

Shigella Outbreak at Shannon Beach

By: Juliann Kibby &
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Shannon Beach



Sandy Beach is now Shannon Beach

- September 13, 2008 Sandy Beach was renamed Shannon Beach
- Named after Senator Charles E. Shannon
- Shannon represented Winchester, Medford, & Somerville between 1991-2005



Shannon Beach

- Managed by the Department of Conservation and Recreation (DCR)
- Open to the public for swimming between Memorial Day and Labor Day
- Access to a swimming beach, picnic area, parking lot, grassy field, walking paths, playground, and restrooms.
- Facilities closed at 6 PM



Beach Area



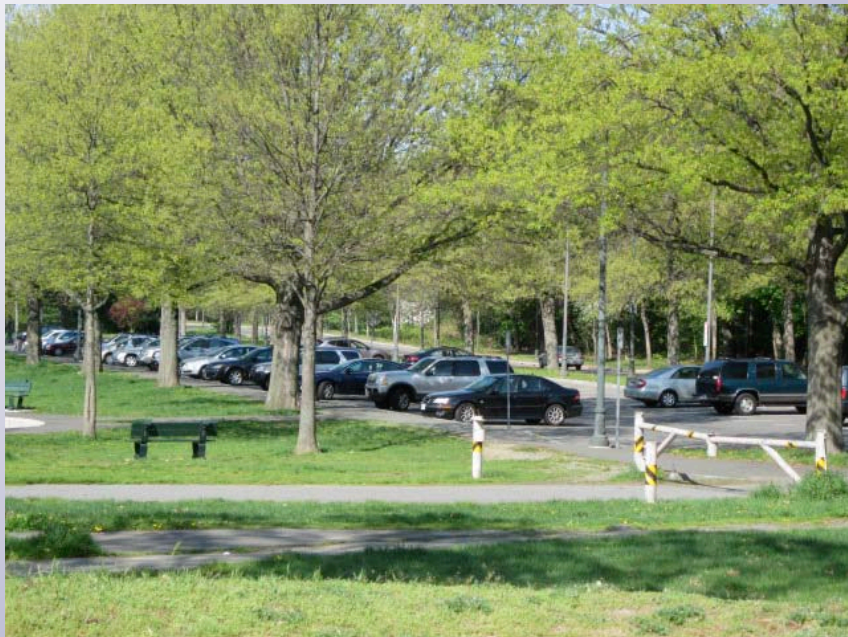
Bathroom & Changing Room Facilities



Nearby Playground



Picnic Areas



Parking Lot



Walking Paths

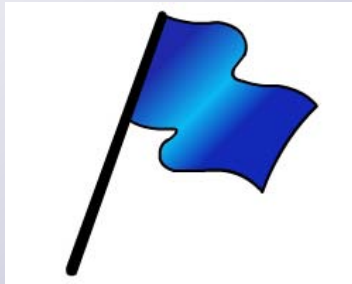
Pictures taken by
Juliann Kibby

Indication of rich life in water?

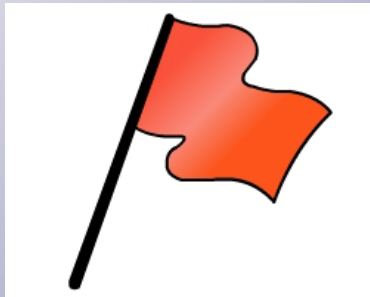


DCR Water Testing

- Regular weekly water quality testing is done during the time the beach is open for swimming



Indicates water is safe for swimming



Swimming is not allowed because it could potentially cause health risks

DCR Closes Sandy Beach August 21, 2009

dcr
Massachusetts



For immediate release
August 21, 2009

Contact: Wendy Fox
617-626-1453

DCR CLOSES SHANNON BEACH AND PLAYGROUND FACILITY

Several cases of bacterial infection reported

The Department of Conservation and Recreation (DCR) closed the Shannon Beach and Playground facility in Winchester at 3 p.m. today after the state Department of Public Health (DPH) reported several cases of shigellosis, a bacterial infection. Information obtained from individuals diagnosed with shigellosis suggests the illness may have been acquired at the facility.

