Appendix D

Response To Comments

[Page intentionally left blank]

Staff Response to Comment Letters on the Staff Report and the Proposed Delisting of the Napa River and Sonoma Creek for Nutrients

We received four comment letters during the December 16, 2013 to January 15, 2014, public comment period. The comments are summarized on the following pages, paraphrased for brevity, followed by staff's response. For the full content and context of each comment, refer to the comment letters.

Contents

[Page intentionally left blank]

Comment Letter 1: Living Rivers Council and Chris Malan (Law Offices of Thomas N. Lippe)

Comment 1.1. Commenter states that the Water Board's consideration of a Resolution to modify the 303(d) list did not follow the environmental review procedures stated in California Environmental Quality Act (CEQA). Commenter states that the proposed revisions to the 303(d) list "…are discretionary decisions that will affect the physical environment, therefore, the Board must demonstrate compliance with CEQA before approving the proposed revisions."

Water Board staff has evaluated the delisting of portions of the Napa River and Sonoma Creek under CEQA. This delisting is not a "project" as defined in CEQA (Cal. Pub. Res. Code § 21065 and Cal. Code Regs., tit. 14, § 15378). Approval of the tentative resolution will not cause either a direct or reasonably foreseeable indirect physical change in the environment (Cal. Pub. Res. Code § 21065). "Where it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA" (Cal. Code Regs., tit. 14, § 15061). In this case, the proposed delisting for nutrients will not alter any other listings in these water bodies, nor will it revoke any permits or other agreements requiring ameliorative actions or otherwise result in any physical changes to the environment. The Commenter did not identify any potential impacts to the environment. In response to this comment, we have revised the tentative resolution to insert the following finding 11:

The Water Board's approval of recommended modifications to California's Clean Water Act Section 303(d) List, and submittal to the State Water Resources Control Board for its consideration for approval, is not a "project" as defined in the California Environmental Quality Act (CEQA) (Pub. Res. Code § 21065) and the CEQA Guidelines (Cal. Code Regs., tit. 14, § 15378). The Water Board's approval of the recommended 303(d) list modifications is not an "activity which may cause either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment." (Pub. Res. Code § 21065.)

Comment Letter 2: Living Rivers Council and Chris Malan (Patrick Higgins)

Executive Summary

Comment 2.1. Data provided by Water Board staff and other data available on the Water Board's web site show signs of impairment consistent with nuisance algae blooms and nutrient pollution. Lack of high levels of phosphorus and nitrogen does not mean the Napa River and Sonoma Creek are not impaired.

We disagree that the Napa River (River) and Sonoma Creek (Creek) are impaired by nutrients. Please see the Staff Report and responses to Comments 2.2 through 2.32.

Comment 2.2. Phosphorus levels in the Napa River and Sonoma Creek are at levels that can cause nuisance algae blooms.

Impairment by eutrophication is caused by the interaction of a combination of environmental factors. Nuisance algae levels occur because of nutrient (nitrogen and phosphorus) concentrations interacting with environmental conditions such as sunlight, riparian shade, stream temperature, and stream velocity (Staff Report Section 2.1). Potential excessive nutrients or nutrient pollution is evaluated by assessing by both primary algal biomass indicators and secondary eutrophication indicators (e.g., pH and dissolved oxygen) while considering relevant environmental conditions. Not all algae growth or blooms will result in eutrophic conditions. Focusing on a single nutrient component, such as phosphorus, is not an effective way to determine impairment by eutrophication since a single nutrient does not result in eutrophic conditions. Therefore, the Staff Report focused primarily on algal biomass endpoints such as benthic chlorophyll *a* and percent macroalgae cover (comprised mostly of the filamentous algae *Cladophora*). Additionally, the Staff Report considered secondary indicators of eutrophic conditions such as pH and dissolved oxygen, which can be used to determine if current algal biomass is resulting in water quality conditions that are harmful to fish or wildlife.

We agree that phosphorus has been observed at some sampling locations at levels that could contribute to a nuisance algae bloom. However, the River and Creek are not nutrient impaired because they are limited by the availability of nitrogen. The delisting dataset for the River and Creek demonstrates that these water bodies are generally nitrogen-limited according to the Redfield Ratio, which is the proportion of nitrogen to phosphorous necessary for plant growth (Sterner and Elser 2002). The Redfield Ratio is the molar proportion of nitrogen to phosphorous, 16:1.When a water body is nitrogen-limited, additional phosphorus will not contribute to additional algae growth. A simplified example of this is making ham sandwiches and having someone supply extra ham (phosphorus), but only enough bread (nitrogen) for 10 sandwiches. Even though there is plenty of ham, no more than 10 complete sandwiches can be made.

Comment 2.3. The Staff Report states that chlorophyll *a* data suggest a lack of impairment. However, benthic chlorophyll *a* levels at some sites (N-09, N-55, S-06, S-13, and S-36) are indicative of nuisance algae blooms.

Staff disagrees that observed benthic chlorophyll *a* levels indicate the River and Creek are impaired by nutrients. The Water Board used a weight-of-evidence approach to assess eutrophication from nutrients for these listings and developed 8 lines of evidence based on primary and secondary indicators of eutrophication, including the algal biomass indicator benthic chlorophyll *a*. This approach was consistent with the State Water Board's Listing Policy's weight-of-evidence approach.

Additionally, the Listing Policy's approach is to assess water bodies as a unit. For example, data from all sample locations in the River's main stem and tributaries were considered when evaluating the number of exceedances for toxicants and weight-of-evidence for algal biomass indicators. The Staff Report also considered spatial and temporal variations to the data as mentioned in sections 3.3.3. and 3.3.4.

