

Closure and Advisory Decision-Making Summaries for Beach and Shellfish Management in Maine and New Hampshire

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Table of Contents¹

1. Beach Advisories and Closures (pp. 4-10)

1.1 Beach Advisory and Closure Decision Making in Maine (p. 5)

1.2 Beach Advisory and Closure Decision Making in New Hampshire (p. 8)

1.3 Comparing Beach Advisory and Closure Decision Making in Maine and New Hampshire (p.10)

2. Shellfish Growing Area Closures (pp. 11-19)

2.1 Shellfish Growing Area Closures in Maine (p. 13)

2.2 Shellfish Growing Area Closures in New Hampshire (p. 17)

2.3 Comparing Shellfish Closure Decision Making in Maine and New Hampshire (p. 19)

3. Websites and Other Resources (pp. 20-22)

4. References (p. 23)

5. Appendices (pp. 24-45)

Appendix A - Beaches Monitored in Maine and New Hampshire

Appendix B - Maine Healthy Beaches Risk Assessment Matrix (Beach Management Areas)

Appendix C - Example Conditional Area Management for NH

¹ Hyperlinked for navigation.

1. Beach Advisories and Closures

Beach advisories and closures in Maine and New Hampshire share a common goal of protecting public health and respond to a common set of federally-recommended recreational water quality criteria. Yet, the distinct ways in which these decisions play out in these two states illustrate the influence of local and regional heterogeneity in water quality management and beach advisory and closure processes. In the United States, state and local governments establish and enforce regulations for protecting recreational water, such as water at beaches, from naturally occurring and human-made contaminants (Hlavsa et al. 2011). Accordingly, collaborative research to improve the scientific basis of these coastal resource management decisions necessitates an agile approach capable of responding to local and regional variation.

Current beach advisory and closure decision-making processes in Maine and New Hampshire reflect recent national coastal resource management efforts. The Beaches Environmental Assessment and Coastal Health Act (BEACH Act) was signed into law in October of 2000, amending the Clean Water Act (CWA) to further improve water quality and protect public health in coastal recreational waters. This act focuses on pathogens and pathogen indicators in coastal recreational waters. The act nationally advanced three improvements to coastal recreational water management: (1) requirements and deadlines for states and tribes that have coastal recreation waters to adopt new standards for which the Environmental Protection Agency (EPA) publishes recommended criteria; (2) requirements for EPA to conduct studies of pathogens and human health to inform these recommended criteria; and (3) authorization for EPA to award grants to states or local governments to develop beach monitoring and assessment programs (US EPA 2006). The BEACH Act was designed to help EPA improve its science and water quality criteria and to help states and tribes improve their monitoring of coastal public beaches for disease-causing microorganisms and their communications with the public when potential health risks are present.

Implementation of the BEACH Act, however, has been complicated by numerous factors, including inconsistent authorized funding by Congress, lack of consistency across state programs, conflicting recommendations and findings from government and research communities, and access to and scaling up of new water testing technologies. Nonetheless, its implementation has influenced numerous activities of great relevance to the Safe Beaches and Shellfish Project, including new research of water contamination and its effects on human health, improved beach water monitoring and outreach, improved public access to water quality and beach closure/advisory information, and new rapid water testing and anticipatory modeling approaches (US EPA 2006). For example, in 2012, EPA released updated water quality guidelines which set geometric mean and statistical threshold values (STV) for fecal bacteria in marine and fresh waters. For marine water, full-body contact beaches, EPA recommends that the monthly geometric mean and STV water quality indicator concentrations be <35 CFU/100mL and 130 CFU/100mL respectively for enterococci (US EPA 2012). The interpretation of these recommended criteria is as follows: the waterbody geometric mean should not exceed the recommended geometric mean in any 30-day interval and

there should not be greater than a ten percent excursion frequency of the selected STV magnitude in the same 30-day interval. Although these recommended criteria may influence water quality monitoring and beach advisory and closure decisions, state and local jurisdictions make the ultimate decisions on criteria for designated uses, the extent and frequency of testing and monitoring, and the type of interventions and communications that occur when state standards have been exceeded (Hlavsa et al. 2011).

Within this policy context which is characterized by local variation and uncertainty, beach advisories and closures emerge from multiple decision pathways, including reactive actions in response to water testing or known pollution events and pro-active or precautionary actions associated with high rainfall events or predictive modeling results. Nationally, the majority of beach advisories and closures are associated with monitored bacteria levels exceeding marine (beach) water quality standards. Other reasons for beach advisories or closures include excessive rainfall (i.e. proxying for expected increases in stormwater runoff and pollution), algal blooms, safety concerns (i.e., riptides or high waves), and known localized pollution events (i.e., sewage treatment plant failures) (NRDC 2013). Despite recent improvements in monitoring, data collection and access, and communications, numerous questions and concerns remain about the monitoring and management of coastal recreation waters and the safety of coastal beaches for swimming and other recreational activities.

In the subsequent sections, we summarize our knowledge to date of how beach advisory and closure decisions are made in Maine and New Hampshire.

1.1. Beach Advisory and Closure Decision Making in Maine

Background

Maine has 46 public coastal and estuarine beaches along 230 miles of coastline. Beach closings and advisories can both be issued in Maine. Beach advisories are far more common than beach closures. The latter occur very rarely at beaches identified as having chronic high bacteria levels or when a threat to public health or safety is known. State and local officials can both make beach closure and advisory decisions. Maine Center for Disease Control (ME CDC) can close a beach due to a cluster of confirmed illnesses. Local public health nurses also have this authority.

Generally, for local authorities to close a beach, they must have a beach closing ordinance in place. A few towns in Maine have a closure ordinance, yet most do not. A key factor for communities to consider is whether or not they can enforce the closure. For example, Portland's East End Beach will close due to chronic bacteria, heavy rainfall, risk of pollution, etc. but the closure is not enforced. Thus, the far more common management decision made in Maine is to issue a beach advisory. Beach advisories can be made by state or local officials such as local beach managers. In 2012, 10.6% of routine beach samples exceeded the enterococci bacteria safety threshold of 104 MPN/100mls of sample water. 194 beach advisory days were reported and 9 of the

reported days were “precautionary rainfall advisories,” based on local precipitation levels rather than recorded bacteria levels.

The Maine Healthy Beaches (MHB) Program plays a central role in coastal water quality management in Maine. As an outcome of the BEACH Act, EPA awarded a grant to the Maine Coastal Program of the State Planning Office to develop and implement Maine’s coastal beach monitoring program. The MHB program (www.mainehealthybeaches.org) emerged from this grant. SPO originally managed the grant and then management was transferred to ME DEP in 2009. UMaine Cooperative Extension continues to develop and coordinate this active program. MHB manages Maine's coastal water quality monitoring program, supports advisory and closure decisions at public bathing beaches, organizes and makes accessible water quality and beach status information, and provides extensive resources for local officials and the public at large about beach water quality, monitoring, and management, and tips for staying healthy at the beach. The collaborative, partnership-focused approach of MHB helps local officials develop capacity to identify, communicate, and address pollution and public health problems at coastal beaches.

Participation in MHB is voluntary, and participating beaches/communities must meet management guidance established by EPA and implemented by MHB. Participating beaches must have a management entity capable of meeting MHB protocols and conditions set forth in the MHB Quality Assurance Project Plan (QAPP) and MHB Town/State Park Agreement. Thirty-seven of Maine's 46 public coastal beaches in Maine currently participate in MHB (see Appendix A). Routine, standardized MHB water quality monitoring takes place at least weekly from Memorial Day to Labor Day using EPA-approved quality-assured testing protocols. Samples must be processed by the laboratory within 6 hours of collection; test results typically are returned and posted at the MHB website (and in the MHB database) within 26 hours. Automatic email alerts are issued to beach managers, local officials, and other management entities when a sample exceeds the single-sample enterococci bacteria standard of 104 MPN/100 ml.

Although monitoring and data have improved because of the innovative and collaborative MHB program, many beaches in Maine are not monitored. For example, private beaches and beaches without a management entity typically are not monitored or managed. US EPA funding supports monitoring of moderate to high use beaches with adequate public access. Maine law allows public use of private beaches for “fishing, fowling and navigation” only. There is no unifying monitoring system or management structure for all beaches. Program, community, and regulatory factors result in gaps in understanding of coastal water quality and beach safety.

Beach Advisories and Closures Decisions

In Maine, the decision to post a beach advisory (or in the rare event, a beach closure) is primarily made by state and local beach managers. As noted above, the Maine CDC and local public health officials also have authority to post advisories or closures. Monitoring coastal water quality for swimming and other water contact usage is the

responsibility of local jurisdictions and is not mandated by state law. Each decision to post (or close) a beach is made on a case-by-case basis. The following decision-making summary integrates content from the MHB website (<http://www.mainehealthybeaches.org/>) and discussions with MHB staff.

Three inter-related groups of factors influence most beach advisories and closures in Maine: (1) bacteria water quality samples exceeding State standards; (2) conditions at beaches indicating the possible presence of disease-causing organisms; and (3) current and historical beach risk factors.

MHB oversees water quality testing for Enterococci bacteria. The State of Maine (MHB) has a two-tiered exceedance criteria system similar to EPA recommendations (EPA 2012). For a single sample the criterion is enterococci levels that are greater than 104 per 100 milliliters of sample water, and the other criterion is Enterococci levels that exceed a geometric mean of 35 counts per 100 mL of water in at least five samples collected over a 30-day period.

Site conditions that indicate presence of disease-causing organisms may include confirmed knowledge of a pollution event such as a sewage treatment plant overflow, malfunctioning septic system, or overboard discharge, or observation of high rainfall events or river flow conditions that have historically been associated with higher bacteria levels.

Additional beach risk factors may also play a role in advisory decisions. MHB employs a Risk Assessment Matrix (RAM) to help local officials evaluate potential risks (see Appendix B). These factors include summary data on past bacteria levels, advisory/closure decisions, and confirmed illnesses; information about rainfall and Enterococci bacteria scores; site characteristics including different types of drains, septic/cesspool systems, proximity to wastewater treatment plant outfall, and connections to waters with documented bacteria pollution problems (i.e., 303D or TMDL); and information on human, domestic animal, and waterfowl beach visitation, restroom facilities, and impervious surfaces. RAM point scores allow for beaches (and beach management areas) to be assessed and classified in terms of pollution risk. MHB offers distinct monitoring and posting advice to areas following into different tiers or classes of risk. Those areas ranked as the highest risk are given recommendations to monitor frequently and adopt precautionary or preemptive advisory posting behavior after excessive rainfall events (e.g., > 1 inch of rainfall in 24 hours). The purpose of the RAM is to educate beach managers, assess risk, and inform the scale and scope of their beach management efforts.

