

Appendix D

Response to Comments

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**Bacteria
in
San Pedro Creek and at Pacifica State Beach
Total Maximum Daily Load (TMDL)
Response to Comments**



**California Regional Water Quality Control Board
San Francisco Bay Region**

November 2012

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**San Pedro Creek and Pacifica State Beach Bacteria TMDL
Staff Response to Comments**

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PART I

**STAFF RESPONSE TO WRITTEN COMMENTS ON THE STAFF
REPORT AND PROPOSED BASIN PLAN AMENDMENT**

We received four comment letters during the public comment period, which closed on October 8, 2012. The comment letters and our responses are presented here in alphabetical order.

Comment letters received:

1. City of Pacifica (Stephen Rhodes)
2. County of San Mateo Department of Public Works and Parks (James Porter)
3. San Mateo County Water Pollution Prevention Program (Mathew Fabry)
4. United States Environmental Protection Agency (Janet Hashimoto)

Comment Letter No. 1: City of Pacifica

Comment 1.1a: “The City in conjunction with San Mateo County is concerned about being held responsible for all sources of bacteria to San Pedro Creek and Pacifica State Beach.... The proposed amendment states that “All permittees or entities that discharge indicator bacteria or have jurisdiction over such dischargers are collectively responsible for meeting these allocations.” This approach is unworkable for the City because the City and San Mateo County do not have control over all the sources.”

Staff disagrees. Multiple parties have responsibility for controlling sources of bacteria. The implementing parties include 1) the City, which is the permittee and the responsible party for sanitary sewer discharges, municipal stormwater runoff, and dry weather flows; 2) San Mateo County, which is the permittee and the responsible party for municipal stormwater runoff and dry weather flows; 3) the private home and business owners in the San Pedro Creek watershed, who are the responsible parties for the private portion of the sanitary sewer collection system (i.e., the private sewer laterals); and 4) the owners and operators of the existing or future horse facilities in the watershed, who are responsible for the discharges of horse waste from their facilities.

However, the City is responsible for other sources, in that it has jurisdiction over and ordinances in place to regulate discharges from the private sewer laterals and horse facilities within the City. The County may not have jurisdiction over private sewer laterals, but it also has an ordinance in place to regulate the horse facility that is located within County lands in the San Pedro Creek watershed.

In addition, the responsibility for meeting the TMDL allocations is collectively assigned to all permittees or entities that discharge bacteria or have jurisdiction over such discharges because, due to the combined nature of the sources, it isn't practical to determine separate allocations. This approach is consistent with that taken by other approved bacteria TMDLs in California.

Comment 1.1b: The commenter expresses concern that the WLAs include loads from wildlife, i.e., natural sources in the watershed, and that the City is being held responsible for these sources.

“This draft TMDL expresses WLAs as allowable exceedance days, which were calculated from the proposed exceedance rates. The exceedance rates were calculated based on single sample *E.coli* counts. EPA’s *Protocol for Developing Pathogen TMDLs* states “*E. coli* is one of the ubiquitous coliform members of the intestinal microflora of warm-blooded animals”. Thus, the exceedance rates do not indicate fecal contamination solely from humans, but also from other warm-blooded animals (many of which were identified in the San Pedro Creek Coalition report). The proposed amendment requires implementing controls for some of these animal sources of bacteria in the watershed (such as horse facilities) and does not require controls for others (such as birds, wild cats, and raccoons). The proposed amendment unfairly assigns responsibility to parties that do not have control over all the sources of bacteria loading.”

Staff disagrees. The wasteload allocations were derived specifically to account for natural sources of bacteria so that the City would *not* be held responsible for controlling bacteria discharges from wildlife. The TMDL is based on a “reference system and antidegradation approach” that uses the exceedance rates observed at an undeveloped reference catchment, with limited anthropogenic bacterial contributions to receiving waters, to determine an allowable number of exceedances of the bacteria objectives that are due to background sources. This approach essentially subtracts the number of exceedances of the bacteria objectives that are due to uncontrollable background sources, from the existing number of exceedances of the bacteria objectives in the impaired waters, so that responsible parties can focus their efforts on controlling bacteria contributions from controllable sources. This approach has been taken in at least a half dozen other bacteria TMDLs approved in California and is fully supported by the U.S. EPA.

Comment 1.2a: The Linkage Analysis does not show a connection between City-controlled sources and water quality. The Linkage Analysis should establish the relationship between the pollutant loadings from the identified sources and existing water quality. In particular, the linkage analysis does not show how reducing the pollutant loadings from stormwater runoff from point sources and nonpoint sources, and dry weather flows, will restore water quality to protect beneficial uses.

Staff disagrees. The linkage between the potential sources of bacteria in the watershed and existing water quality is established by using the findings and conclusions of the San Pedro Creek Watershed Coalition (Creek Coalition) Bacterial Source Tracking (BST) study (Creek Coalition 2008). The study found, in part, that water quality in the South Fork of San Pedro Creek, located within the San Pedro Valley County Park, did not exceed bacteriological water quality objectives. The South Fork catchment is undeveloped, except for modest improvements within the County Park. However, urbanized portions of the Creek had significant exceedances of bacteriological water quality objectives. This shows that anthropogenic sources of bacteria cause or contribute to exceedances in the Creek. This is consistent with data from the reference systems, which show much lower exceedances in undeveloped catchments, and urban runoff characterization work generally, which has found that storm sewer discharges can be significant contributors of bacteria to receiving water bodies. Please see also our responses to later sections of comment 1.2.

Comment 1.2b: “Since the City and County are being held responsible for the entire waste load allocations, a source analysis must show that stormwater runoff and dry weather flows conveyed through storm drains are the primary sources of elevated bacteria loading in San Pedro Creek and at Pacifica State Beach. The...San Pedro Creek Watershed Coalition Bacteria Analysis Project study...supports the possibility that storm drains must be contributing to bacteria loading, but does not concretely determine that stormwater drains are a major source.”

Staff disagrees. As noted above, the City and County are not being held solely responsible for the wasteload allocation. Further, the San Pedro Creek Watershed Coalition (Creek Coalition) Bacterial Source Tracking (BST) study concluded that “runoff from impervious surfaces is likely

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to be a significant cause [of bacteria input] during both wet and dry seasons.”¹ This conclusion is consistent with urban runoff characterization work generally, which has found that storm sewer discharges can be significant contributors of bacteria to receiving water bodies.² The commenter’s subsequent comment also notes the link between urban runoff and dry weather flows and elevated bacterial indicator densities.

Comment 1.2c: The commenter notes that four Southern California bacteria TMDLs that used the reference system approach cited numerous studies to support their linkage analysis, and an additional three Southern California bacteria TMDLs relied on information in the first four. The commenter states the Staff Report “...must clearly support linkage with scientific data before assigning responsibility to the City and...County for stormwater and dry weather runoff” and “...the proposed amendment incorrectly assumes that the reference system approach accounts for linking runoff to existing water quality.”

Staff disagrees. The proposed amendment does not assume that the reference system approach accounts for linking run-off to existing water quality. The Staff Report, instead, relies in part on the findings and conclusions of the Creek Coalition’s BST study to identify potential sources of bacteria in the San Pedro Creek watershed. The Staff Report also relies on the common knowledge that stormwater runoff and dry weather flows regularly discharge high numbers of bacteria (please see paragraph below). The identified potential anthropogenic sources of bacteria in the San Pedro Creek watershed are: sanitary sewer systems, horse facilities, and stormwater runoff and dry weather flows, which can transport bacteria from multitude of sources such as domesticated animals (e.g., dogs, cats, and horses waste), trash (e.g., dirty diapers), homeless encampments, cross connections of sanitary sewer lines to storm drains, and human sewage from sanitary sewer overflows and leaking sanitary sewer pipes.

In addition, field studies conducted to assess the coastal water quality impact of stormwater runoff from the Santa Ana River during the wet season showed that stormwater runoff from the river leads to fecal indicator bacteria concentrations exceeding water contact recreation water quality objectives by up to 500% in the immediate vicinity of the discharge.³ Mean dry season storm drain E.coli counts in urbanized Southern California waters were assessed in Ballona Creek and Los Angeles River and found to be 47,000 (MPN/100 mL and 21,000 MPN/100 mL for Ballona Creek and the Los Angeles River, respectively.⁴ These bacterial counts are more than 150 times higher than the applicable freshwater contact recreation standards. Bacterial counts from in-river and storm drain samples consistently and uniformly exceed water quality standards

¹ San Pedro Creek Watershed Coalition (Creek Coalition). 2008. Bacterial Analysis Project, Final Report. Pacifica, California.

² For example, Bhandaram, et al., 2011. “Effect of urban runoff on water quality indicators in Ballona Creek, CA.” UCLA. http://www.environment.ucla.edu/media_IOE/files/Effect-of-Urban-Runoff-ms-ncg.pdf and Burnhart, et al., ca.1991. “Sources of Bacteria in Wisconsin Stormwater.” Wisconsin DNR. <http://cws.msu.edu/documents/SourcesofBacteriainWISstormwater.pdf>

³ Ahn et al., 2005. Coastal Water Quality Impact of Stormwater Runoff from an Urban Watershed in Southern California. Environ. Sci. technol. 2005, 39, 5940-5953.

⁴ Sein, Eric D., Tiefenthaler, Liesl L. 2005. Dry-Weather Metals And Bacteria Loading In An Arid, Urban Watershed: Ballona Creek, California. Water, Air, and Soil Pollution (2005) 164: 367-382.

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in almost all locations surveyed in the study.⁴ Therefore, the linkage between stormwater runoff and dry weather flows and bacterial pollution is well established and commonly known.

Comment 1.2d: “...because some of the dry weather flow is currently being diverted to the wastewater treatment facility, storm drain flows may not be responsible for causing the exceedances of the bacteria water quality objectives. If dry weather storm sewer flows are not the cause of exceedances, requiring reductions in the number of exceedances for dry weather (a 93% reduction) will not result in meeting the allowable exceedance objectives. This lack of a linkage does not support a clear relationship between the exceedances in bacterial water quality objectives and the City’s stormwater runoff and dry weather flows.”

Staff disagrees. As the commenter states, only some of the catchment’s dry weather flows are being diverted to the wastewater treatment facility. In addition, the portion of the dry weather flows that is not captured and diverted to the wastewater treatment plant is discharged into the Creek directly, where it has the potential to cause or contribute to exceedances of bacteria objectives.

Further, there are other sources of bacteria that could be present during the dry season and cause or contribute to exceedances of bacteria objectives. These sources include: illicit sanitary sewer discharges to the Creek—for example, via a sanitary sewer line cross-connected to a portion of the storm drain system that drains directly to the Creek, or a sanitary sewer line plumbed directly to the Creek—leaking sanitary sewer laterals and lines, direct deposit of pet waste into the Creek or via street and sidewalk cleaning or washing by residents, and discharges of waste from homeless encampments near the Creek. These controllable anthropogenic sources each could be a significant source of bacteria that is not currently being completely controlled and could, therefore, cause or contribute to exceedances of bacterial objectives during dry weather.

