

An underwater photograph showing a fish swimming above a dense field of green seagrass. The water is clear and blue-green. The fish is positioned in the upper left quadrant of the frame.

2011 STATE OF BUZZARDS BAY

Nitrogen
Pollution
Blocking
Progress

45

OUT OF 100

Nitrogen Pollution Prevents Improvement in 2011 State of the Bay Score

It wasn't so long ago when sewage discharges, toxic dumping and oil spills galvanized our region to take action to cleanup and protect Buzzards Bay.

At the peak of this crisis during the late 1980s, 70% of the Bay's most productive shellfish beds were closed to harvest and miles of beaches were unsafe due to bacterial contamination from sewage. And the decades-long practice of toxic dumping was just coming to a close leaving a legacy of contamination in its wake. The pollution sources that earned the public's attention and scorn during this time were remnants of practices that had persisted for a hundred years. Sewage and toxic abuses came with the industrial revolution and during the past century they succeeded in doing much damage to Buzzards Bay.

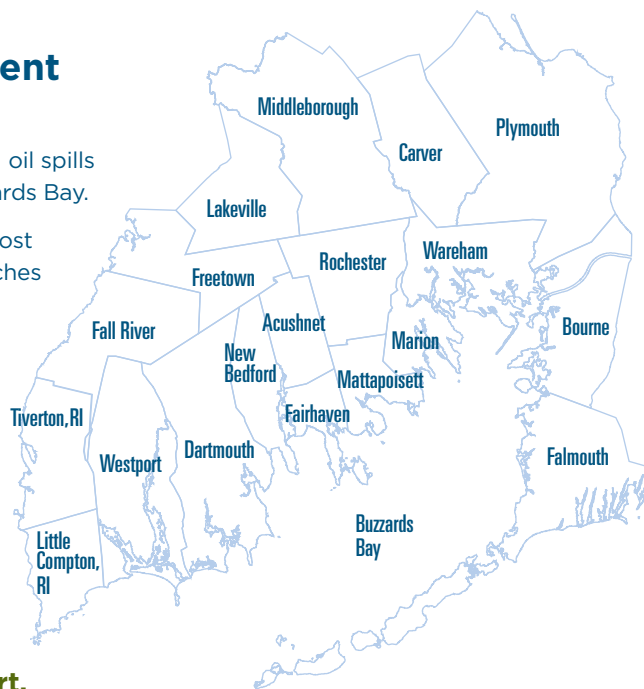
The greatest gains in the health of Buzzards Bay in recent years have been in the slow cleanup of this "Old Pollution" and the impact of that ongoing success story is evident in this State of the Bay report. But these improvements, while enough to prevent the overall State of the Bay score from falling this year, were not enough to overcome the expanding sources of "New Pollution" and its impacts.

Nitrogen discharges are the "New Pollution," worsening water quality and degrading habitat in all corners of Buzzards Bay. It accompanies poorly-planned development and is the byproduct of new homes, septic systems, roads, and lawns. The consequences are a slow suffocation of the Bay we all cherish. The significant declines in the Nitrogen, Eelgrass and Bay Scallop scores documented on the pages of this report are all related to this problem.

2012 marks the 25th anniversary of the founding of the Buzzards Bay Coalition and this report provides an important tool to assess the effectiveness of our work since 1987. We are very proud to have played a part - along with dedicated town officials, state and federal agencies, and citizens - in the ongoing cleanup of the "Old Pollution". We should all celebrate the successes we've had in returning clean beaches and shellfish beds to everyone, even as we rededicate ourselves to the greater challenge ahead - managing wastewater and watershed development to reduce nitrogen pollution.



Mark Rasmussen, President






buzzards
BAY
COALITION










The Buzzards Bay Coalition is a membership-supported non profit organization dedicated to the restoration, protection and sustainable use and enjoyment of Buzzards Bay and its watershed. Founded in 1987, the Coalition works to improve the health of the Bay ecosystem for all through education, conservation, research and advocacy.

Learn more at:

www.savebuzzardsbay.org

2011 STATE OF BUZZARDS BAY

	Improvement
	Decline
	No Significant Change

	2003	2007	2011	
POLLUTION				
Nitrogen	59	56	53	
Bacteria	59	57	62	
Toxics	45	47	52	
WATERSHED HEALTH				
Forests	76	75	79	
Streams	68	67	71	
Wetlands	60	60	60	
LIVING RESOURCES				
Eelgrass	34	25	23	
Bay Scallops	12	10	3	
River Herring	5	1	1	
OVERALL SCORE	48	45	45	



How is Nitrogen Affecting Your Local Harbor or Cove?