When making beach advisory or closure decisions, state and local beach managers consider multiple factors and integrate their understanding of current and historical conditions. Beaches are typically posted following an exceedance of the Enterococci bacteria standard. However, the local beach manager can opt not to post after an exceedance. For example, a local beach manager may wait for resampled water test results before posting or delay a posting because of their historical knowledge of site

conditions, past pollution events, or assessment of risks. For beaches participating in MHB, advisory decisions are often a coordinated decision between the local beach manager and the Maine Healthy Beaches Program (MHB). Local heterogeneity definitely influences the way in which these decisions are made. Local capacity and resources for beach management are highly variable across Maine communities. Local economic dependence on beach visitors may also enter as a decision-making factor. Occasionally, a beach will be posted if there is a known sewage malfunction in the vicinity, and some communities do post in response to site conditions. A small number of beaches will post flags or local signage for sharks, riptides and other safety hazards not associated with bacteria.

Beach Advisory and Closure Notification

Beach status information including advisory and closure data are accessible through the beach status section of the MHB website. Once an advisory or closure decision is made, the website is updated almost immediately and MHB strives to have advisory or closure signs up at the beach within two hours of obtaining results. For areas participating in the MHB Program, signs indicate the beach status: open, advisory (attention; swimming/water contact activities not recommended), and closure (no swimming/water contact activities).

Beach Advisory and Closure Duration and Follow-up

For towns or State Parks participating in the MHB Program, officials will in most cases immediately resample all beaches upon issuing an advisory. Beaches are immediately resampled following an exceedance of the bacteria standard, and sampling will continue until results are within acceptable limits. The monitoring effort is intensified for areas with chronic issues. Once it has been determined that the concentration of bacteria is within the state standard, the advisory signs will be removed from the beach area. Any listings for beach advisories that were placed on the MHB website are updated as the beaches' status changes.

1.2. Beach Advisory and Closure Decision Making in New Hampshire

Background

New Hampshire has 17 public coastal and estuarine beaches along 18 miles of coastal line.² The NH Beach Inspection Program is also supported by USEPA BEACH Act funding that provides the necessary funding for sampling and a coordinated notification program. The New Hampshire Department of Environmental Services (NH DES) plays a major role in both coastal water quality monitoring and the issuance of beach advisories. NH DES beach water quality monitoring takes place from Memorial Day to Labor Day. Monitoring frequencies vary across beaches depending on risk factors including past water quality histories, the presence of sources of microbial pathogens,

² All of these beaches receive some degree of monitoring except for Star Island Beach which is not monitored due to logistical challenges with sampling.

and level of beach use (see Appendix A). New Hampshire uses enterococcus standards of 104 cfu/100 ml and 178 cfu/100 ml. In some cases, 35 GM/60 day approach is used. Enterococci results are typically returned within 24 hours. NH DES Beach Program staff share test results with local managers (i.e., local health officials) and other entities using a twitter feed.

Closings and advisories of beaches can both be issued in New Hampshire, however NH DES does not have legislative authority to enforce a beach closure. Local officials can close beaches in their jurisdiction. Both beach closures and advisories are rare in New Hampshire and this appears to be due, in large part, to consistently meeting water quality standards. For 9 of the last 11 years, no more than 1.6% of samples have failed state standards for water quality. Since 2007, at least 1000 samples have been collected annually at the coast and no more than 21 have ever violated the standard in any one year. However, this pattern does not hold for freshwater lakes in NH, where NH DES tests for E. coli. Roughly 10.4% of all freshwater samples collected since 2003 have violated state standards.

The following information is modified from the NH DES Beach Inspection Program Web Site <http://des.nh.gov/organization/divisions/water/wmb/beaches/>.

Beach Advisories and Closures Decisions

Sampling results are the primary decision pathway for beach advisories in New Hampshire issued by the NH DES Beach Program. If two or more enterococcus samples collected during a sampling event at a beach exceed the state standard of 104 cfu/100 ml, or if one sample exceeds 178 cfu/100 ml, a bacteria exceedance is declared and a beach advisory is issued. These advisories are recommendations to the public to avoid water contact activities at the beach until further analyses reveal safe conditions. Up-to-date advisory information can be found at the NH DES Website. Local beach managers may use their own discretion to actively close a beach to the public. They may place barriers at the entrances or post signs indicating the closure. The municipality must notify the NH DES Beach Program of their intentions to close a particular beach.

Beach Advisory and Closure Notification

NH DES works with municipalities, state departments or local health officials/beach managers to post advisories. Beach status information including advisory data are accessible at the NH DES website. NH DES also collaborates with local officials to have them post advisory signs on-site at beaches. For public beaches monitored by NH DES, signs indicating the beach status distinguish open beaches from those beaches with bacteria pollution.

Beach Advisory and Closure Duration and Follow-up

Once an advisory is posted, the NH DES Beach Program immediately resamples until bacteria levels become acceptable. Once the test results are below exceedance criteria

levels, the advisory sign is taken down and the NH DES Beach Program website advisory listings are updated.

1.3 Comparing Maine and New Hampshire Beach Advisory and Closure Decision-Making

Some key differences emerge when comparing beach advisory and closing decision-making in Maine and New Hampshire. First, Maine has benefitted from a grant funded via the BEACH Act and has a Maine Healthy Beaches Program that coordinates local beach monitoring and management activities. The Maine Healthy Beaches Program actively promotes capacity building at the local level, including volunteer water quality testing. NHDES, through Sally Soule and Sonya Carlson, seek to help local towns address problems; there are so few problems, this has been mostly focused on North Hampton state park beach and one other beach 'up the road'. Beach monitoring and decision-making appear to be more decentralized in Maine than in New Hampshire. For example, local beach managers play a significant role in decision-making in Maine; whereas state agency staff assume a central role in New Hampshire's decision-making on advisories. All coastal beaches are in the NH program, while 9 of 46 coastal beaches in Maine are not part of the MHB.

Another notable difference is New Hampshire's state policy of not closing beaches. New Hampshire monitors for toxic cyanobacteria blooms at their public beaches; Maine does not. Maine issues precautionary or preemptive advisories after extreme rainfall events; New Hampshire does not. Over the last decade, beach advisories were more commonly issued in Maine than New Hampshire. These differences reflect many factors, mainly differences in water quality but also including the political-economies of the two states and the coupling of their human and natural systems. They may also point to the need for different types of research from the Safe Beaches and Shellfish Project. For example, innovative work to understand and ultimately improve local capacity for beach management may be a priority in Maine and NH that enhance both states' capacities to eliminate pollution problems. Studies on the feasibility of improved testing technology capable of delivering real-time results, the design of and return from more localized beach management plans (including advisory and closure decision-making recommendations) based on improved knowledge of local systems, and the potential for new and emerging issues to stress current decision-making structures are likely to be of interest to stakeholders in both states.

2. Shellfish Growing Areas Closures

Maine and New Hampshire classify, close, and open bivalve shellfish (hereafter referred to as “shellfish”) growing areas to protect public health and facilitate commerce by providing safe and sanitary shellfish to consumers. Shellfish management efforts in both Maine and New Hampshire target a diverse range of activities, including conservation of growing areas, harvesting, processing, labeling, handling, and transport of shellfish. Their state-scale shellfish management programs are similar in design as both meet the minimum requirements established by the National Shellfish Sanitation Program (NSSP); states that do not abide by NSSP guidelines are not permitted for interstate shellfish commerce. NSSP Guides, Manuals, and Model Ordinances emerge from a federal-state-industry cooperative program whose purpose is to promote and improve the sanitation of shellfish (oysters, clams, mussels and scallops) distributed via interstate commerce through government cooperation and uniformity of State shellfish programs. The U.S. Food and Drug Administration (FDA) and the Interstate Shellfish Sanitation Conference (ISSC) collaborate officially through a memorandum of understanding. This process affords meaningful collaboration and exchange across NSSP participants, including agencies from shellfish producing and non-producing U.S. States, FDA, EPA, National Oceanic and Atmospheric Administration (NOAA), the shellfish industry, and foreign governments (FDA 2013). Uniformity in practices across state and country lines facilitates inter-state commerce and safe shellfish products. Sanitation concerns include bacteria, viruses, and biotoxins. The intentional and extensive coordination of programs, science, and expertise afforded by NSSP and the Interstate Shellfish Sanitation Conference (ISSC) support an adaptive over-arching management structure, which, in turn, creates opportunities for collaborative research, such as that of the Safe Beaches and Shellfish Project, to have far-reaching impacts.

The NSSP Guide for the Control of Molluscan Shellfish (see NSSP 2011) provides a "Model Ordinance" that provides guidance to states about regulatory authority and management of classification of shellfish growing areas, harvesting of shellfish, shellfish processing and facilities, product labeling, product storage, handling, and packaging, shellfish shipment in interstate commerce, shellfish dealers, and bivalve aquaculture (NSSP 2011). Molluscan shellfish covered under this ordinance include oysters, clams, mussels, and scallops (whose final product form is the adductor muscle only). Where components overlap with wild shellfish production, shellfish aquaculture systems are subject to the regulatory requirements of the NSSP Model Ordinance; polyculture and land-based systems are also subject to additional requirements. The Model Ordinance's requirements for growing areas (e.g., sanitation surveys, classification, indicator standards), laboratory analyses, bacteriological standards, and monitoring are of particular relevance to the Safe Beaches and Shellfish Project because they greatly influence the opening and closing of shellfish growing areas and to some extent define the existing bounds in which new science can change the way in which these decisions occur. ISSC committees are continually considering new approaches through entities submitting proposals for changes to the ordinance wording, new detection methods, or new science for other aspects of the Program.

In accordance with the NSSP's Model Ordinance, state shellfish programs must perform sanitary surveys and implement water quality monitoring and testing systems that meet specified national minimum requirements. Sanitary surveys document and assess potential pollution sources that may adversely affect the water quality in a growing area, and includes reviews and collection of information on meteorological and hydrographic factors and water quality and systems. This survey includes a detailed shoreline survey to locate point (e.g., municipal, industrial) and non-point sources (e.g., wildlife, stormwater runoff, marinas, pets) and potential direct discharges (e.g., septic tanks; municipal and industrial waste treatment). Water quality monitoring and evaluation are completed as part of this survey. Additional water quality monitoring and evaluation (i.e., systematic random sample monitoring and adverse pollution condition monitoring) is required on a regular basis at identified growing areas; the type of sampling design and frequency of required monitoring varies with the classification of each shellfish bed within the growing area. Fecal coliform standards and sampling recommendations are outlined in the model ordinance as are guidance for responding to marine biotoxins (i.e., paralytic shellfish poisoning, neurotoxic shellfish poisoning, and amnesic shellfish poisoning) and assessing risks from pathogenic *Vibrio* species, particularly *Vibrio vulnificus* and *Vibrio parahaemolyticus*. The NSSP Model Ordinance also sets quality assurance standard for state laboratories and testing protocols (i.e. FDA requirements).

