
Central Coast Regional Water Quality Control Board

**Public Comments and Staff Responses
for
Total Maximum Daily Load for Total Phosphorus and an Associated
Implementation Plan to Address Cyanobacteria Blooms in Pinto Lake
A Proposed Basin Plan Amendment to the
Water Quality Control Plan for the Central Coastal Region
Resolution No. R3-2020-0034**

Preface

The purpose of this document is to present public comments and staff's responses to the comments regarding draft Resolution No. R3-2020-0034.

Public outreach and public involvement are an important part of TMDL development and the basin planning process. Over the past several years, staff of the Central Coast Regional Water Quality Control Board (Central Coast Water Board) implemented a process to inform and engage interested persons about this proposed total maximum daily load (TMDL) project. Central Coast Water Board staff's efforts to inform and involve the public included a public comment period. Public comments received are reproduced herein.

Staff solicited public comments from a wide range of stakeholders including owners/operators of agricultural operations, representatives of the agricultural industry, representatives of environmental groups, academic researchers and resource professionals, representatives of local, state, and federal agencies, representatives of city and county stormwater programs, representatives of a NPDES¹-permitted industrial facility, local residents, representatives of Native American tribal groups, representatives of environmental justice groups, and other individuals and groups interested in the water quality of Pinto Lake.

In March 2020, Central Coast Water Board staff distributed a notice of an opportunity to provide public comment on the proposed basin plan amendment. This provided interested parties an opportunity to provide comment prior to any Central Coast Water Board hearing regarding this TMDL. The public comment period for this TMDL project commenced on March 13, 2020 and extended through May 1, 2020.

¹ The acronym NPDES stands for [National Pollutant Discharge Elimination System](#)

Central Coast Water Board staff received three comment letters from the following interested persons:

1. Mr. Robert Ketley, former Senior Utilities Engineer for the City of Watsonville (retired), in an email attachment received April 30, 2020.
2. Mr. Steve Palmisano, Director of Public Works and Utilities, City of Watsonville, in an email attachment received May 1, 2020.
3. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz, in an email attachment received May 1, 2020. Central Coast Water Board staff appreciates the comments provided by these interested persons. Some of the comments prompted us to clarify and improve information and narrative in the TMDL project documents.
4. Central Coast Water Board staff responses to these comments are provided below. We

reproduced direct transcriptions of the comments received and inserted staff responses in *blue, bold, italic* text below each comment

Comments and Staff Responses

1. Mr. Robert Ketley, former Senior Utilities Engineer for the City of Watsonville (retired)

85% Phosphorous Reductions – Table 7.7 details phosphorous based allocations for eight different sources (urban, industrial, cropland, grazing etc). Based on numerous trips through the watershed during and after rain events, I suspect some croplands/irrigated agriculture parcels may not be able to achieve the 85% reduction, especially with current crops and practices. As the TMDL document shows (page 78 and 80), much of the watershed is covered by clay soils with high erodibility. This combination of factors significantly limits the effectiveness of most sediment capture practices and can make erosion control practices much more challenging.

Controlling phosphorous will likely be easier and more cost-effective at some locations, such as those where the land is flat and soils are protected by structures such as hoop houses. For exposed row crops, especially for those grown on sloped sites, it seems unlikely that an 85% reduction is possible. This would seem to suggest that a phosphorous trading system within the watershed may be advantageous.

Central Coast Water Board staff response:

Thank you for your comments and insights. We appreciate the City's commitment to environmental improvement in the Pinto Lake watershed. We will add your insights about phosphorus control to the TMDL Implementation Strategy Report as considerations for watershed management or future studies.

2. Mr. Robert Ketley, former Senior Utilities Engineer for the City of Watsonville (retired)

0.8 µg/L Microcystin in 5yrs. – The Draft Pinto Implementation report (page22) states “Achieve and maintain the toxicity water quality objectives for contact recreation in

receiving waters that are designated REC, based on microcystin numeric target 0.8 µg/L within 5 years of the effective date of the TMDL.”

To meet this interim goal will likely require additional in-lake efforts. The 2017 alum application was very effective, but may not be enough to achieve and maintain the microcystin numeric target for the next 5 years or beyond. As HAB Aquatics have indicated, additional alum application(s) may be necessary. The recommended light springtime applications of alum seems like a potentially cost effective option.

There is a potential for disturbance of the alum layer by carp feeding on the lake bed, potentially impacting the benefits of any future applications. A biennial assessment of carp populations and, if necessary some form of carp population control, would help maximize the effectiveness of additional alum applications.

