

04/01/16

Dear Mr. Ghodrati and Regional Board members,

On behalf of the County of San Mateo (County), thank you for the opportunity to comment on San Vicente Creek Bacteria Water Quality Improvement Plan and Evaluation of Water Quality Conditions for Bacteria in Fitzgerald Marine Reserve (Plan). The County submits the following comments on the Plan for San Vicente Creek and Evaluation for Fitzgerald Marine Reserve:

Delisting Fitzgerald Marine Reserve

The County fully supports the Regional Water Quality Control Board's (Regional Board's) staff's recommendations to remove Fitzgerald Marine Reserve (FMR) from the 303(d) impaired waters list. Data from weekly monitoring conducted by County health officials shows that the Reserve is no longer impaired. In addition, a number of best management practices (BMPs) have already been implemented in FMR and the adjacent watershed by the County and other stakeholders in order to improve water quality. The County will continue to work to protect the water quality in FMR.

Implementation Actions for San Vicente Creek

Table 6.3 (Implementation Actions and Schedule) and Section 6.6.2 (Pet Waste Control) lists the development of a leash law, installation of signs and trash cans and dog waste dispensers and a visual inspection program as potential BMPs for the San Vicente Creek watershed. The County already has a leash ordinance. 6.04.070 of the County Code of Ordinances states that:

No owner or possessor of any animal shall cause or permit it to do any of the following:

- (a) To be upon any public street, sidewalk, park, school ground, any public property, or upon any unenclosed premises in this jurisdiction unless the animal is properly licensed, if such licensing is necessary hereunder, and under the control of the owner by being saddled, harnessed, haltered, or leashed by a substantial chain, lead rope, or leash, which chain, lead rope, or leash shall be continuously held by some competent person capable of controlling such animal.

Moreover, FMR excludes dogs except along a 0.3 mile trail where leashes are required. Therefore, the County requests that the leash law BMP be removed from Table 6.3 and Section 6.6.2.

The County believes that implementation of a visual inspection program for dog waste in the unincorporated areas of the County is infeasible. The County will conduct a robust outreach effort in the watershed. This may include: engaging local dog walking groups; developing and distributing educational materials; developing a dog waste reduction toolkit for local residents; developing a webpage educating residents on the effects of picking up pet waste; and hosting local clean-up days. County staff are currently working on a work plan for these outreach efforts.

Moreover, the County will explore the feasibility of developing a dog waste ordinance that prohibits pet defecation upon public property unless the owner immediately removes the feces and properly disposes of it in trash receptacles. County staff have already conducted research on similar ordinances in other cities/counties and will work with local stakeholders, through community workshops and focus groups, to identify how to best implement and enforce an ordinance in the San Vicente Creek watershed. Violations of the ordinance may result in a citation and/or monetary fine. Details of the dog waste ordinance will be described in the San Vicente Creek Watershed BMP plan submitted by June 2017.

To the extent feasible, County staff will work with local residents and stakeholders to ensure that dog waste is being removed from the residential areas in the watershed using the aforementioned methods. However, at this time the County does not have available staff to regularly patrol and inspect the residential neighborhoods in the San Vicente Creek watershed for dog waste. The water quality monitoring program will assess the effectiveness of the BMPs implemented in the watershed and the additional proposed BMPs will further help control dog waste from residential areas and FMR. Therefore, the County suggests removing the visual inspection plan BMP from Table 6.3 and Section 6.6.2 of the Plan.

The County would like to note that ordinances, installation of signage, trash cans and dog waste bag dispensers and construction of structural stormwater BMPs (as outlined in Table 6.3 and Section 6.6.4) are subject to the review and approval by the California Coastal Commission.

Dog Use in FMR Park

The language in Section 5.4 (Dog Waste) of the Plan suggests that there are multiple trails within FMR open to dogs. The County would like to clarify that there is only one trail within FMR with dog access, which is the Coastal Trail. This 0.3 mile trail already contains trash cans at either end, signage on the trail for picking up dog waste and a dog waste bag dispenser; moreover, dogs on the trail are required to be on-leash at all times. The County suggests changing the language in Section 5.4 to reflect that only one hiking trail in FMR allows dogs and this trail already has on-leash requirements.

Microbial Source Tracking Study

Section 5.2 of the Plan (Microbial Source Tracking Study) states that:

Although the MST study calculated the magnitude, or proportion, of each genetic marker detected, we determined that due to method limitations discussed immediately below, the percentage of samples in which each genetic marker appeared provided a more accurate picture of the bacteria sources affecting the Creek. Therefore, prioritization and, by extension, implementation decisions reflect evidence that a source was contributing bacteria frequently, not that it contributed bacteria in a particular amount. (p. 28)

A 2010 publication by Wang et al. in *Water Research* explains the approach of quantitative MST to assign bacteria load sources quantitatively using statistical modeling. The model is validated with the *Bacteroidales* assays developed by Kildare et al. (2007) that were used by the researchers at the University of California Davis (UC Davis) for the MST study referenced in the Plan. This model could work for other *Bacteroidales* assays, but more validation would need to be done. The methodology used in the MST study has been shown to work for human, cow (now reclassified as ruminant) and dog markers. (Note the methodology was not applied for the horse marker because that marker was developed by another group.) Based on this publication, the County suggests prioritizing implementation tasks based on the quantitative contribution of the marker to the overall bacteria load.

