

Appendix D

Responses to Comments

- Part I: Staff responses to written comments
- Part II: Staff responses to issues raised at the April 14, 2006 testimony hearing before the Water Board
- Part III: Staff responses to Peer Review Comments on December 1, 2005 Project Report
- Part IV: Staff-Initiated Changes

References

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I. STAFF RESPONSES TO WRITTEN COMMENTS SUBMITTED IN RESPONSE TO FEBRUARY 10, 2006 DOCUMENTS

Comment Letter no. 1: U.S. Environmental Protection Agency, Diane Fleck, Water Division, February 27, 2006

U.S. EPA submitted several constructive comments focused primarily on document clarity and consistency with existing water quality objectives.

Comment 1.1: "The proposed staff Report and Basin Plan Amendment for...the Sonoma Creek Watershed TMDLs state...that Sonoma Creek and its tributaries... are listed on the 303(d) list as impaired for pathogens, and that these documents address those listings. However, a specific list of waterbodies that are on the 303(d) list and that are addressed by the documents is not included. Please include a list of the specific impaired water bodies for which TMDLs are to be adopted."

This TMDL addresses the 303(d) listing for Sonoma Creek. We have revised Tables 7-h and 7-i, in the proposed Basin Plan amendment to indicate that the TMDL and numeric targets apply only to Sonoma Creek. However, load allocations and wasteload allocations apply to Sonoma Creek and all tributaries. The revised tables are presented in the response to Comment 1.2. The corresponding tables in the Staff Report have also been revised accordingly. Also, Section 1.3 of the Staff Report as been revised to provide clarification, as follows:

Sonoma Creek (~~including its tributaries~~) is listed as impaired for pathogens, as well as sediments and nutrients. Sonoma Creek lies within the jurisdiction of the California Regional Water Quality Control Board, San Francisco Bay Region (Water Board), and therefore the Water Board is responsible for developing a TMDL to address the impairment of Sonoma Creek by pathogens. This report describes the water quality problem causing the impairment, pollution sources and actions needed to restore or cleanup the water body. This TMDL addresses water quality in all tributaries of Sonoma Creek and includes a comprehensive water quality attainment strategy for the watershed. This report provides the technical and scientific basis for the proposed Basin Plan amendment.

Comment 1.2: Several of Ms. Fleck's comments question our proposed numeric targets and TMDL allocations. She suggests that we add total coliforms and fecal coliforms to the proposed *E. coli* targets and allocations in order to be consistent with current Basin Plan water quality objectives, which are expressed as total and fecal coliforms. She also questions our reliance on an implicit margin of safety for allocations.

The TMDL allocations and targets have been revised so that they are now stated in terms of *E. coli*, fecal coliforms, and total coliforms. We should note, however, that the State Board is in the process of adopting statewide bacterial water quality objectives based on *E. coli* for fresh water, per EPA guidance. As a result of this action, anticipated in early 2007, our existing fecal and total coliform water quality objectives will likely be replaced by the new objectives. In order to be consistent with both current and anticipated future bacterial objectives, we have added

language stating that the fecal coliform and total coliform targets and allocations will sunset and no longer be effective upon the replacement of the total and fecal coliform water quality objectives in the Basin Plan with *E. coli* based water quality objectives for contact recreation.

We have also added an explicit 10 percent margin of safety to our load allocations and to the wasteload allocation for Municipal Runoff. This is reflected in the revisions described below.

The portions of the proposed Basin Plan amendment addressing targets, the overall TMDL, and allocations have been revised as shown below. Corresponding portions of the Staff Report have been revised accordingly:

Numeric Targets

The numeric water quality targets listed in Table 7-a~~h~~ are derived from water quality objectives for coliform bacteria in contact recreational waters, and from U.S. EPA’s recommended bacteriological criteria (Tables 3-1 and 3-2). The ~~third~~ last target, “zero discharge of untreated or inadequately treated human waste,” is consistent with Discharge Prohibition 15 (Table 4-1). The zero human waste discharge target is necessary because human waste is a significant source of pathogenic organisms including viruses; and attainment of fecal coliform targets alone may not be sufficient to protect human health. ~~The *E. coli*~~ These bacteria targets, in combination with the human waste discharge prohibitions, are the basis for the TMDL and load allocations, and fully protect beneficial uses.

Table 7-h Water Quality Targets^a for Sonoma Creek and Its Tributaries
E. coli density: Geometric mean < 126 CFU/100 mL^b
E. coli density: 90th percentile < 320 CFU/100 mL^c
Zero discharge of untreated or inadequately treated human waste
^aThese targets are applicable year-round. ^bBased on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period. ^cNo more than 10% of total samples during any 30-day period may exceed this number.

Table 7-h Water Quality Targets^a for Sonoma Creek
<i>E. coli</i> density: Geometric mean < 126 CFU/100 mL^b; 90th percentile < 409 CFU/100 mL^c
Fecal coliform density^d: Geometric mean < 200 CFU/100 mL^b; 90th percentile < 400 CFU/100 mL^c
Total coliform density^d: Median < 240 CFU/100 mL^b; no sample to exceed 10,000 CFU/100 mL
Zero discharge of untreated or inadequately treated human waste
^aThese targets are applicable year-round. ^bBased on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period ^cNo more than 10percent of total samples during any 30-day period may exceed this number. ^dThe water quality targets for total and fecal coliform shall sunset and shall no longer be effective upon the replacement of the total and fecal water quality objectives in the Basin Plan with <i>E.coli</i> based water quality objectives for contact recreation.

Total Maximum Daily Load

The TMDL, as indicated in Table 7-i, is expressed as density-based total coliform, fecal coliform, and *E. coli* bacteria limits.

Table 7-i	
Total Maximum Daily Loads of Pathogen Indicators for Sonoma Creek and Its Tributaries	
Indicator	TMDL (CFU/100 mL)
<i>E. coli</i>	Geometric mean < 126 ^a 90 th percentile < 320 ^b
^a Based on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period. ^b No more than 10% of total samples during any 30-day period may exceed this number.	

Table 7-i	
Total Maximum Daily Loads of Pathogen Indicators for Sonoma Creek	
Indicator	TMDL (CFU/100 mL)
<i>E. coli</i>	Geometric mean < 126 ^a 90 th percentile < 409 ^b
Fecal coliform ^c	Geometric mean < 200 ^a 90 th percentile < 400 ^b
Total coliform ^c	Median < 240 ^a No sample to exceed 10,000
^a Based on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period. ^b No more than 10 percent of total samples during any 30-day period may exceed this number. ^c The Total Maximum Daily Loads for total and fecal coliform shall sunset and shall no longer be effective upon the replacement of the total and fecal water quality objectives in the Basin Plan with <i>E.coli</i> -based water quality objectives for contact recreation.	

Load Allocations

Density-based pollutant allocations for pathogen source categories are presented in Table 7-j. This table also presents wasteload allocations for the single municipal wastewater discharger in the watershed, Sonoma Valley County Sanitation District, and for municipal runoff. Due to the inherent uncertainty in estimating pathogen loading from nonpoint sources and municipal runoff, allocations for these source categories incorporate a 10 percent margin of safety. Each entity in the watershed is responsible for meeting its source category allocation. All facilities are also responsible for meeting the requirements of applicable waste discharge requirements, waivers, or prohibitions.

All discharges of raw or inadequately treated human waste are prohibited. All sources of untreated or inadequately treated human waste have an allocation of zero.

Discharging entities will not be held responsible for uncontrollable discharges originating from wildlife. If wildlife contributions are found to be the cause of exceedances, the TMDL targets and allocation scheme will be revisited as part of the adaptive implementation program.

Table 7-j Density-Based Pollutant Load and Wasteload Allocations^a for Dischargers of Pathogens in the Sonoma Creek Watershed		
Categorical Pollutant Source	E. coli Density, CFU/100 mL	
	Geometric Mean ^b	90th Percentile ^c
On-site Sewage Disposal Systems (Septic Systems)	0	0
Sanitary Sewer Systems	0	0
Municipal runoff (NPDES Permit No. CAS000004)	<126	<320
Municipal Wastewater Discharge Sonoma Valley County Sanitation District NPDES Permit No. CA0037800	<126	<320
Grazing lands	<126	<320
Dairies	<126	<320
Wildlife ^d	<126	<320

^aThese allocations are applicable year-round. Wasteload allocations apply to any sources (existing or future) subject to regulation by a NPDES permit.

^bBased on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period.

^cNo more than 10% of total samples during any 30-day period may exceed this number.

^dWildlife are not believed to be a significant source of pathogens and their contribution is considered natural background; therefore, no management measures are required.

Table 7-j Density-Based Pollutant Load and Wasteload Allocations^a for Dischargers of Pathogens in the Sonoma Creek Watershed						
Load Allocations^a						
<i>Categorical Pollutant Source</i>	E. coli		Fecal coliform^b		Total coliform^b	
	<u>Geometric mean^c</u>	<u>90th percent- ile^d</u>	<u>Geometric mean^c</u>	<u>90th percent- ile^d</u>	<u>Median^c</u>	<u>Single sample maximum</u>
<u>On-site sewage disposal systems</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Sanitary sewer systems</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
<u>Grazing lands</u>	<u>< 113</u>	<u>< 368</u>	<u>< 180</u>	<u>< 360</u>	<u>< 216</u>	<u>9,000</u>
<u>Wildlife^e</u>	<u>< 113</u>	<u>< 368</u>	<u>< 180</u>	<u>< 360</u>	<u>< 216</u>	<u>9,000</u>

Wasteload Allocation^a						
<u>Categorical Pollutant Source</u>	<u>E. coli</u>		<u>Fecal coliform^b</u>		<u>Total coliform^b</u>	
	<u>Geometric mean^c</u>	<u>90th percent-ile^d</u>	<u>Geometric mean^c</u>	<u>90th percent-ile^d</u>	<u>Median^c</u>	<u>Single sample maximum</u>
<u>Sonoma Valley County Sanitation District NPDES Permit No. CA0037800</u>	<u><126</u>	<u><409</u>	<u><200</u>	<u><400</u>	<u><240</u>	<u>10,000</u>
<u>Municipal runoff (NPDES Permit No. CAS00004)</u>	<u><113</u>	<u><368</u>	<u><180</u>	<u><360</u>	<u><216</u>	<u>9,000</u>

^aThese allocations are applicable year-round. Wasteload allocations apply to any sources (existing or future) subject to regulation by a NPDES permit. Load allocations and the wasteload allocation for municipal runoff reflect a 10 percent Margin of Safety

^bThe allocations for total and fecal coliform shall sunset and shall no longer be effective upon the replacement of the total and fecal water quality objectives in the Basin Plan with *E.coli* based water quality objectives for contact recreation.

^cBased on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period.

^dNo more than 10% of total samples during any 30-day period may exceed this number.

^eWildlife are not believed to be a significant source of pathogens and their contribution is considered natural background; therefore, no management measures are required.

The Margin of Safety section in the proposed Staff Report has been revised as follows:

6.4 Margin of Safety

TMDLs are required to include a margin of safety (MOS) to account for uncertainty in the relationship between pollutant loads and water quality in the receiving water body. The overall level of uncertainty in this TMDL is relatively low, and conservative assumptions in pathogen loading and transport are used. Therefore, a ten percent explicit margin of safety is employed for all load allocations and the wasteload allocation for municipal runoff. This explicit MOS reflects the inherent uncertainty in estimating pathogen loading from nonpoint sources and diffuse sources such as municipal runoff, and in assessing the effectiveness of management measures in reducing pathogen loading. This approach is consistent with the methodology provided in U.S. EPA's Protocol for Developing Pathogen TMDLs (U.S. EPA, 2001).

