Volunteer monitoring of Fall, Winter and Spring Water Quality

Presented by: Dave McLaughlin

Sewage spill fouls Waikiki Beach

More than 48 million gallons of untreated sewage that flowed into the ocean from a sewer spill on Friday, March 24, have forced Honolulu city officials to post signs warning tourists on Waikiki Beach to stay out of the water. *A 42-inch pressurized sewer line in Waikiki cracked on Friday, March 24, sending untreated sewage into the Ala Wai Canal on the mountain side of Waikiki. Engineers believe that heavy rains since February 19 overwhelmed the sewer line, which was constructed in 1965 --- Honolulu Advertiser*

A couple months later…

"This was the third closure of the year for both Easton's and Atlantic beaches. But the four-day closure from June 7-11, and the two-day closure on June 25-26 happened during cooler weather when there were not many people looking for a swim. - Newport Daily News

and then on July 11th…

Beach closed on August 28th

Clam Kill on August 29th

Taking a closer look on August 29th…

Dead Fish – floating in the stream

Wave Avenue Flapper - leaking

DOT outfall - murky flow

Immediate Release
August 30, 2006
HEALTH Recommends Beach Openings/Closings
HEALTH officials recommended re-opening ATLANTIC BEACH CLUB BEACH,EASTON'S BEACH. This recommendation is based on results from water samples that show bacteria levels within acceptable limits. **HEALTH will continue to monitor the water quality regularly to assure safe bathing *throughout the summer season.***

Background information:

- **Clean Ocean Access** is an Environmental group concerned with safety, cleanliness and open access of the ocean and coastlines. The group was formed in the summer of 2006 as a result of access issues along the shoreline, water pollution at area beaches and a general interest of the surfing community to preserve the environment of today, for tomorrow and future generations to allow us to continue to enjoy ocean activities.

Year	Easton's Beach Number of Advisories and Closings	Atlantic Beach Club Number of Advisories and Closings
2006	7	15
2005	1	2
2004	3	4
2003	2	2
2002	0	0
2001	0	0
2000	0	0

Data from EPA BEACON system

General Overview

- Start Date: October 10 2006
- Finish Date: May 25 2007

Summary of Program as of March 30 2007 (May 25)

- Samples collected → 594 (759)
- Testing Days → 50 (65)
- People involved → 37 (45)

- Agencies involved: EPA, RIDOH, City of Newport, Town of Middletown, CoastalVision, Salve Regina University and Clean Ocean Access

Significant events

- 09/20/2006 > Funding secured for program for Fall Water Testing via EPA/RIDOH and CoastalVision.
- 10/10/2006 > 1st water test at Easton's Beach, Sachuest Beach, Moat and Esplanades.
- 12/13/2006 > Funding secured for program for Winter & Spring Water Testing via City of Newport and Clean Ocean Access.
- 01/02/2007 > Testing limited to Eastons Beach, Moat and Esplanades. 11 samples per test.

Program goals and objectives

- Establish data supporting beach usage during non-summer months.
- Gather water samples to monitor pollution levels.
- Correlate high levels of pollution to atmospheric/oceanographic or human events.

General guidelines

- Samples are taken Tuesday at 6am and Friday at 8am and delivered to the Rhode Island Department of Health in Providence within 6 hours of 1st sample and by 1PM.

Collection Procedure

- **PROCEDURES FOR COLLECTION OF BATHING BEACH WATER SAMPLES FOR BACTERIOLOGICAL ANALYSIS**

1. Be sure to notify the laboratory that will be analyzing the samples prior to collection, because samples must be collected in sterile bottles (provided by the laboratory) and they may have special requirements for submission of samples.

2. Samples must be transported in an iced cooler and delivered within 6 hours to the laboratory.

3. Sample Collection from Shore: The Environmental Protection Agency's recommendation is for beach water samples to be collected between knee and waist deep, and at least one foot below the surface of the water.

4. Sample collectors should use extreme caution not to contaminate sample containers by touching the inside of the cap or bottle.

5. Samplers should also take caution not to disturb the bottom sediment while entering the water. Excessive amounts of sediment and benthic material may negatively affect the sample results; often returning inflated bacteriological results.

6. Samples should be clearly labeled to indicate which section of the beach the samples were collected.

Review of Beach Survey

Name of Beach:<1>_____Date: <2>_____Time: <3>___Water Temp: <4>_____

Weather Conditions:

Sunny & Clear_<5>_Cloudly & Overcast_<6>_Rainy__<7>_Foggy_<8>_Windy_<9>_

Tidal Conditions:

Slow_<10> Moderate_<11>_High_<12>_ High Tide_<13>__Low Tide_<14>_

Activity on Beach:

Approx.# of People_<15>_Adults_<16>_Children_<17>_

Swimming_<18>__Sunbathing_<19>__Fishing_<20>_Boating_<21>_Walking_<22>_Other_<23>__

Conditions of the Beach:

Overall Appearance__<24>____Debris on Beach_<25>___Debris in Water_<26>___

Vegetation in Water: <27> 1 2 3 4 5

<25% 25% 50% 75% 100% Cover in 1 meter quadrat

Vegetation on Shore: <28>1 2 3 4 5

<25% 25% 50% 75% 100% Cover in 1 meter quadrat

Width of Wrack on shore (in meters)_<29>___

Visible sewage or sewage odor__<30>___

Conditions of Water:

Clear_<31>____Cloudy & Murky_<32>___Oily Film_<33>___

Sources of Pollution:

Waterfowl Approx.#-Seagulls_<34>___Ducks_<35>___Geese_<36>__Swans_<37>__

Approx. # of Boats_<38>____

Wind and Weather Conditions:

_____<39>_____

Additional Comments:

_____<40>_____

Beach Survey Guidelines

Each entry point is marked with a label on the previous slide.

1	Easton's, Atlantic or Sachuest	**21**	Look only for your sample point
2	Use MM/DD/YYYY format	**22**	See above
3	Use 00:00 All in AM	**23**	Kite Flying, Horses, etc…
4	Use Fahrenheit scale	**24**	Good/bad, describe below if needed
5	Mark if no clouds	**25**	Anything unique, whale, car tire, etc…
6	Mark if ANY clouds	**26**	Describe
7	Self-explanatory	**27**	Look for the 1 square meter
8	Self-explanatory	**28**	In the general area of the sample point
9	Over 15knots equals windy	**29**	**Measure the width from high tide mark to waters edge**
10	Calm to Tiny breakers	**30**	Yikes!
11	Mild to moderate breakers	**31**	Use your best judgment
12	Significant Breakers	**32**	See above
13	If mid-tide, mark both of these	**33**	See above
14	If mid-tide, mark both of these	**34**	Count
15	Look only for your sample point	**35**	Count
16	See above	**36**	Count
17	See above	**37**	Count
18	See above	**38**	This should be exact
19	See above	**39**	Describe (cold front, roll cloud, etc..)
20	See above	**40**	Anything that is pertinent

Bathing Beach Survey: outfalls and stream sources

Bathing Beach Survey: outfalls and stream sources

Name of Source:_Esplanade Outfall__Date:10/10/06 Time:09:30_

Water Temp:_63F____
Weather Conditions:
Sunny & Clear___Cloudy & Overcast ____Rainy___Foggy___Windy___

High Tide__X___ Mid Tide_____ Low Tide____
Activity on Beach adjacent to source:
Approx.# of People_____ Adults_____Children_____ Surfing____
Swimming_____Sunbathing_____Fishing_____Boating_____Walking_____Other____
Conditions of the Source:
Overall Appearance_____
Flow of source*: High_____ Moderate _____ Low _____

*Streammouth	>5 foot depth	<5,	>1	<1 foot depth
Esplanade	Full width of pipe	< full width		<6" wide
Sachuest	Strong flow on beach	trickle on beach		damp on beach

Debris in Source_____
Visible sewage or sewage odor_____
Conditions of Water:
Clear_____Cloudy & Murky_____Oily Film_____
Wind and Weather Conditions:

_____
Additional Comments:

Easton's Beach – West (EB-W)

For this location park at meters on Memorial Boulevard, the light pole has #42 on it and the 3-way coordinate is (1) light pole & (2) chimney to the left & (3) Newport Hospital Radio Tower. Go close to the dune, align properly and then proceed to coastline.

Esplanade Outfall - North (O)

Walk from Atlantic Beach towards Esplanade and carefully climb rocks and take sample DIRECTLY from flow at bottom of Pipe. Measure with a ruler the WIDTH of the flow (side to side) and the DEPTH (in the center for the deepest point) and fill this out within the comments section of the survey form. If the Water is NOT flowing too fast, you will need to use the CAP to scoop up the sample water and add to the container. If the water is flowing fast, this procedure can be replaced with the bottle itself.
PLEASE bring a hand cleaner to this site and wipe off your hands! Please make sure to use the Bathing Beach Survey: outfalls and stream sources.

