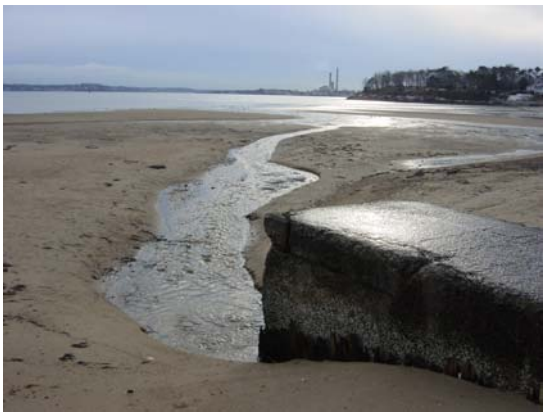
SALEM SOUND COASTWATCH

Protecting the Coastal Habitats of the Salem Sound Watershed with the Communities of Manchester, Beverly, Danvers, Peabody, Salem, and Marblehead.

Salem Sound Clean Beaches and Streams Program 2006 Report

The following report is a summary of results from water quality testing that has occurred over the past summer by Salem Sound Coastwatch's Clean Beaches and Streams Program and by Salem Sound municipalities. The data is displayed in tables and graphs below: Table 1. displays results of tests performed by Salem Sound Coastwatch (SSCW) at coastal outfall pipes and streams.



#213 – Patch Beach, Beverly

US EPA National Water Quality Inventory reports runoff from urbanized areas is the leading source of water quality impairments to surveyed estuaries, harming fish and marine plants and animals, killing native vegetation, and making recreational areas unsafe and unpleasant.

(EPA 841-F-03-003)

Approach and Methods

While municipalities tend to test only bathing waters at public beaches, Salem Sound Coastwatch focuses on stormwater outfall pipes and coastal streams, many of which are located at bathing beaches and near boating areas. SSCW's samples are collected at sites of stormwater discharge at low tide, which means that bacterial counts tend to be higher than beach samples taken at high tide in three feet of water where the ocean has diluted the discharge. The importance of testing outfall pipes and streams is that it shows whether bacterial contaminants are making their way into our area waters.

EPA has concluded that *Enterococcus* is the best indicator organism in marine waters to show a correlation with adverse human health effects. Therefore, all states have been mandated to use this standard by April of 2004. During the 2003 transition year, SSCW tested for both fecal coliform and *Enterococcus*. Since 2004, all Salem Sound communities and SSCW used *Enterococcus* as the indicator organism for marine water testing.

The Salem Sound municipalities tested bathing waters at least once a week during the swimming season, and more frequently if *Enterococcus* levels were shown to be high. **Beaches were closed if a single test reported *Enterococcus* levels greater than 104 CFU/100mL or if the geometric mean of the most recent five (5) *Enterococcus* levels within the same bathing season exceeded 35 colonies per 100mL** (Massachusetts state sanitary code 105 CMR 445.000). This is a statistical averaging method used to even out the average when dealing with a wide range of numbers.

Definition of Dry vs. Wet Conditions

Rain can cause temporary elevated bacterial counts at discharge sites and within nearshore coastal waters. Runoff from impervious surfaces (parking lots, roofs, streets) flushes contaminants through storm drains, bringing pollution onto the beaches and other coastal habitats. Therefore, testing under dry conditions gives a better picture of on-going contamination problems.

Salem Sound Coastwatch defines "dry" conditions vs. "wet" differently than the municipalities. Under SSCW's definition, dry conditions are less than 0.2" precipitation the day of sampling or less than 0.5" within the three days preceding sampling. Wet conditions are defined as more than 0.2" precipitation on the day of sampling or more than .5" within three days preceding sampling. Protocols for wet weather sampling are the same as for dry weather sampling.

The municipalities define wet conditions, or a "storm" event, as any occurrence of precipitation during the sampling or within the 24 hours preceding the sampling.

Salem Sound Coastwatch Test Results

Table 1. below shows the results of samples taken by Salem Sound Coastwatch over the course of the summer. Samples were taken every 2 weeks within two hours of low tide. All samples were tested by the US EPA New England Regional Laboratory (11 Technology Way, North Chelmsford, MA 01863), using EPA Region I method, A110: Entrolert and Quanti Tray method. SSCW has A DEP & EPA approved Quality Assurance Project Plan for this program.

Since there were too few samples to calculate a meaningful geometric mean, each test result is included in the table. Those values that are higher than EPA standard (EPA-823-R-03-008) are indicated in **bold**: *Enterococcus* >104 CFU/100mL.