This TMDL also employs an implicit MOS via the wasteload allocation for wastewater treatment plant discharges. This source is regulated by a NPDES permit with defined effluent limits, therefore there is little uncertainty in pathogen loading. The single wastewater treatment plant discharger in the watershed is the Sonoma Valley County Sanitation District, and its NPDES-permitted effluent limit for pathogen indicators (median total coliform not to exceed 23 MPN/100 mL, and no single sample to exceed 240 MPN/100mL) is far below their wasteload allocation.

TMDLs are required to include a margin of safety (MOS) to account for data uncertainty, growth, critical conditions, and lack of knowledge. Virtually all

~~pathogens have a limited ability to survive outside the human (or other host) body (U.S. EPA, 2001). Pathogen densities are therefore expected to only decrease in the outside environment over time, due to factors such as exposure to sunlight, chemical damage, and predation/competition by native nonpathogenic organisms. This effect provides an implicit MOS to the proposed TMDL.~~

~~Both numeric targets and load allocations are conservatively derived from U.S. EPA's *E. coli* recommendations and current water quality objectives, as described in Section 4 of this report. These *E. coli*-based targets and allocations are more protective of human health than current fecal coliform-based water quality objectives, thereby providing an additional implicit MOS. Therefore, no additional and/or explicit MOS is needed for this TMDL.~~

Comment 1.3: “We recommend you either clearly designate the water bodies as moderately to lightly used areas (limited REC-1 uses), or use a target of 235 CFU/100mL as a 90th percentile single sample value, EPA’s default criteria recommendation, reflecting an appropriate risk for designated beaches (full REC-1 uses).”

It is our understanding that the single sample maximum values provided in U.S. EPA’s 1986 bacteria criteria were intended to be used for closure of formally designated bathing beaches, and that U.S. EPA allows the states discretion in interpreting these values for other Clean Water Act applications. U.S. EPA’s policy on this issue is discussed at length in the 2004 BEACH Act. The BEACH act summarizes U. S. EPA’s current policy on the use of single sample maxima as follows:

EPA recognizes that the single sample maximum discussion in the 1986 bacteria criteria document refers only to beach monitoring, and does not discuss how or whether the single sample maximum should be implemented for other Clean Water Act applications, such as establishing Total Maximum Daily Loads or National Pollutant Discharge Elimination System permit limitations. EPA agrees that the single sample maximum values in the criteria are best used for making beach notification and closure decisions. However, as noted above, they may, but need not, also play a role in implementing other Clean Water Act programs. Except in the beach notification and closure context, EPA expects that States will determine how to use the single sample maximum criteria in the context of their broader programs implementing the Clean Water Act. (EPA, 2004).

For this TMDL we have chosen to adopt the approach described in U.S. EPA’s November 2003 draft Implementation Guidance for Ambient Water Quality Criteria for Bacteria (U.S. EPA, 2003). This draft guidance reinterprets the 1986 criteria as well as the May 2002 draft guidance (U.S. EPA, 2002). The 2003 guidance replaces the different single sample maxima based on intensity of recreational use with upper-percentile values:

EPA’s criteria are essentially constructed as a series of frequency distributions of bacterial densities associated with specific risk levels...over the course of a

swimming season. EPA characterizes each distribution...using a geometric mean and upper percentile values. When the criteria were published in 1986, EPA recommended use of specific risk levels and associated geometric means for fresh and marine recreational waters. Further, upper percentiles of the associated frequency distribution (referred to as “confidence levels” in EPA’s 1986 criteria document) were termed “single sample maximum” values, reflecting one possible way of using the information and applying the criteria. While the risk assessment and scientific basis for EPA’s 1986 criteria remain unchanged, this guidance more fully recognizes and describes the risk management considerations in selecting an appropriate risk level and applying both the geometric mean and upper percentile values. The term “upper percentiles” is used in place of “single sample maximum” to more accurately reflect their derivation and more accurately reflect the range of recommended usage of this aspect of EPA’s criteria. (EPA, 2003, p. 7)

The 2003 guidance then presents a table of recommended upper-percentile criteria for different risk levels. The recommended 90th percentile value for a risk level of 0.8 percent (eight illnesses per thousand swimmers, the lowest risk level addressed in either the guidance or the 1986 criteria) is 409 CFU/100 mL.

Consistent with this guidance, we have chosen to employ this 90th percentile value as a numeric water quality target. Allocations also reflect this value, but with an additional 10 percent margin of safety.

Comment 1.4: “In...the proposed Basin Plan Amendment, at page 4, the sources of pathogens are listed, then discussed. Although the discussion includes wildlife, the list does not. For clarity and completeness, please add wildlife to the list of sources in [the] proposed assessment.”

We have revised the list of potential sources on page 4 of the proposed Basin Plan amendment as follows:

SOURCES

The following source categories have the potential to discharge pathogens to surface waters in the Sonoma Creek watershed:

- On-site sewage disposal systems (septic systems)
- Sanitary sewer lines
- Municipal runoff
- Grazing lands
- Dairies
- Municipal wastewater treatment facility
- Wildlife

Comment 1.5: “In...the proposed Staff Report, the source assessments qualitatively estimate loads for some of the source categories within the watershed, while other categories are not clearly defined. Some source categories are described as “significant”, “potentially significant”, or “not significant”, while other categories are not qualitatively described.

Source estimates should be quantified, if at all possible, if this is not possible, then all sources should be qualitatively assessed.”

We believe that quantitative assessment of each source category in the Sonoma Creek watershed would be subject to a great deal of uncertainty, and would be of little benefit, especially since allocations are density-based rather than load-based. In the Staff Report’s source assessment summary, we qualitatively describe all source categories except dairies. We have revised the discussion of dairies in the source assessment summary as follows:

- **Dairies.** Four dairies currently operate within the Sonoma Creek watershed, all located in the southwest section of the watershed. Currently, the Water Board via NPDES Permit or Waivers of Waste Discharge Requirements regulates all dairies operating in the Sonoma Creek watershed. If not properly managed, dairies have the potential to discharge pathogens to Sonoma Creek. Therefore, dairies are considered a potentially significant source of pathogens. Possible mechanisms of discharge include direct discharge by cows and failure of waste ponds.

Comment 1.6: “ In the proposed Basin Plan Amendment for the Sonoma Creek Watershed, it is not clear in the Table of Allocations, which are load allocations and which are wasteload allocations. Please clarify this.”

The wasteload allocations in this TMDL are for the municipal wastewater treatment facility (Sonoma Valley County Sanitation District) and for municipal runoff. All other allocations are load allocations. We agree that clarification is needed, and have revised Table 7-j of the Basin Plan Amendment accordingly. Please refer to our response to Comment 1.2, which presents the revised Table 7-j.

Comment Letter 2: County of Sonoma Permit and Resource Management Department, Randy Leach, Division Manager-Well and Septic Division. March 27, 2006.

The County of Sonoma Permit and Resource Management Department (PRMD) submitted comments focusing on three issues: 1) scientific justification for key elements of the proposed regulations; 2) financial impacts to existing homeowners and coordination with anticipated new statewide septic system standards (AB 885); and 3) impacts to local government resources.

Comment No. 2.1: “Lack of Scientific Justification for Key Elements of the Proposed Regulations: While we believe that there is clearly a need to improve water quality in Sonoma Creek, we also know that individual property owners and local regulatory agencies have limited resources to devote to this effort. Thus, we believe that public and private efforts must be focused in areas that will achieve the greatest result. For this reason, we believe that the Regional Board should conduct a more critical analysis of the contamination of Sonoma Creek before asking local government and individual home owners to devote financial resources and staff to what appears to be a very broad and expensive program.”

We assert that action is needed now to protect recreational users of Sonoma Creek from waterborne disease. Furthermore, we have identified all actual and potential source categories of pathogens within the Sonoma Creek watershed. Based on water quality sampling data, as well as knowledge of local and national pathogen sources (i.e., rates of failure for septic systems, etc.), the TMDL provides a qualitative assessment of the relative significance of pathogen sources in the watershed. Our approach has been endorsed in the scientific peer review of the Napa River Pathogen TMDL.

We agree that funding and efforts must be focused in areas that will achieve the greatest result. We assume that in this comment, Mr. Leach is referring to the implementation actions required to address pathogen loading from septic system sources, and focus our response accordingly. The implementation plan calls upon the Sonoma County PRMD to develop a prioritized plan to inspect septic systems and repair those that are faulty. We anticipate that the inspection and repair plan submitted by Sonoma County PRMD will focus on high priority areas, and that no one will be asked to repair a system that is not a problem. We look forward to working with Sonoma County PRMD to clarify expectations and assist in development of a plan to address faulty septic systems in the Sonoma Creek watershed.

Water quality data show elevated levels of pathogens downstream of a community (Kenwood) served by septic systems. Water quality data also show significant increases in nitrate levels at the same sites. As stated in section 5.3 of the Staff Report, simultaneous increases in pathogen and nitrate levels downstream of Kenwood constitute overwhelming evidence that septic systems in this community are a major pathogen source. We assert that this data and our analysis warrant the implementation measures required by the TMDL.

Finally, it is important to note that management of wastes (which encompasses all pathogen pollution prevention actions) is required of all source categories with or without this TMDL. In other words, the TMDL does not set forth requirements that are not already called for in existing federal and state policies and regulations. The TMDL process is a mechanism for clarifying these requirements.

Comment No. 2.2: “Specifically, Microbial Source Tracking (MST), including host specific genetic finger printing, should be used to determine the likely source of the *E. coli* contamination. MST is more expensive and time consuming but it would allow for efforts to be focused on the area that will yield the greatest benefit. A more comprehensive investigation and sampling protocol needs to be done to conclusively determine that elevated *E. coli* contamination in Sonoma Creek is a result of septic system discharge rather than naturally occurring contamination from wildlife or other sources. Costs for MST are much lower today and more accurate than it was when the original sampling was completed.”

As noted in our response to Comment No. 2.1 above, we assert that the monitoring program and analysis we conducted are sufficient to conclude that faulty septic systems are a significant source of pathogens in the Sonoma Creek watershed. At monitoring sites downstream from open space areas where wildlife would be expected to be abundant, pathogen levels were

consistently low. These sites are on the upper reaches of Carriger Creek and Sonoma Creek (above Kenwood), areas where contributing watersheds are notably free of development. While wildlife has been found to be a significant pathogen source in other TMDLs, the data indicates that wildlife does not constitute a significant pathogen source in the Sonoma Creek watershed.

As for MST methods, they do have some future promise for identification of microbial sources, and research continues to improve their accuracy and utility. However, they are still not fully developed and validated. In addition, they are expensive and take a considerable amount of time (a few years) to complete. We have reviewed the literature on the current state of MST techniques, and our findings support our position that pursuing MST studies prior to establishing this TMDL are not necessary, and would be of little benefit. A summary of this literature review is presented below:

An article by the United States Geological Survey (USGS), published in December of 2004, reports that:

...Several MST methods using *E. coli* to identify the sources of fecal contamination were less accurate in field application than previously reported....