It should be noted that other cyanotoxins (such as Anatoxin A) have been detected in Pinto Lake and these can also be a significant health hazard. It is possible controlling for microcystin will also control for other cyanotoxins, but this is not certain. Some monitoring for other cyanotoxins should be considered.

Central Coast Water Board staff response:

We agree that future alum treatments are likely warranted and have articulated that within this TMDL project. We will add your insights to the TMDL Implementation Strategy Report as considerations for watershed management or future studies. These insights include carp assessment and control, and monitoring for other cyanotoxins.

3. Mr. Robert Ketley, former Senior Utilities Engineer for the City of Watsonville (retired)

Final TMDL Attainment – The Draft Pinto Implementation report states “Within 10 years after the OAL approval date, achieve the phosphorous waste load allocations and load allocations, or meet all regulatory and policy requirements necessary for removing the impaired waters from the Clean Water Act 303(d) List of impaired waters; or attain the numeric targets for nutrient response indicators (i.e. dissolved oxygen water quality objectives, chlorophyll a numeric targets, and microcystin numeric targets).”

High internal phosphorous loadings suggest that cyanobacteria blooms will continue to be a problem at Pinto Lake, even with an 85% reduction in phosphorous loadings from the watershed. As such, additional in-lake measures will be required. While periodic alum applications are an obvious way to achieve this goal, other measures could be explored.

There have been a number (positive) shifts in the lake biota following the 2017 alum application. Increased light penetration has resulted in significant increases in benthic filamentous algae and large stands of macrophytes such as Coontail (*Cerostophyllum demersum*) and Canadian pond weed (*Elodea Canadensis*). In addition, the springtime cyanobacteria blooms have been largely replaced by prolific diatom and zooplankton blooms. These blooms have, in turn, resulted in noticeably larger schools of black crappie (*Pomoxis nigromaculatus*) and golden shiners (*Notemigonus crysoleucas*), which are heavily predated by herons, cormorants, grebes and gulls.

This means that a significant percentage of the remaining soluble phosphorous is being quickly shifted to higher phyla. This limits the amount of phosphorous available to cyanobacteria, further reducing the size and duration of any blooms. This suggests that measures aimed at promoting native aquatic macrophytes across the lake could improve the effectiveness and duration of any future alum applications and may, at some future date, eliminate the need for further treatments.

Central Coast Water Board staff response:

We will add your insights concerning promoting native aquatic macrophytes across the lake to the TMDL Implementation Strategy Report as a potential consideration for watershed management or future studies.

4. Mr. Steve Palmisano, Director of Public Works and Utilities, City of Watsonville

The City is supportive of the action to adopt the numeric targets for total phosphorus in Pinto Lake. Through two 319 (h) Non-Point Source Grant opportunities (Planning and Implementation), the City was able to determine that internal and continued external phosphorus loadings to Pinto Lake was driving the CHAB cycle. By addressing total phosphorus through alum treatment, there has been a significant reduction in phosphorus (nearly 90%) and therefore, a significant reduction in CHAB events in-lake. The challenge remains that surrounding land use activities are contributing on average 2cm of phosphorus rich sediment to the lake each year.

Central Coast Water Board staff response:

We appreciate these comments and the City's commitment to environmental improvement in the Pinto Lake watershed. We agree that sediment control from the watershed remains a management challenge to the long-term health of the lake, and controlling this source is highlighted as a focus in the TMDL Implementation Strategy Report.

5. Mr. Steve Palmisano, Director of Public Works and Utilities, City of Watsonville

The City owns approximately 90 acres of Pinto Lake. While water quality issues are not defined by jurisdictional boundaries, the City's ability to implement source control measures for properties upstream of the Lake are limited. The City will need to work closely with the County of Santa Cruz in order to have a comprehensive understanding of inputs to the lake and collaboratively work together to implement management measures to address the total phosphorus loadings.

Central Coast Water Board staff response:

We understand the limitations on the City's ability to implement source control upstream of the lake. It is important to note that the City is only responsible for making progress towards and achieving its waste load allocation (aka, the City's portion of the TMDL pollution budget) – the City is not responsible, through its own efforts, to achieve the TMDL (aka, the entire allowable pollution load) for the lake.

6. Mr. Steve Palmisano, Director of Public Works and Utilities, City of Watsonville

Pinto Lake is situated in a mixed land use sub-watershed of the Pajaro River watershed. Due to the mixed land uses, the City will work closely with the County to manage controllable sources such as onsite wastewater treatment systems, residential and municipal fertilizer application. Uncontrollable sources within the sub-watershed are largely agricultural and livestock practices. These sources will need to be considered when developing a waste load allocation attainment plan by the City.