“In the interest of public health and safety, we closed the Shannon Beach facility immediately upon learning of the apparent bacterial contamination,” said DCR Commissioner Richard K. Sullivan Jr. “We thank DPH for informing us of this outbreak, and we appreciate the public’s understanding.”

What is Shigellosis?

- Infectious disease caused by a group of bacteria called Shigella
- Symptoms - diarrhea, fever, stomach cramps. (1-2 days after exposure)
- Rarely requires hospitalization
- Result from poor hygiene habits or sewage contaminating water

Our Goals

- Determine what the possible causes were that lead to the Shigella outbreak in 2009
- Propose solutions to prevent this from occurring again & to protect the health of the public & beach environment

Methodology

- Contacted sources from EPA & MyRWA for history on the beach and data reports - researched area & issue
- Failed to hear back from DCR but called a hotline where we expressed our concerns
- Made visits to the site to monitor change
- Met up frequently to discuss information gathered & suggest solutions.

Source Investigations

- Mass Department of Public Health (MDPH)
 - Interviewed confirmed cases
 - Tested weekly for *Enterococci* & *E.Coli* beginning in May of 2009
- MDPH Bureau of Environmental Health (BEH)
 - Collected additional water & sand samples for testing on Aug. 17, 2009 prior to beach closing
 - 5 locations throughout beach area. Sand tested for *Shigella* & water tested for *Enterococci* & *E.Coli*
 - 25 surface swab samples taken after beach closing testing for *Shigella*

