

August 30, 2010

Jeffrey Shu, State Water Resources Control Board  
Division of Water Quality  
P.O. Box 100  
Sacramento, CA 95812-0100

**VIA ELECTRONIC MAIL:** [jshu@waterboards.ca.gov](mailto:jshu@waterboards.ca.gov)

Re: Notice of Public Solicitation of Water Quality Data and Information for 2012  
California Integrated Report [Clean Water Act Sections 305(b) and 303(d)]

Dear Mr. Shu:

On behalf of San Francisco Baykeeper and its 1,500 members I am writing in response to the California State Water Resources Control Board (SWRCB) public solicitation of water quality data and information for the 2012 California Integrated Report [Clean Water Act Sections 305(b) and 303(d)].

Although Baykeeper maintains a deep concern over many water bodies within Region 2, this letter deals most specifically with the submission of fecal indicator bacteria data for Oakland Inner Harbor, San Francisco Bay, Region 2. We hope this data encourages a Category 5 listing of Oakland Inner Harbor for Indicator Bacteria and urge the SWRCB to list other water bodies receiving storm drain effluent as impaired for Indicator Bacteria in an effort to tackle the issue of aging sewer infrastructure throughout California. In addition, we ask that you review the available data regarding the presence of polybrominated diphenyl ethers, or PBDEs, given the toxic and ubiquitous nature of the contaminant within San Francisco Bay.

### **Summary of Oakland Storm Drain Monitoring Project**

Baykeeper's Oakland Storm Drain Monitoring Project was conducted from summer 2008 to early 2010 and involved water sampling within the immediate vicinity of three (3) storm drain outfalls to the Oakland Inner Harbor, the locations of which are listed in Table 1. The goal of this project was to investigate bacterial contamination of storm drain effluent using *Enterococcus*, which is considered the best indicator of fecal contamination in water. Sampling and enumeration of *Enterococcus* follows protocol and QA/QC outlined by the US EPA.

This project intended to investigate the hypothesis that *Enterococcus* concentrations within storm drain effluent is higher during the rainy season, based on the well-established finding that increased flow in aging sanitary sewer pipes due to inflow and infiltration results in leaching of sewage and sewage contaminated stormwater through cracks in the sanitary sewer pipes and into similarly damaged storm sewer pipes. In addition, blockage-related spills send large volumes of untreated sewage to storm drain. This in fact proved to be the case, resulting in greater contamination of Oakland Inner Harbor during winter months. However, routine exceedances

were also observed in the summer when the area is used heavily for contact recreation (i.e. rowing, kayaking and canoeing).

**Table1. Monitoring Locations – Oakland Inner Harbor**

Station Name	Station ID	Lat/Long	Station Location Description
Union Point	UP	37° 46'44.89" N 122° 14'36.96" W	Storm drain terminus at Union Point, South of Dennison Street Bridge, Oakland, CA.
Executive Inn & Suites	EI	37° 47'09.69" N 122° 14'50.64" W	Storm drain terminus at the end of a pier adjacent to Executive Inn & Suites, 1755 Embarcadero, Oakland, CA
Jack London	JLb	37° 47'34.17" N 122° 16'30.89" W	Storm drain terminus at Jack London Harbor, Oakland, CA. Samples taken from a pier runnings parallel to fuel dock pier.

## Background

The Oakland Storm Drain Monitoring Project was borne out of the SWRCB funded Clean Marinas program, started by Baykeeper in 2004 and consisting of several projects related to water quality assessment, marina outreach, and boater outreach. During the three year program, Baykeeper collected water quality measurements, including levels of fecal indicator bacteria, from four Bay Area marinas; created two new clean boating publications for Bay Area boaters; distributed more than 500 clean boating kits; researched and assessed marinas' environmental needs; and researched and reported on the feasibility and suitability of a Bay Area marina recognition program.

Recent data collected from 2008 to 2010 supports prior findings from the Clean Marinas program, whereby sampling locations in the vicinity of municipal storm drains routinely exceeded water quality standards for fecal indicator bacteria. Of the 422 water samples collected and analyzed by Baykeeper in 2004 and 2005, only 19 (5%) held bacteria levels exceeding one or more of the water quality standards. However, 17 of the 19 (89%) samples which exceeded a water quality standard were collected from stations located adjacent to a municipal storm drain.<sup>1</sup> This strongly suggests that inflow and infiltration is resulting in sewage contamination of storm water infrastructure. In addition, blockage of the sewerage system is known to contribute to spill events, sending thousands of gallons of untreated sewage to the storm water system.

