

Indicator: Shellfish Harvesting Opportunities in the Great Bay and Hampton-Seabrook Estuaries

Question

How much of our estuaries are open for shellfish harvesting and how has it changed over time?

Short Answer

The percentage of possible acre-days (i.e., the number of open acres multiplied by the number of days those acres were open for harvest) between 2012 and 2016 was 80% and 66% for the Great Bay and Hampton-Seabrook Estuaries, respectively. This continues the long-term trend of a gradual increase in acre-days. The next reporting period may see continued increases as the Portsmouth wastewater treatment facility upgrade is completed in 2019-2020.

PREP Goal

Improve water quality and identify and mitigate pollution sources so that additional estuarine areas meet water quality standards for bacteria and for shellfish harvesting (from the PREP Comprehensive Conservation and Management Plan, PREP 2010).

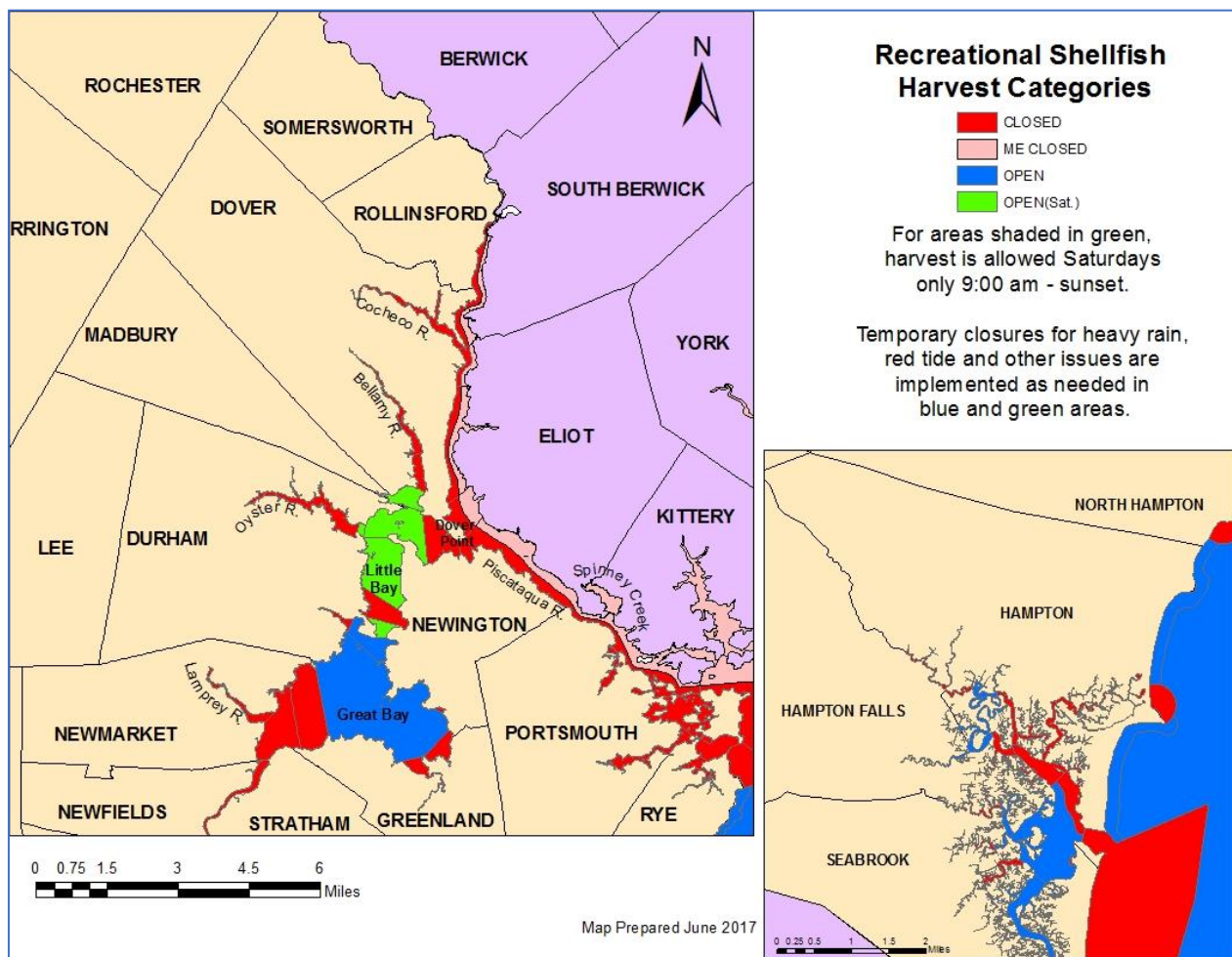


Figure SH-1. Map showing recreational shellfish harvest categories for the Great Bay and Hampton-Seabrook Estuaries. Courtesy of the NH DES Shellfish Program.

