CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

RESOLUTION NO. R9-2005-0036

A RESOLUTION ADOPTING AN AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR THE SAN DIEGO REGION (9) TO INCORPORATE TOTAL MAXIMUM DAILY LOADS (TMDLs) FOR TOTAL NITROGEN AND TOTAL PHOSPHORUS IN THE RAINBOW CREEK WATERSHED, SAN DIEGO COUNTY

WHEREAS, The California Regional Water Quality Control Board, San Diego Region (hereinafter, Regional Board), finds that:

1. **BASIN PLAN AMENDMENT:** The proposed amendment of the Water Quality Control Plan for the San Diego Region (Basin Plan) described in the recitals below was developed in accordance with California Water Code §13240 et seq.

2. **NECESSITY STANDARD [Government Code §11353(b)]:** This regulatory action meets the "Necessity" standard of the Administrative Procedures Act, Government Code, §11353, subdivision (b). Amendment of the Basin Plan to establish and implement total maximum daily loads (TMDLs) for Rainbow Creek is necessary because water quality in Rainbow Creek does not meet applicable water quality objectives for total nitrogen and total phosphorus (hereinafter nutrients) even with implementation of waste discharge requirements containing technology based effluent limits or water quality based effluent limits for discharges of pollutants to Rainbow Creek and its tributaries. These TMDLs for nutrients are necessary to ensure attainment of applicable water quality objectives and restoration of beneficial uses designated for Rainbow Creek.

3. **CLEAN WATER ACT SECTION 303(d):** Rainbow Creek is identified on the Clean Water Act Section 303(d) list of impaired waters due to excessive nutrient concentrations. Section 303(d) requires the Regional Board to develop and implement TMDLs under the conditions that exist in Rainbow Creek.

4. **BENEFICIAL USE IMPAIRMENTS**: Rainbow Creek supports a multitude of beneficial uses. The most sensitive beneficial uses are those designated for protection of aquatic life as described in the Basin Plan definition of the COLD and WARM beneficial uses. The municipal supply (MUN), warm freshwater habitat (WARM), cold freshwater habitat (COLD), wildlife habitat (WILD), contact water recreation (REC-1), and non-contact water recreation (REC-2) are threatened or impaired due to excessive levels of nutrients.

5. **WATER QUALITY OBJECTIVES**: The Basin Plan establishes that inland surface waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect beneficial uses. The Basin Plan establishes the following numerical water quality objective for biostimulatory substances for the protection of the COLD and WARM beneficial uses:

   Total Nitrogen 1.0 mg/L
   Total Phosphorus 0.1 mg/L

   These values are not to be exceeded more than 10% of the time unless studies of the specific water body in question clearly show that water quality objective changes are permissible and changes are approved by the Regional Board.

   The Basin Plan establishes that waters designated for use as domestic or municipal supply shall not contain concentrations of nitrate in excess of the maximum contaminant levels set forth in California Code of Regulations, Title 22. The maximum contaminant level (MCL) for nitrate (as nitrogen) is 10 mg/L.

6. **WATER QUALITY OBJECTIVE VIOLATIONS:** Concentrations for nutrients in Rainbow Creek routinely exceed applicable water quality objectives for nutrients and nitrate. Sampling surveys conducted by the Regional Board in Rainbow Creek in Year 2000 documented water column concentrations as high as 21 mg/L of nitrate as nitrogen, 23 mg/L of total nitrogen and 1.7 mg/L of total phosphorus.

7. **ADVERSE EFFECTS OF NUTRIENTS:** An overload of nutrients can result in an imbalance of the natural cycling processes and can lead to problems ranging from annoyance due to an overabundance of algae and emergent vegetation to human health problems and adverse ecological effects. Nutrient concentrations in Rainbow Creek appear to be contributing to excessive algal growth. Excessive algae present a nuisance that threatens to impair aesthetic and recreational uses (REC1 and REC2). Excessive algae can create conditions that are harmful to aquatic life and degrade water quality, and threaten to impair warm water (WARM), cold water (COLD), and wildlife (WILD) beneficial uses.

