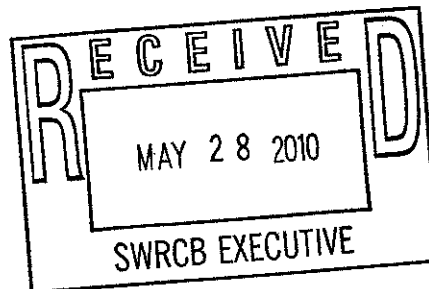


City of San Luis Obispo

879 Morro Street • San Luis Obispo, CA 93401

May 28, 2010

Mr. Charles R. Hoppin, Chairman
State Water Resources Control Board
1001 I Street
Sacramento, CA 95814



SUBMITTED VIA EMAIL

Subject: Comments on the Proposed 2010 Integrated Report, 303 (d) List

Dear Mr. Hoppin:

The City of San Luis Obispo (City) appreciates the opportunity for providing the State Water Resources Control Board (State Water Board) comments on the Proposed 2010 Integrated Report: Clean Water Act Section 303(d) List of Water Quality Limited Segments and Clean Water Act Section 305(b) Assessment of Surface Water Quality (2008 303(d) List). The Proposed Integrated Report includes listings developed by the Central Coast Regional Water Quality Control Board (CCRWQCB) during the 2008 303(d) listing process.

As part of the CCRWQCB's 2008 303(d) list, a number of new nitrate listings were added for the predicted impairment to the warm and cold fresh water beneficial uses based on a predicted reduction in dissolved oxygen related to algae driven by the presence of nitrate. **Table 1** presents a summary of the waterbodies listed as well as the beneficial uses proposed as impaired based on the predictions. The Evaluation Guideline identified in the fact sheets for the listed waterbodies is the *Technical Approach to Develop Nutrient Numeric Endpoints for California* (Tetra Tech 2006 and referred herein as the 2006 NNE Report). As further stated in the Evaluation Guideline: "The Central Coast Region numeric target for maximum nitrate concentration is based on the Tetra Tech NNE (Nutrient Numeric Endpoint) Model and CCAMP data for 193 sites, monitored monthly for at least 1 year between January 1998 and December 2006. The model numeric target for aquatic life habitats in the Central Coast Region is 1.0 mg/L Nitrate as N." The Guideline Reference identified in the fact sheets for the listed waterbodies were the 2006 NNE Report and a technical paper developed by CCRWQCB staff in April 2009 titled *Interpreting Narrative Objectives for Biostimulatory Substances Using the Technical Approach for Developing California Nutrient Numeric Endpoints Central Coast Region* (referred herein as the 2009 Technical Paper).



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Table 1: Proposed 303(d) Listings for Nitrate in the Central Coast Region (R3) Basin Plan based on the Application of the NNE approach^{1,2}

Waterbody Name	Beneficial Uses
Alisal Creek (Monterey County)	Cold and Warm Freshwater Habitat
Bradley Canyon Creek	Cold and Warm Freshwater Habitat
Bradley Channel	Cold and Warm Freshwater Habitat
Gabilan Creek	Warm Freshwater Habitat
Main Street Canal	Cold and Warm Freshwater Habitat
Natividad Creek	Cold and Warm Freshwater Habitat
Orcutt Creek	Cold Freshwater Habitat
Oso Flaco Creek	Warm Freshwater Habitat
Quail Creek	Cold and Warm Freshwater Habitat
Salinas River (lower, estuary to near Gonzales Rd crossing, watersheds 30910 and	Cold and Warm Freshwater Habitat
Santa Maria River	Cold and Warm Freshwater Habitat
Santa Rita Creek (Monterey County)	Cold and Warm Freshwater Habitat

¹Evaluation Guideline: Technical approach to develop nutrient numeric endpoints for California, Tetra Tech, June 2006.