Central Coast Water Board staff response:

We understand the limitations on the City's ability to implement source control from agricultural lands. We do not consider discharges from agricultural lands to be uncontrollable. Existing regulatory mechanisms are anticipated to address controllable sources of pollution from irrigated lands. It is important to note that the City is only responsible for making progress towards and achieving its waste load allocation (aka, the City's portion of the TMDL pollution budget) for the lake.

7. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

Numeric targets:

While the primary numeric target for microcystin (0.8 µg/L) and nitrate (10 mg/L) are linked to health risks or MCLs, it is not clear whether the numeric targets for total-phosphorus are appropriate (0.17 mg/L, 200 lb/year). While these seems to come from relatively generic literature and modelling, can the targets be more closely related to levels observed in Pinto Lake when adverse impacts occur and when they don't occur?

Central Coast Water Board staff response:

We appreciate these comments and the County's commitment to environmental improvement in the Pinto Lake watershed.

At this time, we maintain that an appropriate water quality management objective to reduce the frequency and severity of cyanobacterial blooms is to limit phosphorus loading on a year-round and daily basis and not to limit allowable phosphorus loads to a seasonal basis, i.e. June to October. Sediment deposition and accumulation in the lake bottom during wet season runoff and high flow events serve as a sink where phosphorus can be stored. Even non-bioavailable phosphorus discharged to and accumulating in the lake during the rainy season or during high flow events can become bioavailable over time due to phosphorus cycling, i.e., when phosphorus bound to particulate and organic matter becomes bioavailable upon decay or release.

Also, note that the BATHTUB model establishes total phosphorus loading capacity under adverse conditions. Specifically, BATHTUB establishes an acceptable phosphorus and nitrogen loading capacity based on watershed nutrient inputs and a user specified maximum water column chlorophyll a concentration (in this case 25 micrograms per liter). In that sense, the model

output (lake loading capacity) is based on expected adverse conditions resulting from lake response (biomass, chlorophyll a) to watershed inputs (nutrients).

The California BATHTUB Tool was developed by Tetra Tech for the State Water Resources Control Board (State Water Board) to establish nutrient loading targets for lakes by estimating algal response to nutrients while accounting for hydraulic residence time, light availability, and other key variables. Central Coast Water Board staff defer to the State Water Board's and Tetra Tech's assessment that this model is appropriate for small lakes and reservoirs in California. This model was thus used to supplement our loading capacity analysis for Pinto Lake because it is deemed by the state to be an effective tool for predicting lake response to nutrient loading scenarios.

Finally, this TMDL attempts to establish a range of numeric targets and methodologies which can be used to demonstrate progress towards, and attainment of water quality standards. Even so, a TMDL is not necessarily the last and final word on thresholds used to assess lake management and water quality. The California 303(d) Listing Policy (Listing Policy) allows for flexibility in assessing how a waterbody is assessed and considered for removal from the Clean Water Act section 303(d) List. For example, section 4.11 of the Listing Policy allows for situation-specific evidence in assessment water quality. Here, the Listing Policy states that when "delisting factors" (i.e., previously identified numeric targets) do not result in the delisting of a waterbody, but other information and factors indicate attainment of water quality standards, a weight of evidence approach may be used to remove the waterbody from the 303(d) List. Other information and factors can include measures of biological community health, and photographic evidence. However, all data must meet the quality assurance requirements of the Listing Policy to be useful in justifying a decision to remove a waterbody from the 303(d) List.

Worth noting, the lake is not on the 303(d) List for phosphorus; it is on the List for response indicators like cyanotoxins, dissolved oxygen, and chlorophyll a. Therefore, if we have evidence to delist the lake based on response indicators, then the TMDL would be considered achieved, independent of phosphorus concentrations.

Should implementing parties wish to use situation-specific or alternative weight-of-evidence approaches in assessing water quality we recommend communicating closely with the Water Board's Central Coast Ambient Monitoring Program (CCAMP) and 303(d) List assessment staff to ensure that any situation-specific and weight-of-evidence approaches considered for assessing the lake have buy-in from both stakeholders and Central Coast Water Board staff.

8. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

Can you clarify whether the numeric targets are intended to be met at each monitoring location year-round or if the meta-data will be incorporated into data interpretation (i.e. rainfall, drought, lake turn-over, circulation)?

Central Coast Water Board staff response:

In principle, lake management goals need to be oriented towards attaining the water quality objectives and thresholds identified in the TMDL, with the expectation that water quality objectives need to be met year-round in the lake. This can be determined using the Listing Policy methodology whereby, the data for the lake are aggregated to make a decision about water quality standards attainment for the entire waterbody (i.e., number of total samples for the lake compared to the acceptable number of numeric target exceedances for the lake). The Listing Policy also allows for flexibility in assessing how a waterbody is assessed and considered for removal from the Clean Water Act section 303(d) List. Please refer back to response to question 7 for additional details.

