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 2004 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. Appendix 1. and Appendix 3. show water testing results conducted at bathing beaches by the Salem Sound municipalities, including Beverly, Danvers, Manchester, Marblehead and Salem. The purpose of showing both sets of data is to give a more complete picture of the health of a particular beach.

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 test bathing waters at public beaches, Salem Sound Coastwatch focuses on storm water outfall pipes and coastal streams, many of which are located on bathing beaches and near boating areas. SSCW's samples are collected at sites of stormwater discharge at low tide. As a result, bacterial counts tend to be higher than from samples taken from the water in the middle of a bathing beach. However, results from outfall pipes and streams indicate that contaminants are still making their way into our area waters.

EPA has concluded that *Enterococci* 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 *Enterococci*. In 2004, all Salem Sound communities and SSCW used *Enterococci* as the indicator organism for marine water testing. SSCW tested only one site in 2004 for fecal coliform to enable historical comparisons.

The Salem Sound municipalities test bathing waters at least once a week during the swimming season, more frequently if *Enterococci* levels were shown to be high. **Beaches are closed if a single test reports *Enterococci* levels greater than 104 CFU/100mL or if the geometric mean of the most recent five (5)**

***Enterococci* levels within the same bathing season exceeds 35 colonies per 100mL** (Massachusetts state sanitary code 105 CMR 445.000). The numbers shown in column 1, Appendix 3. represent the "geometric mean" of all test results collected over the summer by the Boards of Health. This is a statistical averaging method used to even out the average when dealing with a wide range of numbers. The variation in bacterial counts is depicted more clearly in the three graphs displayed in Appendix 1. The graphs are plotted using the logarithmic scale, and each y axis marking is an order of magnitude (1, 10, 100, 1000). Appendix 3. column 2 lists the range of *Enterococci* levels for each beach.

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.

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 at Biomarine (16 East Main Street, Gloucester, MA 01930), using membrane filtration method 9222d.

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 standards (EPA-823-R-03-008) are indicated in **bold**: *Enterococci* >104 CFU/100mL and fecal coliform >200 CFU/100mL.

During the summer of 2004, six of the eight SSCW's water quality testing dates took place during dry weather conditions. The two wet events took place on 8/17 and 8/31. On 8/31, every site, except one, exceeded the standards set by EPA (EPA-823-R-03-008), and test results ranged from 500 to 100,000 CFU/100mL for *Enterococci*. See Table 1.0.

For Additional Information

For additional information about Salem Sound Coastwatch's Clean Beaches & Streams Program, including information on how you can get involved as 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 2004 from outfall pipes and streams in the Salem Sound Watershed.