²Guideline Reference: Technical Approach to Develop Nutrient Numeric Endpoints for California, Tetra Tech, June 2006.
 Technical Paper - Interpreting Narrative Objectives for Biostimulatory Substances Using the Technical Approach for Developing California Nutrient Numeric Endpoints. Central Coast Region. April 2009.

The 2004 State Water Board Water Quality Control Policy for developing California's Clean Water Act (CWA) Section 303(d) list (referred herein as the Listing Policy) describes the process by which the State Water Board and Regional Water Boards will comply with the listing requirements. The 2009 Technical Paper indicates that a weight of evidence approach is used as allowed by the Listing Guidance as an alternative procedure to the binomial distribution. The Listing Policy (Section 3.11) identifies situation-specific weight of evidence listings factors that can be utilized when all other listing factors do not result in the listing of a water segment but information indicates non-attainment of standards, a water segment shall be evaluated to determine whether the weight of evidence demonstrates that a water quality standard is not attained. The Listing Policy requires that when making a listing decision based on the situation-specific weight of evidence, Regional Water Boards must justify the recommendation by:

- Providing any data or information including current conditions supporting the decision;
- Describing in fact sheets how the data or information affords a substantial basis in fact from which the decision can be reasonably inferred;
- Demonstrating that the weight of evidence of the data and information indicate that the water quality standard is not attained; and
- Demonstrating that the approach used is scientifically defensible and reproducible.

Additionally, Section 6.1.3 (Evaluation Guideline Selection Process) of the Listing Policy provides the requirements a proposed guideline must meet before it can be accepted as an approach to list based on an evaluating narrative water quality objectives or beneficial use protection. Per Section 6.1.3, Regional Water Boards or the State Water Board shall identify evaluation guidelines that represent standards attainment or beneficial use protection. The guidelines are not water quality objectives and shall only be used for the purpose of developing the section 303(d) list. Section 6.1.3 states that evaluation guidelines may be used if it can be demonstrated that the evaluation guideline is:

- Applicable to the beneficial use
- Protective of the beneficial use
- Linked to the pollutant under consideration
- Scientifically-based and peer reviewed
- Well described, and
- Identifies a range above which impacts occur and below which no or few impacts are predicted.

Although the Evaluation Guideline identified in the fact sheets for the listed waterbodies is the 2006 NNE Report, the actual listings are based on the interpretation of the NNE approach as described in the 2009 Technical Paper developed by CCRWQCB staff. The 2009 Technical Paper and associated analysis do not meet the requirements of Sections 3.11 and 6.1.3. As such, the results of the analysis contained in the 2009 Technical Paper should not be used as evaluation guidelines to support the listings presented in **Table 1**. Specifically, the 2009 Technical Paper does not demonstrate that the evaluation guideline related to nitrate is:

- Peer reviewed
- Scientifically based
- Well described, or
- Identifies a range above which impacts occur and below which no or few impacts are predicted.

As such, the listings being considered by the State Water Board based on the 2009 Technical Paper should not be incorporated into the 2010 Integrated Report. The following details how the required demonstrations for evaluation guidelines have not been met.

Peer Reviewed

Based on a review of the 2006 NNE Report and the 2009 Technical Paper, no reference is provided that suggests a formal peer review process was utilized. Currently, the 2006 NNE Report approach is being evaluated by the State Water Board using four test cases, which are intended as a group to capture the regional differences in the state. The four test cases are as follows:

- Klamath River

- Santa Margarita River (northern San Diego/southwestern Riverside County)
- Malibu Creek
- Chorro Creek (which is located in the Central Coast region)

It is our understanding that the case studies have recently been completed and that a peer review process is underway to evaluate the application of the NNE approach. Until the peer review of the case studies is complete and made available to regional boards and interested parties for consideration, the approach contained within the 2006 NNE Report, or at a minimum, the analysis contained within the 2009 Technical Paper cannot be considered peer reviewed. In fact, one of the test case locations, Chorro Creek, is in the Central Coast region and will provide a peer reviewed example for the CCRWQCB to follow. Therefore, the requirement for demonstrating an evaluation guideline has been peer reviewed has not been met. As such, the proposed listing presented in **Table 1** should be removed from the 2010 Integrated Report.