If there are viable reasons to pursue data interpretation in light of additional hydrologic factors (runoff, lake circulation, drought, etc.), then the proposed Basin Plan amendment provides for a range of methods for the City of Watsonville and the County to demonstrate progress towards and attainment of waste load allocations. This includes an option to develop “Any other effluent limitations and conditions which are consistent with the assumptions and requirements of the waste load allocations.”

9. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

Alternative methods of monitoring chlorophyll/phytoplankton have been developed (i.e. phycocyanin or other probes). These in situ measurements might be more informative than traditional chlorophyll extraction methods. Are there mechanisms to establish equivalent numerical limits based on alternative monitoring tools?

Central Coast Water Board staff response:

The short answer is yes, there are mechanisms and policies which allow for alternative, site-specific evidence and monitoring methods to demonstrate attainment of water quality standards.

The proposed Basin Plan amendment provides for a range of methods for the City and County to demonstrate progress towards, and attainment of waste load allocations. This includes language pointing to an option to develop “Any other effluent limitations and conditions which are consistent with the assumptions and requirements of the waste load allocations.”

In principle, lake management goals need to be oriented towards attaining the water quality objectives and thresholds identified in the TMDL. Even so, a TMDL is not necessarily the last and final word on thresholds used to assess lake management and water quality. The Listing Policy allows for flexibility in assessing how a waterbody is assessed and considered for removal from the Clean Water Act Section 303(d) List. Please refer back to response to question 7 for additional details.

10. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

Waste load allocations (Table 3)

The largest sources of phosphorus load allocations identified in Table 3 are irrigated agriculture and lake sediments.

What is the mechanism in the TMDL for controlling the sources that are out of the jurisdiction of the County of Santa Cruz or the City of Watsonville?

Central Coast Water Board staff response:

In this TMDL project, we define a range of regulatory, voluntary, and grant-funded responses to improve watershed management in the Pinto Lake catchment, including areas outside the jurisdiction of the County and City. Examples are provided below.

Owners and operators of irrigated agricultural land in the Pinto Lake catchment must comply with the Conditional Waiver of Waste Discharge Requirements for Irrigated Lands (Agricultural Order) or future permits regulating the discharge of waste from irrigated agricultural lands. The current Agricultural Order specifically requires owners and operators of irrigated lands to take planning and management actions that are anticipated to reduce erosion and sedimentation. For example, these include requirements for implementing practices which prevent erosion and hold fine particles in place, minimizes the presence of bare soil vulnerable to erosion, and maintains riparian areas for streambank stabilization and erosion control.

Industrial stormwater dischargers are required to comply with the Statewide General Permit for Stormwater Dischargers Associated with Industrial Activities, State Board Order 2014-0057-DWQ, NPDES No. CAS000001 (Industrial General Permit) or any future permit regulating the discharge of stormwater associated with industrial activities containing pollutants.

Central Coast Basin Plan establishes a land disturbance prohibition for the Pajaro River watershed. The Basin Plan prohibition thus requires residents in the Pinto Lake catchment who have livestock and farm animals to manage their property to prevent sediment discharges and protect water quality.

Phosphorus loading from natural woodland areas and undeveloped rural areas are generally considered background, defined as the ambient waterbody concentration regardless of whether those pollutants are natural or result from upstream human activity. Background concentrations are not directly controllable nor are they regulated by an existing regulatory program. However, some load reductions will be achieved through ongoing non-regulatory actions such as grant funded projects that trap sediment and associated phosphorus before it reaches the lake.

The TMDL Implementation Strategy Report identifies sources of financial assistance for implementation. Grants, contracts, supplemental environmental project funds, etc., will likely be needed for future projects to manage the phosphorus loading from the watershed. This is anticipated to include areas in the catchment outside the County's jurisdiction.

11. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

Determination of progress

Assessment of progress towards meeting the total phosphorus target (A) is based on trend analysis. The County of Santa Cruz has a strong history of monitoring water quality in Pinto Lake, however the historic data is on bioavailable phosphorus (ortho-phosphate) and there are limited data on total-phosphorus. The County is planning to collect baseline data on total phosphorus (dissolved and particulate) in addition to monitoring orthophosphate starting in mid-2020. It will be difficult to determine 'progress' and identify 'hot-spots' until statistically sound baseline data are available from Pinto Lake and other local water bodies on the phosphorus distribution (total, dissolved, bioavailable).

