

Clear Lake Nutrient TMDL Program

Technical Memorandum

22 September 2021

Introduction

Clear Lake is the largest natural freshwater lake in California and one of the oldest lakes in North America. Harmful algal blooms (HABs) have been observed in Clear Lake throughout the 20th century with blooms well documented and described since the early 1970s. In 1986, Clear Lake was added to the Clean Water Act Section 303(d) List of Impaired Water Bodies because of algal blooms that impacted recreational uses. Existing study results and data analyses at the time suggested that controlling phosphorus is the best approach for addressing the HABs. The Central Valley Regional Water Quality Control Board (Central Valley Water Board or Board) approved a Basin Plan amendment on 23 June 2006 for the control of nutrients in Clear Lake. The U.S. Environmental Protection Agency (U.S. EPA) subsequently approved the control program for Clear Lake as a Total Maximum Daily Load (TMDL) on 21 September 2007. The focus of the control program is reducing nutrients entering Clear Lake by including load allocations for point and nonpoint sources to limit the loads of phosphorus entering the Lake.

Executive Summary

In 2018, Board staff developed a technical memorandum to summarize information compiled from responsible parties in response to 13267 Enforcement Orders issued in 2016. This technical memorandum provides an:

- Update of actions taken following the stakeholder and public meetings of 2018 for the Clear Lake Nutrient TMDL Control Program,
- A summary of the information Central Valley Water Board currently has regarding attainment of load allocations based on information submitted by responsible parties and 13267 Enforcement Orders issued in 2019 and 2020 to various parties,
- And recommended next steps for the TMDL.

To assess next steps for the TMDL Program, staff focused first on determining if assigned load reductions have been met by each party. The information provided suggests that while many efforts in the watershed have resulted in decreased phosphorus inputs through erosion control management practices, not all responsible parties are in compliance with their load allocation. In addition, measures beyond phosphorus reductions are likely needed to address harmful algal blooms in the Clear Lake watershed. The TMDL is in need of revision to more accurately address scientific knowledge and data that has been gained since the creation of the TMDL in 2006.

Clear Lake is the subject of many programs and activities that are vital to the health and safety of the watershed. In addition to dischargers' activities, Appendix 1 summarizes various organizations' implementation and evaluation efforts occurring throughout the Clear Lake watershed, including Tribal-led monitoring work from Big Valley Band of Pomo Indians and Elem Indian Colony and studies being conducted in the watershed. The efforts in Clear Lake are not limited to the Clear Lake Nutrient TMDL Program, and the Tribal-led monitoring program, local and State agencies working on water quality issues, and ongoing studies provide more insight into the condition and complexities of Clear Lake.

Clear Lake Nutrient Control Program

In 2006, the Central Valley Water Board amended the Basin Plan. The [Basin Plan Amendment](#), based on the recommendations and conclusions in a 2004 Tetra Tech report, included the elements of a TMDL for Clear Lake that established numeric load allocations for point and nonpoint sources that would result in phosphorus reductions needed to reduce the incidence of algal blooms.

Specific load limits were set for point source dischargers in the watershed (urban storm water and California Department of Transportation (Caltrans) road building and maintenance activities) and a general load limit was set for the nonpoint sources, including Irrigated lands and agencies responsible for land management activities- such as the County of Lake, U.S. Bureau of Land Management (USBLM), and the U.S. Forest Service (USFS). The allocated loading of phosphorus to Clear Lake is 87,100 kg phosphorus (P) per year which represents a 40% reduction in the 2006 average annual phosphorus loading. The 87,100 kg P per year is allocated to point and nonpoint source dischargers. Point source dischargers, including Lake County Storm Water Permittees (County of Lake, Cities of Clearlake and Lakeport) and Caltrans, are given a waste load allocation of 2,000 and 100 kg phosphorus per year, respectively. Nonpoint source dischargers, including USBLM, the USFS, irrigated agricultural dischargers, and Lake County, are given a collective load allocation of 85,000 kg P per year. The Basin Plan set a compliance date of 19 June 2017 to meet all allocations. Caltrans is the only responsible party that met compliance at that time.

Status of TMDL Implementation Efforts

Staff compiled phosphorus reduction implementation efforts by the parties named in the TMDL from information submitted by parties in response to Water Code section 13267 Orders issued by the Central Valley Water Board in 2019 and 2020. This information was used to assess and summarize the status of each responsible party, including (where applicable):

- A comparison of pre- and post-TMDL management practices,
- An evaluation of the effectiveness of management practices implemented by USBLM,

- Applicable monitoring data that has not previously been submitted to the Board,
- A total number of acres implementing current management practices, and
- A summary of total acres associated with each current management practice.

Point Sources

The TMDL includes allocations for point sources and nonpoint sources of phosphorus. Point sources release pollutants from discrete channels and are defined in statute. Point sources in the Clear Lake watershed include permitted storm water discharges. The allocations for permitted storm water sources are 2,000 kg P/year for Lake County Storm Water Permittees and 100 kg P/year for Caltrans.

California Department of Transportation (Caltrans)

In 2017, Board staff concluded that Caltrans had met the 100 kg P/year load allocation according to monitoring and best management practice information submitted by Caltrans. More information regarding the response and submittal from Caltrans in response to the 13267 Enforcement Order issued in 2016 to Caltrans is available in the [2017 Clear Lake Nutrient TMDL Technical Memorandum](#).

Information from Caltrans continues to demonstrate that the load allocation is being met. In July 2018, an approval to suspend Caltrans monitoring in the Clear Lake Watershed was issued by the Central Valley Regional Water Quality Control Board on the basis that Caltrans would continue to comply with all other requirements.

To ensure Caltrans continues to meet the load allocation, the Caltrans Municipal Separate Storm Sewer System (MS4) Permit (NPDES No. CAS000003) included requirements. For the Clear Lake Nutrient TMDL, the Department shall minimize phosphorus inputs as required by the TMDL, as follows:

- Control erosion from construction and maintenance activities using approved best management practices in the Clear Lake watershed.
- Comply with the Department's Stormwater Management Plan and implement best management practices to control erosion.

Board staff continue to evaluate Caltrans activities to ensure they remain in compliance with their assigned load allocation.

Lake County Storm Water Permittees: City of Clearlake, City of Lakeport, County of Lake

The Federal Clean Water Act (Clean Water Act) prohibits certain discharges of storm water containing pollutants except in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. The NPDES storm water program regulates some storm water discharges from three potential sources: municipal separate storm sewer systems (MS4s), construction activities, and industrial activities.

The 2013 Small MS4 permit, issued to Lake County, City of Clearlake, and City of Lakeport as co-permittees, specifies actions necessary to reduce the discharge of pollutants in storm water to the Maximum Extent Practicable (MEP). However, the 2013 permit did not include specific provisions for TMDL and impaired waterbodies.