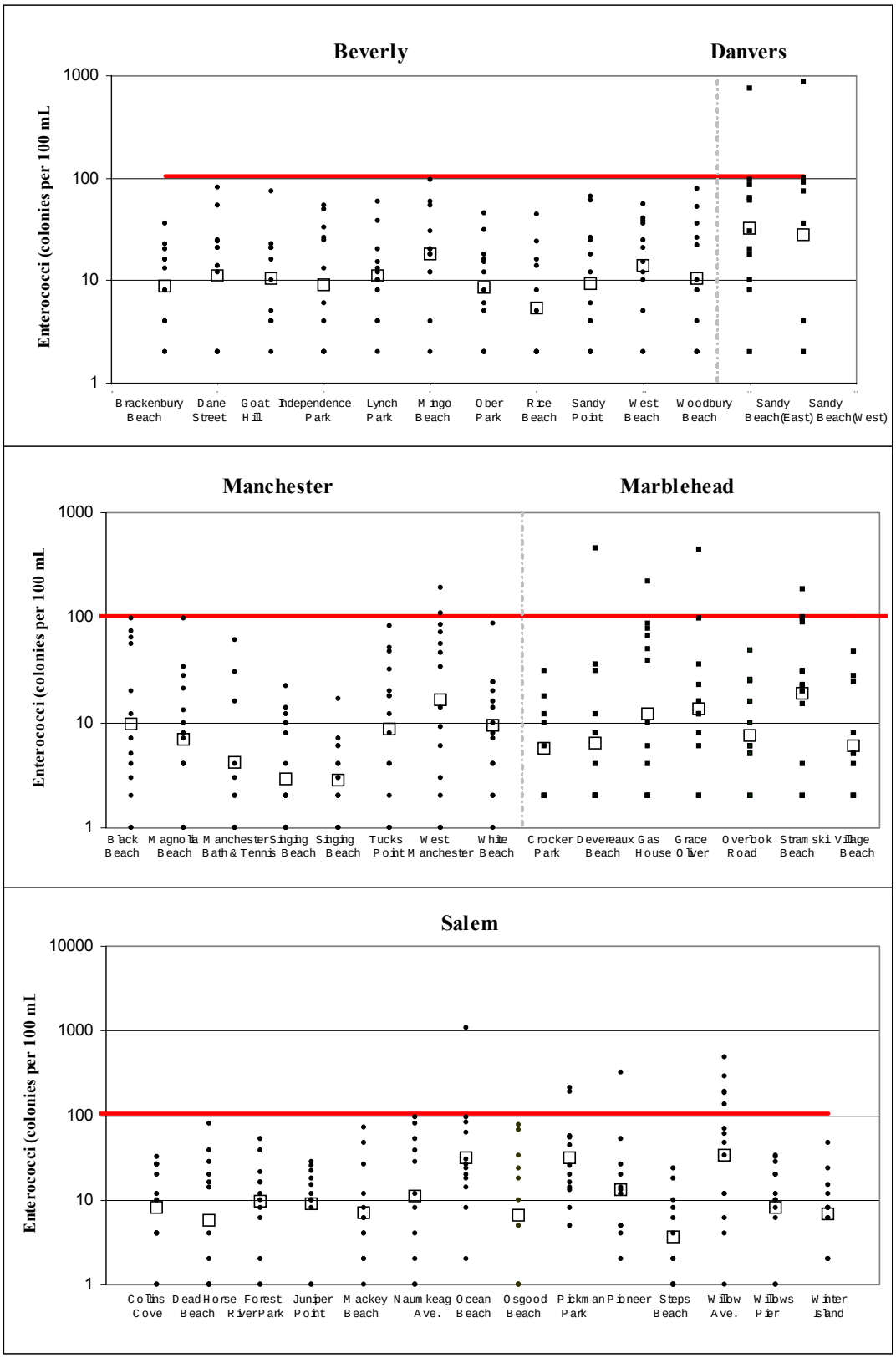
			DRY	DRY	DRY	DRY	DRY	WET	WET	DRY
Marblehead	**Site #**	**Test**	**6/8**	**6/22**	**7/6**	**7/20**	**8/3**	**8/17**	**8/31**	**9/14**
Stramski Beach - Stream draining across beach	722	Ent	**300**	**700**	**1,400**	**600**	**1,500**	**1,300**	**6,400**	**1,200**
Stramski Way - near pkg lot after playground	722a	Ent	<100	**1400**	**2,100**	**800**	**2,100**	**1,200**	**7,400**	**1,000**
Stramski Way - near field	722b	Ent	**200**	**900**	**3,300**	<100	<100	100	**21,000**	<100
Hawthorne Pond - end of street	750a	Ent	100	<100	<100	ns	ns	ns	ns	ns
Hawthorne Pond	750b	Ent	<100	<100	**200**	ns	ns	ns	ns	ns
Hawthorne Pond - boardwalk	750c	Ent	ns	ns	ns	**400**	<100	ns	ns	ns
Beverly										
Dane St. Beach - N. storm drain	322	Ent	<100	100	**500**	<100	<100	100	**11,900**	**400**
Lawrence Street brook at beach	321	Ent	<100	100	**200**	**300**	<100	**300**	**5,800**	**200**
Rice Beach-Stream draining across beach	214	Ent	**200**	**200**	**900**	<100	**300**	**400**	**16,000**	**300**
Brackenberry Beach - Stream across beach	213	Ent	100	**700**	**500**	**300**	**500**	**400**	**1,300**	**400**
Northern storm drain at beach	213a	Ent	100	**3,300**	**300**	**400**	**400**	**300**	**31,000**	**600**
SW storm drain at beach	222	Ent	ns	**500**	**900**	100	**600**	<100	**13,000**	**600**
Danvers										
Holton-Richmond School-field	400a	Ent	ns	**1,400**	**700**	**300**	**200**	100	**3,900**	**1,600**
Bunky's Marina - Porter River	401a	Ent	ns	100	**200**	<100	**200**	<100	**4,500**	<100
Sandy Beach - outfall pipe	430	Ent	ns	**1,600**	<100	<100	100	**500**	**44,000**	<100
Sandy Beach - downstream of outfall pipe	430a	Ent	ns	ns	ns	<100	ns	<100	**1,900**	**200**
Crane River Marina	431a	Ent	ns	ns	ns	<100	ns	ns	ns	ns
Eden Glen Road	491b	Ent	ns	100	100	**200**	<100	<100	ns	ns
Manchester										
Bennett's Brook - at Bennett St.	149	Ent	<100	**200**	**1000**	**1,700**	**300**	**200**	**6,400**	**700**
Bennett's Brook - Forster Rd.	149a	Ent	ns	ns	ns	ns	<100	**400**	100	**500**
Raymond Street	150	Ent	ns	100	**200**	ns	ns	ns	**500**	100
Salem										
Juniper Beach - storm drain on beach	620	Ent	**600**	**900**	**17,000**	**200**	**9,400**	**600**	**100,000**	**69,000**
Juniper Beach - storm drain	620	FC	**60,000**	**47,000**	**210,000**	**1,400**	**950,000**	**2,800**	**160,000**	**450,000**
Palmer Cove - storm drain at Shetland Park	629	Ent	**2,100**	**1,300**	**1,100**	**1,500**	**400**	**400**	**15,000**	**2,000**
Palmer Cove-storm drain below Playground	631	Ent	<100	<100	<100	<100	**35,000**	**300**	**20,000**	**800**
Willow Ave. Beach - storm drain on beach	642	Ent	ns	ns	ns	100	**4,000**	**1,800**	**14,000**	**8,000**
Collins Cove - Arbella St. stairs	527	Ent	ns	ns	ns	**400**	ns	ns	**6,600**	ns
Willows Pier	546	Ent	ns	ns	ns	ns	ns	ns	ns	ns
North River - off Commercial St. near Rt. 114	537	Ent	**400**	**900**	**1,100**	100	**400**	**300**	**3,800**	**1,000**
North River - south side, capped outfall	557	Ent	<100	<100	<100	ns	ns	ns	ns	ns
North River - off Commercial St. by footbridge	559	Ent	ns	ns	ns	**1,600**	**700**	**500**	**13,000**	**600**
Derby Wharf	630	Ent	ns	**400**	ns	**300**	<100	**500**	**12,000**	**1,400**
Pioneer Village	634	Ent	ns	**500**	ns	ns	ns	ns	ns	ns