5-yr (2006-10) running average

Healthy

Penikese Island	92.3
Quissett Harbor, Outer	91.8
Hiller's Cove	85.0
Aucoot Cove, Outer	81.7
Mattapoissett Harbor, Outer	79.9
Cuttyhunk Harbor	79.0
Aucoot Cove, Mid-Harbor	78.7
Quissett Harbor, Inner	75.9
Onset Bay, Outer	75.4
West Falmouth, Outer Harbor	72.8
Pocasset Harbor, Outer	72.4
Onset Bay, Inner	72.0
Nasketucket Bay	71.1
Clarks Cove, Outer	69.6
Mattapoissett Harbor, Inner	67.6
Megansett Harbor	67.0
New Bedford Harbor, Outer	67.0
West Falmouth, Mid-Harbor	66.2
Onset Harbor, Shell Point Bay	64.3
Phinney's Harbor	64.3
Fiddlers Cove	61.3
Onset Bay, East River	60.3
Sippican Harbor, Outer	60.2
Westport River, Inlet	60.2
Clarks Cove, Inner	59.6
Buttermilk Bay	59.1
Apponagansett Bay, Outer	59.0
Red Brook Harbor, Outer	58.3
Hen Cove	58.3
Back River	50.6
Little River, Outer	50.8
Little Buttermilk Bay	51.8
Marks Cove	55.5
Little Bay (Inner Nasketucket)	55.4
Wareham River, Outer	54.5
Pocasset River	54.3
Blankenship Cove	54.1
Pocasset Harbor, Inner	52.2
Wareham River, Inner	50.1
Squeteague Harbor	49.4
Westport River, Inner West Branch	49.2
Apponagansett Bay, Mid-Harbor	48.8
Wild Harbor	47.5
Broadmarsh River	47.2
Slocums River, Outer	47.0
West Falmouth, Harbor Head	46.4
Red Brook Harbor, Inner	45.4
Westport River, Outer East Branch	45.1
Mattapoissett Harbor, River Mouth	45.0
New Bedford Harbor, Inner	44.9
Weweantic River, Outer	44.5
Eel Pond, Bourne	44.1
Sippican Harbor, Inner	43.6
Little Sippewissett Marsh	42.7
Rands Harbor	41.0
Aucoot Cove, Inner	39.6
Little River, Inner	38.4
West End Pond, Cuttyhunk Island	35.8
Agawam River	35.5
Wild Harbor River	34.8
Westport River, Inner East Branch	32.4
Slocums River, Inner	31.9
Weweantic River, Inner	31.5
Apponagansett Bay, Inner	29.0
Hammett Cove	28.9
West Falmouth, Snug Harbor	27.2
Westport River, Upper East Branch	25.6
Eel Pond, Mattapoissett	17.4
Acushnet River	17.4
Nasketucket River	8.6

Degraded

FAIR → EXCELLENT

POOR → FAIR

POLLUTION

Nitrogen

53

↓ Down 3 from 2007

All of Buzzards Bay's harbors and coves should have clear water, eelgrass meadows and vibrant marine life. However, more than half of the Bay's harbors and coves experience cloudy water, excess algae, a dearth of shellfish and, at times, the tell-tale stench of decay. Nitrogen pollution is the cause and it is the greatest long-term threat to the health of Buzzards Bay. A decline of 3 points since 2007, and 6 points since 2003 reveals a trend that is quietly destroying the Bay we all love.

By far the largest source of nitrogen to most Buzzards Bay estuaries is residential septic systems. Even properly functioning and newly-installed Title 5 septic systems do little to prevent nitrogen pollution. The waste travels through the leachfield and into groundwater where its load of nitrogen can be transported many miles to the Bay or nearest stream. How to halt this increasing load of groundwater nitrogen from septic systems represents the greatest political and financial challenge facing Bay communities.

Other sources of nitrogen to the Bay include wastewater treatment plants, stormwater runoff, lawn and agricultural fertilizer, and acid rain. Each of these sources can represent a larger fraction of the problem depending on what part of the Bay you are in (ie. agricultural fertilizers account for a larger component of total nitrogen in the Weweantic River, and wastewater treatment plant discharges are greater in New Bedford Harbor).

The score of 53 is based on a compilation of the 5-year running average of water quality data collected in each of the Bay's major harbors, coves and tidal rivers by the Buzzards Bay Coalition's Baywatchers Program. The Bay Health Index scores shown left are constructed of several individually important indicators such as water clarity, nitrogen levels, dissolved oxygen concentrations, and algae content.