The USGS-led study, done in cooperation with state and local government agencies and several universities and affiliated consultants, was among the first to test the accuracy of microbial source tracking methods against samples of known origin, called "challenge isolates." Scientists compared the accuracy of several source tracking tools in classifying *E. coli* strains to various sources (humans, dogs, gees, deer, horses, pigs, cows, and chickens).

When researchers sent *E. coli* challenge isolates for testing, many isolates either remained unclassified or were classified to incorrect sources. In all, fewer than thirty percent of challenge isolates were classified to the correct source-animal species by any method.

...Prior source tracking research reports cite accuracy ranges from 60-90 percent for various source tracking methods. The authors of the USGS study attribute the discrepancy between the 60-90 percent accuracy rates and the 20-30 percent accuracy rates they reported to a number of factors:

- Different bacteria may be present in animal guts in different seasons; in the USGS study, challenge isolates were collected 9 months after the reference feces were collected;
- There may be too many strains of *E. coli* bacteria in each animal species for effective application with small reference libraries, such as the 900 reference strains in the USGS study. At a cost of \$10 to \$100 to analyze one reference strain, however, building large source libraries gets expensive rather quickly;
- *E. coli* strains may not be truly specific to one animal source. Some *E. coli* strains have been found in more than one animal source, such as when animals live in close proximity with one another, though no evidence to support this premise was found in the USGS study. (USGS, 2004)

A review of MST methods conducted by the New Jersey Department of Environmental Protection and published in December of 2004 concludes that:

All MST methods require further refinements....One of the biggest impediments to such development is the poor current understanding of microbial population genetics and host specificity....None of the methods take into account the change in composition of the microbial population from the intestinal to the environmental habitat....

Until MST techniques become standardized and validated, and because of the cost and time considerations involved in their use, it would be prudent to use MST methods sparingly and with understanding that the results need to be interpreted carefully. The use of MST methods may be warranted when ... thorough sanitary survey and spatially-intensive monitoring of the waterbody using standard quantitative fecal coliform indicator tests reveal no obvious or likely pollution source(s). (NJDEP, 2004)

A recently published Microbial Source Tracking Guide Document by U.S. EPA (June 2005) concludes that:

- None of the Sources Identifiers (SI) currently used [in MST studies] meet the criteria for an ideal SI, including those that are indicator organisms recognized for regulatory uses.
- The ecology and population biology of some source identifiers, particularly fecal coliforms/*E. coli*, are much better understood than that of others, such as the enterococci and *Bacteroides* ssp. While the high genetic diversity of *E. coli* allows great discrimination between subtypes, it also complicates development of known source libraries.
- The correlation of novel SIs such as *Bacteroides* with levels of conventional indicator organisms and/or with human health outcomes has not been determined, but should be if public health effects are under consideration. (U.S. EPA, 2005)

As stated in the Adaptive Implementation section of the Staff Report, the Water Board welcomes new information that may further the state of knowledge about pathogen sources and their relative contributions. At some point in the future we may support utilization of MST study results, if and when they are deemed to be adequately developed and validated.

Comment No. 2.3. "Financial Impacts to Existing Homeowners and New Statewide Septic System Standards: The Regional Board should more thoroughly investigate the costs that will need to be borne by homeowners [served by septic systems] that are adjacent to 303(d) listed water bodies, specifically Sonoma Creek. The number of impacted homeowners needs to be more accurately estimated and the locations of impacted areas need to be more clearly described."

We acknowledge that there is uncertainty about the exact costs that will need to be borne by homeowners. This uncertainty cannot be avoided at this time because the specific locations and numbers of septic systems to be inspected and repaired (if needed) are to be determined as part of implementation actions taken by Sonoma County PRMD. The Staff Report provides lower- and upper-range cost estimates based upon the best available information, including estimates from stakeholders, parcel data, and Geographic Information System (GIS) tools.

Comment No. 2.4. “The staff report must discuss the anticipated consequences if homeowners are unable to afford the requisite costs for compliance. Will noncompliant systems have to be abated with the consequence of abandonment of homes? Providing grant application assistance to local government agencies and limited financial assistance to homeowners through loan programs is not a sufficient financial impact analysis, particularly given the increasing scarcity of state funds for such purposes.”

The purpose of this TMDL is to improve and protect the water quality of Sonoma Creek and its tributaries for the benefit of residents, visitors, and wildlife. It is not the intent of this TMDL to cause anyone to abandon his or her home. No one will be asked to repair a septic system that is functioning properly. Homeowners with failing septic systems will most likely incur expense to correct conditions that threaten water quality and human health, but a discussion in the Staff Report of hardship conditions for individual homeowners would be speculative. See Section 10.4 of the Staff Report, Economic Considerations, which provides a lower and upper range of cost estimates based upon the best available information.

As we noted in our response to Comment 2.2, the TMDL does not set forth requirements for source categories that are not already called for in existing federal and state regulations and policies. A homeowner’s responsibility for eliminating a public health problem originating on his or her property is well established.

Comment 2.5. Mr. Leach comments that cost estimates for repair of septic systems are based on personal conversations, “without further substantiation,” and do not take into account repair and replacement of nonstandard systems with supplemental treatment, “which are considerably more expensive than what is presented in the report.”

Staff’s cost estimates are based on the best available information, including personal communication with individuals knowledgeable on septic systems.

The Economic Considerations section (10.4) of the Staff Report estimates low and high range costs for the septic system repair program as a whole. Because the specifics of the repair program are not known and repair costs vary greatly depending on the problem, we calculated a low and high range estimate with the intent that the actual cost would be captured within that range.

Since the submittal of this comment letter, we have met with Mr. Leach to discuss the septic system repair costs, and have updated the Economic Considerations section (10.4) of the Staff Report, as shown below, to incorporate information he provided:

Repair Program Implementation

OSDS repair costs vary greatly depending upon the problem. As a low-range cost estimate, we assumed a ~~minor standard system (with a septic tank and a three-bedroom leach field)~~ repair costing approximately ~~\$1,000~~ \$10,000. As a high-range per unit cost estimate, ~~a complete system replacement at \$40,000 is assumed.~~ a non-standard system (including drip irrigation, mound system with pretreatment and disinfection serving a three-bedroom house) repair at \$55,000 is assumed (Leach, 2006). For the low-range estimate, a 10 percent failure rate at a repair cost of ~~\$1,000~~ \$10,000 per system is calculated. For a high-range estimate, a 20 percent failure rate at ~~\$40,000~~ \$55,000 per system is calculated. In unusual cases, repairs have been reported to cost as much as \$70,000. There are also rare situations in which homeowners need to purchase an easement from an adjacent property owner to install a nonstandard system, at a cost of \$100,000. These rare and unusual situations are noted, but not used for cost estimating purposes. The septic systems posing the greatest water quality concern will be determined by the County as a result of its evaluation and monitoring program. For the purpose of calculating cost estimates, the low-range cost estimate assumes 10 percent of the septic systems in the Kenwood area would require a simple repair. The high-range estimate assumes 20 percent of all parcels, within the watershed, containing a blue-line stream and served by septic systems would require replacement. The low- and high-range estimates for septic system repair/replacement are ~~\$43,000~~ \$428,000 and ~~\$9.3 million~~ \$12.8 million, respectively.

Table 16 Sonoma Creek Watershed Implementation Actions, Estimated Costs, and Timing, and Table 17 Summary of Estimated Costs for Sonoma Creek Watershed Pathogen TMDL Implementation (Year 0 through 10) of the Staff Report have been revised accordingly, as shown below:

Table 16. Sonoma Creek Watershed Implementation Actions, Estimated Costs, and Timing

Implementation Action	Responsible Party		One-Time Cost		Annual Cost		10-Year Program Cost	
	Name	No.	Low	High	Low	High	Low	High
Onsite Sewage Disposal Systems (OSDS)								
1. Evaluation/ Monitoring ¹	Sonoma County Permit Resource Management Department		\$0	\$0	\$21,400	\$116,500	\$214,000	\$1,165,000
2. Repair Program Implementation ²	Homeowners		\$42,800 \$428,000	\$9,320,000 \$12,815,000	\$0	\$0	\$42,800 \$428,000	\$9,320,000 \$12,815,000
3. Reporting	Sonoma County Permit Resource Management Department		\$0	\$0	\$6,000	\$24,000	\$60,000	\$240,000
Total			\$42,800 \$428,000	\$9,320,000 \$12,815,000	\$27,400	\$140,500	\$316,800 \$702,000	\$10,725,000 \$14,220,000
Sanitary Sewer System Failures								
1. Comply with applicable NPDES Permit and SSMP requirements	Sonoma Valley County Sanitation District		\$0	\$0	\$0	\$0	\$0	\$0
Total			\$0	\$0	\$0	\$0	\$0	\$0
Municipal Runoff								
1. Inspection/ Monitoring	County of Sonoma, City of Sonoma, Sonoma County Water Agency, Sonoma Developmental Center		\$0	\$0	\$1,740	\$4,200	\$17,400	\$42,000
2. Stormwater Plan Implementation	County of Sonoma, City of Sonoma, Sonoma County Water Agency, Sonoma Developmental Center		\$0	\$0	\$2,000	\$15,000	\$20,000	\$150,000
3. Reporting	County of Sonoma, City of Sonoma, Sonoma County Water Agency, Sonoma Developmental Center		\$0	\$0	\$0	\$0	\$0	\$0
Total			\$0	\$0	\$3,740	\$19,200	\$37,400	\$192,000
Grazing Lands								
1. Technical Assistance/ Stewardship	Dairies and Ranchers	10	\$10,000	\$10,000	\$5,000	\$5,000	\$55,000	\$55,000
2. Implement Management Measures	Dairies and Ranchers	10	\$130,376	\$651,882	\$13,038	\$65,188	\$247,715	\$1,238,576
3. Reporting	Dairies and Ranchers	10	\$0	\$0	\$5,000	\$5,000	\$50,000	\$50,000
Total			\$140,376	\$661,882	\$23,038	\$75,188	\$352,715	\$1,343,576
Dairies								
1. Comply with applicable Waste Discharge Requirements (WDRs) or waiver of WDRs	Dairies	4	\$0	\$0	\$0	\$0	\$0	\$0
Total			\$0	\$0	\$0	\$0	\$0	\$0
Municipal Wastewater Discharge								
1. Comply with applicable NPDES permit	Sonoma Valley County Sanitation District		\$0	\$0	\$0	\$0	\$0	\$0
Total			\$0	\$0	\$0	\$0	\$0	\$0
GRAND TOTAL			\$183,176 \$568,376	\$9,981,882 \$13,476,882	\$54,178	\$234,888	\$706,915 \$1,092,115	\$12,260,576 \$15,755,576

Table 17. Summary of Estimated Costs for Sonoma Creek Watershed Pathogen TMDL Implementation (Year 0 through 10)

Source Category	One Time Cost (Site Development/Infrastructure)		Annual Costs		Ten-Year Program Cost	
	Low	High	Low	High	Low	High
Onsite Sewage Disposal Systems (OSDS)	\$42,800 \$428,000	\$9,320,000 \$12,815,000	\$27,400	\$140,500	\$316,800 \$702,000	\$10,725,000 \$14,220,000
Sanitary Sewer System Failures	\$0	\$0	\$0	\$0	\$0	\$0
Municipal Runoff	\$0	\$0	\$3,740	\$19,200	\$37,400	\$192,000
Grazing Lands	\$140,376	\$661,882	\$23,038	\$75,188	\$352,715	\$1,343,576
Dairies	\$0	\$0	\$0	\$0	\$0	\$0
Municipal Wastewater Discharge	\$0	\$0	\$0	\$0	\$0	\$0
GRAND TOTAL	\$183,176 \$568,376	\$9,981,882 \$13,476,882	\$54,178	\$234,888	\$706,915 \$1,092,115	\$12,260,576 \$15,755,576

Comment 2.6. "The staff report must also address the relationship and mandates of the pending statewide standards for septic systems (AB 885) as they would relate to the new proposed basin plan amendment. We are concerned the new statewide septic regulations and the Basin Plan Amendment will cause duplication of effort and be at cross purposes in terms of parcels adjacent to 303(d) impacted waterways and repair and replacement of septic systems. It would seem to make sense to wait for the adoption and approval of the statewide septic regulations before adoption of the Basin Plan Amendment."

