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April 19, 2010

California Regional Water Quality Control Board, Los Angeles Region
320 W. 4th Street, Suite 200
Los Angeles, CA 90013

Attention: Renee Purdy
Ginachi Amah

Subject: Comments prepared in response to the CEQA Scoping Meeting Notice
Proposed amendment to the Water Quality Control Plan for the Los Angeles Region (Basin Plan) to update the bacteria objectives for freshwaters designated for contact recreation by removing the fecal coliform objectives
FSI 037033

Dear Ms. Purdy and Dr. Amah,

Flow Science, on behalf of the City of Signal Hill, appreciates the opportunity to submit comments in response to the April 6, 2010 CEQA Scoping Meeting Notice for the above-captioned proposed Basin Plan amendment.

As detailed below, Flow Science supports the proposed change (removal of objectives for fecal coliform) and urges the Regional Water Quality Control Board (Regional Board) to consider additional changes to the objectives at the same time. We also urge the Regional Board to delay the adoption of bacteria TMDLs until the standards for indicator bacteria are reconsidered.

Support for removal of fecal coliform objectives. The original water quality objectives for fecal coliform were established in 1968 on the basis of epidemiological studies conducted in 1948, 1949, and 1950 (NTAC 1968[1]). However, fecal coliform has since been shown to be a poor indicator of the presence of pathogens and human health risk. As early as 1972, a Committee formed by the National Academy of Science-National Academy of Engineers noted the deficiencies in the study design and data used to establish the recreational fecal coliform criteria, and stated that it could not recommend a recreational water criterion because of a paucity of valid epidemiological data.[2] Studies initiated in 1972 by USEPA found that fecal coliform densities showed "little or no

[1] Water Quality Criteria, a Report of the National Technical Advisory Committee to the Secretary of the Interior, Federal Water Pollution Control Administration: Washington, D.C. April 1, 1968, at p. 8 and p. 12.
[2] Committee on Water Quality Criteria. National Academy of Sciences-National Academy of Engineering. Water Quality Criteria. USEPA R3-73-033, Washington, D.C., 1972.

correlation" to gastrointestinal illness rates in swimmers.[3] Based upon these studies, EPA in 1986 proposed section 304(a) criteria for full body contact recreation based upon *E. coli* and/or enterococci.[4]

Although the Regional Board adopted criteria for *E. coli* consistent with USEPA's recommendations in 2001, fecal coliform criteria remained in the Basin Plan following that amendment. The current proposed Basin Plan Amendment to remove fecal coliform is consistent with USEPA's directives and consistent with scientific studies showing the fecal coliform is at best a poor indicator of human health risk. For this reason, we support the proposed Basin Plan amendment.

Request to consider "controllable water quality sources" language as a CEQA alternative. However, the best available science indicates that *E. coli* are far from a perfect indicator of human health risk. *E. coli* originate from multiple sources, including birds and wildlife, and can regrow in sediments and biofilms. Further, recent epidemiological work in southern California indicates that, when human sources of indicator bacteria have been minimized or eliminated, indicator bacteria are uncorrelated with human health risk. An extensive cohort epidemiological study of Mission Bay[5], where extensive efforts were made to eliminate human sources of bacteria, found that "[t]he risk of illness was uncorrelated with levels of traditional water quality indicators. Of particular note, the state water quality thresholds [including those for *E. coli*] were not predictive of swimming-related illnesses. Similarly, no correlation was found between increased risk of illness and increased levels of most non-traditional water quality indicators."

We are now fortunate to have detailed data on *E. coli* and on a human-specific bacteria (bacteroidales) from six dry weather sampling events in the Los Angeles River, which were collected as part of the CREST sampling effort.[6] As shown in **Figure 7-26** of the CREST study (at p. 7-59, and reproduced below), only about 10-50% of the bacteria measured in Reach 2 of the Los Angeles River during six dry weather sampling events originated from storm drains and tributaries. This indicates that elimination of inflows, or elimination of bacteria in inflows, to this reach would not eliminate the exceedances of the water quality objectives for *E. coli*.