State shellfish programs rely on sanitary surveys, water testing, and other knowledge of coastal systems to issue classifications for shellfish beds in shellfish growing areas. Each shellfish bed is classified into one of five classes: Approved, Conditionally Approved, Restricted, Conditionally Restricted, or Prohibited. The classification of a shellfish bed determines how shellfish stock from that area may be used. For example, some classes signal that shellfish can be sold directly to consumers. In other instances, the classification requires stock be naturally or artificially cleansed prior to being sold directly to consumers. Classes typically remain constant for a minimum of a year and are only updated based on improved knowledge of water quality, pollution events, etc. The extreme classes of Approved and Prohibited send a somewhat clear signal to harvesters; the conditional classes (Conditionally Approved and Conditionally Restricted) acknowledge the variable context of coastal systems and force managers to put performance standards (e.g., linked with bacteriological quality of proximate sewage treatment plants, vessel traffic in an area, rainfall in the immediate area, height or flow of rivers) and management plans in place. These conditional classifications recognize that many growing areas experience intermittent microbiological pollution. The Safe Beaches and Shellfish Project's research could help with the management of these classes - classes whose opening and closing demand resources and scientific knowledge of the performance of the coastal systems. The Restricted classification is often employed with a requirement for shellfish stock to be sent to relaying, container relaying, or depuration facilities. Relaying may involve moving shellfish stock to an area classified Approved for cleansing; depuration is a treatment process (i.e. controlled aquatic environment) that reduces the levels of pathogenic organisms.

The status (Open and Closed) of a particular shellfish bed is distinct from its classification. Requirements for an open or closed status vary across classifications.

The status provides further information about what shellfish can be harvested under what constraints from specific areas. Once an area is closed, it will not be re-opened until sampling or time (typically 14-21 days) indicate or suggest the water quality meets the requirements of the particular classification. In some instances, shellfish beds can be open to harvest of particular species and closed to other species.

Despite commonalities in structure and requirements, implementation varies across states because of regional variation in state agency capacity, involvement of local government oversight, shellfish growing areas, shellfish industry, and safety concerns. As coastal systems experience multiple forms of change, including landscape and climate change, numerous questions and concerns remain about the monitoring and management of growing areas and the safety of shellfish. Institutions have been set up to deal with established threats; new and emerging threats pose challenges and opportunities for shellfish management. Ultimately, closures emerge from multiple decision pathways, including reactive actions in response to water testing, known pollution, bloom, or biotoxin events, or illness outbreaks and pro-active or precautionary actions associated with high rainfall events, past water quality trends, marina activity or other proxies tied to performance standards.

In the subsequent sections, we summarize our knowledge to date of how shellfish growing area classification and closure decisions are made in Maine and New Hampshire.

2.1. Shellfish Growing Area Closures in Maine

Background

Maine has approximately 214,760 acres of **shellfish growing areas** that are under a pollution classification; these areas are distributed somewhat consistently across its extensive coastline. Of these, 174,936 acres are classified as prohibited, 10,686 acres as restricted, 966 acres as conditionally restricted, and 28,172 acres as conditionally approved (see Table 1 for details on these classifications).

The sum **habitat areas** for soft shell, razor, hard and surf clams; American and European oysters; and mussels identified by state and local officials in 2010 are 168,503 acres. Of this identified habitat, 114,060 acres fall under one of the above pollution classifications, which leaves 54,443 habitat acres with an approved status. Shellfish growing area is greater than identified habitat area because there are locations under pollution classification that do not provide actual shellfish habitat.

Collectively, these areas support both commercial and recreational shellfishing. In 2012, commercial shellfish landings were divided across several species, including soft shell clam, ocean quahog, northern quahog, razor clam, blue mussels, and eastern and European oysters. Soft shell clams stand out as the most commercially important species; in 2012, this species accounted for over 11 million pounds in landings and \$15.6 million in value (<http://www.maine.gov/dmr/commercialfishing/historicaldata.htm>).

Compared to other species, the soft shell clam fishery also has high participation (i.e. many harvesters). The Bureau of Public Health within the Maine Department of Marine Resources manages the application of the NSSP within Maine.

The subsequent summary integrates content gleaned from ME DMR website, a seminar given by Kohl Kanwit, Director of ME DMR's Bureau of Public Health, at University of Maine, and discussions with key shellfish stakeholders.

Consistent with the requirements of NSSP, ME DMR's Bureau of Public Health assumes significant and diverse shellfish management responsibilities. To this end, the ME DMR Shellfish Program supports Shellfish Growing Area Classification, Shellfish Dealer Certification and Inspection, Municipal Shellfish Management, and Marine Biotoxin Monitoring Programs. ME DMR staff work collaboratively with other state and local officials but have the primary authority over shellfish growing area classification and closures.

Key activities that ME DMR's Shellfish Growing Area Classification Program manages include water quality monitoring and sanitary surveys. Maine's shellfish growing areas are grouped into 47 distinct areas. Each year ME DMR staff survey some portion of the Maine coast. Surveying includes evaluating all actual and potential pollution sources (within 500 feet of the shoreline) that may impact water quality; conducting and analyzing marine water sampling (i.e. fecal coliform); and documenting site conditions that may influence the distribution of pollutants. Generally, survey efforts are led by ME DMR agency representatives but may involve others. Shellfish wardens may help staff identify areas that should be monitored or surveyed. ME DEP also provides more technical survey capabilities and investigates pollution "hot spots" as ME DEP staff is able to survey beyond 500 feet from the shoreline. Comprehensive sanitary surveys are conducted at each area every 12 years; in compliance with the NSSP's Model Ordinance, data and information are updated annually and triennially. These updates are designed to support regular reevaluations of commercial shellfish bed classifications and are also mandated by the NSSP Model Ordinance. Reports summarizing these activities are available by request from the DMR Bureau of Public Health.

The ME DMR has approximately 1,400 marine water quality stations from which they collect data to inform these shellfish management activities; approximately 13,000 water samples are annually evaluated at 2 state labs located in Boothbay Harbor and Lamoine. At least 6 samples are taken per year at each station; adverse conditions may require more regular sampling near a particular area. Water testing is focused on fecal coliform as an indicator. ME DMR uses a geometric mean standard of 14 CFU/100ml and a 90th percentile standard of 31 CFU/100ml for approved classification.

Consistent with the NSSP Model Ordinance (NSSP 2011), each commercially harvested shellfish bed within a growing area is assigned into one of the 5 classifications of Approved, Conditionally Approved, Restricted, Conditionally Restricted, or Prohibited. Constraints on harvesting follow from whether the area is

given an open or closed status. Refer to Table 1, reproduced from http://www.maine.gov/dmr/rm/public_health/howclassified.htm.

Table 1. Shellfish bed classification description and related harvesting activity regulations within each area.

Classification	Status	Shellfish Harvesting Activity
Approved	Open	Harvesting allowed
Conditionally Approved	Open	Harvesting allowed except during specified conditions (rainfall, STP bypass or seasonal)
	Closed	Harvesting NOT allowed
Restricted	Open	Depuration and/or Relay harvesting only
Conditionally Restricted	Open	Depuration and/or Relay harvesting allowed except during specified conditions (rainfall, STP bypass or seasonal)
	Closed	Harvesting NOT allowed
Prohibited	Closed	No harvesting allowed or water use allowed for processing (administratively imposed precautionary closure)

In Maine, the most recent 30 marine water samples are used when assessing growing area classifications along with other site information assembled in the sanitary survey and associated area reports.

Closure Decisions

Maine DMR’s Bureau of Public Health Growing Area Program Supervisors make necessary area closure decisions and confirm conservation/seasonal closures decided by managing municipalities. Growing area characteristics and shellfish bed classifications are based on the shoreline survey data and water quality results. An approved classification opens an area; conversely, a prohibited classification closes an area. The conditionally approved and conditionally restricted growing areas necessitate more frequent decision-making and extensive consideration of site characteristics to determine performance standards and specified conditions when harvesting is allowed.

Two factors have a major influence on bacterial closure decisions: (1) any environmental influence such as rainfall or seasonal use of coastal areas with actual or potential increases in fecal coliform counts and (2) identified point source pollution issues such as sewage treatment plants or septic contamination. Rainfall and resulting runoff is a major adversity for conditional growing areas in Maine. Trigger rainfall amounts for conditional areas are dependent on the characteristics of the specific area. However, most of the growing areas in Maine use a trigger of 1 inch of rain over 24 hours. In some instances, a known malfunction at a sewage treatment plant or other

point source will also close a shellfish bed. Shellfish beds or entire growing areas are also closed because of red tides based on PSP toxicity levels.

The municipal shellfish management program assists towns to manage flats and shellfish for conservation and resource use. Area biologists work with towns to develop conservation areas and engage in reseeding, surveying, town license allocations, shellfish ordinances, warden programs, and related activities. Though classification and closures affect the municipal management programs, they are separate efforts. Municipalities and other governance entities that are approved to manage their shellfish resources (except for intertidal mussel harvest permits) adopt and enforce a shellfish conservation ordinance. Area biologists in the Municipal Shellfish Program oversee this co-management of Maine's shellfish resources. Under these ordinances, municipalities may select shellfish beds for specific closures, approved by ME DMR. Conservation closures aim to allow recruitment and growth of shellfish spat. Conservation closures may also be used in locations with higher growth rates where shellfish are transplanted for later harvesting. A closure can be applied to a shellfish bed receiving transplanted shellfish from a closed-status shellfish bed, in order to allow for cleansing and later harvesting, usually a 14-day closure. Seasonal closures help ensure successful harvesting during times of the year that are economically important for harvesters. Shellfish beds can also be closed to either commercial or recreational harvesting, to help alleviate conflicts between these groups of users. These closures are often decided by a local shellfish committee; once approval by the local governing entity, ME DMR staff must approve the closure for it to be effective.

Closure Notification

Closures are announced online at the DMR website, through the use of a phone hotline, and by email to wardens, patrol officers, monitors, local officials, and industry interests. The Maine Red Tide and Shellfish Sanitation Hotline is a phone number that individuals can call to hear the latest closure information (1-800-232-4733 or 207-624-7727). Red tide closures are reported by species. Shellfish growing areas can be closed for specific species while open to harvesting of other species.

Closure Duration and Follow-Up

The duration of a closure will vary depending on the type of closure, the growing area classification, time of year and available scientific understanding of the site(s) involved. Rainfall closures typically last for 14 days and require water sampling to reopen. However, site and area-specific research can lower the default length of a closure (e.g., revised performance standards such as the 8-day re-opening after flow-based triggers in the Kennebec region). For areas classified as conditionally approved or conditionally restricted, the length of closure is based on site-specific water and shellfish sample data that show the amount of time it takes for water quality and shellfish to recover.

