

Item 6 - Appendix E

Response to Comments

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**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION**

**2018 Proposed Revisions to the Clean Water
Act Section 303(d) List of Impaired Waters
for the San Francisco Bay Region**

Response To Comments

March 6, 2019

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STAFF RESPONSE TO COMMENTS ON THE DECEMBER 2018 STAFF REPORT AND PROPOSED CHANGES TO THE 303(D) LIST

We received five comment letters during the 30-day public comment period, which began on December 21, 2018, and closed on January 21, 2019. The comments from these letters and our responses are presented here.

Comment letters received:

1. Living Rivers Council
2. Santa Clara County Creeks Coalition
3. Santa Clara County Urban Runoff Pollution Prevention Program (SCVURPPP)
4. Santa Clara Valley Water District (SCVWD)
5. Sierra Club – Loma Prieta

Comment Letter 1: Living Rivers Council

Comment 1.1: The commenter opposes the de-listing of Napa River for a variety of cited reasons and refers to a letter written by Patrick Higgins (biologist) on behalf of Living Rivers Council stating that the de-listing was contrary to California’s Listing Policy. “Living Rivers Council wants the Nutrient TMDL for the fresh water to remain in place to protect the public’s right to fish, swim and recreate.”

The Staff Report explained that the Regional Water Board approved the Napa River nutrient de-listing in 2014 ([Resolution No. R2-2014-0006](#)) and is not reconsidering this decision as stated in the Staff Report. Water Board [staff addressed](#) the comments of Patrick Higgins and all other commenters prior to Regional Water Board action in 2014.

The commenter submitted photos from 2015 showing algae and aquatic plants in Napa River. These photos were not submitted during the data solicitation period for the 2018 303(d) List ending May 3, 2017. Moreover, the photos are not sufficient to establish impairment of beneficial uses and, therefore, do not invalidate the conclusions reached by staff and accepted by the Board upon approval of the delisting in 2014. Staff responded to a comment (Comment 2.29 submitted by Living Rivers Council in 2014) alleging impairment based on photographic evidence. In the response, staff explained:

We agree that impairment of recreational beneficial uses can be assessed visually but such a process needs to be systematic. This is why Water Board staff followed SWAMP protocols in assessing percent macroalgae cover at 105 systematically-selected locations as a rapid visual indicator (results included in the Staff Report). Photographs of stream algae cannot be directly translated into a percent cover metric unless taken from an aerial view, which was not the case for the provided photograph. The Listing Policy was developed to ensure a reliable and consistent means for evaluating beneficial use impairment, including recreational beneficial uses. A single photograph, while helpful, does not meet the goals or requirements of the Listing Policy.

The commenter may submit comments on this de-listing as part of the State Water Board’s public process that will take place later in 2019. We encourage the commenter to sign up for the email list to receive notifications of the State Water Board’s public process.

Comment Letter 2: Santa Clara County Creeks Coalition

Comment 2.1: The commenter writes to “express strong support for the listing of Los Gatos Creek as impaired by temperature”.

We appreciate the comment supporting our temperature evaluation and listing recommendation.

Comment 2.2: The commenter also requests “that, as part of the TMDL process, the Regional Board consider the instream flow needs of the creek as it impacts temperature.”

While future TMDL development considerations are outside the scope of the public process for the 2018 303(d) List recommendations we note that, in general, we will consider all controllable factors associated with a given impairment when developing a TMDL. The commenter included two attachments supporting the request for the TMDL process to include consideration of flow requirements. These are included in the comments package, but we are not offering a response to them because they do not contain comments on the lower Los Gatos Creek listing recommendation.

Comment Letter 3: Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP)

Comment 3.1: “We would like to point out that there was insufficient time provided by the SF Bay Water Quality Control Board (SF Bay Water Board) to adequately review the data used to propose the new listing and provide meaningful comments. For this reason, these comments should be considered preliminary. The release of the public notice occurred on Friday, December 21st (prior to the winter holiday season), with comments due on January 21st, 2019 (Martin Luther King Day). The timeline provided less than one month (including holidays and weekends) to review a dataset with millions of data points (i.e., hourly data collected at 32 sites over a 13-year period) and the evaluation guidelines used by the SF Bay Water Board staff to support the listing.”

The Regional Water Board’s 30-day comment period complied with the requirement in Listing Policy section 6.2 to provide the “[a]dvance notice and opportunity for public comment.” The Regional Water Board also complied with the applicable 30-day noticing and document review requirements (40 CFR § 25.5), which is the standard requirement for changes to the 303(d) List. A consultant representing SCVURPPP contacted Regional Water Board staff to request data on January 11 (21 days after the start of the public review period), and we responded the same day with detailed information on the temperature evaluation guidelines and provided the evaluated temperature data in a convenient format for their analysis. We note that SCVURPPP did not request an extension to the comment period.

Comment 3.2: “Evaluation guidelines are not from peer reviewed sources as required by listing policy. The documents from which evaluation guidelines were taken were not journal articles.”

All four of the guidelines used in the Los Gatos Creek temperature assessment comply with Section 6.1.3 of the Listing Policy and have been used in previous listing decisions. Section 6.1.3 of the Listing Policy describes the requirements for using an evaluation guideline when a numeric water quality objective is not available: “Narrative water quality objectives shall be evaluated using evaluation guidelines. When evaluating narrative water quality objectives or beneficial use protection, the Regional Water Boards and the State Water Board shall identify evaluation guidelines that represent standards attainment or beneficial use protection. The guidelines are not water quality objectives and shall only be used for the purpose of developing the section 303(d) List.” In addition, the evaluation guideline should: “be applicable to the beneficial use; be protective of the beneficial use; be linked to the pollutant under consideration; be scientifically-based and peer reviewed; be well described; and identify a range above which impacts occur and below which no or few impacts are predicted.” Since there is no clear numeric objective for temperature in the San Francisco Bay Basin Water Quality Control Plan, we used guidelines that are related to the protection of several beneficial uses which apply to Los Gatos Creek (cold water habitat, , spawning, migration). We relied on these four evaluation guidelines to assess temperature in Los Gatos Creek and have noted references that support those thresholds.