## Methods for Data Collection and Analysis

During each of the summer and winter seasons of 2008 through 2010 five (5) samples were collected from three (3) stations over a 30-day period to calculate the geometric mean of *Enterococcus* concentrations within Oakland Inner Harbor in the immediate vicinity of storm drain outfalls. Data was collected and analyzed by qualified staff pursuant to Standard Operating

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<sup>1</sup> California Regional Water Quality Control Board San Francisco Bay Region. 2010. *Bacteria Objectives for Marine and Estuarine Waters Designated for Contact Recreation in the San Francisco Bay Region - Proposed Basin Plan Amendment and Final Staff Report*. Available at [www.waterboards.ca.gov](http://www.waterboards.ca.gov)

Procedures (SOPs) for YSI and Sample Collection (Attachment 1) and Bacterial Analysis (Attachment 2).

For each monitoring event data was collected on a standard form (Attachment 3) for the following parameters using a YSI multi-parameter sonde: temperature, conductivity, salinity, dissolved oxygen (DO) and pH. Water samples were collected, maintained on ice and processed within two hours of collection for analysis with the Enterolert<sup>®</sup> system. This product by IDEXX is an official ASTM Method (#D6503-99) for *Enterococcus* enumeration as well as a US EPA-approved method included in Standard Methods for Examination of Water and Wastewater.<sup>2</sup> Enumeration was carried out according to manufacturer specifications within 24 hours according to strict QA/QC.

## Results

Please refer to the enclosed Excel Sheet (Oakland\_SD\_Monitoring\_Datasheet\_SB\_Submittal.xls) for full information regarding sampling dates, physical conditions and results of *Enterococcus* counts. Essential information is contained in the 'summer geo mean' and 'winter geo mean' worksheets, as summarized below:

**Table 2. Enterococcus Geometric Mean Summer 2008 - July 29, 2008 to August 27, 2008**

Site	Max	Min	Geometric mean (MPN/100ml)
Jack London b	6294	<10	173.39
Executive Inn	6294	20	362.07
Union Point	203	<10	14.85

**Table 3. Enterococcus Geometric Mean Summer 2009 - September 1, 2009 to September 30, 2009**

Site	Max	Min	Geometric mean (MPN/100ml)
Jack London b	9139	235	1031.82
Executive Inn	226	<10	27.91
Union Point	6294	30	390.05

**Table 4. Enterococcus Geometric Mean Winter 2009 - January 27, 2009 to February 26, 2009**

Site	Max	Min	Geometric mean (MPN/100ml)
Jack London b	2,310	10	209.8
Executive Inn	10,112	10	640.6
Union Point	5,475	10	700.5

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<sup>2</sup> APHA. 9230. Fecal Streptococcus and Enterococcus Groups. In: Standard Methods for the Examination of Water and Wastewater, 20th edition. APHA, AWWA, WEF, Washington, DC.

**Table 5. Enterococcus Geometric Mean Winter 2010 - February 3, 2010 to March 1, 2010**

Site	Max	Min	Geometric mean (MPN/100ml)
Jack London b	10112	97	846.78
Executive Inn	4569	281	778.04
Union Point	5012	488	2193.4

Pursuant to the San Francisco Bay Basin Plan, the *Enterococcus* objectives include a geometric mean of less than 35 MPN/100 ml and states that no sample should exceed 104 MPN/100 ml. Under this standard, only two stations satisfied the geometric mean objective during the summer and none satisfied the objective during the winter. In addition, none of the stations achieved compliance with the ‘no sample greater than 104 MPN/100ml’ objective within a given 30-day sampling period during either the summer or winter monitoring seasons.

Unfortunately, San Francisco Bay is only subject to bacteriological monitoring at designated beaches, although contact recreation occurs routinely throughout the Bay, including Oakland Inner Harbor. In light of this and other data, which indicates contact recreation in the vicinity of storm drains poses a serious risk to human and ecological health, Oakland Inner Harbor must be designated as impaired for Indicator Bacteria. More effort is required to curb the neglect of aging sewage infrastructure that permits the untreated discharge of sewage and grey water-containing contaminants to San Francisco Bay, and such a designation would provide an essential step in stopping this contamination pathway.

### **Request for Consideration of PBDE Data Collected from San Francisco Bay**

Since 2002 Baykeeper has requested that SWRCB consider listing San Francisco Bay for PBDEs, a class of chemicals for which there are more than 209 congeners and used as flame retardants in a variety of products. Despite California’s ban on products containing some of these 209 congeners, PBDEs still pose a significant threat to human and ecological health. Baykeeper has consistently urged listing of San Francisco Bay as impaired for PBDEs and continues to believe that listing is appropriate based on all available information.