2.2 Shellfish Growing Area Closures in New Hampshire

Background

New Hampshire has approximately 63,377 acres of shellfish growing areas distributed in its estuarine (11,590 acres) and coastal (51,787 acres) area. These areas support modest commercial and recreational shellfishing. Major soft shell clam beds are located in Hampton Harbor, with scattered beds in Great Bay Estuary. Major oyster beds are found in the Great Bay, and blue mussel resources can be found in Hampton Harbor (NH DES FAQ). The NH DES Shellfish Program, the New Hampshire Department of Health and Human Services (NHDHHS), and the NH Fish and Game (NHFG) Department share responsibility for the application of the NSSP within New Hampshire.

The following summary is based largely on information available at the NH DES Shellfish Program Website and conditional area management plans as provided by Chris Nash at the NH DES.

NH DES conducts the sanitary surveys of shellfish growing areas and oversees marine water sampling. NHDHHS handles the laboratory analysis of water and shellfish tissues and oversees certification of commercial shellfish operations. NHFG is responsible for enforcement of open and closed status designations, licenses for harvest, and issues permits for commercial harvesting and shellfish aquaculture projects. These three state agencies also partner with various industry, research, and community organizations to manage New Hampshire's shellfish resources.

In compliance with the NSSP, the DES Shellfish Program evaluates the sanitary quality of all coastal shellfish growing areas and ensures that these evaluations are kept current through periodic re-evaluations. The program's sanitary survey research identifies pollution sources and other factors that introduce risks from human consumption of shellfish. These surveys, which are required in order to open shellfish beds for harvesting, involve a variety of activities including ongoing pollution source surveys, general water quality monitoring, and hydrographic, meteorological, and other studies. The NH DES Shellfish Program also supports efforts to address the identified pollution problems and to educate the public about the safety of shellfish consumption and the state's shellfish resources.

The NH DES Ambient Monitoring Program involves regular collection of water quality samples from over 75 locations in the Great Bay Estuary, Hampton/Seabrook Harbor, Little Harbor, and the Atlantic coast, focusing on monitoring bacteria levels in seawater. Consistent with the NSSP and analogous to the monitoring protocol in Maine, water testing is focused on fecal coliform as an indicator. NH DES uses a geometric mean standard of 14 CFU/100ml and a 90th percentile standard of 31 CFU/100ml for approved classification.

Supplemental sampling of seawater and shellfish samples is conducted following pollution events such as heavy rain, accidental sewage discharges, and others, in order

to properly manage temporary closures of harvesting areas. The "Red Tide" Monitoring Program involves the weekly collection of blue mussels from two sites (April through October) to check the levels of Paralytic Shellfish Poison (PSP) toxin in shellfish meats. Shellfish staff assist with the GulfWatch Program, which monitors the levels of toxic substances in blue mussels on an annual basis.

Using sanitary survey, marine sampling, and other information about its growing areas, NH DES Shellfish Program staff assign growing areas into the NSSP classifications.

Closure Decisions

The NH DES Shellfish Program Staff are responsible for making shellfish growing area closure decisions. Closures occur because of high bacteria levels due to high rainfall and accidental or intermittent pollution events associated mainly with wastewater treatment facilities and combined sewer overflows. The site-level triggers and subsequent decision making process is influenced by the growing area management plans. For example, the Great Bay growing area is classified as Conditionally Approved, a determination based on the presence of a wastewater treatment facility, how these point sources respond to rainfall events, and the capacity for tidal flushing in this area.

Rainfall events of more than 1.50 inches total precipitation within 24 hours will trigger a closure of the Conditionally Approved areas in Great Bay. Closures will be instituted for precipitation events that fall primarily as rainfall and not ice or snow. The potential for growing area contamination by such events will be evaluated by DES Shellfish Program staff on a case-by-case basis, and closure decisions are made accordingly.

Shellfish beds are closed when they are subject to accidental releases of untreated sewage or hazardous materials such as petroleum products. Beds in close proximity to wastewater treatment plant outfalls and marinas are permanently closed. Incidences of "Red Tide" will also cause closures. Once levels of toxin in shellfish reach an established threshold, shellfish harvesting is stopped in affected areas. Some shellfish beds are closed for resource conservation for some or all of the summer. For some shellfish areas in New Hampshire, closure decisions are made on a week to week basis.

Closure Notification

Closure information is shared with the public through the NH Fish and Game's Clam Flat Hotline at 1-800-43-CLAMS. The hotline is updated weekly on Friday afternoons. Closure information is also posted on NHFG's website at www.FishNH.com.

Closure Duration and Follow-Up

Shellfish areas typically remain closed for 14 days after a rainfall event. Beds can be opened to harvest in less than 14 days if water and shellfish tissue samples show that harvesting conditions are once again safe. In recreationally-important areas such as

Hampton/Seabrook, DES usually conducts water and meat sampling to determine if the closure can be lifted sooner than the typical 14-day period.

2.3 Comparing Maine and New Hampshire Shellfish Growing Area Closure Decision-Making

A key similarity between Maine and New Hampshire is the reliance on the NSSP to develop the shellfish management programs. This guidance document determines the process for conducting the shoreline survey work, collecting water samples, evaluating water quality, classifying growing areas, and all other aspects of managing shellfish harvest areas.

Despite this shared foundation, there are at least three primary differences. First, and most obviously, is the geographic extent and subsequent acreage in the shellfish growing area program. Second, New Hampshire growing areas along the Atlantic coast are mostly designated as approved. Closures of these growing areas are only based on PSP events and extreme rainfall events (greater than 2.5 inches). Maine does not differentiate growing areas by estuarine and ocean proximity. The third and final difference is that New Hampshire does not have a municipal shellfish program and its licensing program is managed by the Fish and Game Department. While this does not affect the growing area programs and related survey efforts, municipal shellfish committees are considered a potential stakeholder group in Maine but not in New Hampshire.

3. Websites and Other Resources

The following links provide additional resources for learning more about beach and shellfish advisory and closure decision making across scales.

Beaches

International and Federal

- EPA: http://water.epa.gov/type/oceb/beaches/beaches_index.cfm
 - 2012 summary PDFs and raw data by state:
http://water.epa.gov/type/oceb/beaches/2012_season.cfm
 - Contacts: http://water.epa.gov/type/oceb/beaches/whereyoulive_state.cfm
- CDC: <http://www.cdc.gov/healthywater/swimming/>
- WHO: http://www.who.int/water_sanitation_health/bathing/en/

State and Local

Maine

- Maine Healthy Beaches: <http://www.mainehealthybeaches.org>
- Maine CDC Division of Infectious Disease:
<http://www.maine.gov/dhhs/mecdc/infectious-disease/>
- Maine Town/State Park Beach Managers:
<http://www.maineoastdata.org/public/beachManagers.aspx>

New Hampshire

- Department of Environmental Services Beach Inspection Program:
<http://des.nh.gov/organization/divisions/water/wmb/beaches/index.htm>
- Department of Environmental Services:
<http://des.nh.gov/organization/divisions/water/wmb/beaches/index.htm>
 - Contacts for water-related issues:
<http://des.nh.gov/organization/divisions/water/contactus.htm>
- New Hampshire Parks and Rec – seacoast beaches:
<http://www.nhstateparks.org/explore/visiting/seacoast-beaches.aspx>
- Department of Health and Human Services - Public Beach Inspection Program Document: <http://www.dhhs.nh.gov/dphs/holu/documents/hom-beach.pdf>

Organizations

- Blue Ocean Society: <http://www.blueoceansociety.org/>
- Natural Resources Defense Council:
<http://www.nrdc.org/water/oceans/ttw/default.asp>
- Surfriders: <http://newhampshire.surfrider.org/>
- Granite State Septic Designers and Installers: <http://www.gsdia.org/index.php>

Shellfish

International and Federal

- Interstate Shellfish Sanitation Conference: <http://www.issc.org/Default.aspx>
- NSSP Model Ordinance:
<http://www.fda.gov/food/guidanceregulation/federalstatefoodprograms/ucm2006754.htm>
- CDC: <http://www.cdc.gov/ncezid/dfwed/waterborne/index.html>
- EPA: <http://water.epa.gov/scitech/swguidance/fishshellfish/>
- FDA:
<http://www.fda.gov/forfederalstateandlocalofficials/partnershipscontracts/ucm303971.htm>
- <http://www.fda.gov/ForFederalStateandLocalOfficials/PartnershipsContracts/ucm299286.htm>

State and Local

Maine

- Maine Department of Marine Resources:
<http://www.maine.gov/dmr/msf/index.htm>
 - DMR Public Health: http://www.maine.gov/dmr/rm/public_health/index.htm
Growing Area Classification
http://www.maine.gov/dmr/rm/public_health/shellfishgrowingarea.htm
Growing Area Reports
http://www.maine.gov/dmr/rm/public_health/G_A_reports/index.htm
Maine Red Tide and Shellfish Sanitation Hotline
http://www.maine.gov/dmr/rm/public_health/closures/shellfishhotline.htm
Bacteria Closures:
http://www.maine.gov/dmr/rm/public_health/closures/closedarea.htm
PSP Closures:
http://www.maine.gov/dmr/rm/public_health/closures/pspclosures.htm
- Maine Sea Grant: <http://www.seagrant.umaine.edu/resources-for-shellfish-growers/industry-overview>
 - Seafood Guide: <http://www.seagrant.umaine.edu/maine-seafood-guide/soft-shell-clams>
 - Clam Handbook: <http://www.seagrant.umaine.edu/files/pdf-global/98clamhandbook.pdf>

New Hampshire

- NH DES Shellfish Program:
<http://des.nh.gov/organization/divisions/water/wmb/shellfish/index.htm>
 - Frequently Asked Questions
<http://des.nh.gov/organization/divisions/water/wmb/shellfish/categories/faq.htm>
- NH DHHS Shellfish Inspection Program:
<http://www.dhhs.nh.gov/DPHS/fp/shellfish/index.htm>

- NH Fish and Game Clam Flat Status Information:
http://www.wildlife.state.nh.us/Fishing/clam_flat_status.htm
- NH Sea Grant: <http://www.seagrant.unh.edu/>