Comment 1.3: “The existing Municipal Regional Permit is a very comprehensive stormwater management tool and is sufficient to satisfy City requirements. Because the City only has control over a limited number of sources, and because each of these sources is comprehensively covered in the Municipal Regional Stormwater NPDES Permit (MRP, Order No. R2-2009-0074), requirements in addition to the baseline MRP mandates are not warranted for the City. The City is in compliance with the MRP and is committed to implementing existing programs under the MRP as long as that mandate exists. The City believes that this approach would address the other comments in this document. See also changes to Table 10.2 after Comment No. 22.”

The TMDL Implementation Plan relies, and builds on, the MRP’s BMP-based approach as its model, focusing on activities the City is already implementing and additional BMPs that will be implemented. Section C.1 of the existing MRP states that when discharges are causing or contributing to an exceedance of an applicable water quality standard, the permittee(s) shall submit a report to the Water Board that describes the best management practices that are currently being implemented, and additional best management practices that will be implemented to prevent or reduce the discharge of pollutants that are causing or contributing to the

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exceedance.⁵ As such, the City is already required under the MRP to complete actions, in addition to “baseline” MRP requirements, sufficient to resolve the identified impairments. The proposed TMDL Implementation Plan applies this existing MRP requirement calling for iterative improvements to existing BMPs within ensuing permit terms.

Comment 1.4: “The City should not have to report the efforts of horse management in the Watershed.”

The City plans to continue to enforce the local ordinances for the horse facilities; however, these facilities will be covered under a reissued Regional Water Board permit. Thus, the Regional Water Board will already be receiving information from the horse facilities that details the facilities’ efforts, so the City should not have to conduct additional reporting. This reporting would be extra work for the City and there is no funding to do it.

Staff disagrees. The required reporting is similar to the kind of reporting required of the City by the MRP for industrial and commercial facilities, and the City’s role is similar: to complete day-to-day oversight, with recourse to the Water Board when a recalcitrant facility operator or owner will not timely address water quality problems. Because the City is already overseeing the two horse boarding facilities within City limits, and because it is already inspecting and reporting on its oversight of other commercial and industrial facilities as a part of the stormwater program, the additional burden imposed by adding reporting on the two horse boarding facilities to the existing reporting is small.

Further, we note that the Water Board is currently overseeing one of the two facilities, Millwood Ranch, under an enforcement order. That oversight is the result of significant problem discharges from and other unpermitted work at the facility. The duration of those problem discharges could have been curtailed much sooner, had there been better communication of the problems between the City and Water Board. The required reporting will facilitate that communication in the future.

We recognize that staff resources are limited at both the City and Water Board. Thus, the TMDL proposes a combination of reporting and oversight by the City and backup oversight by the Water Board, modeled on the existing MRP approach, to ensure adequate oversight and control of potential discharges of waste from the horse facilities in the San Pedro Creek watershed.

Comment 1.5: “Existing data and information does not support the allegation that leaking sewer lines are a significant source of bacteria loading. ...if the sewer lines are leaking, the leak would steadily contribute to bacteria counts; in other words, the recorded bacteria counts on page 15 of the Staff Report would be much more consistent. Furthermore, because wet weather flows effectively dilute wastewater in the sewer system, leaking sewer lines would contribute less to the wet season bacteria count than the dry season bacteria count, but the bacteria count results do not reflect this pattern. The dry season counts are

⁵ San Francisco Bay Regional Water Quality Control Board (Water Board). 2011. Municipal Regional Stormwater NPDES Permit No. CAS612008. Oakland, California. Available online at: http://www.swrcb.ca.gov/rwqcb2/water_issues/programs/stormwater/Municipal/R2-2009-0074_Revised.pdf

not significantly more than or less than the wet season count, so there is no technical link that supports the statement that human inputs are from sewers.

The Staff Report (Section 4.4.2 and Section 7.2) provided data and information to support the conclusion that discharges from sanitary sewers are a source of bacteria. It summarizes the findings of 2006 Creek Coalition's BST study report, which identifies leaking sewer lines as a bacteria source.

Separately, leaking sewer lines are not the only source of bacteria present in the watershed. Other sources, such as stormwater runoff and dry weather flows, sanitary sewer overflows, discharges from horse facilities, pet waste, and contributions from background sources (e.g., wildlife) could be present along with discharges from leaking sewer lines. These sources can respond differently or similarly to environmental factors such as rainfall (e.g., the volume of sanitary sewer discharges may increase during a rainstorm, but discharge at lower bacterial densities, and stormwater runoff discharges will be increased, but bacterial densities may depend on antecedent rainfall conditions or the intensity of a given storm). Due to the combined and overlapping nature of bacteria sources in the watershed, it is impractical to isolate the individual impacts from and the corresponding water quality response to each of these sources by simply looking at existing water quality data.

Staff has relied on findings from the bacterial source tracking study, conducted in 2006 by the San Pedro Creek Watershed Coalition, to identify leaking sewer laterals as a potential source of bacteria in the watershed. Section 7.2 of the Staff Report states:

...the 2006 San Pedro Creek bacterial source tracking study concluded that "human inputs are no doubt from leaking sewer lines, and...greatly increase downstream. ...so the places to focus efforts are in downstream neighborhoods where laterals are old and poorly constructed" (Creek Coalition 2008). Per the Creek Coalition's report, the sewer laterals in the older neighborhoods of the lower San Pedro Creek Valley are constructed of tarpaper-like materials that are more than 50 years old, have long exceeded their life expectancy, and are known to be leaking sewage into San Pedro Creek (Creek Coalition 2008).

Further, as summarized in the Staff Report, the sanitary sewer overflow data reported by the City indicates that from May 1, 2007, to January 20, 2011, 94 sanitary sewer overflows with a total volume of 125,356 gallons occurred in Pacifica. Of this amount, a reported 110,340 gallons of wastewater reached surface waters. This self-reported sanitary sewer overflow data provides evidence that waste discharges from the City's sanitary sewer system, even separate from potential discharges from broken tarpaper-like laterals, broken or leaking sewer lines, or illicit cross-connections with the storm drain system, are a potential source of bacteria in the San Pedro Creek watershed and need to be controlled.

Comment 1.6a: Special studies should be performed before the TMDL implementation, not after. The draft Staff Report specifies that responsible parties "may conduct special studies designed to help refine allocations and/or assist with TMDL implementation." ...such special studies should be performed before assigning WLAs in order to make

informed decisions about how to implement the TMDL. ...it would waste time and resources attempting to implement measures to meet likely unachievable goals in the proposed TMDL.

Staff disagrees. The Water Board is mandated to develop and implement TMDLs to restore water quality and protect public health in a timely fashion. Due to the complexities of TMDLs, rarely is all relevant or desired information available at the time of a TMDL's development and adoption. As such, a common practice by Water Board staff is to develop and propose TMDLs based on the best information available. The long timeframe proposed to meet the TMDL's allocations, which spans from 8 to 15 years, allows sufficient time for the responsible parties to implement corrective actions, gather additional information (e.g., from water quality monitoring), and refine and focus their implementation actions so that their efficiency and effectiveness have been maximized.

Comment 1.6b: "...the City does not have funding to conduct these additional studies and should not be held responsible for conducting these studies that are the responsibility of the Regional Water Board."

Comment noted. The TMDL does not require the City to complete special studies to refine the TMDL allocations or assist with TMDL implementation. Because the TMDL does not require or mandate special studies, the reference to special studies has been deleted from the Staff Report and proposed Basin Plan amendment. The City may conduct such studies on its own initiative. An example of when it may make sense to conduct such a study is when future monitoring data suggest such work would provide particular focus to implementation actions.

Comment 1.7: The commenter states that many of the CEQA statements conflict with the TMDL implementation program, noting that construction of some BMPs, such as large cisterns, diversion structures, pump stations, or regional treatment facilities "...will create major physical changes that would adversely impact the aesthetic environment, at a minimum," and that those changes "...are not reflected in the [CEQA] analysis."

Staff disagrees. Local rainwater capture systems are usually small to moderate in size (e.g., 10,000 gallons or less) and can be installed above or below ground. Therefore, their aesthetic impact is not believed to trigger the "aesthetic" threshold for significant impact. Further, staff believes that significant implementation of large regional treatment systems is unlikely, due to limited available open space in the San Pedro Creek watershed and the presence of existing capture and diversion systems near the Beach—the location most likely for a regional treatment system.

In addition, as stated in the regulatory analysis (CEQA analysis) section (Section 12) of the Staff Report, the water quality regulatory framework and existing Water Board orders and other local, regional, and statewide regulations that are currently in effect will result in many actions that reduce bacteria loading. These actions would occur with or without the TMDL, and, thus, inform the baseline for CEQA analysis.

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Lastly, all construction projects within the City of Pacifica must comply with local building, grading, and other requirements of the municipal code. Any construction activities undertaken in San Mateo County's jurisdiction must comply with applicable County regulations. As such, any potential structural BMP projects would be required to comply with CEQA if and when they are actually undertaken. The environmental review completed as a part of the Staff Report appropriately considers the potential impacts of those projects that are likely under the TMDL.

Comment 1.8: The commenter states the Staff Report should recognize that the City has already installed major stormwater BMPs that go above and beyond the MRP. These BMPs include two pump stations that divert dry weather flows to the Calera Creek Water Recycling Plant during dry weather, and a portion of stormwater runoff during wet weather. "...few other communities, if any, in the entire San Francisco Bay Area are diverting any kind of stormwater to sanitary sewer wastewater treatment plants. (...) [t]he MRP...does not...require stormwater diversions."

Staff agrees, and we support the City's efforts to reduce pollution via diversion of dry weather flows to the wastewater treatment plant. The draft Staff Report includes details about these efforts in Section 7.3, which states:

Pacifica operates two stormwater pump stations, Anza and Linda Mar, which are located adjacent to Pacifica State Beach. ...In the wet season, Pacifica first tries to divert as much of the stormwater runoff as it can to its wastewater treatment plant for treatment and subsequent discharge. However, due to limited capacity at the treatment facility, the City can only divert a small amount of the overall runoff volume—approximately 5 percent, on average.