In December 2017, an amendment to the 2013 Small MS4 permit was adopted. Among other requirements, the amendment requires permittees to demonstrate compliance with adopted TMDLs. For Lake County and the Cities of Clearlake and Lakeport, this includes activities such as monitoring, implementation of erosion control best management practices (BMPs) as a means of reducing phosphorus inputs, and documentation of those BMPs in Annual Reports. In addition, for those permittees in watersheds with TMDLs past their attainment dates, the MS4 amendment requires the permittee to develop and submit a management plan to the Regional Board that outlines how they will come into compliance with the TMDL. This would include identifying BMPs and a schedule to reduce discharges of phosphorus to Clear Lake.

Under Section E.15.b of the Small MS4 General Permit, where a final deadline to attain load allocations has passed and the permittee has not demonstrated compliance, the permittee may seek a Time Schedule Order (TSO) pursuant to Water Code section 13300 and in accordance with the criteria established in the Small MS4 General Permit. In August 2019, the Permittees jointly submitted a request for a TSO under Water Code section 13300. Central Valley Water Board approved this request and a draft Time Schedule Order ([R5-2019-1005](#)) was released for public comment in October 2019. The Time Schedule Order (TSO) was officially enforced beginning December 2019. The TSO designates tasks with affiliated deadlines, such as the submittal of a BMP Effectiveness Assessment Report, which the Permittees submitted to Board staff in April of 2021.

The BMP Effectiveness Report provided an update on the Permittees' load allocation. In order to assess an estimate of the phosphorus reduction, the Permittees worked with EOA, Inc. to develop a Stormwater Best Management Practices Phosphorus Load Reduction Effectiveness Calculator Tool (BMP Calculator Tool) for the Lake County Clean Water Program (LCCWP) co-permittees. The BMP Calculator Tool is an Excel-based spreadsheet tool that calculates the loads reduced for a variety of stormwater BMPs implemented in the Clear Lake watershed. The data produced by the BMP Calculator Tool provided the Permittees with the information needed to produce a BMP Effectiveness Assessment Report that demonstrates progress towards meeting their Clear Lake Nutrient Total Maximum Daily Load (TMDL) waste load allocation (WLA) of 2,000 kg P/year, in compliance with reporting provisions of the Time Schedule Order R5-2019-1005. The estimates provided by Permittees based on the data from the BMP Calculator Tool are presented in Table 1 below.

Table 1. Final Lake County MS4 Distribution of Waste Load Allocations based on BMP effectiveness assessments for Point Sources in Clear Lake Watershed, CA. (Calculated by EOA, Inc. March 2021)

MS4 Jurisdiction	Weight Factor ¹	Area (Acres)	Distribution of WLA (kg/year) ²	Phosphorous Baseline ~1993 ³	Phosphorus Baseline ~2007 ⁴	Total Load Reductions Achieved to Date (kg/year)	Remaining Load Reduction (kg/year) ⁵
County	56%	8,766	1,117	1,923	1,603	347	486
Clearlake	31%	3,454	624	1,075	896	187	264
Lakeport	13%	1,990	259	446	372	125	62
<i>Total</i>	-	<i>14,210</i>	<i>2,000</i>	<i>3,444</i>	<i>2,870</i>	<i>658</i>	<i>786</i>

- 1- Weight Factor is the percentage distribution of the MS4 TMDL WLA allocation based on a metric considering both area and population based on 2010 Census Data and was the approved metric by the Clean Water Program Management Council (August 2020).
- 2- Distribution of Waste Load Allocation. Out of the 2,000 kg/year allocated to Lake County MS4 co-permittees, this column shows the relative WLA allocated for each jurisdiction based on the weight factor. (For example, Lakeport, based on their relative area and population is allocated 259 kg/year a year of sediment phosphorus to meet compliance with the Clear Lake Nutrient TMDL).
- 3- This is the phosphorus loading baseline amount that each jurisdiction is discharging based on modeling calculations derived from monitoring data collected within the Clear Lake Watershed within the 1990s.
- 4- This is the phosphorus loading baseline amount based on an updated estimate of annual load from monitoring data collected in the watershed during water years for 2007 and 2008.
- 5- This column represents the amount of sediment phosphorus load (annual kg/year P load) that is remaining for each of the co-permittees to reach compliance with the Clear Lake Nutrient TMDL WLA.

Based on the information submitted by the Permittees and the data produced by the BMP Calculator Tool, Board staff concluded that the Permittees are not in compliance with the point source allocation as assigned in the TMDL. To achieve compliance, the Permittees will provide Board staff a Work Plan with a proposed schedule to implement specific actions to meet the TMDL requirements by September 2024. To ensure compliance in 2024, the Work Plan must include:

- Additional, modified, and/or updated best management practices and other specific actions that will be implemented.
- The locations of anticipated future best management practices.

- A quantitative estimate of the load reduction based on the methods outlined in the Work Plan.
- A submittal of a Water Quality Monitoring Plan and Quality Assurance Project Plan (QAPP), as specified in Attachment G of the Small MS4 General Permit, to evaluate the effectiveness of new BMPs implemented and/or installed for compliance with TMDL WLAs; and
- A summary explaining how funding is expected to be obtained to implement the BMPs. The summary shall include:
 - A list of applications submitted or planned to be submitted to obtain funding and an update on the application progress.
 - A list of any other funding mechanism (e.g. voter approved measure, etc.) being pursued and an update on the progress; and
 - An explanation with specific details if no attempts has been made toward obtaining funding.

While the load allocation is not being met by the MS4 co-permittees, the Permittees provided estimates for remaining load reduction and will utilize the BMP Calculator Tool to inform decision-making on implementation strategies. Board staff will continue to enforce and monitor the Permittees progress in achieving compliance with the load allocation and deadlines outlined in the TSO.

Nonpoint Sources

Nonpoint sources release pollutants from landscape scale features; sources can include agricultural field runoff and dust and air pollution from human activities. The allocation for nonpoint sources includes a combined allocation of 85,000 kg of phosphorus per year for the US Bureau of Land Management, the US Forest Service, Lake County, and Irrigated Agriculture. This equates to a 40% load reduction for each responsible party.

Agricultural Sources

In May 2019, the Lake County Farm Bureau Education Corporation (LCFBEC) submitted a technical report to Board staff in response to a 13267 Enforcement Order issued in January 2019. Since 2005, the Lake County Farm Bureau Education Corporation (LCFBEC) has been responsible for implementing the Irrigated Lands Regulatory Program (ILRP) as part of the Sacramento Valley Water Quality Coalition. The following summarizes Irrigated Agriculture's 2020 technical report to the 2019 Order, in which LCFBEC and Lake County Natural Resources Conservation Service (NRCS) estimated a 30-43% load reduction:

- Of the 850,560 acres of Lake County, there are approximately 14,392 bearing acres in agricultural production (Lake County Crop Report 2017). That number includes dry-farmed pasture, which is not included in the Irrigated Lands Program. 10,073 acres were irrigated according to the 2015 Farm Evaluations which is roughly 1.2% of Lake County's total acreage. Dry farmed walnuts,

winegrapes and hay crops make up most of the unirrigated agricultural acres in production. In 2017, there were 8,771 bearing acres of vineyards which constitute 60% of Lake County's productive agricultural acres.