Scientifically Based

With regard to a demonstration of the guideline being scientifically based, the City's comments are specific to the 2009 Technical Paper. The City's understands the scientific basis for the 2009 Technical Paper is the approach outlined in the 2006 NNE Report; however, the paper does not follow the procedures as outlined in the report. The 2006 NNE Report advises against the use of the NNE models for a broad stroke approach such as that being proposed by the 2009 Technical Paper. The NNE approach is based on lines of evidence that incorporate natural conditions; the status risk cofactors (e.g., habitat integrity, flow); and the relationship between secondary indicator response variables (e.g., chlorophyll a, clarity, DO, and pH maximums). As such, the NNE approach requires a good understanding of the individual waterbody being evaluated and consideration of all of the lines of evidence. However, instead of evaluating individual waterbodies using the Central Coast Ambient Monitoring Program (CCAMP) data to calculate NNEs for each waterbody, a generalized number is calculated and applied to all waterbodies. The generalized approach may be appropriate for developing screening criteria as a basis for identifying waterbodies for which a site-specific NNE should be evaluated. However, it is not appropriate, nor scientifically based, to set guidelines for listing. Therefore, the requirement for demonstrating an evaluation guideline is scientifically based has not been met. As such, the proposed listing presented in **Table 1** should be removed from the 2010 Integrated Report.

Well Described

Based on a review of the 2009 Technical Paper, there are several instances where CCRWQCB staff make assumptions and decisions without appropriately describing the rationale or providing supporting scientific information. For example, CCRWQCB staff indicated that default values were utilized for several model inputs, including latitude (35 degrees), canopy cover (80%), stream velocity (0.3 meters per second), and stream depth (0.5 meters). Each of these parameters can have an effect on the output of the NNE. No explanation is provided as to the appropriateness of the selection of default values, nor is a sensitivity analysis conducted to evaluate the effects of the use of default value on the NNE output. **Table 2** presents average stream velocity and depth data from six waterbodies in the Central Coast as well as the default

values utilized in the model. As indicated by the average data contained in **Table 2** the default values utilized in the model are not representative of conditions in the waterbodies proposed for inclusion in the 2010 Integrated Report.

Table 2: Average Stream Velocity and Depth for 2009 for Waterbodies Proposed for Inclusion on the 303(d) List in the 2010 Integrated Report

Site Code	Waterbody Name	Average Stream Depth (meters)	Average Stream Velocity (meters per second)	Notes
Not Applicable	Default Model Parameters	0.5	0.3	
309QUI	Quail Creek at Highway 101	0.10	0.10	1
312BCC	Bradley Canyon Creek	0.04	0.13	2
312BCJ	Bradley Channel at Jones Street	0.07	0.12	3
312OFC	Oso Flaco Creek at Oso Flaco Lake Road	0.10	0.30	
312ORI	Orcutt Solomon Creek at Highway 1	0.17	0.10	
312SMA	Santa Maria River at Estuary	0.16	0.18	

1. Average of velocity/depth when site was flowing. Site was dry during 4 out of 12 events.
2. Average of velocity/depth when site was flowing. Site was dry during 6 out of 12 events.
3. Average of velocity/depth when site was flowing. Site was dry during 1 out of 12 events.

The 2009 Technical Paper utilizes CCAMP data to confirm the NNE results. However, instead of using the extremely comprehensive CCAMP dataset to conduct confirmation of the results of the NNE approach for individual waterbodies, CCRWQCB staff conducted a gross assessment of the overall dataset. Neither a description of the appropriateness of the approach, nor a description of how the NNE performed at evaluating individual sites is provided.