Of the 34 chlorophyll *a* samples collected across the River and Creek in 2011 and 2012, we observed only three exceedances were above the identified benchmark of 150 mg/m^2. The 150 mg/m^2 threshold is considered protective of the COLD beneficial use (Tetra Tech 2006). The observed chlorophyll *a* levels at site S-06 were 108 & 37 mg/m^2 , and those at S-13 were 110 & 71 mg/m^2, all levels below the threshold of 150 mg/m^2. While levels at three other sites had some observations above the threshold (i.e., 162 and 41 mg/m^2 at N-09, 161 mg/m^2 at N-55, and 259 and 27 mg/m^2 at S-36), we found these should not lead to a finding of impairment for the following reasons. No sites showed a consistent exceedance across both years for chlorophyll *a* and observed exceedances at N-09 and S-36 were close to the 150 mg/m2 guidance threshold. For N-09 in both 2011 and 2012, secondary indicators (e.g., dissolved oxygen and pH) showed that the COLD beneficial use was not affected by algae blooms (see responses to Comments 2.26 and 2.27). For N-55, observed percent macroalgae cover was low, and the chlorophyll *a* level appeared related to a combination of very low late summer flow and the temporary removal of shade by a river restoration project. For S-36, secondary indicators (e.g., pH, dissolved oxygen) did not show signs of eutrophic conditions (see responses to Comments 2.26 and 2.27).

Comment 2.4. The overall significance of chlorophyll *a* data was difficult to judge because the Staff Report did not include a description of shade conditions for each monitoring station that might suppress algal growth.

The Staff Report states that most portions of the River and Creek are well-shaded, so current levels of shade are important for preventing algae blooms (Sections 3.6 and 4.6). Further, shade conditions can be found in Tables 7 and 14 for sites with levels of chlorophyll *a* above 150 mg/m^2—that is, for those sites with potentially impairing levels of chlorophyll *a*. The average shade in the study was 71% on the River and 79% on the Creek, reported in Sections 3.5 and 4.5 of the Staff Report, respectively. In response to the Commenter's interest in the data, shade data for individual monitoring sites were added to the Revised Staff Report in Appendix A.

Comment 2.5. Continuous datasets show dissolved oxygen levels that do not support steelhead trout and COLD beneficial uses at several sites in the River and Creek (N-09, N-55, and S-36) and are not consistent with delisting.

Please refer to the responses to Comments 2.3 and 2.27.

Comment 2.6. Data show lethal or near-lethal levels for steelhead of dissolved ammonia at two locations (N-30 and N-25), which clearly is not supporting COLD nor is supportive of the proposed delisting.

Please refer to the response to Comment 2.20.

Comment 2.7. Commenter cites a study that found a number of Napa River tributaries lost flow seasonally and that a number of stream segments were becoming stagnant and incapable of supporting steelhead juveniles. Commenter states the Staff Report does not cite that study, and states the report identifies streams as intermittent when they were historically perennial.

The Commenter submitted data to the State Water Board on behalf of the Living Rivers Council as part of the 2012 listing cycle regarding potential flow impairment in the River. That data is currently in the review process for the next updated 303(d) listing of impaired water bodies. However, the Listing Policy is water body- and pollutant-specific. Thus, the proposed delisting for nutrient impairment is separate from the Commenter's request to consider listing the River for flow impairment. We will review the data submitted by the Commenter as part of the next listing cycle. See also our response to Comment 2.9 (below).

The Staff Report refers to streams that lack year round flow as non-perennial. The report does not speculate regarding whether the observed flow occurs because of natural conditions or because of water withdrawals.

Please refer to the response to Comments 2.11 and 2.28, which also refer to flows.

Comment 2.8. Commenter states that the Staff Report does not "fully disclose flow conditions in tributaries where monitoring occurs."

Water Board staff collected instantaneous flow data in 2011 and 2012 and stated the mean values and ranges of those data in the Staff Report (Sections 3.4 and 4.4). Because the Staff Report did not specifically analyze flow as a line of evidence, individual site data were not listed. In response to the Commenter's interest in the data, flow data for individual monitoring sites were added to the Revised Staff Report in Appendix A.

Comment 2.9. Substantial reaches of the Napa River and Sonoma Creek were not monitored.

Staff believes that the data appropriately characterize conditions in the River and Creek consistent with the Listing Policy. The study includes over 38 sample locations in the River and

23 in the Creek over a 10-year time frame. The study meets the Spatial (Section 6.1.5.2) and Temporal (Section 6.1.5.3) Representation Requirements in the Listing Policy as stated in Sections 3.3.3, 3.3.4, 4.3.3, and 4.3.4 of the Staff Report. There is no evidence that simply sampling more data points would result in observing a significantly higher proportion of exceedances for algae or nutrients. Our obligation under the Listing Policy is to evaluate conditions based on the readily available data (Listing Policy 6.1.1). The 2004 data collection undertaken by the San Francisco Estuary Institute (SFEI), which was part of the overall dataset reviewed, was also focused on hotspot areas most likely to be problematic, so this comprehensive dataset even included sample locations where the Water Board was likely to find nutrient-related issues, if present. However, no exceedances for ammonia, nitrate, or nitrite were identified in the 2004 data.

Comment 2.10. Commenter disagrees that nutrient inputs are generally lower in the summer. Nutrients could have discharged to unmonitored reaches of the River and Creek via groundwater and could be causing nutrient impairment in those unmonitored reaches.

Staff disagrees. The data collected by SFEI across multiple seasons in 2002-2004 support the conclusion that nutrient inputs are higher during the wet season, and this is discussed specifically in SFEI 2005 (p.16). In that analysis, nitrate and nitrite were the highest in winter and decreased as flows decreased in spring and summer. See also our response to Comment 2.9.