- Best management practices (BMPs) that are protective of water quality have been implemented since 2001, especially in the Lake County winegrape industry which has been the main driver in Lake County agriculture since a wave of pear and walnut orchard conversions starting in 2000. Lake County vineyard BMPs are promoted by the Lake County Winegrape Commission and include soil management, cover cropping for erosion control and irrigation and nutrient management practices. Additionally, nearly 60% of Lake County winegrape acreage is enrolled in a certified sustainability program which require erosion control, irrigation efficiency and pesticide/nutrient application BMPs.
- The Lake County Grading Ordinance, which was established in 2007, also requires BMP implementation in ag-land conversions to mitigate erosion.
- The implemented best management practices as a result of crop type changes, the ILRP, certified sustainability programs and Lake County Grading Ordinance have resulted in as high as a 99.5% reduction in sediment erosion in certain areas around Lake County and an average 43% reduction in sediment erosion across the watershed.

Figure 1, below, outlines the introduction of multiple programs, regulations or ordinances that promote BMPs in Lake County agriculture over the past twenty years.

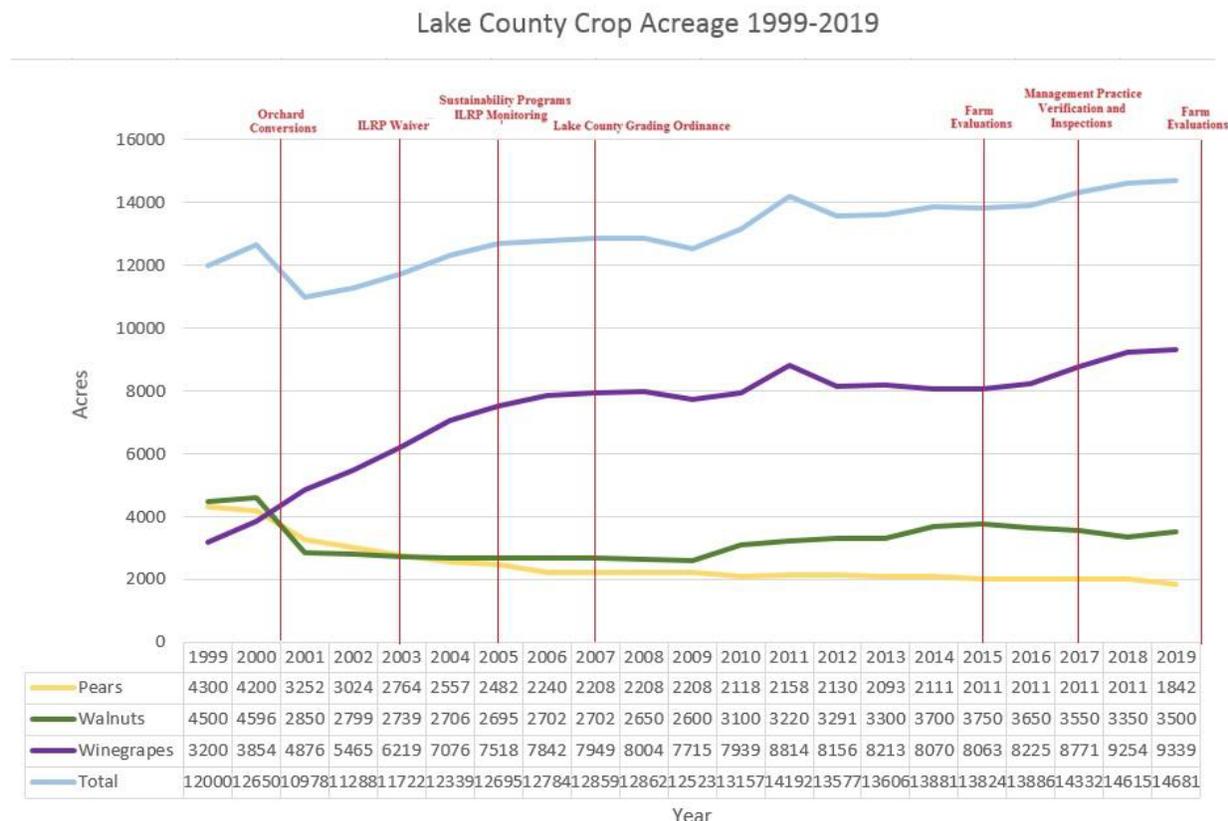


Figure 1: Twenty-year record of productive acres in Lake County by crop type from 1999 to 2019. These numbers reflect irrigated and dry-farmed acreage in the three major crops. Orchard conversions started between 2000 and 2001 and continued throughout the early decade. Shown on graph are the introduction of important programs that established best management practices in the growing wine grape industry and the rest of Lake County agriculture. (Data source: Lake County Crop Reports, 1999-2019).

Note: The Lake County Ag Department distinguishes between productive and non-bearing acres. Productive acres are used in this comparison vs. total crop acres. This is because productive acres account for agricultural land that is actively being farmed. This difference is minimal; in 2019 there were only 745 non-bearing acres, representing only 4% of the total.

Central Valley Water Board conducted Irrigated Lands inspections in 2017 and 2018 during the wet season. Inspectors found no evidence of in field erosion or run-off, even on wet days. Inspectors toured both valley operations and vineyards on steep, erosive hillsides.

ILRP has been monitoring two sites in Lake County, located at Middle Creek (MDLCR) in Upper Lake and at McGaugh Slough (MGSLU) in Big Valley, for fourteen years. There have been zero exceedances from phosphorus, nitrate, or nitrite according to this monitoring data.

Under the ILRP, the first Farm Evaluations were required of growers in 2015. These Farm Evaluations identified management practices on 93% of acreage enrolled in the ILRP in 2015. Since 2015, approximately 3,000 additional acres have been enrolled in the program. According to the Farm Evaluations, there were cover crops or native vegetation cover in almost 80% of acreage (7,500 acres), and 70% of acreage (6,562 acres) used drip or micro-irrigation to mitigate surface water run-off. 90% of vineyard acreage maintains an annual or winter cover crop.

To calculate reductions in agricultural phosphorus loading to Clear Lake between 2001 and 2018, the following assumptions were made:

- Nearly all phosphorus load from agriculture comes from sediment erosion. Local agricultural materials companies confirmed that phosphorus as fertilizer is used sparingly on Lake County's main agricultural crops.
- Acres developed under the Lake County Grading Ordinance, ILRP and maintained under sustainability programs will reduce more sediment loading through implementation of BMPs.
- The NRCS Universal Soil Loss Calculation (or RUSLE2 Model) is the best available science for calculating and comparing sediment delivery against specific agricultural practices. RUSLE2 estimates rates of soil erosion caused by rainfall, its associated overland flow, and its land-use.
- Acreage conversions are approximated to LCFBEC's best ability using local knowledge from landowners, farmers, and residents. Data regarding the exact composition of Lake County agriculture 18 years ago is not available. However, crop reports and local knowledge can contribute enough information to make a reasonable assumption at the watershed level. LCFBEC determined that it was better to calculate erosion reductions in a specific case where unknown factors could be controlled.