Due to improved collection and treatment of sewage and stormwater there are fewer closures of shellfish beds around Buzzards Bay today due to bacterial contamination. That means we are all safer when we swim and enjoy the Bay's fish and shellfish thanks to decades of cleanup action in all Bay communities. The 5 point improvement in the Bacteria score in this year's State of the Bay represents an exciting, albeit incomplete, success story that we can all celebrate.

Bacterial contamination is caused by improper disposal of human sewage and animal wastes. The presence of certain bacteria in the water is closely monitored as an indicator of disease-causing pathogens and viruses. When bacteria levels exceed public health standards, the Bay's swimming beaches and shellfish beds are closed.

Bacterial contamination represents a serious human health risk and economic loss in many parts of Buzzards Bay. Despite the improvements in this area, of the 23,000 acres of Buzzards Bay's most productive nearshore shellfishing areas, 8,542 acres (38% of them) were closed to harvest on July 1, 2011. Sources include failing septic systems, old cesspools, combined sewer overflows in New Bedford, and the more than 2,500 pipes that still discharge untreated road runoff into the Bay.

While this indicator is clearly heading in the right direction, there is much work to be done, particularly with regard to the large share of bacterial contamination that still washes off our roads as stormwater runoff.



photo: Robert Manz

Among all threats to Buzzards Bay, toxic pollutants are the most difficult to measure. Current sources include oil spills, discharges from industry and wastewater treatment plants, household hazardous wastes, agricultural pesticides and stormwater. In addition, “legacy” contaminants – pollution from past practices that remain in need of cleanup – continue to demand attention and funding.




Overall, however, toxic pollution to Buzzards Bay continues to decline and the cleanup of legacy contaminants is underway although proceeding slowly.

No major oil spills have occurred since 2003 with trained escort tugs and local pilots vigilantly guiding oil barges through the Bay. On a smaller scale, however, in New Bedford Harbor, 22 separate fuel spills were reported in 2011 alone and half of them remain unsolved ‘mystery spills’ with no responsible entity identified. This chronic problem has not improved in the past decade and demands attention from City officials.

A legacy of toxic contamination continues to plague Inner New Bedford Harbor where, since 1983, the US EPA has spent \$325 million to dredge and dispose of contaminated sediment. As of the end of 2011, however, only 27% of the total 900,000 cubic yards of heavily PCB-contaminated sediment has been removed. Between 2007-2011, the project was briefly accelerated due to an infusion of federal Stimulus Funds. Without increases in funding, the project is projected to take more than 40 years to complete.

In Bourne, groundwater contaminated from past activities at the Massachusetts Military Reservation continues to flow into Buzzards Bay only partially treated. Through the ongoing efforts of the Air Force, however, 3.6 billion gallons of groundwater has been pumped and treated resulting in the removal of nearly 400 lbs of contaminants since the system went online in 1999. As in the case of New Bedford Harbor PCBs, full cleanup will take more than three decades.

Status of PCB Cleanup in New Bedford Harbor

-  2011 Cleanup Areas
-  Areas Partially or Fully Remediated as of 12/31/2010
-  Areas to be Dredged per 1998 Record of Decision (ROD)

source: US EPA



WATERSHED HEALTH

Forests

79

↔ Up 3 due to availability of improved data

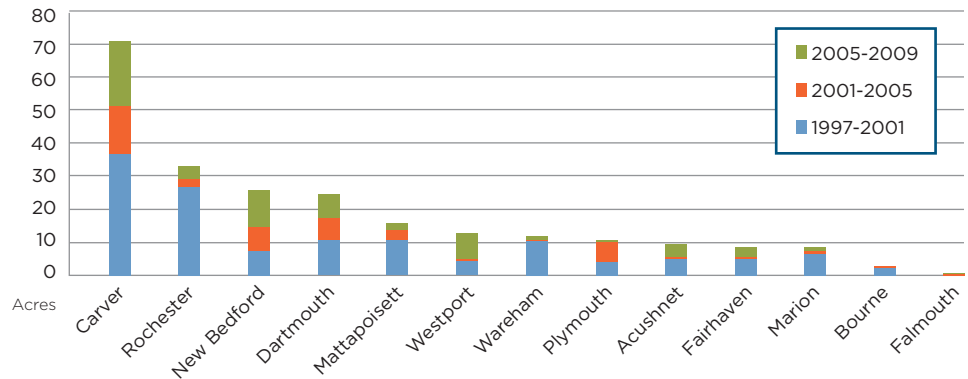
When Buzzards Bay is compared to other East Coast estuaries, one of its most important distinguishing features is the extent of its watershed forests. It's also one of the key secrets behind the Bay's relative good health compared to places like the Chesapeake Bay, Long Island Sound and Narragansett Bay.

