

Regional Water Quality Control Board Central Valley Region

Board Meeting – 4/5 October 2012

Response to Written Comments on Clear Lake Nutrient TMDL Control Program 5-year Update

At a public hearing scheduled for 04/05 October 2012, the Regional Water Quality Control Board, Central Valley Region (Central Valley Water Board) will be updated on the Clear Lake Nutrient TMDL Control Program. Written comments on the Staff Report from interested parties were due to the Central Valley Water Board by 20 August 2012. Comments were received during the comment period from:

- The Essential Public Information Center
- Big Valley Rancheria Band of Pomo Indians

Late comments were received 29 August 2012 from:

- County of Lake, Department of Water Resources

The submitted comments and are summarized below, followed by Central Valley Water Board staff responses.

The Essential Public Information Center Comments

Comments number 1 through 6 represent a list of primary concerns, which reflect the Essential Public Information Center's understanding of federal and State programs intended to protect the US EPA Hydrological Unit 180-20116 (Upper Cache Creek Watershed, including the Clear Lake basin and resident water resources).

Comment # 1

The Clear Lake Nutrient TMDL is focused solely on reduction of phosphorus, despite the known importance of nitrogen to the generation of nutrient produced impairments.

Reference: (a) USEPA memo dated March 16, 2011, "Working in Partnership with States to Address Phosphorus and Nitrogen Pollution through Use of a Framework for State Nutrient Reductions," and (b) "Evaluation and Review, Amendment to the Water Quality Control Plan for the Sacramento River and San Joaquin River Basins -- The Control of Nutrients in Clear Lake and Total Maximum Daily Load for Nutrients in Clear Lake, Lake County, California (Tetra Tech)," Vladimir Novotny, PhD, P.E., December 19, 2005.

RESPONSE:

The Clear Lake Nutrient TMDL's control program is centered on phosphorus reduction. Current research on eutrophication suggests that phosphorus reductions are the most promising action

that can be taken to reduce the incidence of algal blooms¹. In the basin plan and in this review of the control program, staff recognizes the value of evaluating other factors that may affect production of nuisance blooms. However, we continue to support efforts to reduce phosphorus loads while these other factors are explored.

Comment # 2

The ongoing nutrient TMDL program in Lake County does not articulate the appropriate implementation of California's Nonpoint Source Pollution Program tools (61 management measures, watershed management initiative goals, and the "three-tiered" approach to enforcement) available for pollution prevention planning by the Responsible Parties to reduce nutrient loading in Clear Lake.

Reference: (a) "Volume I -- Nonpoint Source Program Strategy and Implementation Plan, 1998-2013 (PROSIP)," (b) "Volume II -- California's Management Measures for Polluted Runoff (CAMMPR)," State Water Resources Control Board; (c) "Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Waters," USEPA January 1993; "Nonpoint Source Program and Grants Guideline for States and Territories, October 23, 2003" (Federal Register Volume 68, Number 205, Page 60653-60674).

RESPONSE:

Responsible parties are implementing management measures mentioned in California's Management Measures for Polluted Runoff.

Comment # 3

The nutrient TMDL program focuses on monitoring of trophic, limnological characterization of lakebed "dynamics" rather than on implementing the recommendations of the Clean Lakes Program (Phase II) projects defined in the "Clear Lake Diagnostic/Feasibility Study" (Clean Lakes Program Phase I) -- also referred to as the "Causes and Control of Algal Blooms in Clear Lake" (Richerson et al. 1994) -- and which is updated by the "Clear Lake Report, Clear Lake Historical Data Analysis" (Winder et al., 2010). ["Phase II projects are initiated in a comprehensive, integrated manner based on the Phase I study. Funded activities include artificial aeration, phosphorus precipitation, dredging, and the installation of watershed best management practices," from the "Clean Lakes Program 1993-1994 Annual Report, Page 4.]