Twenty-five samples were taken every other week in June, July and August, all happened to be during dry weather conditions. (On June 14 and July 11, the rain fell after all sampling was completed.) Every site exceeded the standard set by EPA (EPA-823-R-03-008) on three or more sampling dates, except for the western storm drain (#323) at Dane Street Beach, Beverly. Test results ranged from "Not Detectable" to a high of 92,080 CFU/100mL for *Enterococcus*.

In **Manchester**, efforts concentrated on Black Beach, including Coolidge Point, and two new sampling sites, Wolf Trap estuary (#160) and brook (#161) that flow onto Black Beach. The estuary sampling had the highest levels for the Manchester sampling, and **investigation should begin as to the source of the bacterial contamination in the Wolf Trap estuary**. Bacterial levels coming from the ponds on Coolidge Point (#151) exceeded EPA standard in 4 out of 6 samplings, with the highest numbers on 8/8 after a heat spell.

In **Beverly**, sampling took place at two sites, Patch Beach (3 outfalls) and Dane Street Beach (3 outfalls). Upon the request of the City of Beverly Health Department and SSCW, EPA conducted an assessment of bacterial contamination at Patch Beach in 2004 and 2005. Levels in 2006 continued to be high, especially during higher than usual tides associated with the full moon. **SSCW has begun work on EPA's recommendations by partnering with landowners, MA Coastal Zone Management Wetlands Restoration Program, and the City of Beverly to restore tidal flushing to the adjacent salt marsh.**

Dane Street Beach - Lawrence Street brook (#321) results, while still over the EPA standard, have improved since the City conducted work in the watershed.

In **Danvers**, two river locations were sampled. For dry weather sampling, results from Frost Fish Brook (#400) as it becomes the Porter River (at Rt. 62) were high. **Examination of the Frost Fish Brook watershed should take place**. Samples were also taken from seepage from a retaining wall on the Crane River (#432A). The first three samples were in the acceptable range, but counts increased as the weather became hot at the end of July and August. **This site requires follow-up to understand hydrology and the storm drain system. Data collection during wet events would also be helpful**.

In **Peabody**, the North River at Howley Street (#500) was sampled. While results exceeded the standard (>104CFU/100 mL) in 5 out of 6 samples, the average was 333 and one of the better sites in the study.

In **Salem,** two outfalls along Commercial Way, across from Leslie's Retreat Park, were sampled as they flow into the North River. The outfall near the footbridge (#559) had low levels of bacterial contamination similar to the upstream North River site in Peabody. However, site #537 for the second year in row has had very high counts, with numbers continuing to exceed 9,678 CFU/100mL. **The storm drain system feeding this outfall should be examined and cleaned by Salem's DPW.**

The outfall (#630) at Derby Wharf, Salem Maritime National Historic Site, continues to have increasing levels of bacterial contamination. In 2005, the two highest readings were 32,700 (a wet event in May) and 9,678 CFU/100mL (August). In 2006, the two highest readings were 92,080 (July) and 18,500 (August) CFU/100mL. **The storm drain system feeding this outfall should be cleaned and examined by Salem's DPW.**

The inner harbor sites at Palmer Cove (#631) and Willow Ave Beach (#642) still have problems, resulting in frequent beach closures. **Regular cleaning of the storm drains in the Palmer Cove watershed should be tried to reduce the bacterial contamination levels. The City of Salem, working with SSCW, has applied for a Coastal Pollution Remediation (CPR) grant to reduce contamination at the Willow Ave. Beach by installing an AbTech Smart Sponge® Plus vault.**

The Juniper Beach outfall (#620) started off the sampling season with the same high numbers as in the past (16,740 CFU/100mL). However, after the Salem DPW cleaned the pipe and installed a TideFlex "duckbill" tide gate, the numbers dropped into the low hundreds, a dramatic improvement. There was a jump in bacteria on August 8 (3,266 CFU/100mL). **SSCW will continue to sample the outfall to determine the long-term effectiveness of the "duckbill." Data collection during wet events would also be helpful**.

#620 – Juniper Beach, Salem

In **Marblehead**, the stream flowing on to Grace Oliver Beach (#700) was sampled. Bacterial levels coming from the brook were high, but not high enough to warrant the frequent beach closures. **Other marine sources of bacteria should be investigated to gain a better understanding of what is causing the beach closures in the cove.**

The two large Riverhead Beach Culverts (#701A & B) continued to be sampled. While the results were lower than in past years, the numbers still exceed the EPA standard.