- **7DADM:** The 7-day average daily maximum temperature, which is the rolling seven-day average of daily maximum temperature compared to a threshold of 20 °C for the period March 1 through June 15 (steelhead out-migration period) (U.S. EPA, 2003, Shapovalov and Taft, 1954)¹
- **Lethal:** Days for which the temperature, at any time, exceeded 24 °C (U.S. EPA 1977, Moyle 1976, Carter 2008), a temperature associated with lethality for steelhead (from March 1 through October 31)
- **MWAT:** The maximum weekly average temperature (from March 1 through October 31, summer rearing for steelhead) at each station for each year compared to 19.6 °C (Sullivan 2000)
- **7DAVG:** The rolling seven-day average temperature from March 1 through October 31(summer rearing for steelhead) compared to a threshold of 17 °C (Sullivan 2000)

The 7DADM evaluation guideline from U.S. EPA (2003) meets the requirements of [California’s Listing Policy](#) and has been used as an evaluation guideline in several temperature listing decisions in California. Two independent scientific peer review panels were convened to provide comment on various aspects of the guidance and the scientific issue papers upon which the guidance relied. We evaluated temperature data against the 20 °C 7DADM, which is appropriate to assess the threat to migration in a creek in the southern portion of the steelhead range. U.S. EPA has not only accepted listing decisions using this evaluation guideline, they explicitly defended use of the 20 °C 7DADM in

¹ Note that this migration period is different than that used for the analysis contained in the Staff Report release to the public in December 2018. Please see the response to SCVWD comment 4.1 for more details on this change.

California streams and rivers in [their approval letter on California’s 2008-2010 303\(d\) List](#) (page 22). They provide the following justification for its use in their 2003 guidance document.

“The recommended metric for all of the following criteria is the maximum 7-day average of the daily maxima (7DADM). This metric is recommended because it describes the maximum temperatures in a stream, but it is not overly influenced by the maximum temperature of a single day. Thus, it reflects an average of maximum temperatures that fish are exposed to over a weeklong period. Since this metric is oriented to daily maximum temperatures, it can be used to protect against acute effects, such as lethality and migration blockage conditions.

...EPA believes that a 20°C criterion would protect migrating juveniles and adults from lethal temperatures and would prevent migration blockage conditions.”

The evaluation guideline corresponding to lethal temperatures (24 °C) for steelhead is from a reputable U.S. EPA research document (U.S. EPA 1977) reviewed by six independent scientists. This threshold is also discussed in Carter (2008), a report subjected to scientific peer reviewed as part of the Klamath River TMDL process. The responses to peer review comments for the Klamath River TMDL project are [available online](#). This 24 °C lethal threshold is consistent with lethal temperatures for steelhead identified by other frequently-cited authors (Moyle 1976, Bell 1986). Moyle specifically focuses on California fish so the thresholds he presents are applicable to California. This evaluation guideline meets the requirements of Section 6.1.3 of the Listing Policy and has been widely used in U.S. EPA-approved listing decisions in our region and elsewhere in California. The 24 °C temperature evaluation guideline was used in our region in a line of evidence resulting in a decision to place Arroyo Mocho on the 303(d) List in 2010. This evaluation guideline was also used in temperature assessments in our region for Indian Creek in 2010, Devil’s Gulch Creek in 2010, Coyote Creek in 2010, San Leandro Creek in 2010, Ritchie Creek in 2010, Redwood Creek (Marin) 2010, Mitchell Creek in 2010, Las Trampas Creek in 2010 as well numerous temperature assessments in other regions.

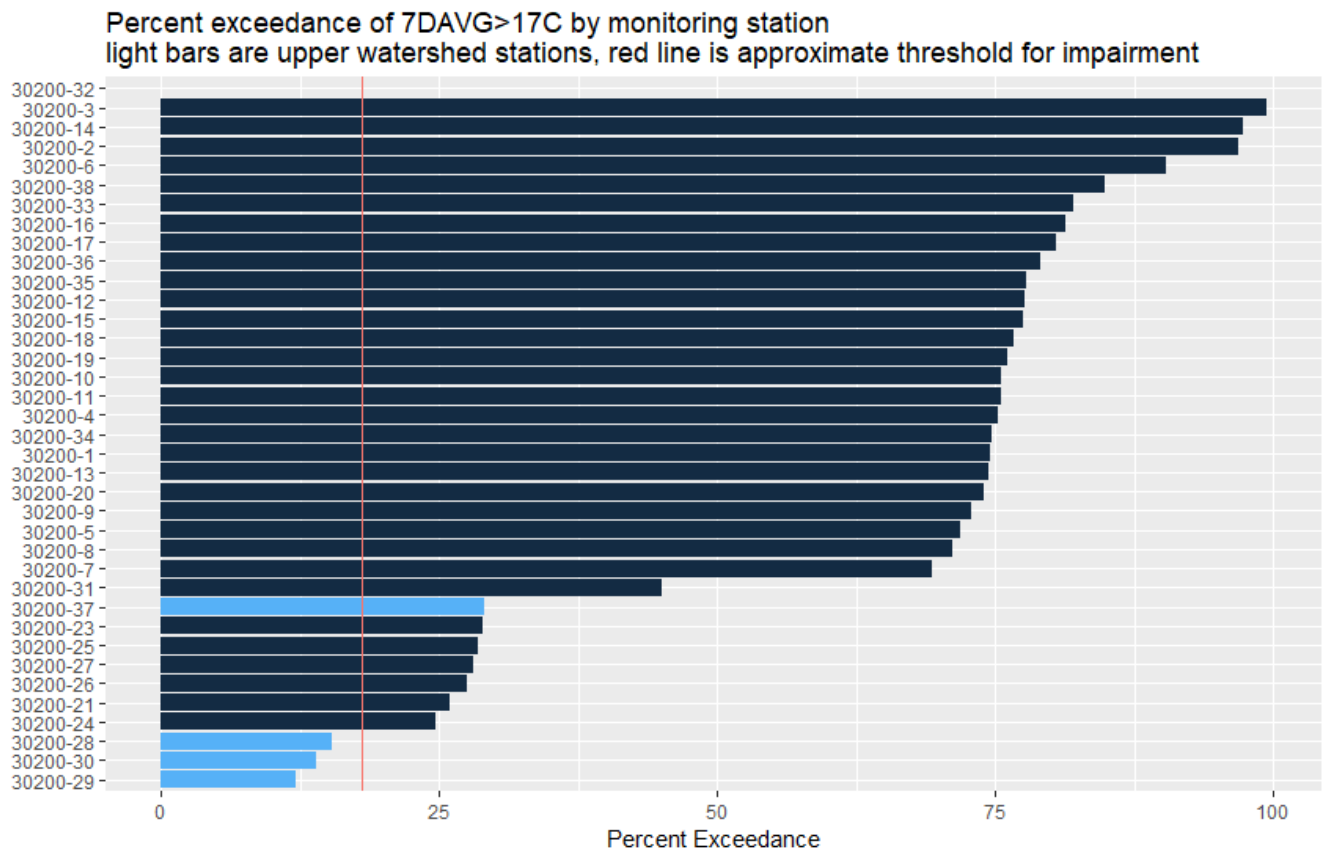
The remaining two temperature evaluation guidelines (MWAT and 7DAVG) are from a reputable and frequently-cited² report by Sullivan (2000) that reviews several peer-reviewed papers on temperature requirements for salmonids. Sullivan relies on peer-reviewed literature to develop a risk-based approach for setting temperature criteria and assessing temperature risk to fish. Temperature in streams is not uniform in space or time, but consistent exceedance of these temperature thresholds suggests that high temperatures are impairing aquatic life, and that water quality standards are not being met. The evaluation guidelines from Sullivan have been widely used in Section 303(d) temperature assessments in the San Francisco Bay and North Coast Regions, and these assessments have been accepted by U.S. EPA as part of several California integrated reports. For example, the seven-day