Reference: (a) "Clean Lakes Program, 1990 Annual Report," USEPA Office of Wetlands, Oceans and Watersheds, Office of Water, 1991; (b) "Clean Lakes Program 1993-1994 Annual Report," USEPA

http://water.epa.gov/type/lakes/upload/2007_04_05_lakes_lakes-93-94report.pdf

RESPONSE:

The Nutrient TMDL control program focuses on phosphorus reduction, which is identified as a control in the Clean Lakes Report. See Section 9 in the report, Alternative Methods for the Control of Blue-Green Blooms states in the Abstract which says:

"Scum-forming blue-green blooms are typically controlled either by removing sources of phosphorus from inflowing waters and/or by chemical treatment of lake waters to limit recycling

¹ Carpenter, Stephen R. 2008. Phosphorus control is critical to mitigating eutrophication. PNAS vol. 105, no. 32, pgs. 11039-11040. August 12.

of this nutrient...Phosphorus (and probably iron) fertilization of algal blooms can be substantially reduced by management practices designed to reduce non-point sources of sediment from damaged creek channels, roads, and similar sources. Rehabilitation of wetlands and floodplains to settle nutrient-laden sediments would have important benefits. Control of point source inputs, such as wastewater from sewage treatment plants, is currently reasonably effective, and only marginal benefits will be obtained by improving the plants. In-lake treatments might be effective, but would be expensive and have potential hazards to the ecosystem. Direct management of blue-green populations by harvest, poisoning, or biomanipulation are not practical in Clear Lake, although skimming and similar practices are useful on a small scale for relief of local problems."

Comment # 4

Significant impacts of agricultural operations and lakebed management services are not adequately measured to ensure that best management practices required for achievement of Nonpoint Source Pollution Program goals are implemented.

Reference: (a) your report; (b) "Clear Lake Integrated Aquatic Plant Management Plan," 2004 (and affiliated document components, reports to CVRWQCB, SLC, and other responsible agencies).

RESPONSE:

Irrigated agriculture in the Clear Lake Watershed is regulated under the Central Valley Water Board's Irrigated Lands Regulatory Program (ILRP) which requires compliance with TMDLs. The Lake County Farm Bureau is working in coordination with the ILRP to achieve the load reductions required in the TMDL. Irrigated agriculture's contribution to phosphorus loads is currently lumped in as part of the general nonpoint source category allocation.

Comment # 5

Despite some seventy years of multiple agency data gathering and studies, integrated commitment to reduce environmental stresses on the "receiving water body" appears to be absent.

Reference: (a) Bulletin 143-2, California Department of Water Resources 1966; (b) "Clear Lake Integrated Watershed Management Plan," Lake County Department of Public Works 2010; (c) minutes of Clear Lake Advisory Committee 2011-2012.

RESPONSE:

Collaborative efforts are occurring in the Clear Lake watershed to improve water quality in the Lake. Resources are being raised to fund the Middle Creek Restoration project, which is a key element of the phosphorus control program. State and local agencies, environmental non-profit organizations, and Tribes are working collaboratively on the Westside Integrated Regional Water Management Plan. In addition, US Forest Service (USFS) is collaborating with West Lake RCD on a sediment reduction project on USFS land and the Scotts Valley Band of Pomo Indians is working in coordination with the US Bureau of Land Management on a sediment reduction and habitat enhancement project.

Comment # 6

Economic conditions resulting from loss of lake-provided revenues have the effect of calling into question the adequacy of our multiple environmental protection programs (including, of course, the nutrient TMDL).

Reference: (a) "Causes and Control of Algal Blooms in Clear Lake," UC Davis and Lake County Department of Public Works, 1994; (b) personal statement of Sandi Shaul, Lake County Tax Collector, July 25, 2012*; (c) minutes of Clear Lake Advisory Committee 2011-2012.

RESPONSE:

There have been multiple efforts by the State of California to improve the water quality of Clear Lake, thereby improving the lake-provided revenues. For short term improvements to Clear Lake, the State Water Resources Control Board provided two rounds of Clean-up and Abatement emergency funds to the Lake County Department of Water Resources for the purchase of boats then booms to mitigate floating algal mats in marinas. And for long term solutions, responsible parties and stakeholders are participating in the implementation of the Clear Lake Nutrient TMDL control program.

Comment # 7

The overall impression given by the descriptions of "Numerous actions . . . implemented prior to adoption of the control program and in the 5 years since the program was adopted to reduce the input of sediment and nutrients into the Lake," as detailed in Appendix A of your report, is that the system in place is functioning "normally" if not "well," and that the state's expectations are met by current implementation processes. In general, I disagree with this finding.