Whether it's the pine-oak barrens of the Mass Military Reservation; the vast tracts of white pine forests throughout cranberry country; large state parks such as Myles Standish and the SE MA Bioreserve in Fall River; or even the wooded spaces scattered throughout our suburban neighborhoods, forests contribute to the Bay's health in a variety of ways. They filter nitrogen pollution and sediment from runoff, capture rainfall and regulate streamflows, moderate stream and air temperatures, prevent erosion of soils, and support fish and wildlife habitat.

In 1999, prior to the release of our first State of the Bay Report, the Woods Hole Research Center analyzed available land use data and satellite imagery to determine that 76% of the Buzzards Bay Watershed's forest coverage remained. With new data available, the WHRC took a fresh look at the state of the Bay's forests for this report and found that due to a much finer level of detail in today's photo imagery, the earlier estimate of 76 underestimated the amount of forest still found in the Bay's mainly residential areas. The 2011 State of the Bay score of 79 reveals an improvement in the precision of available data and not an increase in actual forest area.

Wetland Destruction by Town

source: MA Department of Environmental Protection



Stream Buffers

71



Up 4 due to availability of improved data

No acreage works harder to maintain our region's water quality and aquatic biodiversity than the forested lands alongside the more than 700 miles of streams that flow into Buzzards Bay. The first 200 feet of natural vegetation on either side of the stream is most critical and collectively comprises a little more than 11% of the overall Buzzards Bay Watershed.

But in this 11%, a large portion of the nitrogen and other pollution can be naturally captured, absorbed and removed. An amazing natural service provided at no cost.

Unfortunately, nearly 9,000 acres of those critical first 200' along watershed streams – or 29% of all stream buffer area – have been lost to residential, commercial and agricultural development.

The 1996 passage of the MA Rivers Protection Act has gone a long way toward ensuring that development is prohibited along the first 100' of all watershed streams, but the second 100' face ongoing development pressure.

Note: As in the case with the Forest indicator score, our calculation of stream buffers benefitted from a much finer level of detail in today's photo imagery than was used in earlier reports. The 2011 State of the Bay score of 71 for Stream Buffers, therefore, reveals an improvement in the precision of available data and not an increase in natural stream buffer area.

Wetlands

60



<1 point decline from 2007

Between 1997 and 2009, 235.57 acres of wetlands were filled, drained or built upon in the Buzzards Bay Watershed. Approximately 85 acres of this destruction occurred since the last publication of this State of the Bay Report.

Overall, 40% of Buzzards Bay's original wetlands have been filled, drained or built upon. Today, the watershed's remaining saltmarshes, wooded swamps and freshwater marshes serve as the Bay ecosystem's filtering mechanism able to absorb as much as 90% of the nitrogen and other pollution generated by human activities.

Wetlands are protected in Massachusetts by layers of local, state, and federal laws. And for this reason, it is widely believed that wetlands are no longer at risk in our watershed. Data collected by the MA Department of Environmental Protection reveals a troubling reality however (see graph). Confirmed by comparison of aerial photography, the data find that despite these laws, we continue to lose wetlands through outright illegal filling by landowners, improper permitting decisions by local Conservation Commissions, and agricultural and other exemptions from wetlands laws.

The scale of wetland loss experienced throughout the watershed wasn't large enough to trigger a full point drop in the Wetlands Score. Nevertheless, this remains a trend that cannot continue if we are to halt the decline in Bay and watershed health.



LIVING RESOURCES

Eelgrass

23

↓ Down 2 from 2007

If you want to track the spread of nitrogen pollution in your own corner of the Bay, watch the eelgrass. And in many nearshore areas of Buzzards Bay today, eelgrass is slowly disappearing.

Eelgrass is a rooted underwater plant that grows in meadows on the bay floor in areas of excellent water quality and sunlight penetration. It serves as vital habitat for a broad range of marine life such as bay scallops, blue crabs, juvenile flounder and other fish species. In Buzzards Bay, a major cause of eelgrass loss is reduced water clarity which is driven by increases in nitrogen pollution.

The good news is that there remains enough eelgrass seed stock in the Bay for eelgrass meadows to recover on their own in many areas once nitrogen pollution is reduced and water clarity restored.

A score of 23 is based on the extent of eelgrass meadows in the Bay in 2010 compared against the maximum historical potential eelgrass coverage as estimated by the Buzzards Bay National Estuary Program.