Ent = *enterococci*
FC = fecal coliform
ns = not sampled

Numbers in bold exceed standards specified by the EPA (EPA-823-R-03-008):
Fecal Coliform >200 CFU/100mL; *Enterococci*> 104 CFU/100mL

Appendix 1. Graphs displaying local Boards of Health test results at Salem Sound bathing beaches per community in 2004. ☐ **Geometric mean for all results per beach.** ━ **EPA guideline 104 CFU / 100mL**

Note: Plots use the logarithmic scale, and each y axis marking is an order of magnitude.



Appendix 2. Public beach closings during the 2004 bathing season

Beaches are closed if a single test finds *Enterococci* levels greater than 104 CFU/100mL or if the geometric mean of the most recent five (5) *Enterococci* levels within the same bathing season exceeds 35 colonies per 100mL (Massachusetts state sanitary code 105 CMR 445.000)

Beverly:

No beaches were closed.

Danvers:

Sandy Beach closed July 28, reopened August 2.

Manchester:

West Manchester Beach closed June 30, reopened July 7 and closed July 28, reopened August 4.

Marblehead:

Stramski's closed July 16, reopened August 12.
Grace Oliver's closed July 30, reopened August 1.
Gas House Beach closed July 30, reopened August 12.

Salem:

Willow Avenue closed July 7 to August 11, and then closed again on September 1.
Pickman Park closed July 14, reopened August 18.
Ocean Ave. closed July 28 through September 1.
Pioneer Village closed September 1.

Appendix 3. Salem Sound Bathing Beaches tested by local Boards of Health, 2004

Figures listed in this table are the **geometric mean of all available water quality testing results** per beach by municipality.

City and Beach Sampled	*Enterococci* (including rain events)	Range in *Enterococci* (CFU/100mL)
Beverly		
Brackenbury Beach	9	2 - 36
Dane St. (mid-beach)	11	2 - 80
Goat Hill	10	2 - 115
Independence Park	9	2 - 174
Lynch Park	11	2 - 146
Mingo Beach	18	2 - 95
Ober Park	8	2 - 46
Rice Beach	5	2 - 44
Sandy Point	9	2 - 134
West Beach	14	2 - 56
Woodbury Beach	10	2 - 380
Danvers		
Sandy Beach East	32	2 - 755
Sandy Beach West	28	2 - 870
Manchester		
Black Beach	10	1 - 97
Magnolia Beach	7	1 - 97
Manchester Bath and Tennis	4	1 - 61
Singing Beach	3	1 - 22
Singing Beach (right of pkg. lot)	3	1 - 17
Tucks Point Beach	9	1 - 87
West Manchester Beach	16	1 - 190
White Beach	9	1 - 89
Marblehead		
Crocker Park	6	2 - 31
Devereaux Beach	6	2 - 460
Gas House Beach	12	2 - 220
Grace Oliver Beach	13	2 - 440
Stramski Beach	8	2 - 49
Village Beach	19	2 - 185
Salem		
Collins Cove	8	2 - 32
Dead Horse Beach	6	2 - 80
Forest River Point	10	2 - 52
Juniper Point	9	2 - 28
Mackey Beach	7	2 - 71
Naumkeag	11	2 - 96
Ocean Ave. Beach	31	1 - 1100
Osgood Beach	6	2 - 77
Pickman Park	32	1 - 210
Pioneer	13	2 - 320
Steps Beach	4	1 - 24
Willow Ave.	33	1 - 490
Willows Pier	8	1 - 33
Winter Island	7	2 - 48