² A Google Scholar search on February 11, 2019 shows that the Sullivan 2000 paper is cited by more than 120 scholarly articles and books.

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average temperature (7DAVG) evaluation guideline (17 °C) from Sullivan was used in the listing of Suisun Creek in 2010, Stevens Creek in 2010, Codornices Creek in 2010, Arroyo Mocho in 2010, and as a line of evidence in temperature assessments (not resulting in listings) for more than twenty additional creeks and rivers in our region.

We evaluated temperature data in both lower and upper Los Gatos Creek to determine if average temperatures support the cold water beneficial use. We found that temperatures in the lower watershed were too high on average to support this use. Combining data from all lower Los Gatos Creek monitoring stations, 65% of the 7-day moving averages exceeded the 7DAVG evaluation guideline. Average temperatures in the upper watershed exceeded the evaluation guideline less than 17% of the time and were, thus, considered supportive of the use. The figure below shows that the exceedance frequency of the 7DAVG evaluation guideline ranged from 25% to nearly 100% at monitoring locations in lower Los Gatos Creek. The exceedance frequency is much lower at upper water stations shown as light blue bars in the figure.



Comment 3.3: “Evaluation guidelines are not applicable to streams in Santa Clara County, but rather cold water salmonid streams of Washington and/or Oregon. Guidelines developed for streams in the Pacific Northwest may not be applicable to streams in other ecoregions, such as the drier and warmer salmonid streams in Santa Clara County.”

As explained in the response to comment 3.2, all the temperature evaluation guidelines used to assess Los Gatos Creek have previously been applied to waterbodies in many parts of California, including many waterbodies in the San Francisco Bay Region with climates like those found in Santa Clara County. These assessments and the evaluation guidelines used therein have been accepted by the State Water Board and U.S. EPA through their approval of the 303(d) Lists for which these temperature assessments were developed. We recognize that fish bioenergetics plays an important role and that if food supplies are abundant, then salmonids may be able to grow and develop in warmer waters³. However, without sufficient food supply data or bioenergetic studies, we are required to assess all readily available water quality data using guidelines according to the Listing Policy.

Comment 3.4: “Sullivan et al. (2000) risk assessment approach relies on the effects of temperature on juvenile salmon growth rates in a laboratory setting. These dose-response relationships established in a laboratory may not be representative of what is present in highly variable natural stream conditions.”

California and other states frequently rely on water quality objectives and evaluation guidelines derived through laboratory studies to assess water quality and determine if waters are impaired. It is neither feasible nor required by the Listing Policy to test all such evaluation guidelines in “real-world” conditions prior to making assessments. Water Board staff use professional judgement to select the best available evaluation guidelines to assess available data. In this case, we used a suite of four temperature evaluation guidelines from technical sources (Carter 2008, Sullivan 2000, U.S. EPA 1977, U.S EPA 2003) that have been used in California and the San Francisco Bay Region. These are described more fully in response to comment 3.2. We acknowledge that stream conditions are highly variable, and it is not possible to determine the precise exposure of steelhead to stream temperatures. However, we feel confident that we have accounted for the variability of stream conditions given that we compared our evaluation guidelines to over two million temperature measurements taken hourly over a period of twelve years at over thirty locations along Los Gatos Creek.

Comment 3.5: “Several case studies demonstrate that the Central California Coast Steelhead Distinct Population Segment (DPS)² have adapted feeding behaviors and life history strategies to deal with warmer water temperatures characteristic of the southern end of their range. Smith and Li (1983) observed that juvenile steelhead will tolerate warmer temperatures when food is abundant by moving into riffle habitats to increase feeding success. Juvenile steelhead will also move into coastal estuaries to feed during the summer season when stream conditions become stressful to the fish (Moyle 2008).”

A finding of impairment is a determination that conditions in the creek are not suitable to fully protect one or more beneficial uses, in this case cold water beneficial use and migration beneficial use related to steelhead habitat. The temperature-related challenges for steelhead in Lower Los Gatos Creek are significant (see figure below in the response to SCVWD

³ See response to comment 4.3. Sloat and Osterback findings suggest “that increased food production is not likely to sufficiently offset the energetic cost of activity at temperatures approaching tolerance limits.”

comment 4.3). There are large portions of the lower Creek where, on more than 20% of the days, the temperature of the creek exceeds the lethal temperature of 24°C. Throughout the portion of Los Gatos Creek below Lexington Reservoir, the rolling 7-day average temperature exceeded the evaluation guideline (for steelhead protection) 65% of time, well above the threshold associated with impairment. While it may be true that steelhead have some capacity to adapt to adverse conditions, we have an obligation to identify water quality impairments when stream temperatures exceed relevant evaluation guidelines by such a large margin. Also, in the absence of data showing the food supply is abundant and that the bioenergetics of fish are not impacted by the current temperate regime, listing the stream based on regional analysis is appropriate and environmentally protective.

