Appendix N – Scientific Peer Review No. 2
Dr. David Jenkins
July 2004

N-1 Dr. Jenkins' Peer Review Comment Letter

N-2 Response to Peer Review No. 2 Comments

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July 19, 2004

Answers to Review Questions

1. Does the staff report adequately and correctly address the effects of nutrients in a freshwater stream system?

   Yes, in general….but you have not really made a very strong case relating the current N & P levels to any conditions that impair water quality and adversely effect any beneficial use except municipal water supply.

2. Are nutrient dynamics, including physical and chemical processes, and biological uptake and assimilation adequately and correctly addressed?

   Yes

3. Is the role of algae and its response to nutrients and other limiting factors adequately and correctly addressed?

   Yes (but see 1. above)

4. Based on existing information, has the hydrology of the watershed been adequately and correctly addressed?

   No comment, not in my area of expertise

5. Does the staff report adequately and correctly address the sources of nutrients in the watershed?

   Yes

6. Are data used in this report reliable and appropriate, and is the treatment of the data defensible?

   Yes

7. Please comment on the general validity of the approach used to calculate nutrient loading to the creek.

It is valid

8. Is the approach used to assign the load allocation reasonable?

   It is fair to reasonable to start with. However the Board should be open to future changes in allocations should it be shown far more economical to reduce nutrients from one sector than another

9. Have the correct data gaps been identified for ground water and septic system issues?

   Yes

10. Overall, is the submitted material scientifically sound and thorough, and does it support the Regional Board's proposed action?

    Yes and No (see 1 above)

    Other specific comments (by page (p.), paragraph (¶) and line (l).

    Executive Summary

p.iv ¶4, l 9	How do you define/measure that a water has a "susceptibility to excessive algae growth"?
p.iv ¶5	In ¶4 you stated that eutrophic conditions "have not been observed" yet here you state that resulting algae growth occurs.
p.iv-v last and first ¶'s	"Septic wastewater" is not discharged…it is domestic septic tank effluent.
p.v ¶3	Second sentence implies that there is a Drinking Water Standard for Total P!
p.v ¶4	1st sentence. State the current loads to which the N & P reductions are being made i.e. from ???? to ????
p.vi ¶1 l 2	I thought that there were 4 stages of implementation, yet here you state "second phase of implementation".
Ix point 8 l 6	How can the numeric target for total N = 1.0 mg/L while for NO_3-N (a component of total N) is 10 mg N/L??
xi point 14	The last sentence is hard to follow. Suggest rewrite as follows: Incremental reductions of the nutrient waste load are required throughout the subsequent 12-year period".

xv last ¶-xvi first ¶ is hard to understand. Suggest rewrite as follows " The annual loading of total nitrogen and total phosphorus to Rainbow Creek shall be reduced incrementally from the current loads of 3,868 kg/yr and 392 kg/yr respectively to ???? kg/yr and ??? kg/yr respectively by no later than [the end of the 16th year after USEPA approval] or until the applicable water quality objectives of 1 mg/L for total nitrogen and 0.1 mg/L for total phosphorus have been met.

p.2 ¶3 Only nitrate exceeds MUN, total P and total N do not. Reword to make this clear.

p.2 ¶4 l 5 "wastewater" not "waste".

p.2 ¶5 Remove the text concerning N_2 gas. It is unnecessary when discussing dissolved N and P forms. Confine your discussion to organic, ammonia, nitrite and nitrate N. I recommended that you do this in my first review of this TMDL.

p.3 ¶2 l 2,3 Phosphate minerals do not break down, they dissolve.

p.3 ¶2 l 6 Plants and algae do not urinate!

p.3 ¶3 l 2 "wastewater" not waste.

p.3 ¶3 l 7 Omit the 4th sentence. It is flat WRONG.

p.4 ¶2 last sentence Delete, it is repetition.

p.5 last ¶ last sentence and p.6 1st ¶, 1st sentence. Omit sentence, it is not needed and it is awkwardly stated.

p.6 ¶1 sentence 2 Omit it.

p.8 ¶2 This ¶ is unintelligible (to me)!

p.10 Fig 2-1 On both graphs show existing creek levels and target creek levels after TMDL has become fully effective.

p.11 You state that the 2000 monitoring data were taken to see whether the 1998-9 levels were being maintained and whether these levels were effectively limiting excessive algae growth. However nowhere in the next 2 pages of discussion of the monitoring results do you say a word concerning these objectives.