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[3] Dufour, A.P. Health Effects Criteria for Fresh Recreational Waters. USEPA 600/1-84-004, August 1984.
[4] Ambient Water Quality Criteria for Bacteria – 1986, USEPA 440/5-84-002, January 1986.
[5] Colford, J.M. Jr, T.J. Wade, K.C. Schiff, C. Wright, J.F. Griffith, S.K. Sandhu, S.B. Weisberg. Recreational water contact and illness in Mission Bay, California. 2005. Technical Report 449. Southern California Coastal Water Research Project. Westminster, CA
[6] CREST (2008). Los Angeles River Bacteria Source Identification Study: Final Report. November.

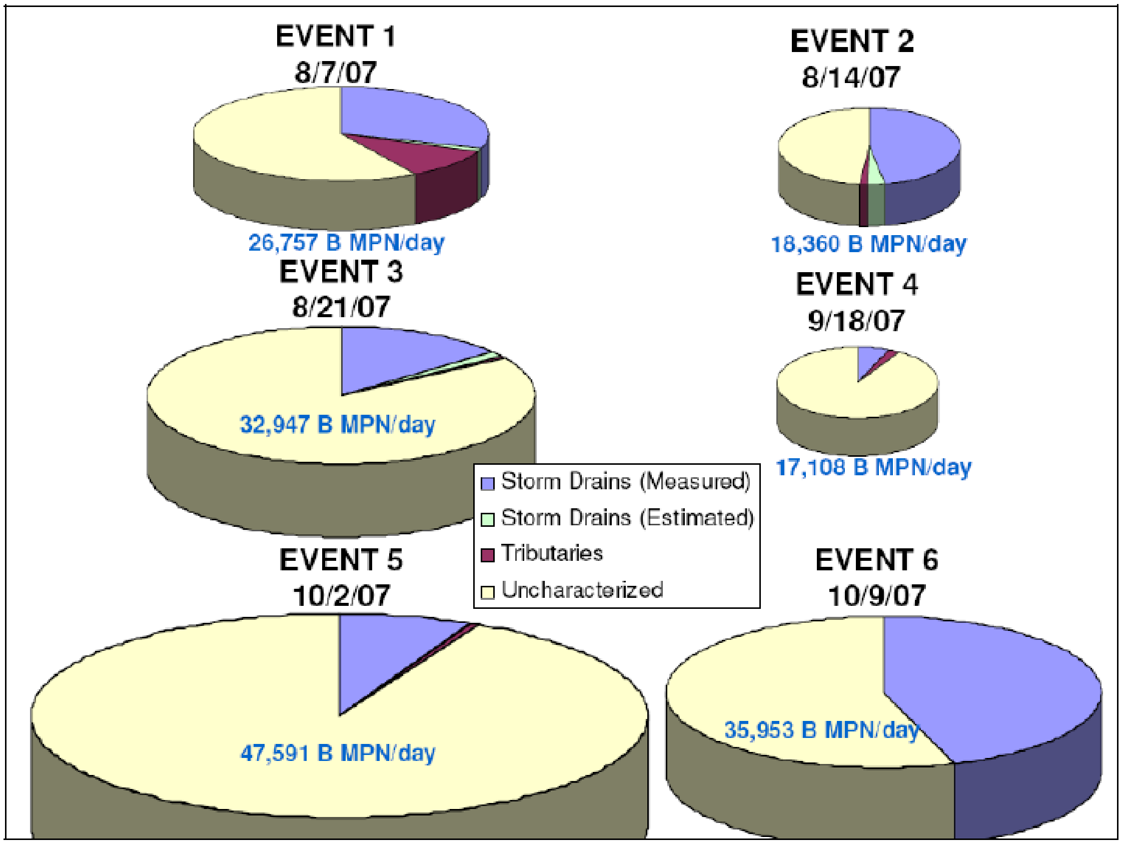

Figure 7-26. Reach 2 Event-by-Event *E. coli* Mass Balance
This figure is a graphical representation of **Table 7-24**. The diameter of the pie charts is proportional to the upstream-downstream loading increase measured along the LA River reach (i.e., the net loading from all sources), which is also detailed with text. The scale is unique to Reach 2 monitoring events (i.e., the figure for Reach 4 uses a different scale). The calculated vs. measured loading difference in **Table 7-24** is represented by "uncharacterized".