Steelhead have used the lower, warmer portion of Los Gatos Creek during the spring and summer. Thus, temperatures in lower Los Gatos Creek have directly affected this protected species. Steelhead were observed in summer 2001 in lower Los Gatos Creek at Leigh Avenue, and spawning steelhead were observed at Hamilton Ave. and at Meridien Ave. in 1998 (Leidy et al. 2005). At the four monitoring stations within one kilometer of Leigh Ave., stream temperatures during March through October reached the lethal threshold of 24 °C on 25% of the days, and 76% of the 7-day rolling average temperatures exceed the evaluation guideline of 17 °C. These data suggest that adult steelhead have used a portion of the lower Los Gatos Creek during the summer where the habitat is not suitable for their survival. Steelhead presently making use of these same sections of lower Los Gatos Creek will similarly be exposed to water temperatures above thresholds associated with harm. A high fraction of the days in this portion of the creek have a temperature above the lethal threshold, and a high proportion of the 7-day averages are above the established threshold for steelhead summer rearing. See also the response to comment 3.6 citing a National Oceanic and Atmospheric Administration Marine Fisheries Service (NOAA NMFS) view that there is little justification that steelhead can undergo large adaptation to different temperature regimes.

Comment 3.6: “Temperature guidelines used to evaluate temperature data in Los Gatos Creek (and other Bay Area streams) should be based on peer-reviewed case studies that evaluate temperature effects on salmonid populations that occur in watersheds of the Central Coast region.”

We are obligated to assess available data against evaluation guidelines that meet the requirements of the Listing Policy, which is what we have done. The evaluation guidelines we used have been accepted by U.S. EPA when used in previous California 303(d) Lists and are suitable for Los Gatos Creek. The 1977 U.S. EPA technical document from which we selected the lethal threshold was reviewed by six independent scientists, and the 2003 U.S. EPA guidance document from which we selected the 7DADM guideline was reviewed by two separate peer review panels.

In their [approval letter for the 2008-2010 303\(d\) List](#) for California, U.S. EPA cites a correspondence dated November 15, 2010 (pp 5-6) from Maria Rea (NOAA NMFS) to Alexis

Strauss (Regional Administrator for U.S. EPA Region 9) supporting the use of the temperature guidance values for a California river (emphasis added):

*“The use of the US EPA 2003 criteria for listing water temperature impaired water bodies in the San Joaquin River basin is scientifically justified. It has been recognized that salmonid stocks do not tend to vary much in their life history thermal needs, regardless of their geographic location. **There is not enough significant genetic variation among stocks or among species of salmonids to warrant geographically specific water temperature standards** (US EPA 2001⁴). Based upon reviewing a large volume of thermal tolerance literature, McCullough (1999⁵) concluded **that there appears to be little justification for assuming large genetic adaptation on a regional basis to temperature regimes.**”*

This passage in the U.S. EPA approval letter supports our view that the evaluation guidelines we selected, even those developed for the Pacific Northwest, are appropriate to protect steelhead in Los Gatos Creek. Please see the response to comment 3.2 for more information.

Comment 3.7: The Water Board “should delay consideration of listing Los Gatos Creek until thorough review of applicable published literature is accomplished.”

We have used evaluation guidelines consistent with the Listing Policy and appropriate for Los Gatos Creek. However, we are open to recognizing the value of site-specific or regional temperature thresholds to develop TMDL temperature targets, but we do not recommend delaying the proposed listing until such new temperature thresholds are available. Based on our current understanding of temperature requirements for steelhead, we think it is unlikely that site-specific or regional temperature metrics will deviate substantially from those we used. Please see the response to comment 3.2 for more information.

Comment 3.8: “There are existing efforts to increase salmonid populations in the San Francisco Bay. Should the SF Bay Water Board proceed with the listing for temperature (after appropriate temperature guidelines are established), it should be placed into Category 4b (TMDL is not needed because other pollution control requirements are expected to result in the attainment of an applicable water quality standard in a reasonable period of time). Development of a TMDL for temperature in Los Gatos Creek will divert local resources away from implementing the recommendations in the FAHCE agreement and delay further recovery of salmonids in Santa Clara County watersheds.”

We disagree that Los Gatos Creek should be placed into Category 4(b) because existing efforts (contained in the FAHCE agreement) will not be sufficient to resolve the temperature impairment in Los Gatos Creek. U.S. EPA regulations recognize that by using other pollution control requirements, states may resolve the impairment without a TMDL (40 CFR 130.7(b)(1)). Waterbodies for which alternatives to TMDLs will be used to resolve the

⁴ EPA 2001a. Salmonid Behavior and Water Temperature, Issue Paper 1, prepared by Sally Sauter, John McMillan and Jason Dunham as Part of EPA Region 10 Temperature Water Quality Criteria Guidance Development Project. EPA-910-D-01-001, May 2001. 38 pp.

⁵ McCullough, D.A. 1999. A Review and Synthesis of Effects of Alterations to the Water Temperature Regime on Freshwater Life Stages of Salmonids, With Special Reference to Chinook Salmon. Prepared for the U.S. Environmental Protection Agency Region 10, Seattle, Washington. Published as EPA 910-R-99-010, July 1999. 291 p.

impairment are referred to as Category 4(b) waters as described in U.S. EPA’s Integrated Reporting Guidance (IRG) for Sections 303(d) (U.S. EPA 2006). This guidance document requires states to demonstrate the suitability of placing waters in Category 4(b) by providing a rationale supporting their conclusion that there are “other pollution control requirements” sufficiently stringent to achieve applicable water quality standards within a reasonable time frame.

Specifically, this rationale should include: (1) a statement of the problem causing the impairment, (2) a description of the proposed implementation strategy and supporting pollution controls necessary to achieve water quality standards, including the identification of point and nonpoint source loadings that when implemented assure the attainment of all applicable water quality standards, (3) a reasonable schedule for implementing the necessary pollution controls, (4) an estimate or projection of the time when water quality standards will be met, (5) a description of, and schedule for, monitoring milestones for tracking and reporting progress to U.S. EPA on the implementation of the pollution controls, and (6) a commitment to revise as necessary the implementation strategy and corresponding pollution controls if progress towards meeting water quality standards is not being shown.

We reviewed the “Fisheries and Aquatic Habitat Collaborative Effort Settlement Agreement”⁶ (agreement) of 2003. We found that the agreement does not currently contain any of the six elements required in a rationale to place Los Gatos Creek in Category 4(b) with respect to temperature impairment in the creek. If, in the future, the agreement were amended or supplemented with provisions corresponding to the required Category 4(b) justification elements, the agreement could constitute the basis for a Category 4(b) designation for Los Gatos Creek.