Section 5.2 of the Plan also states that:

Because *Bacteroidales* markers are easily diluted in running water, may degrade over a short period of time, and appear in different concentrations in each host species (Griffith, et al. 2013), we determined that the data in the MST study did not provide a reliable long-term picture of each source's share of the total bacteria load. Therefore, this Staff Report focuses on detection frequency rather than the magnitude of particular genetic markers.

Researchers at UC Davis have done multiples studies on the decay of the *Bacteroidales* markers in water (Bae and Wuertz, 2009, 2012, 2015) and sediments (Kim and Wuertz 2015), which can be provided to your Board or Board staff. Based on the results of these studies, the County believes that that the MST study conducted in the watershed *can* reliably show each source's share of the total bacteria load. The County suggests that language in Section 5.2 of the Plan be amended (and citations added) to reflect these publications and that the implementation tasks in the Plan be prioritized based on the quantitative contribution of the marker to the overall bacteria load.

References to the studies cited above are as follows:

Bae, S. and Wuertz, S. (2009) Rapid decay of host-specific fecal *Bacteroidales* cells in seawater as measured by quantitative PCR with propidium monoazide. *Water Research* 43(19), 4850-4859.

Bae, S. and Wuertz, S. (2012) Survival of host-associated *Bacteroidales* cells and their relationship with *Enterococcus* spp., *Campylobacter jejuni*, *Salmonella enterica* Serovar Typhimurium, and Adenovirus in freshwater microcosms as measured by propidium monoazide-quantitative PCR. *Applied and Environmental Microbiology* 78(4), 922-932.

Bae, S. and Wuertz, S. (2015) Decay of host-associated *Bacteroidales* cells and DNA in continuous-flow freshwater and seawater microcosms of identical experimental design and temperature as measured by PMA-qPCR and qPCR. *Water Research* 70, 205-213.

Kildare, B.J., Leutenegger, C.M., McSwain, B.S., Bambic, D.G., Rajal, V.B. and Wuertz, S. (2007) 16S rRNA-based assays for quantitative detection of universal, human-, cow-, and dog-specific fecal *Bacteroidales*: A Bayesian approach. *Water Research* 41(16), 3701-3715.

Kim, M. and Wuertz, S. (2015) Survival and persistence of host-associated *Bacteroidales* cells and DNA in comparison with *Escherichia coli* and *Enterococcus* in freshwater sediments as quantified by PMA-qPCR and qPCR. *Water Research* 87, 182-192.

Wang, D., Silkie, S.S., Nelson, K.L. and Wuertz, S. (2010) Estimating true human and animal host source contribution in quantitative microbial source tracking using the Monte Carlo method. *Water Research* 44(16), 4760-4775.

Alternative Approaches and Future Considerations

Finally, please note that the County plans to implement cost-effective BMPs to control bacteria sources to San Vicente Creek, over a reasonable time period and to the extent practicable and feasible within available resources. If such efforts do not result in bacterial Basin Plan Water Quality Objectives (WQOs) being met in the creek, then the Regional Board may need to develop a Total Maximum Daily Load (TMDL) water quality restoration program. TMDL objectives (i.e., allocations) could be more applicable than the current strategy of attempting to directly meet WQOs, because the allocations of bacteria TMDLs in California typically allow for some exceedances of WQOs, based on using a reference watershed approach to account for natural uncontrollable sources of bacteria in the watershed (e.g., wildlife).

However, a weakness of these TMDLs is that the underlying WQOs were derived from epidemiological studies of people recreating at bathing beaches that received bacteriological contamination via treated human wastewater. Applying these WQOs in San Vicente Creek is not appropriate for two reasons: (1) the level of human exposure at this creek is presumably much lower than at a bathing beach; and (2) a substantial portion of the bacteria loading to the creek is likely related to fecal contamination from domestic animals (e.g., horses and dogs). In general, animal sources are associated with a lower human health risk than human sources. Thus TMDL allocations based on the Basin Plan WQOs may be overly conservative. Attempting to meet such allocations could result in unwarranted use of limited and finite public resources that could instead have been prioritized to address other pressing needs.

If TMDLs are established, the County would propose TMDL allocations that account for lower human exposure in San Vicente Creek and the potential predominance of non-wildlife animal sources over human sources in the watershed. One methodology would be to develop site-specific water quality criteria for San Vicente Creek using tools described in recent United States Environmental Protection Agency guidance, including epidemiological studies and quantitative microbial risk assessment.

However, development of site-specific criteria would be very time and resource-intensive. Identifying sources for the necessary funding would be extremely challenging and the County would appreciate the Regional Water Board's support (e.g., to secure grant funding) in that eventuality.

Thank you again for the opportunity to comment on this Plan.

Sincerely,

A handwritten signature in black ink, appearing to read "Danielle Lee". The signature is fluid and cursive, with a large initial "D" and "L".

Danielle Lee
Deputy Director
Office of Sustainability
County of San Mateo