p.17 ¶1 l 2 You have absolutely no evidence of impairment of benthic communities by pesticides. Delete reference to pesticides.

p.17 ¶3 l 3 What does a “ratio of atomic weights” mean? I have never seen this term before. Do you mean mole ratio? If so use “mole ratio” because it is well-understood!

p.17 ¶3 l 10 All collections of data have high and low values. This is an utterly meaningless statement. Delete it.

p.26 Table 4-2 and Figure 4-2 It would be useful to try and estimate the individual contributions of the various land use categories in this table and figure.

p.29 ¶2 l 2 The statement “Phosphates are less soluble in water than total nitrogen components…” is wrong and irrelevant. Delete it.

pp 29 and 30 Table 4-4 and Figure 4-4. It would be useful to try and estimate the individual contributions of the various land use categories in this table and figure.

cc. G. Bowes
State Board\commentsLisa

Appendix N – Scientific Peer Review No. 2
N-2 Response to Peer Review No. 2 Comments

Part 1: Answers to Review Questions

A list of scientific issues was provided to the Peer the Reviewer in the Request for Additional Peer Review Letter. This list of scientific issues was the same as the list that was provided in the first request in November 2001. Not all of the issues necessarily applied to the revisions that were made since the first review. The peer reviewer was asked to consider these questions again in performing this additional review of the Technical Report as appropriate.

Comment:

1. Does the staff report adequately and correctly address the effects of nutrients in a freshwater stream system?

Yes, in general….but you have not really made a very strong case relating the current N & P levels to any conditions that impair water quality and adversely effect any beneficial use except municipal water supply.

Response:

Water quality objective exceedances of nitrate, total nitrogen, and total phosphorus concentrations provide a sufficiently strong case for water quality impairment of Rainbow Creek and the need for TMDL establishment. The case remains as follows:

1. Nitrate concentrations in Rainbow Creek exceed the water quality objective for municipal supply (MUN);
2. Total nitrogen and total phosphorus concentrations exceed the water quality objective for biostimulatory substances, and threaten to unreasonably impair the water quality necessary for warm freshwater habitat (WARM), cold freshwater habitat (COLD), and wildlife habitat (WILD) beneficial uses of Rainbow Creek; and
3. Excessive nutrient levels in Rainbow Creek promote the growth of algae in localized areas, creating a nuisance condition, that unreasonably interferes with aesthetics and contact and non-contact water recreation (REC1, REC2) and threatens to impair WARM, COLD and WILD beneficial uses.

Sufficient water quality data is presented to support these points. Photographic documentation is presented and supports the existence of nuisance algal growth. Reference water quality data of San Diego streams are presented and support that target nutrient levels are realistic. Scientific literature support that the proposed numeric targets are in the same range as nutrient levels that have been found to prevent excess algal growth. Biological surveys show that the aquatic insect population is impaired and scientific literature indicates nutrient enrichment as a possible cause of such changes in aquatic insect communities.

Comment:
2. Are nutrient dynamics, including physical and chemical processes, and biological uptake and assimilation adequately and correctly addressed?

Yes

Response:
Comment noted.

Comment:
3. Is the role of algae and its response to nutrients and other limiting factors adequately and correctly addressed?

Yes (but see 1. above)

Response:
Comment noted. Refer to comment response 1.

Comment:
4. Based on existing information, has the hydrology of the watershed been adequately and correctly addressed?

No comment, not in my area of expertise

Response:
No response necessary.

Comment:
5. Does the staff report adequately and correctly address the sources of nutrients in the watershed?

Yes

Response:
Comment noted.

Comment:
6. Are data used in this report reliable and appropriate, and is the treatment of the data defensible?

Yes

Response:
Comment noted.

Comment:
7. Please comment on the general validity of the approach used to calculate nutrient loading to the creek.

It is valid

Response:
Comment noted.

Comment:
8. Is the approach used to assign the load allocation reasonable?

It is fair to reasonable to start with. However the Board should be open to future changes in allocations should it be shown far more economical to reduce nutrients from one sector than another

Response:

The Regional Board agrees and the Implementation Plan has been written to include opportunities for evaluation of and revisions to the TMDLs, allocations, and implementation.

Comment:
9. Have the correct data gaps been identified for ground water and septic system issues?