During the dry season, dry weather flows are stored at each pump station in sumps with capacities of 62,000 and 43,000 gallons, respectively. The stored dry weather flows are routinely pumped to the wastewater treatment plant for treatment and subsequent discharge to Calera Creek. The City has also installed irrigation pumps at both stations so that during dry weather months a portion of the dry weather flows can be pumped onto the adjacent constructed vegetated swales to reduce the amount of stored dry weather flows. Despite these measures, occasionally the sumps run out of room and need to be emptied. At that point, the stored dry weather flows are discharged onto the adjacent Pacifica State Beach. Dry weather discharge events to the Beach occur very rarely at the Linda Mar station and at an average frequency of less than once per month at the Anza station. Pacifica is currently in the process of obtaining a larger transfer pump for the Anza station so that, like the Linda Mar station, almost all of the stored dry weather flows at that station can be diverted to the wastewater treatment plant for treatment prior to being discharged to the Calera Creek (City of Pacifica staff 2012).

Comment 1.9: The commenter states the economic analysis does not consider the City finances needed to support the suggested BMPs, and notes it has reduced funding for items including, but not limited to, its public library, visitor center, and public access television channel.

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“There is a lack of funds available to the City’s Stormwater Compliance program. Currently, a fraction of property taxes in Pacifica funds the program to handle storm drainage issues and maintenance, such as street sweeping and storm drain cleaning.

“Due to Proposition 218...the City has had difficulty raising additional funding for stormwater activities. For example, in May 2009, the City proposed *Pacifica Sales Tax, Measure D*, which proposed a one-cent sales tax in Pacifica that would have expired in 2016. A portion of this sales tax would have contributed to protecting local coastal areas and beaches from polluted runoff and trash. This measure failed at the ballot box.”

Staff recognizes the current challenging fiscal situation, including the limits imposed by Propositions 13 and 218. The CEQA guidelines require the Water Board to “take into account a reasonable range of economic factors,” and Section 12 of the Staff Report includes a consideration of economic factors.

The Water Board’s role is to resolve the existing water quality impairment in San Pedro Creek and at Pacifica State Beach. In doing so, the TMDL has been designed to focus on already-required implementation actions, actions already underway, and actions and a schedule that the City will propose, in order to resolve the impairment in as efficient a manner as possible, with the minimum necessary expenditure of public funds.

Comment 1.10: The commenter states the economic analysis significantly underestimates the costs of capital and operations and the maintenance costs of structural BMPs. The commenter provides information on two BMPs it installed within the City, noting “[t]hese two examples show that the economic analysis in the proposed TMDL significantly underestimates the actual costs of the structural BMPs.”

Staff has included information about the City’s cost estimates for structural BMPs, however, information that would allow us to understand the actual costs, such as contributing catchment size and BMP area, were not provided, so the information is of limited value with respect to projecting potential costs for this TMDL.

However, staff has revised the cost estimates for some structural stormwater BMPs to include information that describes the likely range of costs. Additionally, we obtained additional cost information from recently-constructed projects in Portland, Oregon, which we have summarized and included in Section 12.3 of the Staff Report.

Comment 1.11: Economic considerations must include land acquisition costs.

“Because Pacifica is about 95% developed within the developable area, the cost of land can greatly increase the capital costs of structural controls. By excluding the land acquisition costs, the economic analysis is further underestimating the actual costs of these systems.

“Land in Pacifica is approximately \$900,000 per acre at the present time, based on current prices for several available lots in the developed areas in Pacifica. The value is the cost of acquiring developed land, because building stormwater facilities will occur in a developed area.

“(…)land acquisition is required for many of the suggested structural stormwater BMPs (pages 56-59), such as diversion structures for media filtration treatment systems, transfer pumps stations, and other structural BMPs....”

Staff disagrees. Implementation of future structural stormwater BMPs is likely to be limited to available City-owned undeveloped lands, modification of existing City facilities (e.g., existing pump stations), or other practical and cost-allowing measures, including requiring private property owners to incorporate measures during new development and significant redevelopment projects, as is already required by MRP section C.3 and associated City requirements.

As noted by the City, the high cost of acquiring land makes it much more likely that the City would choose to implement BMPs on land it already owns or controls, to the extent such BMPs are needed. The Staff Report identifies BMPs, such as bioretention cells, that are regularly implemented in existing public rights of way.

Comment 1.12: “The Staff Report significantly underestimates the cost of water quality monitoring. The economic analysis omits many costs associated with sampling at five different reaches of San Pedro Creek. The City estimates a more complete annual cost for monitoring activities is \$95,400, assuming samples are collected 5 times per month at 5 monitoring locations.”

The City also provided a detailed assessment of these costs as part of its comment.

Staff disagrees. The level of water quality monitoring that the City is concerned about is only appropriate for the San Pedro Creek mouth station and the Pacifica Beach station. This is the weekly monitoring that is needed to evaluate achievement of the proposed allocations and is already being conducted by the San Mateo County Environmental Health Department. This sampling and the associated costs do not represent a new requirement under this TMDL.

The additional sampling of San Pedro Creek does not need to be conducted on a weekly basis. The frequency and length of additional monitoring are left to the implementing parties to propose based on what would provide them with the most-useful information for effective and efficient implementation of corrective measures. To clarify this, we revised the monitoring discussion in the Monitoring Cost Estimate Section of Section 12.3.32 and Table 12.3 of the Staff Report and revised the cost estimate for a potential water quality monitoring plan to account for the cost categories provided by the City.

We have also discussed this issue with the City and advised them that, at a minimum, we would expect ten samples per year (one month of sampling in both the wet and dry seasons) at a few locations in the San Pedro Creek Watershed, collected by the City and/or the County. We also found that the City’s cost estimates may be greater than the cost the City is likely to incur for TMDL monitoring. Staff obtained cost estimates from a local lab in San Francisco, CEL Analytical Laboratories, that could lower the City’s costs, and provided that information to the City. In addition, many of the monitoring activities can be completed by City staff at low

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incremental cost to the City. These include collecting and transporting the samples and reviewing and analyzing the data.

Comment 1.13: The City does not have funding to monitor San Pedro Creek and the City should not be responsible for this monitoring. The City is complying with the MRP's existing requirements, but cannot take on a new monitoring program. The City does not have the necessary expertise. Monitoring should be conducted by the Regional Water Board or another party.

Staff disagrees. The water quality monitoring proposed in the Staff Report is, to some extent, already required under the MRP, under which the City and County are permittees. Further, as explained in our response to comment 1.12, the actual cost of an effective and efficient water quality monitoring program is likely to be significantly lower than the City's estimate.

As the responsible parties for the main controllable sources of bacteria in the watershed, the City and County are in the best position to conduct the proposed water quality monitoring because they should know what monitoring would help them best to effectively and efficiently implement the appropriate corrective measures.

Further, while City and County staff may not have all the expertise required to conduct all aspects of such monitoring in-house, they should be able to conduct the majority of the tasks related to monitoring without incurring significant additional cost. We note that City staff at its wastewater treatment plant have expertise in pathogen monitoring and analysis. The monitoring-related tasks that could be completed by City or County staff include: collecting samples, transporting samples to the lab, reviewing laboratory reports, interacting with the laboratory, analyzing results, and reporting results.

Water Board staff's intention for TMDL implementation is to work with the responsible parties to gather the minimum necessary water quality data to efficiently implement and evaluate the performance of the corrective implementation measures. The TMDL allows for this by allowing the responsible parties to develop and propose their own monitoring plans sufficient to address TMDL requirements.

Comment 1.14a: "Compliance is not achievable with the proposed numeric targets. The San Pedro Creek watershed is a developed watershed, with domestic animals, as well as wild animals that are attracted to developed areas (such as raccoons, skunks, and opossums). There is also a large bird population in and around the City. While public outreach can have some effect on the magnitude of domestic animals' bacterial loadings, the City simply cannot control all sources, certainly not to the degree suggested in the proposed TMDL."

Staff disagrees that the TMDL requires the City to control "all sources" of bacteria. The City is only required to control the sources of bacteria over which they have control and jurisdiction, such as: stormwater runoff and dry weather flows from municipal storm drains and the City-owned portion of its sanitary sewer collection system. See also our response to comments 1.1

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and 1.2, above. Regarding the achievability of the proposed numeric targets, see our response to comment 1.14c, below.

Comment 1.14b: The commenter states that Calera Creek, in an adjacent watershed, has low bacteria densities upstream of the City’s wastewater treatment plant. These densities are diluted by treatment plant effluent, but then increase again downstream, as the creek flows towards the Pacific Ocean. “...natural sources of bacteria loading in the undeveloped area around Calera Creek are causing the increases in bacteria counts....”

Staff agrees that bacteria from non-anthropogenic sources in the San Pedro Creek watershed, including undeveloped open space, likely contribute to exceedances of bacteria objectives. The “reference system and antidegradation approach” is intended to subtract contributions from these natural sources of bacteria, such that the corrective efforts are focused on the remaining, controllable, sources of bacteria.

Further, the restored reaches of creek and the constructed wetland downstream of the wastewater treatment plant, to which the plant effluent is being discharged, are not comparable to the situation in the San Pedro Creek watershed. The reach of Calera Creek below the treatment plant has been designed and constructed as a wetland to receive effluent discharges from the treatment plant. As a result, this reach of Calera Creek may attract wildlife at unusually high numbers as compared to San Pedro Creek. That is, staff agrees that non-anthropogenic sources of bacteria are a likely explanation for the presence of increasing bacteria densities below the wastewater treatment plant at a specific location in a nearby catchment.

Comment 1.14c: “The TMDL’s targets are not achievable because “...the natural, undeveloped area in the Pacifica region contributes considerably to bacteria loading. And even if the City installs many of the BMPs to control stormwater runoff and dry-weather flows in San Pedro Creek, the natural sources of bacteria in the region will most likely cause exceedances in the applicable water quality objectives.”

Staff agrees that natural sources of bacteria in the region are likely to cause exceedances of applicable water quality objectives. That is why the TMDL is based on a “reference system and antidegradation approach” to estimate the likely number of such exceedances, and subtract it from the total number of existing bacteria objective exceedances to establish the TMDL’s numeric targets.

Staff disagrees with the statement that the TMDL’s targets are not achievable. There is no evidence at this time that, with the implementation of appropriate corrective actions, the TMDL’s targets, including the allowable exceedances due to background sources, will not be achieved in the future. Further, we note that the measurable compliance standard for compliance with the TMDL is implementation of corrective actions, the vast majority of which are already required and being implemented in the watershed.

The reference system and antidegradation approach is intended to account for uncontrollable background sources. We agree that, without fully implementing corrective actions, it is impossible to know with certainty exactly what is achievable. However, the TMDL addresses

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this issue. Should there be a future determination that the TMDL's targets need to be adjusted, that will be considered as part of adaptive implementation of the TMDL.

Comment 1.15: The draft Staff Report does not justify why applying the proposed Southern California freshwater reference system is appropriate for San Pedro Creek.

“... just because the exceedance rate percentages are applied in Southern California does not mean they are appropriate, or even realistic, for Pacifica. Numerous factors affecting bacteria loading in Northern California and Southern California are substantially different and the staff report is introducing a large degree of uncertainty by assuming that the Southern California reference systems are appropriate for San Pedro Creek. The City requests more justification for why a Southern California reference system can be applicable in the San Pedro Creek watershed.”