8. **NUMERIC TARGETS:** TMDL Numeric Targets interpret and implement water quality standards (i.e., numeric and narrative water quality objectives and beneficial uses) and are established at levels necessary to achieve water quality standards. The Regional Board has set the total nitrogen and total phosphorus TMDL Numeric Targets for both the numeric and narrative water quality objectives equal to the numeric water quality objectives cited in Finding 5. The numeric targets for nitrate (as nitrogen) is 10 mg/L, total nitrogen is 1.0 mg/L and total phosphorus is 0.1 mg/L. Attainment of the TMDL numeric targets will result in attainment of water quality standards in Rainbow Creek.

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9. **TOTAL MAXIMUM DAILY LOADS [40 CFR 130.2(i)]:** The Total Maximum Daily Loads (TMDLs) for total nitrogen and total phosphorus discharges into Rainbow Creek are calculated to be 1,658 kilograms of nitrogen per year (kg N/yr) and 165 kilograms of phosphorus per year (kg P/yr). The TMDLs are equal to the assimilative or Loading Capacity (LC) of Rainbow Creek for total nitrogen and total phosphorus and are defined as the maximum amount of total nitrogen and total phosphorus that Rainbow Creek can receive and still attain water quality objectives and protection of designated beneficial uses. The TMDLs are comprised of the sum of all individual Wasteload Allocations (WLAs) for point source discharges of nutrients, the sum of all Load Allocations (LAs) for nonpoint source discharges of nutrients, and natural background. The TMDLs include a margin of safety (MOS) that takes into account any uncertainties in the TMDL calculation. (i.e. TMDL = LC = $\sum$ WLAs + $\sum$ LAs + MOS). The TMDL calculations also account for seasonal variations and critical conditions.

10. **ALLOCATIONS AND REDUCTIONS:** A 74 percent (74%) overall reduction of total nitrogen loading and an 85 percent (85%) overall reduction of total phosphorus to Rainbow Creek are required to meet the TMDLs of 1,658 kg N/yr and 165 kg P/yr. The assigned allocations from each source translate into a percent reduction of nutrients from current loading.

Percent Reduction by Source	Total Nitrogen	Total Phosphorus
Point Sources		
Caltrans	68%	64%
Nonpoint Sources		
Commercial Nurseries	77%	90%
Agricultural Fields	77%	90%
Orchards	77%	90%
Park	50%	50%
Residential Areas	77%	90%
Urban Areas	50%	50%
Septic Tank Disposal Systems	77%	Not Applicable

11. **DISCHARGERS:** The Regional Board has identified Caltrans, County of San Diego, commercial nurseries, agricultural fields, orchards, parks, residential areas, urban areas, and septic tank disposal systems as causing or permitting the discharge of total nitrogen and total phosphorus to Rainbow Creek.

12. **IMPLEMENTATION ACTIONS**: Strategies that the Regional Board could take to implement the TMDL are described in the *Basin Plan Amendment and Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads For Rainbow Creek, dated February 9, 2005*.

13. **IMPLEMENTATION MONITORING:** Water quality monitoring will be required to evaluate the overall TMDL implementation effectiveness and success in attaining nutrient water quality objectives in Rainbow Creek and its tributaries.

14. **COMPLIANCE SCHEDULE:** Nutrient wasteload and load reductions are required over a 16-year phased compliance schedule period. The first four-year phase consists of nutrient reductions to attain the nitrate water quality objective and reduced phosphorus concentrations in Rainbow Creek. Incremental reductions of nutrient load are required throughout the subsequent 12-year period.

15. **SCIENTIFIC PEER REVIEW:** The scientific basis of this Basin Plan amendment has undergone external peer review pursuant to Health and Safety Code Section 57004. The Regional Board has considered and responded to all comments submitted by the peer review panel.

16. **STAKEHOLDER PARTICIPATION:** Interested persons and the public have had reasonable opportunity to participate in the development of this amendment to the Basin Plan. Efforts to solicit public review and comment include four (4) public workshops held between April 1999 and December 2004; two (2) public review and comment periods of at least 45 days preceding the Regional Board public hearing; and written responses from the Regional Board to oral and written comments received from the public.

17. **ECONOMIC ANALYSIS:** The Regional Board has considered the costs of implementing this Basin Plan amendment, and finds these costs to be reasonable relative to the water quality benefits derived from implementing the amendment.