Comment 2.11. The Staff Report states that there are no Napa River flow trends in recent decades, but the Commenter identified a decreasing trend for one type of flow analysis. Declining flows increase the potential for nutrient pollution.

Please refer to the broad discussion on flow in the response to Comment 2.28.

Declining flows, if actually occurring in this watershed, would have the potential to increase nutrient concentrations or alter environmental conditions that facilitate algae growth (e.g., stream temperature, stream velocity). However, algal biomass data collected in 2011 and 2012 reflect current flows, and the weight-of-evidence analysis of water quality data in the River and Creek showed a lack of algal biomass indicative of excessive nutrients (Comments 2.13-2.15).

For a discussion on assessing nutrient pollution, please see the response to Comment 2.2.

Review of Justification Data and Arguments

Comment 2.12. Not all lines of evidence [were] reviewed…because only some were inconsistent with delisting.

Staff disagrees that that any lines of evidence are inconsistent with delisting as discussed elsewhere in the Staff Report and this response to comments. The following sections 2.13 through 2.29 address each of the Commenter's specific comments regarding specific data sets.

Chlorophyll Data

Comment 2.13. Commenter states that they only addressed benthic chlorophyll in their comments and not water column chlorophyll because water column chlorophyll *a* is more appropriate for measuring photosynthetic activity in lakes.

As the Commenter notes, water column chlorophyll *a* is an indicator of lake productivity, and, while we would not use this indicator as the sole line of evidence for wadeable streams, it is also used to evaluate stream productivity (Central Coast Water Board 2010). Because previous water quality assessments in streams examined this analyte, we evaluated the available data as a line of evidence of potential nutrient impairment. We found it did not indicate nutrient impairment in the River or Creek.

Comment 2.14. The Staff Report uses 150 mg/m^2 of benthic chlorophyll *a* as an indicator of impairment by nutrients. However, Horner et al. (1983) found that a level of 100 mg/m^2 could compromise beneficial uses of Pacific coastal streams.

Water Board staff arrived at the decision to use the 150 mg/m^2 benchmark after careful deliberation. Tetra Tech, supported by U.S. EPA, published a report summarizing multiple chlorophyll *a* benchmarks, including the paper by Horner et al. (1983). Tetra Tech summarized results from Horner et al. (1983) that 100-150 mg/m^2 could affect recreational and aesthetic beneficial uses. Benchmarks used by other researchers varied between 100 and 150 mg/m^2 (Tetra Tech 2006). Additionally, we considered the benthic chlorophyll *a* dataset collected by SWAMP from minimally-impacted reference streams in 2008-2010, which contained observations as high as 169 mg/m^2 under minimally-impacted reference conditions (Water Board 2012) as discussed in the Staff Report (pp. 12, 28, and 45). We decided an appropriate balance between Type I error (declaring streams as impaired when they are truly not) and Type II error (not finding a stream as impaired when it truly is) would be to use the evaluation guideline stated by Tetra Tech as the threshold between Beneficial Use Risk Category II/III boundary, which represents a threshold above which the risk of beneficial use impairment by nutrients is probable (Tetra Tech 2006).

Comment 2.15. "The fact that stations at key locations on the main branches of both water bodies [showed] nuisance levels of algae in both 2011 and 2012 is not consistent with delisting them for nutrient pollution."

Staff disagrees that the observed levels of algae demonstrate the River and Creek are impaired by nutrients. As noted in comments 2.3 and 2.18, for the few instances where the algal biomass guidance threshold was exceeded for one indicator (e.g., chlorophyll *a*), the second algal biomass indicator (percent macroalgae cover) did not show an exceedance nor did secondary indicators (e.g., pH and dissolved oxygen) show signs of eutrophication. This finding is consistent with the Listing Policy's weight-of-evidence approach.

Comment 2.16. "[D]issolved oxygen levels are consistent with nutrient pollution and impairment."

Please see response to Comment 2.27.

Comment 2.17. "No problems with algae blooms or high levels of chlorophyll *a* occur in shaded locations." Since the Staff Report gives no indication of shade at specific monitoring sites, there is no way for the reader to discern whether the low chlorophyll *a* results are low simply because most monitoring sites were shaded. "Similar questions and analytical problems exist for Sonoma Creek chlorophyll *a* data." Impairment at sites N-55 and N-09 suggests that sites between the two stations may have similar problems.

Please see the responses to Comments 2.3 and 2.4. In response to the Commenter's interest in the data, shade data for individual monitoring sites were added to the Revised Staff Report in Appendix A.

Percent Substrate Cover by Algae

Comment 2.18. Sites that exceeded 100-150 mg/m^2 benthic chlorophyll *a* also had levels of benthic macroalgae cover near or above 30% macroalgae cover. Algae cover at N-09 indicates high dry season nutrient availability. Results at N-09, S-36, S-06, and N-32, as well as N-55 (due to DO levels) are consistent with nutrient impairment.

Staff disagrees that percent macroalgae cover results are consistent with nutrient impairment. The estimate of stream bottom cover is one primary indicator of impairment, which should be supported by additional primary and secondary eutrophication indicators. We concur that, with some significant exceptions, sites with higher observed benthic chlorophyll *a* also had higher levels of benthic macroalgae cover. The 100-200 mg/m^2 range of chlorophyll *a* guidance thresholds is expected to correlate roughly to an estimated 30% stream bottom cover by benthic algae (Tetra Tech 2006). However, sites N-32, S-36, and S-06 all had less than 30% macroalgae cover. This is below the level indicating impairment based on this indicator. While observed values were close to 30%, the exercise of evaluating exceedances is based on the actual indicators. Further, although percent macroalgae cover was correlated with chlorophyll *a* (r=0.45), an exceedance of the chlorophyll *a* indicator was only associated with a simultaneous exceedance of percent macroalgae cover in one of three samples in Napa and in no samples in Sonoma (Tables 7 and 14 in the Staff Report).