LCFBEC worked with the local NRCS District Conservationist in calculating three scenarios based on the largest potential impact to sediment load reductions into Clear Lake between 2001 and 2018. This impact is the broad-scale conversion of high-till, dry-farmed walnuts with no cover crop to drip irrigated winegrapes with low till and/or no till practices and year-round cover crop. There is ample evidence via direct local knowledge and the Lake County crop reports for broad-scale conversions in the Red Hills, Kelsey Bench and Big Valley.

Using the RUSLE2 model, the local NRCS calculated the reductions in sediment loading between these two crop types for Red Hills soils and slope, Kelsey Bench soils and slope and Big Valley soils and slope. These three geographic areas capture the soils types and slopes in virtually all of Lake County growing areas. Red Hills' steep slopes and volcanic soils are similar to the Clearlake area; Kelsey Bench is a good

approximate for other alluvial areas with sloping topography; and Big Valley’s dense soil types and low slope are the same in Scotts Valley and Upper Lake.

LCFBEC surveyed many residents, farmers, and landowners to come up with acreage estimates based on specific parcels they remember as converted. After these surveys were done and calculations applied, LCFBEC looked at other factors across the watershed and applied reasonable rates of erosion reduction (e.g., the number of acres with a sediment catchment basin, acres enrolled in a sustainability program with a cover crop vs. acres not enrolled in a sustainability program and flood irrigation conversions). In these calculations, LCFBEC made estimates based on the total acreages of the three irrigated crops in Lake County.

In total, 4,726 acres had a combined weighted 77% reduction in erosion. Adjusting to 2017 irrigated acreage, this represents an approximately 30% loading reduction from agriculture across the watershed.

This overall reduction percentage does not take into account potential sediment loading reductions from the Lake County Grading Ordinance or the Winegrape Sustainability Programs.

There have been 1,842 acres developed under the Lake County Grading Ordinance since 2007. NCRCD calculated a 75-98% reduction in soil loss just with the presence of hay mulching, which is required in the ordinance.

Calculating Watershed Sediment Reduction Rates

Reducing Practice	Acres	Reduction Percentage	Constant Erosion Rate (in tons/acre)	Theoretical Erosion (in tons)
Red Hills	2387	99.46	1	12.88
Kelsey Bench no till	333	99.75	1	0.832
Kelsey Bench till	142	29.2	1	100.5
Big Valley	550	28.5	1	393.25
Flood to Sprinkler	600	15	1	510
Sediment Basins	700	94	1	42
Sediment Basins-roads	14	94	1	0.84
Sustainability Programs	1315	90	1	131.5
Grading Ordinance	460	98	1	9.2
Totals	6501	n/a	n/a	1201.002
Acreage not reduced	5820	0	1	5820
			Total Erosion:	7021.002
2017 Productive Acres	12,321		1	12,321
Erosion reduction			7021.002/12,321	43% overall reduction

Table 1: Erosion reduction assuming a 1 ton/acre/year erosion rate for simplicity of calculation.

Based on the information provided in 2019, Board staff has evaluated that the party is demonstrating a 30-40% reduction in phosphorus loads.

In January 2020, the Regional Board issued LCFBEC a California Water Code section 13267 Enforcement Order to submit an updated report with the requirements above on behalf of irrigated agriculture to fully demonstrate a complete 40% reduction and ensure Irrigated Agriculture had completed the actions outlined in the 2019 technical report.

The Regional Board required the following assessments in this update:

- Additional management practices that have been implemented since the submittal of the prior technical report,
- Any changes in the watershed (reduction in flood irrigation, increased enrollment in sustainability programs, etc.),
- And an updated quantitative estimate of the load reduction based on additional practices implemented.

The updated report, submitted March 2021, demonstrated that since the TMDL submittal in May 2019:

- The percentage of winegrape acres enrolled in a certified sustainability program has increased from 60% to over 90% of total acres and 98% of bearing acres. These sustainability programs require erosion control, irrigation efficiency and pesticide and nutrient application BMPs.
- Flood irrigation has continued to decline in Lake County to 1.3% reported in pears in the 2020 Farm Evaluations. Walnuts and pears have also implemented additional erosion control measures since 2015, such as cover cropping.
- Additional changes since the 2019 Technical Report demonstrate improvements in cover cropping (77% vs. 99% in all crops); micro-irrigation (68% vs 84%); and many other cultural practices to manage sediment and erosion.
- Implementation of best management practices as a result of crop type changes, the ILRP, certified sustainability programs and Lake County Grading Ordinance have resulted in as high as a 99.5% reduction in sediment erosion in certain areas around Lake County and an average 57% reduction in sediment erosion across the entire watershed.
- In 2019, there were 14,749 acres in agricultural production (Lake County Crop Report 2019), and 13,100 acres enrolled in the Irrigated Lands Program. The dry-farmed agriculture in Lake County consists mostly of pasture hays and some walnuts. Of irrigated agriculture, 64% of Lake County's productive acres is winegrapes.
- In 2020, Lake County growers submitted their second Farm Evaluations, which covered approximately 94% of acreage enrolled in the Irrigated Lands Program

as of March 2021. Farm Evaluations were completed on 12,296 acres of Lake County's 13,100 enrolled irrigated acres in the Irrigated Lands Program. The total reported acreage captures the majority of all of Lake County's productive pear, walnut and winegrape acreage, as reported in the 2019 Crop Report (12,321 acres).

- According to the 2015 Farm Evaluations, there were cover crops or native vegetation cover in almost 80% of acreage (7,500 acres). By 2020, this practice had increased to nearly 99.5% of all irrigated acres (12,241 acres). This increase was mostly credited to an increase of certified sustainable winegrape acreage and walnuts and pears acreage using more cover crops.
- In 2015, growers reported that they practiced minimum tillage to reduce erosion risk in 75% of the acreage reported (7,031 acres). By 2020, this practice had increased to 85% or 10,393 acres.
- 70% of acreage (6,562 acres) reported using drip or micro-irrigation to mitigate surface water run-off in 2015. In 2020, this percentage had improved to 84% and 10,328 acres.
- BMPs to limit erosion had increased between 2015 and 2020. Including improvements in:
 - Sediment catchment basin (8% to 14%).
 - Vegetated ditches (30% to 37%).
 - Vegetative filter strips (24% to 76%).
 - Field borders (11% to 60%).
 - And shorter irrigation runs to capture flows (28% to 52%).
- Additionally, more acres reported that there is no irrigation drainage due to field and soil conditions (66% to 73%) and more acres reported no storm drainage due to field and soil conditions (16% to 69%).

Calculating Watershed Sediment Reduction Rates

Reducing Practice	Acres	Reduction Percentage	Constant Erosion Rate (in tons per acre)	Theoretical Erosion (in tons)
Red Hills	2387	99.46	1	12.9
Kelsey Bench no till	333	99.75	1	0.8
Kelsey Bench till	142	29.2	1	100.5
Big Valley	550	28.5	1	393.3
Flood to Sprinkler	731	15	1	621.4
Sediment Basins	1019	94	1	61.1
Sediment Basins-roads	24	94	1	1.4
Sustainability Programs	2300	90	1	230
Grading Ordinance	460	98	1	9.2
Cover Crops, non-winegrapes	612	90	1	61.2
Totals	8558	n/a	n/a	1491.8
Acreage not affected, vs. 2019 acreage	3763	0	1	3763
			Total Erosion:	5254.8
2019 Productive Acres (Ag Dept)	12,321		1	12,321

Theoretical erosion reduction using constant erosion rate **57% overall reduction**
 5254.8/12,321

Table 2: Erosion reduction assuming a 1 ton/acre/year erosion rate for simplicity of calculation and comparing against 2019 productive acres as reported by the Ag Department in the 2019 Crop Report.

