

Detecting and Monitoring
Bacterial Contamination in the Stormwater Discharges
of a Diverse Coastal Watershed:
A case study in the Salem Sound region of MA

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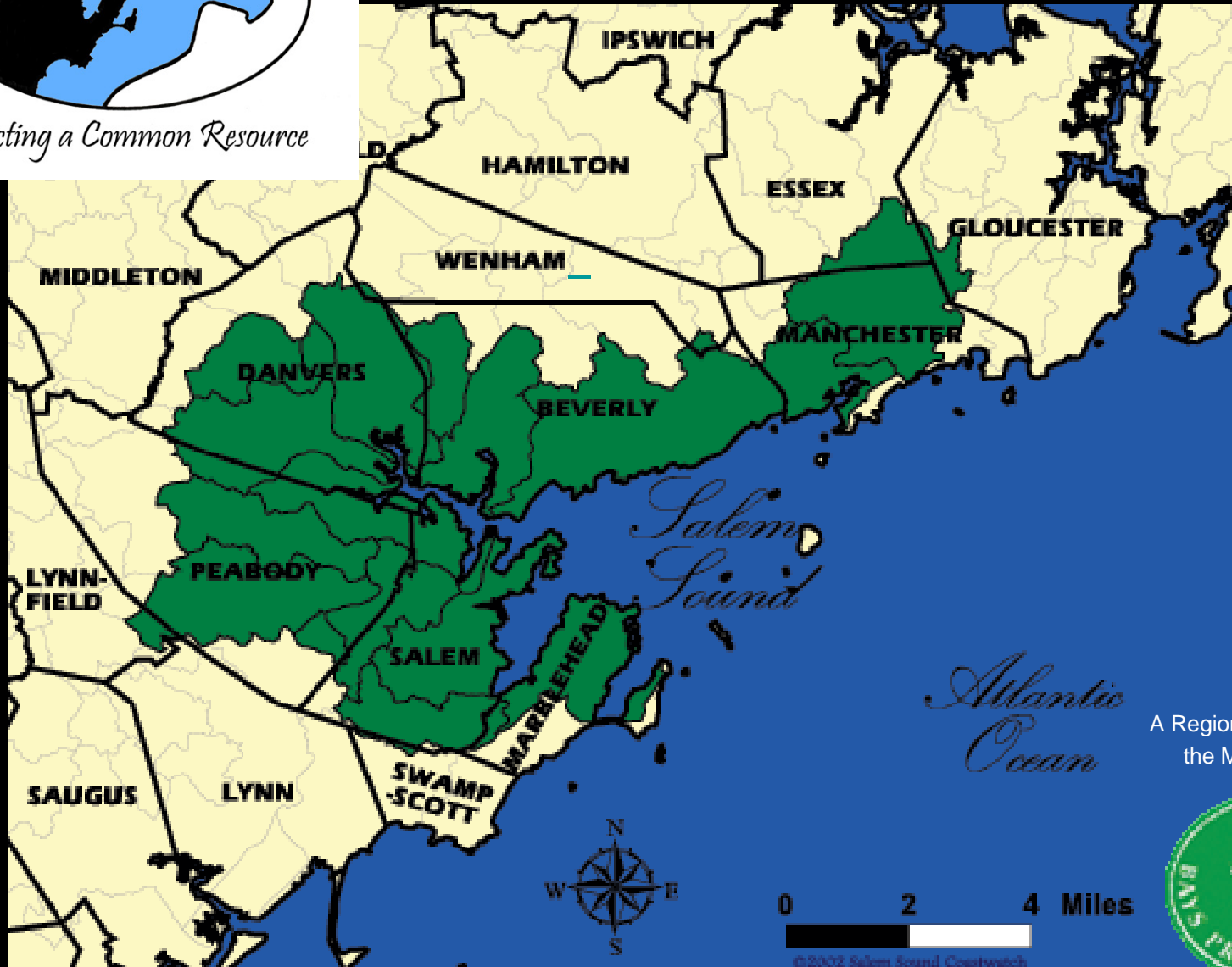
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Protecting a Common Resource

“... committed to enhancing and protecting the environmental quality of Salem Sound and its watershed.”