A similar situation exists for storm-drain data (C). All of the historic nutrient data are for ortho-phosphate and nitrate,

Central Coast Water Board staff response:

The proposed Basin Plan amendment identifies a ten-year timeline for achievement of the TMDL. Currently, we anticipate this attainment date provides the necessary time and flexibility to collect sufficient data and implement management practices to demonstrate progress towards, and attainment of waste load allocations that can be demonstrated by attaining the total phosphorus TMDL and/or the numeric targets for the response indicators (refer to the response to question 7 above).

State and federal policy and guidance recognize that we do not always have as much data as we would like. In terms of the abundance of historical orthophosphate data, we recommend that stakeholders and Central Coast Water Board staff consider continuing to evaluate orthophosphate data and trends as a proxy indicator of progress towards reducing total phosphorus loading to the watershed and the lake. As discussed in the response to comment 7, the proposed Basin Plan amendment and the state Listing Policy allow for flexibility in developing methods for assessing trends in water quality and for identifying "Any other effluent limitations and conditions which are consistent with the assumptions and requirements of the waste load allocations."

12. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

Monitoring: We appreciate the opportunity to 'develop and submit creative and meaningful monitoring and implementation programs'. Are there any examples of successful phased approaches that have been used to meet similar goals in other locations?

Central Coast Water Board staff response:

USEPA defines a phased TMDL as an approach where load allocations and waste load allocations are calculated using the best available data and information, recognizing the need for additional monitoring data to more accurately characterize sources and loadings. The phased approach is typically employed when nonpoint sources dominate the contribution of the pollutant. It provides for the implementation of interim load reduction strategies while collecting additional data.

The proposed TMDL for Pinto Lake can be considered a phased approach in which we recognize that extended water quality attainment schedules and additional data and studies may be warranted to refine the lake and watershed management strategies.

One example of a phased approach is the Big Bear Lake Nutrient TMDL approved by the Santa Ana Regional Water Quality Control Board in 2006. This TMDL purports to use a phased approach for control of phosphorus loads to Big Bear Lake. Following TMDL approval, stakeholders in the Big Bear Lake watershed formed a TMDL taskforce to develop and implement nutrient management and monitoring plans for the watershed. One noteworthy improvement is the result of active management of both beneficial and nuisance plants using a variety of controls. These actions support restoring recreation and aquatic life uses in localized areas of the lake. During TMDL implementation, we will endeavor to stay abreast of other lake TMDLs in California and share information and lessons learned from them with Pinto Lake stakeholders.

13. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

Irrigated Agricultural Lands: Can you clarify the mechanism for meeting the load allocations for irrigated lands? As noted in Table 3, irrigated lands represent a significant contribution of phosphorus.

Central Coast Water Board staff response:

Owners and operators of irrigated agricultural land in the Pinto Lake catchment must comply with the Conditional Waiver of Waste Discharge Requirements for Irrigated Lands (Agricultural Order) or requirements in future permits regulating the discharge of waste from agricultural lands. Please refer to the response to comment 10 (see paragraph 2).

14. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

We question the calculated contribution from OWTS and to what extent that can be reduced. The County is actively involved in assessing releases from Onsite Wastewater Treatment Systems (OWTS). While it is possible to encourage use of low-phosphorus or phosphate-free products, this would only be expected to reduce overall load by 15% at most (based on the cited supporting USEPA material). We anticipate using source tracking and chemical fingerprinting to better quantify wastewater inputs. The LAMP will

provide guidance on treatment and monitoring, however the use of alum treatment may not be practicable or enforceable. The TMDL report indicates that the calculated phosphorus loading from OWTS is based on failures and surface transport of wastewater. We would concur that that is the primary mechanism for phosphorus transport from OWTS in this watershed. That would not indicate a need to utilize supplemental treatment to sequester phosphorus, and we are not aware of technology that does that. There is also no discussion in the TMDL report supporting specific requirements for OWTS at 600 or 900 ft from the lake. We look forward to working with the Water Board to develop appropriate measures in our LAMP to reduce contributions of nutrients to the lake from OWTS, where they can be documented to occur.

Central Coast Water Board staff response:

This TMDL project acknowledges uncertainty in the magnitude of pollutant source contributions from all sources, including OWTS. This TMDL acknowledges that estimates of phosphorus loading from OWTS are conservative and may represent a worst-case scenario. We endeavor to include implicit conservative assumptions in the TMDL to be consistent with USEPA guidance to include a margin of safety in the TMDL calculation, as described in further detail in the TMDL Report. Given the acknowledged uncertainties, we encourage the County to submit any additional phosphorus surface water and groundwater data in its possession in their Local Agency Management Program (LAMP) proposal. This may help to further our knowledge of OWTS pollutant contributions to the watershed and lake. We also encourage the County to continue to work with Waste Discharge Requirements Program staff to develop a LAMP that addresses protection of Pinto Lake from OWTS in the vicinity of Pinto Lake.