Program highlights and current results

Training

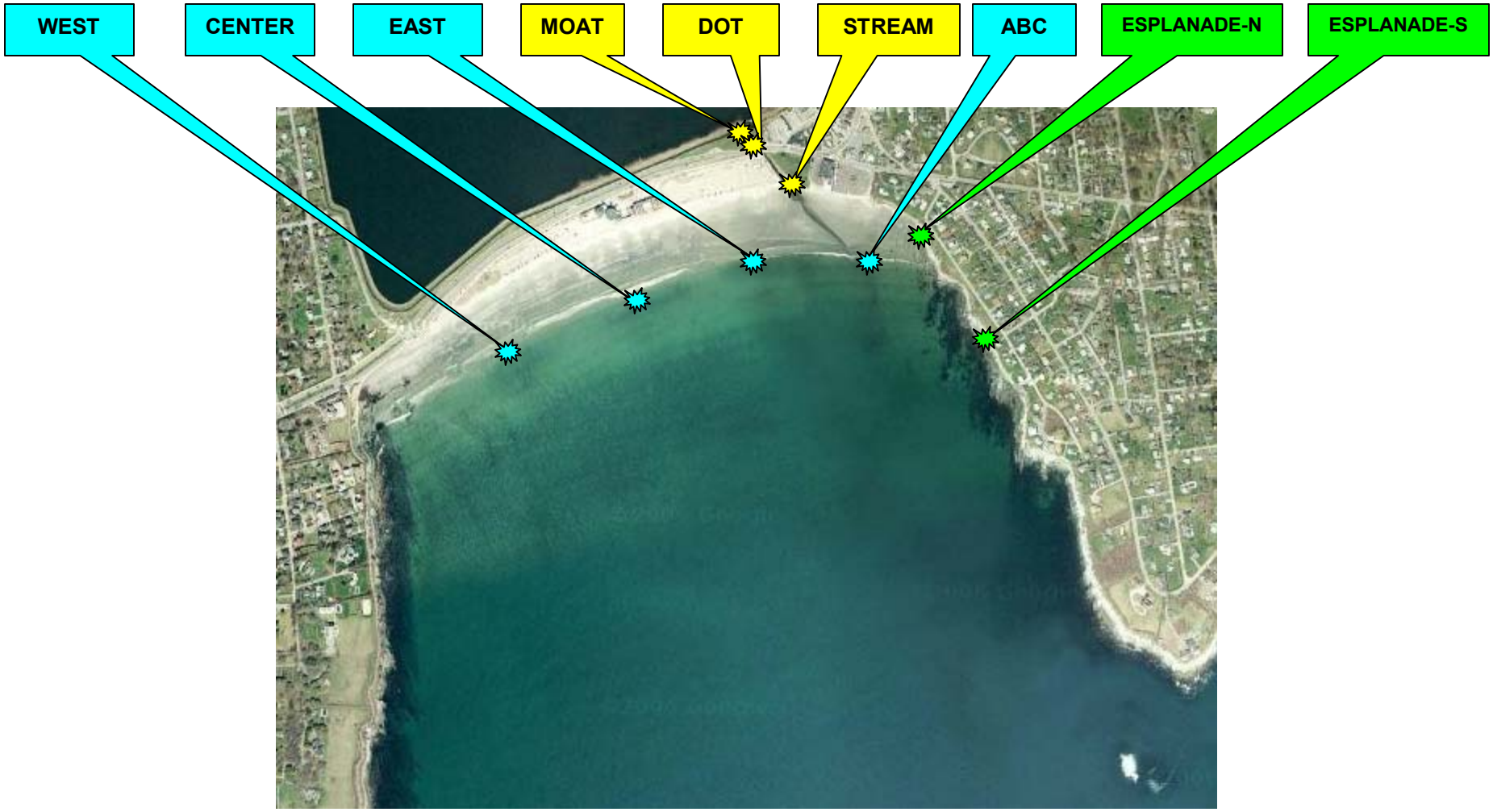
January

February

March!!!