Given the examples, a general lack of description and scientifically supported basis for some of the assumptions and decisions made within the paper, and the inability of our staff and consultants to understand key decisions identified in the paper, the 2009 Technical Paper does not appear to meet the requirements of being “well described”. Therefore, the requirement for demonstrating an evaluation guideline as well described has not been met. As such, the proposed listing presented in **Table 1** should be removed from the 2010 Integrated Report.

Identifies a Range Above Which Impacts Occur and Below Which No or Few Impacts Are Predicted

In the 2009 Technical Paper, CCRWQCB staff utilized CCAMP data to confirm the NNE findings. In the evaluation, staff evaluated CCAMP data for characteristics of sites meeting warm and cold water oxygen objectives that in staff’s opinion do not show evidence of biostimulation. The basis for the staff’s opinion are listed but not explained as to why the opinion is founded in the available science. Furthermore, it appears the confirmation was based on a one-way test as staff only evaluated sites that met oxygen objectives and did not show evidence of biostimulation based on staff’s opinion. No consideration is presented relative to

determining whether the results of NNE approach proposed as a listing guidance (1.0 mg/L nitrate as N) confirmed the presence of an oxygen impairment. As such, it is not possible to evaluate whether the 1.0 mg/L nitrate as N guideline identifies a range above which impacts occur and below which no or few impacts are predicted. Therefore, the requirement for demonstrating an evaluation guideline identifies a range above which impacts occur and below which no or few impacts are predicted has not been met.

The following provides additional information demonstrating that without a comprehensive evaluation the results of NNE approach proposed as a listing guidance (1.0 mg/L nitrate as N) does not adequately identify a range above which impacts occur and below which no or few impacts are predicted. The 2009 Technical Paper uses an estimated algal biomass to predict dissolved oxygen deficit. Staff then determines an average nitrate concentration that predicts this oxygen deficit. However, these relationships are not necessarily valid as evidenced by the following figures.

Figure 1 presents a dataset for the Ventura River watershed demonstrating that the relationship between benthic algal biomass and nitrogen can be weak in chaparral-dominated watersheds in Mediterranean climates. The figure shows that one cannot simply use nitrate concentrations to predict benthic algal biomass in a waterbody. The figure speaks to the (potential lack of) relationship between the Central Coast screening tool (nitrate concentrations) and the beneficial use impairment of interest (dissolved oxygen deficits, which are caused by algal biomass, not necessarily nitrogen over the NNE predicted threshold).