Organizations

- Maine Clammers Association:
<https://www.facebook.com/MaineClammersAssociation>
- Maine Seafood Alliance: <http://www.maine seafoodalliance.org/>
- Maine Wastewater Control Association: http://www.mwwca.org/?page_id=13
- Community Colleges (Great Bay Community College): <http://www.greatbay.edu/>
- Watershed Associations (Penobscot River Restoration Trust):
<http://www.penobscotrivers.org/>
- Natural Resources Council of Maine: <http://www.nrcm.org/>
- Nature Conservancy: <http://www.nature.org/>
- Maine Land Trust Network: <http://www.mltn.org/>
- Penobscot East Resource Center: <http://www.penobscoteast.org/>
- Island Institute, Susan Arnold: <http://www.islandinstitute.org/staff/Susie-Arnold/14834/>
- Sullivan Harbor Farms: www.sullivanharborfarm.com
- Maine Aquaculture Innovation Center: www.maineaquaculture.org
- AquaNIC (AquacultureNetworkInformationCenter): <http://aquanic.org>
- Aquaculture Connection: www.AquacultureConnection.com
- University of Maine, School of Marine Sciences Aquaculture Program:
www.marine.maine.edu/academics/academics_prog.php?program_id=85
- University of Maine, School of Marine Sciences Aquaculture Program:
www.marine.maine.edu/academics/academics_prog.php?program_id=85
- New EnglandSea Grant: <http://web.mit.edu/seagrant/northeast>
- Herring Gut Learning Center: www.herringgut.org
- Piscataqua Region Estuaries Project: <http://www.stateofourestuaries.org/>
- Pemaquid Oyster Company: <http://www.pemaquidoysters.com/>

References

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<http://www.fda.gov/food/guidanceregulation/federalstatefoodprograms/ucm2006754.htm>
- <http://www.fda.gov/downloads/Food/GuidanceRegulation/FederalStateFoodPrograms/UCM350344.pdf>
- Hlavsa et al. 2011. Surveillance for waterborne disease outbreaks and other health events associated with recreational water - United States, 2007-2008. CDC, MMWR 60(12): 1-32.
- NRDC. 2013. Testing the Waters, June 2013, 23rd Edition. Prepared by Mark Dorfman and Angela Haren.
- NSSP 2011. Guide for the Control of Molluscan Shellfish: 2011 Revision. FDA and ISSC.
- US EPA. 2006. Implementing the BEACH Act of 2000 Report to Congress. US EPA, Washington DC, EPA 823-F-06-014.
- US EPA. 2012. 2012 Recreational Water Quality Criteria. US EPA, Office of Water Fact Sheet, Washington, DC, EPA-820-F-12-061.

Appendices

Appendix A: Beaches Regularly Monitored in Maine and New Hampshire

Appendix B: Maine Risk Assessment Matrix (Beach Management Areas)

Appendix C: Example Conditional Area Management for NH

Appendix A: Beaches Monitored by the Maine Healthy Beaches Program (2013)

S to N	Beach Management Area	Town/Park	County	Beach Monitoring Sites
1	Fort Foster-Pier Beach	Kittery	York	K-5
2	Fort Foster-Horn Point	Kittery	York	K-4; K-6
3	Fort Foster-Scuba Beach	Kittery	York	K-3
4	Crescent Beach	Kittery	York	K-2
5	Sea Point	Kittery	York	K-1
6	York Harbor	York	York	YK-20
7	Long Sands Beach-South	York	York	YK-18, YK-16
8	Long Sands Beach-North	York	York	YK-13, YK-11, YK-10, YK-8, YK-6
9	Short Sands Beach	York	York	YK-4
10	Cape Neddick Beach	York	York	YK-2
11	Little Beach	Ogunquit	York	OG-5
16	Crescent Beach	Wells	York	W-11
17	Casino Square	Wells	York	W-10, W-9
18	Wells Beach	Wells	York	W-8, W-7, W-6, W-5
19	Wells Harbor	Wells	York	W-4
20	Drakes Island	Wells	York	W-3, W-2, W-1
21	Laudholm	Wells/WNERR	York	LDHLM-2, LDHLM-1
22	Mother's Beach	Kennebunk	York	KBK-4
23	Gooch's Beach	Kennebunk	York	KBK-2, KBK-1
24	Colony Beach	Kennebunkport	York	Colony-1
25	Goose Rocks Beach	Kennebunkport	York	GR-5, GR-4, GR-2, GR-1
26	Fortune Rocks	Biddeford	York	BID-7
27	Middle Beach	Biddeford	York	BID-5
28	Gil Bouche Park/Biddeford Pool	Biddeford	York	BID-4
29	Hills Beach	Biddeford	York	BID-1

30	Ferry Beach	Saco/Ferry Beach SP	York	FBSP-03
31	Bay View	Saco	York	SACO-02
32	Kinney Shores	Saco	York	SACO-01
33	Ocean Park	Old Orchard Beach	York	OOB-8, OOB-7
34	Central Beach	Old Orchard Beach	York	OOB-5, OOB-4, OOB-3
35	North End Beach	Old Orchard Beach	York	OOB-1
36	Pine Point	Scarborough	Cumberland	PP-1
37	Ferry Beach	Scarborough	Cumberland	Ferry-1
38	Scarborough Beach State Park	Scarborough/Scarborough Beach State Park	Cumberland	SBSP-3, SBSP-2, SBSP-1
39	Higgins	Scarborough	Cumberland	HIG-3, HIG-2, HIG-1
40	Crescent Beach	Cape Elizabeth/Crescent Beach SP	Cumberland	CBSP-3, CBSP-2
41	Kettle Cove	Cape Elizabeth/Crescent Beach SP	Cumberland	CBSP-1
42	Willard Beach	South Portland	Cumberland	Wil-2
43	East End Beach	Portland	Cumberland	EEB-01
44	Winslow Park	Freeport/Winslow Park	Cumberland	WP-1
45	Popham-West/Morse River	Phippsburg/Popham Beach SP	Sagadahoc	PSP-6, PSP-5, PSP-4
46	Popham-Center	Phippsburg/Popham Beach SP	Sagadahoc	PSP-3
47	Popham-East	Phippsburg/Popham Beach SP	Sagadahoc	PSP-2, PSP-1
48	Half-Mile	Georgetown/Reid State Park	Sagadahoc	RSP-7, RSP-6
49	Mile	Georgetown/Reid State Park	Sagadahoc	RSP-5, RSP-4
50	Lagoon	Georgetown/Reid State Park	Sagadahoc	RSP-3
51	Pemaquid Beach	Bristol	Lincoln	PEM-2, PEM-1
52	Sandy Beach	Rockland	Knox	RKLD-2

53	Goodies Beach	Rockport	Knox	GB-1
54	Laite Beach	Camden	Knox	CAM-2
55	Lincolnville Beach	Lincolnville	Waldo	LIN-3
56	Seal Harbor	Mount Desert	Hancock	MDI-02
57	Sand Beach	Bar Harbor/Acadia National Park	Hancock	SB-2
58	Town Beach	Bar Harbor	Hancock	MDI-05, MDI-04
59	Hulls Cove	Bar Harbor	Hancock	MDI-06
60	Hadley Point	Bar Harbor	Hancock	MDI-09

Source: 2013 Maine Healthy Beaches (MHB) Program Beach Inventory; List provided by Meagan Sims of the MHB Program.

Beaches Monitored by New Hampshire DES

BEACH_NO	BEACH_NAME	TOWN	BEACH_TYPE	INSPECTION FREQUENCY
121	HAMPTON BEACH SP	HAMPTON	STATE	8 PER MONTH
122	NORTH BEACH	HAMPTON	STATE	4 PER MONTH
123	NORTHSIDE PARK	HAMPTON	TOWN	2 PER MONTH
367	SUN VALLEY BEACH	HAMPTON	TOWN	4 PER MONTH
381	HAMPTON HARBOR BEACH	HAMPTON	TOWN	2 PER MONTH
201	NEW CASTLE TB	NEW CASTLE	TOWN	8 PER MONTH
213	NORTH HAMPTON STATE BEACH	NORTH HAMPTON	STATE	8 PER MONTH
257	BASS BEACH	NORTH HAMPTON	TOWN	4 PER MONTH
251	SAWYER BEACH	RYE	TOWN	8 PER MONTH
252	WALLIS SANDS STATE PARK	RYE	STATE	4 PER MONTH
253	JENNESS BEACH STATE PARK	RYE	STATE	8 PER MONTH
254	JENNESS BEACH AT CABLE ROAD	RYE	TOWN	8 PER MONTH
255	WALLIS SANDS BEACH AT WALLIS ROAD	RYE	TOWN	8 PER MONTH
258	FOSS BEACH	RYE	TOWN	4 PER MONTH
275	SEABROOK TB	SEABROOK	TOWN	8 PER MONTH
276	SEABROOK HARBOR BEACH	SEABROOK	TOWN	4 PER MONTH

Source: NH DES One Stop Data Query - <http://www2.des.state.nh.us/DESOnestop/BasicSearch.aspx>

Beach Monitoring Stations - New Hampshire

STANO	STATIONID	STATNAME	TOWN	COUNTY
1873	BCHHSPHAMCR	HAMPTON BEACH SP-CENTER	HAMPTON	ROCKINGHAM
1878	BCHHSPHAMLf	HAMPTON BEACH SP-LEFT	HAMPTON	ROCKINGHAM
1879	BCHHSPHAMLcr	HAMPTON BEACH SP-LEFT CENTER	HAMPTON	ROCKINGHAM
1880	BCHHSPHAMRT	HAMPTON BEACH SP-RIGHT	HAMPTON	ROCKINGHAM
1881	BCHHSPHAMRCR	HAMPTON BEACH SP-RIGHT CENTER	HAMPTON	ROCKINGHAM
16751	BCHHHBHAMCR	HAMPTON HARBOR BEACH-CENTER	HAMPTON	ROCKINGHAM
17327	BCHHHBHAMLf	HAMPTON HARBOR BEACH-LEFT	HAMPTON	ROCKINGHAM
18066	BCHHHBHAMRT	HAMPTON HARBOR BEACH-RIGHT	HAMPTON	ROCKINGHAM
1882	BCHBSPHAMCR	NORTH BEACH-CENTER	HAMPTON	ROCKINGHAM
1887	BCHBSPHAMLf	NORTH BEACH-LEFT	HAMPTON	ROCKINGHAM
1888	BCHBSPHAMLcr	NORTH BEACH-LEFT CENTER	HAMPTON	ROCKINGHAM
1889	BCHBSPHAMRT	NORTH BEACH-RIGHT	HAMPTON	ROCKINGHAM
1890	BCHBSPHAMRCR	NORTH BEACH-RIGHT CENTER	HAMPTON	ROCKINGHAM
1891	BCHNSPHAMCR	NORTHSIDE PARK-CENTER	HAMPTON	ROCKINGHAM
1892	BCHNSPHAMLf	NORTHSIDE PARK-LEFT	HAMPTON	ROCKINGHAM
1893	BCHNSPHAMRT	NORTHSIDE PARK-RIGHT	HAMPTON	ROCKINGHAM
7133	BCHSVBHAMLf	SUN VALLEY BEACH-LEFT	HAMPTON	ROCKINGHAM
7132	BCHSVBHAMRT	SUN VALLEY BEACH-RIGHT	HAMPTON	ROCKINGHAM
2005	BCHNWCNWCCR	NEW CASTLE TB-CENTER	NEW CASTLE	ROCKINGHAM
2006	BCHNWCNWCLf	NEW CASTLE TB-LEFT	NEW CASTLE	ROCKINGHAM
2007	BCHNWCNWCRT	NEW CASTLE TB-RIGHT	NEW CASTLE	ROCKINGHAM
2088	BCHBASNHMCR	BASS BEACH-CENTER	NORTH HAMPTON	ROCKINGHAM
2089	BCHBASNHMLf	BASS BEACH-LEFT	NORTH HAMPTON	ROCKINGHAM
2090	BCHBASNHMRT	BASS BEACH-RIGHT	NORTH HAMPTON	ROCKINGHAM
2029	BCHSTBNHMCR	STATE BEACH-CENTER	NORTH HAMPTON	ROCKINGHAM
2030	BCHSTBNHMLf	STATE BEACH-LEFT	NORTH HAMPTON	ROCKINGHAM
2031	BCHSTBNHMRT	STATE BEACH-RIGHT	NORTH HAMPTON	ROCKINGHAM
2094	BCHFOSRYECR	FOSS BEACH-CENTER	RYE	ROCKINGHAM
2095	BCHFOSRYELf	FOSS BEACH-LEFT	RYE	ROCKINGHAM
2096	BCHFOSRYERT	FOSS BEACH-RIGHT	RYE	ROCKINGHAM
2091	BCHCBLRYECR	JENNESS BEACH AT CABLE ROAD-CENTER	RYE	ROCKINGHAM
2092	BCHCBLRYELf	JENNESS BEACH AT CABLE ROAD-LEFT	RYE	ROCKINGHAM
2093	BCHCBLRYERT	JENNESS BEACH AT CABLE ROAD-RIGHT	RYE	ROCKINGHAM
2097	BCHJENRYECR	JENNESS STATE PARK-CENTER	RYE	ROCKINGHAM