The background exceedance rates (due to uncontrollable background sources such as wildlife) used for San Pedro Creek were calculated by averaging the exceedance rates observed at 38 different natural streams in Southern California coastal watersheds. This same approach has been used by at least two other bacteria TMDLs in the Los Angeles Region and has been determined as an appropriate freshwater reference system approach for all future freshwater bacteria TMDLs in that Region.

Averaging this large number of observations from all major geologic and natural land cover settings is likely to result in the evening out of any effect on water quality due to variable factors such as watershed size, land use distribution, soils, topography, and geology. Therefore, staff asserts that using an average number for background exceedances from this large dataset is an appropriate approach for determining the allowable number of exceedances of freshwater bacteria objectives due to uncontrollable background sources in San Pedro Creek.

The use of an existing reference system from Southern California was recommended to Water Board staff and supported by U.S.EPA and State Water Board staff. There is no clear evidence that applying a Southern California reference system is over-protective. The alternative approach to applying a reference system and antidegradation approach would be to develop targets and allocations based strictly on the Basin Plan bacteriological water quality objectives, without consideration of natural background. Staff believes that approach would put the City in the position of trying to control natural background sources of bacteria, and that is why this TMDL uses the reference system and antidegradation approach instead.

Comment 1.16a: Leo Carrillo Beach, in Southern California, is not an appropriate reference system for Pacifica State Beach because it “...has a very different land use distribution. The Leo Carrillo State Beach and its associated drainage Arroyo Sequit Canyon consist of 98% open space, whereas Pacifica State Beach and its associated watershed is 50% developed. Further, field surveys have confirmed that there is little evidence of anthropogenic impact in most [of the Leo Carrillo State Beach catchment].”

The main purpose of using a reference system is to identify and subtract exceedances of water quality objectives that are due to uncontrollable background sources from undeveloped areas. To

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accomplish that, one needs to identify and use a reference system with no or limited anthropogenic impacts. Leo Carrillo State Beach, the catchment of which is 98% undeveloped open space and shows limited anthropogenic impact, is an appropriate reference system for Pacifica State Beach.

Comment 1.16b: Leo Carrillo State Beach is not an appropriate reference system because its rainfall patterns are different from those in Pacifica. “Regional Water Board staff state that even though storm sizes are not comparable, the rainfall runoff transport systems are comparable; however, no justification is provided for how transport systems could be comparable. Without this information it seems unlikely that the transport systems are comparable because storm intensity is important in transport characteristics.”

Staff disagrees. The commenter did not submit evidence or analyses demonstrating a significant difference in storm intensity between Southern and Northern California, and that such a difference, if present, would make use of a Southern California reference system inappropriate. Staff considered this issue during development of the proposed TMDL. Staff considered, in part, hourly rainfall intensity in Northern and Southern California, as shown in the 2003 CASQA BMP Handbook for New Development and Redevelopment, Appendix D.⁶ Comparison of the Los Angeles Airport and Oakland Airport gages suggests that Northern California has a slightly lower frequency of storms with an hourly intensity below 0.05 inches per hour, which make up about 65% of all storms, and a modestly higher frequency of storms with an intensity above 0.05 inches per hour. For example, an hourly intensity of 0.20 inches per hour is about a 96th-percentile storm at the Los Angeles Airport, but about a 93rd-percentile storm at the Oakland Airport. Staff does not believe these differences are significant enough to render the two catchments incomparable over the number of storms that occurs each year, as suggested by the commenter. The San Pedro Creek watershed’s topography and size are similar to Leo Carrillo’s, so orographic and topographic effects are likely to be similar. The San Pedro Creek watershed sees variable amounts of rain, with significantly greater amounts in the upper watershed and lesser amounts at the Beach. The typical number of annual precipitation events is greater in the San Pedro Creek watershed than in coastal Southern California, but that has been accounted for as described in section 8 of the Staff Report. See also responses to comment 16a above.

Comment 1.16c: “It is unrealistic that a developed watershed should attain the water quality of an undeveloped watershed.”

Staff disagrees. The Water Board’s mandate is to protect and restore water quality to established water quality standards, ensuring the protection of beneficial uses. The TMDL requires actions to address the portion of water quality impairment that is due to anthropogenic activities, using the appropriate water quality objective for the REC-1 beneficial use. While an undeveloped watershed was used to estimate the background contribution of bacteria, the TMDL requires compliance with the water quality objective, not that the San Pedro Creek watershed meet the water quality of the reference system watershed.

⁶ California Stormwater Quality Association (CASQA). 2003. California Stormwater BMP Handbook: New Development and Redevelopment. January 2003.

Comment 1.17.a: The animal sources of bacteria loading in the San Pedro Creek watershed are not comparable to the reference watersheds.

“While the reference system is supposed to account for uncontrollable sources, there is a tremendous amount of uncertainty in whether the reference system is comparable. For example, the fraction of developed land in the San Pedro Creek watershed is not the same as the fraction in the freshwater reference systems.”

Staff agrees that the fractions of developed land in the San Pedro Creek watershed and the freshwater reference system are not the same. This is appropriate. In order for the reference system approach to work, the reference systems should represent relatively undeveloped catchments that have limited anthropogenic bacteria contributions. That is necessary to identify the amount of bacteria objective exceedances that can be attributed to uncontrollable background sources (e.g., wildlife), as a reference system approach intends to do. As such, one of the main criteria for selection of a reference system is that only 5% or less of its land should be developed.

Comment 1.17b: “The diversity, and species distribution, of domestic and wild animals depends on the amount of undeveloped and developed land in a watershed. Hence, the animal populations in the two watersheds likely vary significantly due to this difference in development.”

Staff agrees that the relative makeup of domestic and wild animals may differ between the reference system and San Pedro Creek watersheds. Bacteria contributions from domestic animals are considered a controllable source and the TMDL does not allow any exceedances of bacteria objectives for controllable sources. Therefore, their contribution and population number is not relevant to the reference system approach, which intends to account only for contributions from the uncontrollable sources of bacteria (e.g., wild animals).

The make-up of wild animal species and their population in either the reference systems or the San Pedro Creek watershed is not known. If the reference watershed with very little developed land contains a larger population of wild animals, that would likely result in higher exceedances of the bacteria objectives due to wildlife (background sources) and would allow for higher exceedances at the San Pedro Creek watershed. Due to lack of data, that determination cannot be made.

At this time, the existing reference system and antidegradation approach is the best available option to account for the contributions from uncontrollable background sources of bacteria. In the absence of such approach, the only other option would be to strictly apply the existing bacteria objectives from the Basin Plan without allowing any exceedances of those objectives due to contributions from uncontrollable background sources.

Comment 1.17c: “In the San Pedro watershed, avian, canine, wildlife, and other types of warm-blooded animals are major sources of bacteria loading.”

Staff disagrees. While the sources stated by the commenter may be prevalent in the San Pedro Creek watershed, their relative contribution to bacterial loading in the watershed is not known.

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Comment 1.17d: “In the reference watershed, the animal sources may be significantly different from those in the San Pedro Creek. The draft Staff Report does not provide any information about how the differences in wild animal populations are accounted for in the reference system approach.”

See our responses to Comments 1.17a and 1.17b.

Comment 1.18: The City requests one or more milestones in the Implementation Plan for the Regional Board to re-evaluate the reference system approach.

Both of the LARWQCB bacteria TMDLs that developed the two reference systems (the LA River Watershed Bacteria TMDLs and the Santa Monica Bay Beaches TMDL) include a milestone that requires the LARWQCB to reconsider the TMDL. Regional Water Board staff are under the impression that scoping and studies to identify and analyze an appropriate bacteria TMDL reference system for the San Francisco Bay Area will be performed in the next several years. Thus, the City feels it is appropriate for the Regional Water Board to reconsider this TMDL to reflect technical studies and/or policy changes that occur after the approval of this TMDL.

Staff disagrees that additional milestones are needed. However, the “adaptive implementation” Section 7.4.1.8 of the Basin Plan amendment, which already includes language regarding review of new data and other information, has been revised to more clearly indicate likely instances when it would be appropriate to consider review and adaptive implementation of the TMDL as follows:

The Water Board will adapt the TMDL and implementation plan to incorporate new and relevant scientific information such that effective and efficient measures can be taken to achieve the allocations. The Water Board staff will periodically, in coordination with the implementation schedule, at 5, 8 and 15 years, evaluate new and relevant information from implementation actions, water quality monitoring results, and the scientific literature, including any local reference system studies, U.S.EPA’s revised recommended bacteria, or new or revised State bacteria water quality objectives, and assess progress toward attaining TMDL targets and load allocations and present that information to the Water Board. The Water Board staff will also evaluate new and relevant information from special studies and scientific literature including any local reference system studies, or U.S.EPA’s revised recommended bacteria criteria. The Water Board will consider a Basin Plan amendment that reflects any necessary modifications to the targets or implementation plan. will be incorporated into the Basin Plan via an amendment process.

Comment 1.19: The compliance deadlines for allowable exceedances should be revised to 12 years for Pacifica State Beach and 20 years for San Pedro Creek.

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The City is aware that the 8 and 12 year deadlines were chosen because they would both potentially come after the required January 1, 2020 deadline to achieve full compliance with Prohibitions C.1 and C.2 of the Sanitary Sewer Order, which prohibit any sanitary sewer overflow that results in a discharge of untreated or partially treated wastewater to waters of the United States. However, as stated in Comment No. 5, there is no clear evidence that sewers are the source water quality objective exceedances for bacteria.

The City requests that the deadlines for compliance with allowable exceedances be revised to 12 years (Pacifica State Beach) and 20 years (San Pedro Creek) to allow time for the current activities to have some effect. For example with the newly enacted private sewer lateral ordinance, it will take approximately 30 years for close to full property turnover to occur.

Staff disagrees with the request to extend the deadline for compliance with the allowable exceedances for Pacifica State Beach. Eight years is an adequate amount of time to reduce the number of exceedances of bacteria objectives at Pacifica State Beach by only one, as required by the TMDL. A reduction by one exceedance, to zero from one during the dry season, means that no weekly sampling events at the Beach during the dry season would exceed single-sample bacteriological water quality objectives.

Staff agrees to extend the proposed deadline for compliance with the allowable exceedances for San Pedro Creek to 15 years to account for the much larger needed reduction in the number of exceedances in the Creek. This will also allow for compliance to be completed over three full 5-year cycles of the City's and County's NPDES municipal stormwater permit. The implementation schedule in the Staff Report (Section 10) and Basin Plan amendment have been revised accordingly.

Comment 1.20: If the City is required to conduct water quality monitoring in San Pedro Creek despite a lack of funds to do so, the City will significantly reduce the monitoring scheme and must have additional time to submit the plan. The commenter asks that the deadline be revised to June 2014.