Moreover, we could not identify any measures in the agreement aimed explicitly at achieving and maintaining water temperatures suitable for steelhead in Los Gatos Creek because it does not include a temperature target or implementation plan for this water body. The agreement only mentions Los Gatos Creek in these passages:

Implementation of the agreement will provide suitable spawning and rearing habitat for salmon in Los Gatos Creek from Camden Avenue to its confluence with Guadalupe River; (page 24)

Unless modified under paragraph 6.3, SCVWD will make flow releases from Lexington Reservoir, Vasona Reservoir, or Vasona Pump Station, or any combination thereof, as provided below. (A) November 1 to April 30. SCVWD will provide a suitable winter base flow in order to support chinook salmon spawning and egg incubation. SCVWD will make releases for the purpose of providing winter base flows in accordance with reservoir operations rule curves contained in Appendix E. (page 29)

Subject to paragraph 6.1.2, Additional Measures will be defined by the Phase One feasibility studies. Following such studies, if the Overall Management Objectives have not been met, the AMT may undertake periodic review of reaches within Los Gatos Creek below Lexington Reservoir, to identify

⁶ The settlement agreement is included as an attachment to the comments submitted by the Santa Clara County Creeks Coalition.

opportunities for Additional Measures that may be implemented in Phases Two and Three, specifically to increase access to spawning or juvenile rearing habitat (page 29)

The management zone objective for Los Gatos Creek is from the Camden Avenue drop structure to the confluence with Guadalupe River. There is no cold water management zone for Los Gatos Creek. (Appendix E-8)

Cold water releases from Lexington Reservoir are not required for the May 1 to October 31 time period. Instead releases for recharge and water supply will be made in an attempt to maintain the recreation pool and a minimum pool storage of 2000 acre-feet on December 1 (Appendix E-8)

We find that the current agreement does not contain any provisions describing planned pollution control requirements expected to result in the attainment of the temperature evaluation guidelines in a reasonable period of time. The agreement speaks only in general terms about providing “suitable spawning and rearing habitat” and “suitable winter base flow”, but these goals are not clearly defined in the agreement. There is no explicit management strategy for temperature in Los Gatos Creek. In fact, the agreement explicitly states that, in contrast to Coyote Creek, there is no cold water management zone for Los Gatos Creek and that no cold water releases from Lexington Reservoir are required during the summer months when water temperatures downstream of the reservoir are not suitable for summer steelhead rearing and frequently exceed lethal levels.

There is a provision in the agreement that SCVWD will maintain temperatures below 18 °C in a designated “cold water management zone” of Coyote Creek from May 1 through October 31. We analyzed data in Los Gatos Creek relative to the 18 °C temperature threshold and found that the temperatures below Lexington Reservoir exceeded 18 °C 68% of the time from May 1 through October 31. The station with the coolest temperatures exceeded 18 °C nearly 30% of the time. Thus, if a cold water management zone were established for Los Gatos Creek with the same temperature requirement as for Coyote Creek, the temperature goal would only be met about one-third of the time based on our analysis of twelve years of data.

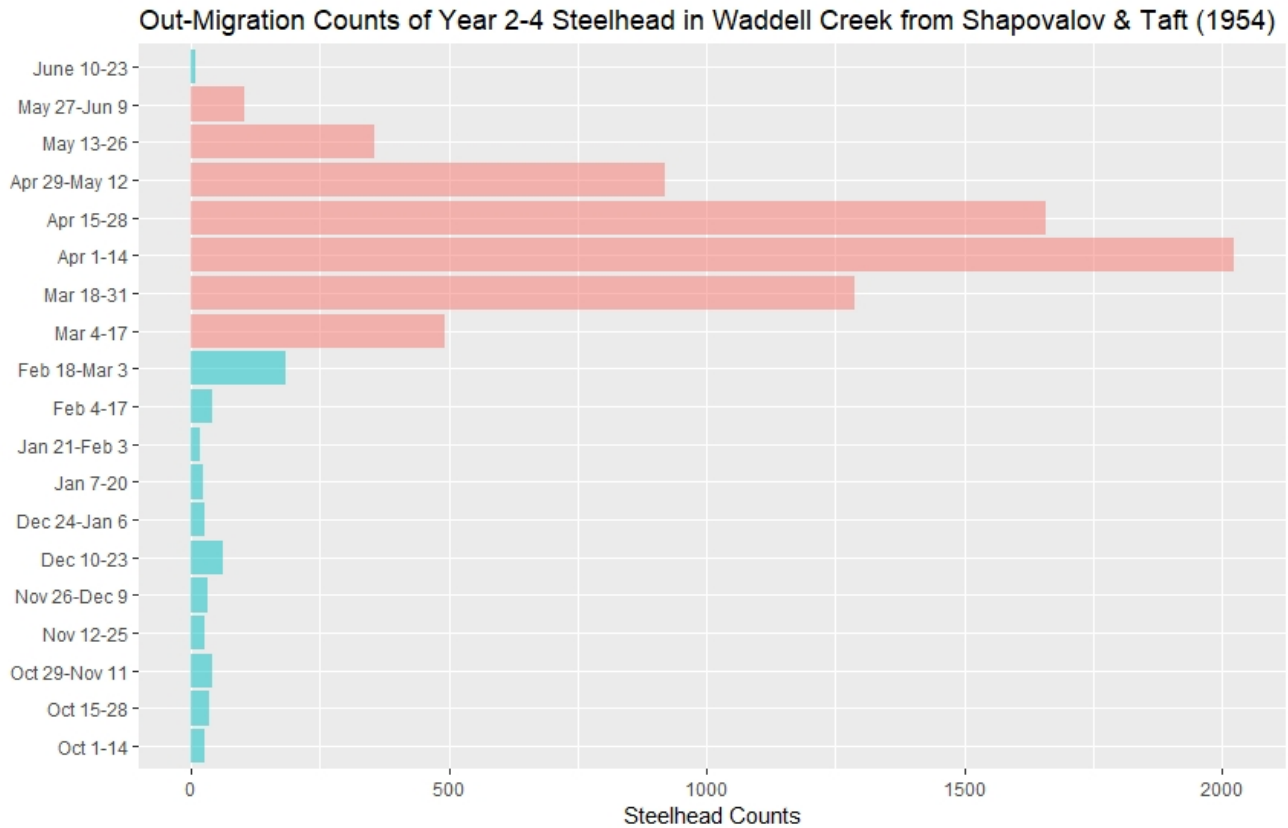
Comment Letter 4: Santa Clara Valley Water District (SCVWD)

Comment 4.1: “The line of evidence indicates that data during the migration period (March 15 through June 15 and September 1 through October 31) were assessed. According to Moyle (2002), fish may move upstream after rains increase flows, any time during the period December through March, although peak activity is January and February. The migration period September 1 through October 31 is typical for Chinook salmon, not steelhead. The analysis does not accurately reflect timing of steelhead migration in our area and is based on erroneous criteria and flawed conclusions.”