We agree with Commenter's statement that results at N-55 showed strong disagreement between the chlorophyll *a* and percent macroalgae cover indicators. However, we disagree that dissolved oxygen data show impairment related to nutrients (please refer to responses to dissolved oxygen in Comment 2.27).

Nutrient Criteria

Comment 2.19. Commenter claims dissolved phosphorus is not likely limiting algae blooms and aquatic plant growth in either basin, but that phosphorus levels reported are higher than those needed to stimulate nuisance algae blooms at most stations in both basins. Referencing a value of 20 µg/L (Welch et al. 1998) for soluble reactive phosphorus (SRP), the Commenter states that 79% of the sites exceeded this level indicating phosphorus is not limiting algae blooms.

Staff concurs with the Commenter that the River and Creek are not phosphorus-limited. As stated in Comment 2.2, eutrophic conditions are not defined by the concentrations of a single nutrient, but are assessed by looking at multiple primary and secondary eutrophication indicators. Staff does not support the use of the 20 ug/L threshold for SRP (called orthophosphate in the Staff Report) put forward by the Commenter for two reasons. The Staff Report highlighted a potential nutrient-based benchmark proposed by U.S. EPA for total phosphorus at 0.518 mg/L (Section 2.4, p.10) but rejected its applicability as a line of evidence because of the high proportion of exceedances found within the regional SWAMP reference data, indicating that unimpaired streams in the San Francisco Bay Region could exhibit levels of phosphorus higher than the proposed U.S. EPA benchmarks (Water Board 2012). The SWAMP reference stream dataset developed from monitoring 6 sites intensively over 3 years has 47 orthophosphate values, of which 38 (81%) were greater than the 20 µg/l (0.02 mg/L) threshold the Commenter draws from Welch et al. (1983). This indicates that data from streams in the Pacific Northwest may not be appropriate to apply to streams in this Region. Rather, local reference data from within this Region are more appropriate to evaluate nutrient benchmarks than data from Pacific Northwest streams (i.e., northern California, Oregon, and Washington) found in Welch et al. (1998). For these reasons, the Staff Report did not use total phosphorus or orthophosphate as individual lines of evidence. Still, observed values for these analytes were reported in Tables 10 and 17 in the Staff Report, and supplied in the public dataset, because they can be used in multivariate models such as the algae predictor tool developed by Tetra Tech (2006).

Dissolved Ammonia

Comment 2.20. Three data points out of 206 are near or above a dissolved ammonia threshold of 0.025 mg/L. A 0.022 mg/L level of un-ionized ammonia is "nearly lethal" to fish. "…[I]t is likely that even higher concentrations occurred on un-sampled dates. Therefore, these [two] sites manifest highly stressful or lethal conditions for salmonids and data are not consistent with delisting."

Staff disagrees that un-ionized ammonia data show exceedances of the ammonia objective indicating impairment. The San Francisco Bay Basin Water Quality Control Plan (Basin Plan) water quality objective for un-ionized ammonia is 0.025 mg/L. The objective, however, is calculated as an annual median of all data collected within the water body (e.g., all samples in the River in 2003) and is not calculated for every individual sample, as noted in Tables 2, 6, and 13 in the Staff Report. Annualized median results for un-ionized ammonia ranged from 0.000 to 0.002 mg/L for all years of the study in both watersheds, far below the 0.025 mg/L objective. Additionally, all 206 individual ammonia measurements, including the samples identified by the Commenter with high un-ionized ammonia levels, such as site N-30 (0.026, 0.024 mg/L) and N-25 (0.022 mg/L), were below the recently-published U.S. EPA criteria for both acute and chronic conditions (2013). These criteria are expressed as total ammonia thresholds based on pH and temperature associated with the total ammonia sample, which is the same information used to calculate un-ionized ammonia—the toxic form of ammonia. As specified in the Staff Report, total ammonia thresholds ranged from 0.1 to 2.8 mg/L (Tables 6 and 13). Therefore, the Commenter's proposed toxicity threshold of 0.022 mg/L un-ionized ammonia for salmonids does not correlate with the 2013 U.S. EPA ammonia criteria, which specifically considered that taxonomic group as well as other more-sensitive organisms. As noted in the Staff Report, there

were no observed exceedances of the annual median un-ionized ammonia water quality objective, nor were there any exceedances of the U.S. EPA chronic or acute criteria for total ammonia.

pH

Comment 2.21. Commenter states that the continuous monitoring data from 2011 and 2012 "…show only modest indications of photosynthetic activity."

Staff agrees. In total, over 99.9% of these pH values were within the Basin Plan water quality objective of 6.5 - 8.5. Site N-32 (2012) showed 9 exceedances above 8.5 out of 1463 readings (<1%), and S-36 (2012) showed 2 exceedances above 8.5 out of 5688 readings (<0.1%). This number of exceedances is well below Listing Policy criteria in Table 4.1 that would indicate impairment due to pH.

Comment 2.22. Commenter states that "companion D.O. data for N-09, N-55, S-36, N-32 and S-05 show depressions indicating algal bloom activity and nocturnal respiration or high biological oxygen demand."

We disagree that dissolved oxygen data show eutrophication impairment related to excessive nutrients. Please refer to our response to Comment 2.27 regarding dissolved oxygen.