Staff agrees to extend the proposed deadline for the submittal of a comprehensive bacteria water quality monitoring plan to June 2014, as proposed by the commenter, so the City can budget for this activity. This should allow the monitoring plan to be incorporated into the next MRP when it is reissued.

As for the frequency and other specifics of the proposed water quality monitoring plan, as noted in the response to comment 1.12, staff intends to work with the City to develop and implement an effective and efficient monitoring plan with adequate sites and frequencies that help inform and focus the implementation of appropriate corrective measures.

Comment 1.21: The City requests more specificity in the Staff Report that the specific WLAs will not be included in a future-reissued MRP as enforceable numeric limits.

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Based on correspondence with Regional Water Board staff, the City understands that only specific BMP-type activities would be required in the MRP (based on a work plan developed by the City), not numbers related to the WLAs.

The City requests that this approach be discussed more explicitly in the Basin Plan amendment. (...) The Staff Report and Basin Plan amendment must state that the WLAs or related numeric limits will not be enforced. In addition, the City should not be required to continue to ratchet down the bacteria levels beyond existing programs, due to the *significant* uncertainty inherent in the development of the WLAs.

Staff has revised the proposed Basin Plan amendment, Section 7.4.1.6 to make it clear that the TMDL wasteload allocations will be implemented in future permits via narrative requirements requiring implementation of BMPs, and not as numeric effluent limits.

Regarding the comment that the City should not be required to take actions beyond “existing programs,” see our response to comment 1.3.

Comment 1.22: “The existing MRP annual reporting should be sufficient for reporting on TMDL activities. The City should not have to conduct additional, separate monitoring for the TMDL. Significant reporting is already occurring in the Annual MRP Report and this reporting should be sufficient.”

We disagree that the City may not have to complete monitoring and reporting specific to the TMDL. The existing MRP annual reporting does not account for bacteria pollution prevention and control actions. However, simple improvements and modifications of the existing annual reporting should be sufficient. Also, see our response to comment 1.3.

Comment 1.23: “The City requests an opportunity to review a revised draft Staff Report and Basin Plan amendment with a minimum 2-week review period prior to adoption.”

Staff met with City staff on October 23, 2012, following our receipt of the City’s comments, to discuss our response and proposed modifications to the TMDL. Also, a revised Staff Report and proposed Basin Plan amendment and this Response to Comments document will be available for public review no later than one week prior to the November 2012 Water Board hearing.

Comment Letter No. 2: County of San Mateo Department of Public Works and Parks

Comment 2.1: The commenter provided information on the number of acres of open space/undeveloped parcels that are owned by public agencies in the San Pedro Creek Watershed to demonstrate the limited potential for anthropogenic sources of bacteria from unincorporated lands within the County's jurisdiction. They asked for more detail to be added to section 2.2 of the Staff Report.

According to County calculations, the San Pedro Creek watershed is approximately 5,275 acres, (compared to a figure of 5,114 acres as stated in the subject report), of which approximately 2,200 acres are located in unincorporated San Mateo County. Within the unincorporated County portion, approximately 85% of lands are large open space/undeveloped parcels owned by public agencies, including San Mateo County, City of Pacifica, City and County of San Francisco Water Department (SFPUC), State of California, and North Coast County Water District. Land use within these areas is park (McNee Ranch State Park, San Pedro Valley County Park, and Golden Gate National Recreation Area) and public utility/water supply (public access in these areas is generally restricted). The remaining 15% of the unincorporated area within the watershed is privately owned..... There are no County-maintained roads or storm drains, nor any urban or residential development within the unincorporated portion of the watershed.

Staff agrees with the commenter and has revised Section 2.2 of the Staff Report to provide a better understanding of the limited potential for anthropogenic bacterial source contributions from unincorporated lands within the County's jurisdiction.

Comment 2.2: The commenter provided information on Shamrock Ranch, a horse boarding facility located in the unincorporated County, noting that the facility operates under a County Planning Department-issued Confined Animal Facility Permit. The County also voiced its support for the recommended actions in the TMDL Implementation Plan, including proposed coverage of the facility by the Regional Water Board under a reissued Confined Animal Facilities Order and County submittal of a report summarizing its compliance efforts.

Staff agrees that the TMDL's proposed coordination of County oversight and reporting and Water Board oversight will appropriately address potential discharges from Shamrock Ranch.

Comment 2.3: The commenter raised concerns that the TMDL Implementation Plan doesn't make a clear distinction between the named responsible parties for stormwater (San Mateo County and City of Pacifica) and the degree of potential bacteria source contribution or expected level of effort for TMDL implementation. They provided information on land uses in San Pedro Valley County Park, which is located in both

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Pacifica and unincorporated San Mateo County. Infrastructure at the Park consists of: a visitors center; ranger's office/shop; caretaker/ranger residence; two restrooms; two group picnic areas; a youth day camp area; small picnic areas; and 11 miles of trails. They point out that dogs and cats are prohibited by County ordinance and equestrian use in the park is very low, and allowed on designated trails only (nine of the 11 miles of trails).

They recommend adding footnotes to Table 8.4, Load and Wasteload Allocation Scheme for Dischargers of Bacteria in San Pedro Creek Watershed, and Table 10.1, Implementation Actions, similar to that for Caltrans, indicating that the open space land within County jurisdiction is not believed to be a significant source of anthropogenic indicator bacteria and that the County would not be expected to develop plans to conduct extensive water quality monitoring and implement any additional pollution prevention measures/BMPs, unless a significant source contribution from the unincorporated area is discovered in the future or the land use changes.

Staff disagrees that the trigger for any implementation actions is the identification of significant source contributions. Also, staff believes that County lands are appropriately characterized in the Staff Report, and did not revise Tables 8.4 or 10.1. As stated by the commenter, County land within the San Pedro Creek watershed includes infrastructure and activities such as restrooms, picnic areas, and horse trails, which could contribute bacteria from controllable anthropogenic sources. As such, the County is required to comply with the proposed implementation and monitoring actions in the Staff Report and the Basin Plan amendment. The County's efforts should focus on the possible sources and source locations within its jurisdiction and the County's level of effort should be commensurate with the likelihood of threat from such sources. Staff agrees that the County does not need to develop an extensive water quality monitoring plan. Instead, the County would be required to conduct water quality monitoring to characterize bacteria discharges from its land only downstream of locations that have likely sources of anthropogenic bacteria.

Comment 2.4: "We have reviewed the Proposed Basin Plan Amendment and would like to clarify the very limited role the County has in pollutant contribution in this watershed. The source assessment determined that the major man-made sources of pollutants are from sewer infrastructure and horse facilities. The County Park's restrooms and caretaker/ranger residence are connected to the City's sewer system, which has not had any problems with cracked or leaking pipes. There are no horse facilities at the County Park, and as observed by Rangers overseeing the County Park on a daily basis (see above), there is a minimal amount of equestrian use taking place in the County Park."

Comment noted. The County's responsibility would be limited to conducting water quality monitoring to characterize bacteria discharges from their land and to implementing and documenting implementation of appropriate BMPs to properly manage the limited anthropogenic sources of bacteria within the County's jurisdiction. These are likely to include activities such as managing trash at campgrounds, managing horse waste from Shamrock Ranch and horse trails, and managing human waste from leaking sewer lines, should they be present. Also, see response to comment 2.3.

Comment 2.5: “We are concerned about prior monitoring stations identified in the August 2012 report because the sources of monitoring for problems at the County Park were taken outside of park boundaries at the confluence of the Middle Fork and North Fork. The North Fork is surrounded by residential development and has a horse facility upstream, and is regulated by the City of Pacifica.”

Comment noted. We acknowledge that the sample location in question combines contributions from the County Park and other sources. Future water quality monitoring efforts should better characterize bacteria discharges from the Park, i.e., from the South and Middle Forks of San Pedro Creek before they mix with discharges from the developed subwatersheds (e.g., the North Fork or the Creek main stem). As the implementing party for this monitoring, the County has the ability to determine where monitoring stations should be located to appropriately characterize bacteria discharges from its land.

Comment 2.6: “We see no need for the County to be involved in future bacterial monitoring in the watershed since equestrian use is minimal and potential sources from the undeveloped rural County jurisdiction is likely from native wildlife and cannot be controlled.”

Staff disagrees. There are potential anthropogenic sources of bacteria on County lands. To confirm that the County does not contribute significant amounts of bacteria to San Pedro Creek from anthropogenic sources, discharges of bacteria from County land should be monitored and characterized in conjunction with the monitoring efforts required of Pacifica for the developed portion of the watershed under their jurisdiction. If the results of such monitoring show that County lands do not contribute significant levels of bacteria, then that information would inform the expected level of effort for subsequent monitoring and implementation actions by the County.

Comment Letter No. 3: San Mateo County Stormwater Pollution Prevention Program

Comment 3.1: “The staff report and proposed Basin Plan amendment are well written and organized.... “

Comment noted.

Comment 3.2: “The [TMDL Waste Load A]locations (i.e., number of exceedances of Basin Plan Water Quality Objectives (WQOs) allowable) are driven primarily by potential human exposure to pathogens in San Pedro Creek, not Pacifica State Beach.”

Staff disagrees. The TDML includes two separate sets of allocations: one for the Creek and one for the Beach. These allocations are calculated based on the exceedances observed at two separate and different reference systems (a freshwater reference system for the Creek and a marine reference system for the Beach) representing the exceedances of bacteria objectives due to natural background sources. These two sets of allocations are not dependent on each other.

Comment 3.3: “However, the WQOs in the Basin Plan were derived from epidemiological studies of people recreating at bathing beaches that received bacteriological contamination via treated human wastewater. Applying these WQOs in San Pedro Creek is highly questionable for two reasons:

- a) **The level of human exposure at a creek is presumably much lower than at a bathing beach. Even if the full presumptive REC-1 beneficial use of the creek is achieved at some point in the future the rate of usage (i.e., number of people recreating over a unit time period such as yearly) would likely be much lower at a creek than at a bathing beach.”**
- b) **The staff report presents very useful data showing that among sources of indicator bacteria assumed to be at least somewhat "controllable," fecal contamination from domestic animals (e.g., horses, dogs and cats) may make a much greater contribution in this watershed than human fecal contamination.”**

Staff disagrees that the level of use significantly affects the applicable WQOs, as described further below. The WQOs apply to any water body with REC-1, water contact beneficial uses regardless of usage. In addition, although no quantitative usage data are available for the Creek or the Beach, qualitative observations suggest the Beach sees significant REC-1 use during much of the year, and that the portion of the Creek that experiences the most REC-1 use--the Creek mouth--is located within Pacifica State Beach and is often used by toddlers and small children who are recreating at the Beach.