18. **CEQA REQUIREMENTS:** The Basin Planning process has been certified as functionally equivalent to the California Environmental Quality Act (CEQA) requirements for preparing environmental documents and is, therefore, exempt from those requirements (Public Resources Code Section 21000 et seq.). The required environmental documents (Basin Plan amendment, staff report, and environmental checklist) have been prepared.

19. **DE MINIMIS ENVIRONMENTAL EFFECTS**: This Basin Plan amendment results in no potential for adverse effect, either individually or cumulatively, on fish and wildlife resources or the habitat upon which they depend. Any and all effects on the environment are expected to be beneficial.

20. **PUBLIC NOTICE**: The Regional Board has notified all known interested parties and the public of its intent to consider adoption of this Basin Plan amendment in accordance with Water Code Section 13244.

21. **PUBLIC HEARING:** The Regional Board has, at public meetings on May 8, 2002 and December 8, 2004, held public hearings and heard and considered all comments

pertaining to this Basin Plan amendment.

NOW, THEREFORE, BE IT RESOLVED that

1. **AMENDMENT ADOPTION**: The Regional Board hereby adopts this amendment to the Basin Plan to incorporate the Rainbow Creek Total Nitrogen and Total Phosphorus TMDLs as set forth in Attachment A hereto.

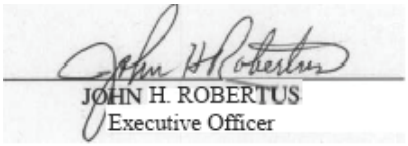
2. The Regional Board hereby approves the report *Basin Plan Amendment and Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads For Rainbow Creek, dated February 9, 2005*.

3. **CERTIFICATE OF FEE EXEMPTION**: The Executive Officer is authorized to sign a Certificate of Fee Exemption.

4. **AGENCY APPROVALS:** The Executive Officer is directed to submit the Basin Plan amendment to the State Water Resources Control Board (State Board) in accordance with California Water Code Section 13245. The Regional Board requests that the State Board approve the Basin Plan amendment and forward it to Office of Administrative Law (OAL) and the United States Environmental Protection Agency for approval.

5. **NON-SUBSTANTIVE CORRECTIONS:** If, during the approval process for this amendment, the State Board or OAL determines that minor, non-substantive corrections to the language of the amendment are needed for clarity or consistency, the Executive Officer may make such changes, and shall inform the Regional Board of any such changes.

I, John H. Robertus, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, San Diego Region, on February 9, 2005.



JOHN H. ROBERTUS
Executive Officer

ATTACHMENT A
TO RESOLUTION NO. R9-2005-0036
BASIN PLAN AMENDMENT

This Basin Plan Amendment establishes Total Maximum Daily Loads (TMDLs) and associated wasteload and load reductions for nutrients in Rainbow Creek, a tributary of the Santa Margarita River. This Amendment includes a program to implement the TMDLs and to monitor their effectiveness. Chapters 2, 3, and 4 of the Basin Plan are amended as follows:

1. **Chapter 2, Beneficial Uses**
   Table 2-2. ***Beneficial Uses of Inland Surface Waters, Santa Margarita River Watershed, Rainbow Creek, Hydrologic Unit Basin Numbers 2.23 and 2.22.***

Add the following footnote 3 to Rainbow Creek, Hydrologic Unit Basin Numbers 2.23 and 2.22:

> [3]Rainbow Creek is designated as an impaired water body for total nitrogen and total phosphorus pursuant to Clean Water Act Section 303(d). Total Maximum Daily Loads (TMDLs) have been adopted to address these impairments. See Chapter 3, Water Quality Objectives for Biostimulatory Substances and Chapter 4, Total Maximum Daily Loads.

2. **Chapter 3, Water Quality Objectives**
   Inland Surface Waters, Enclosed Bays and Estuaries, Coastal Lagoons, and Ground Waters

   Water Quality Objectives for Biostimulatory Substances:

Insert the following as new paragraph 5:

> Rainbow Creek is designated as an impaired water body for total nitrogen and total phosphorus pursuant to Clean Water Act Section 303(d). Total Maximum Daily Loads (TMDLs) have been adopted to address these impairments. See Chapter 2, Beneficial Uses Table 2-2. Beneficial Uses of Inland Surface Waters, Santa Margarita River Watershed, Rainbow Creek, Hydrologic Unit Basin Numbers 2.23 and 2.22, Footnote 3 and Chapter 4, Total Maximum Daily Loads.