Additional information is provided by reviewing **Figures 6-3** and **6-12** of the CREST report (at p. 6-11 and 6-25, respectively, and reproduced below), which show measured concentrations of *E.coli* and human bacteriodales from six dry weather sampling events along the length of the river. As shown in **Figure 6-3**, concentrations of *E. coli* fall to levels mostly below water quality objectives for E. coli downstream of sewage treatment plants. Highly purified wastewater enters the Los Angeles River between river miles 5 and 8, and between river miles 14 and 26. However, downstream of those locations, *E. coli* concentrations rise again. Note in particular the rise in *E. coli* concentrations between 6th St. and Slauson Ave.

Figure 6-12 presents concentrations of human bacteroidales, measured in the same samples from which the *E. coli* measurements (shown in Figure 6-3) were obtained. Note the concentrations of human bacteroidales increase only slightly in Reach 2 of the river between 6th Street and Slauson Ave. The increase in *E. coli* concentrations in this river segment is far greater (more than one order of magnitude) than the corresponding increase in bacteroidales, indicating that the *E. coli* in this segment is from non-human sources. These data indicate that non-human sources (which may include wildlife and birds, or regrowth in sediments) are likely responsible for the exceedances of water quality criteria in this river segment.

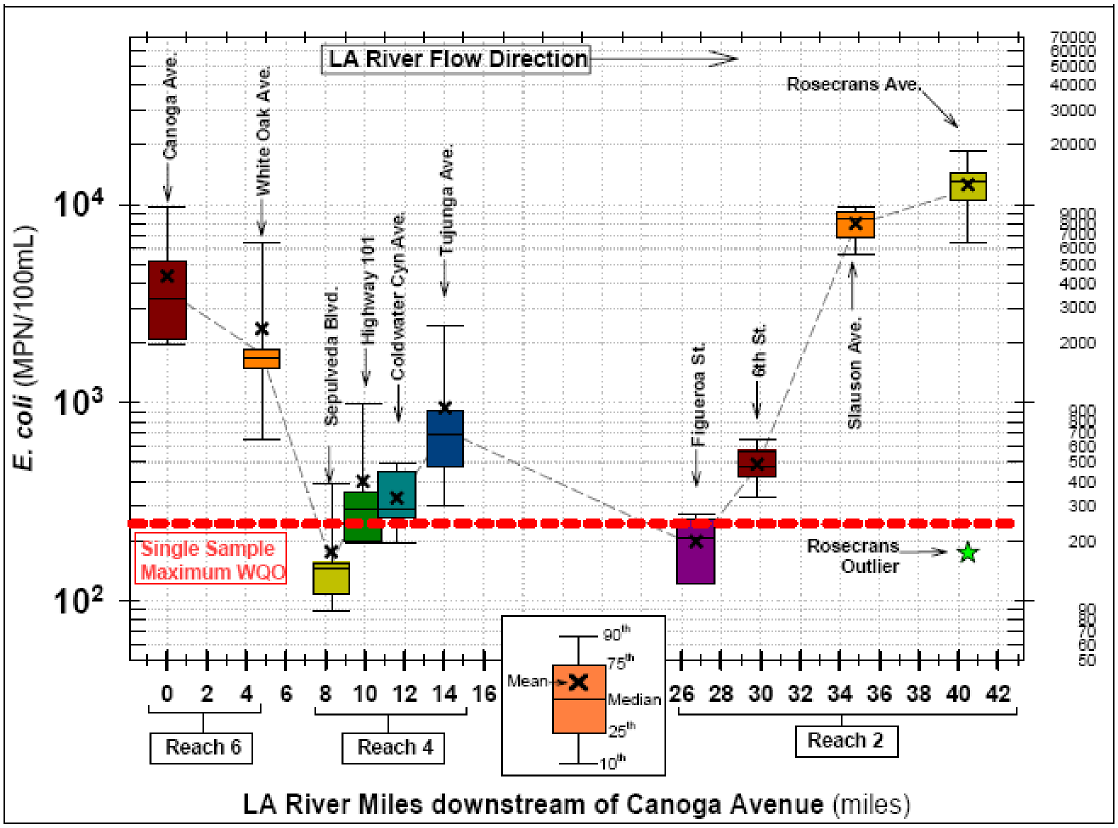

Figure 6-3. Measured *E. coli* Concentrations along the LA River

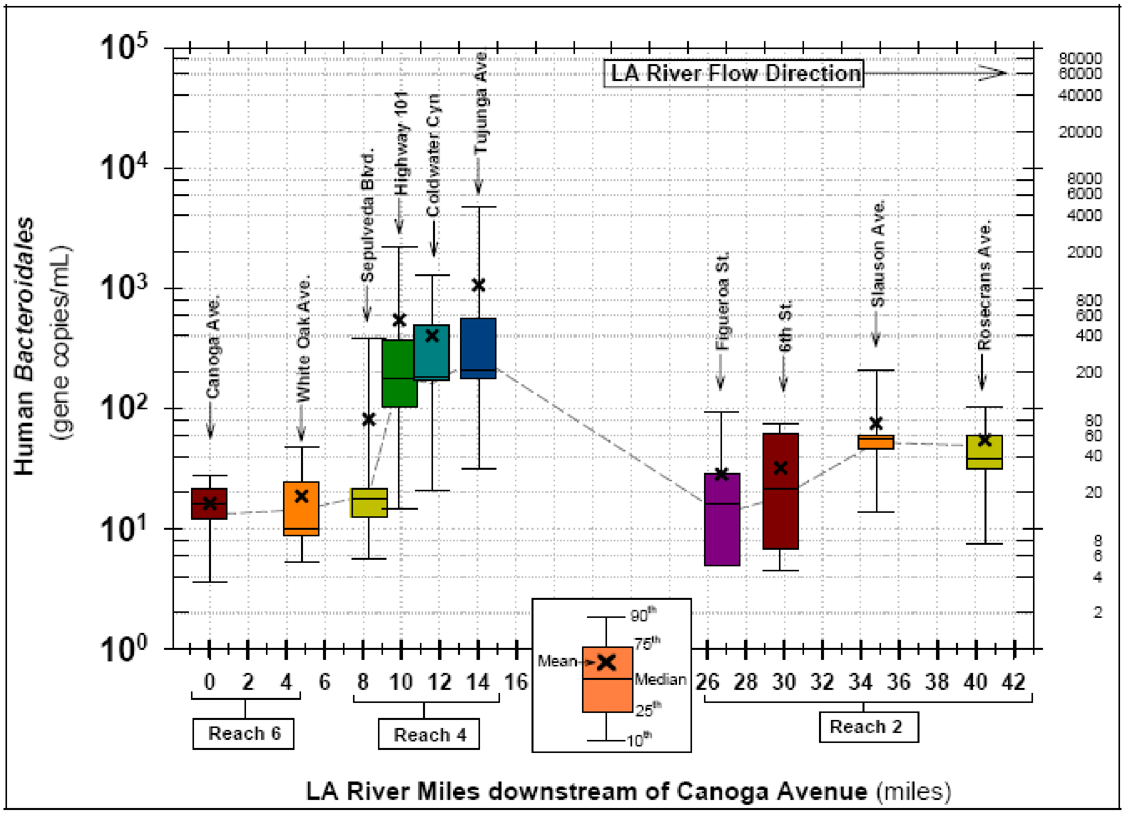

Figure 6-12. Measured Human-specific *Bacteroidales* Concentrations along the LA River