March

Easton's Bay Sampling Locations

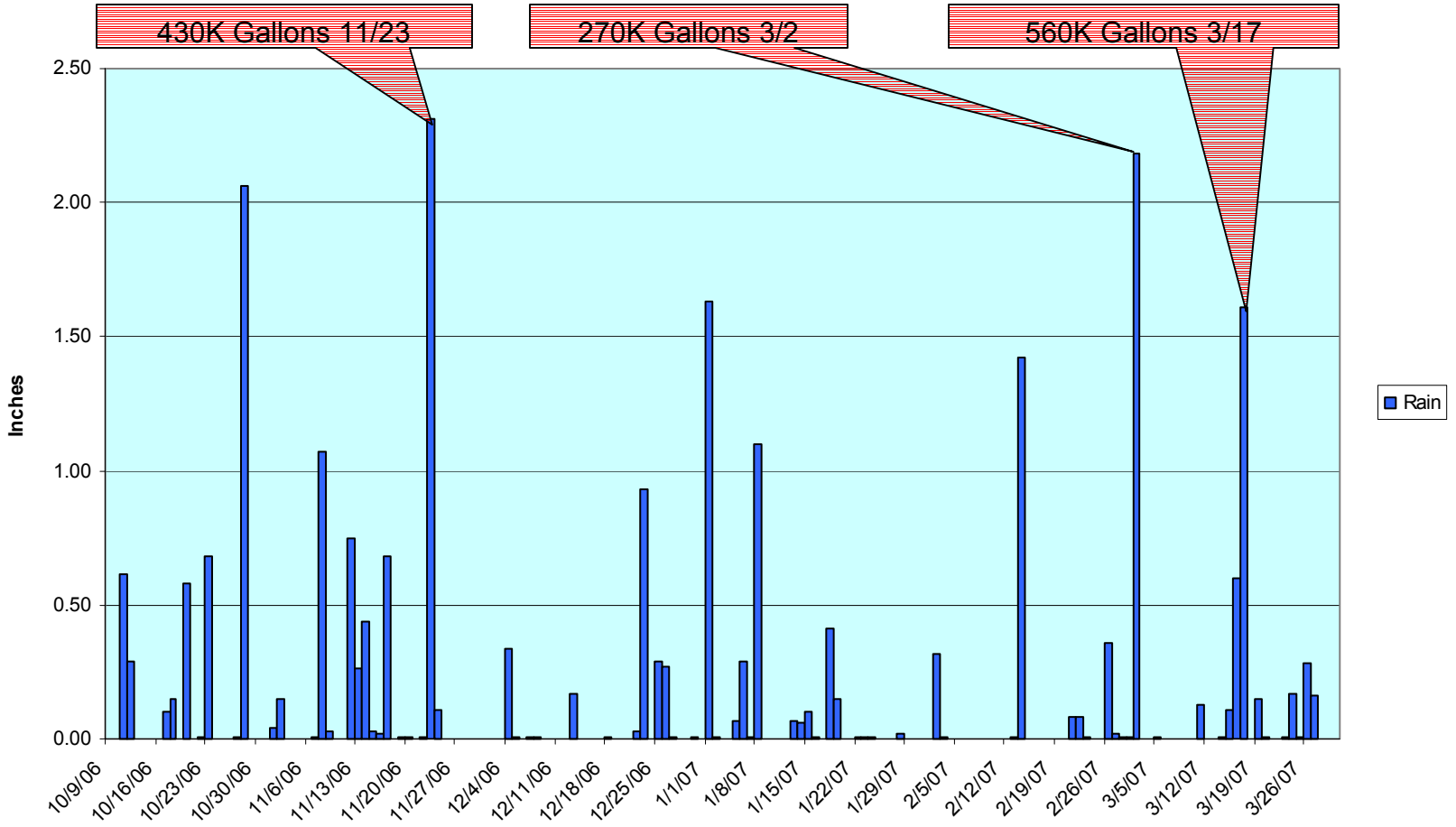


Picture obtained from Google maps

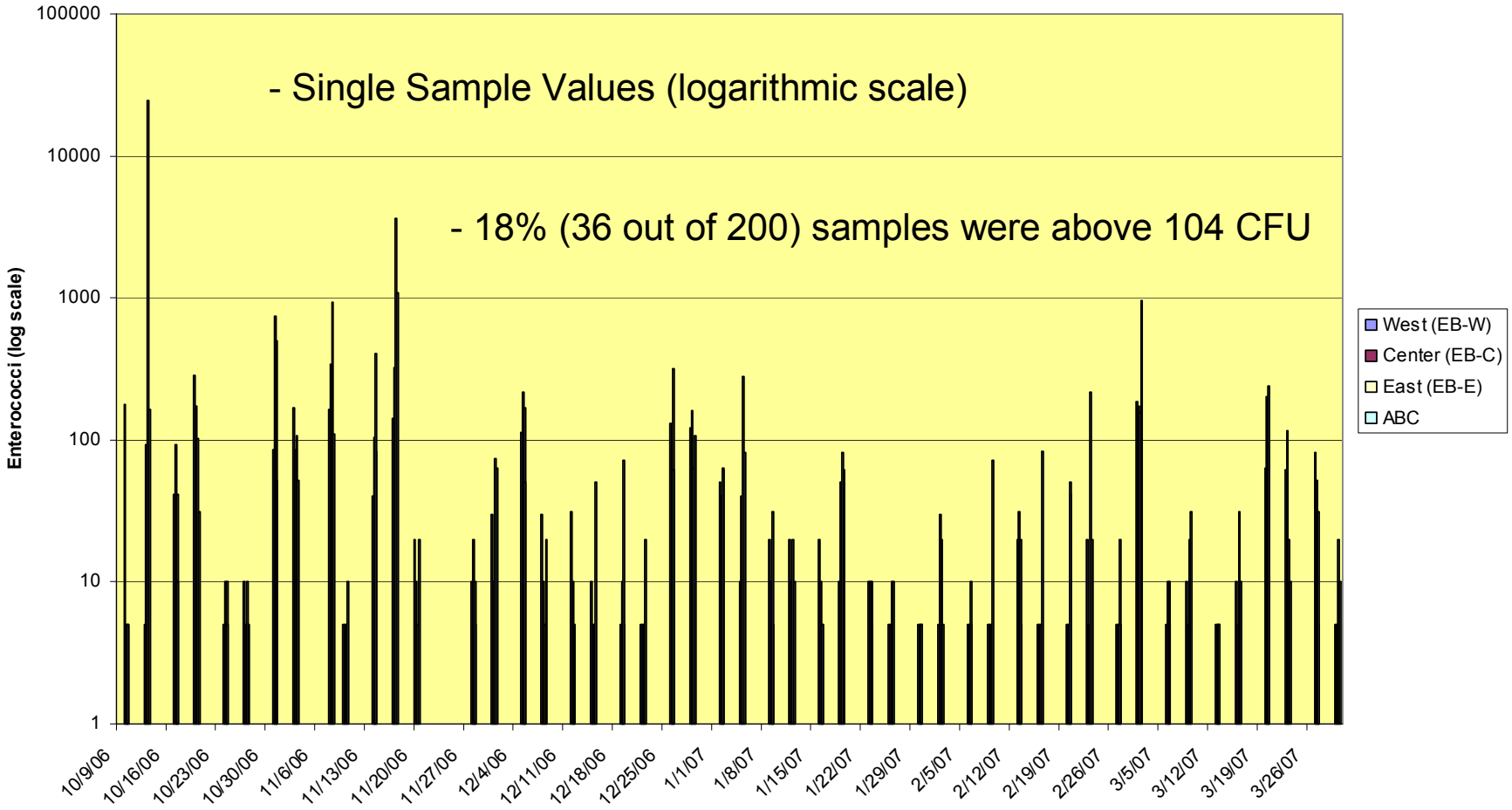
- 56% of precipitation occurred in 8 events (some snow!)

Precipitation

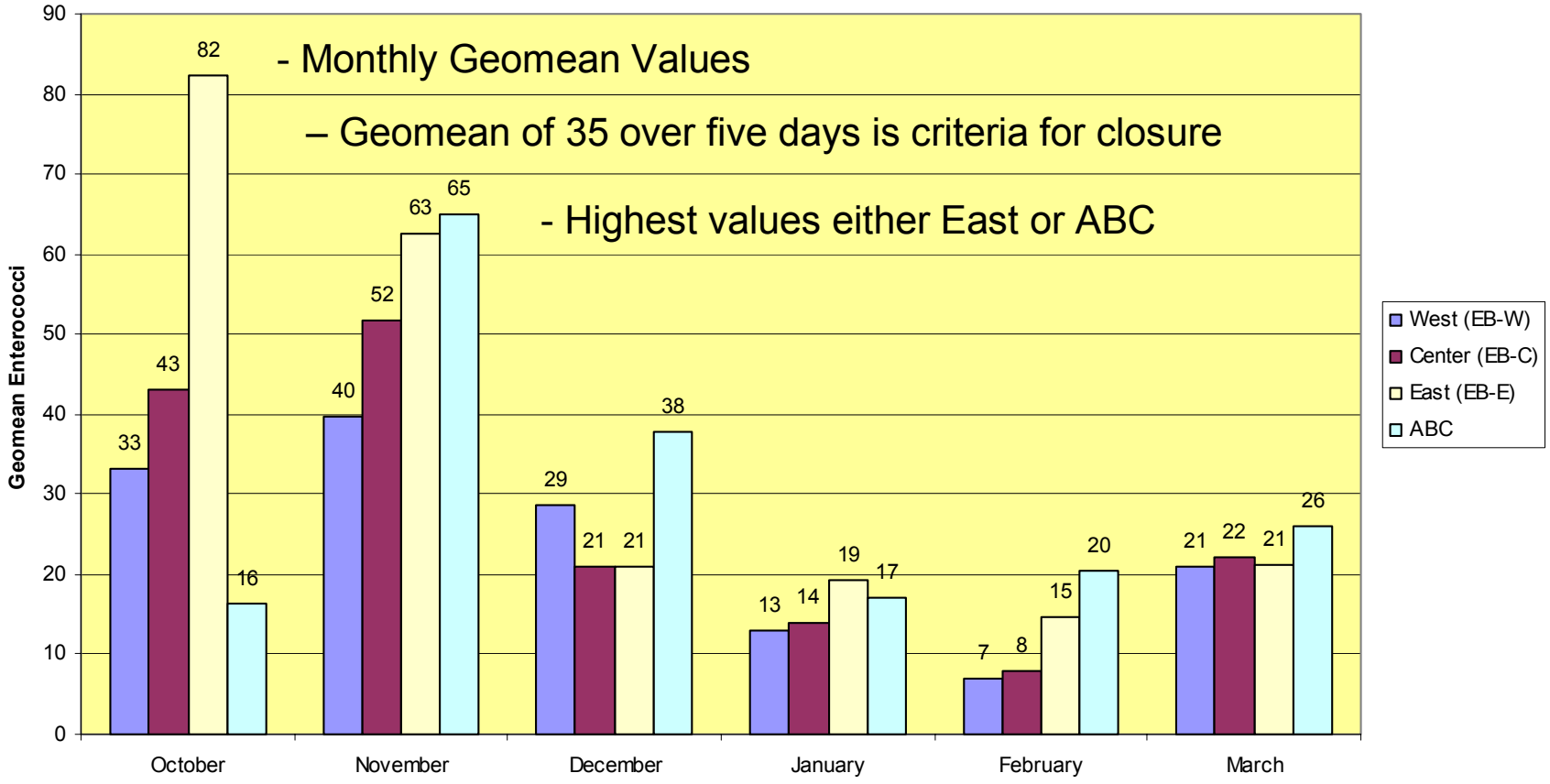
- 3 SSO events at Wave Avenue Pumping Station



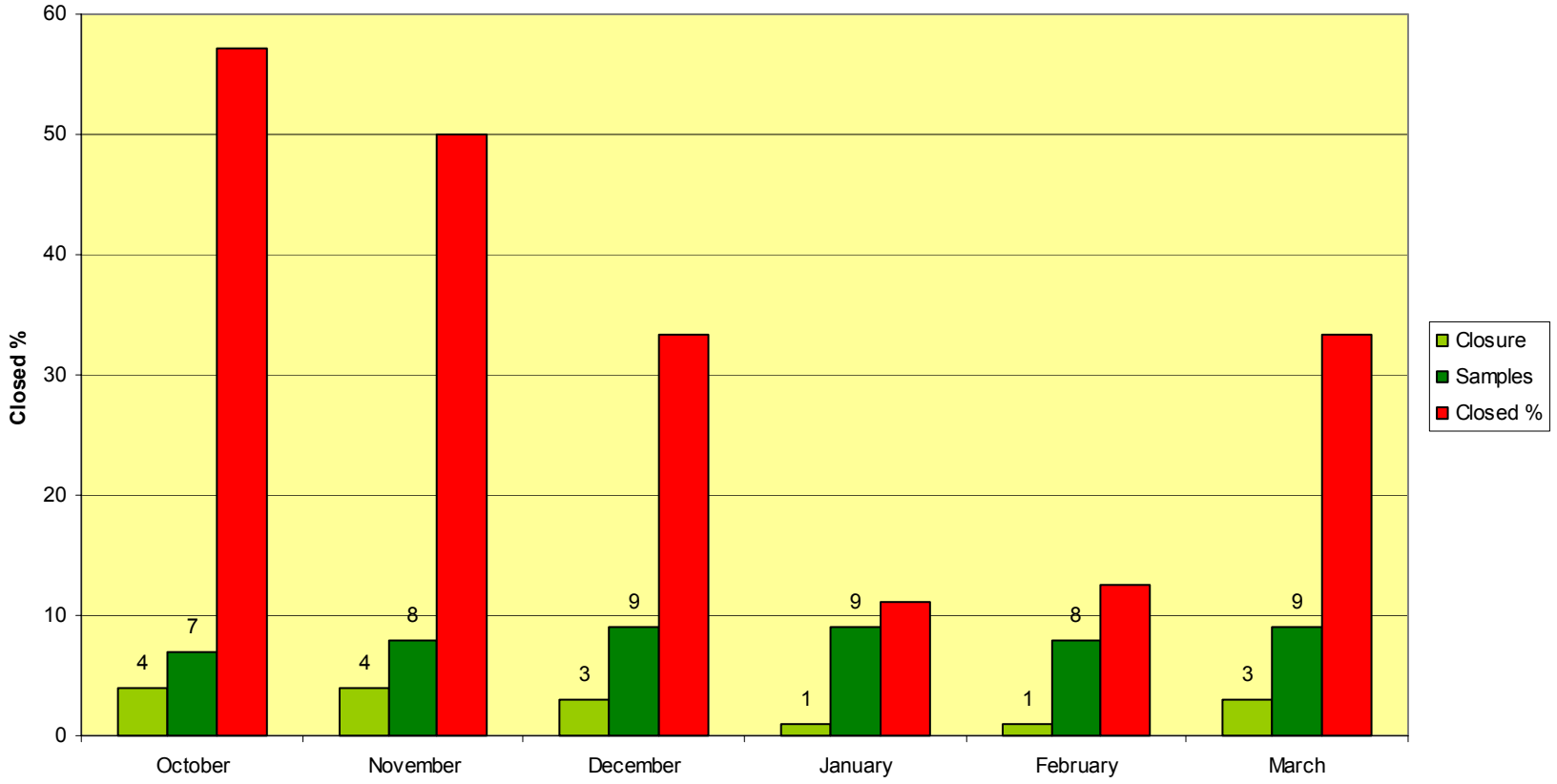
Variation of Enterococci – Beach Locations (Beach)