RESPONSE:

Appendix A of the report simply states the implementation actions that have been taken to reduce sediment to Clear Lake. The Clear Lake Nutrient TMDL was adopted in 2006 and the control program mandated an implementation plan be developed by 2008. Since 2008, responsible parties have implemented management measures to reduce sediment loads to the Lake, thereby reducing phosphorus loading. Many of the responsible parties are applying for State and Federal grants and using their own funds to implement projects. Regardless of the actions implemented by agencies mentioned above, the load reductions specified in the Basin Plan likely cannot be achieved without implementation of the Middle Creek restoration project. And after the restoration project is completed, it may take some time before conditions in the Lake improve. The lake bed sediments will provide an internal load of phosphorus that will take some time to reach equilibrium with a reduced supply of inflowing external phosphorus.

Researchers and scientists agree that the factors influencing nuisance blooms and the dominance of one species over another are complicated. However, past research on Clear Lake and in other water bodies suggests that phosphorus reductions are a reasonable approach to take. New science on the subject continues to indicate that phosphorus is a key element in algae production.

Comment # 8

While all of the agencies and requirements you mention are present, their degree of functioning and integration is weak, at best. The last meeting of the Resource Management Committee was July 2010, and no one from the State or CVRWQCB was present. I have been attending and

participating in Lake County Board of Supervisor public hearings on almost every water related issue in Lake County for the last 5 years, and have not seen anyone from CVRWQCB in attendance; not that my own attendance at BoS hearings is perfect, I'm just saying. Also, I am Secretary of the Clear Lake Advisory Committee, and in earlier years participated in both RMC and CLAC meetings, beginning occasionally in 2003 and increasingly beginning in 2007. I became Secretary of CLAC in 2010.

RESPONSE:

Unfortunately, Central Valley Water Board staff is not able to attend most local meetings. Staff reviews various meeting agendas to track the local effort and to determine if our participation is warranted. We expect that we will need to be more involved in the future in order to determine whether phosphorus control efforts are effectively reducing loads.

Comment # 9

There have been a few local consortiums formed to address invasive species (for implementation of the Quagga Mussel Prevention Program, 2008 to present), and a special task force was created in 2010 to provide direction to the Board of Supervisors regarding funding for lakebed "management" programs to mitigate weeds and algae, but there has been no public meeting of the Clear Lake TMDL Stakeholders Committee since 2010 or earlier (perhaps since publication of the 2009 "Final Report").

RESPONSE:

Staff worked with the responsible parties to obtain the information presented in the Staff Report. Staff anticipates there will be a need for the Clear Lake TMDL Stakeholders Committee to meet after the Central Valley Board Meeting to discuss next steps.

Comment # 10

The original Clear Lake TMDL Stakeholders Committee (CLTSC) never achieved the long-identified objective of merging data, and no further action was taken beyond conducting meetings (described in the "Monitoring and Implementation Plan, Clear Lake Mercury and Nutrient TMDLs," of 2008). In fact no shared data analysis occurs or is planned for -- according to the California Department of Water Resources, Northern Region IWRM Branch Chief, Scott McReynolds.

RESPONSE:

Merging data is a worthwhile task, but it was not one of the stated objectives of the Clear Lake Nutrient TMDL. Staff can assist with making data more readily available to the public by posting data on our website (i.e., chlorophyll-a, grants that were funded by the Water Board in the Clear Lake watershed, and the California Department of Transportation). The data that the ILRP collects is already posted on our website and the California Department of Water Resources posts data on their data library.

Comment # 11

There is no discussion in your review report of the costs of actions taken so far, contracts awarded, project reporting outcomes, responsible party management reports, or management (CVRWQCB programs) costs to allow discussion of value received for dollars spent on the TMDL implementation process. Combined with an appropriate "Use Attainability Analysis" the

results of such discussion might yield a significant indication of future program direction for the participating state and federal agencies to assist the local responsible parties.

RESPONSE:

There were some statistics given for implementation projects if the projects were funded by State or Federal grants, but you are correct, the cost of actions taken so far has not been compiled. However, it is not mandatory that the Central Valley Water Board be made privy to the cost of implementation projects undertaken by named parties or other stakeholders.