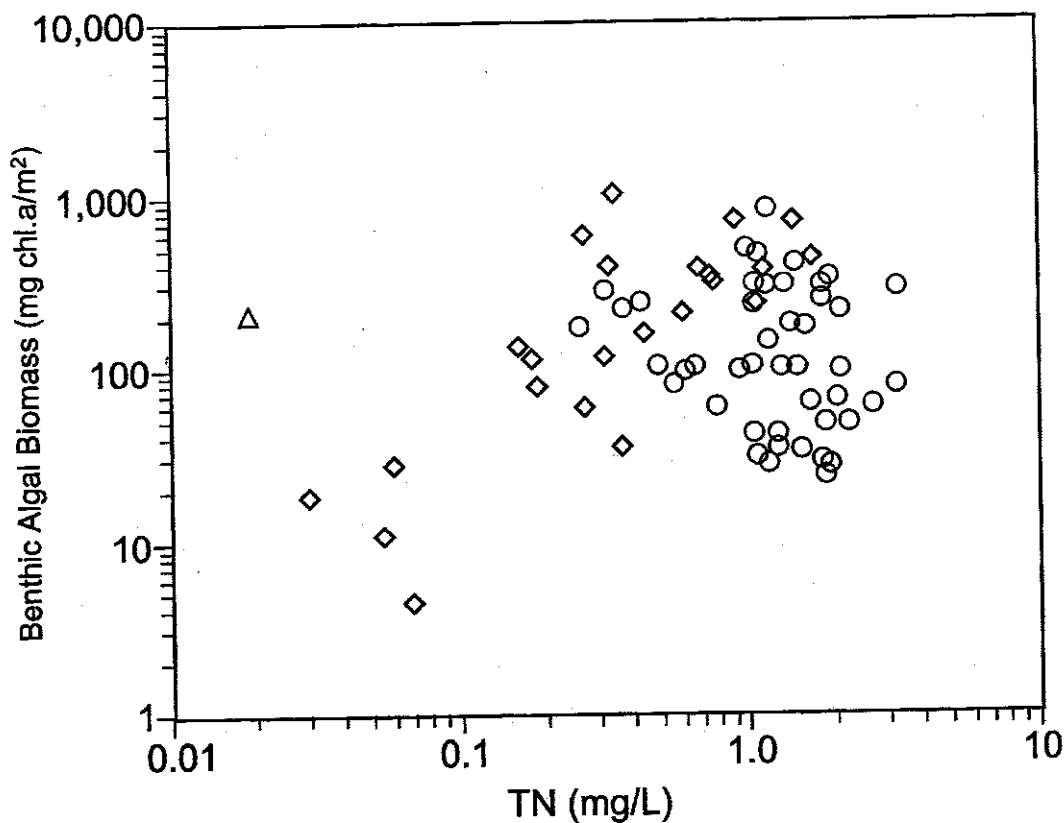


Figure 1. Total nitrogen (mg/L) versus benthic algal biomass (mg chlorophyll-a/m²) in the Ventura River Watershed. Data are for 2005 (circles) and 2009 (diamonds and triangle). Triangle indicates where chlorophyll-a was estimated from diel variation in dissolved oxygen, using a site specific model relating chlorophyll-a, discharge, and dissolved oxygen. All other chlorophyll-a values are reach means (10-12 transects per reach, 3 discrete chl.a samples per transect).

Figure 2 presents results from 5-day continuous (15-min) DO measurements at three sites in the Ventura River watershed characterized by different concentrations of nitrate, carried out in mid-September 2008 (nitrate values are in the legend). Below the wastewater treatment plant (WWTP) on the Ventura River, nitrate exceeded the Central Coast Board's proposed screening limit of 1.0 mg N/L. Above the WWTP as well as in a reference reach (located in the National Forest), nitrate was below the screening level. However, as demonstrated in Figure 2:

1. Nitrate alone does not predict minimum DO in this watershed (all three sites exhibit the same minimum DO, regardless of nitrate concentrations).
2. The diurnal range of DO varied in the reference reach from day to day, showing that factors other than nutrient concentrations and algal biomass influence daily swings in DO. Also, "oxygen deficit" was not a reliable indicator of *minimum* DO (which raises issues with the assumptions in the 2009 Technical Paper related to the stated requirement to use oxygen deficit from model output to select a screening tool).

3. Daily maximum DO was frequently over 13 mg/L (one of the parameters in monitoring data the 2009 Technical Paper considered indicative of biostimulation) at the reference site -- and higher on several days at the reference site where nitrate was lower than at the site below the WWTP where nitrate-N was above 1.0 mg N/L.
4. Daily *maximum* DO is not a reliable predictor of daily *minimum* DO. As such, the assumption in the 2009 Technical Paper that CCAMP monitoring data for mid-day DO (assumed proxy for maximum) is not a reliable proxy for daily minimum DO. It is the latter parameter that relates to beneficial use impairment.