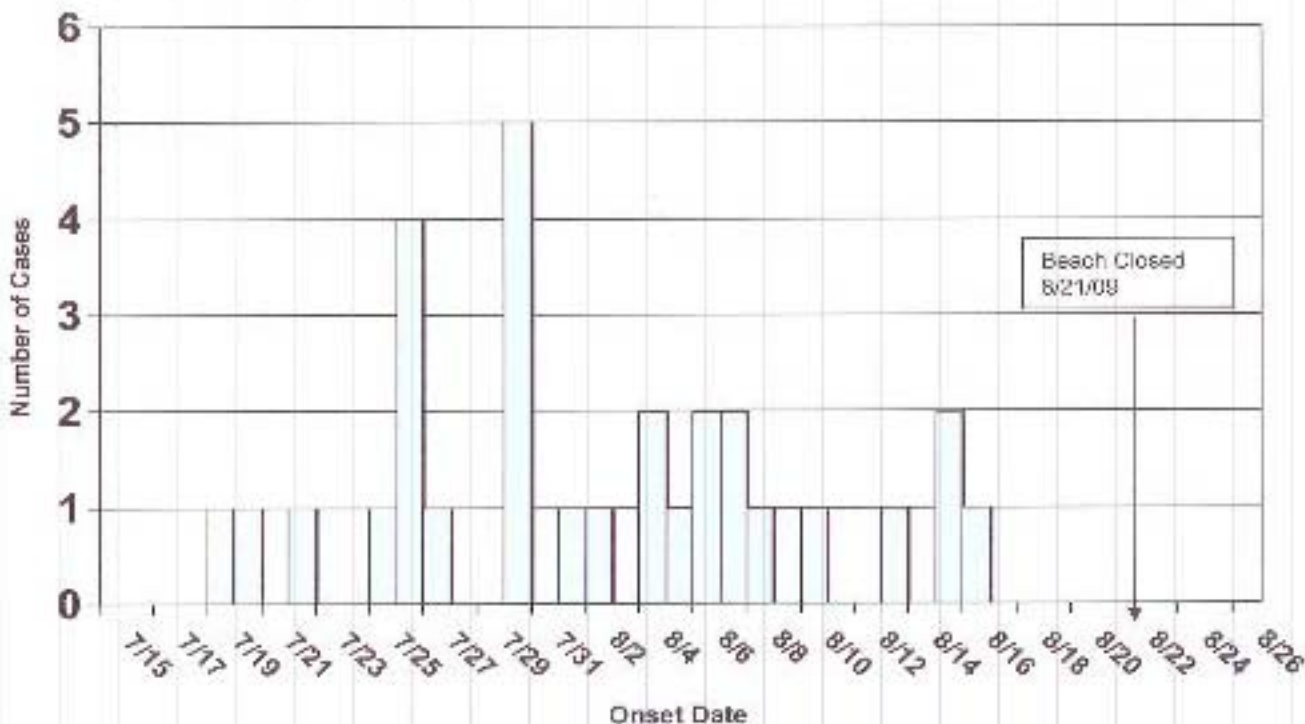
Source Investigations

- Mystic River Watershed Association (MyRWA)
 - Anecdotal reports - described poor sanitary conditions of the beach - our personal observations supported these conditions
 - Hotspot sampling testing for possible sewage contamination
 - Samples from shoreline, nearby sewage pipes, & from the middle of the river
 - Contamination in the Aberjona River

Massachusetts DPH

Attachment 6: Epidemic Curve

Confirmed Primary Cases of PFGE-matched *Shigella sonnei* with Reported Exposure to Shannon (Sandy) Beach within Incubation Period 2009



N=29

31 confirmed cases

MDPH Report on *Shigella* at Shannon Beach

Enterococci & E. Coli

- Fecal bacterial indicators of possible sewage contamination in water
- *Enterococci* levels shall not exceed a geometric mean of 33 organisms per 100 ml
- *E. Coli* levels shall not exceed a geometric mean of 126 organisms per 100 ml

Sand Sampling Locations by MDPH-BEH



All negative results!

MDPH Report on Shigella at Shannon Beach

Additional Water Samples by MDPH-BEH

Sample Location	Sample Date	Indicator	Bacteria Level (cfu/100 mL)
Location 1	17-Aug-09	Enterococci	10
Location 1	17-Aug-09	E. Coli	220
Location 2	17-Aug-09	Enterococci	20
Location 2	17-Aug-09	E. Coli	260
Location 3	17-Aug-09	Enterococci	20
Location 3	17-Aug-09	E. Coli	290
Location 4	17-Aug-09	Enterococci	20
Location 4	17-Aug-09	E. Coli	55
Location 5	17-Aug-09	Enterococci	20
Location 5	17-Aug-09	E. Coli	50

The freshwater beach water Enterococci standard is 61 colony forming units/100 mL and the E. Coli standard is 235 colony forming units/10 mL

MDPH Report on Shigella at Shannon Beach

Swab Samples by MDPH-BEH

1. Ladies' Room sink handles
2. Ladies' Room soap dispenser
3. Ladies' Room center stall flush handle
4. Ladies' Room inside stall door handle and lock
5. Ladies' Room handicapped stall flush handle
6. Ladies' Room handicapped stall hand rail
7. Men's Room sink handles
8. Men's Room left side urinal handle
9. Men's Room right side urinal handle
10. Men's Room stall flush handle
11. Men's Room stall door inside lock and handle
12. Men's Room hand rail in stall
13. Outdoor drinking water spigot
14. Lifeguard stand handles
15. Stone wall surface (where people often sit)
16. Playground – handles for the small slide
17. Playground – pirate ship wheel toy
18. Playground – tic tac toe board
19. Playground – bottom of large slide
20. Playground – handles leading into music play area and small slide
21. Wooden handrails by bathroom entrance
22. Surface of green bench near bathroom door
23. Right side shower spigot knob
24. Left side shower spigot knob
25. Bathroom entry door



MDPH Report on Shigella at Shannon Beach

All negative results!



Unsanitary Trash On Shoreline

Pictures taken by Juliann Kibby



Overfilled trash barrel
and no dog bags!