Comment # 12

Implementation of the NPDES Phase II Small Municipal Separate Storm Sewer System and Aquatic Pesticide permits require monitoring and enforcement of permitted actions, but these program actions are not integrated with the TMDL nutrient reduction program, nor are cumulative and combined impacts identified and monitored.

RESPONSE:

Monitoring is currently not a requirement of the NPDES Phase II MS4 permit, but Clear Lake Nutrient TMDL load allocations have been included in the draft Phase II MS4 permit. Staff will investigate the Aquatic Pesticide permit requirements and monitoring.

Comment # 13

Health concerns regarding safe drinking water prompted inquiries into possible contamination of water supply (Clear Lake) by cyanobacterial "blue-green" algae, causing citizens and business owners to struggle and in too many cases fail. The Clear Lake TMDL 5-Year Review Report does not discuss this indication of worsening lake water quality.

RESPONSE:

The Central Valley Water Board is committed to addressing the water quality problems in Clear Lake. We have employed a three-pronged strategy. First, we worked with the responsible parties and other stakeholders to develop the phosphorus control program. Second, we will continue to work to ensure that the control program is implemented and phosphorus loads are reduced so water quality conditions in the Lake improve. Third, while the control program is being implemented, we have worked (and will continue to work) with Lake County to obtain grants and other funding to address identified problem areas that continue to occur. In addition, the Staff Report discusses the massive algae blooms in 2009, 2010 and 2011 and well as the shift in cyanobacteria species.

Comment # 14

The Lake County Department of Public Works and staff continue to proclaim that the lake is getting "clearer," regardless of the increasing negative impacts on Clear Lake water quality, as evidenced by the costs of water treatment for domestic use. As an example, the 648 hookups in the County Service Area #20 (Soda Bay) fund the cost of removal of solid wastes created in their drinking water treatment process to the tune of over \$100,000 per year. Likewise, around the lake other purveyors have added more filtration processes and solid waste removal fees.

RESPONSE:

Regardless of Lake County's measurement of lake clarity, staff recognizes there are water quality issues at Clear Lake and is committed to working on them with the responsible parties and local stakeholders.

Comment # 15

The mounting evidence of degrading water quality cannot be countermanded by marketing and academic studies, when tens of thousands of Clear Lake community water users are suffering from a variety of impairments to their health and wellbeing. Studies of these impacts, and internal capacities to serve need to be compiled in an integrated look at the whole process of treating and using Clear Lake.

RESPONSE:

The Central Valley Water Board remains committed to addressing any beneficial use impairments at Clear Lake and will work with the California Department of Public Health and the local Health Department, who are the lead agencies to address drinking water treatment issues.

Comment # 16

According to the "Nonpoint Source Program Strategy and Implementation Plan, 1998-2013," "In 1996, USEPA issued CWA [Clean Water Act] section 319 program guidance that identified 'nine key elements' that must be addressed to receive USEPA approval for upgraded NPS Plans."

"Minimum Elements for Watershed-Based Plans per CWA Section 319(H)" include "Element 1: Identification of Causes and Sources." According to the text explaining the requirement ("Identification of caused impairment and pollutant sources or groups of similar sources that need to be controlled to achieve needed load reductions, and any other goals identified in the watershed plan."), "Your watershed plan should include a map of the watershed that locates the major causes and sources of impairment. To address these impairments, you will set goals that will include (at a minimum) meeting the appropriate water quality standards for pollutants that threaten or impair the physical, chemical, or biological integrity of the watershed covered in the plan."

The "Clear Lake Integrated Watershed Management Plan" (2010) referred to in your report might be considered the repository for this information, but significant sources of pollution -- such as the watersheds surrounding the City of Clearlake, and impacts to the Lower Arm of Clear Lake -- are not included in that plan, and the 5-year report does not address the necessity for updating the plan and providing a map compliant with the CWA section 319 requirements.

RESPONSE:

"Element 1: Identification of Causes and Sources" is satisfied in the Clear Lake Nutrient TMDL, and the sources have been given waste load allocations and load allocations in the TMDL.

Comment #17

Your "Staff Conclusions and Recommendations" include the following statement: ". . . there is inadequate information available to 1) determine current phosphorus loading to the Lake from the various sources, 2) evaluate the effectiveness of implemented phosphorus control practices, and 3) evaluate overall compliance with the TMDL."