We are confident that the proposed Basin Plan amendment will not conflict with statewide standards currently being developed pursuant to AB 885 . We therefore assert that waiting for adoption of the statewide regulations prior to approval of this proposed Basin Plan amendment is not necessary. This TMDL requires Sonoma County PRMD to develop and submit an inspection and repair plan, to identify and correct deficient septic systems. The County will need to meet AB 885 requirements in developing its septic system program. The timeframe put forth in the implementation plan gives the County time to update or modify its program to comply with these forthcoming regulations. Given that the plan is subject to review and approval by the Water Board's Executive Officer, it can also be modified in the future to address any new requirements. In addition, Water Board staff will work with Sonoma County PRMD, during development of its inspection and repair plan, to help ensure consistency with statewide regulations."

To provide further clarification, section 9.4 Plans & Policies in the Sonoma Creek Watershed, has been revised as follows:

Then, in 2000, pursuant to Assembly Bill 885 (AB 885), the California Water Code (CWC) was amended to require the State Water Board to develop

statewide regulations or standards for permitting and operation of septic systems by January 1, 2004 (CWC Sections 13290 to 13291.7). The regulations are required to address, in part, new systems, systems subject to major repairs, systems adjacent to 303(d)-listed impaired waters, and minimum requirements for monitoring to determine system performance.

In 2002, the CWC was further amended to specify that all existing Waivers of Waste Discharge Requirements for septic systems would expire on June 30, 2004 in anticipation of the new State Water Board regulations (CWC Section 13269(b)(2)). This amendment also requires any new Regional Water Board septic system regulations to be consistent with the new State Water Board regulations. State Water Board regulations are currently being developed, with adoption projected for late 2006. Following adoption of the statewide regulations, on-site system programs at both the Regional Water Board and County level will need to be updated to incorporate and implement the new requirements. To prevent conflicts with this TMDL and other site-specific and science-based cleanup plans, Regional Water Board staff is involved in the AB 885 stakeholder process. A key stakeholder comment is that the AB 885 regulations should specifically recognize existing programs in watersheds where a TMDL has been adopted.

Comment 2.7: Mr. Leach comments that Sonoma County PRMD staff would like to work with Water Board, prior to adoption of the Basin Plan Amendment, to better define local government responsibility. He also comments that the staff report is “unclear regarding the specific tasks required in development of an implementation plan and management plan”. He states that “PRMD already administers a very comprehensive program for the regulation of septic systems. This not only includes permitting for new systems and upgrades to existing systems, but also an annual operational permit program for non-standard systems.” Mr. Leach also expressed concern about “adding a significant new regulatory and/or monitoring component” to Sonoma County PRMD’s existing program.

We acknowledge Sonoma County PRMD’s existing program. However, a gap in its program is the inspection and repair of existing “standard” systems, which are not generally inspected. Addressing this gap is necessary to prevent the discharge of inadequately treated human waste to Sonoma Creek and its tributaries.

We are happy to work with Sonoma County PRMD staff to clarify the Water Board’s expectations regarding a plan to evaluate septic systems and repair problems. The Staff Report and proposed Basin Plan Amendment provide flexibility for Sonoma County PRMD to formulate a plan that is prioritized and site-specific. We look forward to meeting to discuss and refine the details of the septic system evaluation and repair program.

Comment 2.8. Mr. Leach comments that the staff report “needs to include a more complete comprehensive assessment of the costs [and resources needed by] local government to implement the proposed Basin Plan Amendment.” He suggests that this assessment should also identify options for funding.

The Staff Report (in section 10.4 Economic Considerations) provides low and high-range estimates of the cost to implement measures to reduce pathogen discharges from Onsite Sewage Disposal Systems. We developed this TMDL with a goal of providing flexibility to responsible parties in developing their best effective means of compliance. It is not possible to predict the exact costs, and we therefore provide low and high-range estimates. As described in the response to comment 2.7, we have revised the unit costs used in the cost estimates to incorporate information provided by the commenter. The Staff Report, Section 10.4, also discusses potential sources of funding for nonpoint source pollution control and implementing TMDL actions.

Comment 2.9. “Sonoma County is highly supportive of improving the water quality in the Sonoma Creek watershed and in all of our 303(d) impacted streams. We look forward to working collaboratively with the Regional Board in establishing a reasonable science based Basin Plan Amendment and TMDL for the Sonoma Creek watershed.”

We note and appreciate the comment.

Comment Letter No. 3: Sonoma County Water Agency, Don Seymour, Water Agency Principal Engineer. March 26, 2006.

Mr. Seymour notes that Sonoma County Water Agency (SWCA) is a Special District providing wholesale water supply to residents of Marin and Sonoma Counties. He also notes that SWCA is responsible for operating the Sonoma Valley Wastewater Treatment Plant and collection system on behalf on Sonoma Valley County Sanitation District, and is a co-permittee under the Phase II General Permit for Small Municipal Separate Storm Sewer Systems and implements the associated Storm Water Management Plan. He submitted several comments regarding load allocations and the scientific basis of the TMDL.

Comment 3.1: “The TMDL does not allocate loads. Load allocations and target concentrations appear to be same. If calculated, load allocation should be the density of the pathogen multiplied by the volume of water released into a given volume of receiving water.”

The TMDL does include a specific load allocation (or, for point sources, wasteload allocation) for each identified source category. These allocations are provided in Table 7-j of the Basin Plan Amendment, and have been revised in response to comments received. Please refer to our response to Comment no. 1.2.

We understand that the commenter is suggesting that the TMDL and allocations should be mass-based. For many pollutants, TMDLs are expressed on a mass loading basis. For pathogen indicators, however, EPA’s protocol for developing pathogen TMDLs (EPA, 2001) states that TMDLs may be density-based. We have chosen to express this TMDL and its allocations based on density because exposure to pathogen densities determines the risk of waterborne illness. A

density-based TMDL is more protective of human health. In addition, a density-based approach is consistent with other pathogen TMDLs developed in the state, and is supported by U.S. EPA.

Comment 3.2: “SWCA is unclear why separate TMDLs are being proposed for the Sonoma Valley Treatment Plant and the collection system. Pathogen loading resulting from untreated waste does not result in a greater health risk than pathogen loading resulting from the release of adequately treated effluent.”

We interpret this comment to ask why different allocations are proposed for treated domestic wastewater discharges (effluent) and for sanitary sewer collection systems. The answer is that the nature of the discharges is different.

Discharges from sanitary sewer collection systems, such as from leaking sewer lines, or overflowing manholes, are untreated and constitute discharges of raw sewage. Prohibition 15 of the Basin Plan prohibits the discharge of raw sewage to any waters. Therefore, the allocation for sanitary sewer collection systems must be zero.

Treated domestic wastewater discharges, on the other hand, are permitted by NPDES permits and are subject to effluent limits protective of beneficial uses. Therefore, the allocation for the domestic wastewater treatment plant discharge is set to be equal to the numeric targets. Disinfection is part of the treatment process, and the resulting effluent has pathogen levels many orders of magnitude below levels in raw sewage.

Comment 3.3: “More rigorous sampling and analysis is required to evaluate source identification. For, example the staff report... appears to assume that wildlife is not a significant source of pathogen loading to the watershed based on the limited data set. As stakeholders in the watershed, SWCA and the Sonoma Valley County Sanitation District would be willing to participate in additional studies that would better assess: 1) pathogen identification; 2) background pathogen levels in the watershed; and 3) the watershed’s ability to assimilate pathogen loading. Additional information provided by these additional studies is essential for developing a realistic and scientifically based TMDL.”

We appreciate SWCA and Sonoma Valley County Sanitation District’s offer to participate in studies to better understand the pathogen problem in the watershed. We agree that additional sampling and analysis would provide useful information, but maintain that action can begin now. As discussed in the Adaptive Implementation sections of the Basin Plan Amendment and Staff Report, we propose an adaptive approach that allows actions to take place now to address the pathogen impairment, while we continue to gather information. We look forward to coordinating with SCWA and other stakeholders to further refine the evaluation/monitoring plan.

Please refer to our response to comments nos. 2.1 and 2.2, which address the comments regarding wildlife’s pathogen contribution and the scientific basis of this TMDL.

Comment 3.4 “In the section summarizing the Pollutant Source Assessment, homeless encampments have been associated with municipal runoff. While likely a significant source of waterborne pathogens, SCWA has no legal authority to address or mitigate this possible source.”

The implementation plan of this TMDL does not require anyone to take actions regarding homeless encampments. It does require municipal runoff agencies to implement their existing stormwater management plans, and amend them as needed to reduce pathogen loading from human and animal waste. One possible management measure to reduce human waste discharges is to provide adequate restroom facilities.

Comment 3.5. “It would be helpful if the sampling procedures used during the study conducted cooperatively by the Water Board and San Francisco Estuary Institute were described in the staff report by the Water Board.”

Sampling was conducted in accordance with the State Water Board’s Quality Assurance Management Plan for the Surface Water Ambient Monitoring Program. The following addition has been made to Section 3.3, Bacterial Water Quality Studies in the Sonoma Creek Watershed, of the Staff Report:

Beginning in 2002 the Water Board, in cooperation with the San Francisco Estuary Institute (SFEI), and with laboratory support from U.S. EPA, conducted an intensive study to assess fecal coliform levels in the Sonoma Creek watershed. Sampling was conducted in accordance with the State Water Board’s Quality Assurance Management Plan for the Surface Water Ambient Monitoring Program.

Comment 3.6. “There is little or no data collected from the Sonoma Creek Watershed to support the validity of the Water Board’s assumptions regarding pathogen die-off.”

The source of human pathogens is usually fecal waste from humans and other warm-blooded animals. Virtually all pathogens have a limited ability to survive outside of a warm-blooded host. Given this knowledge of the nature of pathogens, it is not necessary to collect data from the Sonoma Creek watershed to further study die-off. Please also note that this TMDL has been revised to include an explicit Margin of Safety, as discussed in the response to comment no. 1.2.

Comment 3.7. “The Water Board’s Staff Report assumes that during the dry season, pathogen transport is dominated by groundwater inflow. Although limited sections of creeks in the watershed may be gaining, seepage runs conducted as part of a multi-year hydrogeologic study of the Sonoma Valley performed cooperatively by the U.S. Geological Survey and SCWA indicates that Sonoma Creek is characterized by many losing reaches during the dry season.”