In the past, the Los Angeles Regional Board has used a "reference" or "natural" watershed approach to try to address natural sources. Under this approach, an "allowable exceedance frequency" is determined using monitoring data for indicator bacteria in an undeveloped watershed; the subject watershed is then allowed to exceed standards at the same frequency as the natural watershed. However, this approach is problematic for several reasons. For example, dry weather flows in urban watersheds come from many sources, including POTW effluent, overland flows, and flows through storm drains (including NPDES-permitted flows), while dry weather flows in natural watersheds are often comprised mainly of groundwater inflow. Thus, there is less opportunity for the dry weather flows in natural watersheds to be exposed to natural sources of bacteria. Data from the CREST study process[7] indicate exceedance rates for *E. coli* of between 7% (for single samples) and 16% (for geomeans) for all dry weather data from a natural watersheds study completed by SCCWRP. When two of the undeveloped watersheds in the SCCWRP study were excluded from the analysis because they were "minimally impacted" (i.e., had higher rates of exceedances and were nearer to urban development), exceedance rates fell to <2%. However, as shown in **Figures 6-3** and **6-12**, it appears that non-human sources were responsible for increases in *E. coli* concentrations between 6th St. and Slauson Avenue for 100% (6 of 6) dry weather sampling events. Thus, it

[7] CREST Consulting Team, Freshwater Reference Site Conditions, Calculation of Allowable Exceedance Days, and Consideration Points for the LA River Bacteria TMDL. December 2008.

