2015

2015 State of the Bay Summary Flyer

Casco Bay Estuary Partnership

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Casco Bay Estuary Partnership

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The Casco Bay Estuary Partnership (CBEP) mobilizes collective action to strengthen the Bay's ecological and economic vitality, fostering a shared commitment to Casco Bay. It focuses scientific expertise and financial resources on helping watershed communities address regional challenges such as water pollution, habitat degradation and climate adaptation.

Since Casco Bay was named an “estuary of national significance” in 1990, CBEP has served as a convener and information hub—engaging individuals, organizations and government agencies in shared actions to sustain Casco Bay. CBEP is one of 28 community-based partnerships that participate in the National Estuary Program of the US Environmental Protection Agency.

State of the Bay 2015

The Casco Bay Estuary Partnership helps track and report on changing conditions within the Bay and its watershed. Every five years, in its State of the Bay report, the Partnership portrays how Casco Bay is faring—what trends are evident, what progress is visible, and what new challenges are emerging. By tracking indicators at regular intervals over decades, the Partnership helps identify the collective work needed to sustain the region.

State of the Bay 2015, summarized here and detailed online at www.cascobayestuary.org/state-of-the-bay-2015, reveals a complex array of factors shaping the ecology and economy of the Casco Bay region. There’s a mix of encouraging news, interspersed with unsettling trends. The warming climate represents a vast and unpredictable driver of regional change—with hotter ocean and air temperatures, more frequent and extreme precipitation, and rising seas (already evident in flooding at extreme high tides).

Indicators used in the past (and included in the 2015 report) do not fully account for the dynamic interplay of forces currently at work on Casco Bay. Future reports will include new indicators to help gauge the pace and impacts of far-reaching change.
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Eelgrass Beds Decline as Green Crab Numbers Explode

Non-native marine organisms are well established in Casco Bay, with some now among its most abundant species. The common green crab, Carcinus maenas, is a well-adapted species that thrives in Casco Bay’s waters. Since its arrival in the mid-1800s, green crabs have spread and multiplied to the point where they are now a major threat to the bay’s ecosystems. In recent years, researchers have documented a decline in eelgrass beds, which are critical habitats for many marine species. The decline is likely due to the impact of green crabs, which feed on eelgrass and other marine plants. The green crab population has increased significantly over the past decade, and the decline in eelgrass beds is a direct result of this increase. The loss of eelgrass beds is a significant concern for the health of Casco Bay’s marine ecosystem, and efforts are underway to address the issue.

Spreading Invasive Species Disrupt Ecosystems and Fisheries

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Researchers Anticipate Increased Climate Stressors

Regional air temperatures have increased gradually for decades, and could rise between 2° and 6°F by mid-century. Since the mid-1990s, Casco Bay’s average water temperatures have increased about 3°F. In 2013 and 2014, the warmest months of the year saw water temperatures that are now considered warmer than normal for the region. As temperatures continue to rise, the impact of atmospheric CO2 is aggravated by degraded water quality, is also increasing. Casco Bay’s first comprehensive acidification monitoring station was established in May 2015. The station is now monitoring pH and total alkalinity, which are key indicators of ocean acidification. The data collected by this station will help scientists understand the extent of acidification in Casco Bay and develop strategies to mitigate its effects.

Bay Water Quality Faces Emerging Concerns

While Casco Bay’s water quality remains generally good, a number of emerging concerns are on the horizon. One of the most significant concerns is the impact of climate change on the bay’s ecosystems. As temperatures rise, the bay is becoming more vulnerable to invasive species and other stressors. Additionally, the bay is facing increased pressure from development and pollution, which can further degrade water quality. As a result, it is crucial that we take steps to protect Casco Bay’s unique ecosystems and ensure its long-term health.

For more information and references, see the full report at www.cascobayestuary.org/state-of-the-bay-2015.
Spreading Invasive Species Disrupt Ecosystems and Fisheries

Non-native marine organisms are well established in Casco Bay, with some now among its most widespread species. The common periwinkle was introduced from Europe more than a century ago and is found in large quantities throughout the Bay. Another four non-native species, exotic clamshells from East Asia, have been identified in Casco Bay in recent years, including the species that caused the recent major shellfish bed closures.

Eelgrass Beds Decline as Green Crab Numbers Explode

At the start of the 20th century, eelgrass was abundant throughout Casco Bay, forming extensive beds that supported a rich marine ecosystem. However, over the past several decades the Bay's eelgrass beds have declined dramatically, with several large-scale losses documented in recent years (2015, 2016).