I suggest that the program should identify all of the sources of pollutant contributions, attempt to quantify their inputs to the receiving water body, and look for reasonable ways to reduce or prevent those contributions -- including watershed drainages now substantially laden with wine grape vineyards, urban environmental (legacy) damage in the City of Clearlake, rice growing practices in the Scotts and Middle Creek drainages, unremediated former landfills and municipal operation sites (county corporation yards, CalTrans corporation yards, et cetera), aquatic pesticide applications, and sediment sources from unremediated forest fire suppression damages. Each agency is described as having its own program plans, but since there are no meetings of the Resource Management Committee, the public has no opportunity to monitor the various agency programs, and plan local action plans accordingly.

RESPONSE:

The Staff Report continues to direct responsible parties to 1) aggressively implement sediment reduction BMPs to decrease phosphorus loading to the Lake, 2) evaluate the effectiveness of BMPs in reducing phosphorus loading to the Lake and 3) provide this information to the Central Valley Water Board on an annual basis. Staff will continue to support all nutrient reduction projects that can estimate load reduction and plans to convene a meeting of the Clear Lake TMDL Stakeholders Committee after the Central Valley Board Meeting to discuss next steps.

Big Valley Rancheria Band of Pomo Indians**Comment #1**

It is obvious that the measures being taken by the communities in the Clear Lake Basin are not reducing nuisance algal blooms. The devastating cyanobacteria blooms that have occurred each summer since the Clear Lake Nutrient TMDL was initiated have impaired multiple beneficial uses of Clear Lake. There is widespread concern among Tribal members about the safety of swimming in the lake and certainly the enjoyment of the lake has been reduced drastically.

RESPONSE

Unfortunately, reducing the nuisance algal blooms will take time. Responsible parties and other stakeholders are on the right path in reducing the external loading of phosphorus. However, it may take some time before conditions in the Lake improve. The lake bed sediments provide an internal load of phosphorus that will take some time to reach equilibrium even with a reduced supply of inflowing phosphorus.

Comment #2

We believe that targeted water quality monitoring is needed to identify the entry points of nutrients into the lake and to bring nonpoint source polluters into compliance with not only the loading requirements, but also the Clean Water Act. We are aware of areas with leaking septic tanks, yet there appears to be [no] monitoring to confirm and therefore no compliance assistance.

RESPONSE

The Staff Report discusses some of the previous and current targeted monitoring efforts by Lake County, the California Department of Transportation, the Irrigated Lands Regulatory Program and the California Department of Water Resources.

Earlier reports have concluded that septic tank systems are likely not an important source of phosphorus. Phosphorus binds to soil, so by the time a groundwater discharge from a septic tank/leach field reaches the Lake, there would likely be little phosphorus in the discharge.

Comment #3

The efforts that have been undertaken to meet loading requirements are positive, but obviously the entire Nutrient TMDL needs to be revised and updated to reflect what is happening in Clear Lake: we have multiple areas of nutrient loading, very little water quality monitoring, little handle on where the pollutant loading is occurring, and ultimately: how to reduce the nuisance algal blooms.

RESPONSE

Staff recommends maintaining the existing Nutrient Control Program. It will take time to see results from phosphorus reduction, as the lake bed sediments will provide an internal load of phosphorus that will take some time to reach equilibrium even with a reduced supply of inflowing phosphorus. Also, current science continues to support the reduction of phosphorus in addressing nutrient issues and nuisance blooms in lakes.

County of Lake, Department of Water Resources Comments**Comment #1**

We do not believe the TMDL places enough emphasis on the nutrient cycling from the sediments. The Technical Report acknowledges this by stating:

There is evidence that internal loads of P are a larger source than external loads on an annual basis. (Tetra Tech, 2004, p 23)

There is some discussion of the phosphorus coming from the sediments (300-500 tons). In addition, hundreds of tons of nitrogen are added to the Clear Lake water column during the summer months by nitrogen fixation and/or cycling from the sediments (generally 1,000 to 2,000 tons, and as much as 4,400 tons in 1990). Lake County began measuring nitrogen in sediments in late 2011 in an attempt to determine how much of this is coming from the sediments. Until sufficient data is collected, it will not be clear how much nitrogen is cycling from the sediments and how much is due to nitrogen fixation. Based on ammonia cycling in Upper Klamath Lake, hundreds of tons of nitrogen could be coming from Clear Lake sediments.