Yes

Response:
Comment noted.

Comment:

10. Overall, is the submitted material scientifically sound and thorough, and does it support the Regional Board's proposed action?

Yes and No (see 1 above)

Response:

Comment noted. Refer to comment response 1.

Part 2: Other specific comments (by page (p.), paragraph (¶), and line (l)).

Executive Summary	
p.iv, ¶4, l 9	**Comment:** How do you define/measure that a water has a "susceptibility to excessive algae growth"? **Response:** "Susceptibility" is the term used to describe the segments of the creek that were observed to be prone to large quantities of algae, primarily filamentous green algae in the water column and/or attached to the substrate.
p.iv, ¶5	**Comment:** In ¶4 you stated that eutrophic conditions "have not been observed" yet here you state that resulting algae growth occurs. **Response:** Large quantities of filamentous green algae were observed attached to the substrate and in the water column, while eutrophic conditions, such as offensive odors and fish kills, were not observed.
p.iv-v last and first ¶'s	**Comment:** "Septic wastewater" is not discharged…it is domestic septic tank effluent. **Response:** Under the Porter-Cologne Water Quality Control Act (Porter-Cologne) [California Water Code §13000 et seq.], wastewater from septic tanks is considered to be a "waste" that is "discharged".

Executive Summary	
p.v, ¶3	**Comment:** Second sentence implies that there is a Drinking Water Standard for Total P! **Response:** The word "similarly" has been replaced with "also". The sentence now reads as follows: "The initial reductions will be implemented to meet the nitrates in the drinking water quality objective and also reduce phosphorus concentrations."
p.v, ¶4	**Comment:** 1st sentence. State the current loads to which the N & P reductions are being made i.e. from ???? to ???? **Response:** The current load estimates have been added to the sentence.
p.vi, ¶1, l 2	**Comment:** I thought that there were 4 stages of implementation, yet here you state "second phase of implementation". **Response:** The revised implementation plan specifies a phased-reduction schedule, of which there are four phases. The statement regarding a "second phase of implementation" has been corrected.
Resolution	
p.ix, point 8, l 6	**Comment:** How can the numeric target for total N = 1.0 mg/L while for NO_3-N (a component of total N) is 10 mg N/L?? **Response:** The two numeric targets identified in the comment are based on two water quality objectives that have different purposes. The water quality objective for inorganic chemicals in municipal supplies states that nitrate in domestic or municipal water supplies should not exceed 10 mg NO_3-N/L and is based on human health toxicity in infants. The water quality objective for biostimulatory substances addresses tolerance levels for algal and emergent plant growth by limiting total nitrogen and total phosphorus. The purpose of this water quality objective is to prevent nuisance or adverse effects on beneficial uses (i.e., recreation, aquatic life, and wildlife).

Resolution

	Comment:
p.xi, point 14	The last sentence is hard to follow. Suggest rewrite as follows: Incremental reductions of the nutrient waste load are required throughout the subsequent 12-year period".
	Response:
	The recommended change has been incorporated.

Basin Plan Amendment

	Comment:
p. xv, last ¶ - p. xvi, first ¶	is hard to understand. Suggest rewrite as follows " The annual loading of total nitrogen and total phosphorus to Rainbow Creek shall be reduced incrementally from the current loads of 3,868 kg/yr and 392 kg/yr respectively to ???? kg/yr and ??? kg/yr respectively by no later than [the end of the 16th year after USEPA approval] or until the applicable water quality objectives of 1 mg/L for total nitrogen and 0.1 mg/L for total phosphorus have been met.
	Response:
	The recommended change has been incorporated.

2.0 Problem Statement

	Comment:
p.2, ¶3	Only nitrate exceeds MUN, total P and total N do not. Reword to make this clear.
	Response:
	The first paragraph of the Problem Statement has been reworded.
	Comment:
p.2, ¶4, l 5	"wastewater" not "waste".
	Response:
	The use of the term "waste" is appropriate in accordance with Porter-Cologne Water Quality Control Act that defines "waste" as … "sewage and any and all other waste substances, liquid, solid, gaseous, or radioactive, associated with human habitation" [CWC § 13050(d)].