In 2008, the San Francisco Estuary Institute (“SFEI”) published a mass budget of PBDEs to facilitate understanding of the sources and fate of PBDEs in the San Francisco Bay.<sup>3</sup> As noted in the article, published in *Environmental International*, “California, and in particular, San Francisco Bay, is a known global PBDE hotspot.” To date, studies have established elevated PBDE concentrations in San Francisco Bay seals,<sup>4</sup> fish,<sup>5</sup> bird eggs,<sup>6</sup> bivalves, sediment and

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<sup>3</sup> Oram, J.J., *et al.*, “A mass budget of polybrominated diphenyl ethers in San Francisco Bay, CA,” *Environ Int.* 34(8):1137-47 (Nov. 2008).

<sup>4</sup> She, J. *et al.*, “PBDEs in the San Francisco Bay Area: measurements in harbor seal blubber and human breast adipose tissue,” *Chemosphere* 46 697–707 (2002).

<sup>5</sup> Holden A., *et al.*, “PBDEs in the San Francisco Bay area: measurements in fish,” *Organohalogen Comp* 61:255–8 (2003); Brown F.R., *et al.*, “Levels of PBDEs, PCDDs, PCDFs, and coplanar PCBs in edible fish from California coastal waters,” *Chemosphere* 64:276–86 (2006).

<sup>6</sup> She, J. *et al.* “Highest PBDE Levels (max 63 ppm) Yet Found In Biota Measured in Seabird Eggs from San Francisco Bay.” *Organohalogen Compounds* 66:3939-3944 (2004).

water.<sup>7</sup> Concentrations in San Francisco bivalves are some of the highest reported in the world, and levels in San Francisco Bay fish are at least an order of magnitude greater than those found in fish in Japan or Europe. Collectively, the available data demonstrate that PBDE levels have been increasing in organisms for more than a decade in San Francisco Bay.

In the fall of 2002, the Oakland-based Environmental Working Group (EWG) initiated a study to determine PBDE concentrations in commonly consumed fish species in the Bay.<sup>8</sup> Researchers arranged for the donation by fishermen of 22 fish from six of the most commonly eaten species at 10 locations around San Francisco Bay. Analysis conducted under contract by the state Department of Toxic Substances Control's Hazardous Materials Laboratory in Berkeley found that every sample contained seven different PBDEs, in concentrations ranging from trace amounts to more than 60 parts per billion (ppb) in fish tissue. Researchers from EWG also tested for PBDEs in fish samples archived from 1997, and found that in five years, levels of the chemicals had increased in four of six species tested.

According to the EWG report of the study, levels of PBDEs found in San Francisco Bay fish were much higher than those found in commonly eaten fish species from Europe, Japan, the Pacific Northwest and the Great Lakes. Consumption of contaminated fish is believed to be a major route of PBDE exposure for adults. Earlier studies of PBDEs in the blood and breast tissue of Bay Area women, and of harbor seals from San Francisco Bay, have found levels from three to 60 times higher than levels measured in people and animals in Europe.

The San Francisco Bay Basin Plan clearly prohibits the detrimental bioaccumulation of toxic substances in bottom sediments or aquatic life. As described above and in our comment letters submitted in 2002, 2006 and 2008, PBDEs are clearly present in Bay sediments, are accumulating in Bay organisms, and are known to negatively impact aquatic life. For these reasons, the Regional Board should consider published and peer-reviewed literature in support of a PBDE listing for San Francisco Bay in this 2012 listing cycle.

Thank you for your consideration of this data and if you have any questions, please don't hesitate to contact me at [ian@baykeeper.org](mailto:ian@baykeeper.org) or (415) 856-0444 x.108.

Sincerely,



Ian Wren, Staff Scientist  
San Francisco Baykeeper

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<sup>7</sup> Oros D.R., et al., "Levels and distribution of polybrominated diphenyl ethers in water, surface sediments, and bivalves from the San Francisco Estuary." *Environ. Sci. Technol.* 39:33-41 (2005).

<sup>8</sup> Lunder S. and Sharp R. 2003. *Tainted Catch: Fire retardants are building up rapidly in San Francisco Bay fish and people*. Environmental Working Group. Available at: [www.ewg.org](http://www.ewg.org)

*Attachments:*

*Attachment 1: Standard Operating Procedures for YSI and Sample Collection*

*Attachment 2: Standard Operating Procedures for Bacterial Analysis*

*Attachment 3: Blank monitoring form for the Oakland Storm Drain Monitoring Project*

*Attachment 4: Monitoring data: Oakland\_SD\_Monitoring\_Datasheet\_SB\_Submittal.xls*