We agree with the commenter that the period assessed (March 15 through June 15 and September 1 through October 31) does not reflect the period of steelhead migration for Los Gatos Creek. In response to this comment, we have made a change to our migration temperature analysis. First, we decided to focus on out-migration because out-migration occurs during a time of year when migrating steelhead are more likely to encounter warmer water temperatures. Next, we consulted the available literature for an appropriate time

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period for steelhead out-migration. We reassessed the data for the out-migration period of March 1 through June 15 based on a study by Shapovalov and Taft (1954). The authors made careful observations of the number and age of migrating steelhead in Waddell Creek (Santa Cruz County). The authors counted 93% (6840 of 7350) of year 2-4 steelhead migrating out (downstream) of Waddell Creek during the period March 4 through June 9 (Table 38 of Shapovalov and Taft, 1954). The authors found that April and May were the peak months for out-migration of year 2-4 steelhead. See the figure below for a distribution of their steelhead counts developed from the data presented in Table 38 of their paper. The red bars in the figure represent the approximate time period we used for our out-migration analysis. Waddell Creek, like Los Gatos Creek in Santa Clara County, is in the southern portion of the steelhead range. The revised analysis now better reflects the timing of steelhead out-migration that is likely applicable to Los Gatos Creek.



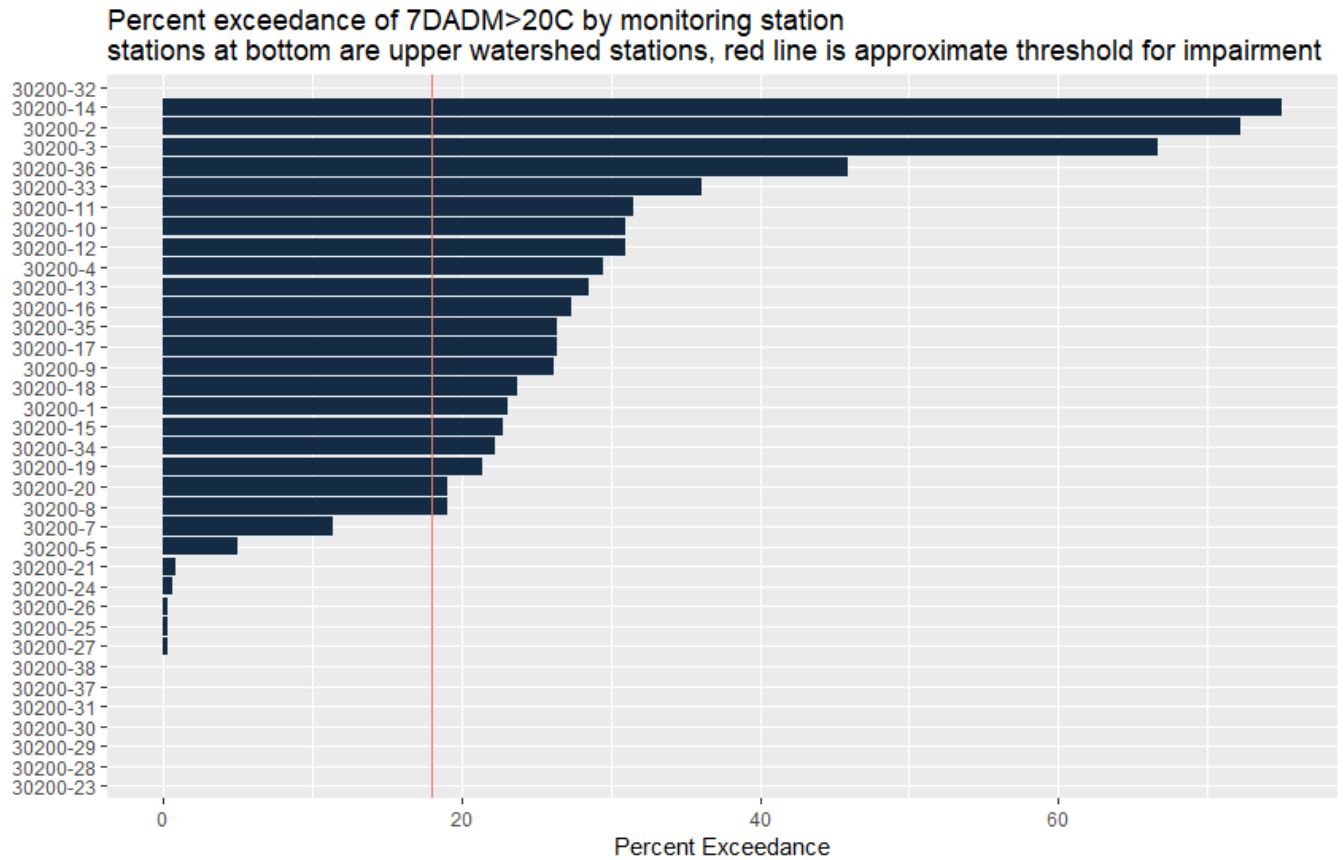
Below is the revised version of a table in the Staff Report showing the results of the Los Gatos Creek temperature evaluation. Combining all lower Los Gatos Creek monitoring stations, the 7DADM evaluation guideline was exceeded by 19% of the 7-day moving averages, which is above the threshold indicating impairment. Lower Los Gatos Creek temperature data exceed three of the four evaluation guidelines. We note here that much of the warming in lower Los Gatos Creek occurs as the creek flows through Lake Vasona. In other words, the evaluation guideline exceedance frequencies for stations upstream of Lake Vasona (e.g., stations 30200-21 and 30200-31) are lower than those downstream of the lake (e.g., station 30200-19 and 30200-20). The figure below the table shows the exceedance frequency of the

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7DADM for all Los Gatos Creek many monitoring stations. None of the upper watershed stations exceed the 7DADM evaluation guideline. Several of the lower watershed monitoring stations have a 7DADM exceedance frequency above 30%, and three stations exceed this guideline more than 60% of the time.