A Regional service provider for the Mass Bays Program



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Primary challenges to addressing contaminated discharge in the Salem Sound watershed

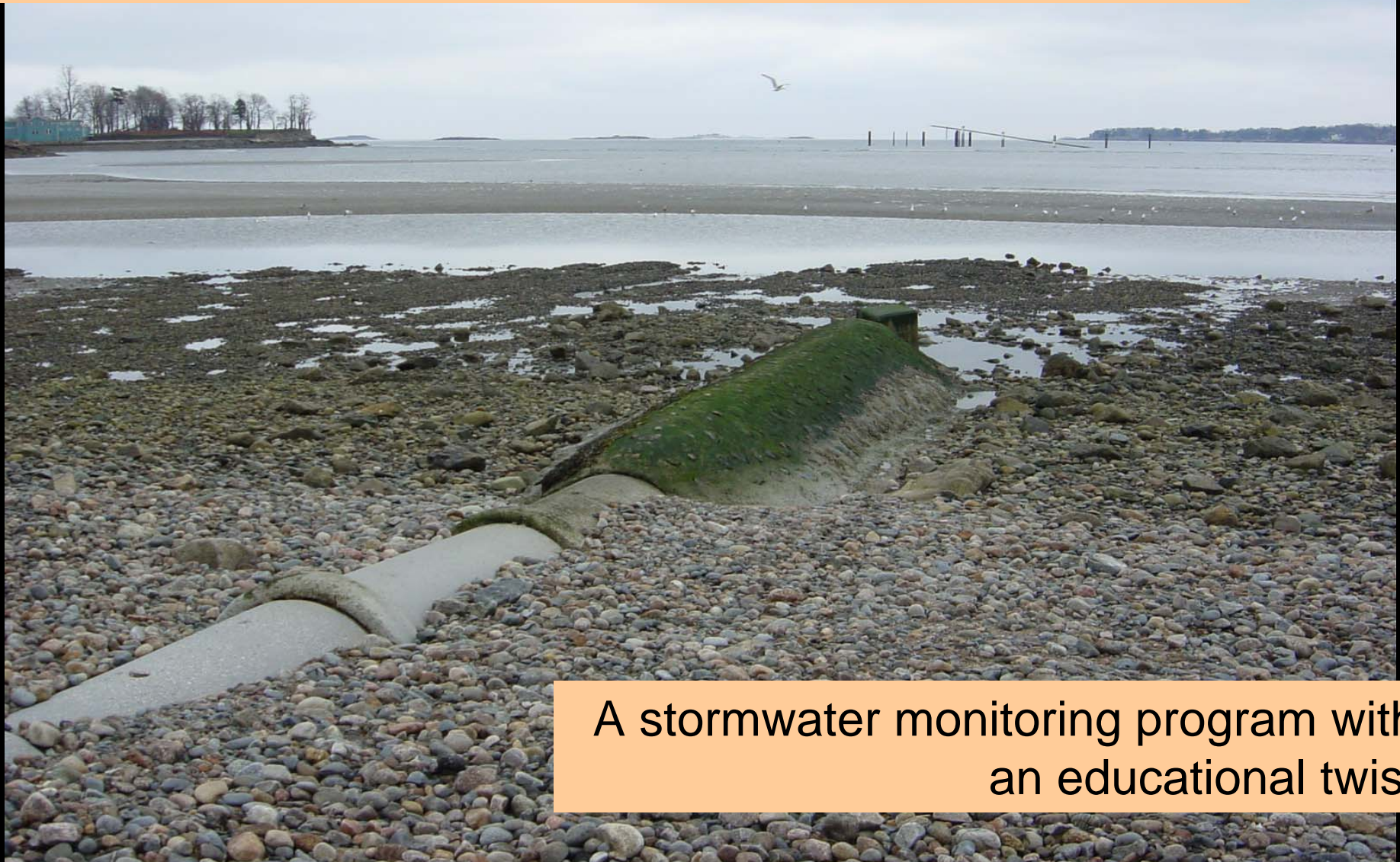
- Six unique communities
 - different governmental structures (3 cities + 3 towns)
- Large, diverse population
 - (approx 180,000*)
- Primarily urbanized, but diverse landscape
 - pop. density ranging from 563/mile² to 5000/mile²
 - variety of land uses
- Old communities (1600s)
 - old / aging infrastructure under heavy use
- High recreational & commercial use of coastal resources
 - increases need to prioritize sites