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appears that a reference or natural watershed approach would be ineffective for at least certain reaches of the Los Angeles River.

Because of bacteria regrowth in streams, compliance with water quality objectives in-stream may not be achievable, even when extensive treatment measures are implemented to minimize bacteria concentrations in inflows. For example, Orange County recently studied the efficacy of several BMPs for reducing bacteria concentrations in Aliso Creek, Orange County, California. Results of this study were summarized by the County of Orange (2005)[8]. The BMPs that were evaluated included a multimedia filtration and UV sterilization system. The study, which was conducted during dry weather, found that these BMPs greatly reduced concentrations of indicator bacteria, but that bacteria levels rebounded within a short distance downstream of the BMPs. For the filtration/sterilization BMP, the geometric mean concentration of fecal coliform increased from 317 cfu/100mL at the outlet of the BMP to 2575 cfu/100mL (i.e., in excess of water quality objectives) in a natural channel at a distance of 35 feet downstream of the BMP.

The draft implementation plan prepared by the CREST consulting team[9] includes several options for the "first iteration" of implementation. (The CREST work product was developed assuming that E. coli would be the only targeted bacteria [i.e., the proposed alternative in the subject proposed Basin Plan amendment], and considering implementation measures for dry weather compliance only.) One of the concepts evaluated would focus on meeting TMDL waste load allocations (WLAs) by diverting and/or treating dry weather flows from storm drains and tributaries to the mainstem of the Los Angeles River. The cost estimate for this approach, assuming 3% escalation of costs per year, is $ 1.112 billion for dry weather flows only. Expenditures of this magnitude will undoubtedly impact other municipal services, potentially including health and safety services, environmental restoration measures, and a wide range of other public services. In addition, the construction of diversions to the sewer system will have environmental impacts at the point of diversion, and increasing flows to POTWs will impact their capacity and treatment and energy costs. Treatment at the point flows enter the mainstem of the river will also potentially have significant environmental impacts, including construction impacts, noise, and energy use. The energy requirements of multiple treatment systems could potentially impact public utilities and energy consumption, and could result in increased regional CO_2 emissions. Finally, it is reasonably foreseeable the strict compliance with the *E. coli* objectives could require control and/or elimination of wildlife and associated habitat, as wildlife is a significant source of bacteria to receiving waters.

For these reasons, we request that the Board consider as a CEQA alternative amending the objectives for indicator bacteria such that they require compliance with *E.*

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[8] Final Report, Agreement: 01-227-550-0, Aliso Beach Clean Beaches Initiative. J01P28 Interim Water Quality Improvement Package Plant Best Management Practices. County of Orange, February 2005.
[9] DRAFT Los Angeles River Watershed Bacteria TMDL Technical Report Section 7: Dry Weather Implementation Plan. Prepared for CREST by the CREST consulting team. February 2010.

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coli concentrations "as a result of controllable water quality factors." Under this concept, if it were demonstrated, using appropriate scientific techniques, that bacteria in excess of criteria were from "uncontrollable" factors (such as wildlife), the presence of those bacteria would not be considered a violation of water quality objectives. It is likely that this alternative would have a less significant environmental impact than the proposed alternative (i.e., removal of fecal coliform from the water quality objectives) alone. Most importantly, the CEQA alternative proposed for consideration here would allow the presence of wildlife and associated habitat without considering those wildlife and habitat to cause or contribute to an exceedance of water quality standards. Further, we believe that this proposed CEQA alternative would be protective of water quality and human health and would meet the objectives of the proposed CEQA project.

Project timing. Because of the potentially large expenditures of public resources associated with the proposed project, we urge the Regional Board to delay the adoption of bacteria TMDLs until the standards for indicator bacteria are further reconsidered, as detailed above.

Thank you for the opportunity to provide comments. Please contact me if you have any questions.

Sincerely,

Susan C. Paulsen

Susan C. Paulsen, Ph.D., P.E.
Vice President and Senior Scientist