Summary of Samples and Exceedances for Los Gatos Temperature

Evaluation Guideline	Los Gatos Creek, upper		Los Gatos Creek, lower	
	# samples	# exceedances (critical value)	# samples	# exceedances (critical value)
7DADM > 20°C	1867	0 (310)	16427	3053 (2727)
Lethal > 24°C	5687	0 (944)	48857	6726 (8110)
MWAT > 19.6°C	37	4 (7)	261	229 (44)
7DAVG > 17°C	5444	887 (904)	47179	30499 (7830)



Comment 4.2: “The Sullivan threshold of 17°C is a comparison to maximum growth which does not provide for evaluation of steelhead survival and habitat usage. Habitat usage would be more appropriate measure for our region than growth rate.”

We disagree that habitat usage is necessarily a more appropriate measure of temperature impairment than growth rate. We used a variety of evaluation guidelines in our analysis and they collectively indicated impairment in lower Los Gatos Creek. An evaluation guideline

associated with growth has been used in several other temperature assessments in California. We have also used an evaluation guideline related to survival (the lethal temperature of 24 °C) and an evaluation guideline related to out-migration and summer rearing (7DADM). We are open to the use of other evaluation guidelines related to habitat usage if they are available. However, the commenter has neither offered any data with which we can evaluate steelhead habitat usage in Los Gatos Creek, nor provided evidence to support the assertion that habitat usage is a more appropriate measure than growth rate. Accordingly, we have not adjusted our analysis.

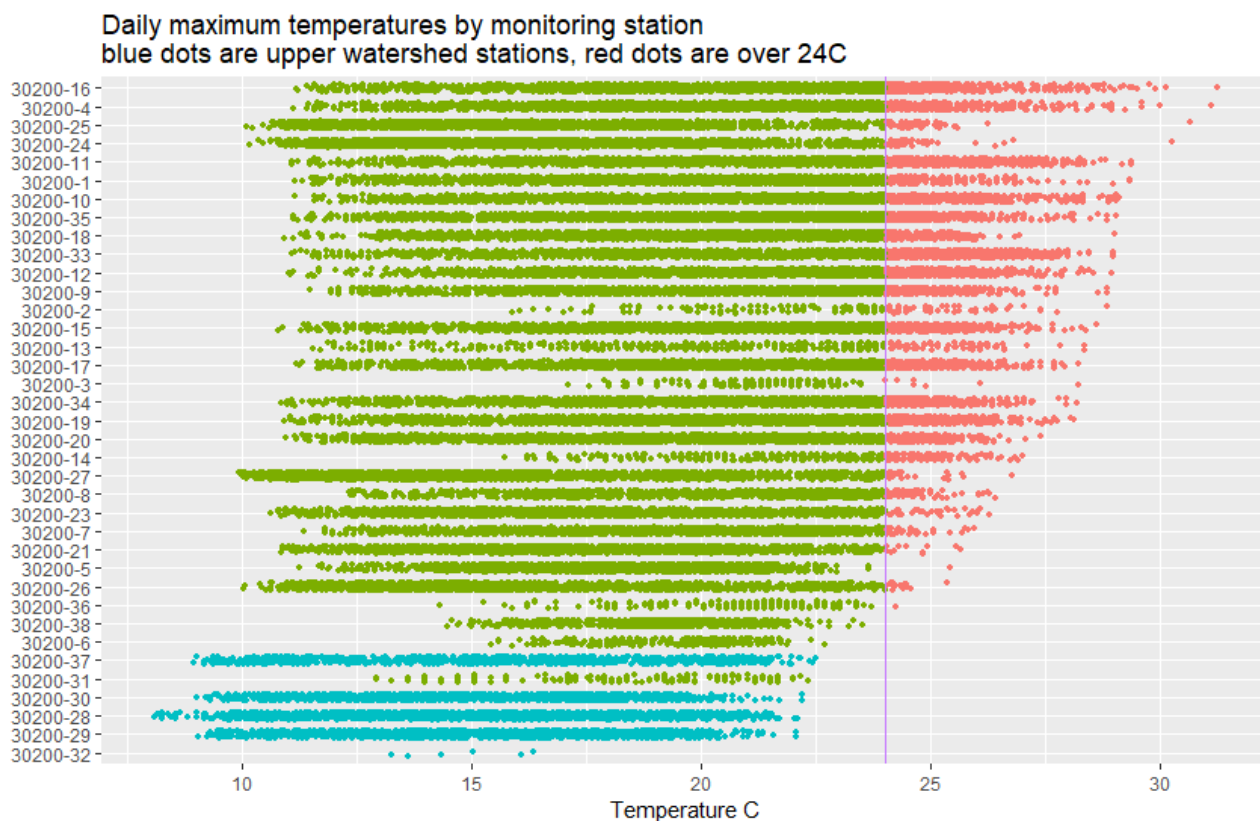
The growth endpoints (7DAVG and MWAT) have been used in several temperature evaluations in our region. The evaluation guidelines related to the growth response from Sullivan were used in these other temperature evaluations and accepted by USEPA through its approval of the 303(d) List. See the response to SCVURPPP comment 3.2 for more information on the evaluation guidelines used in the analysis.

Comment 4.3: “Carter (2008) showed a range of habitat usage up to 24 °C which is relevant to the region. More recent studies show steelhead possess a greater ability to withstand high temperatures than summarized in Carter, particularly if acclimated. Sloat and Osterback (2013) showed that steelhead are able to persist in streams > 30 °C through summer months. Los Gatos creek is in southern portion of steelhead range where steelhead are commonly exposed to elevated water temperature. Temperature thresholds used in the listing should be peer-reviewed per the listing policy.”

Temperature evaluation guidelines meet the requirements of the Listing Policy as described in more detail in response to comments 3.2 and 3.6. Carter (2008) reports on the findings of Bell (1986) who reviewed several peer-reviewed studies and stated that the lethal threshold for steelhead is 23.9 °C. Although we used a lethal threshold of 24 °C in our analysis (Moyle 1976, U.S. EPA 1977), we note that Carter also identified other authors who found lower lethal thresholds for steelhead (e.g., 21.1 °C by the California Department of Fish and Game⁷).