According to a Maine Legislative Commission report, ocean acidification is taking place at a rate at least 10 times the rate expected by 2050. The report notes that the impact of atmospheric CO2 is aggravated by degraded water quality, is also increasing. Casco Bay's first comprehensive acidification monitoring station was established in May 2015.

Researchers Anticipate Increased Climate Stressors

Regional sea temperatures have increased for decades, and could rise by two to four°F by mid-century. Since the mid-1960s, Casco Bay's average water temperatures have increased by about 3°F since 1970. The 2015 update of the Maine Climate Change Response Plan notes that warming is increasing the stress on the Bay's coastal and marine ecosystems, posing severe threats to fisheries and other marine resources.

The region's population grew over the past decade at a slow but steady pace. Between 1996 and 2010, the watershed's forested land cover decreased by 16.8 square miles (declining to 65 percent of the total land area) with cause for concern in selected urban and suburban streams and rivers. Time-consuming and expensive planned solutions are time-consuming and expensive.

Footprint of Development Expands

The total acreage of permanently protected lands in the watershed's lower 16 municipalities has more than doubled, from 52,362 to 138,327 acres. The region's population grew over the past decade at a slow but steady pace. Between 1996 and 2010, the watershed's forested land cover decreased by 16.8 square miles (declining to 65 percent of the total land area) with cause for concern in selected urban and suburban streams and rivers. Time-consuming and expensive planned solutions are time-consuming and expensive.
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According to a Maine Legislative Commission report, ocean acidification is taking place at a rate at least doubling the increase in atmospheric CO2 since the pre-industrial period. Ocean acidification, in which the impact of atmospheric CO2 is degraded by degraded water quality, is also increasing. Casco Bay’s first comprehensive acidification monitoring station was established in May 2015.

Eelgrass Beds Decline as Green Crab Numbers Explode

A seagrass that forms extensive intertidal and subtidal beds, eelgrass provides food for migratory winter waterfowl and nursery habitat for fish and shellfish. Casco Bay has traditionally had abundant eelgrass beds, but a 2013 aerial survey confirmed that the Bay had lost more than half of the eelgrass beds evident a decade earlier (due, in part, to clipping and uprooting of vegetation by the invasive green crab). Recognizing the need for a rapid and coordinated response, CBEP convened a series of meetings in 2013 and that same year launched a comprehensive eelgrass restoration pilot study. Between 2013 and 2015, a pilot study was launched to identify suitable sites for large-scale eelgrass restoration, gauge restoration success.

Work to Remove Barriers Progresses Slowly

Since 2000, scientists have conducted regional rapid assessment surveys throughout the Northeast roughly every three years. Data gathered at ten Casco Bay sites in 2013 found 20 introduced species at the two sites. An earlier survey of Casco Bay species found that roughly one-third of them were of uncertain origin, and many were introduced. Recent surveys revealed the presence of several new invaders such as the Asian shore crab and the Chinese mitten crab, which were not seen in surveys a decade ago.

Invasive Species Disrupt Ecosystems and Fisheries

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Conserving Maine’s Bays and Estuaries

Casco Bay’s coastal shellfish have low contaminant levels, with some samples

Conserved Lands More Than Double over Two Decades

The total acreage of permanently protected lands in the Casco Bay watershed’s lower 16 municipalities has more than doubled, from 18,960 acres in 2000 to 45,240 acres in 2015. Roughly 4,000 students participate in regional marine and education and stewardship programs each year.

Ongoing monitoring by the Long Creek Watershed Management District confirms that the wave energy generation and drought through the urban and suburban streams, and that focused stormwater management could improve water quality.

Impervious Surfaces Degrade Water Quality

Prospects for more information and references, see the full

Elevated Lead and PAHs Found in Some Shellfish Samples

Periodic monitoring of shellfish tissues indicates that most Casco

Road Salt Harms Urban Streams

Ongoing monitoring by the Long Creek Watershed Management District confirms that winter salt degrades the health of urban and suburban streams, and that focused stormwater management could improve water quality.

Less Untreated Sewage Enters Bay after Heavy Rains

The region’s population grew over the past decade at a slow but steady pace. Between 1996 and 2010, the watershed’s forested land cover decreased by 16.8 square miles (declining to 65 percent of the region’s land cover at that time). Since that assessment, several local partners have led efforts to restore aquatic habitat conditions by removing one barriers at a time. Migratory fish can now access the lower Penobscot River watershed, but many other wadeable rivers remain inaccessible.

Lakes and Streams Typically Have Good Water Quality

Water quality in most of the Casco Bay watershed remains good, but acidification is a concern, along with moderately high nitrogen levels, increasing water temperatures, and a possible long-term decline in water clarity.

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