Comment 2.23. Commenter states that data collected in 2003 by the San Francisco Estuary Institute on the Napa River and Sonoma Creek showed elevated pH values consistent with eutrophic conditions that are stressful or lethal to salmonids.

The data reported by SFEI are unreliable and were noted as such in the dataset posted with the public notice. This information was also clarified in Sections 3.3.1 and 4.3.1 in the Staff Report. SFEI did not produce a pH Sampling and Analysis Plan or Quality Assurance Project Plan that could confirm the reliability of the equipment used, pH standards, number of points used for calibration, adequate frequencies for pre- and post-measurement calibrations, and established measurement quality objectives for drift. For these reasons, we determined these data to be unusable for the pH line of evidence analysis. Only pH data collected by this Region's SWAMP staff in 2011 and 2012 according to the SWAMP QAPrP (2008) were considered to be of suitable data quality and included in pH analysis. We note, further, that the recently-collected data, as noted in the Staff Report and our response to Comment 2.21, do not indicate impairment.

Comment 2.24. The Commenter states that the dataset contains "just one hand held 2011-2012 pH value except for the seven sites where continuous recorders were deployed in those years."

Staff disagrees. The dataset contained 27 handheld pH measurements from the River and another 27 from the Creek collected between 2011 and 2012, as noted in Tables 6 and 13 in the Staff Report. The handheld pH data have good spatial and temporal ranges, as outlined in our response to Comment 2.9. Of these 54 combined samples, none exceeded the Basin Plan water quality objectives. Additionally, continuous monitoring pH and dissolved oxygen data were collected

from a total of seven locations, at sites we expected to have higher algal biomass than other sites. Continuous monitoring occurred at four locations in both 2011 and 2012. Three additional locations were monitored for one year, in either 2011 or 2012. This resulted in 11 continuous monitoring datasets. The datasets focused on the areas where high algae levels, if present, would have resulted in pH and dissolved oxygen patterns indicative of eutrophic conditions. However, such patterns were not observed. Please see responses to Comments 2.26 and 2.27 for a detailed discussion of the continuous monitoring data.

Comment 2.25. Commenter presents a case for pH values above 8.5 being harmful to salmonids.

This value is in agreement with the Basin Plan's maximum pH water quality objective of 8.5, which was not exceeded in the 2011-12 data in any of the 54 point measurements and was only exceeded a small <0.1% of the time at sites with continuous monitoring data.

Comment 2.26. "Seven locations on Sonoma Creek had pH greater than 9.5 according to SFEI data and only three sites were under 8.5. On the Napa River, only 17 readings of 60 in 2003 were under 8.5. Spot readings in 2011-2012 are not useful for judging diel swings of pH symptomatic of nuisance[.] Therefore, pH data are insufficient for understanding nutrient pollution and do not justify delisting."

Please see response to Comment 2.23.

The pH data contribute to an understanding of nutrient pollution. While we would not rely solely on pH data for assessing impairment, it is appropriate that they be used as part of the evidence in a weight-of-evidence approach to consider delisting. Spot readings, of which we collected 54 samples, are useful in identifying potentially high pH levels, particularly as they were collected during daylight hours, when pH maxima would be expected to be reached (Water Board 2012, raw data). For example, the short-term high of pH 8.0-8.6 range at site S-19 occurred in the early morning and late morning, which is when SWAMP staff collected most spot measurements from sites in 2011 and 2012. Also, 11 continuous monitoring deployments occurred in the River and Creek over 2011-12. In eutrophic waters, the data would be expected to show strong daily variation in pH with peaks potentially exceeding the Basin Plan maximum objective of 8.5. However, the data do not exceed that threshold, as demonstrated in Commenter's Table 2, "[m]aximum and minimum annual pH data from probes deployed by SFBRWQC[B] in 2011 and 2012 in Sonoma Creek and the Napa River." The amount of grab and continuous monitoring data are enough to show that pH is meeting current water quality objectives under a weight-of-evidence approach.

Figure 1, below, shows the pH data from the site in the Creek with the highest chlorophyll *a* readings. The small amount of daily variation in pH (0.5 units) was within the daily range of variation observed in regional reference sites (Water Board 2012, raw data). According to Nimick et al. (2011), the amplitudes of diel pH cycles in streams are typically are less than 1 pH unit, whereas during summer low-flow conditions in eutrophic streams, daily fluctuations can be as high as 2 pH units.