The Staff Report states that “...pathogen delivery is predominantly through groundwater inflow (possibly including septic system leachate), direct deposition (e.g. animals in the creek), and low-volume runoff from human activities (e.g. lawn and landscaping watering, car

washing, washing of animal holding areas, etc.).” We understand the commenter to suggest that there may be streams where streamflow is infiltrating into groundwater, and that groundwater-transported pathogen sources (such as septic system leachate or leaking sewer lines) would not reach these surface waters in the dry season. We assert that in locations where the stream flow level is higher than the water table in nearby areas, significant numbers of pathogens may still enter the stream from failing septic systems or leaking sanitary sewer lines.

Comment Letter no. 4: Sonoma Ecology Center, Rebecca Lawton, Geologist, Research Program Manager. March 27, 2006.

Sonoma Ecology Center expressed appreciation for the work performed in developing this TMDL.

We note and greatly appreciate the following supportive statements:

“The Sonoma Ecology Center would like to add its voice to the chorus of support for implementing the proposed actions.”

“Hotspots identified in the 2002-2003 study were confirmed by supplemental monitoring in 2004-2005... This confirmation presents a strong case that the elevated E. coli densities found downstream of Kenwood are not anomalous and need to be addressed.”

“The source assessment summary...gives sound reasons, supported by detailed information throughout the report, that the sources most important to address first if Sonoma Creek is to become less pathogen impaired are septic systems, sanitary sewer line failures, municipal runoff, cattle grazing, and improperly managed dairies.”

“The implementation action[s]... seem reasonable and thoughtfully presented. The actions spread the responsibility among the agencies best suited to address pathogen loading.”

Ms. Lawton also provided the following comments:

Comment no. 4.1. “...Should a treatment facility be required for Kenwood, which could encourage growth in the area, associated impacts to the marsh, groundwater supply, and environmental quality (such as air pollution) would need to be addressed as well.”

The TMDL requires all source categories to take actions to reduce discharges of pathogens, but it does not specifically require that a treatment facility be built for Kenwood or any other area. At this point, it would be speculative to discuss the environmental impacts of a treatment facility project.

Any treatment facility project would be subject to environmental review under CEQA, and CEQA compliance would be the responsibility of the lead agency for the project.

Comment no. 4.2. "We're often asked by Sonoma Valley residents whether it's okay for their kids to swim in the creek. We'd like to be able to answer with a resounding 'yes', but at the moment we feel we must qualify any response with the knowledge that we've gained through the pathogen TMDL."

We look forward to working with the Sonoma Ecology Center and other interested parties to protect those who recreate in Sonoma Creek from waterborne illness.

II. STAFF RESPONSES TO ISSUES RAISED AT THE APRIL 12, 2006 HEARING BEFORE THE WATER BOARD

Many of the comments raised at the Water Board hearing are addressed in our responses to peer review or public comment letters. In addition, some of the comments were addressed by Water Board staff during the hearing. Below we summarize and respond to issues raised in oral testimony at the April 12, 2006 that are not addressed elsewhere.

Commenter no. 1: Don Seymour, Water Agency Principal Engineer, Sonoma County Water Agency

Comment 1.1: Mr. Seymour commented that a conceptual model, describing how pathogens enter and move through the watershed, is needed. He referenced the San Luis Obispo Creek Pathogen TMDL developed by the Central Coast Regional Water Quality Control Board as an example of a TMDL that adequately describes pollutant sources.

Section 3 of the Staff Report, Problem Definition and Section 5 Pollutant Source Assessment, provides a qualitative description of pathogen sources, describes how they are transported to surface waters, and discusses the fate of pathogens once they reach surface water.

With regard to the San Luis Obispo Creek Pathogen TMDL, an approach that is appropriate for one TMDL is not necessarily appropriate for another TMDL. The San Luis Obispo Creek watershed has different characteristics and pathogen source categories as compared to this TMDL. One significant difference is that a portion of San Luis Obispo Creek is in a tunnel through the downtown area, and this tunnel receives pathogens from many sources, including stormwater and leaking sewer lines. In addition, this tunnel provides habitat for pathogen sources such as pigeons, bats, and rodents. This situation does not apply to Sonoma Creek. Nonetheless, the two TMDLs do share some commonalities in the approach to pollutant assessment: analyzing water quality data and land-use information to assess pathogen sources. The Sonoma Creek pathogens TMDL qualitatively assesses the relative significance of all pathogen source categories on a watershed basis. This approach has been validated by the scientific peer reviewer.

Commenter no. 2: Randy Leach, Division Manager- Well and Septic Division, Sonoma County Permit Resource Development Department

Comment 2.1: Mr. Leach referenced the Final Interim Report for Bodega Bay- Campbell Cove Tidal Circulation Study, Water Quality Testing and Source Abatement Measures Project as an example in which Microbial Source Tracking (MST) studies were conducted prior to requiring abatement measures. He notes that, in this study, high pathogen levels were found to be from wildlife (marine mammals, seabirds).

For reasons discussed in our response to written comments, MST studies were not conducted during the development of this TMDL but may be utilized in the future as part of the adaptive implementation plan. The pathogen contribution from wildlife was evaluated during the source

assessment phase of this TMDL; staff's analysis indicated that wildlife is not generally a significant pathogen source in the Sonoma Creek watershed. In addition, evaluation methods vary depending upon the project, and the Bodega Bay- Campbell Cove system (A tidal beach) is very different from the Sonoma Creek watershed, with different land use characteristics. For septic systems, the implementation plan calls for a plan to evaluate septic systems and repair problems. No one will be forced to replace or repair a system that is not faulty.

Commenter no. 3: Kathy Hayes, Government Affairs Director, North Bay Association of Realtors

Comment 3.1: Ms. Hayes stated that there is "a lot of fear among homeowners...about regulations from the Regional Water Quality Board."

There is no intention on the part of Water Board members or staff that any homeowner will lose his or her home as a consequence of the need to repair a failing septic system or sewer lateral. We will support the County in ongoing efforts to educate homeowners about the importance of septic system maintenance and repairs, and the potential of a single failing system to impair a nearby stream or creek. We will also help to clarify the availability of grants and loans for low-income homeowners whose sanitary systems need repair.

Comment 3.2: She asks that the board "figure out ways to include [local homeowners] in the [TMDL] process."

We are open to suggestions on how to better include residents in the TMDL process. A number of residents attended the public workshop and CEQA scoping meeting for the Sonoma Creek Pathogens TMDL, at Sonoma City Hall on December 1, 2005; the meeting was noticed prominently in the local newspaper and covered in the press. In addition, we issued a Public Notice in the local newspaper regarding this TMDL, and invited public comment.

Comment 3.3: She questions the discharge prohibition against untreated or inadequately treated human waste, which she characterizes as giving homeowners "no slack."

Ms Hayes is correct that there are no exceptions. This is based on the Basin Plan's region-wide prohibition against the discharge of raw or inadequately treated sewage.

Comment 3.4: Ms Hayes indicates that she reads the review drafts to mean that the zero discharge prohibition will be reviewed for appropriateness in five years, at which time the standard may be relaxed.

We do not anticipate revising the zero discharge prohibition for faulty septic systems or sewer lines at any time in the future.

Comment 3.5: Ms Hayes expresses uncertainty about what the county and property owners will be required to do to comply with the TMDL.

Property owners and the County are expected to comply with conditions specified in the implementation plan. TMDL targets and allocations are not themselves directly enforceable; only actions specified in the Implementation Plan or in the course of the adaptive implementation process are. The Water Board expects the county to develop a program for prioritizing and inspecting septic systems and sewer connections in areas where pathogens are detected in local waterways. Homeowners will be required to comply with the existing county program and any new requirements. However, continued discharge of untreated septage to surface waters is in violation of the Basin Plan, and may subject a property owner in violation to Water Board enforcement actions.

Comment 3.6: She questions the relative numbers of homes within hotspot target areas in the Sonoma Creek and Napa River watersheds.

We understand this comment to question the disparity between the number of potential problem septic systems called out in the Napa River and Sonoma Creek TMDLS (860 and 1165 systems, respectively). These numbers differ due to differing patterns of water quality impairment and residential development in the two watersheds. While we are confident in these estimates, we anticipate refining them during adaptive implementation.

Comment 3.7: Ms. Hayes requests cost estimates for dairies.

As stated in the Staff Report (Section 10.4), the four dairies in the Sonoma Creek watershed are already regulated. The proposed Basin Plan amendment does not impose any new requirements or actions for the confined animal operations associated with dairies. Therefore, no cost estimates are calculated in the Staff Report.

Dairies may incur some additional costs in the future, associated with implementation of management practices for pasturelands. Costs are likely to vary widely depending on geography, pattern of animal use, and management practices selected to achieve management goals. (See the Grazing Lands Runoff section of the Staff Report, Section 10.4.)

Comment 3.8: Ms. Hayes asked, “What’s the ‘ask’ of property owners, and what are we going to do with property owners that can’t meet the standard? And what financial resources are in place to both help the county and the property owners?”

As explained in the Staff Report (Section 10.4), costs will vary with the nature of the failure, location of the parcel and system, soils characteristics, etc. Section 10.4 provides the range of costs expected.

There are a number of potential funding sources to which the County could apply for cost assistance, including Proposition 13, 40, and 50 funds. The State Water Resources Control Board’s Small Community Wastewater Grant Program may have funds available for small treatment works. Funds, if available, are awarded on a sliding scale based on the median household income in the designated project area.

As for financial resources that may be available to homeowners, Sonoma County's Community Development Commission manages a loan program for resident homeowners of low-to-moderate income, which may support septic system repairs, installation of a new system, or construction costs to connect with a sewer main if one is available. Funding for the program is from the federal department of Housing and Urban Development. Depending on location, other funding sources may include redevelopment funds in Redevelopment Areas of the County or the City of Sonoma. If a municipality makes application to the State Water Resources Control Board, the Board may be able to make state revolving funds available to supply collateral to local banks for low-interest loans to homeowners for repair of systems causing water quality problems.

Comment 3.9: Ms. Hayes offered the Realtors' Association's support in helping to provide opportunities for outreach to the community.

Staff gratefully acknowledges her offer and looks forward to working with the Board of Realtors in the future.

Board members made a number of comments and suggestions at the April 12 meeting. These are addressed below.

Board Member Wolff noted that while "compliance will ... be determined under plans that will be submitted later" in the adaptive management process, staff need to clarify for residents and other stakeholders, where compliance will be measured. "For example, for an on-site sewage disposal system [with] an *E. coli* allocation of zero, is that zero at the property line, or [in the nearest] surface water?"

In general, all dischargers and potential dischargers in the watershed need to take reasonable actions to prevent human and animal waste from reaching surface waters. Compliance with the TMDL will be assessed based on implementation of appropriate management measures and/or compliance with applicable permits. At the Water Board hearing, Ms. Whyte of the Board's staff added that in the case of septic systems, compliance will be determined "based on the operation of the system itself, in addition to monitoring [in the] water body." Site-specific evaluation will consider the age of systems, how well they are functioning, depth to groundwater, depth to bedrock, and soil permeability. A weight-of-evidence approach will be used to identify problem systems. This approach is preventative, meaning that with septic tanks we do not wait until we find evidence of human waste in downstream waters to make a determination of non-compliance. We require that all septic tanks meet basic standards and function properly.

For grazing lands, operators are expected to implement practices to prevent animal waste from entering creeks. We anticipate that, as the County develops its plan and implementation schedule for evaluating septic systems and correcting deficiencies, and as WDRs and waiver conditions for grazing lands and confined animal facilities are developed or amended, measures of compliance will be further defined.