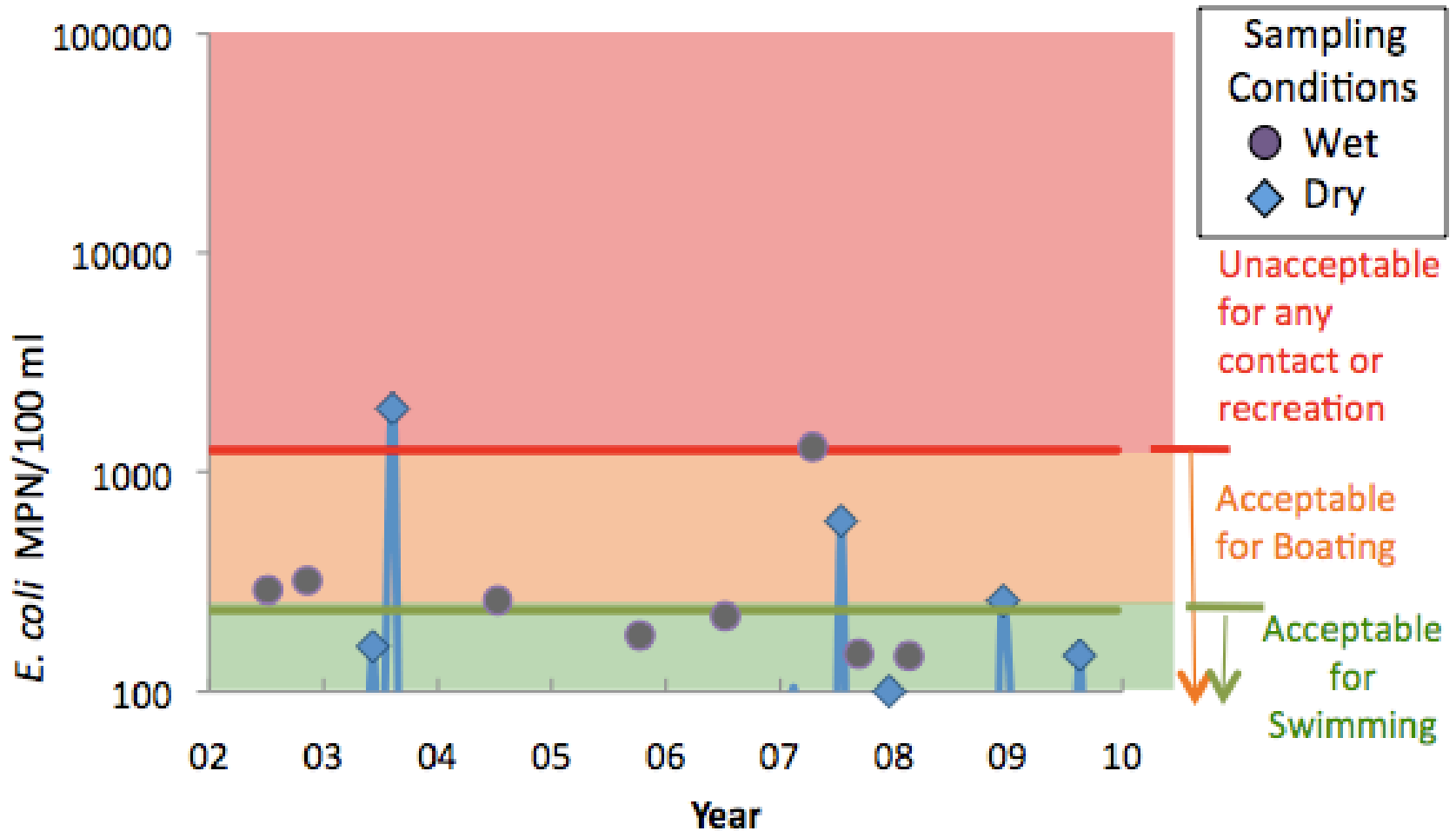
Pictures taken by Juliann Kibby

Aberjona River - Winchester, Ma

- Hotspot results predicted possible high bacteria levels at the beach from sewage overflows in the river during storms
 - Combined Sewer Overflows (CSOs)
 - Sanitary Sewer Overflows (SSOs)
- Since July 2000, MyRWA has been monitoring water quality across the watershed
 - Data proves prediction to be FALSE

E. coli (2002-2009)

Baseline Site: UPL001 Dam at Upper Mystic Lake, Medford



Aberjona River - Winchester, Ma

- Low chance it is source of outbreak
 - Water quality data does not match
 - Storms events did not exist during period of concern
 - Distance from beach to opening of river
 - Presence of 2 forebays between locations
 - Tendency of bacteria to attach to solids and settle out of water column

What's Going on Now?