STAN O	STATIONID	STATNAME	TOWN	COUNTY
2098	BCHJENRYELF	JENNESS STATE PARK-LEFT	RYE	ROCKINGHAM
2099	BCHJENRYERT	JENNESS STATE PARK-RIGHT	RYE	ROCKINGHAM
2107	BCHSYRRYECR	SAWYER BEACH-CENTER	RYE	ROCKINGHAM
2108	BCHSYRRYELF	SAWYER BEACH-LEFT	RYE	ROCKINGHAM
2109	BCHSYRRYERT	SAWYER BEACH-RIGHT	RYE	ROCKINGHAM
2100	BCHPICRYECR	WALLIS SANDS BEACH AT WALLIS ROAD-CENTER	RYE	ROCKINGHAM
2101	BCHPICRYELF	WALLIS SANDS BEACH AT WALLIS ROAD-LEFT	RYE	ROCKINGHAM
2103	BCHPICRYERT	WALLIS SANDS BEACH AT WALLIS ROAD-RIGHT	RYE	ROCKINGHAM
2112	BCHWSPRYECR	WALLIS SANDS STATE PARK- CENTER	RYE	ROCKINGHAM
2113	BCHWSPRYELF	WALLIS SANDS STATE PARK-LEFT	RYE	ROCKINGHAM
2114	BCHWSPRYERT	WALLIS SANDS STATE PARK-RIGHT	RYE	ROCKINGHAM
2147	BCHSBHSEACR	SEABROOK HARBOR BEACH- CENTER	SEABROO K	ROCKINGHAM
2148	BCHSBHSEALF	SEABROOK HARBOR BEACH-LEFT	SEABROO K	ROCKINGHAM
2149	BCHSBHSEART	SEABROOK HARBOR BEACH-RIGHT	SEABROO K	ROCKINGHAM
2150	BCHSEASEACR	SEABROOK TB-CENTER	SEABROO K	ROCKINGHAM
2151	BCHSEASEALF	SEABROOK TB-LEFT	SEABROO K	ROCKINGHAM
2152	BCHSEASEART	SEABROOK TB-RIGHT	SEABROO K	ROCKINGHAM

Source: NH DES

Appendix B

Maine Risk Assessment Matrix (Beach Management Areas)

Maine Healthy Beaches Program Risk Assessment Matrix

Scope and Application

A *Risk Assessment Matrix* (RAM) is a preliminary assessment of beach characteristics, activities, and water quality. The Maine Healthy Beaches (MHB) Program uses this risk-based ranking system to assess and classify coastal beaches and their management areas. This assessment helps beach managers gain a better understanding of the actual and potential pollution sources impacting the beach. The RAM will help define the typical “worst-case scenario” (i.e., when the risk of pollution is the greatest) resulting in unsafe bacteria levels at coastal swim beaches. Each beach or beach management area (BMA) is ranked based on a points grading system. A higher point score indicates a beach management area with a greater risk of bacterial pollution compared to areas with a lower point score. The number of points and associated ranking will help determine the beach’s “tier”¹ classification, and provide guidance on the best management course of action (monitoring frequency, posting a precautionary advisory following rainfall, the need to implement a more thorough sanitary survey, etc.).

The purpose of the RAM is to:

- Provide a preliminary assessment of potential and actual sources of bacterial pollution.
- Assist beach managers in making well-informed beach management decisions related to monitoring, assessment, and public notification of beach water quality conditions.
- Work in conjunction with routine monitoring, special studies, and sanitary survey work to build a profile of each BMA.
- Determine the need for an in-depth sanitary survey of the shoreline, adjacent watershed area(s), and offshore.

Beach Management Areas

A beach management area (BMA) is an entire beach or segment of a beach that is managed independently from other segments or area beaches. Implementing separate BMAs for large or heterogeneous beaches allows management decisions to be made for a specific region of the beach, rather than treating the whole beach as one unit. Each beach management area has its own beach sign(s) and is listed separately on the MHB Web site.

An initial RAM of the entire beach will help managers determine if separation of the larger beach area is warranted. Possible reasons to implement separate BMAs include, but are not limited to:

- The beach is heterogeneous and conditions vary considerably (e.g., a river mouth or storm drain on the north end of the beach increases the likelihood of bacterial pollution compared to the southern end, or an area where water quality results are not consistent throughout the entire length of beach).
- Monitoring and public notification of conditions are not practical or feasible for the entire beach.
- Sections of the beach not promoted for public use, including areas that are privately owned, not serviced by lifeguards, lack public access, or deemed unsafe for recreational purposes.
- A section of the beach is heavily used by the public compared to other areas.
- The beach has historically informal names or sections known to the public.

1. The MHB Program ranks coastal beaches into separate tiers or categories based on criteria for program participation, water quality history, beach usage, risk of pollution, etc. See MHB Tiered Monitoring Plan.

Equipment List

- Pencils/pens
- Risk Assessment Matrix
- Clipboard
- Definitions

Before heading to the field, read through the RAM and become familiarized with the process and the resources necessary to successfully complete the exercise. Obtain copies of data and reports specific to the beach management area(s) such as any previous sanitary surveys, watershed surveys, special studies, etc.

Completing the RAM

A RAM should be completed for each BMA.² The matrix should be updated frequently, typically every one to three years, depending on conditions and new information available. The frequency of updates depends on new development, increase in activities posing a risk to water quality, designated use of the waterbody, etc. The coastal surf zone is a dynamic environment where conditions can change very rapidly. Each beach management area has its own set of factors or characteristics impacting water quality, and the RAM helps to determine what those factors are.

If bacteria levels are consistently above the US EPA safety limit,³ simply examining the areas/properties directly on or adjacent to the beach may not be sufficient to thoroughly investigate all of the actual and potential sources of fecal contamination affecting the beach. Further sanitary survey work includes additional monitoring of freshwater inputs, property and septic system inspections within the watershed, and documenting offshore activities (unsanitary boating practices, dumping) contributing to poor water quality. Removing sources of bacterial pollution can lead to measurable improvements in water quality.

While completing the RAM be sure to:

- ✓ Complete all sections of the RAM as thoroughly as possible.
- ✓ Integrate the expertise and knowledge of local officials (code enforcement officers, local plumbing inspectors, planners, conservation commission members).
- ✓ Refer to the Definitions for terms used in the RAM.

Complete the Following Sections of the RAM:

I. Beach History

- ✓ Access previous years' monitoring, notification (beach posting), and environmental data to determine each criterion's point value. This information can be found from MHB Program data, sanitary surveys, special studies, and local weather monitoring stations (e.g., sewage treatment plant).
- ✓ Total the number of points and enter the sum in the **Section I. Total Points Box**.

II. Potential and Actual Sources of Contamination

- ✓ Access the appropriate data/reports and conduct on-site evaluation to obtain the information for this section.
- ✓ Fill out each segment and record individual totals. Transfer the sums to the associated boxes at the end of this section.
- ✓ Total the number of points from each segment and enter the sum in the **Section II. Total Points Box**.

2. Initially, a RAM may be completed for the entire beach which is then separated into BMAs.

3. The US EPA has deemed Enterococci bacteria as the most appropriate indicator organism for marine recreational waters. The single sample safety limit for marine waters is 104 MPN or cfus per 100 mls, 35 geometric mean value (five records within a 30-day period). For fresh water (zero salinity), the single sample limit is 61 MPN or cfus per 100 mls, and a geometric mean of 33.

III. Beach Activities and Environmental Conditions

- ✓ Access the appropriate data/reports and conduct on-site evaluation to obtain the information for this section.
- ✓ Total the number of points and enter the sum in the **Section III. Total Points Box**.

IV. Subtract Points for the Following

- ✓ Access the appropriate data/reports and conduct on-site evaluation to obtain the information for this section.
- ✓ Total the number of points and enter the sum in the **Section IV. Total Points Box**.

V. RAM Final Score

- ✓ Enter the section totals in their corresponding boxes.
- ✓ Total all of the section points and enter the final score in the **Section VI. Final Total Box**. This final RAM score will correspond with the RAM Ranking system.

RAM Ranking System

The final RAM score corresponds to a ranking or grade with associated recommendations. The beach rankings are meant as *guidelines* to help communities and resource managers assess the recreational water quality and safety of their beaches. Conditions can change very rapidly in the coastal surf zone and the RAM is simply one piece of the beach management “tool-box.”

The exercise of completing the RAM will allow beach managers to gain a better understanding of the beach area and to assist in making informed management decisions such as when to post a beach advisory or closure, or to determine whether a more thorough sanitary survey is warranted.⁴ It is a *get to know your beach* exercise.

Two examples of using the RAM in making beach management decisions:

- Bacteria results are slightly above the safety limit, there is no known safety hazard (e.g., malfunctioning septic, sewage treatment plant overflow), the conditions are not the typical “worst-case scenario” and the **Beach Ranking = A**. The beach manager may choose to wait for the resample results before posting an advisory.
- The same conditions as above, but the **Beach Ranking = D**. The beach manager may choose a more cautious approach and post an advisory or closure immediately, prior to the availability of resample results.