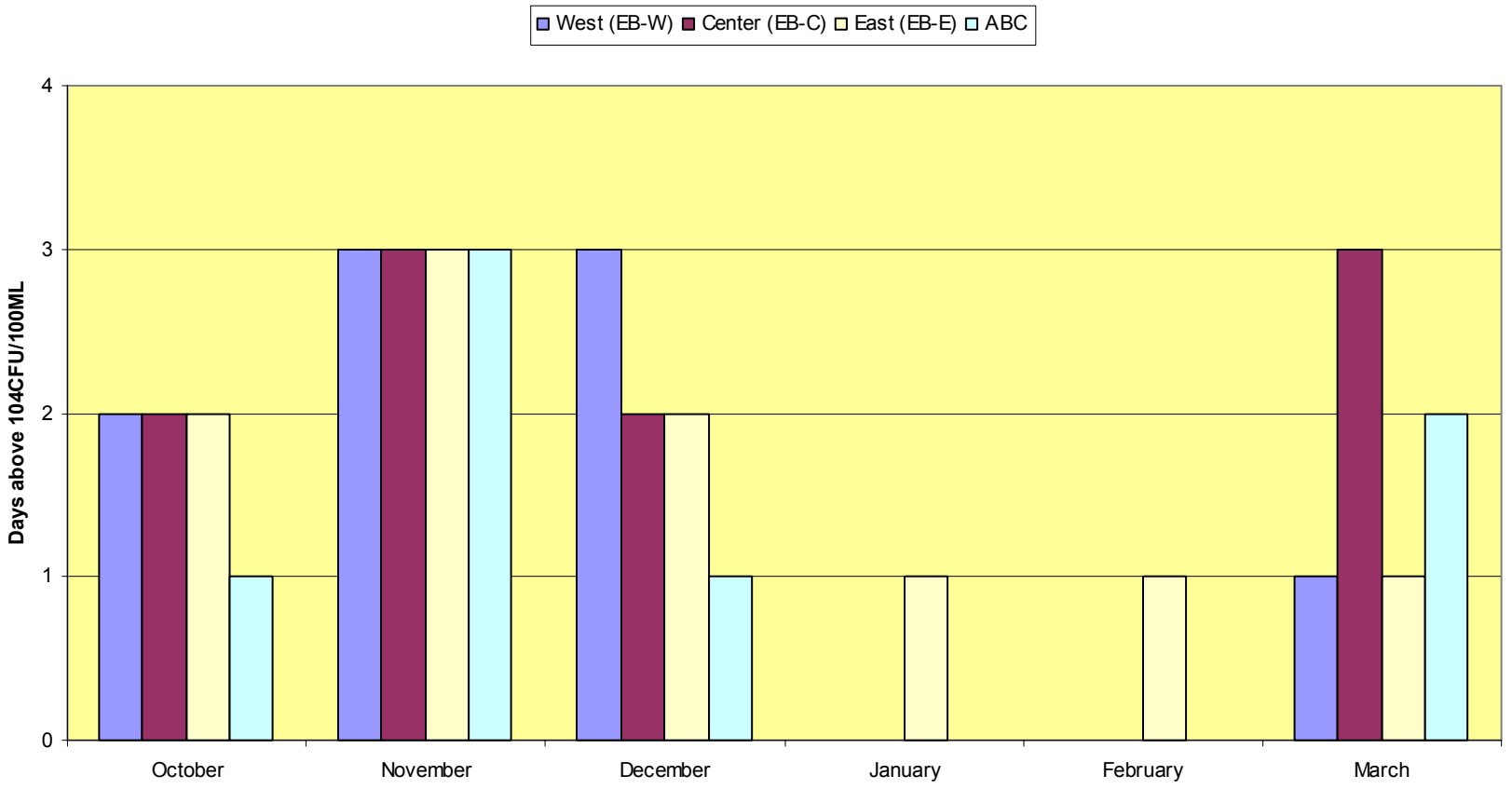
Variation of Enterococci – Beach Locations (Beach)