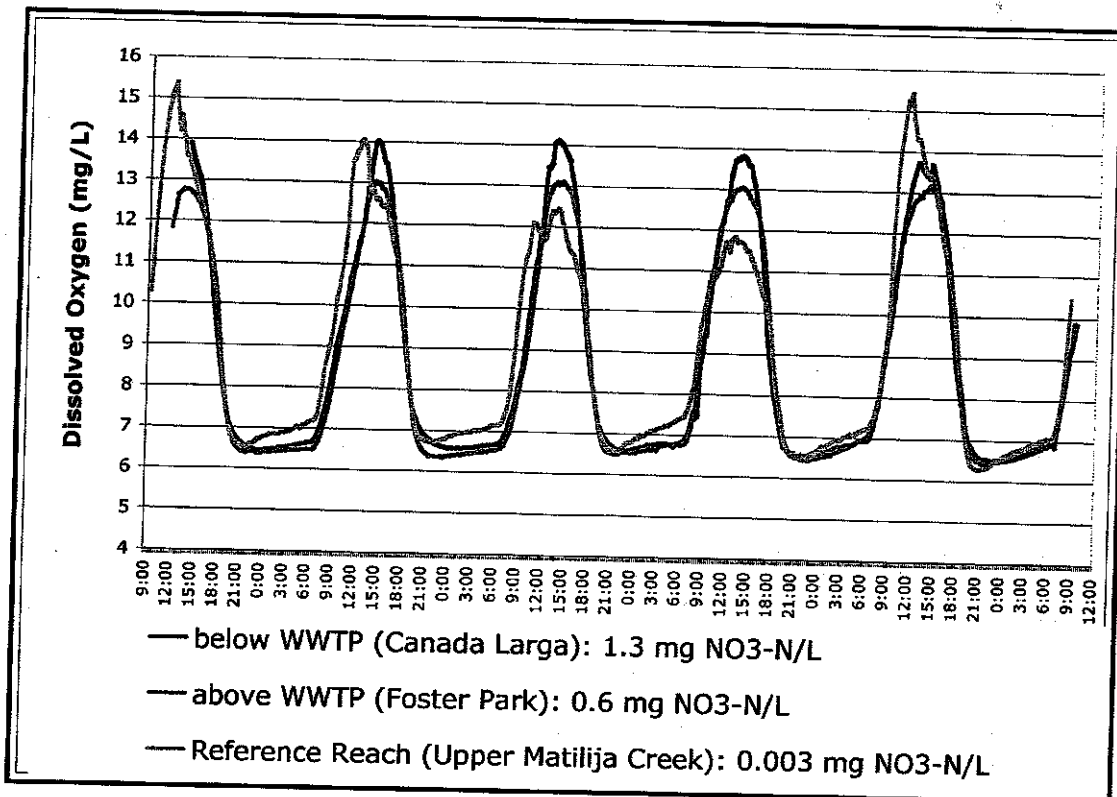


Figure 2. Diel oxygen variation at three sites in the Ventura River Watershed, Sept. 11-16, 2008.

Figure 3 presents a time series graph for eight years of monthly nitrate concentrations collected between 2001 and 2009 in a reference reach (in National Forest) in the Ventura River Watershed. Note that the concentrations of nitrate as N are quite low. The photos following Figure 3 present an algal bloom photographed in 2010 in late March at the same long-term reference sampling site. Note that the second photo is not an algae covered rope it is actually a long, thick rope of pure filamentous algae.