2.0 Problem Statement	
	Comment:
p.2, ¶5	Remove the text concerning N_2 gas. It is unnecessary when discussing dissolved N and P forms. Confine your discussion to organic, ammonia, nitrite and nitrate N. I recommended that you do this in my first review of this TMDL.
	Response:
	The recommended change has been incorporated into Section 2.1.
	Comment:
p.3, ¶2, l 2,3	Phosphate minerals do not break down, they dissolve.
	Response:
	The sentence in the third paragraph of Section 2.1 has been reworded.
	Comment:
p.3, ¶2, l 6	Plants and algae do not urinate!
	Response:
	Urinating plants and animals is not implied in this sentence. Rather, the sentence states that organic phosphorus moves through the food web when organisms ingest plants and algae (which contain organic phosphorus) and then excrete phosphate (e.g., urine or other waste) making it once again available for plant and algae uptake. The third paragraph of Section 2.1 has been reworded to clarify this point.
	Comment:
p.3, ¶3, l 2	"wastewater" not waste.
	Response:
	The use of the term "waste" is consistent with the definitions of the Porter-Cologne Water Quality Control Act [CWC § 13050(d)].
	Comment:
p.3, ¶3, l 7	Omit the 4th sentence. It is flat WRONG.
	Response:
	The sentence in the last paragraph of Section 2.1 has been deleted.

2.0 Problem Statement	
p.4, ¶2, last sentence	**Comment:** Delete, it is repetition. **Response:** The last sentence of the third paragraph of Section 2.2 has been deleted.
p.5, last ¶, last sentence and p.6, 1st ¶, 1st sentence.	**Comment:** Omit sentence, it is not needed and it is awkwardly stated. **Response:** The sentence in the first paragraph of Section 2.3 has been deleted.
p.6, ¶1, sentence 2	**Comment:** Omit it. **Response:** The sentence in the first paragraph of Section 2.3 has been deleted.
p.8, ¶2	**Comment:** This ¶ is unintelligible (to me)! **Response:** The paragraph titled "USEPA's Recommended Ecoregional Nutrient Criteria" in Section 2.4 was added in response to public comments that the numeric goals set in the water quality objective for biostimulatory substances were unreasonably low and had no basis in science. The referenced paragraph is a summary of the empirically derived nutrient criteria recommended by the USEPA for the San Diego Region to address the prevention and assessment of eutrophic conditions. The paragraph summarizes the statistical analyses performed on the data used to derive the criteria.
p.10, Fig 2-1	**Comment:** On both graphs show existing creek levels and target creek levels after TMDL has become fully effective. **Response:** The recommended change has been incorporated.

2.0 Problem Statement	
p.11	**Comment:** You state that the 2000 monitoring data were taken to see whether the 1998-9 levels were being maintained and whether these levels were effectively limiting excessive algae growth. However nowhere in the next 2 pages of discussion of the monitoring results do you say a word concerning these objectives. **Response:** A sentence has been added to Section 2.5 to address this issue.
p.17, ¶1, l 2	**Comment:** You have absolutely no evidence of impairment of benthic communities by pesticides. Delete reference to pesticides. **Response:** The reference to pesticides has been deleted from Section 2.7.
3.0 Numeric Targets	
p.17, ¶3, l 3	**Comment:** What does a "ratio of atomic weights" mean? I have never seen this term before. Do you mean mole ratio? If so use "mole ratio" because it is well-understood! **Response:** The recommended change has been incorporated into the second paragraph of Section 3.0.
p.17, ¶3, l 10	**Comment:** All collections of data have high and low values. This is an utterly meaningless statement. Delete it. **Response:** The recommended change has been incorporated into the second paragraph of Section 3.0.

4.0 Source Assessment	
p.26, Table 4-2 and Figure 4-2	**Comment:** It would be useful to try and estimate the individual contributions of the various land use categories in this table and figure. **Response:** Table 4-2 and Figure 4-2 provide summary information for the section. The individual contribution estimates of each land use category are provided in Table 4-1 and Figure 4-1.
p.29, ¶2, l 2	**Comment:** The statement "Phosphates are less soluble in water than total nitrogen components…" is wrong and irrelevant. Delete it. **Response:** The statement in Section 4.2.2 has been deleted.
pp. 29 and 30, Table 4-4 and Figure 4-4.	**Comment:** It would be useful to try and estimate the individual contributions of the various land use categories in this table and figure. **Response:** Table 4-4 and Figure 4-4 provide summary information for the section. The individual contribution estimates of each land use category are provided in Table 4-3 and Figure 4-3.