Our proposed listing of lower Los Gatos Creek is not driven by exceedance of the lethal evaluation guideline because the proportion of the days on which the temperature in lower Los Gatos Creek exceeded 24 °C, 14%, did not exceed the threshold for impairment (approximately 17% exceedance). Nonetheless, we are concerned that Los Gatos is not providing suitable habitat for steelhead summer rearing because there are several locations along lower Los Gatos Creek where temperatures reach the 24 °C lethal threshold more than 20% of days between March and October during the period 2000-2012, with one station reaching this lethal threshold on 40% of the days. We illustrate this in the figure below, which shows the daily maximum temperatures exceeding 24 °C as red dots. Nearly every lower watershed station has a significant proportion of days where this lethal threshold is exceeded.

⁷ California Department of Fish and Game (CDFG). 2001. California’s Living Marine Resources: A Status Report. Leet, W.S., C.M. Dewees, R. Klingbeil, and E.J. Larson [eds.]. The Resources Agency. Sacramento, CA. December 2001. 552pp. + appendices.



We disagree that the findings of Sloat and Osterback (2013) should guide the listing in Los Gatos Creek. Although their findings do suggest that in certain circumstances, steelhead are able to persist in pools with temperatures up to about 30 °C, several elements of their study reduce its usefulness as a benchmark here.

Sloat and Osterback documented steelhead presence, behavior, and persistence over time in approximately 30 pools along Santa Paula Creek (Ventura County) and correlated these observations with the pool temperature. The authors found that steelhead were able to persist in pools with temperatures up to about 30 °C. However, this finding is not equivalent to a finding that steelhead will thrive and not encounter thermal stress at temperatures up to 30 °C. The discussion section contains several passages relevant to this point.

First, the authors hypothesize that the lack of interspecies competition in Santa Paula Creek, where steelhead were the only fish in more than 90% of the study reach, allowed them to survive at higher temperatures than laboratory studies indicated. In Los Gatos Creek, steelhead do face interspecies competition and may not be the numerically dominant fish species. In fact, Lake Vasona on Los Gatos Creek contains warm water fish such as black bass, bluegill, catfish, crappie and carp⁸. These species are adapted for warm water

⁸ “This pond (Lake Vasona) is stocked with rainbow trout from November through April. Black bass, catfish, bluegill, crappie and carp” (<https://www.sccgov.org/sites/parks/parkfinder/Pages/Vasona.aspx>). See also the list of fish species in

conditions and thus would be expected to compete for resources with steelhead during the warm summer months. The authors also explicitly express doubt concerning the hypothesis that southern steelhead populations have adapted higher thermal tolerances than more northerly populations.

Furthermore, the authors concluded that the ability of steelhead to access pools, where water temperatures remained comparatively low even during warm weather, increased their ability withstand higher water temperatures. However, where movement between pools was restricted due to low flows (e.g., at the end of the summer), the fish showed thermal stress, and pools had lower fish abundance. Thus, steelhead were choosing cooler pools when flows were high enough to allow them to choose, but they had no choice but to try and persist when they could no longer move to a cooler pool. And, the steelhead were able to survive in these warmer pools, in part, because they did not face strong competition from other fish species more tolerant of warm temperatures.

The authors also found that increases in temperature caused lethargy in steelhead regardless of other factors. They noted that, *“in response to elevated stream temperatures, steelhead appeared to alter their behavior to reduce energetic costs associated with foraging and agonistic (associated with conflict) interactions. Elevated temperatures reduced fish activity in pools with and without food additions, suggesting that increased food production is not likely to sufficiently offset the energetic cost of activity at temperatures approaching tolerance limits.”*

Far from concluding that steelhead can consistently withstand higher temperatures than previously thought, Sloat and Osterback stated that their results *“emphasize the importance of maintaining or restoring suitably cool thermal regimes in streams currently or historically occupied by southern steelhead populations.”* The authors concluded that *“the threshold effect of temperature on steelhead persistence indicates that in regions where ambient conditions already approach critical thermal limits, relatively small increases in maximum stream temperatures may substantially reduce the extent of suitable summer rearing habitat.”* Accordingly, based on our review of Sloat and Osterback (2013), we find that the study findings do not invalidate our use of the 24 °C lethal temperature evaluation guideline we used for steelhead.

Comment 4.4: “Los Gatos Creek is in the Guadalupe River Watershed, which already has ongoing action to improve aquatic spawning and rearing habitat and fish passage for migration to and from the watersheds. The Fisheries and Aquatic Habitat Collaborative Effort (FAHCE) Settlement Agreement (Settlement Agreement) ...includes actions regarding temperature issues as they relate to fisheries. Given this ongoing effort, the listing should not be categorized as “TMDL required”, but instead should be listed in Category 4b: TMDL not needed because other pollution control requirements are expected to result in the attainment of an applicable water quality standard in a reasonable period of time.”

Please see the response to SCVURPPP comment 3.8. As mentioned previously, the FAHCE settlement agreement is not sufficient to place Los Gatos Creek in Category 4(b).

Los Gatos Creek at: <http://calfish.ucdavis.edu/location/?catcol=4712&categorysearch=%27Los%20Gatos%20Creek-180500030303%27&reportnumber=1293&ds=698>

Comment 4.5: “Given the flawed steelhead migration analysis, inappropriate temperature thresholds, the ongoing FAHCE Settlement actions, and questionable regulatory basis for the evaluation guidelines detailed in comments by SCVURPPP, the Santa Clara Valley Water District urges the San Francisco Regional Water Quality Control Board to delay consideration of the proposed listing of Los Gatos Creek for temperature.”

Please see the responses to SCVWD comment 4.1 concerning the steelhead migration analysis, and SCVURPPP comments 3.2 and 3.3 concerning the appropriateness and regulatory basis of the temperature evaluation guidelines, and, and SCVURPPP comment 3.7 concerning the request to delay the proposed listing.

Comment Letter 5: Sierra Club – Loma Prieta

Comment 5.1: “The listing of Los Gatos Creek as impaired for temperature is a critical and timely step towards the restoration of species and general water quality in the Guadalupe River watershed. Thank you for doing the work to analyze the Los Gatos Creek temperature data, and for your recommendation to add the Creek to the Clean Water Act Section 303(d) List of Impaired Water Bodies in the San Francisco Bay Basin.”

We appreciate the comment supporting our temperature evaluation and listing recommendation.

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