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Through various calculations on management practices compared against Ag Department acreage data, LCFBEC and Lake County NRCS estimate Lake County's sediment loading reduction at 57% since TMDL research concluded in 2001. These numbers took conservative estimates into account.

It should be noted that there are different ways to represent productive, irrigated, and total agricultural acreage. When accounting for all irrigated land enrolled in the ILRP in 2021, (13,100 acres), this represents a 54% reduction in erosion on those acres. Therefore, LCFBEC concludes that since TMDL research concluded in 2001, Irrigated Agriculture has reduced its phosphorus contributions through erosion by 54% to 57% depending on how agricultural acreage is accounted for.

Overall, the data submitted demonstrated that agriculture has a decreasing impact on the nutrient loading in the lake. LCFBEC calculated a 54-57% erosion reduction depending on baseline agricultural acres.

Board staff have evaluated the information submitted and concur that Irrigated Agriculture has fully met its 40% load allocation and is in compliance with the TMDL. Board staff will continue to evaluate the impacts of Irrigated Agriculture in relation to nutrient impacts and monitor the progress of LCFBEC in maintaining compliance.

Lake County

In October 2019, Board staff issued a 13267 Enforcement Order to Lake County requesting information regarding their allocation, including the following tasks to provide an estimated load reduction:

- A compiled list of implemented management practices that reduce soil erosion in the unincorporated areas of the County pre- and post-TMDL adoption.
- A rough estimate of the County's load reduction based on the identified management practices. This estimate shall demonstrate whether a 40% reduction in the phosphorus load has been made since the implementation of the TMDL.
- A written technical, final report that describes management practices implemented to reduce phosphorus loads to Clear Lake. This assessment will summarize the prior deliverables and must include:
 - A comparison of pre- and post-TMDL management practices,
 - An evaluation of the effectiveness of management practices implemented by Lake County,
 - Applicable monitoring data that has not previously been submitted to the Board,
 - A total number of acres implementing current management practices,
 - Summary of total acres associated with each current management practice, and
 - An estimate of the load reduction from Lake County based on the implementation of management practices compared to the TMDL load allocation.

In April 2021, Lake County provided the final, technical report. To estimate the load reduction and remaining load, Lake County used the Phosphorus Load Reduction Effectiveness Calculator Tool (BMP Calculator Tool), as described in the Lake County Storm Water Permittees section in this technical memo. Table 3 below demonstrates the total load reduction achieved since the adoption of the Clear Lake Nutrient TMDL.

Table 3. Unincorporated Lake County Distribution of Waste Load Allocations based on BMP effectiveness assessments in Clear Lake Watershed, CA. (Calculated by EOA, Inc. March 2021)

MS4 Jurisdiction	Area (Acres)	Distribution of WLA (kg/year) (3)	Percent of TMDL	Phosphorus Baseline ~2007(4)	Total Load Reductions Achieved (kg/year)	Remaining Load Reduction (kg/year) (5)
Lake County Non-MS4 Parcels (1)	5,979	2,078	2.4%	2,982	1,025	904
Lake County Non-MS4 Remaining Area (2)	160,773	55,870	64.1%	80,181		24,311

- (1) County Owned / operated parcels as calculated from County records and spatial assessment and maps (GIS).
- (2) Private properties, county roads, and all other categories.
- (3) Distribution of Waste Load Allocation. Out of the 85,000 kg/year allocated to non-MS4, non-Caltrans Responsible Parties, this column shows the relative WLA allocated for each jurisdiction based on the proportional acres within the Clear Lake Watershed.
- (4) This is the phosphorus loading baseline amount based on an updated estimate of annual load from monitoring data collected in the watershed during water years for 2007 and 2008.
- (5) This column represents the amount of sediment phosphorus load (kg/year) that is remaining for each type of Lake County unincorporated area in order to reach compliance with the Clear Lake Nutrient TMDL WLA (assuming the WLA distribution is approved by the Water Board). This load does not currently take county roads into account, which the Water Board will also need sediment phosphorus load information to consider Lake County in compliance.

Management practices implemented by Lake County include retention ponds, wetland basin, channel dredging, general sediment removal, construction controls, and grading controls. Table 4, below, demonstrates the BMP types implemented since 2007 and the associated phosphorus load reduced.

Table 4. Summary of Phosphorus Loads Reduced by Permittee, BMP Type, and Implementation Period. *(Calculated by EOA, Inc. March 2021)*

BMP Type	Sum of Total Area Addressed by BMP (acres)	Sum of Phosphorus Load Reduced (kg/yr.)
Good Housekeeping (e.g., NPDES permit compliance)		0
Slope and Shoreline Stabilization Techniques		0
Media Filter		0
Retention Pond	922.16	347.28
Wetland Basin	276.72	83.58
Channel dredging	89.21	2.22
General Sediment Removal	103.81	17.59
Unknown	607.47	0
Construction Controls	570.44	199.15
Grading Controls	1075.28	375.39
Grand Total	3645.10	1025.21

Based on the information and data submitted, Board staff have concluded that Lake County is not in compliance with the assigned load allocation. Under the 13267 Order issued in 2019, Lake County is responsible for submitting a Work Plan outlining when and how compliance will be achieved. In August 2021, Board staff issued a Requirement to Submit a Work Plan Deliverable under the 13267 Order Issued to County of Lake. The Work Plan to reduce discharges of phosphorus and comply with the designated allocation is due to the Board within six months of the notification that the letter is received. This Work Plan will include:

- A detailed timeline outlining when Lake County will be in compliance with the specified load allocation,
- Additional management practices that will be implemented,
- The potential locations of future management practices, and
- A quantitative estimate of the load reduction based on the methods outlined in the Work Plan.

Board staff will evaluate the work plan to ensure the timeline and deadlines are appropriate and effective and continue to monitor the County's progress in coming into compliance with the assigned load allocation.

United States Forest Service (USFS)

In 2019, Central Valley Water Board staff received new information from USFS regarding their management practices and erosion control efforts. Based on this information, staff concluded that there is enough data to link management practices evaluations and sedimentation reduction projects to a 40% phosphorus loading reduction prior to the Mendocino Complex fire.