Board member Wolff requested that we add to the Staff Report context for the pathogen TMDL in terms of other impairments in the watershed, and the relative importance of each pollutant (and TMDL) to the health of the watershed. Where is the overlap? Perhaps some of the “same measures that control pathogens will control sediments,” for example; this information would be helpful to stakeholders.

We appreciate the suggestion. Sonoma Creek is listed as impaired by pathogens, nutrients, and sediment, and these pollutants impact many of Sonoma Creek’s designated beneficial uses. In addition to this pathogen TMDL, we are also working on TMDLs to address sediment and nutrients. As we continue to develop and implement TMDLs in the watershed, we expect to make significant strides in restoring these uses. The following text has been added to the Staff Report, Section 2 Watershed Description.

The watershed contains about 465 miles of blue-line streams mapped by the USGS (Sonoma Creek Watershed Limiting Factors Analysis, Sonoma Ecology Center, December 2004) and supports the following beneficial uses, as defined by the Basin Plan: cold freshwater habitat, warm freshwater habitat, water contact recreation, noncontact water recreation, fish migration, preservation of rare and endangered species, fish spawning, warm freshwater habitat, and wildlife habitat. In addition, the Sonoma Creek watershed provides habitat for several native species of concern, including steelhead trout (*Oncorhynchus mykiss*), Chinook salmon (*Oncorhynchus tshawytscha*), and California freshwater shrimp (*Syncaris pacifica*).

Sonoma Creek is also listed as impaired by nutrients and sediment. It is likely that actions implemented to reduce pathogen loading will also reduce nutrients and sediment. The mechanisms and the effects of impairment differ for each pollutant. Pathogens impair contact recreational use by posing health risks to users. Excess nutrients impair aquatic habitat by depleting dissolved oxygen, smothering bottom habitat, and in extreme cases through acute toxicity. Excess sediment degrades stream habitat in a number of ways, including clogging of spawning gravels, intensifying streambed scour during peak flows, and filling of deep pools.

Although the mechanisms by which these pollutants (pathogens, nutrients, and sediment) in Sonoma Creek differ, these pollutants do share some common sources. As examples, faulty septic systems are a source of both pathogens and nutrients, and improperly managed grazing operations are likely to be sources of pathogens, nutrients, and sediment. Therefore, many (but not all) of the implementation actions prescribed in this TMDL will also satisfy implementation requirements for the other pollutants.

The following section has also been added to the Staff Report:

9.9 Relationship to Other TMDLs in the Sonoma Creek Watershed

In addition to pathogens, Sonoma Creek is also listed as impaired by nutrients and sediment. Some of the implementation actions required in this TMDL will also satisfy implementation requirements for other pollutants impairing this

watershed because the pollutants have several common sources. For example, by meeting conditions of the Water Board's grazing waiver program, grazing land operators will likely meet the requirements of all three TMDLs. We anticipate that pathogen TMDL requirements for septic systems and sewer lines will generally fulfill requirements of the nutrient TMDL.

However, it should be noted that not all actions that abate pathogen pollution from septic systems also reduce nutrient pollution. For example, incorporating a disinfection unit into a septic system will control pathogens, but has no effect on nutrient loading to nearby waters. This is because nutrients (especially nitrate) can be more mobile in soil than pathogens. (Pathogens, being particles, are more readily retained in the soil than nitrate, a chemical solute.) Therefore, setbacks from waterbodies deemed to be appropriate for pathogens may not be sufficient for nutrients.

Board Member Wolff commented about the need to make strategic adjustments over time by prioritizing efforts and resources in the watershed. He also suggested that certain types of land uses or hotspot areas be initial priorities.

To address the pathogen impairment, all source categories are required to take action. Many implementation efforts are already underway within existing programs. The implementation measures required in the Basin Plan Amendment recognize and build upon existing efforts, and encourage many source categories to prioritize efforts in high-priority areas. Water Board staff will focus our efforts on those areas posing the greatest water quality risk. In the Sonoma Creek watershed, our source analysis indicates that faulty septic systems in the Kenwood area are a significant source of pathogens, and we expect to focus on this area initially.

In the context of "strategic adjustments over time" to the TMDL, Board Member Wolff suggested an additional "soft" section of the TMDL, headed "watershed approach" or "watershed compliance." To summarize his remarks, he suggested that if groups of property owners with common land use got together to set priorities for investments as well as compliance, that the Water Board might afford them "preferential treatment when it comes down to enforcement," possibly providing relief to "individual property owners who can't or don't comply, as long as bigger problems are being solved."

A watershed approach that allows coordination among individual dischargers provides many benefits. A group of people that comes together around local water quality issues is an important resource for long-term health of the watershed. Groups with incentives to work together are more likely to innovate solutions while they avoid state interference with individual actions. We hope that watershed groups will participate and assist in many of the functions that will be called for in successful implementation of this TMDL, including developing appropriate management practices, conducting group or watershed-based monitoring, sharing technical knowledge, and obtaining funding. In West Marin County residents on the eastern shoreline of Tomales Bay, working in cooperation with Marin County, have secured grant funds to develop a community wastewater treatment system.

We encourage watershed groups and other coalitions to coordinate, with the primary goal of achieving water quality targets, and a secondary goal of reducing the regulatory burden on individual members of the group as long as the designated reach or waterbody meets TMDL water quality targets. We must note, however, that the state's Nonpoint Source Enforcement Policy makes it clear that individual dischargers continue to bear ultimate responsibility for complying with water quality requirements and orders.

In clarify our support of watershed groups, the following section has been added to the staff report:

9.8 Watershed Groups and Stakeholder Partnerships

Water Board staff encourages, but does not require, watershed groups and stakeholder partnerships to coordinate, with the ultimate goal of achieving water quality targets. In many cases, watershed groups may assist and participate in many actions to facilitate implementation of this TMDL, including developing appropriate management practices, conducting group or watershed-based monitoring, sharing technical knowledge, and obtaining funding. Watershed groups can assist participating individual dischargers achieve compliance. However, as required by the state's Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program, individual dischargers continue to bear the ultimate responsibility for complying with water quality requirements and orders.

Boardmember Waldeck encouraged staff to continue to communicate with stakeholders to provide clarification, in order to address concerns.

We agree that communication is key to working with our stakeholders and in providing assurance as to the intent of this TMDL. Since the April hearing, we have met with staff of the Sonoma County Permit Resource and Management Department to discuss their concerns and our expectations for their septic system evaluation and repair program. (See our response to Randy Leach's comment no. 2.7.) We will continue to work with stakeholders throughout the TMDL implementation process.

Board Member Waldeck encouraged staff to "not to relax any of the requirements," making specific references to "people that have a few sheep, a few cows in their backyard." He said that he "would want extra strong regulations on people that [have small flocks or herds]" because small operators may be less concerned with pollution prevention than large ranches. Mr. Waldeck noted that "If it turns into the cool thing to take some of your vineyard land and raise llamas on it, I want regulations in place to protect the watershed."

We appreciate the comment. A small number of animals can indeed cause serious water quality problems if management measures are not in place to prevent waste from entering surface waters. The state's *Policy for Implementation and Enforcement of the Nonpoint Source Pollution Control Program* requires that all current and proposed nonpoint source discharges (such as animal waste) must be regulated under WDRs, waivers, or basin plan prohibition, or some

combination of these tools. In accordance with this policy, staff will work to address discharges of animal waste from both large and small facilities. Efforts underway include development of grazing lands WDRs or waiver conditions. Small confined animal facilities may also be addressed in the next renewal of the confined animal facilities waiver, anticipated in 2008.

III. STAFF RESPONSES TO PEER REVIEW COMMENTS ON DECEMBER 1, 2005 PROJECT REPORT

Dr. Saied Mostaghimi of Virginia Polytechnic Institute provided independent scientific peer review for this TMDL. We are grateful to Prof. Mostaghimi for the time and attention he invested in his review.

Areas of Agreement

We are pleased to note the positive feedback provided by Professor Mostaghimi:

- **“The nature of impairments in the watershed is well-described and well-established.”**
- **“The monitoring program used in the study [during the source assessment phase] seems to be sufficient for evaluation of the potential sources of pathogens and their relative significance.”**
- **“Use of concentration for TMDLs, as opposed to loads, is justified.”**
- **“I believe the report is well-written, scientifically sound and that the procedures used are defensible.”**

Comment Area: 1. Problem Statement

Comment 1.1: “The introduction presents an excellent description of the watershed. The percent land uses add up to 95 percent only; need to clarify what the rest of the land is (5 percent). A general description of topography (land slopes) will also be useful in interpretation of the results.”

We agree that such additional information regarding the watershed’s land use and topography will be useful, and that the numbers should add up. In response to this comment we have modified the Staff Report (Section 2. Watershed Description) as follows:

The Sonoma Creek watershed is located in the California Coast Ranges north of San Pablo Bay (Figure 1), covering an area of approximately 166 square miles (430 km²). The main stem of Sonoma Creek flows in a southeasterly direction from headwaters on Sugarloaf Ridge through the Sonoma Valley before discharging to San Pablo Bay. The watershed ranges in elevation from sea level to the peak of Bald Mountain at 2,739 feet, and from the north-south trending ridgeline of the Sonoma Mountains in the east to the Mayacamas Mountains in the west. The mainstem of Sonoma Creek flows in a southeasterly direction from headwaters on Sugarloaf Ridge through the Sonoma Valley before discharging to San Pablo Bay. Numerous tributaries enter the main stem from the mountains that rise on both sides of the valley. These upper and central watershed tributaries are characterized by steep bedrock channels (with slopes from 0.10 to greater than 0.40), while channel slopes in the mainstem channel range from 0.001 to 0.02 (Sonoma Ecology Center, 2004).

Average annual rainfall in the watershed ranges from approximately 23 inches in the lower portions of the Sonoma Valley to greater than 50 inches in the highest slopes of the Sonoma Mountains to the west and Mayacamas Mountains to the

east. The majority of rainfall occurs from November through April, with heaviest rainfall occurring from December through February. This rainfall regime results in two distinct seasons in the watershed. During the winter wet season stream flow and pollutant loading are dominated by precipitation-driven surface runoff. In contrast, groundwater inflow and runoff from human activities dominate during the dry summer months.

Major land cover types in the watershed are forest (approximately 30 percent), grassland/rangeland (20 percent), and agriculture (30 percent; a large and growing percentage of this is vineyards), and wetlands and sparsely vegetated —land (5 percent). Developed land—residential, industrial, or commercial—accounts for approximately 15 percent of the watershed. (Association of Bay Area Governments, 2000)

Comment 1.2: “Table 2 [Water Quality Objectives for Coliform Bacteria] indicates values are based on minimum of 5 consecutive data points, equally spaced, taken during a 30-day period. Data presented from the intensive study were taken in 5 weeks; need to explain the reason for differences in sampling scheme in the study. One question to raise is how did the rainfall amounts during the intensive study period (2002-2003) compare with long-term average rainfall for the region?”

In fact there is no difference between the sampling scheme used in the 2002-2003 Water Board/SFEI intensive study and the sampling protocol for the water quality objectives presented in Table 2 of the Staff Report. The intensive study data are presented as geometric means of five weekly samples, with the first sample collected day 1, the second sample collected day 8, etc. The fifth sample was taken on day 29. Therefore, “five weekly samples” does not differ from “five consecutive samples equally spaced over a 30-day period.” To add clarity, the footnote in the Staff Report’s Table 5: *E. coli* Densities Observed in the Water Board/SFEI Study, October 2002–July 2003 is revised as follows:

^a Values in bold type represent geometric means of five weekly samples (five consecutive samples equally spaced over a 30-day period); non-bold values represent single samples.