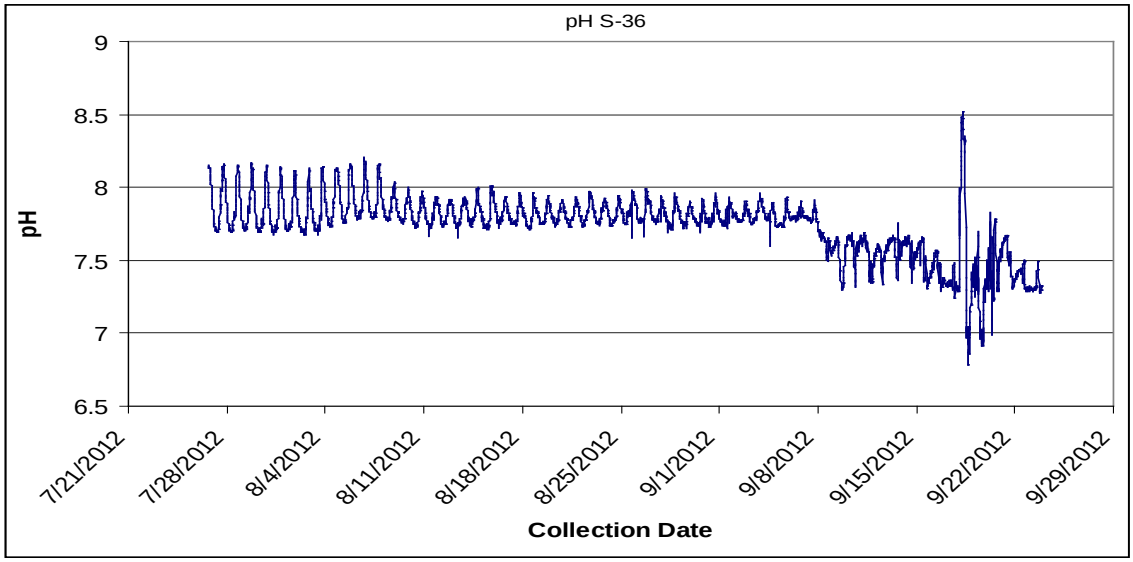

Figure 1. Site S-36 pH data, the only site in Sonoma Creek with chlorophyll *a* above 150 mg/m^2.

Dissolved Oxygen

Comment 2.27. Commenter states that many aquatic species in the River and Creek require high levels of dissolved oxygen, with stress occurring for juvenile steelhead trout at DO levels below 7 mg/L and death at DO levels below 3 mg/L. Commenter states that 2011 and 2012 data show "conditions limiting for salmonids" and "show that critically low DO levels were also accompanied by saturation levels that fell below 50% in some cases."

Staff concurs that continuous observations of dissolved oxygen included observations of dissolved oxygen below Basin Plan objectives. However, we disagree that dissolved oxygen data show signs of eutrophication (i.e., that dissolved oxygen data is likely a result of nutrient impairment). Severe eutrophication would be evidenced by large daily swings in dissolved oxygen levels. For example, observed dissolved oxygen levels in Arroyo Las Positas, a stream in the San Francisco Bay Region that was listed for nutrient-related eutrophication in 2010, ranged daily from 5 mg/l to 30 mg/L and up to 395% saturation (http://www.waterboards.ca.gov/water_issues/programs/tmdl/2010state_ir_reports/00671.shtml#7578). Those conditions were not observed in the River or Creek.

Mild supersaturation of dissolved oxygen is expected in streams under natural conditions in the summer, when non-nuisance levels of algae produce oxygen in the day and respire at night (Nimick et al. 2011). However, the process of identifying nutrient impairment requires us to determine when these daily variations become too extreme. The Central Coast Regional Water Quality Control Board developed a benchmark for dissolved oxygen supersaturation of 13 mg/L (Water Board 2010). This concentration was never reached in any of the 11 samples of continuous monitoring data from both water bodies, as noted by the Commenter in Table 1, "Minimum and maximum values for DO from various Sonoma Creek and Napa River sites for 2011 and 2012 derived from data recorders."

The dissolved oxygen lows recorded at sites S-36, N-09, and N-55, as noted in Commenter's Table 1, were below the Basin Plan objective for dissolved oxygen. However, the daily pattern of changes in oxygen does not support eutrophication as the cause, as explained below. We note that 2012 was a very dry year, and flows in 2012 were correspondingly low, likely contributing to the observed low dissolved oxygen levels then, which were not observed at the same sites in 2011. In fact, two sections of the River's main stem that we intended to sample dried out in 2012.

At site S-36, the mean dissolved oxygen was 6.4 and generally ranged from 5 to 10 mg/L for 80% of the observation period (Figure 2). After September 9, 2012, nighttime oxygen levels started to dip below 5 mg/L.

At site N-55, the River was deep and wide (1-2 m depth by 9 m width) with very little flow (< 1 cubic feet per second), as described in the Staff Report. Dissolved oxygen levels were generally between 1 and 4.5 mg/L, with low readings often observed around midnight (Figure 3). The sonde at this site was tied to a root wad at the bottom of the stream.

At these two sites, available data are insufficient to determine the cause of low dissolved oxygen conditions. However, they are not indicative of eutrophic conditions because the amount of daily variation was within ranges observed in non-eutrophic reference streams monitored by the Water Board (Water Board 2012, raw data).

At site N-09 in 2012, dissolved oxygen data averaged 6.68 mg/L, and generally ranged from 5-10 mg/L, with some extreme low values observed around 7-10 PM. The daily fluctuations of about 4-5 mg/L are occurring because of daily cycles in photosynthesis and algae respiration (Nimick et al. 2011). This amount of daily variation was within ranges observed in non-eutrophic reference streams monitored by the Water Board (Water Board 2012, raw data). As noted above, they are not at levels exemplary of eutrophic conditions.