Three outfalls were sampled in the Stramski Beach watershed (#722, 722A & B). The Marblehead Water and Sewer Commission worked to remediate bacterial contamination by cleaning storm drains and inspecting the pipes in the watershed, however when averaged, bacteria levels continued to be well above the standard. There is still no clear understanding as to the cause of the bacterial levels and thus the beach closures. If Salem receives the CPR grant and the Smart Sponge® technology proves to effectively reduce bacterial contamination, **the Smart Sponge® Plus vault will be considered for the Stramski Beach stream.**

For Additional Information about SSCW's Clean Beaches & Streams Program, including information on how one can become a volunteer in this important, environmental monitoring program, please call Salem Sound Coastwatch at 978-741-7900 or email barbara.warren@salemsound.org

Table 1. Salem Sound Coastwatch--Water Quality Monitoring Results 2006 From Outfall Pipes and Streams in the Salem Sound Watershed.

	SITE	DRY	DRY	DRY	DRY	DRY	DRY
Manchester	#	**6/14**	**6/28**	**7/11**	**7/26**	**8/8**	**8/23**
Coolidge Point - Black Beach	151	87	**118**	**839**	**307**	**5,040**	49
Black Beach - Wolf Trap estuary	160	**806**	**1,045**	**5,654**	**1,462**	**30,760**	**1,462**
Wolf Trap upstream	161	21	30	96	**104**	**1302**	**117**
Beverly							
Patch Beach (previously called Brackenbury) - stream from 4' x 4' Culvert	213	**690**	**384**	**3,080**	**689**	**9,678**	**555**
Patch Beach - concrete culvert to the east (18" dia.)	213A	**147**	**112**	**960**	**1,045**	**6,820**	**550**
Patch Beach - storm drain 100 ft west of road	222	49	91	85	**238**	**1,379**	**804**
Dane St. Beach - Lawrence Street brook at beach	321	**136**	**104**	39	**567**	**225**	**244**
Dane St. Beach - easterly storm drain at beach	322	34	21	21	**276**	**996**	**974**
Dane St. Beach - western storm drain at beach	323	16	16	ND	12	4	89
Danvers							
Porter River at Rt. 62 and Holten-Richmond School	400	**155**	**600**	**2,747**	**1,045**	**6,932**	**2,190**
Crane River - seepage from under retaining wall	432A	34	12	34	**2,190**	**944**	**432**
Peabody							
North River - downstream of Howley Street Bridge	500	93	**218**	**384**	**643**	**326**	**336**
Salem							
North River - upstream of Rt. 114 overpass, Commercial Way	537	**2,595**	**255**	**>9678**	**1,600**	**7,945**	**>9678**
North River - Commercial Way near foot bridge	559	**142**	30	**114**	**307**	**232**	**402**
Juniper Beach - storm drain on beach	620	**16,740**	**173**	**156**	**316**	**3,266**	**124**
Derby Wharf - storm drain	630	**2,908**	**396**	**92,080**	**2,452**	**18,500**	**6,212**
Palmer Cove - storm drain below Palmer Cove Playground	631	**239**	**3,266**	12	**3,466**	**36,540**	**233**
Willow Ave. Beach	642	**289**	**140**	**2,380**	**714**	**3,922**	**568**
Pioneer Village - Pond	634						**899**
Marblehead							
Dolliber Cove Creek - Grace Oliver Beach	700	**285**	**333**	**242**	**690**	**2,595**	90
Riverhead Beach Culvert - facing on left	701A	**395**	**334**	**714**	**302**	NS	**326**
Riverhead Beach Culvert - facing on right	701B	**420**	**395**	**1,102**	**494**	NS	**174**
Stramski Beach-Stream draining across beach	722	**140**	**1,642**	**1,379**	**1,954**	**4,185**	**534**
Stramski Way-Dodge Road drainage	722A	68	**329**	43	**2,595**	**953**	**219**
Stramski Way-Pitman Road drainage	722B	89	8	4	**1,230**	**953**	**2,005**
Numbers in bold exceed standards specified by the EPA (EPA-823-R-03-008):							
NS = not sampled / ND = not detected		**Enterococci> 104 CFU/100mL**					

Full Moon – June 11, July 11 and August 9; new moon – June 25, July 25 and August 23.

Precipitation recorded at the Beverly Airport.