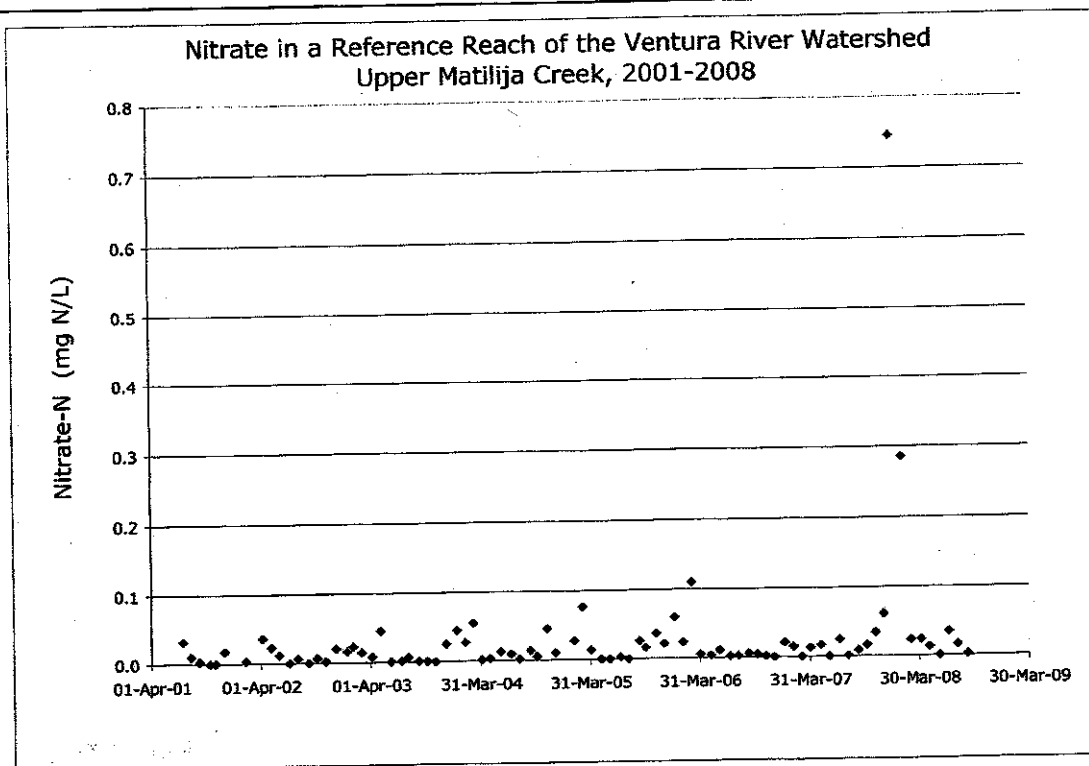
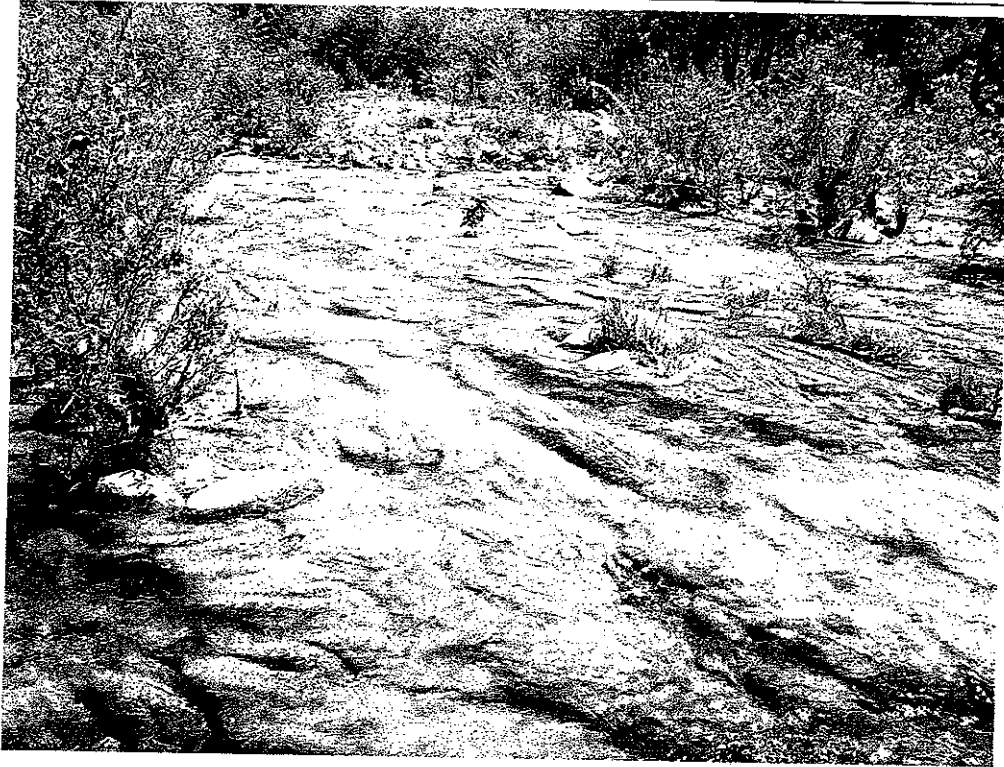