Regardless of the number of recreational users, the REC-1 use must be protected at both the Creek and the Beach. The Basin Plan has two sets of bacteria WQOs for the REC-1 beneficial

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use. The first set, for fecal coliform and total coliform, applies to all water bodies with the REC-1 designated use regardless of the water body type, intensity of use, or origin of bacterial pollution.

In addition, the Basin Plan lists the 1986 U.S.EPA-recommended recreational water quality criteria for water contact recreation (for *E. coli* and *Enterococcus*). As noted by the commenter, those criteria include different thresholds based on use intensity.

The U.S. EPA appears to be backing away from intensity-based bacteria water quality criteria. In its draft 2012 recreational water quality criteria document, the U.S. EPA no longer recommends multiple use intensity-based values for the proposed recreational water quality criteria. The U.S. EPA states that it made this decision “to ensure equivalent public health protection in all waters” (U.S. EPA 2011). Instead, the U.S. EPA is recommending a statistical threshold value that corresponds to the 75th percentile of water-quality distribution around the 2012 recreational water quality criteria’s geometric mean. This 75th percentile distribution is identical to the most stringent distribution recommended by the U.S. EPA for the 1986 recreational water quality criteria (i.e., the 75th percentile, or a single sample concentration of 235 *E. coli* colonies per 100 mL of water). Therefore, staff asserts that use of the Basin Plan objectives for fecal and total coliform bacteria as well as the existing 75th percentile threshold for the 1986 U.S. EPA criteria for *E.coli* bacteria for developing the proposed load and wasteload allocations is appropriate and protective of public health.

With regard to the second point raised by the commenter, staff disagrees that the bacteria source tracking data presented in the Staff Report are solely for the purposes of reaffirming presumptive potential sources of bacteria in the watershed. The data indicate presence, but do not assess the sources’ relative load-based contribution to the overall bacteria loads.

Comment 3.4: EPA’s recent research indicates that the source of fecal contamination is critical to understanding the human health risk associated with recreational waters and that the amount of human health risk in recreational waters varies with various fecal sources (EPA Draft Recreational Water Quality Criteria, December 2011). Thus, deriving the TMDL allocations based on the Basin Plan WQOs, which are based solely on exposure to human fecal contamination, may not be appropriate in this watershed.

Staff disagrees. In 2004, when U.S. EPA promulgated water quality standards for those States that had failed to do so for their coastal and Great Lakes waters based on the 1986 U.S. EPA-recommended criteria, U.S. EPA evaluated the scientific understanding of the human health risks associated with nonhuman sources of fecal contamination. Based on those evaluations, it concluded that although “[the] U.S. EPA’s scientific understanding of pathogens and pathogen indicators has evolved since 1986, data characterizing the public health risk associated with nonhuman sources is still too limited for the [U.S. EPA] to promulgate [water quality standards for States based on] another approach.” Thus, the federally-promulgated criteria in the Rule were considered applicable regardless of origin unless a sanitary survey shows that the sources of the indicator bacteria are nonhuman and an epidemiological study shows that the indicator densities are not indicative of a human health risk. Further, in evaluating whether State standards were as

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protective of human health as U.S. EPA's 1986 criteria, U.S. EPA concluded that State water quality standards with exemptions for non-human sources were not as protective of human health as U.S. EPA's 1986 criteria (U.S. EPA 2011).

U.S. EPA has continued to examine the potential for illness from exposure to nonhuman fecal contamination compared to the potential for illness from exposure to human fecal contamination. It has concluded that both human and animal feces in recreational waters pose potential threats to human health, especially in immunocompromised persons and subpopulations. Though U.S. EPA states in its draft 2012 recreational water quality criteria that the potential human health risks from human versus non-human fecal sources can be different, it has determined that the current scientific understanding of the human health risk associated with the wide variation of exposure to nonhuman fecal contamination is insufficient to support development of separate nationally applicable 2012 recreational water quality criteria for water bodies impacted by nonhuman sources (U.S. EPA 2011). Rather, it recommends that "States use the nationally applicable criteria in all waters designed for primary contact recreation" (U.S. EPA 2011).

The U.S. EPA is making available technical support materials for quantitative microbial risk assessment and epidemiological studies to assist States or local governments to develop equivalent site-specific criteria to account for local scale, non-human sources, if they wish to do so. To date, such studies have not been completed in the San Pedro Creek watershed, nor is there any plan to complete them.

Given the above, the application of the existing Basin Plan REC-1 bacteria WQOs to all water bodies with such designated use regardless of the water body type, intensity of use, or origin of bacterial pollution is appropriate and protective of public health.

Comment 3.5: "[The] proposed allocations may be overly conservative and essentially unachievable. Thus attempting to meet these allocations could result in unwarranted use of limited public resources that to the extent available could instead have been prioritized to address other pressing needs."

Staff disagrees. As discussed above, the proposed allocations are appropriate given the existing Basin Plan WQOs and scientific understanding of bacterial pollution. The commenter has not submitted evidence demonstrating why they would be unachievable. The proposed TMDL calls for common sense, no-regret actions to reduce bacteria loads from all controllable sources to reduce health risks to humans recreating in the Creek and at the Beach.

Comment 3.6: The proposed TMDL allocations do not apply the Basin Plan WQOs strictly, but instead make use of a reference system in an attempt to adjust the allocations to account for "uncontrollable" natural sources of indicator bacteria (e.g., wildlife). However, an evaluation should be conducted regarding whether the allocations should be adjusted further to account for 1) potential lower human exposure in creeks compared to bathing beaches and 2) the potential predominance of non-wildlife animal sources over human sources in the watershed.

See response to comments 3.3 and 3.4.

Comment 3.7: ...the Regional Water Board plans to begin developing other bacteria TMDLs in San Mateo County and the Bay Area region over the next few years. SMCWPPP is concerned about setting the best precedents for these future TMDLs. We need to begin the discussion now about developing and applying tools in our region to improve the scientific basis and defensibility of all bacteria TMDLs and thereby optimizing our ability to prioritize the use of limited public resources in addressing water quality problems caused by fecal contamination.

Staff agrees. Water Board staff will continue to work with the San Mateo County Stormwater Pollution Prevention Program and other Bay Area municipal stormwater programs to ensure this happens.

Comment 3.8: Section 9 of the staff report is entitled “Linkage between Water Quality Targets and Pollutant Sources.” Some of the language in this section is misleading and should be revised to include the information presented above regarding the derivation of WQOs and allocations, including the potential for lower human exposure in creeks compared to bathing beaches and the potential lower human health risk associated with the predominance of non-wildlife animal sources over human sources in the watershed.

Staff disagrees. See response to comments 3.3 and 3.4.

Comment 3.9: Section 11.3 of the staff report and Section 7.4.1.8 of the proposed Basin Plan amendment are both entitled “Special Studies.” Both of these sections should be revised to explicitly include an option to allow for evaluation of methods and tools to develop alternative TMDL allocations that account for lower human exposure in San Pedro Creek and the potential predominance of non-wildlife animal sources over human sources in the watershed. For example, EPA’s Draft Recreational Water Quality Criteria, December 2011 describes tools that can be used to assess and manage recreational waters and derive site-specific water quality criteria, including sanitary surveys, epidemiological studies, and quantitative microbial risk assessment.

Staff disagrees. Staff has deleted these sections of the Staff Report and proposed Basin Plan amendment because special studies are not required by this TMDL. However, if the City or County should choose to complete epidemiological studies or quantitative microbial risk assessment, Water Board staff will consider this new information as part of adaptive implementation of the TMDL.

Comment 3.10: Section 12.3 of the staff report is entitled “Economic Considerations.” SMCWPPP understands that the City of Pacifica will provide information regarding

refining the cost estimates for implementing the TMDL presented in this section. SMCWPPP supports revising these estimates and would like to point out that the estimated monitoring costs in the staff report are based simply upon multiplying an estimated number of samples by an estimated laboratory analysis cost per sample. This calculation omits large parts of the cost for designing and implementing a field monitoring program including project management/coordination, developing a Sampling and Analysis Plan (SAP) and Quality Assurance Project Plan (QAPP), labor and equipment to collect the samples in the field, QA/QC review and documentation, developing a data management system, and reporting. The monitoring program estimates should be revised to include all of these costs.

In response to this comment and a comment from the City, staff revised the monitoring cost estimates in the Economic Consideration Section of the Staff Report, Section 12.3, to clarify monitoring costs expected to result from the proposed Basin Plan amendment.

The water quality monitoring proposed in the Basin Plan amendment is, to some extent, already required under provisions of San Mateo County's existing stormwater permit. We agree that the amendment is likely to result in costs due to monitoring, but the additional costs to the responsible parties (i.e., the City and the County) incurred as result of this Basin Plan amendment would not equal the total cost of the proposed monitoring, because they are already doing some of the work.

Comment 3.11: "...SMCWPPP appreciates the opportunity to comment on the draft TMDL staff report and proposed Basin Plan amendment and commends Regional Water Board staff on all the hard work that went into preparing these documents."

Comment noted.

Comment Letter No. 4: U.S. EPA

Comment 4.1: “We appreciate the opportunity to provide comments.... These comments are not comprehensive and do not constitute an approval or determination by the U.S. Environmental Protection Agency (EPA) under Clean Water Act Sections 303(c) or 303(d).”

Comment noted.

Comment 4.2: “EPA supports the Regional Board's use of the reference beach approach to develop numeric targets and allocations to protect recreational uses in waters for San Pedro Creek and at Pacifica State Beach. EPA has approved this approach in other bacteria TMDLs (e.g., Santa Monica Bay Bacteria TMDL, Los Angeles River Bacteria TMDLs, and San Diego Beaches). Additionally, we support and encourage the Regional Board's involvement with ongoing efforts to establish a reference beach in northern California.”

Comment noted.

Comment 4.3: “EPA acknowledges that approval of the San Pedro/Pacifica TMDLs will be contingent on the approval of the Basin Plan Implementation Provision. Therefore, we ask that the submittal to EPA request review for two separate actions under Clean Water Act: 303(c) for use of the reference beach approach to establish allowable exceedance frequencies of the Single Sample Objectives, and 303(d) for the TMDLs.”

Comment noted.

Comment 4.4: “EPA appreciates your efforts in completing the San Pedro/Pacifica TMDLs to address bacteria impairment.”

Comment noted.

Comment 4.5: “In either the transmittal letter or the TMDL Staff Report, please include a table identifying the CWA 303(d) listed waterbodies (name and waterbody identification number) and pollutants being addressed by the TMDLs.”

Staff will include the requested information in the transmittal letter.

Comment 4.7

For clarity in assigned allocations, please provide separate tables for load allocations and waste load allocations (WLAs) (see Staff Report Table 8-4 and Proposed Basin Plan Amendment Table 7.4.1-3), and include in the Proposed Basin Plan Amendment the information currently presented in Staff Report Table 8.4.