3. **Chapter 4, Implementation**

Add the following new section to Chapter 4:

TOTAL MAXIMUM DAILY LOADS

Total Maximum Daily Loads (TMDLs) for Total Nitrogen and Total Phosphorus in the Rainbow Creek Watershed

On February 9, 2005, the Regional Board adopted Resolution No. R9-2005-0036, A Resolution Adopting An *Amendment To The Water Quality Control Plan For The San Diego Region (9) To Incorporate Total Maximum Daily Loads (TMDLs) For Total Nitrogen and Total Phosphorus In The Rainbow Creek Watershed, San Diego County*. The Basin Plan Amendment was subsequently approved by the State Water Resources Control Board on November 16, 2005, the Office of Administrative Law on February 1, 2006, and the United States Environmental Protection Agency on March 22, 2006.

The TMDL is described in the Basin Plan Amendment and Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads For Rainbow Creek, dated February 9, 2005.

Problem Statement

Nitrate, total nitrogen, and total phosphorus concentrations in Rainbow Creek exceed the Inorganic Chemicals nitrate and Biostimulatory Substances water quality objectives. These exceedances threaten to unreasonably impair the municipal supply (MUN), warm freshwater habitat (WARM), cold freshwater habitat (COLD), and wildlife habitat (WILD) beneficial uses of Rainbow Creek. 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. State highways, agricultural fields and orchards, commercial nurseries, residential and urban areas, and septic tank disposal systems contribute to increased nutrient levels in Rainbow Creek as a result of storm water runoff, irrigation return flows, and ground water contributions to the creek.

Numeric Targets

The Numeric Targets for nitrate, total nitrogen, and total phosphorus are set equal to the Inorganic Chemicals nitrate water quality objective for municipal water supply and the numeric goals of the Biostimulatory Substances water quality objective as defined in the Basin Plan and shown below.

Table 4 - A. Rainbow Creek Nitrate, Total Nitrogen, and Total Phosphorus Numeric Targets

Constituent	Water Quality Objective	Numeric Target
Nitrate (as nitrogen)	10 mg NO_3-N/L	10 mg NO_3-N/L
Total Nitrogen	1.0 mg N/L	1.0 mg N/L
Total Phosphorus	0.1 mg P/L	0.1 mg P/L

If the Inorganic Chemicals nitrate and Biostimulatory Substances water quality objectives in Rainbow Creek are modified in the future then the TMDL will be recalculated and the numeric targets will be set equal to the new water quality objectives.

Source Assessment

Seventy-nine percent (79%) and seventy percent (70%) of total nitrogen and total phosphorus mass loading, respectively, are attributable to controllable sources, which include certain land use activities, septic tank disposal systems (total nitrogen only), and Interstate 15 (I-15). The land use activities include commercial nurseries, agricultural fields, orchards, residential areas, urban areas, and park areas. Background and direct atmospheric deposition are not considered to be controllable sources.

Table 4 - B. Summary of Total Nitrogen and Total Phosphorus Sources to Rainbow Creek

Source	Total Nitrogen Mass Load (kg N/yr)	Percent Contribution (% N)	Total Phosphorus Mass Load (kg P/yr)	Percent Contribution (% P)
Land Uses Runoff	2,662	69	262	66
Background	779	20	116	29
Septic Tank Disposal Systems	200	5	0	0
I-15 Runoff (Caltrans)	153	4	14	4
Direct Atmospheric Deposition	40	1	2	1
Combined Sources	**3,834**	**100**	**394**	**100**

Total Maximum Daily Loads or Loading Capacity

The TMDLs for nutrients in Rainbow Creek are 1,658 kg N/yr for total nitrogen and 165 kg P/yr for total phosphorus in order to attain and maintain the Inorganic Chemicals – Nitrate and Biostimulatory Substances water quality objective in Rainbow Creek waters.

The annual loading limit of total nitrogen and total phosphorus to Rainbow Creek shall be reduced incrementally from the current load of 3,834 kg/yr and 394 kg/yr, respectively, to 1,658 kg/yr and 165 kg/yr, respectively, by no later than December 31, 2021. The annual nutrient loading limits to be attained by December 31, 2021 is listed in Table 4-C.

