of the major sources of pathogens in the Massachusetts Bays include marine sanitation devices, CSOs, and urban stormwater runoff. Disease-causing viruses and bacteria from these sources regularly close bathing beaches and shellfish-harvesting areas. An average of 44 beach closures occurred each year between 1988 and 1991 at South Shore, North Shore, and Boston Harbor due to pathogen contamination. Each year, an estimated 10,000 people become ill from ingestion of the bacteria-contaminated waters of this estuary (Martin et al., 1996). In recent years, there has been a significant reduction in the number of CSOs in the MBP estuarine area (MBP, 2004b).

Wastewater discharges can also introduce contaminants to the Bays. The number of permitted discharges to the Bays has decreased in the last 14 years as a result of local water conservation programs (MBP, 2004a), but overall discharge flow increased between 1991 and 2004 due to cooling-water use by area power plants (MBP, 2004b).


Ferries in Boston, MA (Ben Fertig).

## Current Projects, Accomplishments, and Future Goals

The MBP has had a number of successful programs and uses benchmarks that measure progress toward the goal of restoring and maintaining the health of the Bays. To combat stormwater pollution, the MBP installed high-tech "StormTreat" systems for stormwater discharge at two sites, which has been very successful. The Shellfish Clean Waters Initiative is currently monitoring the effectiveness of these treatment systems for possible use at other sites. In 1996, the town of Duxbury completed construction of a shared sewer/septic system with a $32,000 grant from the MBP. This project reduced bacteria levels to a safe range, leading to the reopening of 99 acres of productive shellfish beds (MBP, 2000). Another method used by the MBP to reduce pathogen pollution involved initiating a Betterment Bill, which provides loans to landowners to replace failing septic systems (Martin et al., 1996).

In 2003, the COASTSWEEP Program organized cleanups with local coordinators and more than 3,000 volunteers, cleaning up 35,000 pounds of trash and marine debris from 155 locations estuary-wide (APNS, 2005). In August 2003, the MBP worked with 7 other NEPs and the Massachusetts Institute of Technology Sea Grant Program to conduct a rapid survey for marine invasive species in the northeastern United States, focusing on fixed docks and piers at 20 different sites between Casco Bay, ME, and the New York/New Jersey Harbor (MBP, 2004b).

Currently, the MBP is working with EPA and the Massachusetts Watershed Initiative to develop a Wetlands Restoration Atlas for tidally restricted coastal wetlands from Winthrop to Quincy, which will be used to aid in the assessment of anadromous fish runs. The MBP is also pursuing No-Discharge Zone designations and is developing guidelines for personal watercraft use on Cape Cod (MBP, 2000).

## Conclusion

Some of the most significant environmental challenges facing the Massachusetts Bays are wetlands loss and degradation, increased stormwater runoff in developing areas, contamination of Bay sediments with toxic contaminants, contamination of shellfish beds and recreational waters with bacteria, declines in fisheries stocks, and the impact of invasive species on the estuary. The actions of EPA and the MBP, with support from the MWRA and Massachusetts CZM, have been successful in addressing many of the priority environmental concerns facing the Massachusetts Bays. One of the notable successes in the region has been the restoration of 450 acres of wetlands. In addition, eelgrass populations have stabilized since the 1990s, partly due to improvements in water quality. Wastewater impacts in the Bays, specifically in Boston Harbor, are much less than historic levels. Total nitrogen levels have decreased, and dissolved oxygen levels in bottom waters have increased since 2000. Remediation of contaminated sediments in Boston Harbor is still a work in progress because the inner harbor area has had some of the highest concentrations of sediment contaminants compared to other sites in the Bays. For the Massachusetts Bays, the NCA estuarine survey rates water quality as good, fish tissue contamination as fair, and sediment quality and benthic condition as poor.


Humpback whales are found in the MBP study area (Robin Hunter, FWS).