The information provided in 2019 demonstrated that since the Clear Lake Nutrient TMDL Control Program was adopted, the Mendocino National Forest, Upper Lake Ranger District has:

- Implemented management practices for areas that cause steep erosion. Examples include constructing drain dips to prevent tread soil loss, which can accelerate sediment deposits into stream channels, and redepositing the soil in steep trails sections with deep ruts where there has been drain dip failure.
- Evaluated the implementation and effectiveness of management practices for all project activities including: Range, Timber, Roads and Recreation. USFS has scored highly in both national and regional best management practices evaluations in recent years with less than 10% of evaluations showing any problems or issues.
- Surveyed at least 50% of their Off-Highway Vehicle (OHV) trails system on a rotating basis during each grant application cycle.
- Constructed a native vegetation sediment basin adjacent to the OHV practice area in the Middle Creek campground.
- Closed OHV established and illegal trails that were steep and eroding in the watershed and added rock to channel crossings to harden the crossing and preclude erosion. Sediment reduction was 100% in closed areas within a few seasons due to natural revegetation.

- Utilized storm proofing methods to decrease contributions of sediment into the stream system. Eighty percent of roads in the 42-mile project area were disconnected, leading to a potential sediment decrease from 2,263 tons/year to 1,063 tons/year (>50% reduction in sedimentation). These 42 miles represent all the roads in the Middle Creek Watershed on USFS lands. USFS staff concluded via Water Erosion Prediction Project (WEPP) modeling that the project completion resulted in a 50% reduction in sedimentation from Forest roads in the watershed.
- Determined if there were any indicators of Significant Existing or Potential Problems (SEPES) through the Bartlett Hazard Tree Abatement project.

However, to fully address the changed landscape caused by the Mendocino Complex fire and evaluate sediment inputs into the lake, Central Valley Water Board issued a 13267 Order to USFS in March 2020.

The information requested by Board staff included:

- Reports and/or monitoring data available associated with the Bartlett Hazard Tree Abatement Project.
- Monitoring data available for the OHV trails mentioned in the Post Ranch Clear Lake TMDL assessment (submitted by USFS staff to Water Board staff in December 2019) that have had maintenance work completed.
- Next steps planned for the 6 SEPES locations identified for the Bartlett Hazard Tree Abatement project.

Based on the information staff received, USFS has demonstrated that they have met the load allocation reduction. There is continued progress that will be measured through the Bartlett Project, which is connected to a Board Timber General Order. The information submitted by USFS in response to the 13267 Order demonstrates:

- The reports and OHV trail information associated with the Bartlett Hazard Tree Abatement project show that erosion control management practices were implemented. Erosion control practices were identified for potential problem areas and estimates were determined for the potential for sediment discharge. The potential for each SEPES location to discharge was estimated to be 0.5 cubic yards/year. Board staff is scheduled to have another inspection to assess if USFS has put in the required mitigation measures to effectively prevent sediment discharge.
- The three SEPES locations identified in the Bartlett Hazard Tree Abatement project in the Clear Lake Basin were addressed and mitigated by Lake County (located on County land). The other three SEPES locations were identified to not drain into the Clear Lake Basin (located in Long Valley Creek basin). Five of these six SEPES sites have been addressed by the USFS and the County.
- Six OHV trails were monitored for implementation during the 2019 OHV maintenance season. Observations include potential effects from operations

(such as sidecasted material) and the success to maintain effective drainage structures (such as rolling dips). Trails 1, 7, and 8 drain into the Clear Lake Basin. Two crossings that were destroyed during the 2018 Ranch Fire were reconstructed in the winter of 2020. Effectiveness monitoring is scheduled for 2021. These are located along Trails 27 and 9 (Trail 9 drains into Clear Lake Basin). The BMP implementation monitoring for Trail 9 was “Fully Successful”.

- **Table 5.** USFS Trails Implementation Ratings

Trail	Trail Name	Implementation Rating
1	Sled Ridge	Fully Successful
7	Deer Valley	Fully Successful
8	Short Cut	Fully Successful
9	Lil Sled Ridge	Fully Successful

- Trails 15 and 32 were maintained (implementation) during the 2018 season and revisited in 2019 to ensure the work did not result in resource damage. All trails monitored did not show any signs of pollutants reaching water courses and no potential threat evident.

- **Table 6.** USFS Trails Implementation and Effectiveness Ratings

Trail Number	Trail Name	Implementation Rating (2018)	Effectiveness Rating (2019)	Overall Score
15	Elk Mountain	Fully Successful	Effective	Excellent
32	McCledon’s Loop	Fully Successful	Effective	Excellent

In addition to the information received by USFS, information submitted from Board staff outside of the TMDL program matched the information submitted by USFS and verified that there are no current additional direct or indirect erosion/sediment delivery issues to the lake not listed in the current project areas.

The Bartlett Project was enrolled under the Board Timber General Order in 2019, and the Annual Monitoring Reports will continue to track progress on this project. Though continued progress is needed on the project, the implemented practices and OHV monitoring demonstrate that USFS has systems in place to track and evaluate mitigation measures moving forward through the Timber Order and their annual monitoring and maintenance programs.

Board staff concluded that USFS is in compliance with the load allocation and has demonstrated a 40% reduction of their load. USFS will continue to be responsible for maintaining the TMDL’s assigned load allocation, and Board staff will continue to work with USFS to monitor implementation efforts and project updates.

United States Bureau of Land Management (USBLM)

In April of 2021, USBLM submitted a final, technical report with the information requested of the agency as outlined in the 13267 Enforcement Order issued to USBLM by Central Valley Water Board in September 2019. As outlined in the Order, the information submitted required:

- Information regarding management practices utilized in the Cow Mountain Recreation Area to address potential erosion impacts from recreational activities as well as USBLM’s process for handling illegal Off-highway vehicle (OHV) use, and
- An estimate of the load reduction from USBLM based on the implementation of management practices compared to the TMDL load allocation.
- Any changes in management practices caused by wildfires. In addition, the Board is requesting an estimate of load reduction or increase based on post-fire management practices.

USBLM submitted a technical report summarizing USBLM’s progress, including:

- USBLM’s South Cow Mountain Recreation Area (SCMRA) has over seventy miles of Off Highway Vehicle (OHV) trails. The trails remain open year-round apart from temporary wet weather closures in the winter months.
- USBLM completed a Trail Condition Assessment (TCA) for all OHV trails in the SCMRA in December 2020. The data was evaluated based on the conditions of the trail and categorized by color (good) to red (poor). This TCA was last completed in 2012. The two assessments were used by USBLM to assess changes in trail condition from 2012 to 2020.

South Cow Mountain OHV Trail Condition			
Year	Green	Yellow	Red
2012	24.13%	67.81%	8.06%
2020	44.89%	36.26%	18.85%
	+20.76%	-31.54%	+10.79%

Table 7: Trail Condition Assessment changes from 2012-2020

The data shows that trail conditions are generally improving, as highlighted with green locations increasing sharply in 2020 (Table 7). Yellow locations have decreased significantly, indicating that regular maintenance is resolving many of the more minor issues and moving trail conditions into the green category. The most common notes for

yellow and red categories included insufficient water control features resulting in increased soil erosion, especially in red categories. Additional work and improvement are needed to address soil erosion in OHV trails showing degradation instead of improvement.