Beach Scores & Rankings

- (0-50 points) Suggested Action: Conduct routine monitoring once per week or less during the monitoring season. Resample if Enterococci results exceed the single sample safety level of 104 mpn/100 mls of sample water. Routinely update the RAM and take precautionary actions to maintain healthy conditions including routine septic system inspections, reduce runoff by planting buffers and minimizing impervious surfaces within the watershed, ensure adequate pump-out facilities for boats, etc.
- (51-100 points) Suggested Action: Continue to monitor at least once per week depending on the recorded bacteria levels. Additional monitoring of freshwater inputs (river mouths, streams, storm drains) during wet weather events may be warranted. Examine the relationship between bacteria levels and other parameters (e.g., rainfall, tidal stage, bather load). Education and outreach efforts should promote healthy sanitary practices at the beach and throughout the watershed.
- (101-150 points) Suggested Action: Continue to monitor at least once per week depending on the recorded bacteria levels. Additional monitoring within the watershed including storm drains, rivers, and streams may be warranted. If there is a relationship between rainfall and bacteria exceedances, precautionary wet weather advisories should be

4. Beaches with low scores may also require sanitary surveys.

posted. Education and outreach efforts should promote healthy sanitary practices at the beach and throughout the watershed.

- D. (151+ points) Suggested Action: Increase the monitoring effort in response to recorded bacteria levels. This may require monitoring at least twice per week. Ensure that an advisory or closure is posted until monitoring results are consistently below the safety level. Consider posting additional educational signage at the beach (e.g., high bacteria levels during wet weather, do not feed waterfowl, pick up after pets, etc.). Examine all bacterial pathways to the beach. Special studies, additional data analysis, assessment of offshore activities, and sanitary surveys of properties within watershed is warranted. Identify and remediate pollution sources. Education and outreach efforts should promote healthy sanitary practices at the beach and throughout the watershed.

Maine Healthy Beaches Risk Assessment Matrix

Town or State Park: _____

Beach or Beach Management Area (BMA) Name: _____

Date of Evaluation: _____

Beach or BMA Boundaries: _____

Evaluator Name(s): _____

Title(s): _____

Address: _____

Phone: _____ Fax: _____

Email: _____

I. Beach History

1. The geometric mean for beach monitoring sites (past season):

_____ > 35 col/100mls (# sites ___ x 10 points)

_____ < 35 col/100mls (0 points for each site) _____

2. Was an "advisory" or "closure" posted during previous season due to fecal contamination?

_____ Yes (10 pts) _____ No (0 pts) _____

3. How long was the beach posted during the previous season due to elevated levels of bacteria?

_____ >16 days (20 points) _____ 11-15 days (15 points) _____ 6-10 days (8 points)

_____ 1-5 days (5 points) _____ 0 days (0 points) _____

4. Was an "advisory" or "closure" posted during the bathing season 2 years ago?

_____ Yes (5 points) _____ No (0 points) _____

5. Was an "advisory" or "closure" posted during the bathing season 3 years ago?

_____ Yes (5 points) _____ No (0 points) _____

6. Any confirmed recreational water illnesses directly related to beach water quality reported in the past 4 years?

_____ > 3 reports/year (20 points) _____ < 2 reports/year (10 points)

_____ 0 reports (0 points) _____

7. Has dry weather monitoring resulted in Enterococci scores greater than 104?

_____ Yes (10 points) _____ No (0 points) _____

8. Has wet weather or rain event monitoring resulted in Enterococci scores greater than 104?

(>1" rain in 48 hours)

_____ Yes (5 points) _____ No (0 points) _____

Section I. Total Points:

II. Potential and Actual Sources of Contamination

Impact Guidelines

- Adjacent to the beach
- Adjacent to a stream/river that empties within a mile of the beach
- Drains directly to the beach

1. Score 1 point for each of the following that impacts the beach based on impact guidelines (see above):

- i. Number of Land Drains (# of drains _____ x 1 point) _____
 - ii. Number of Animal Farms or Kennels (# of farms/kennels _____ x 1 point) _____
 - iii. Number of Roof Gutter Drains (# of drains _____ x 1 point) _____
 - iv. Number of Gray Water Drains (# of drains _____ x 1 point) _____
-

Segment 1 Total _____

2. Subsurface Waste Water Disposal (i.e. septic, cesspool) Systems that have not been inspected in over 3 years

(# uninspected systems _____ x 3 points) _____

3. Score 5 points for each intermittent stream flow

(# stream flows _____ x 5 points) _____

4. Score 10 points for each of the following that impacts the beach based on impact guidelines:

- i. Waterbody on the 303d list with bacteria as a pollutant(# waterbodies _____ x 10 points) _____
 - ii. Waterbody with a TMDL study for bacteria (# waterbodies _____ x 10 points) _____
-

Segment 4 Total _____

5. Score 15 points for each of the following that impacts the beach based on impact guidelines:

- i. Stream flows, not related to rain event (may flow intermittently) (# stream flows _____ x 15 points) _____
 - ii. Malfunctioning Subsurface Wastewater Disposal (i.e. septic) Systems (# malfunctioning systems _____ x 15 points) _____
 - iii. Overboard Discharge Unit (OBD) (# units _____ x 15 points) _____
 - iv. Marina (# marinas _____ x 15 points) _____
 - v. Mooring Field (# fields _____ x 15 points) _____
 - vii. Stormwater Pipe or Drain (# pipes _____ x 15 points) _____
-

Segment 5 Total _____

6. Score 25 points for each of the following that impacts the beach based on the impact guidelines:

i. Illegal straight pipe (# of pipes _____ x 25 points) _____

ii. Combined Sewer Overflow (CSO) (# of CSOs _____ x 25 points) _____

iii. Waste Water Treatment Plant Outfall (within 1 mile of beach)
(# of outfalls _____ x 25 points) _____

Segment 6 Total _____

Section II Segment Totals

Segment 1 Total _____

Segment 2 Total _____

Segment 3 Total _____

Segment 4 Total _____

Segment 5 Total _____

Segment 6 Total _____

Section II. Total Points:

III. Beach Activities and Conditions

1. The number of people visiting the beach throughout the season:

_____ > 150,000 visitors (10 points) _____ 50,000 - 150,000 visitors (5 points)
_____ < 50,000 visitors (1 point) _____

2. The number of people that visit any one mile stretch of beach during the time of maximum use:

_____ > 50,000 visitors (10 points) _____ 25,000 - 50,000 visitors (5 points)
_____ < 25,000 visitors (1 point) _____

3. Are there public restrooms located with 400' (feet) of the beach?

_____ No (25 points) _____ Yes (0 points) _____

3a. If yes, what type of public restrooms are they?

_____ Outhouse (15 points) _____ Port-a-potty (10 points)
_____ Septic (5 points) _____ Sewered (0 points) _____

4. Are domestic animals allowed on the beach during the months of May - September?

_____ Yes (5 points) _____ No (0 points) _____

5. Are there large numbers of waterfowl regularly present on or near the beach? (e.g. flocks of birds)

_____ Yes (10 points) _____ No (0 points) _____

6. Are there wildlife areas near or adjacent (based on Section II. guidelines) to the beach watershed?

_____ Yes (15 points) _____ No (0 points) _____

7. Impervious surface scoring:

Each paved parking lot located within 100 feet (# lots _____ x 5 points) _____
Each paved road within 500 ft of the beach (# roads _____ x 2 points) _____
Each building roof located within 200 feet (# roofs _____ x 1 point) _____

Section III. Total Points:

IV. Subtract Points for the Following:

- i. 5 points for each active marine vessel pump-out station within 3 miles of the beach
(# stations___ x 5 points) _____
 - ii. 3 points for each property located within 200 feet
of the beach that is tied to a municipal sewer system (# properties___ x 3 points) _____
 - iv. 10 points if a significant portion of the beach has a 200 foot vegetative buffer _____
 - v. 5 points if beach management has posted educational signs about pollution resulting from
soiled diapers, dog feces, gull feeding, and/or advertising public restroom locations _____
 - vi. 10 points if a sanitary shoreline survey has been conducted _____
 - viii. 3 points if trash cans are located at the beach _____
 - ix. 3 points if doggie waste bags are provided at entry points: _____
 - x. 15 points for a public bathroom facility at the beach tied into a municipal sewer system _____
-

Section IV. Total Points:

V. RAM Final Score

Section Total Points

- I. Beach History (+) _____
 - II. Sources of Contamination (+) _____
 - III. Beach Uses and Conditions (+) _____
-

Subtotal Sections I-III

- IV. Subtract Points (-) _____
-

Final Score

Note: See beach scores and rankings, page 3.

Appendix C. Example Conditional Area Management Plan for Great Bay, NH

Conditional Area Management Plan for Great Bay Revision 8: January 24, 2013

DESCRIPTION OF CONDITIONALLY APPROVED AREA

The eastern two-thirds of the Great Bay growing area is classified as Conditionally Approved. This area is defined as the waterbody bounded to the west by a Prohibited line extending from the shore between Vols Island and Crommet Creek, to the shore just west of Bracketts Point, to the north by the boundary between Great Bay and Little Bay at Adams Point, and to the east by Prohibited boundaries near Fabyan Point, Pickering Brook, and the Winnicut River near Pierce Point.

FACTORS INDICATING SUITABILITY OF PORTIONS OF GREAT BAY AS CONDITIONALLY APPROVED

1. The major pollution sources with the capacity to adversely affect water quality in Great Bay are point source in origin, including the wastewater treatment facilities in Exeter and Newmarket and the Combined Sewer Overflow discharging to the Squamscott River via Clemson Pond in Exeter. The Conditionally Approved area is separated spatially from the wastewater treatment facility outfalls by a Prohibited/Safety Zone. National Pollutant Discharge Elimination System (NPDES) permit requirements for the facilities require the plant operators to immediately notify DES when discharges of improperly treated sewage occur, and experience to date has shown the plants do provide timely notification to DES. Prohibited zones are around other significant pollution sources adjacent to the Conditionally Approved area (Fabyan Point, Pickering Brook, Winnicut River, and Crommet Creek). There are no other significant point sources in the Conditionally Approved area.
2. The waters of Great Bay can be affected by nonpoint sources of pollution following heavy (>1.50 inches) rainfall events. Weather information is available in real-time from the Pease airport weather tower in Portsmouth, which is staffed 24 hours a day.
3. Great Bay exhibits a tidal range that indicates substantial exchange with coastal ocean waters.