Concerning source tracking and chemical fingerprinting to better quantify wastewater inputs: We commend the County for committing to data collection of this nature and encourage the county to include this monitoring program in the County's LAMP proposal.

Concerning practicality and enforceability of alum treatment: Our waste discharge requirements staff informs us that one can easily perform phosphorus reduction with the use of an alum-based chemical from the local pool supply retailer for about \$20. We maintain this is practicable and could be reasonably enforceable as a recommended management practice in the proposed Basin Plan amendment.

Concerning fate and transport of nutrients from OWTS: Based on the limited available data available to us (a handful of groundwater samples, several soil boring logs, assumptions about the geologic conditions and geochemical fate of phosphorus in the subsurface), we estimate at this time that the majority of phosphorus loading to the lake from OWTS is via surface runoff. We do not have sufficient data or modeling to conclusively rule out a groundwater load of nutrients to the lake from OWTS, though existing data and information outlined in detail in the TMDL report seems to suggest it could be only nominal.

Concerning uses of low-phosphorus products: We would consider a 15 percent reduction in phosphorus loading from OWTS to be a significant improvement in watershed management. The TMDL's estimated 85 percent reductions to achieve load allocations for OWTS represents an aspirational performance goal, and it may represent a conservative, worst-case scenario. Percent reduction estimates in and of themselves are not water quality standards. In light of uncertainties, this TMDL provides flexibility for using alternative monitoring parameters and methods to demonstrate progress towards and attainment of load allocations.

Concerning the 600-foot and 900-foot buffers: We will add supporting references for these buffers to the TMDL Implementation Strategy Report. These are known distances that phosphorus travels in groundwater, based on peer reviewed literature and state policy. The 600-foot buffer around impaired waterbodies is the Tier 3 requirement from the State Water Board's OWTS Policy. Supporting research for the 900-foot buffer include two peer-reviewed scientific literature sources which will be included in the TMDL Report. We estimate there are only a handful of parcels – perhaps ten at most – around the lake which are within these buffer distances.

15. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

The interim water quality objectives are presented in terms of microcystin. Have targets for any other cyanobacterial toxins been considered? Is that target specific to the boat-dock or throughout the lake and water column?

Central Coast Water Board staff response:

Other cyanobacterial toxins were not considered in this project because the lake is not currently listed on the Clean Water Act Section 303(d) List for other cyanobacteria toxins, nor were any other cyanotoxin data available to staff for inclusion in this TMDL analysis. However, we anticipate that improved lake management strategies and reductions in the frequency and severity of microcystin toxicity will have beneficial effects to concentrations of other cyanobacterial toxins. It should be acknowledged that there is uncertainty about whether or if reductions in microcystin concentrations will track with reductions in other cyanotoxins.

We recommend that if the City of Watsonville or County have or plan to collect data for other toxins that meet the Listing Policy requirements for quality assurance that they submit that data to the California Environmental Data Exchange Network (CEDEN) so that we can use it for future assessments.

In principle, the microcystin targets apply throughout the lake. In practice, we anticipate that the point of compliance – where microcystin water quality standards are expected to be achieved – will logically be assessed in surface waters of the lake where impacts to human health and recreation are anticipated

since these are the most sensitive beneficial uses of the lake. While we would expect local stakeholders to be in the best position to identify logical monitoring sites, we recommend monitoring entities work with Central Coast Water Board staff so that we can assist in the design of monitoring activities that will be sufficient to ultimately remove the lake from the 303(d) List. Note that the Listing Policy requires that monitoring programs have a quality assurance project plan, or similar documentation, to be useable for 303(d) assessments and defines readily available data as those data in the CEDEN database.

16. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

The report references the County of Santa Cruz monitoring plan. Please note that this plan is undergoing revision to better align with TMDL goals and resource constraints.

Central Coast Water Board staff response:

We will add this information to the TMDL Implementation Strategy Report.

17. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

It is estimated based on census data that there are some 283 septic systems in the watershed. Our database indicates about 400 septic systems. There are a number of situations with more than one system on a parcel that has multiple units.

Central Coast Water Board staff response:

Thank you for this update. We understand that information and estimates can change over time. The estimate of the number of septic systems in the Pinto Lake catchment in this TMDL project is based on housing and demographic data. In an email dated April 14, 2017, County staff informed us that our estimate seemed reasonable.

18. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

The report indicates that most phosphorus enters the lake from the watershed via runoff, not subsurface groundwater flow. This supports the approach of eliminating OWTS failures and not requiring supplemental phosphorus treatment that would have limited benefit.

Central Coast Water Board staff response:

The proposed Basin Plan amendment language provides substantial flexibility to the County in how to address the risk of phosphorus loading from OWTS to Pinto Lake. Alum treatment applications are provided in the amendment language as a recommendation or example of a practice which could be implemented. The Central Coast Water Board generally recognizes that local stakeholders are in a good position to identify effective environmental management practices. We encourage the County to build treatment and control practices into their LAMP submittal proposals that will reduce the risk of phosphorus loading to Pinto Lake. We also encourage the County to submit any additional phosphorus surface water, groundwater data, and geochemical fingerprinting data in its LAMP

proposal. This may help to further inform our knowledge of OWTS pollutant contributions to the watershed and lake.

In our judgement, OWTS failures and surface runoff are the highest risk for phosphorous loading to Pinto Lake from OWTS sources. This judgement was based on our review of the limited available data (a handful of groundwater samples, several soil boring logs, assumptions about the geologic conditions and geochemical fate of phosphorus in the subsurface), and we estimate at this time that the majority of phosphorus loading to the lake from OWTS is via surface runoff. We do not have sufficient data or modeling to conclusively rule out a groundwater load of nutrients to the lake from OWTS at this time.

19. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

Water quality monitoring shows low levels of phosphorus and nitrogen in the parts of the watershed most influenced by OWTS: the “Ditch” and Pinto Creek. Phosphorus targets are not exceeded, which would suggest those areas are not contributing significantly to the lake.

Central Coast Water Board staff response:

We agree that limited water quality data in the catchment from ditches and Pinto Creek suggest relatively low levels of nutrients from upper watershed areas of the lake catchment. We anticipate the main risk of phosphorus loading from OWTS to Pinto Lake are likely from lakeside residences on the west side of the lake, where there is a record of septic system failures, and a shallow, hardpan clay layer which can limit the vertical transport of septic effluent, atmospheric recharge, and shallow groundwater.

With those observations in mind, the TMDL Implementation Strategy Report and the proposed Basin Plan amendment generally highlights and focuses attention on areas adjacent to the lake by specifying buffer distances from the lake as a focal point for management practices based on the OWTS Policy and peer reviewed scientific literature. These lake buffer distance considerations do not apply to residences with OWTS located in the upper reaches of the lake catchment farther north along Amesti Road and near upper Pinto Creek.

20. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

It is unclear what is the definition of shallow groundwater. Groundwater loads of phosphorus to the lake do not seem to be significant.

Central Coast Water Board staff response:

We appreciate the opportunity to clarify. As noted on page 62 of the TMDL Report, shallow, recently recharged groundwater is defined by the U.S. Geological Survey in its Groundwater Vulnerability Assessment (GWAVA) dataset as groundwaters typically less than 5 meters (approximately 15 feet) below ground surface. Shallow groundwaters would be expected to be in direct

hydrologic communication with the lake, in contrast to deeper, drinking water aquifers found at depth within the Pajaro Valley basin.

Our source assessment – while subject to uncertainties – does suggest that phosphorus loading via groundwater to Pinto Lake appear to be relatively nominal.

21. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

Table 4-21: what do IS and ND mean in this table?

Central Coast Water Board staff response:

We appreciate the request to clarify these terms. In Table 4-21 of the TMDL Report staff defined these terms in the footnotes as follows: IS indicates insufficient data were available to make a water quality assessment for that parameter-monitoring site pair. ND indicates no data were available for assessment.

22. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

It is unclear how useful or reliable the results are from the STEPL model, without somehow relating them back to measured conditions in our watersheds. Loads could be calculated by multiplying measured mean or median concentrations in an area by estimated annual runoff.

Central Coast Water Board staff response:

We acknowledge that it could be possible to estimate sources using a simple runoff volume calculation. We chose to use the STEPL spreadsheet model because it accounts for runoff, precipitation, land use, in-stream decay, and representative nutrient concentrations in soils and groundwater.

Two scientific peer reviewers (Dr. Frank M. Wilhelm and Dr. Thomas Johengen) for this TMDL project reported to us that our source analysis using STEPL was fundamentally sound and scientifically defensible. One peer reviewer (Dr. Dale M. Robertson) stated that STEPL is notorious for over-estimating downstream loading unless instream decay is carefully incorporated.²

On balance, while we acknowledged that the STEPL output are subject to significant uncertainty, we maintain the required level of inputs, the simple structure of the model, and its use in previously approved TMDLs make it an appropriate load estimation tool on the basis of Water Board resources and effort.