- In 2020, USBLM completed maintenance on the trails west of Mendo-Lake Rd. In 2020, Geographic Information System (GIS) applications were rolled out for tracking maintenance work, with implementation efforts to continue in 2021. The use of GIS applications for tracking maintenance work will allow BLM staff to monitor treatment effectiveness in future years.
- USBLM will be using monitoring data to prioritize trail sections for maintenance; focusing on making significant improvements in areas most likely to contribute sediment to streams (i.e., hydrologically connected locations with a red overall condition code). Annual monitoring will include collecting data at random previously documented locations to establish trends.
- In 2020, USBLM acquired \$465,975 for planning and \$1,392,131 for restoration in OHV Grant Funding. The Planning Grant is specifically for South Cow Mountain and is being used to identify trails for reroute/closure as well as new routes that can be built sustainably. A preliminary route evaluation took place in 2020, identifying six locations that could benefit from a reroute and three sections that may require closure. These locations are historically problematic areas experiencing significant soil erosion. Both grants have a three-year performance period (2020-2023). The planning process will be further informed in the coming years as the Scotts Creek Nutrient Erosion Study is able to model the impacts of trails on water quality. This modeling will enable USBLM to quantify the sediment contribution/reduction associated with trail creation/closure.
- The Restoration Grant is for multiple OHV areas, including South Cow Mountain, where USBLM is focusing on restoring areas affected by off-trail use or trespassing. The ongoing installation of boulders, post-and-cable, and signs aim to deter recreationists from venturing off trail and ensure that closed trails can recover.
- Trail Condition Assessment (TCA) monitoring revealed an increase in red locations. USBLM has identified these sections of the trail for reroute or closure if damages are beyond repair. Fires of increasing severity in the Clear Lake watershed may be a factor in these negative conditions as increased runoff resulting from recent fires has likely contributed to the erosion documented in the 2020 survey. USBLM also demonstrated that survey practices adopted since 2008 have evolved to better document soil erosion. To ensure more accurate documentation of trail conditions continues, surveyors will be calibrated prior to conducting TCAs to ensure greater accuracy.

- Road conditions were monitored using the same method as the trails. Due to limited staff, monitoring was focused on identifying areas of concern as opposed to the overall condition. Areas of concern largely reported soil erosion due to insufficient water control features.

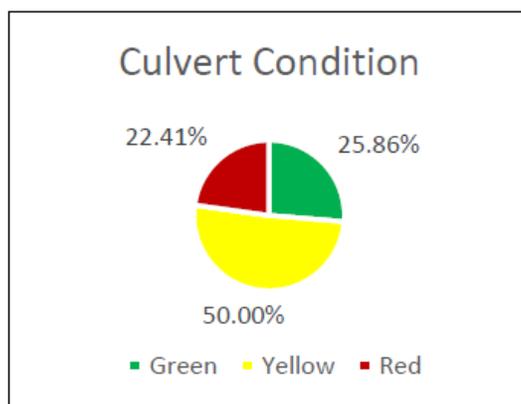


Figure 2 Chart depicting the overall condition of culverts on South Cow Mountain roads.

- Of the 114 culverts mapped on South Cow Mountain roads, forty were found to be hydrologically connected. Like the trends identified with the trail mapping, hydrologically connected culverts were more likely to be in the green category. More than 50% of hydrologically connected culverts were coded green and less than 5% were coded as red. Culvert monitoring and maintenance will be incorporated into annual duties moving forward.
- In 2021, Ukiah Field Office was awarded over \$7M in funding through the Great American Outdoors Act (GAOA) to repair Mendo-Lake Rd. USBLM has requested engineering assistance to develop a plan to improve drainage and erosion control spanning the entire length of the road (~11miles). If awarded, this project would drastically reduce the sediment entering streams from the road surface. Project implementation is expected to begin in 2023.
- In 2020, the BLM began funding the Scotts Creek Nutrient Erosion Study, a multi-year study being conducted by the U.S. Geological Survey (USGS). This study aims to assist the BLM in quantifying erosion rates and nutrient loads, determining the sources of nutrients within the drainage, and modeling rainfall and runoff within the Scotts Creek watershed. The objectives will be achieved through the tasks below, and data associated with the project will inform future management decisions to reduce sediment loss and monitor progress in achieving compliance.
 - Task 1. Erosion Rates from Aerial Coverages:

- This task will use historic aerial imagery along with current lidar data to model erosion and sedimentation using structure from motion techniques across Cow Mountain. This data will compare the distribution of erosion to OHV use and high burn severity areas. The high erosion rate areas will be targeted for restoration/trail closure/maintenance.
- Task 2. Nutrient Monitoring and Loads
 - USGS installed two new seasonal stream gages, one on the South Fork Scotts Creek and one on the main stem, for continuous flow and turbidity monitoring in 2020. Water samples will be collected at these locations during approximately six storm events per year and analyzed for a variety of constituents including multiple forms of phosphorus, nitrogen, and carbon. This monitoring will continue over a five-year period as funding permits.
- Task 3. Sediment Fingerprinting
 - USGS will collect sediment samples from a variety of soil horizons, land cover types, and burn severity classes across Cow Mountain. These samples will undergo analysis to determine the physical and chemical properties that will serve as “fingerprints” for their identification. Suspended sediment samples collected from four downstream locations will be analyzed for several constituents which can then be matched to the source “fingerprint”, determining the origin of that suspended sediment. This information will pinpoint where erosion is occurring and where those highly erosive locations are hydrologically connected.
- Task 4. Watershed Modeling
 - A watershed model will be produced for Scotts Creek that is calibrated by data collected throughout this multi-year study. This model will be able to demonstrate runoff, sediment, and nutrient transport under various conditions. This tool will be used to assist USBLM in determining the Best Management Practices for Cow Mountain as well as analyzing potential management decisions associated with the OHV planning process.
- USBLM has been working with the Lake County Resource Conservation District (LCRCD) and the State Water Resources Control Board to implement a riparian rehabilitation project in Eightmile Valley, South Cow Mountain. The Eightmile Valley Restoration project is being implemented to correct erosion issues caused by past agricultural practices. Project implementation began in October 2019 and

construction was completed in November 2019. Additional revegetation work is still ongoing and was delayed due to fires and COVID-19 restrictions. USBLM is planning to implement the unfinished portion of the revegetation project in the fall/winter of 2021/2022, dependent upon funding.

- The Eightmile Project will utilize the Spreadsheet Tool for Estimating Pollutant Loads (STEPL) model to estimate load. STEPL will be used to calculate annual average nutrient and sediment loads from different land uses and load reductions that would result from the implementation of various best management practices (BMPs).
- The annual sediment load is calculated based on the Universal Soil Loss Equation and a sediment delivery ratio. The sediment and pollutant load reductions that result from the implementation of BMPs are computed using assumed BMP efficiencies. Water sampling data was collected from four locations within Eightmile Valley (Table 8). Samples were collected during large storm events to capture sediment run-off.