Why This Matters

Shellfish beds are closed—either temporarily or indefinitely—to commercial and recreational harvesting when there are high amounts of bacteria or other pollution in the water. Closures also occur for precautionary reasons related to wastewater treatment facilities (WWTFs). Therefore, the amount of time that shellfish beds are open for harvest can be used as an indicator of water quality.

Explanation (from 2018 State of Our Estuaries Report)

Figure SH-1 indicates open and closed areas of the Great Bay and Hampton-Seabrook Estuaries for recreational shellfish harvesting. (Note that open areas may become temporarily closed after large rain events due to water quality issues). The percentage of possible acre-days between 2012 and 2016 was 80% and 66% for the Great Bay Estuary and Hampton-Seabrook Estuaries, respectively (Figure SH-2). The Great Bay acre-days open data exhibits a saw tooth profile between 2006 and 2009, which is most likely caused by major storms, such as the Mother’s Day storm of 2006. The 2016 steep decrease in the Hampton-Seabrook acre-days open data was the result of a prolonged discharge of raw sewage from a broken 14-inch force main pipe under a salt marsh in the Town of Hampton. The pipe broke in late 2015 and was fixed in early 2016. The overall long-term trend of gradual improvements since the year 2000 may reflect improved pollution source management, such as efforts by NHDES and municipalities to identify and eliminate illicit discharges. Lower rainfall amounts in recent years may also have led to a decrease in the occurrence of bacterial pollution events related to stormwater runoff.

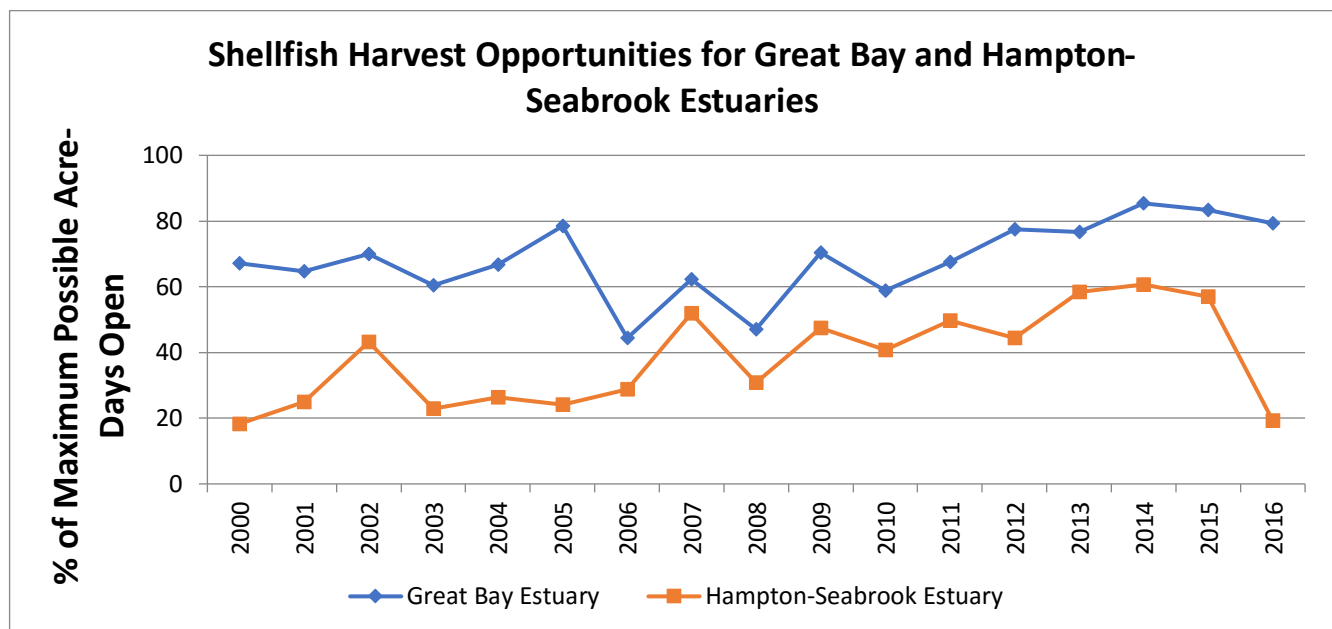


Figure SH-2. Shellfish harvest opportunities for Great Bay and Hampton-Seabrook Estuaries. The Y axis indicates the percentage of maximum possible “acre-days,” which is the number of open acres multiplied by the number of days those acres were open for harvest. Data Source: NH Department of Environmental Services, Shellfish Program.