Key elements to approach

- Quantify and characterize issue(s) through scientific monitoring
- Build community-based, volunteer program
 - Facilitates stakeholder buy-in, local stewardship
- Build effective partnerships with local governments, state & fed agencies, citizen groups, and other nonprofits
- Public outreach & education
 - Utilize O & E as a nonstructural BMP
- Transfer data into action
 - address site-specific problems with site-specific solutions

Salem Sound Coastwatch's **Clean Beaches & Streams Program**



A stormwater monitoring program with
an educational twist

A nautical chart of Salem Sound, Massachusetts, showing the coastline from Beverly Harbor in the north to Marblehead Harbor in the south. The chart includes depth soundings, navigational markers, and labels for various channels and points. The text is overlaid on the chart in a large, bold, black font.

**Began in 1993 as a Shoreline Survey
of all coastal streams and outfalls**

100 volunteers - 47 miles of coastline - ~ 300 sites

Salem Sound

Gales Point in Manchester to the lighthouse on Marblehead Neck.

**Includes the Harbors of Beverly, Salem, Manchester and
Marblehead**

**Tributaries include the Bass R., Danvers R., Porter R., Crane R.,
Waters R., North R., South R., and Forest River.**



Clean Beaches & Streams Program Goals

1. Assist in identification and characterization of bacterial discharge problem locations
2. Leverage state and local resources to remediate coastal pollution
3. Educate public about potential health risks and their role in the both problem and solution

Program is focused on monitoring sources (vs. receiving waters) by sampling stormwater discharges at coastal interface



Prioritized Coastal Outfall Pipes, Culverts and Streams

- Monitor the source of runoff
 - Flowing across beaches and into swimming areas
 - Draining into resource areas (ex. shellfish and eelgrass beds)
- Focus on bacterial contamination
 - Both fecal coliform and Enterococci (transition from FC to E)
- Supported by dedicated, trained Volunteers
 - Summer 2004 monitored 25 discharge sites (outfall pipes, culverts, and coastal streams) biweekly throughout summer



Nuts & bolts of valid sample collection

- Biweekly Sampling
 - As close to 2 hours after low tide as possible
- Began as dry weather sampling only, now includes wet
 - Dry conditions if $< .2$ " of precip. on sampling date or < 0.5 " within the three preceding days
- Stream/River Collection Method
 - Sterile container, free of contamination
 - Inverted bottle 6-20" below surface scoop upstream leaving $\frac{1}{2}$ air
- Pipe Collection Method
 - Sterile container must not touch any part of the pipe



Chain-of-Custody

- **Storage of Sample(s)**

- Labeled bottle (site #) immediately placed upright in cooler
- Cooler at/near 4°C using ice packs or ice in sealed bags
- Field Data Form completed with observations stays with sample

- **Transport**

- Samples to SSCW's office by 10:00 AM
- Delivered to certified laboratory by 12:00 Noon
- If holding time is greater than 6 hours, data results flagged

- **Chain of Custody form**

- Completed at the laboratory by SSCW staff
- Specifying samples collected, date and time of collection

Based on Quality Assurance Project Plan (QAPP)
approved by MA DEP and EPA, May 2001

Clean Beaches and Streams Network

- Regional partnership from the watershed's six communities
 - Municipal Board of Health Agents
 - Department of Public Works Staff
 - City Planners and Other Municipal Staff
 - Other Community Members
(citizen groups, schools, two local colleges)
 - Local business and foundation sponsors
 - Salem Sound Coastwatch
- State & federal partners
 - Massachusetts Bays Program
 - MA Office of Coastal Zone Management
 - U.S. EPA