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Staff made some modifications to Table 8-4 from the Staff Report and is now including it in the proposed Basin Plan amendment to address this comment; it is Basin Plan amendment Table 7.4.1-3. Staff also revised the titles of Tables 8.3 and 7.4.1-3 to clearly show that the numbers in those tables represent both the load and wasteload allocations. However, since the load and wasteload allocation numbers are identical, there is no need or benefit to represent them separately.

The modifications to Table 8-4 (Table 7.4.1-3) include clearly indicating that the Sanitary Sewer Systems receive a zero wasteload allocation and making it clear that the compliance points for the allocations are existing monitoring stations: the “Creek Mouth” monitoring station in San Pedro Creek and Station #5 at Pacifica State Beach.

Comment 4.8: Please clarify that the identified horse facilities are properly categorized as non-point sources (e.g., the number of animals confined does not exceeds 150 horses).

Staff has verified that none of the three horse facilities in the San Pedro Creek watershed boards more than 150 horses. Millwood Ranch has fewer than 60. Park Pacifica Stables currently boards between 26 and 40 horses. Shamrock Ranch, on average, boards 45 horses and 30 dogs. Therefore, all three facilities have been categorized as nonpoint sources in the Staff Report and would not be considered Confined Animal Facility Operations (CAFOs) under U.S. EPA’s definitions and do not require an NPDES permit. Instead, they are considered Confined Animal Facilities (CAFs) and are subject to Waste Discharge Requirements under the California Water Code.

Comment 4.9: The discrepancy between the allowable exceedance numbers in the Proposed Basin Plan Amendment Table 7.4.1-4 (Allowable Exceedance of Single Sample Bacteria Objectives as Interim LAs and WLAs) and in TMDL Staff Report Table 8.5 (pg. 44) should be corrected.

Staff has eliminated the discrepancy and modified both the TMDL Staff Report and the Basin Plan amendment. See “Staff-initiated changes” for additional discussion of this deletion.

Comment 4.10: “Please clarify if allocations apply to all points in the creek or only at the bottom, and be more specific as to the location of compliance points (e.g., show on map). Section 11.2 of the TMDL Staff Report states compliance locations will be in the receiving water bodies (i.e., San Pedro Creek and Pacific Ocean Waters adjacent to the Pacifica State Beach), and page 44 states "Exceedance rate is based on the "San Pedro Creek" station located near the mouth of the creek where an exceedance of an SSO on any day counts as an exceedance."”

The allocations apply at the mouth of the Creek. The proposed Basin Plan amendment and Section 8.6 of the Staff Report have been revised to clarify this point as follows:

Table 8.4 presents the allocations and the related information for dischargers of indicator bacteria in San Pedro Creek watershed. As presented in Table 8.3, load allocations and wasteload allocations for this TMDL are expressed as the number of allowable

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exceedance days of the single-sample objectives. The Creek allocations apply at the “Creek Mouth” monitoring station. Permittees that discharge to San Pedro Creek have allocations based on allowable exceedance days for San Pedro Creek. Permittees that discharge to the Pacific Ocean at Pacifica State Beach have allocations based on allowable exceedance days for the Beach.

Staff has also revised Table 8-4 and the Monitoring Sections of the Staff Report and the proposed Basin Plan amendment to specifically state that the “compliance points” are located at the current San Mateo County water quality monitoring stations at the mouth of the Creek (Creek Mouth station) and at Station #5 at the Pacifica State Beach.

Comment 4.11: “Chapter 11 of the TMDL Staff Report says monitoring locations should be located in each creek/watershed. We recommend that future monitoring be able to distinguish contributions from all forks of San Pedro Creek. It appears from Figure 4.1 that prior sampling did not distinguish the Middle and North Forks of San Pedro Creek.”

Staff agrees. The Monitoring Sections of the Staff Report (Section 11) and the proposed Basin Plan amendment (Section 7.4.1.7) have been revised to reflect this point as follows:

At a minimum, in addition to the existing San Mateo County sampling stations at the mouth of San Pedro Creek and at the Pacifica State Beach (which will be used to measure compliance with the designated load and wasteload allocations), at least one sampling station shall be located in each creek reach/subwatershed such that bacteria contributions from each of the San Pedro Creek’s forks/subwatersheds are distinguished.

Comment 4.12: “Please specify in both Chapter 11 of the TMDL Staff Report and the Proposed Basin Plan Amendment (BPA) that monitoring data will be entered into the BEACH database.”

Staff has made the requested edit to the Monitoring sections of the Staff Report and the proposed Basin Plan amendment as follows:

Monitoring data must be entered into the State Water Board’s “Beach Watch” database as appropriate.

Comment 4.13: “So that it is easy for an agency or a member of the public to track what the Implementation Plan of the TMDL expects to be done, by whom and by when, Table 10.1 and Table 10.2 should be cross-referenced and/or merged. Table 10.1 lists implementation actions by source. Table 10.2 provides a schedule of implementation actions, with "tasks" that aren't always readily found in the "action" table and vice-versa. These clarifications should also be reflected in Proposed Basin Plan Amendment Tables 7.4.1-5 and 7.4.1-6.”

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Staff agrees. Staff has revised the tables and merged them. The new combined Table 10.1 is titled Implementation Plan Requirements and Schedule and is Basin Plan amendment Table 7.4.1-4.

Comment 4.14: Proposed Basin Plan Amendment Table 7.4.1-6 Implementation Schedule – Where implementation actions require reports and/or plans (e.g., MRP compliance / implementation plans), please clarify if there are review/approval requirements for such reports and/or plans, and how they affect the schedule.

This table has been merged into Table 7.4.1-4. The Implementation Schedule tables in the Basin Plan amendment and Staff Report have been revised, as appropriate. Where plans or reports would not be submitted under a permit (e.g., the MRP), and as appropriate, we have clarified that reports and plans must be submitted “acceptable to the Executive Officer.”

Comment 4.15: “The Adaptive Implementation (BPA Section 7.4.1.9) schedule refers to "periodically" evaluating water quality monitoring results and assessing progress toward attaining TMDL targets. The schedule can and should be more specific (e.g., coordinating with tasks on the implementation schedule at 5, 8 and 12 years).”

Staff agrees. Staff has revised the Adaptive Implementation Section of the proposed Basin Plan amendment and the Staff Report to be clearer about this process and coordinating with the implementation schedule. See response to City of Pacifica comment 1.18 and this additional language in Section 7.4.1.8:

The Water Board will adapt the TMDL and implementation plan to incorporate new and relevant scientific information such that effective and efficient measures can be taken to achieve the allocations. The Water Board staff will periodically, in coordination with the implementation schedule, at 5, 8 and 15 years, evaluate new and relevant information from implementation actions, ...

PART II
**STAFF RESPONSE TO PEER REVIEW COMMENTS ON THE STAFF
REPORT AND BASIN PLAN AMENDMENT DRAFTS**

Peer Review Comments from Dr. Patricia Holden, Professor of Environmental Microbiology, University of California at Santa Barbara, September 30, 2012

Part 1: General Approach: the Reference System Approach

Comment Peer-1a:

The reference system approach has the following inherent flaw. When a reference beach or watershed is chosen, this is on the basis of it being similar to the study watershed / beach in all ways except the potential for human-associated fecal sources. Natural sources of fecal indicator bacteria are assumed to predominate at the reference watershed / beach. It is assumed that this abundance will be similar at the study watershed / beach. But it is not known—at the time of adopting the reference beach—if the abundance of “natural” source fecal indicator bacteria (FIB) is the same when comparing the reference and the study watershed/ beach. To strike an “apple and orange” analogy, it is as though a specific number of apples (natural source FIB) would be subtracted from a combination of apples and oranges (natural and human-associated FIB at the study watershed/ beach). But if the “apple” abundance at the study watershed/ beach is much less than the “apple” abundance at the reference watershed/ beach, then “natural apples” are being subtracted from “human associated oranges.” This situation, which would tend to underestimate real risk, is possible at the time of reference watershed/beach selection/adoption.

Comment noted.

To minimize the potential for underestimating the risk associated with human-associated fecal indicator bacteria (FIB), the TMDL requires that all “human-associated fecal sources” of bacteria, such as sanitary sewer systems (e.g., sanitary sewer overflows and leaky sewer laterals and mains), and stormwater runoff and dry weather flows potentially containing bacteria from “human-associated fecal sources” (e.g., trash, homeless encampments, etc.) be fully controlled. While the peer reviewer’s suggestion that the actual “abundance” of FIB at the impaired watershed might be less than that of the reference system watershed could be true, this TMDL requires that all “human-associated fecal sources” in the impaired watershed are controlled, which would significantly reduce the chance for “underestimating the real risk” to recreational users from “human-associated fecal sources” of bacteria when using the reference system approach.

The discussion about the “reference system approach” in the first paragraph of page A-1 of the proposed Basin Plan amendment, which would be added to Chapter 3 of the Basin Plan, and in

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the corresponding Section 5.2 of the Staff Report, have been revised to better ensure that control of all “human-associated fecal sources” of bacteria are required before a reference system approach can be implemented for a given water body. The revision is as follows:

Water quality objectives for bacteria in Table 3-1 shall be strictly applied except when otherwise provided for in a TMDL. In the context of a TMDL, the Water Board may implement the objectives in fresh and marine waters by using a ‘reference system and antidegradation approach’ as discussed below. Implementation of water quality objectives for bacteria using a ‘reference system and antidegradation approach’ requires control of bacteria from all anthropogenic sources so that bacteriological water quality is consistent with that of a reference system. A reference system is defined as an area (e.g., a subwatershed or catchment) and associated monitoring point that are minimally impacted by human activities that potentially affect bacteria densities in the reference receiving water body.

Comment Peer-1b

Further, since there is no reason to believe that the parallels—even if they do exist at the time of selection—will remain the same over time, there is an inherent risk that human-associated waste management would worsen as the reference and study watershed/beach diverge (e.g. due to continual infrastructure degradation in the study watershed/ beach, or due to development, or other changes that can impact water quality and FIB sources).

Staff disagrees. Staff does not see how the use of a reference system approach would result in undetected worsening of “human associated waste management.” As explained above, both the TMDL and the new implementation provisions for the bacteria objectives (i.e., the reference system approach) require complete control of all human-associated fecal sources of bacteria. In addition, the allowable exceedances of bacteria objectives, which are based on the observed exceedances at the reference watershed, at the time of the TMDL adoption, are fixed. Therefore, any potential worsening of “human-associated waste management” would result in exceedances of assigned wasteload allocations. These exceedances would be detected through the proposed water quality monitoring activities, and consequently corrected, in order to meet the wasteload allocations.

Comment Peer-1c

Inherently, a better model to manage FIB contamination is to determine sources using modern BST methods, then alleviate or manage those sources, with a particular focus on human-associated sources as those carry the greatest human health risk to swimmers. The reference system, in contrast, allows exceedances without knowing the sources.