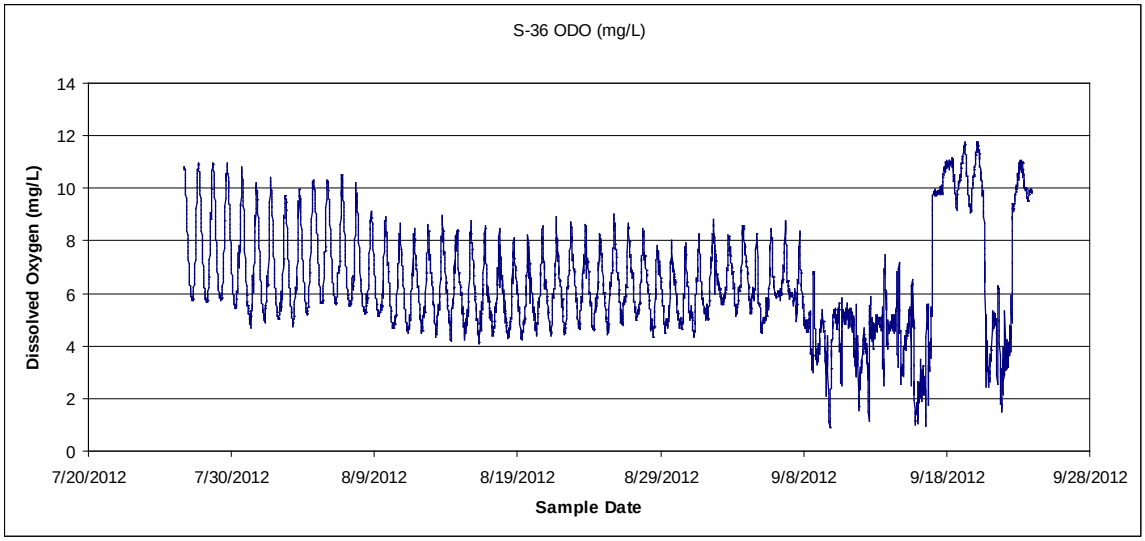

Figure 2. Dissolved oxygen data from site S-36, the only site in Sonoma with chlorophyll *a* above 150 mg/m^2.

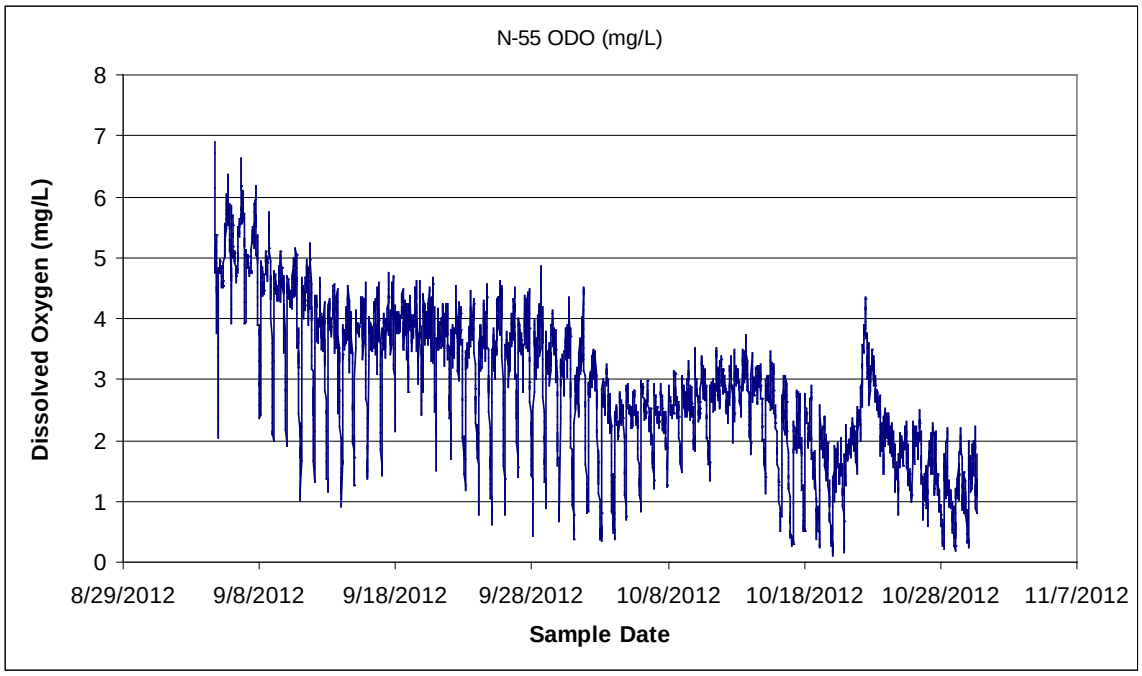

Figure 3. Dissolved oxygen data from site N-55, the one site in the Napa River with chlorophyll *a* greater than 150 mg/m^2 in 2012.

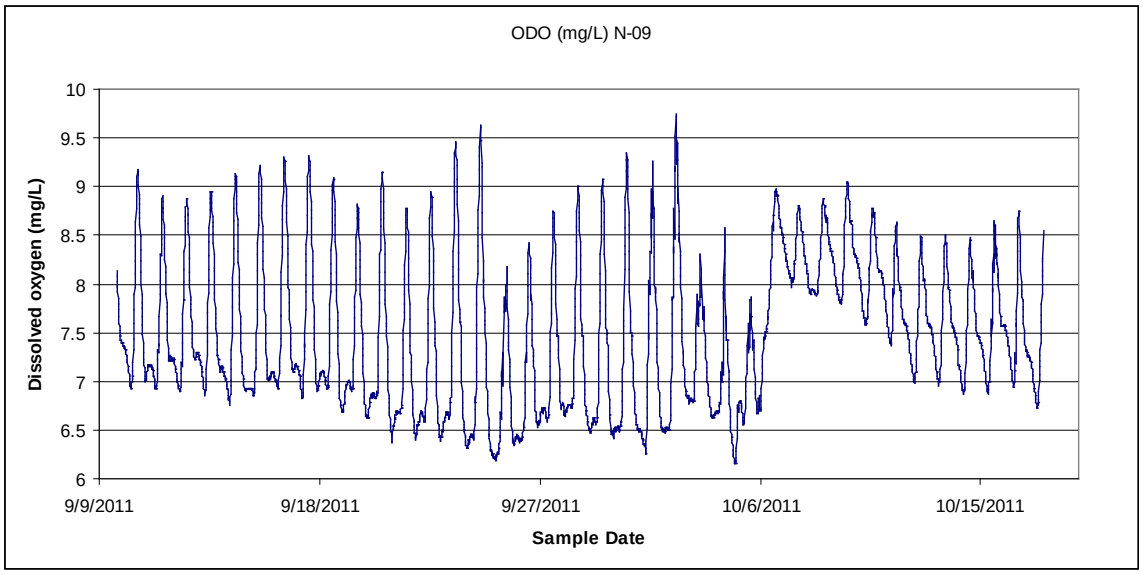

Figure 4. Dissolved oxygen data from site N-09 in 2011, the year high chlorophyll *a* (>150 mg/m^2) was recorded. The increase around October 7 closely follows a one inch rain event during October 4-5, 2011.