The areas designated as “conditionally approved” (open but subject to temporary closures due to water quality issues), “restricted” (closed due to chronic water quality problems) and “prohibited” (closed due to water quality issues that require further investigation) have remained fairly constant since 2004 (Figure SH-3). The most notable change occurred in 2014 with the conversion of over 1,300 acres that were “prohibited/unclassified” (closed because the water quality is unknown) to “prohibited/safety zone.” This refers to areas closed due to pollution sources that may unpredictably affect the water quality of the area and create a potentially dangerous public health risk. These zones are most often related to wastewater treatment facilities.

This 2014 conversion was a direct result of the December 2012 Portsmouth wastewater treatment facility (WWTF) dye study (Ao et al. 2017), which examined how this primary WWTF affected water quality in the estuary, and how those effects might change once the facility upgrade is complete in 2019. The dye study indicated effluent travels further up river and faster than previously determined; this resulted in the reduction of harvest opportunities at the Little Bay and Bellamy River shellfish beds (Figure SH-1). Specifically, harvest days were reduced from seven days/week to Saturdays only, from 9 a.m. to 5 p.m.; this approach gives wastewater operators and the NHDES Shellfish Program more time to react in the event of a WWTF problem that occurs overnight. (Note: aquaculture operators in Little Bay are mandated to call the NHDES Shellfish Program before harvesting and so are not impacted by the new rule).

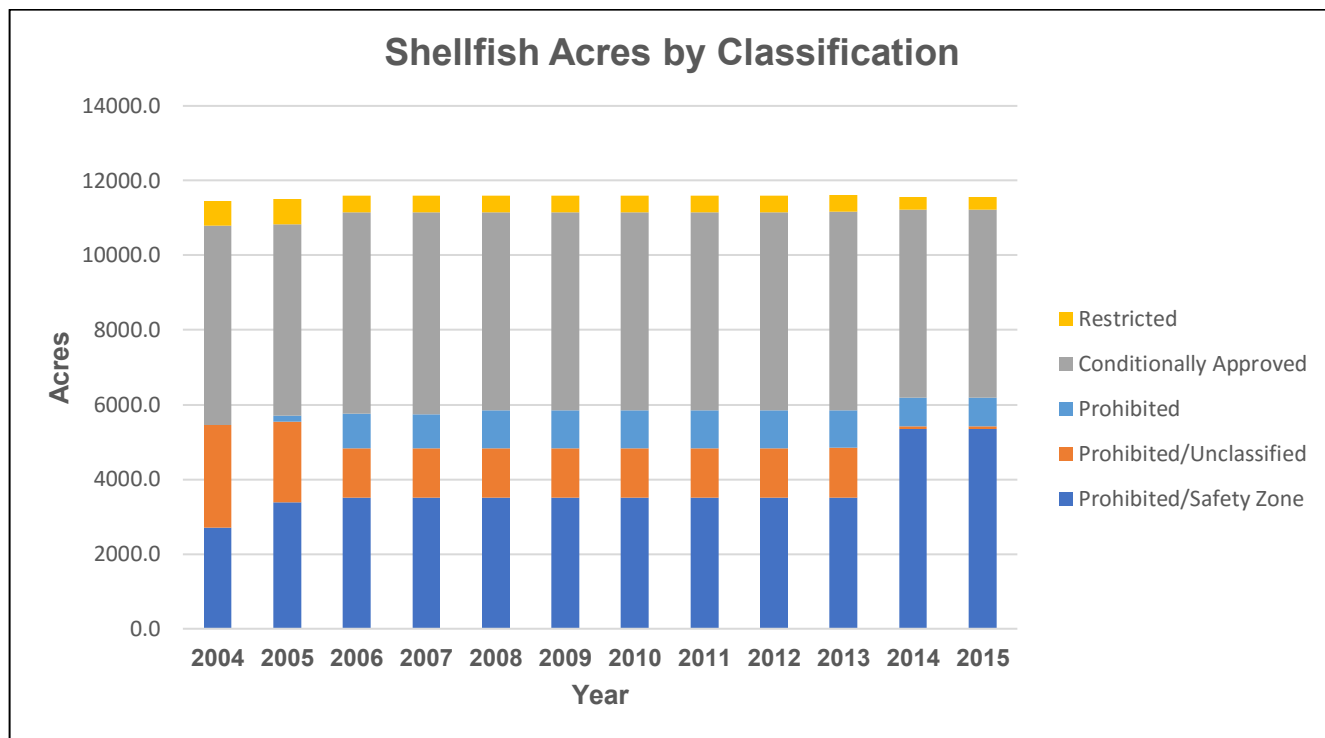


Figure SH-3: Shellfish closure acres by classification. Data Source: NH Department of Environmental Services, Shellfish Program.