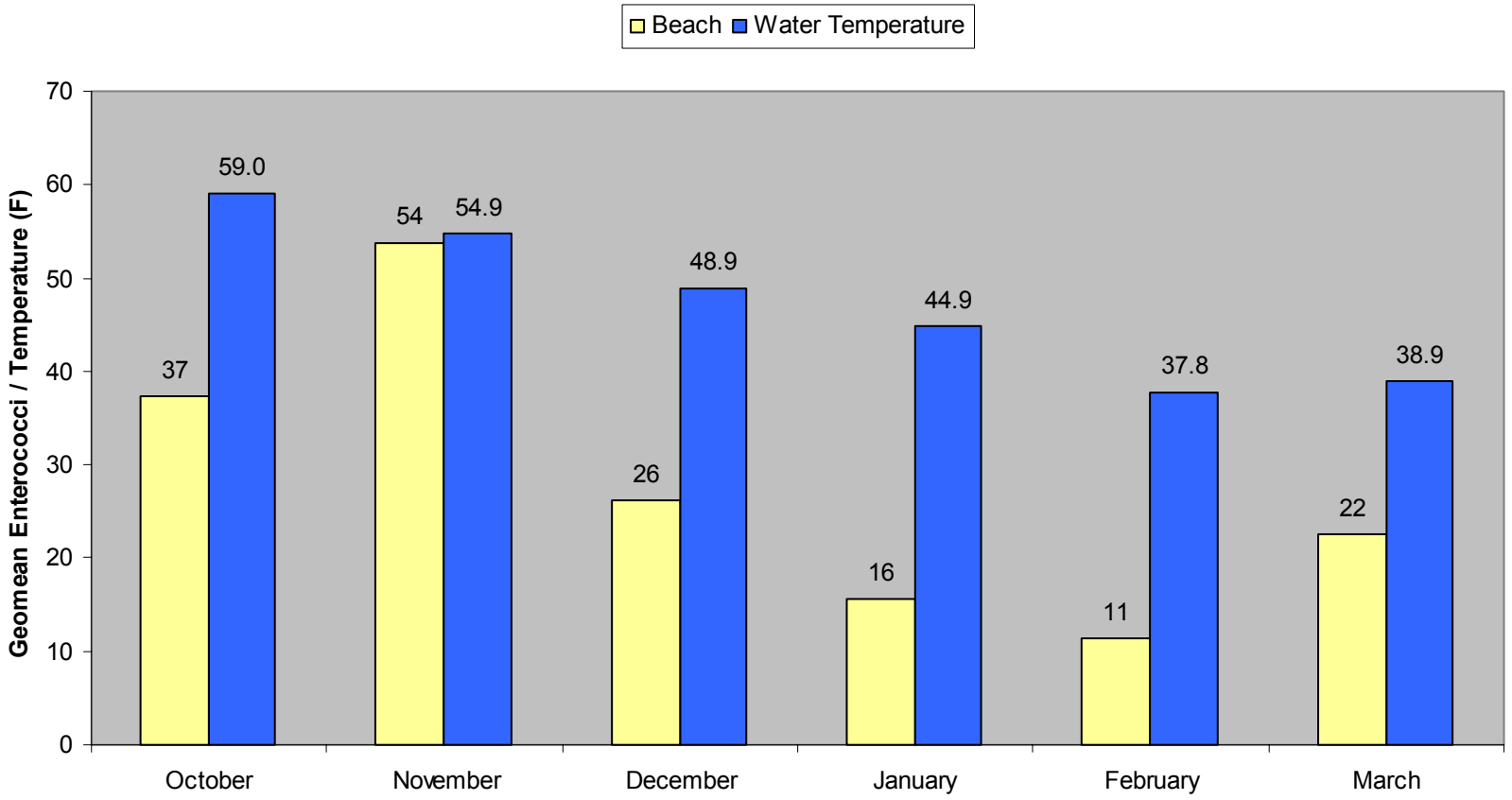
Non-summer months beach closure



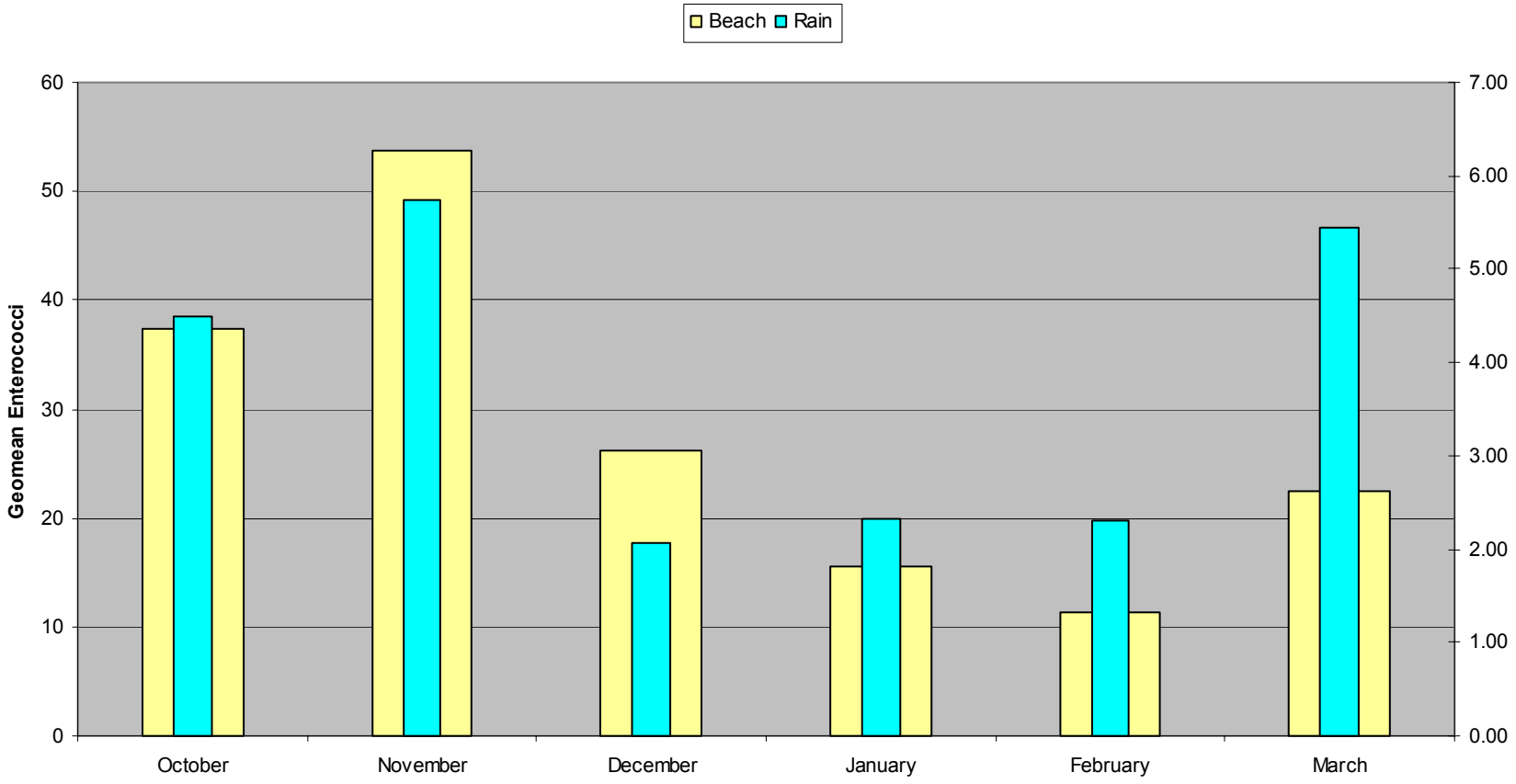
Number of days above acceptable Single Sample Maximum per location



Variation of Enterococci – geomean monthly beach values average monthly water temperatures



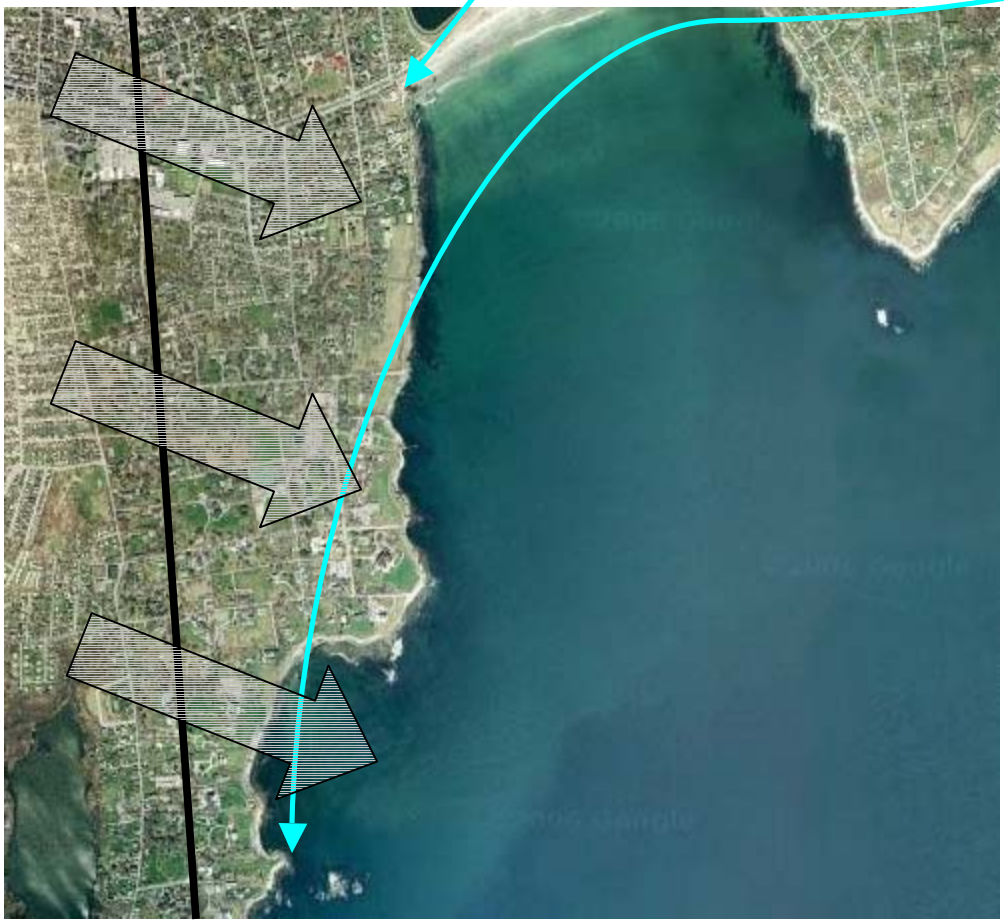
Variation of Enterococci – geomean monthly beach values total monthly rainfall



What are the sources?

Source:	Our Program:
Storm water into the moat and stream	Yes, 1 sample at the top of the moat
Other sources into the moat and stream	No, just the sample listed above
The moat itself	No, just the sample listed above
Wave Avenue Pump Station Overflow	No, we took 2 measurements
Construction of new pipe and pump station	No, we have observation data recording altered flow and disturbed sediment.
DOT Outfall	Yes, 1 sample
Esplanade North Pipe	Yes, 1 sample
Esplanade South Pipe	Yes, 1 sample
Pipes along Newport Cliff Walk	No, we have identified 101 pipes
Contaminated sediment	No
Seaweed	No, indirectly we have some data
Other	No

101 Pipes from Memorial BLVD to Sheep's Point.



Salve Regina University has partnered with Clean Ocean Access and performed a detailed assessment of the coastline and located 101 pipes in various ages (new, old, decaying, very decayed, trace remains) and also general discharge location.

It would be ideal to test these pipes and the general discharge area within a rain event.