This and future TMDLs using the “reference system approach” must control all “human-associated sources” of bacteria in the study watershed regardless of the exceedances of bacteria objectives allowed as part of a such approach. Since all anthropogenic sources of FIB will be controlled, the remaining FIB can only be contributed by the non-human-associated sources of

bacteria in the watershed. That is, the TMDL's proposed approach is to control the sources with the greatest potential for human health impacts.

Conducting BST studies would be costly and time-consuming, and is unlikely to result in a concomitant return in TMDL effectiveness. The studies could provide an incremental increase in focus for this TMDL, but staff believes it would not significantly alter the TMDL's approach, which is to rely largely on already-established management measures to control likely sources of bacteria, such as fixing leaking sewer lines. However, future bacteria TMDL projects using the reference system approach may choose to use BST methods to better inform them of the bacteria sources in the impaired watershed.

Part 2: Selection of Reference Systems

Comment Peer-2a

It is difficult to defend the scientific basis for selection of reference systems when the concept of reference systems is flawed. The basis appears to be on watershed area, lack of development, and possibly similar terrain.

The reference system approach has been used in California in more than a half dozen approved bacteria TMDLs by at least two Regional Water Boards (Los Angeles and San Diego) to account for uncontrollable background sources of bacteria. U.S. EPA supports the Water Board's use of the reference system approach, including use of the selected reference systems from Southern California, to develop numeric targets and allocations to protect recreational uses in waters for San Pedro Creek and at Pacifica State Beach.

Part 3: Numeric Targets

Comment Peer-3a

The numeric targets in Table 6.1 are aligned with regulations, as indicated. The targets in Table 6.2 include disallowing exceedances in summer dry months at Pacifica State Beach, which is appropriate—especially considering that human waste is considered to be a source of contamination. The exact basis for wet weather allowances for exceedances in Table 6.2 is not described in Section 6 (it is, in Section 8). Scientifically, it is unknown how fecal bacterial emissions in wet weather affect exceedances in dry weather, for example by introduction of fecal bacteria that persist or colonize coastal sands during the protracted dry weather period that follows wet weather in this climatic region.

Comment noted. The Staff Report, at Table 6.2, states "This approach...is explained further in Section 8."

Part 4: TMDL and Load and Waste Load Allocations

Comment Peer-4a

In section 8.2 [of the Staff Report], it is conveyed that the San Pedro Creek watershed “...areas contribute indicator bacteria loads to San Pedro Creek and Pacifica State Beach.” However, this is actually unknown, and is part of the “apples and oranges” conundrum described in part 1 of this review. In order to contribute to the lower watershed contamination, FIB from the upper watershed would need to be conserved (i.e., not decay) during transit from up- to downstream. The degree to which this happens is unknown. The problem with assuming direct, conserved, translocation is that if the contamination is mostly arising in downstream reaches of the watershed, then the reference system is even further susceptible to erroneously equating FIB from one watershed to FIB in another (more developed) watershed.

Comment noted. The reference system approach, by using a catchment of approximately the same size and with terrain similar to the San Pedro Creek watershed, is intended to control for some of these unknowns, under the theory that similar processes (e.g., FIB decay) will apply in both the reference and target systems.

We do not assume direct and fully conserved transportation of indicator bacteria. Rather, we rely on knowledge of the existing patterns of development, in combination with monitoring data from the Creek and Beach that indicate impairment. The densely developed area of the San Pedro Creek watershed is located in the bottom section of the watershed, separated from Pacifica State Beach by only State Highway 1 and surrounding the north fork and the main stem of the Creek. Monitoring shows the creek and beach to be impaired, and the TMDL’s focus is to control sources of FIB, which the Staff Report notes include significant sources from this densely developed portion of the watershed. That focus is not dependent on an assumption that FIB is fully conserved from the top to the bottom of the watershed, although it assumes that there is at least some transmission from upstream to downstream.

That said, the required water quality monitoring is intended to more closely define the areas of impairment over time, narrowing the focus regarding sources of impairment as sources are cleaned up, leading the responsible parties to focus their corrective efforts on the most-significant contributors to the observed impairment. This approach is appropriately protective of water quality and public health.

See also our response to comments Peer-1a through c.

Comment Peer-4b

“Section 8.5 contains Table 8.4 wherein the load allocation for sanitary sewers is appropriately (sound, scientifically) zero.”

Comment noted.

Part 5: TMDL Implementation

Comment Peer-5a

The legal analysis in section 10 appears to be very comprehensive.

Comment noted.

Comment Peer-5b

Section 10.4 (first paragraph) is somewhat challenging to understand, since earlier in the draft plan (section 7.1), it is stated that “Due to data and resource limitations, this report does not quantitatively estimate loads for the different bacteria sources.”

The Staff Report does not estimate actual numeric loads (number of bacteria per unit time) discharged by each given source. As explained in section 8, it does establish load allocations and wasteload allocations expressed in terms of an allowable number of exceedance days of bacteria objectives. Section 7.1 of the Staff Report has been revised for clarification purposes as follows:

Due to data and resource limitations, this report does not quantitatively estimate loads (i.e., total number of bacteria discharged by each given source per unit time) for the different bacteria sources in the San Pedro Creek watershed.

Section 10.4 of the Staff Report has also been revised for clarification purposes as follows:

This section describes the proposed implementation strategy to provide reasonable assurance the load allocations and wasteload allocations, ~~developed~~ which are expressed in terms of an allowable number of exceedances of bacteria objectives for San Pedro Creek and Pacifica State Beach, can be met.

Comment Peer-5c

The implementation actions outlined in Table 10.1 are comprehensive, and are scientifically sound, for example based on current understanding of the propensity for aged sanitary sewers to leak and pollute.

Comment noted.

Part 6: The Big Picture, addressing the following:

Comment Peer-6a

Are there any additional scientific issues?

In Section 3, “Problem Definition”, section 3.1 equates “pathogens” with FIB in stating that the Creek and Beach “are impaired by the types of pathogens that are found in warm-blooded (e.g., human) waste”. While this is clarified in the next

statement by the use of “infer”, still the measurement of FIB is just that: only a measurement of FIB.

Comment noted.

Comment Peer-6b

Section 4.2 presents a somewhat dated summary of where BST methods stand, currently. While this doesn’t really impact the rest of the report, the following book published in 2011 is a source of more up to date descriptions of current methods in BST: “Microbial Source Tracking: Methods, Applications, and Case Studies”. 2001. Hagedorn, C., Blanch, A. R., and Harwood, V. J. (Eds).

Comment noted.

Comment Peer-6c

Regarding section 4.4.2 and the cited BST study, while not part of this review, it is noted that the “Draft Report” of the Creek Coalition (2008), which can be downloaded from the worldwide web, describes typing of *E. coli* isolates for source identification. This type of method is inherently non-quantitative due to the random nature of isolate selection. Further, it is uncertain if the methods used for that study would now be considered scientifically sound for source differentiation, at the time of this peer review. Other methods that have arisen since 2006 have supplanted the methods, generally, used for BST in the 2008 report.

Comment noted.

Comment Peer-6d

The concerns expressed herein affect the “Discussion” in section 4.4.2 where the term “dominated” is used to describe fecal hosts. Part of the issue regards the unequal abundances of *E. coli* across various hosts, which would create bias in representation of fecal sources. However, the random selection of *E. coli* for typing, as above, is a further concern that relegates the approaches to being qualitative, not quantitative.

Staff agrees. This study’s results have been used in the Staff Report only qualitatively, to, in part, assist staff with identification of the potential bacteria sources within the watershed. The study’s findings have not been used quantitatively to assess the bacteria loads contributed by each potential source category, nor should they be.

Part 7: Altogether, is the scientific portion based on sound scientific knowledge, methods and practices?

Comment Peer-7a

Taken together, with the exception of the adoption of a “reference system” approach, the emphasis on eliminating human sources of pollution through enforcement of existing laws and order(s) is scientifically sound, on the basis of the highest risk to recreational water use emanating from the likely presence of human waste and human waste-associated pathogens. Regardless of the adoption of the reference approach, the outcome should be protective based on scientific knowledge.

Comment noted.

Comment Peer-7b

A broader concern would be that the adoption of the reference watershed / beach here becomes the template for other basin plans where local order(s) are not available to reduce the sources that are known to be associated with risk to human health.

The proposed amendment would only apply to the San Francisco Bay Basin Water Quality Control Plan and not to any other Basin Plans. At least two other Regional Water Boards (Los Angeles and San Diego) have already adopted and used similar approaches. Any consideration of the adoption of a similar “reference system approach” by other Regional Water Boards would be subject to separate evaluation and Basin Plan amendment process by those Regional Water Boards, on a case-by-case basis.

**PART III
STAFF-INITIATED CHANGES TO DRAFT STAFF REPORT AND BASIN
PLAN AMENDMENT**

Water Board staff have made a number of insignificant editorial changes to the proposed Basin Plan amendment and Staff Report, intended to clarify or correct the August 24, 2012, draft documents. These include correcting punctuation and other typographic errors, deletion of repetitive information, and related minor changes. With the exception of minor typographic corrections, these changes are shown in underline/strikeout in the revised versions of these two documents (Appendices B and C to the November 14, 2012, Staff Summary Report).

The other, more significant, staff-initiated changes are described below:

1. Deleted the interim targets (Basin Plan amendment Table 7.4.1-4 and Staff Report Table 8.5, “Allowable both tables titled “Allowable Exceedances of Single-Sample Bacteria Objectives as Interim LAs and WLAs for San Pedro Creek and Pacifica State Beach Bacteria TMDL”).

Staff determined that the interim allocations are not necessary and would not affect the TMDL’s Implementation Plan. To avoid confusion, the tables and associated references were deleted.

2. Added a “TMDL” section (Staff Report Section 8.5 and Basin Plan amendment Section 7.4.1.4). Staff added the following:

8.5 Total Maximum Daily Loads

The TMDLs for San Pedro Creek and Pacifica State Beach, which are the same as the proposed numeric targets, are listed in Table 8.3 and are expressed in terms of allowable exceedances of single-sample objectives.

7.4.1.1 Total Maximum Daily Loads

The TMDLs for San Pedro Creek and Pacifica State Beach are the same as the Numeric Targets listed in Table 7.4.1-2 and are expressed in terms of allowable exceedances of single-sample objectives.

This language was omitted from the draft Staff Report and Basin Plan amendment.

3. Added to Basin Plan amendment Section 7.4.1.6 acknowledgement of existing Basin Plan prohibition 15:

Basin Plan Discharge Prohibition No. 15 (Table 4.1), which states: “it shall be prohibited to discharge raw sewage or any waste failing to meet waste discharge requirements to any waters of the Basin.”

This prohibition was omitted from the draft Basin Plan amendment.