Bay Scallops

3

↓ Down 7 from 2007

Bay scallops were to Buzzards Bay what oysters historically were to New York Harbor and the Chesapeake Bay. But today, our once abundant, highly valuable signature shellfish has all but disappeared from many parts of Buzzards Bay. It is a serious decline that mirrors the loss of eelgrass beds and the increase in nitrogen pollution throughout the Bay.

An average catch of less than 2,000 bushels per year was reported in all Bay coastal towns between 2006-2010 by local shellfish wardens and the MA Division of Marine Fisheries. This figure represents less than 3% of the catches being reported in the 1970s when consistent catch data first became available.

Strong Bay Scallop populations are indicative of clear waters as they are particularly sensitive to water quality and temperature. Despite reducing overall water clarity, waters polluted by excess nitrogen also choke out eelgrass beds destroying crucial habitat for both young and adult scallops. As we eliminate nitrogen pollution and eelgrass meadows are restored, bay scallop populations can begin to return to their once abundant levels.

River herring in Buzzards Bay are in a state of profound collapse, with serious consequences for the Bay ecosystem. Only a tiny fraction of historic populations of herring still make the journey up the Bay into local streams and ponds to spawn.

This is very bad news for the bay's sportfish such as Striped Bass, Bluefish, and Squeteague that rely on herring as well as for many bird species including the region's nesting Roseate Terns, a federally endangered species of which 50% of the North American population rest on the Bay's islands. River herring, as the base of the food chain, provide an important pillar in the Bay ecosystem and today it is in desperate need of rebuilding.

With one of the longest datasets available, the Mattapoissett River serves as our regional benchmark for tracking the state of river herring throughout Buzzards Bay. In 1921, state biologists estimated the river's run at 1.85 million fish. Today, this figure sits at 10,300 fish per year, or less than 1% of historic levels. In addition to the Mattapoissett, the Agawam River, considered by many to be the Bay's second largest run, has fallen dramatically from 100,473 fish counted in 2007 to 19,064 in 2011.

The historic decline of Buzzards Bay's anadromous fish like river herring can be traced to the damming of the Bay's rivers, degradation of water quality, and alterations to pond and stream flows. There is also growing evidence that the declines of the past decade may be linked to river herring being caught inadvertently at sea alongside their commercially-valuable cousins: menhaden, mackerel, and atlantic herring.

Glimmers of hope do exist however. On the Acushnet River, blocked from migrating upstream for decades by the Sawmill Dam at the head of tide, river herring are slowly returning after partial removal of that dam in 2007. Fish counts collected by the Coalition and the MA DMF have steadily risen from 381 individual fish in 2007 to 3,679 in 2011.

Additional actions to remove barriers to fish migration such as unnecessary dams on the Bay's rivers combined with regional steps to prevent offshore bycatch of river herring can bring these important fish back.





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HOW WE CREATE OUR REPORT

To create the State of the Bay report, the Buzzards Bay Coalition collaborates with scientists and land use experts to examine the best available current and historical information for indicators in three categories: Pollution, Watershed Health, and Living Resources. Every four years, we return to assess these same indicators as a consistent method for tracking progress or degradation over time.

The current State of the Bay is measured against the healthiest Buzzards Bay in recorded history – the natural abundance experienced by explorer Bartholomeu Gosnold and his crew in 1602. The Bay Gosnold experienced was unspoiled by harmful human activities and rates 100 on our scale.

In examining the best available information for each of the indicators in this report, we discovered gaps in available data regarding many of the indicators, particularly in areas such as toxic pollution and bay scallop catch reporting. We also look for more accurate sources of information to improve on this report every four years. When such data becomes available, we can improve upon this assessment, as happened this

year with the Woods Hole Research Center's acquisition of enhanced land use data which positively affected our forest and stream buffer scores.

We are grateful to the Buzzards Bay National Estuary Program for their assistance with the Bacteria and Eelgrass scores this year; to the Woods Hole Research Center for the development of the Forest cover score; and to the Marine Biological Laboratory's Ecosystems Center for their analysis of our Baywatchers data which serves as the foundation of the Nitrogen score. In addition, a number of agencies provided data for this report including the Massachusetts Division of Marine Fisheries, Massachusetts Department of Environmental Protection, US Environmental Protection Agency, United States Coast Guard, Air Force Center for Environmental Excellence, Alewives Anonymous, and municipal shellfish wardens along Buzzards Bay.

The Chesapeake Bay Foundation's annual State of the Bay report serves as a model for our report.