Picture obtained from Google maps

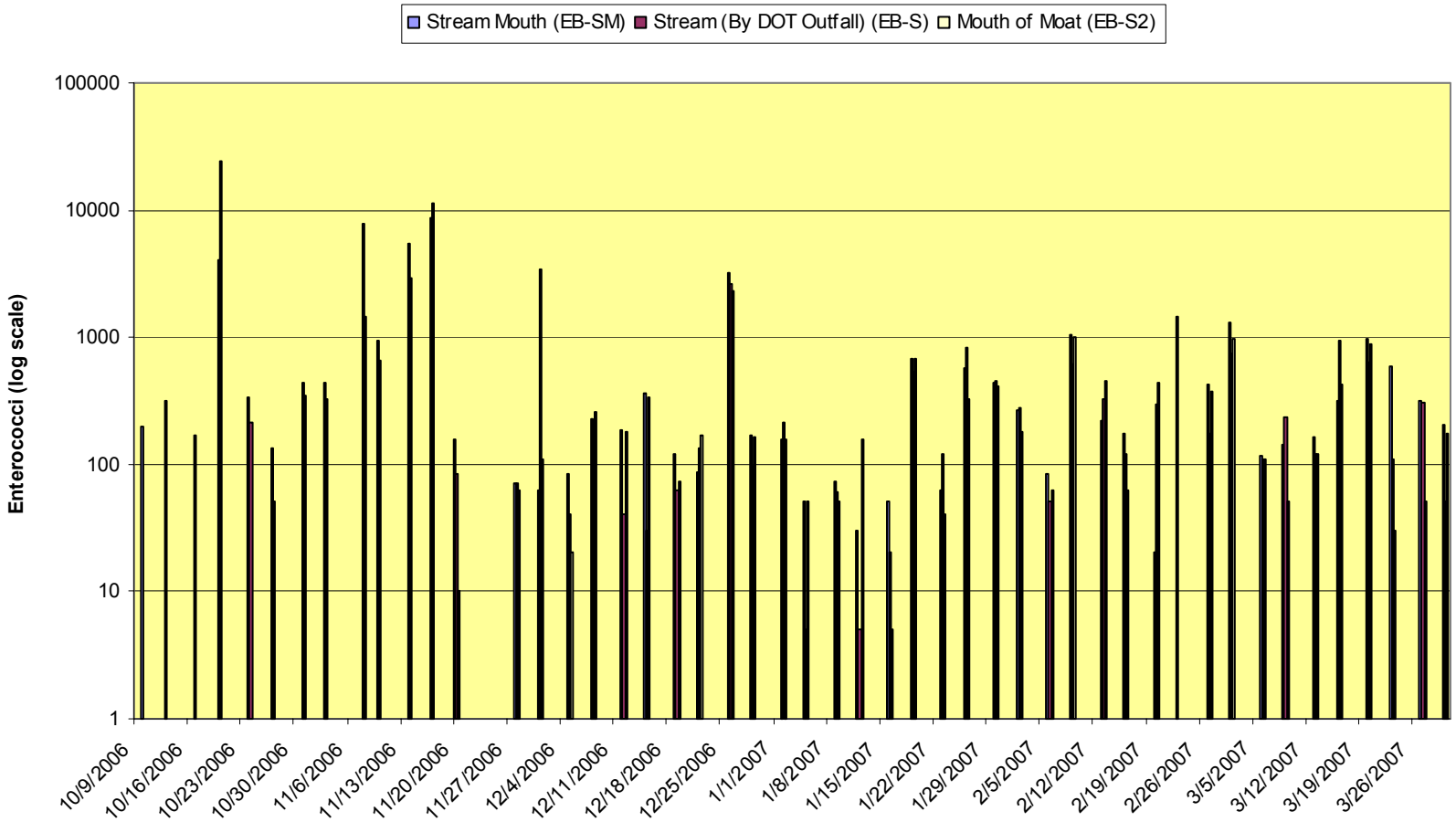
Spatial distribution of seaweed

Sometimes it is stuck in the western corner

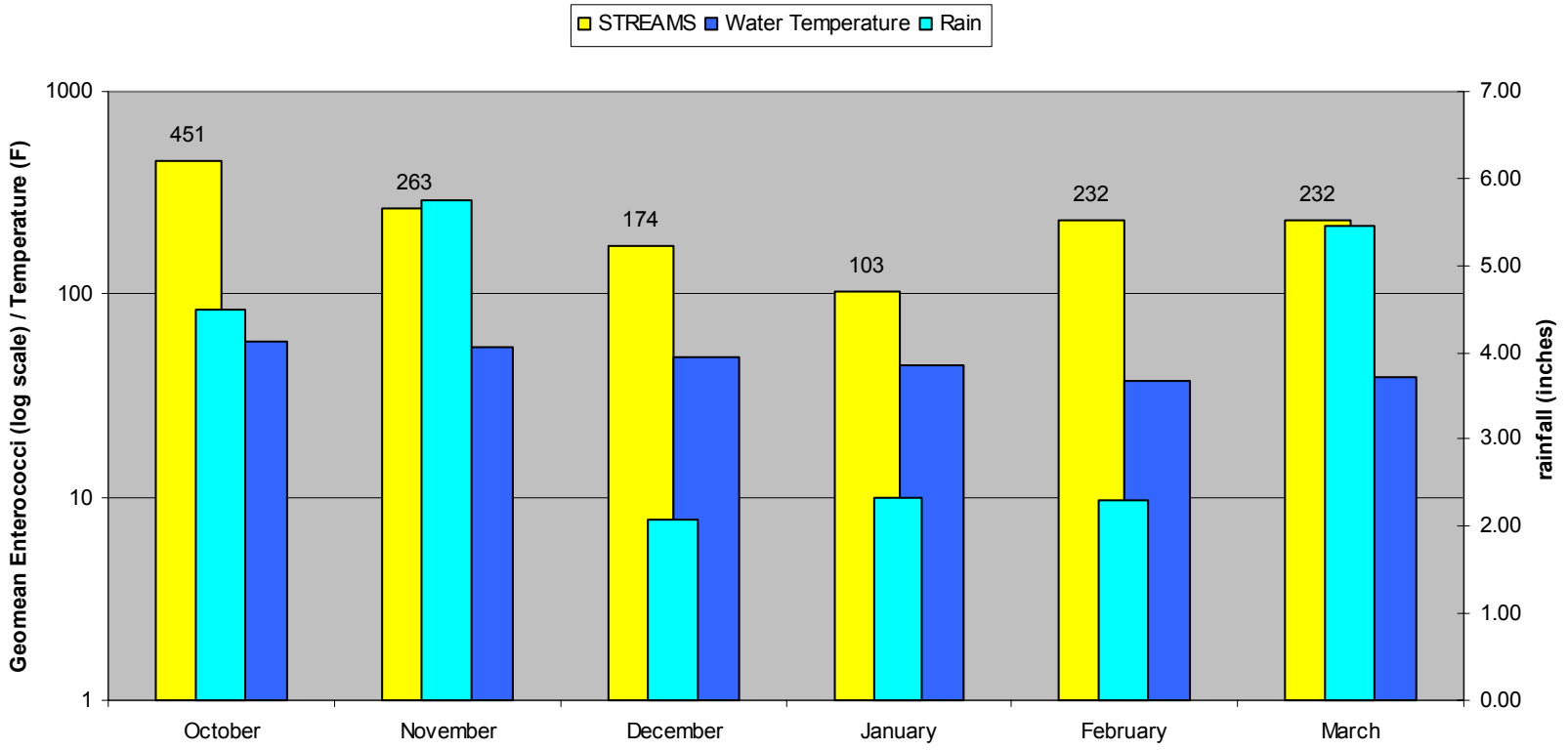
Other times it is a pile in the center

Occasionally it is all on the Eastern side of the beach, separated by the stream

Variation of Enterococci – Moat and Stream Mouth (Stream)