² We confirmed with the TetraTech STEPL helpdesk staff that we correctly set the model inputs to incorporate downstream decay of pollutant loads.

23. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

It seems odd to treat suburban runoff in this area as point source rather than as a nonpoint source when the area is semi-rural with almost no storm sewer infrastructure or point source outfalls.

Central Coast Water Board staff response:

We identified residential stormwater runoff as a point source because administratively, USEPA considers permitted MS4 discharges to be a point source of pollution. The residential areas around Pinto Lake are within the County of Santa Cruz's MS4-permitted jurisdictional boundaries.

24. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

We would concur with Water Board staff that the model results for OWTS are weak. We would not want to see any regulatory action regarding OWTS based on the model results.

Central Coast Water Board staff response:

The proposed Basin Plan amendment language provides flexibility to the County in how to address the risk of phosphorus loading from OWTS to Pinto Lake. Alum treatment applications are provided in the amendment language as a recommendation or example of a practice which could be implemented. The Central Coast Water Board generally recognizes that local stakeholders are in a good position to identify effective environmental management practices. We encourage the County to build into its LAMP proposals phosphorus treatment and control practices that will reduce the risk of loading to Pinto Lake.

25. Mr. John A. Ricker, Water Resources Division Director, County of Santa Cruz

It is still not clear how the overall target of 200 lb/yr was arrived at. It would be useful to have a more grounded basis, such as the observed concentrations and calculation of the annual load during recent years when impairment was not observed. It seems that the stakeholder load targets on page 247 are more reasonable.

Central Coast Water Board staff response:

To improve clarity regarding the model, we included additional information and/or hyperlinks in the TMDL Report regarding the water quality model we used in this TMDL.

Concerning the TMDL target of 200 pounds/year: The BATHTUB water quality model we used in this TMDL provides a range of total nitrogen and total phosphorus (N-P) loads at which a desired chlorophyll a target will be met.

As described in the TMDL Report, we used the BATHTUB model to predict ranges of N-P load combinations which are expected to meet the chlorophyll a numeric target concentration of 25 mcg/L in Pinto Lake. Based on these BATHTUB N-P

loading predictions, we identified a proposed loading capacity for total phosphorus of 200 pounds/year to meet the chlorophyll a target of 25 mg/L at an N-P ratio of about ten. We chose this loading capacity threshold from the predicted N-P range because a N-P ratio of around ten is reasonable for Pinto Lake and other lakes in this ecoregion. In contrast, the higher allowable loads identified on the BATHTUB N-P range prediction (310 to 490 pounds of phosphorus) occur at very low TN:TP ratios of between 3.6 and 5.7. These nutrient ratio conditions are not reasonable or achievable in lakes in this ecoregion.

As outlined in the TMDL Report, the BATHTUB model also incorporates lake volume, surface area, and secchi depth at typical chlorophyll a concentrations. This model is thus a way of estimating lake response to watershed nutrient inputs, light availability, hydraulic residence time, and other factors. Please refer to our response to comment 7 for additional details about the BATHTUB Tool used to derive the TMDL.

The goal of this TMDL is to estimate the allowable load necessary to achieve water quality standards, based on watershed nutrient inputs and an acceptable lake response in terms of algal biomass (chlorophyll a). Since the 2017 alum treatment is assumed to have a short-term duration of effectiveness (five to seven years), our model input included recent and historic data on watershed nutrient inputs and water quality.

We cannot respond to the assertion that the stakeholder targets are more reasonable, since there is no information provided to indicate why it is considered more reasonable. In the TMDL Report, we reported stakeholder-derived loading targets to illustrate there may be a range of possible lake management objectives for nutrient loading. The total phosphorus loading capacity needed to achieve the proposed TMDL is lower than the stakeholder-derived goals. This is because our BATHTUB modeling indicated that larger percent reductions of phosphorus loading to the lake were necessary to achieve a chlorophyll a water quality target of 25 mcg/L. This chlorophyll a water quality target aligns with management goals of the TMDL which are to attain numeric targets for nutrient-response indicators (chlorophyll a, dissolved oxygen, and microcystin).

This TMDL, as we acknowledge in the TMDL Report, is based on implicit, conservative assumptions consistent with USEPA policy. Therefore, this TMDL presents an allowable loading scenario that approaches a more conservative, more stringent, or worst-case scenario. It is possible water quality standards for response indicators such as chlorophyll a, dissolved oxygen, and microcystin may be attained before an allowable annual load of 200 pounds total phosphorus/year is achieved. In light of this observation, this TMDL provides flexibility and a range of methods to demonstrate progress towards and attainment of water quality objectives.