Figure 3. Monthly Nitrate Concentrations (2001-2009) in a Reference Reach of the Ventura River Watershed Located in a National Forest



As demonstrated by the data presented in **Figure 1** through **Figure 3**, the use of the results of NNE approach proposed as a listing guidance (1.0 mg/L nitrate as N) does not meet the requirement for demonstrating an evaluation guideline identifies a range above which impacts occur and below which no or few impacts are predicted. As such, the proposed listing presented in **Table 1** should be removed from the 2010 Integrated Report.

Summary

The 2006 NNE Report (page 1-5) acknowledges the challenges related to evaluating the potential affect of nutrients on aquatic life beneficial uses:

Except in extreme cases, nutrients alone do not impair beneficial uses. Rather, they cause indirect impacts through algal growth, low DO, and so on, that impair uses. **These impacts are associated with nutrients, but result from a combination of nutrients interacting with other factors** (emphasis added). Appropriate nutrient targets for a waterbody should take into account the interactions of these factors to the extent possible. For instance, the nutrient concentration that results in impairment in a high-gradient, shaded stream may be much different from the one that results in impairment in a low-gradient, unshaded stream. Instead of setting criteria solely in terms of nutrient concentrations, it is preferable to use an analysis that takes into account the risk of impairment of uses.

The approach contained within the 2006 NNE Report sought to address these issues. However, without careful application of the approach the potential exists that the results will not determine nitrate concentrations predictive of beneficial use impairments. This likely is one of the reasons the State Water Board is conducting case studies and subjecting them to a peer review so that the use of the NNE approach is not premature.

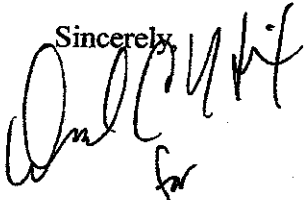
The generalized approach may be appropriate for developing screening criteria as a basis for identifying waterbodies for which a site-specific NNE should be evaluated. However, it is not appropriate, nor scientifically based, to set guidelines for listing. The CCRWQCB has access to the data necessary to evaluate streams on a site to site basis from the CCAMP and the Central Coast Agricultural Waiver Monitoring Program. Rather than taking a broad brush approach resulting in listings that require the development of TMDLs which are resource intensive for the State and stakeholders to develop and implement, the CCRWQCB should look at each waterbody on a reach by reach basis.

Given that the 2009 Technical Paper does not demonstrate the evaluation guideline of 1.0 mg/L nitrate as N is peer reviewed, nor is it well described, and given that it does not identify a range above which impacts occur and below which no or few impacts are predicted the 2009 Technical Paper does not meet the requirements of Section 6.1.3 of the Listing Policy. For these reasons a guideline of 1.0 mg/L nitrate as N is not appropriate for use in making listing decisions. As such, the proposed listings presented in **Table 1** should be removed from the 2010 Integrated

Report and the use of the 2009 Technical Paper as an evaluation guideline should be dismissed by the State Water Board.

In conclusion, the City would be happy to cooperate and provide assistance to the CCRWQCB as they work to develop NNE for the Central Coast. Our hope is that any future efforts be conducted through an open stakeholder process resulting in an approach and results that are appropriately peer reviewed. The City appreciates the opportunity to provide comments regarding the proposed 2010 Integrated Report. If you have any questions concerning this letter, please contact David Hix at (805) 781-7039.

Sincerely,



for
Carrie Mattingly
Utilities Director

C: Tess Dunham, Somach Simmons and Dunn
Chris Minton, Larry Walker Associates