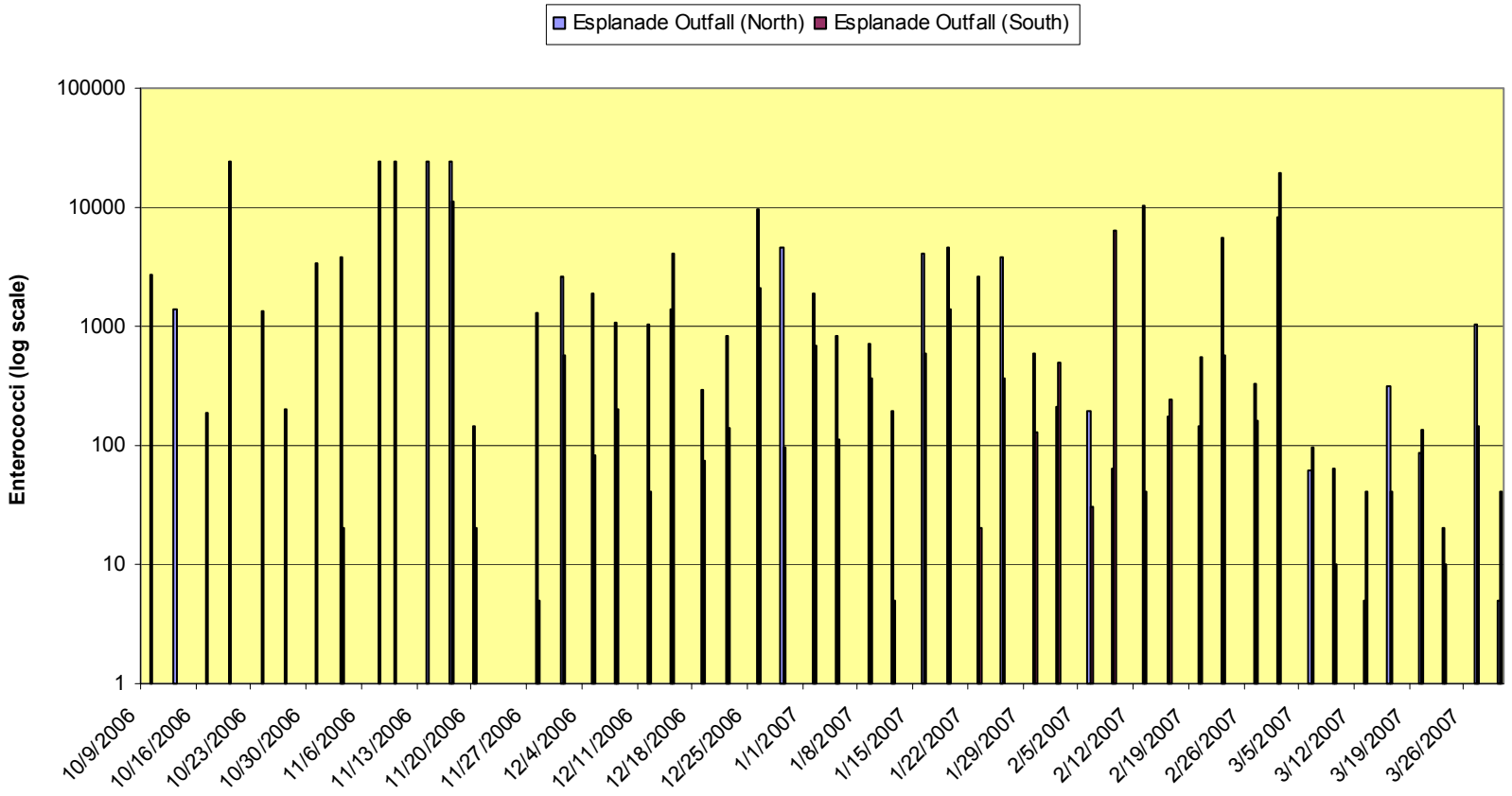
Variation of Enterococci – Moat and Stream Mouth (Stream)
Comparison with water temperature on primary axis
Comparison with Rainfall on 2nd axis



January – Spillway flooded every day until the 27th (dilution factor?)

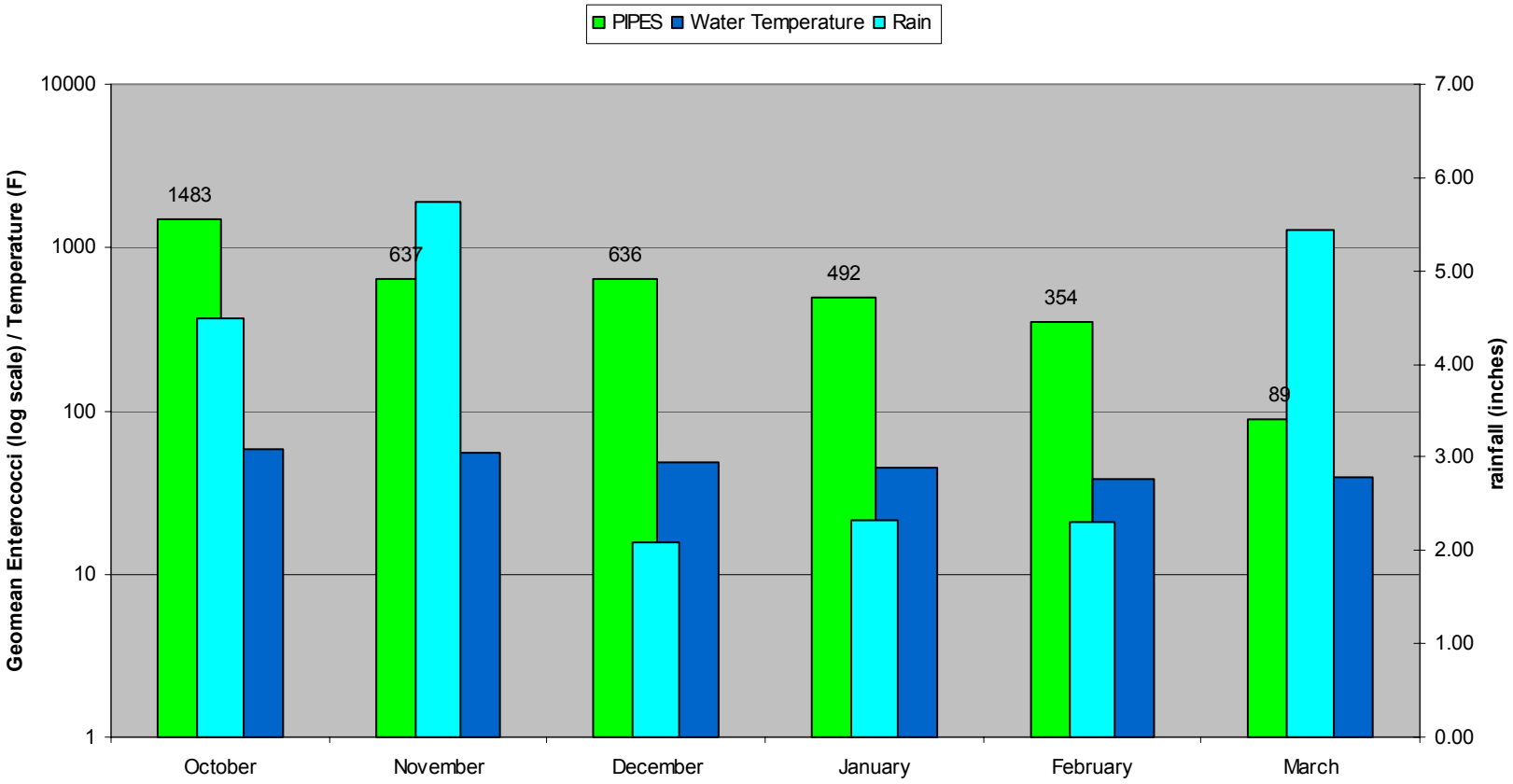
February & March – construction of new force main pipe and pumping station

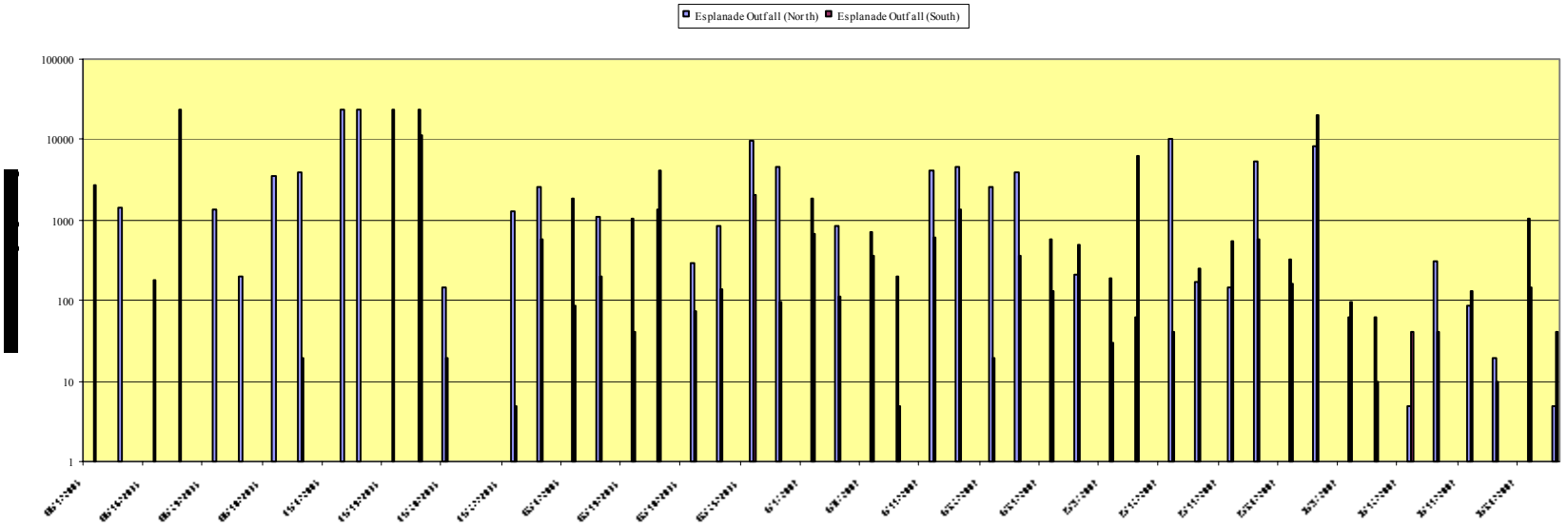
Variation of Enterococci – Esplanade Pipes (Pipes)