During the 2002-2003 study period, rainfall was slightly below average. The long-term average (1952-2005) annual rainfall for the city of Sonoma is 30.1 inches. The annual rainfall for 2002 and 2003 in the city of Sonoma was 24.8 inches and 24.3 inches, respectively. The data are representative, as the rainfall during the study period was well within one standard deviation (9.75 inches) of the long-term average.

Comment 1.3: Need to address the fact that many data points included in Table 5 are single-samples and not geometric mean. How could these data be used against the US-EPA guidance?

For the purposes of the study, U.S. EPA guidance was used to provide a basis for comparison to aid in interpreting the study results, but it was not used for regulatory compliance purposes.

The guidance, which includes *E. coli* water quality criteria based on percentiles, allows for comparison with single-sample data.

Comment 1.4: Information on groundwater discharge as percent of total flow in the stream will also be helpful.

We agree that more detailed information on groundwater discharges as a percentage of the total stream flow would be helpful. But because we do not have a reliable way of estimating actual amounts throughout the watershed, and because such data would not change any conclusions, we did not attempt to quantify groundwater discharge as part of developing this TMDL.

Comment Area 2. Numeric Targets

Comment 2.1: Clarification is needed as to whether water quality “objectives” are the same as the water quality “standards.”

We are happy to clarify the relationship, and the distinction. As defined in the Clean Water Act, water quality standards consist of three elements: designated uses, water quality criteria (numeric or narrative), and an antidegradation policy. The State of California has adopted parallel terminology, using “beneficial uses” in place of designated uses, and “objectives” in place of criteria. In order to clarify our use of these terms, we have revised Section 3.2 of the Staff Report as follows:

Under CWA authority, the Water Board has established water quality standards for Sonoma Creek and its tributaries. Water quality standards consist of: a) beneficial uses¹ for the waterbody, b) water quality objectives² (numeric or narrative) to protect those beneficial uses, and c) the Antidegradation Policy, which requires the continued maintenance of existing high-quality waters.

The Water Board's San Francisco Bay Basin Water Quality Control Plan (the Basin Plan) specifies beneficial uses for waterbodies in the Region and the objectives and implementation measures necessary to protect those beneficial uses. The beneficial uses of Sonoma Creek and its tributaries impaired by high levels of pathogens are water contact recreation (REC-1) and non-contact water recreation (REC-2). These beneficial uses are described in Table 1.

The purpose of this TMDL is to protect and restore these uses by reducing the levels of pathogens in this watershed. Water quality objectives for REC-1 use are more stringent than those for REC-2, since REC-1 can involve water ingestion. Since both uses occur in Sonoma Creek, this TMDL will be driven by the more rigorous REC-1 requirements.

¹Beneficial Uses are synonymous with “designated uses” as used in the CWA.

²Water quality objectives are synonymous with “water quality criteria” as used in the CWA.

Comment 2.2 Data on exact percentage of fecal coliform as *E-coli* vary greatly, therefore, a MOS based on this argument might not be defensible. It is preferable to set an explicit MOS, of say 10 percent, and develop the TMDL, although this is left to scientific judgment.

The TMDL Basin Plan amendment and Staff Report have been revised to include an explicit Margin of Safety (MOS) of 10 percent. The revisions and discussion are presented in the response to U.S. EPA's comment no. 1.2.

Comment 2.3: "There is also a need to define 'inadequately treated' human waste."

The term "inadequately treated" as it pertains to sewage discharges is interpreted to mean any human waste-associated discharge that results in an exceedance of water quality objectives in the receiving water or that fails to meet conditions of WDRs or waivers. The primary treatment provided by septic tanks is not considered adequate to protect public health, as typical septic tank effluent has a fecal coliform concentration in the range of 10^6 fecal coliform/100 mL. This is why discharge of septic tank effluent to waters of the state is prohibited. In order to clarify this point, staff has revised Section 4. Numeric Targets of the Staff Report as follows:

The third target, zero discharge of untreated human waste, is based on the knowledge that fecal bacteria are imperfect indicators of human pathogens. Since direct monitoring of human pathogens is not feasible (see Section 3.1), and since untreated human waste is the most serious potential source of these pathogens, a prohibition of raw or inadequately treated human waste discharge is proposed. This target is consistent with the Basin Plan's region-wide prohibition against the discharge of raw sewage. The primary treatment provided by septic tanks is not considered adequate to protect public health, as typical septic effluent has a fecal coliform concentration on the order of 10^6 fecal coliform/100 mL (Leverenz, et al., 2002)

Comment 2.4: "There needs to be a period attached to calculation of geometric mean. Is it 30 days? Based on how many samples?"

The geometric mean must be based on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period. This explanation can be found in the footnotes to Table 7-h Water Quality Targets for Sonoma Creek and its Tributaries in the version of the proposed Basin Plan amendment dated February 10. To clarify the calculation of geometric mean, the following footnote has been added to Section 4. Numeric Targets of the Staff Report:

¹ Geometric mean is based on a minimum of five consecutive samples equally spaced over a 30-day period.

Comment Area 3. Source Assessment

Comment 3.1: "I agree with the relative importance of sources identified in the report, however, experience with other TMDLs show that waterfowl, and wildlife, in general, could be a significant source. Depending on monitoring scheme, this may or may not be evident in the samples taken. It is suggested that the significance of wildlife contribution be clarified through further monitoring during the TMDL implementation phase."

While staff agrees that localized problems may exist in certain areas where wildlife densities are particularly high, analysis of indicator bacteria monitoring data shows that wildlife are not, in general, a significant pathogen source in this watershed. Data taken from sampling sites located upstream of significant human impact show low levels of indicator bacteria.

During the adaptive management phase of implementation, the Water Board will review the TMDL every five years and evaluate new and relevant information from monitoring, special studies, and scientific literature. Evaluation and review will seek to gain additional information on the actual pathogen loads for various source categories, including background/wildlife and contributions from open space areas.

Comment 3.2: “Authors need to indicate the source of pathogens in the ‘municipal runoff’.

Pathogen sources found in municipal runoff include domestic animal and pet waste, trash, wildlife, failing septic systems, and human waste. Section 5. Pollutant Source Assessment of the Staff Report describes the pathogen sources found in municipal runoff.

Comment 3.3: It is not stated whether there are any management practices currently in place in the watershed. If no fencing is in place, direct deposit by animals and wildlife could be a significant source.

Several source categories which are currently regulated by the Water Board are required to implement management practices as specified in applicable permits. Dairies are regulated via a waste discharge requirements (WDRs) waiver program; and management practices are in place. Municipal runoff is regulated by a stormwater NPDES permit, and entities implement management practices as specified in their stormwater management plans. Entities responsible for domestic wastewater treatment discharges and sanitary sewer overflows also implement management practices in compliance with existing permits or regulatory actions.

With regard to fencing, an accurate estimate of the percentage of streams that are currently fenced would be very difficult to obtain. Direct deposit of livestock waste would be a significant source in unmanaged areas, and the implementation plan presents specific actions to address this source. In general, wildlife do not appear to be a significant source of pathogens in this watershed.

Comment 3.4: In Table 6 [May 2004 and April 2005 Supplemental E. Coli Sampling Results, of the Staff Report], are the E. coli values for cases where the number of samples are less than 5 (2 or 3) geometric values or simple averages? Need to indicate rainfall amounts during the first two weeks of sampling compared with the last three weeks. If one period was drier than the other, then lack of sample representativeness could be an issue.

As stated in the column heading of the table, the *E. coli* values are geometric means for all sites, including those with less than five samples. All data taken during the study period (May 2004 and April 2005) were taken during dry weather. To clarify, section 5.2 Supplemental Monitoring 2004-2005 of the Staff Report has been modified as follows:

Samples were collected weekly over a five week period which was a dry period, without rainfall. In order to conserve limited laboratory resources, an adaptive, tiered monitoring scheme was employed. All sites were sampled for the first two weeks and the results used to establish a subset of sites for three additional weeks of sampling. Sampling was discontinued at sites that were consistently very low or high for the first two weeks, or that were very similar to either upstream or downstream sites.

Comment 3.5: “Could pets be a source of pathogens in the watershed? What is the population of cats and dogs? Other TMDLs have found pets to be significant sources of pathogens in urban areas. The report does not mention the [pet] population.”

Pet waste is indeed a source of pathogens in municipal runoff. We do not have information regarding the watershed’s pet population. We address the contribution of pathogens from pet waste in the source assessment and implementation measures, as part of the “municipal runoff” source category. To clarify, we have revised the Pollutant Source Assessment of the Staff Report (Section 5) as follows:

- **Municipal runoff.** Approximately 15 percent of the watershed is occupied by residential or commercial development (Association of Bay Area Governments, 2000). Urban runoff delivers pathogens to surface waters from pets waste (dogs and cats) and other domestic animals, trash, wildlife, failing septic systems, and in some cases human waste from homeless populations. Homeless encampments are readily observed at a number of locations along Sonoma Creek, and may be a significant source of waterborne pathogens.

Comment Area 4. Total Maximum Daily Load and Allocations

Comment 4.1: “Implicit MOS, based on not considering the die-off is reasonable. This approach, however, puts heavier responsibilities on monitoring and assessment during the implementation phase of the TMDL since these levels (or lower) should be achieved at all stations within the watershed. “

We note this comment. Also, as stated in our response to U.S. EPA’s comment no. 1.2, we have now included an explicit margin of safety of 10 percent.

Comment 4.2.: “How would one separate and keep track of these densities in individual source (wildlife, dairies, etc.) throughout the watershed? Sampling would give a cumulative effect of all sources on pathogen levels. Therefore, to say wildlife allocation is less than 126 implies that it can be measured by itself, with no interference from other sources!”

If all entities discharge at or below their density based allocation, the cumulative effect will be less than or equal to the targets. If the receiving water is elevated, monitoring will need to be conducted upstream at key locations to identify the source area. Wildlife is given an allocation because according to U.S. EPA guidance all sources must be given an allocation, including

natural background. Please keep in mind that the numeric targets and load allocations in the TMDL are not directly enforceable (see the proposed Basin Plan amendment, Implementation Plan section). To demonstrate attainment of applicable allocations, responsible parties must demonstrate that they are in compliance with the specified implementation measures and any applicable waste discharge requirements or waiver conditions. Densities related to sources will be tracked by land use and water quality data downstream from specific land uses.

Comment 4.3: “Are the data presented in Table 9 [Density-Based Pollutant Load and Wasteload Allocations for Different Pollution Source Categories, of the staff report] geometric mean based on 5 samples collected during a 30-day period? This needs to be clearly stated in a footnote.”

Yes, the allocations presented in Table 9 are geometric means based on five samples collected during a 30-day period. The following footnote has been added to the table.

^bGeometric means are based on a minimum of five consecutive samples collected at approximately equal intervals over a 30-day period.

Comment 4.4: “Was the public engaged during the source assessment part of the study? Otherwise, how is it ascertained that all potential sources are identified?”

Staff identified potential sources using water quality monitoring data and GIS analysis. In addition, we reviewed numerous other pathogen studies in semi-rural watersheds, and conducted one in the Tomales Bay watershed, and found sources to be consistent. In the future, if additional sources are identified, the TMDL will be revised as warranted.