Table 8. Eightmile Valley Project Monitoring Sites

Site	Representation	Coordinates
MS1	Willow Creek downstream of project	39.08842, -123.07934 ^[1]
MS2[2]	Gulley on east side of valley	39.09040, -123.07899
MS3	Main tributary watershed to west	39.08993, -123.08141
MS4	Main tributary watershed to north	39.09071, -123.08037

Each site was monitored during seven events. Five events were monitored pre-project over the period 3/24/2017 – 4/10/2019 and two post-project events were monitored on 12/8/2019 and 3/19/2021. As demonstrated by Table 9 below, post-monitoring events demonstrated a 55% sediment load reduction (t/year) in the Eightmile Valley watershed.

Table 9. STEPL model results for load reductions for the entire Eightmile Valley watershed.

Status	N Load	P Load	Sediment Load
	lb./year	lb./year	t/year
No BMP	5,398	2,758	2,004
Reduction	2,034	783	1,105
With BMP	13,364	1,975	898
% reduction for watershed	13.2	28.4	55.2

Through various efforts aimed to reduce soil erosion but also factoring in soil erosion caused by wildfires, USBLM estimates it has achieved an average annual reduction in phosphorus loads of 16.39%. USBLM estimates an average annual reduction of 38% upon the successful completion of the Mendo-Lake Rd Repair Project in 2023.

Although much effort has taken place to reduce phosphorus loads through various projects and policies, at this time, USBLM has not met their phosphorus load allocation. However, Board staff will continue to monitor progress on the Scotts Creek and Eightmile Valley projects. Board staff concurs with USBLM that completion of the projects, such as the Mendo-Lake Rd Repair Project, will help bring USBLM into compliance with the assigned load allocation. USBLM will be required to provide an updated report upon completion of the projects to demonstrate compliance.

Conclusions and Next Steps

Updated information from the responsible parties identified that many of the parties, including Caltrans, USFS, and Irrigated Agriculture, have achieved compliance with their assigned load allocation. Moreover, for parties currently not in compliance, associated workplans, projects, and timelines to achieve compliance have been developed or are in the process of being drafted. However, despite the progress, Clear Lake continues to face negative impacts to lake health, public health, Tribal practices, and recreational activities due to harmful algal bloom events, pointing towards the need to evaluate and enforce measures for the lake beyond controlling phosphorus inputs.

Next steps for the Clear Lake Nutrient TMDL Control Program will include revisiting and revising the TMDL. The revisions will incorporate much of the information currently being gathered through studies and projects in the watershed, including the Board's Environmental Driver's study, the UC Davis study, Tribal monitoring data, and other stakeholder efforts. Revisions will also evaluate other contributing factors, such as cyanotoxins. Central Valley Water Board staff anticipate stakeholder and public input meetings in the future to continue discussions regarding revisiting the TMDL and to develop and implement actions that will aid in better lake management and health.

In addition to gaining more information from responsible parties and stakeholders regarding phosphorus loads, staff is aware that other factors could be contributing to harmful algal blooms. Further studies are necessary to understand Clear Lake's cyanotoxin production, sediment chemistry, the impacts of in-lake phosphorus cycling, and nitrogen cycling processes to potentially mitigate the impacts of nitrogen inputs and assess if Clear Lake's nitrogen-to-phosphorus ratio is affecting algal bloom growth. Furthermore, considering current and future trends regarding global warming and climate change and associated impacts in the watershed, such as wildfires, is important while evaluating Clear Lake conditions in warmer temperatures. Staff will continue to assess these factors, along with the primary focus of phosphorus levels within the lake, as potential research, monitoring, or funding opportunities arise.

Since the last update provided by Board staff in 2018 via the Technical Memorandum and public meetings, many changes have occurred in the Clear Lake watershed in the form of new studies, increased implementation of best management practices, and progress from responsible parties in decreasing phosphorus inputs as funding and opportunities to collect and evaluate data continue to arise. As sediment reduction efforts continue in the watershed, Board staff will continue to work with responsible parties and stakeholders and look to programs and studies outside of the TMDL to help inform next steps.

Appendix 1: Other Implementation and Evaluation Efforts

In addition to efforts made by responsible parties, many important activities are occurring in the watershed to address erosion control and harmful algal blooms. These efforts include:

- Tribal Efforts
 - The environmental directors from the Big Valley Rancheria of Pomo Indians and the Elem Indian Colony of Pomo developed and lead the Clear Lake Cyanobacteria Task Force in coordination with other local and government agencies to protect beneficial uses of Clear Lake, to support public health advisory postings at affected HAB sites, and to inform local drinking water systems of potential presence of cyanotoxins.
 - Big Valley Rancheria and the Elem Indian Colony are actively monitoring water quality at more than 20 sites along the lake. Monitoring data is distributed to the Cyanobacteria Task Force as well as made publicly accessible through a Water Quality Dashboard on the [Big Valley Rancheria of Pomo Indian's website](#), the Clear Lake Water Quality Facebook page, and the US EPA's Water Quality Data exchange (WQX).
- Middle Creek Flood Damage Reduction and Ecosystem Restoration Project
 - The project will restore historic wetland and floodplain areas, help capture phosphorus-laden sediment, reduce flood risks, and enhance water quality. The project is currently in the first phase, which focuses on property acquisition of the project area. Once all the land has been acquired, the project will move on to the restoration phase. The Middle Creek Restoration Project Committee oversees progress on the project.
- Blue Ribbon Committee for the Rehabilitation of Clear Lake
 - The Blue Ribbon Committee for the Rehabilitation of Clear Lake, created by [Assembly Bill 707](#) (Aguiar-Curry, Ch. 842, Statutes of 2017), was formed to make recommendations that will rehabilitate and restore Clear Lake. The Committee consists of fifteen members, which includes representatives from tribes, UC Davis, the Central Valley Regional Water Quality Control Board, and members appointed by Lake County with expertise in agriculture, economics, environment, and public water supplies.
 - The Central Valley Regional Water Quality Control Board representative is Jennifer LaBay. The alternate representative from the Board is previous Board Member Robert Schneider.

- The Committee meets quarterly and provides an annual update to the Governor and other parties.
- Clear Lake UC Davis Studies
 - Under the Blue Ribbon Committee for the Rehabilitation of Clear Lake researchers from UC Davis Center for Regional Change (CRC) and UC Davis Tahoe Environmental Research Center (TERC) are conducting research to guide the Blue Ribbon Committee in improving the environmental quality and economic outcomes for the communities surrounding Clear Lake in Lake County, California. The TERC study is collecting data to understand processes in the Clear Lake watershed that are negatively impacting the rehabilitation of lake water quality and ecosystem health. This data will inform local and State decision-making.
- Environmental Drivers of Cyanobacteria Blooms and Cyanotoxins in Clear Lake
 - The Southern California Coastal Water Research Project Authority (SCCWRPA) has been contracted by the State Water Resources Control Board and the Central Valley Regional Water Quality Control Board to lead a two-year study investigating environmental drivers contributing to cyanobacterial blooms and toxin production in Clear Lake. The project will consist of developing and implementing a field study monitoring plan and identifying the specific triggers of cyanotoxin production. The results of this study will be used to develop recommended approaches to manage and mitigate cyanobacterial blooms in Clear Lake and identify next steps for the Clear Lake Nutrient TMDL.
 - Monitoring for the study began in August 2020 and is ongoing.