- June of 2010 MyRWA makes a visit
 - Majority people of Latino background
 - Several barrels lined with plastic
 - Outside working drinking fountain
 - 2 port-o-potties with toilet paper & hand sanitizer
- May of 2011 We make a visit
 - Off season, facilities locked
 - No outdoor way for hand washing & drinking fountain turned off
 - 1 overflowed barrel
 - 3 port-o-potties with toilet paper & hand sanitizer
 - Beach rules posted in English only
 - Trash scattered along beach

Challenges

- No established protocol for Shigella testing
- DCR cleaned facilities between time the beach closed & swab samples taken
- Not all cases followed up
- Language & cultural barriers
- Biased answers in interviews
- Hotspot bias
- Have not been able to yet witness the beach during peak season

Enough Evidence to Close Beach!

- Environmental sampling & laboratory testing could not locate source
- Confirmed cases & poor sanitary conditions make it clear the area was connected
- Poor conditions make it a desirable site for transmission & spreading
- No cases later than Aug. 24, 2009 supports hypothesis that Shannon Beach was the likely source of the outbreak
- MyRWA & personal observations also support poor sanitary conditions

What can be done?

- Educate!
- Restore Facilities
- Continue water quality testing
- Increase staff to help maintain area
- Maintain, clean, and supply restrooms & port-o-potties
- Ill people should not use the area
- Rules & regulations in other languages
- More barrels & regular changing of bags

NO DUMPING



DRAINS TO RIVER

EDUCATE!

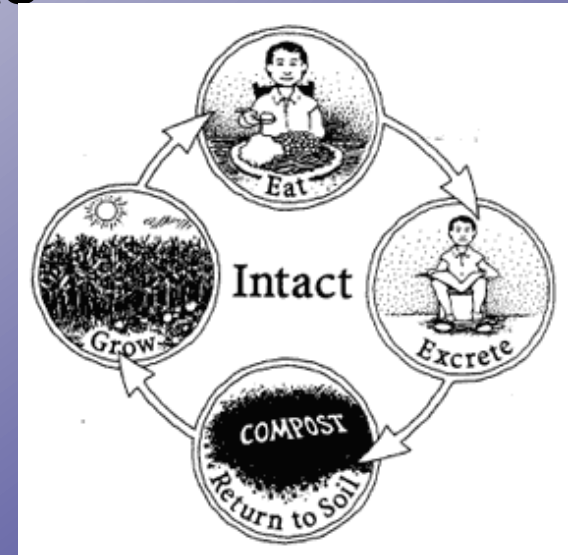
- Inform public & require participation!
 - Better hygiene & sanitary practices
 - Eliminate direct pollution
 - Reduce, Reuse, Recycle
 - Flush responsibly
 - Conserve water





Restore Facilities

- Environmental justice issue?
 - MyRWA advocating for upgraded facilities
- Clivus multrum composting toilets
 - Do not pollute the environment
 - Biosolid waste is sanitized
- Motion sensor lights, sinks, soap dispensers, & hand dryers
 - Save energy & water
 - Prevent the spread of bacteria & germs
- Feminine napkin & diaper disposal boxes







- More trash barrels needed throughout beach & park area
- Increase staff to consistently change trash

Discussion

- Environmental sampling & laboratory testing could not locate source
- Confirmed cases & poor sanitary conditions make it clear the area was connected
- Poor conditions make it a desirable site for transmission & spreading
- No cases later than Aug. 24, 2009 supports hypothesis that Shannon Beach was the likely source of the outbreak
- MyRWA & personal observations also support poor sanitary conditions
- Changes to the beach area need to be made in order to improve conditions - informing the public, educating the youth, building new facilities, increasing staff, and adding more barrels can all help in making the beach a healthier environment

Acknowledgments

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