Maine waters, including areas of the Piscataqua River and Spruce Creek, are also closed due to concerns about the Portsmouth WWTF. This facility is being upgraded from primary to secondary treatment, which should greatly reduce both the risk of bacterial/viral contamination during failure events as well as improve overall water quality. When the Portsmouth upgrade is complete, NHDES and Maine Department of Marine Resources will reassess the public health risks and modify harvesting classifications accordingly.

Methods and Data Sources

The areas of estuarine waters in each National Shellfish Sanitation Program (NSSP) classification category were compiled in a table showing the percentage of the estuarine waters in the “approved,” “conditionally approved,” “restricted,” “prohibited (unclassified),” or “prohibited (safety zone)” categories. All estuarine waters in both New Hampshire and Maine were included. Ocean waters were not included.

For areas that are classified as “approved” or “conditionally approved,” the percent of possible acre-days that were actually open for harvesting was calculated. The NHDES Shellfish Program measures the opportunities for shellfish harvesting using “acre-days,” which is the product of the acres of shellfish growing waters and the amount of time that these waters are open for harvest. The acre-days indicator is reported as a percentage of the total possible acre-days of harvesting for the year; (this total does not include days when harvesting is not allowed during the summer oyster reproductive season).

In the past, results for this indicator were reported for five regions: Great Bay, Upper Little Bay, Lower Little Bay, Little Harbor, and Hampton-Seabrook Harbor. For this reporting period, only Great Bay and Hampton Harbor are included, so that the indicator better represents actual water quality issues, rather than the risk of water quality issues. (See “Changes in Policy Versus Changes in Water Quality” section below.)

Data Sources

The acres of estuarine waters in each NSSP classification and the acre-days of harvesting potential for the estuary were taken from annual reports by the NHDES Shellfish Program (<http://des.nh.gov/organization/divisions/water/wmb/shellfish/index.htm>) and Maine Department of Marine Resources (http://www.maine.gov/dmr/rm/public_health/G_A_reports/index.htm). Shellfish growing area classifications and harvest closures are determined by NHDES and Maine DMR following protocols from NSSP (2017).

Technical Advisory Committee (TAC) Discussion Highlights

As part of the January 2017 TAC meeting, participants discussed some of the most salient issues related to shellfish harvesting opportunities (PREP 2017c). Complete notes are available at: <http://prepestuaries.org/prep-technical-advisory-committee/>

Changes in Policy Versus Changes in Water Quality

The TAC noted that this indicator is complex since it captures changes in both water quality as well as policy changes, usually around perceptions of risk related to unforeseen incidents at WWTFs. Several TAC members suggested modifications so that changes in perceptions of risk wouldn't be confused with changes in actual water quality.

For example, it was noted that the number of acre-days for Upper and Little Bay as well as Little Harbor decreased dramatically after the Portsmouth WWTF Dye Study (Ao et al. 2017). However, this does not indicate actual decreases in water quality, but rather a heightened understanding of potential public health dangers if a facility failure (in the disinfection system) should occur. Therefore, it was determined that the acre-day data and graph (Figure SH-2) should focus on areas where “safety zone” prohibitions were not in effect. In this way, the indicator would reflect water quality issues only. Moreover, by showing both SH-2—focused on acre-days related water quality issues—as well as SH-3, focused on changes in policy closures, the public can obtain a broader perspective on real and potential water quality issues.

Clarifications Regarding the Portsmouth Wastewater Treatment Plant

TAC discussions clarified current versus projected water quality issues as it relates to the Portsmouth WWTF. Construction on the facility upgrade began in 2017 and initial phases are scheduled to be finished in 2019, with all phases complete in 2020. Before the upgrade, the Portsmouth facility operated with a disinfection system that keeps bacteria concentrations very low (fecal coliform counts less than 14 colony forming units per 100 ml), when the system is working properly. Precautionary “safety zone” closures are related to potential disinfection failures; there have been only 2 failures in the last two decades.

After the upgrade, the Portsmouth WWTF will be a functioning advanced secondary facility and wastewater will receive more extensive treatment for longer periods of time. This will greatly diminish both bacteria and virus counts, regardless of the status of the disinfection system. As noted earlier, once the Portsmouth upgrade is complete, the Shellfish Program will re-evaluate its shellfish area designations.

References Cited

Ao Y, Goblick GN, Calci KR, Nash WC. 2017. Hydrographic Study of Peirce Island Wastewater Treatment Plant Effluent in the Piscataqua River of Portsmouth, New Hampshire: Report of Findings from the December 10 – 14, 2012 Study Period. *PREP Publications*. 372. <http://scholars.unh.edu/prep/372>

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