***.... translating data into
action through cooperation!***

Clean Beaches and Streams Network

- Health Departments
 - Share beach water quality testing results with SSCW
- Salem Sound Coastwatch
 - Compiles the municipal beach water quality results with the stormwater outfall & stream water quality monitoring
 - Publishes a biweekly “Beaches and Streams Report”
 - Assists in identifying and acquiring funding support to eliminate nonpoint pollution sources
- DPWs, Health Depts, SSCW and other partners together
 - Investigate documented water quality problems
 - Work to identify and implement solutions to problems detected by this program

Biweekly Beaches and Streams Report

- Presents Boards of Health beach testing data and Salem Sound Coastwatch stormwater outfall and stream data
- Designed for the Public -simple, easy to understand format
- Distributed by fax, email and SSCW's website (www.salemsound.org)
- Give recognition to Municipal Actions

Salem Sound Coastwatch Clean Beaches and Streams
Water Monitoring Results **Summer 2003**

Date of Sample Collection: 7/29/03 **Report Issue Date:** 7/31/03
 Samples Collected by Salem Sound Coastwatch staff and volunteers: Mary Rully (SR-MR), Christina and Tregan Rink (SR-CR), Jon Savoy (SR-JS),
 Marjyn McCreary (SR-MM), Jon Maloney (SR-MJ), Mary Sullivan (SR-MS), Stephanie Ruly (SR-SR), David Nove (SR-DN), Susan Marsh (SR-SM), Bob Sells (SR-BS)
 Beaches Rating: Dry
 Low Tide: 4:00am

Salem Sound Coastwatch's Clean Beaches and Streams Program is an ongoing water quality monitoring program that collects data from prioritized, potential pollution areas/sites along Salem Sound's coastline, including outfall pipes, culverts, and runoff streams. Sites may change throughout the season. For more information contact Mary Rully at 978-741-7900. Testing conducted specifically for water quality at bathing beaches is performed by each city/town's Board of Health.

Salem Sound Coastwatch Sampling Sites by Community	Site Number	Time of Sampling	Flow	Sample Collected by	Fecal coliform per 100 mL	Enterococci per 100 mL	Luk
Methuen							
Riverside Beach - 300m from shore at low tide	701	7:11	F	SR-JM	940	163	NEG
Beach 2 Beach-Stream - 300m from beach	722	6:45	T	SR-JM	1,180	269	NEG
Proctor Beach	702	00	00	00	00	00	00
Beverly							
Deer Street Beach							
Widow's Cove - 300m from shore at low tide	322	7:22	S	SR-MM	540	<100	NEG
Lansdowne Street Beach - 300m from beach	321	7:26	T	SR-MM	<100	<100	NEG
High Beach - 300m from shore at low tide	324	7:05	S	SR-MM	6,000	369	NEG
Mingo Beach - 300m from shore at low tide	322	00	00	00	00	00	00
Beach - 300m from shore at low tide	323	7:25	F	SR-MR	1,780	769	NEG
Beach - 300m from shore at low tide	322	00	00	00	00	00	00
Danvers							
Eden Glen Ave. Pipe	491b	7:23	T	SR-RS	4,400	<100	NEG
Waters River (at Route 15)	460	7:22	S	SR-DN	480	<100	NEG
Salem							
Longer Beach - 300m from shore at low tide	629	6:15	F	SR-MS	1,340,000	26,800	NEG
Longer Cove - 300m from shore at low tide (Columbia Ave.)	625	6:19	S	SR-MS	00	00	00
Chickadee Cove - 300m from shore at low tide (Chickadee Cove Park)	325	7:05	S	SR-CR	00	00	00

Public outreach & education component:

Working to raise public awareness and understanding of NPS


- personal responsibility / accountability
- understanding of associated health concerns
- individual & neighborhood role in solutions

Tools / resources utilized

- print publications (pamphlets, poster, fact sheets, flyers)
- Data release (biweekly report)
- public presentations
- storm drain stencils
- and more...




Program includes advocacy for and facilitation of appropriate signage at sites of chronic contaminated discharge.



Clean Beaches & Streams Program's
central message:

Citizens and municipalities, working
together, can make real improvements to
local water quality



Program has given rise to other projects aimed at addressing additional sources of potential bacterial contamination





Thank you!



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