The public was engaged during the source assessment part of the study. We met with the Sonoma Ecology Center, a local watershed group, and participated on a TMDL steering committee. At a public meeting held prior to completion of the source assessment portion, no one raised any questions or suggested additional sources other than those described in our Staff Report. At the CEQA scoping meeting for the project, a number of attendees stated that they have observed problems with septic tanks in the watershed and supported our call to action.

Comment Area 5. Implementation

Comment 5.1: “It is not clear how the stakeholders (particularly those contributing pathogens through nonpoint sources) are involved in the design and implementation of the plan. Will there be a local stakeholder advisory group? How would one know the level of implementation necessary to achieve the TMDL goal? What time frame is specified for achieving the goal?”

Implementation actions by all the dischargers in a source category will be overseen and coordinated by Water Board staff in collaboration with other agencies (such as the Sonoma County Permit and Resource Management Department for failing septic systems). We are not planning a single overall stakeholder advisory group at this time.

After the TMDL is adopted, adaptive implementation, periodic evaluation, and monitoring will help to assess progress in achieving TMDL goals and tell us whether levels of implementation are appropriate.

A schedule of trackable implementation measures is specified in the Implementation Plan. The overall goal of the TMDL should be achieved when all implementation measures are in place and fully functioning. The TMDL will be reviewed/assessed every five years to assure this takes place.

Comment 5.2: “Who will pay for installation of management practices? How is the implementation of BMPs prioritized in various areas of the watershed?”

Individual responsible parties within each source category will be responsible for implementation measures. For example, owners of dairies will be responsible for implementing management practices for their facilities; the agency managing the sanitary sewer collection system will be responsible for pathogen-reducing activities/measures such as locating and repairing leaking sewer lines or overflows. Management practices in different areas of the watershed will be prioritized based on places where high levels of indicator bacteria have been documented, and on assessments conducted by the implementing parties (dischargers).

Comment 5.3: “How is the contribution from wildlife, pets, etc. measured and what actions will be undertaken to meet the attainment of the goal for pathogens from wildlife?”

The contribution from wildlife is assessed based on water quality data from areas in which wildlife is presumed to be the dominant pathogen source. These areas are already meeting TMDL targets and therefore, wildlife is not considered to be a significant source of pathogens in this watershed and reductions from this source category are not called for. Pet waste is addressed in implementation actions under the “municipal runoff” source category.

Comment Area 6. Monitoring

Comment 6.1: “The monitoring goals are stated clearly, however the monitoring system design is not explained well. How many stations will be established? How often will water quality samples be taken? QA/QC for water quality monitoring are not specified. How will the data be analyzed? How long will the data be collected? What determines TMDL attainment. If you reach the target water quality concentrations, do you keep monitoring or stop right away? Is monitoring to be conducted year-round or a specific time of year? If during parts of the year, how do you justify year-round compliance? How is sufficient data defined? What courses of action will be taken if monitoring proved no real progress is made. Need to be aware of and incorporate the effect of BMP lag time in the assessment procedures.”

The February 10 version of the Basin Plan amendment includes the following monitoring plan, which was not described in the peer review version. This plan, now also included in the Staff Report, addresses many of the concerns you raise.

A formal water quality monitoring program for pathogen indicator bacteria will be developed by Water Board staff in coordination with stakeholders. Monitoring should begin as soon as possible, and should initially focus on previously identified hot spots and tributaries not assessed in previous work. Initial water quality monitoring objectives will be to:

- Evaluate spatial and temporal water quality trends in the Creek and its tributaries
- Further identify significant pathogen source areas
- Collect sufficient data to prioritize implementation efforts and assess the effectiveness of implementation actions

Table 16 presents locations for baseline water quality monitoring. Each site will be sampled for *E. coli* ten times each year. Five samples will be collected weekly during one 30-day period in each wet season (November through March) and one 30-day period in each dry season (May through September). All water quality monitoring (including quality assurance and quality control procedures) will be performed pursuant to the State Water Board's Quality Assurance Management Plan for the Surface Water Ambient Monitoring Program. Additional monitoring will be conducted as needed if funds are available.

<u>Table 16</u> <u>Baseline Monitoring Sites</u>
<u>Sonoma Creek at Highway 12</u>
<u>Sonoma Creek below Kenwood</u>
<u>Sonoma Creek at Sonoma Developmental Center</u>
<u>Sonoma Creek at Maxwell Park</u>
<u>Sonoma Creek at Watmaugh Road</u>
<u>Nathanson Creek at Nathanson Park</u>
<u>Nathanson Creek at Watmaugh Road</u>
<u>Schell Creek at Highway 121</u>

If source control actions are fully implemented throughout the watershed and the TMDL targets are not met, the Water Board may consider whether the TMDL targets are attainable, and re-evaluate or revise the TMDL and allocations as appropriate. Alternatively, if the required actions are not implemented or are only partially implemented, the Water Board may consider regulatory or enforcement action against dischargers not in compliance.

We believe the proposed sampling scheme is representative of typical conditions during dry and wet seasons. Staff will use best professional judgment to determine whether the sampling data are sufficient. . Because pathogens die off quickly in the environment found in Sonoma Creek and its tributaries, we do not expect a significant lag time between implementation measures and pathogen reduction.

If no significant progress is made as specified in the implementation plan, we will investigate the causes, and consider adjustment of the TMDL, additional regulatory action, or changes in implementation actions.

The extent of monitoring to be conducted after TMDL targets are attained will be determined based on the implementation plan.

Comment Area 7. Overarching Questions

Comment 7.1: “Who will be responsible for data collection and analysis? How do you deal with changes in the land use and as such changes in source contributors during the assessment period? How will the future loads be dealt with as the watershed goes under more development?”

In evaluating and monitoring the progress of the TMDL, the Water Board, working in collaboration with stakeholders and local agencies, will collect and analyze data.

Since the source category allocations are density-based, potential future sources will be regulated in the same manner as current sources and responsible for meeting the density-based allocations and complying with all Water Board discharge prohibitions.

IV. STAFF-INITIATED CHANGES

On May 2, 2006, the State Board adopted general WDRs for sanitary sewer systems. All public entities that own or operate sanitary sewer systems greater than one mile in length and/or convey untreated or partially treated wastewater to a publicly owned treatment facility in the State of California must comply with these WDRs. To incorporate this recent State Board action we have revised the Basin Plan Amendment and Staff Report as follows:

Staff Report, Section 9.4 Plans & Policies in the Sonoma Creek Watershed:

Sanitary sewer system failures

An October 2003 Water Board resolution (No. R2-2003-0095) established a collaborative program between the Water Board and Bay Area Clean Water Agencies (BACWA) to reduce sanitary sewer overflows (SSOs). The collaborative program includes four key tasks:

- Establish SSO reporting guidelines,
- Develop an electronic reporting system,
- Establish guidelines for sewer system management plans (SSMP) and
- Conduct a series of regional workshops to provide training on the first three tasks.

Reporting guidelines, the electronic reporting system, and regional workshops were completed in 2004. The Water Board in cooperation with BACWA completed the Sewer System Management Plan (SSMP) Development Guide in July 2005. Some of the SSMP requirements direct wastewater agencies to:

- Develop an overflow emergency response plan to contain overflows and prevent wastewater from reaching surface waters,
- Develop a Fats, Oils, and Grease (FOG) Control Program if needed,
- Allocate adequate resources for the operation, maintenance, and repair of its collection system,
- Prioritize preventive maintenance activities, such as scheduled cleaning of sewers, root control, and investigation of customer complaints;
- Identify structural deficiencies and prioritize repair, and
- Monitor the effectiveness of each SSMP element.

The Water Board notified wastewater collection agencies of the requirements for preparing SSMPs in July 2005, and the notification included required completion dates for each SSMP element.

On May 2, 2006, the State Water Board adopted general Waste Discharge Requirements for sanitary sewer systems (Board Resolution 2006-0003). All public entities that own or operate sanitary sewer systems greater than one mile in length and/or convey untreated or partially treated wastewater to a publicly owned treatment facility in the State of California are required to apply for coverage under these WDRs by November 2, 2006. The WDRs contain provisions for SSO reduction measures, including development and implementation of SSMPs.

Staff Report, Table 12:

Table 12. Proposed Implementation Actions to Reduce Pathogen Loading from Sanitary Sewer Systems	
Implementing Party	Action
Sonoma Valley County Sanitation District	1. In cooperation with the Water Board and Sonoma County Permit and Resource Management Department, <u>provide existing sanitary sewer maps to Water Board staff in order to identify potential areas of greatest water quality concern from collection system failure based on proximity to impaired reaches, soil type, topography, and other factors.</u>
	2. Develop Sanitary Sewer Management Plan in accordance with Water Board/BACWA guidelines (see Section 9.4, pages 36-37). Plan should include provisions to identify and repair collection system failures. Priority should be given to areas identified as posing water quality risks. Comply with provisions of general WDRs for sanitary sewer systems
	3. Report progress on implementation of pathogen reduction measures. <u>Priority should be given to areas identified as posing water quality risks.</u>

Basin Plan Amendment, excerpt from Table 7-K:

Table 7-K Trackable Implementation Measures for the Sonoma Creek Pathogen Total Maximum Daily Load			
Source Category	Action	Implementing Party	Completion Dates
Sanitary Sewer systems ⁱ	Comply with applicable WDRs	Sonoma Valley County Sanitation District	As specified in applicable WDRs
	Submit to the Executive Officer for approval a plan and implementation schedule to evaluate sanitary sewer line performance and to correct identified deficiencies^a. Priority should be given to areas identified as posing water quality risks. Apply for coverage under the State Water Board's general WDRs for sanitary sewer systems. Comply with provisions of WDRs		January 2008-As specified in general WDRs
	Report progress on inspection and evaluation of sewer systems ^{ba} . <u>Priority should be given to areas identified as posing water quality risks.</u>		Annually

^aPlans may be incorporated into approved Sanitary Sewer Management Plans (SSMPs).
^bReports may be incorporated into annual SSMP audit reports.

The following are minor corrections:

Staff Report, Table 7 has been revised to correct typographical errors (Jan-03 data was mistakenly listed as Jul-03 data, and vice versa):

Table 7. Nitrate Concentrations in Upper and Middle Sonoma Creek.					
Station	Location	Nitrate-N, µg/L			
		Oct-02	Jan-03	Jul-03	May-04
		S-07	Sonoma Creek at Goodspeed Trail in S.P.	67	416 <u>166</u>
S-05	Sonoma Creek at Highway 12				72
S-04	Sonoma Creek below Kenwood	1,059	2,091 <u>1,619</u>	1,619 <u>2,091</u>	2,052
S-12	Sonoma Creek at Glen Ellen	29	960 <u>1,612</u>	1,612 <u>960</u>	
S-6	Sonoma Creek at Developmental Center	18	437 <u>1,495</u>	1,495 <u>437</u>	
S-11	Sonoma Creek at Agua Caliente	15	129 <u>1,442</u>	1,442 <u>129</u>	
S-5	Sonoma Creek at Maxwell Park	2	102 <u>1,454</u>	1,454 <u>102</u>	597

Staff Report, Section 3.3 Bacterial Water Quality Studies in the Sonoma Creek Watershed:

Results of the Water Board/SFEI study are summarized in Table 5 (raw data are presented in Appendix A).

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