POLLUTION EVENTS THAT MAY TRIGGER CONDITIONAL AREA CLOSURE

Newmarket Wastewater Treatment Facility (186 Main Street, Newmarket, NH 03857. Sean Grieg, Operator, 603/659-8810)

The following performance standards may be used to trigger a closure of the Conditionally Approved areas in Great Bay. Violation of any of the following shall trigger immediate notification of the DES Shellfish Program by the Town of Newmarket:

- Effluent flow: total daily flow shall not exceed the design flow of 1.0 MGD.
- Bacteriological quality of the effluent: shall not exceed 43 fecal coliform/100ml after disinfection.

- Bypasses: any discharge of raw sewage or partially treated sewage from the WWTF or from any part of the sewage collection system. For the purposes of this performance standard, “partially treated sewage” means sewage/effluent that has been released to the environment before undergoing all aspects of treatment required by the most recent NPDES permit.
- Failure of the WWTF to complete its required effluent monitoring, such that the biological, physical, and/or chemical quality of the effluent is unknown.

Exeter Wastewater Treatment Facility (10 Front Street, Exeter, NH 03833. Scott Butler, Operator, 603/773-6168).

The following performance standards may be used to trigger a closure of the Conditionally Approved areas in Great Bay. Violation of any of the following shall trigger immediate notification of the DES Shellfish Program by the Town of Exeter:

- Effluent flow: total daily flow shall not exceed the design flow of 3.0 MGD.
- Bacteriological quality of the effluent: shall not exceed 43 fecal coliform/100ml after disinfection.
- Bypasses: any discharge of raw sewage or partially treated sewage from the WWTF or from any part of the sewage collection system. For the purposes of this performance standard, “partially treated sewage” means sewage/effluent that has been released to the environment before undergoing all aspects of treatment required by the most recent NPDES permit.
- Failure of the WWTF to complete its required effluent monitoring, such that the biological, physical, and/or chemical quality of the effluent is unknown.

Exeter Combined Sewer Overflows

- *Any discharge* of the CSOs may be used to trigger a closure of the Conditionally Approved areas in Great Bay. Dye dilution/dispersion studies of the Squamscott River indicate that discharges of 100,000 gallons per hour and FC concentrations of 500,000/100ml could adversely affect Great Bay’s water quality. Discharges with lower rates but higher bacterial concentrations may also adversely affect Great Bay.

Meteorological or Hydrological Events

Rainfall events of more than 1.50 inches total precipitation shall trigger a closure of the Conditionally Approved areas in Great Bay. The 1.50 inch criterion is intended to generally apply to a 24-hour period; however, rainfall events that occur over a longer period of time may also warrant closure. Analysis of precipitation records from Portsmouth, NH suggests that on average, such events will occur approximately 5-10 times per year. An analysis of the relationship between rainfall and bacteria levels is presented in the sanitary survey report.

For the purpose of this performance standard, rainfall data will be obtained from the meteorological observation station at the Pease International Tradeport Airport in Portsmouth, New Hampshire. Real-time checks of rainfall data are made via phone calls to the weather observation station at the airport tower. Data from other coastal New Hampshire weather stations (e.g., Seabrook) may also be used to institute a closure.

Closures will be instituted for precipitation events that fall primarily as rainfall. Precipitation that falls primarily as snow and/or ice will generally not trigger a closure, as these events do not produce the runoff that transports bacterial contamination to the growing waters. However, precipitation events that fall as a mix of rain and snow/ice, or snow/ice events that are immediately followed by a significant melting period, may trigger a closure. The potential for growing area contamination by such events will be evaluated by DES Shellfish Program staff on a case-by-case basis, and closure decisions will be made accordingly.

IMPLEMENTATION OF A CONDITIONALLY APPROVED AREA CLOSURE

Notification of Management Plan Violation

The Newmarket and Exeter WWTFs are responsible for immediately notifying DES in the event of a violation of the aforementioned performance standards. The response time between management plan violation and notification of DES can vary, depending on the sewage discharge. However, historical experience with these WWTFs indicates notification can be expected within four hours of the management plan violation. Notification time is shortened by the availability of a pager maintained by DES staff (Chris Nash, Shellfish Program Manager, 222 International Drive, Suite 175, Pease Tradeport, Portsmouth, New Hampshire 03801). The Shellfish Program pager is to be used for notification (603/771-9826). The Shellfish Program also maintains a cell phone (603/568-6741), to be used by WWTF as needed (if direct contact with Shellfish staff is not made via cellphone, a page must be sent).

The current closure is based in part on the time of travel notification time (response time) by the WWTFs. The permanent closure will be reviewed for expansion if the four-hour notification time is exceeded by the WWTFs, which may take away harvestable shellfish from the general public.

DES Shellfish Program staff are responsible for monitoring weather forecasts and conditions and acquiring real-time rainfall data from the Pease Airport or other sources for the purposes of determining when a rainfall closure is necessary.

Implementation of Closure

Response time between management plan violation notification and legal closure by DES is relatively short, typically within four hours for the Newmarket and Exeter WWTFs, due to the DES Shellfish Program maintaining a pager. Rainfall closures are also implemented quickly, as DES maintains direct contact with the Pease airport weather observation station. Notification of NHF&G (patrol agency) by DES typically occurs immediately following DES notification. Implementation of closure by NHF&G is often immediate as well and typically occurs immediately after notification by DES. The following notification protocol is followed for each closure:

Initiation of Closure: Each week, the DES Shellfish Program calls the F&G Law Enforcement Division and sends a "Clam Hotline update" email to F&G Marine Fisheries Division/Durham, F&G Law Enforcement Division/Durham, and F&G Public Affairs Division in Concord. The email makes note of any management plan violations that have occurred, as well as any necessary closures. These emails typically outline the more common types of temporary closures, such as those occurring after rainfall events. For the more rare management plan violations that could involve prolonged closures (e.g., significant

discharges of improperly treated waste from a WWTF), an informational email is sent not only to F&G Marine Fisheries Division/Durham, F&G Law Enforcement Division/Durham, and F&G Public Affairs Division in Concord, but also to the DHHS/Bureau of Food Protection, the DHHS Public Health Laboratory in Concord, and the DES Public Information Office in Concord.

F&G will enforce provisions of Fis 606.02(b) once DES has placed the area in the closed status.

Public Dissemination of Closure Information: F&G will serve as the lead agency to inform recreational harvesters and the general public of any closures and subsequent reopenings. Procedures to inform the public may include such vehicles as the Clam Hotline, press releases and website updates, and alerting the public during patrol activities. DHHS will serve as the lead agency to inform the commercial shellfish industry of any closures and subsequent reopenings.

Enforcement of Closure

The New Hampshire Fish and Game Department is the agency responsible for patrolling waters closed for public health reasons. The frequency of patrols will be at the discretion of NH Fish and Game Department/Law Enforcement Division staff (Lt. Michael Eastman and Conservation Officers Josiah Towne, James Benvenuti, and Eric Fluette, NHF&G Region 3 Office, 225 Main Street, Durham, New Hampshire 03824, 603/868-1095).

REOPENING A CONDITIONALLY APPROVED AREA AFTER CLOSURE

Wastewater Treatment Plant/Collection System-Related Closures: Following closures triggered by discharges of raw or partially treated sewage from a wastewater treatment facility and/or any part of its sewage collection system, DES will be the lead agency for identifying necessary sampling locations and frequency needed to reopen the shellfish beds. At a minimum, water sampling will be conducted at monitoring sites GB4A, GB5, and GB16. If site access is limited by ice cover or other conditions, alternative shoreline sites will be used. Because access to shellfish tissue sampling sites can vary with tide stage, ice, and daylight considerations, shellfish tissue sampling sites will be determined on a case-by-case basis. DES will be the lead agency in collecting water and shellfish tissue samples and will notify the DHHS lab of its intention to sample. All samples will be held on ice and delivered to the DHHS Laboratory in Concord by the collecting agency as soon as practical, but always within 24 hours of collection. Upon completion of the laboratory tests, DHHS laboratory personnel will promptly inform the DES Shellfish Program of the results. DES will then decide whether or not the sample results support a reopening of the area and will notify F&G/Law Enforcement Division of the decision. Sampling will continue until meat samples show a FC MPN of 230/100g or less (or a different baseline value established for a particular site) and confirmatory water samples show FC of 43/100ml or less. When sampling demonstrates that the area was in fact impacted by a significant sewage discharge, the area will remain closed for a period of at least three weeks, per U.S. FDA recommendations relating to the time required for viral pathogens to be purged from shellfish. Reopening after the three week closure will be done in concert with water and meat samples that show sufficiently low fecal coliform results.

Rainfall-Related Closure Periods: Because water quality impacts can vary among storms of the same size, DES may elect to conduct an initial round of sampling, involving water samples only, of the Conditionally Approved area in the day(s) following closures from rainfall events. The purpose of such sampling is to determine if the rainfall event did in fact cause bacterial contamination of the growing area, and therefore to determine if a closure was warranted. At a minimum, water sampling will be conducted at monitoring sites GB4A, GB5, and GB16. If site access is limited by ice cover or other conditions, alternative shoreline sites will be used. If these water samples show low fecal coliform levels (i.e., the samples indicate that there was no water quality impact from the storm to begin with), then the closure may be lifted with no additional sampling of waters or shellfish meats. If high FC levels are observed, then the area will remain in the closed status until post-rainfall meat samples show a FC MPN of 230/100g or less (or a different baseline value established for a particular site) and confirmatory water samples show FC of 43/100ml or less, or until fourteen consecutive days with no storms >1.50 inches have elapsed and confirmatory water samples show FC of 43/100ml or less, whichever is less.

DES will be the lead agency in collecting samples from sites in the Conditionally Approved area and will notify the DHHS laboratory, as well as the F&G Law Enforcement Division of its intention to sample. All samples will be collected as soon as practical after the rainfall event has ended, will be held on ice, and will be delivered to the DHHS Laboratory in Concord, or an appropriate contracting laboratory, by the collecting agency within 24 hours of collection. Upon completion of the laboratory tests, DHHS laboratory personnel will promptly inform the DES Shellfish Program of the results. DES will then decide whether or not to close the area for harvesting and will notify F&G/Law Enforcement Division of the decision.

Notification of Reopening: DES will promptly rescind the closure after it is determined that the shellfish growing waters meet NSSP standards. Upon this determination, DES will email a reopening notice to the F&G Marine Fisheries Division/Durham, F&G Law Enforcement Division/Durham, and the F&G Public Affairs Division, as well as to the other individuals/organizations that received a closure notice. F&G will serve as the lead agency to inform recreational harvesters and the general public of any closures and subsequent reopenings. Procedures to inform the public may include such vehicles as the Clam Hotline and press releases. DHHS will serve as the lead agency to inform the commercial shellfish industry of any closures and subsequent reopenings.

MANAGEMENT PLAN EVALUATION

This plan shall be evaluated once per year as part of the DES Shellfish Program's annual report.