Although phosphorus concentrations are being reduced in the sediments, phosphorus concentrations in the water column have increased substantially since the late 1980's. The premise of reducing external phosphorus loading will lead to reduced phosphorus cycling from the sediments and reduced phosphorus in the water column does not appear to be supported by the data.

Phosphorus cycling increased significantly in the late 1980's and has continued to be high. This increase in cycling comes after external loading had been reduced substantially (Richerson, 2008). Until the cause of this increase in phosphorus cycling is known, appropriate strategies to reduce this cycling and limit nuisance cyanobacteria growth cannot be developed and implemented.

RESPONSE

Tom Smythe, Lake County Department of Water Resources, submitted a memo to Staff on 9 January 2012. The memo was summarized and pertinent information was added in the Staff Report, including that total phosphorus concentrations and mass, as well as the solids content

have declined slightly in the top 10 cm of the sediment between 1997 and 2011. The memo also made a comparison between current phosphorus concentrations and concentrations that existed prior to 1927 (1927 would reflect conditions that existed before significant earth moving activities were initiated by European settlers). Based on the analysis, the memo estimated the time it would take for phosphorus concentrations in the sediment to return to pre-European conditions (assuming that loadings did not change). The estimates varied from a few years to more than a hundred years for the different arms of the Lake.

Staff believes it would be useful to gather additional information on nutrient cycling and specifically phosphorus cycling dynamics in the Lake. At the same time, staff supports continued implementation of the control program which is focused on phosphorus reduction.

Comment #2

The County believes reduction in external phosphorus and nitrogen is supported by general limnological principles and supports the TMDL's target of reducing the phosphorus load to Clear Lake. By reducing this load, reductions in other nutrients and micronutrients, which currently play an unknown role in cyanobacteria blooms, should be realized.

RESPONSE

Staff agrees with this statement. As the Staff Report concludes, it is most appropriate to implement sediment reduction management practices to decrease phosphorus loading to the Lake.

Comment #3

We take exception of the portrayal of agricultural conversions on pages 9 and 10. It is our observation that conversions to wine grapes has resulted in a reduction in erosion, especially compared to walnut orchards. Typical walnut operations in the past included tilling and floating the walnut orchard in the late summer/early fall to facilitate harvest, resulting in no cover crop during the early winter until germination of tilled seed occurred. The Soil Conservation Service reported up to 12 inches of top soil loss in a 40-50 year period in the Red Hills region due to these practices in walnut orchards (Leonard Kashuba, personal communication)¹. In contrast, most vineyards have been implementing BMP's during the conversion process and maintain a cover crop. Many vineyard owners with severely degraded soils are working actively to rebuild the top soil layer to improve their productivity. This disparity in erosion and land management practices was highlighted during a tour of the Irrigated Lands tour in Lake County for CVRWQCB staff several years ago. A quick review of some of the soil types in the Soil Survey of Lake County identifies the need for cover crops in the steeper soils, i.e. the Glenview Series (138 et seq.). Lake County has regulated development and conversion of agricultural properties for over 10 years due to the erosion hazard, something the State of California does not regulate. Under the current Grading Ordinance (Chapter 30, LCC, adopted July 17, 2007), implementation of BMP's is required for new agricultural properties (native vegetation to agriculture) and conversions of deep rooted crops, i.e. orchard to vineyard, on soils with a moderate to severe hazard rating. The citation of Tetra Tech, who spent approximately one day observing conditions in Lake County, is very misleading.

We request that the Agricultural Sources section be revised as it implies that an increase of approximately 2,500 acres of vineyards play a significant role in the Clear Lake nutrient budget, although they affect less than one percent of the 287,300 acre watershed. The vineyard conversion discussion is misleading and is likely to be cited in the future, even though there has been no documentation of the impact of agricultural conversions on erosion.

RESPONSE

The Agricultural Sources was revised to include the Lake County Grading Ordinance that specifies implementing BMP's during the land conversion process of deep rooted crops and for new agricultural properties.