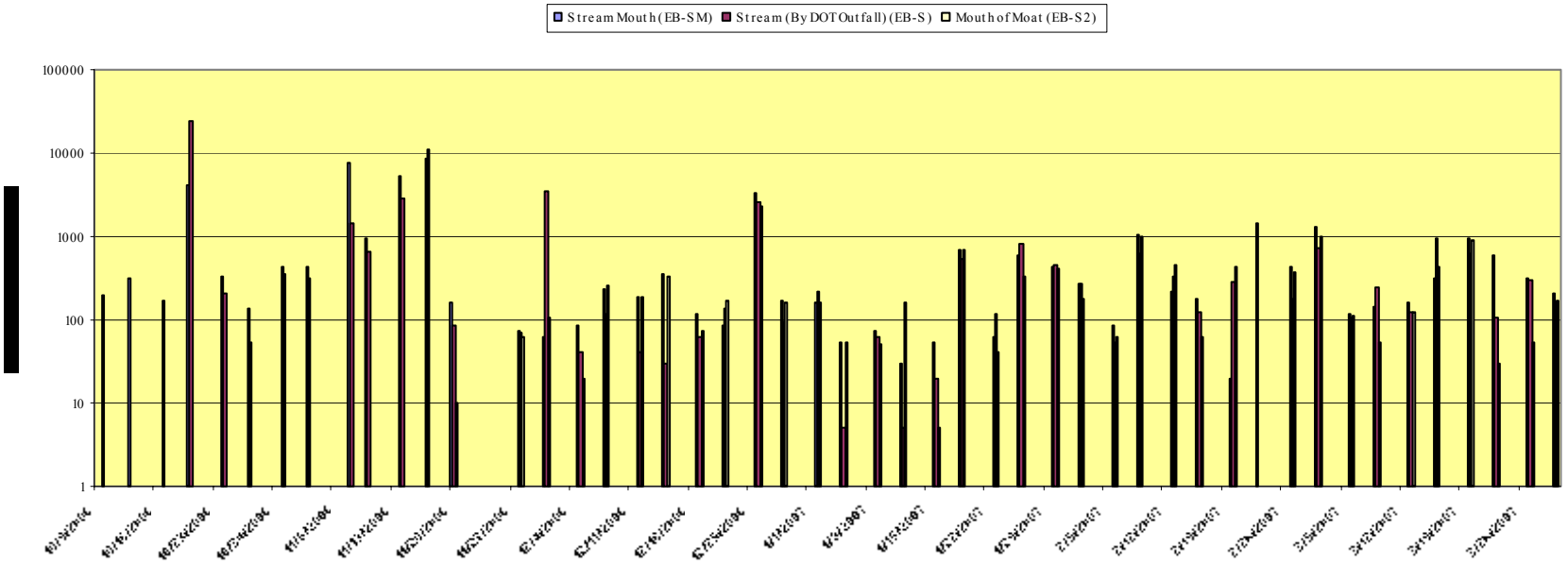


…High values in the fall, decreasing values in the spring.

Variation of Enterococci – Esplanade Pipes (Pipes)
Comparison with water temperature on primary axis
Comparison with Rainfall on 2nd axis

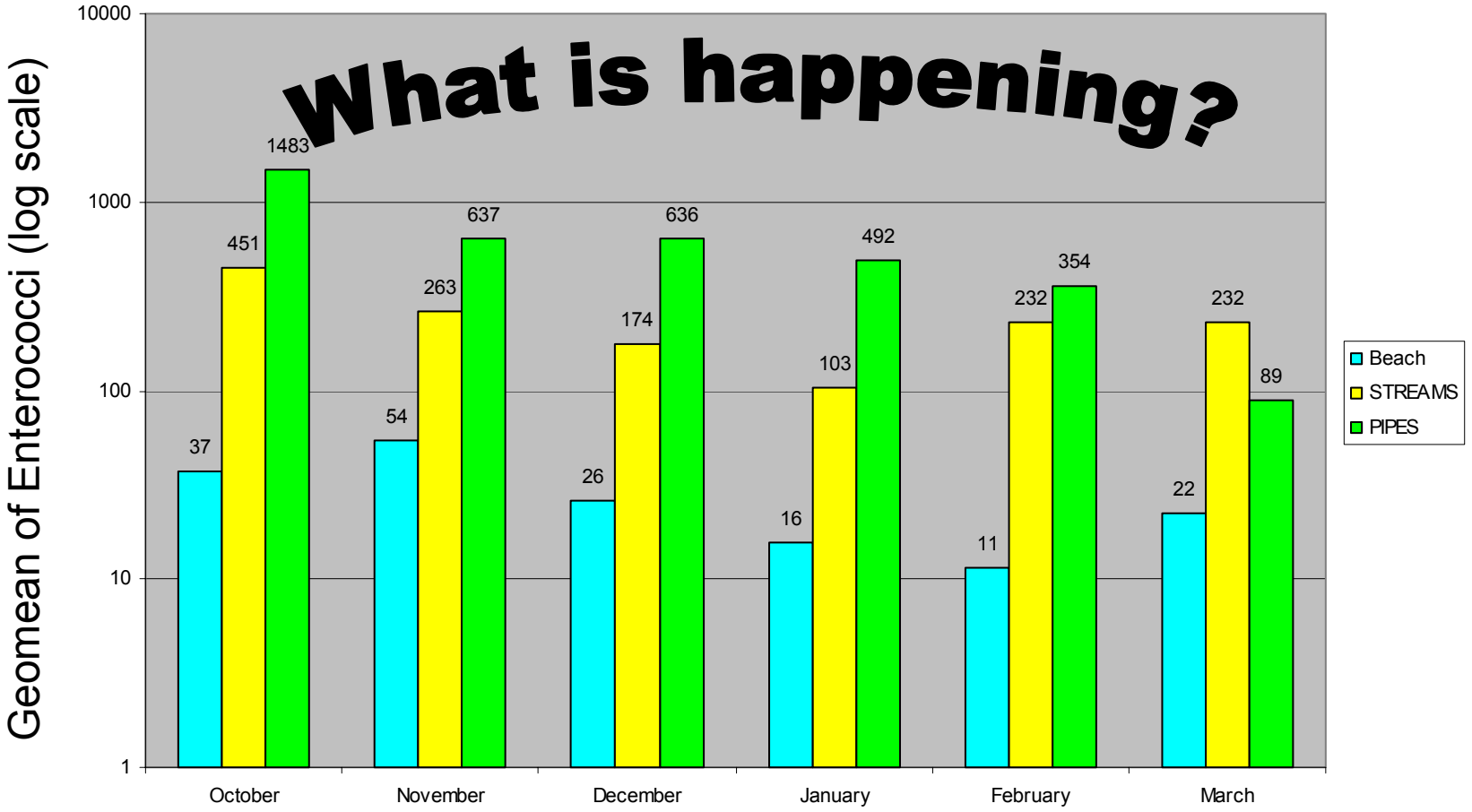



Esplanade Outfall (North)
Esplanade Outfall (South)
100000
10000
1000
100
10
1


Stream Mouth (EB-SM)
Stream (By DOT Outfall) (EB-S)
Mouth of Moat (EB-S2)
100000
10000
1000
100
10
1

Geomean of Beach and Source

Beach values decrease into the winter months, starts to increase in March
Stream values experience gradual decrease and then increase.
Pipe values continue to decrease



General findings & questions

- The results from the program have been a primary driver for escalation of this issue. Awareness of public health risk during fall and winter conditions have increased the priority for the resolution of bacterial contamination in local waters. Citizens both young and old across several towns are now joining forces via local advocacy groups to keep the pressure to resolve the issues.

- Local officials as well as State agencies use the COA non-summer month water testing results as a measurement of the continuing problems of contamination, a source of data unavailable until the surfers took action to make it happen.

- The limited data does not explain the behavior of the systems. A more comprehensive program including (1) daily sampling (2) flow-monitoring (3) salinity measurements (4) nutrient analysis (5) detailed spot-sampling of seaweed (6) sediment sampling (7) upstream moat testing (8) Newport pipe testing would produce a data set that would allow for a better understanding of the system.

- A comprehensive data set combined with a three-dimensional numerical model governed by the shallow water wave equations (continuity and momentum) would likely provide results that would allow local and state officials to make informed decisions as to the best solution for permanent clean water along Aquidneck Island shoreline.

Working together to preserve the environment of today, for tomorrow and future generations, to allow for continued enjoyment of ocean activities.

For more information visit our website at http://members.cox.net/cleanoceanaccess/