Flow Trends

Comment 2.28. Commenter includes approximately 5 pages of comments making an analysis of flow and assessing water withdrawals in this Region, stating, in part, that lack of flow and resulting conditions in the Napa River are causing conditions limiting juvenile steelhead production.

Comment noted. The proposed delisting is for the existing impairment listing for nutrients in the River and Creek. The Commenter separately submitted information to the State Water Board requesting that the River be listed as flow- and temperature-impaired on the 303(d) list of impaired water bodies. That information is, appropriately, under consideration as part of the 303(d) listing update process.

Listing Policy section 6.1.5.1 directs the Water Board to consider "readily available pertinent factors such as…flow" when assessing water quality standards attainment. Thus, it does not necessarily require a detailed flow analysis but does guide staff to take flow into consideration, as we did in the Staff Report in Sections 3.4 and 4.4.

The Staff Report includes a simple analysis of stream flow based on the three USGS gauging stations in the River and Creek. Flow is a variable that affects algae growth since it is correlated with stream temperature, stream depth, and light penetration to the stream bottom. The Staff Report analysis did not find a significant change in annual flows over a 40 year period and concluded that increases in flow were unlikely to have been a factor in why eutrophic conditions decreased since initial reports from the mid-1970s. If summer low flows have indeed decreased, as proposed by the Commenter, then water quality conditions appear to have improved independent of reductions in flow, even though flow reductions have a hypothetical potential to increase algae blooms if all other variables remain the same.

Visual Evidence

Comment 2.29. Commenter states that impairment of recreational beneficial uses can be visually assessed. Commenter includes an undated photo of an unidentified site on the Napa River near the Oakville Road Bridge, stating that it "…shows objectionable algae blooms and the channel choked with vegetation … conditions consistent with high nutrient availability even though the site is partially shaded."

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 (Fetscher et al. 2009) 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.

Another means of assessing recreational beneficial uses is to survey or observe stream users. We completed anecdotal observations during several visits to site N-09, which had the highest percent macroalgae cover observed in both watersheds. The site is publicly-accessible. We observed the site in 2012, when it had 45% macroalgae cover, to examine how it affected non-contact recreational use. There were no nuisance odors and the river bank was still a very aesthetically pleasing location for lunch and walking. River otters were seen by staff at this site on another visit. Many members of the public were also observed enjoying the site during the 2012 visit and other visits.

A challenge in assessing the amount of algae that affects non-contact recreation is that different people will perceive the same environmental conditions differently. Staff's qualitative anecdotal observations of site N-09 were that even though it had a quantitatively high level of macroalgae in 2012, the non-contact water recreation beneficial use did not appear to be impaired by it.

Conclusion

Comment 2.30. Commenter does not believe the data presented in the Staff Report provide appropriate justification to delist Napa River and Sonoma Creek.

Staff disagrees. The Water Board followed guidance in the Listing Policy to analyze available data to assess the historical listing for nutrients related to eutrophic conditions in these water bodies. Data meet the spatial, temporal, and quality assurance requirements in the Listing Policy. The weight-of-evidence approach, using eight lines of evidence and data collected throughout the two watersheds from 2002-2012, indicated that nutrients are no longer causing impairments to beneficial uses in the River and Creek.

Comment 2.31. Commenter urges the Water Board needs to take action to restore flow citing Supreme Court case *Jefferson County PUD and City of Tacoma v. Washington Dep't of Ecology* (1994) 511 U.S. 700.

Please refer to the response to Comment 2.28.

Comment 2.32. Commenter included as Appendix A a letter from Patrick Higgins to Jeffery Shu at the State Water Board containing data to be considered for the 2012 Integrated Report, requesting that the Napa River be listed as impaired for flow and temperature.

The Commenter's submittal does not include significant information on nutrients, which is the issue being considered in these proposed delistings. To the extent flow- impacted nutrient issues were raised, they are addressed elsewhere in this response (e.g., see responses to Comments 2.7, 2.11, and 2.28). The Commenter's submittal is currently in the review process for the next update of the 303(d) list of impaired waters, and we would expect to address it as a part of that process.

Comment Letter 3: Napa County Farm Bureau (Norma Tofanelli and Jim Lincoln)

Comment 3.1. Commenter supports the proposed delisting of the Napa River and Sonoma Creek main stems for nutrients.

Comment noted.

Comment Letter 4: Napa County Flood Control and Water Conservation District (Phillip M. Miller)

Comment 4.1. Commenter appreciates the work to collect data and concurs with the proposed delisting of the Napa River and Sonoma Creek main stems for nutrients.

Comment noted.

References

All references in this Response to Comment are identified in the Staff Report with the exception of the following:

Nimick, D.A., C.H. Gammons, and S.R. Parker. 2011. Diel biogeochemical processes and their effect on the aqueous chemistry of streams: A review. Chemical Geology, 283: 3-17.

Sterner, R.W., and J.J. Elser. 2002. Ecological Stoichiometry: The Biology of Elements from Molecules to the Biosphere. Princeton University Press, Princeton, N.J.