Table 4 - C. Annual Nutrient Loading Capacity and Compliance Date

TMDL	December 31, 2021[1]	
Total Nitrogen – Annual Load	1,658 kg/yr	3,648 lbs./yr
Total Phosphorus – Annual Load	165 kg/yr	365 lbs./yr

[1] Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is reasonable and feasible.

Margin of Safety

Explicit and implicit margins of safety (MOS) were considered for these TMDLs. An explicit MOS of 5% is reserved to account for uncertainties and calculated to be 83 kg/year total nitrogen and 8 kg/year total phosphorus. An implicit MOS has been incorporated through conservative assumptions in the analysis.

Load Allocations and Wasteload Allocations

A seventy-four percent (74%) and an eighty-five percent (85%) overall reduction of total nitrogen and total phosphorus loading, respectively, to Rainbow Creek is required to meet the TMDLs described in Table 4 – C.

The load allocations for the initial annual loading are provided in Table 4 – D.1. and D.2., below. A margin of safety (MOS) of 5% is subtracted from this nutrient TMDL to account for unknowns, errors in assumptions, and potential future development in the watershed. This 5% is reserved for unknowns and is not allocated to any source. Allocations (other than for background and margin of safety) will be further reduced by 20% every 4 years until the biostimulatory targets for nitrogen and phosphorus are met. In the event that a nonpoint source becomes a permitted discharge, the portion of the load allocation that is associated with the source can become a wasteload allocation.

Table 4 – D.1. Annual Total Nitrogen Allocations for Rainbow Creek

Source	Annual Total Nitrogen Load Allocations			
	2009 kg/yr[1]	**2013 kg/yr[1]**	**2017 kg/yr[1]**	**2021 kg/yr[1]**
Load Allocations (LA)				
Commercial nurseries	390	299	196	116
Agricultural fields	504	386	253	151
Orchards	607	465	305	182
Park	5	3	3	3
Residential areas	507	390	260	149
Urban areas	40	27	27	27
Septic tank disposal systems	200	100	46	46
Air deposition	40	40	40	40
Wasteload Allocations (WLA)				
Caltrans highway runoff	118	90	59	49
Unidentified & future point sources	33	33	33	33
Total LA & WLA	**2,444**	**1,833**	**1,222**	**796**
Background[2]	779	779	779	779
MOS (not allocated)	83	83	83	83
Total	**3,306**	**2,695**	**2,084**	**1,658**

[1] To calculate pounds per year, multiply by 2.2.
[2] Background is calculated based on reference concentrations in San Diego streams and Rainbow Creek annual flow volumes.

Table 4 – D.2. Annual Total Phosphorus Allocations for Rainbow Creek

Source	Annual Total Phosphorus Load Allocations			
	2009 kg/yr[1]	2013 kg/yr[1]	2017 kg/yr[1]	2021 kg/yr[1]
Load Allocations (LA)				
Commercial nurseries	20	16	10	3
Agricultural fields	28	21	14	4
Orchards	50	37	24	6
Park	0.15	0.10	0.10	0.10
Residential areas	99	74	47	12
Urban areas	9	6	6	6
Air deposition	2	2	2	2
Wasteload Allocations (WLA)				
Caltrans highway runoff	11	8	5	5
Unidentified & future point sources	3	3	3	3
Total LA & WLA	**223**	**167**	**111**	**41**
Background[2]	116	116	116	116
Margin of Safety (not allocated)	8	8	8	8
Total	**346**	**291**	**235**	**165**

[1] To calculate pounds per year, multiply by 2.2.
[2] Background is calculated based on reference concentrations in San Diego streams and Rainbow Creek annual flow volumes.

Recalculations if Water Quality Objectives Change

If the water quality objectives for Biostimulatory Substances are changed in the future, then the MOS, TMDL and allocations and reductions will be recalculated using the method shown in Appendix D of the Basin Plan.

TMDL Implementation Action Plan

The necessary actions to implement the TMDLs are described in Section 9 of the *Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads (TMDLs) in Rainbow Creek*, dated February 9, 2005 and listed below.

A. Regional Board Actions

1. **Caltrans – Incorporate Wasteload Allocations in NPDES Storm Water Permit**
   The Regional Board shall request that the State Water Resources Control Board

amend the Caltrans statewide NPDES storm water permit[1] to include the following requirements:

a. MS4 discharges to Rainbow Creek shall not exceed the following wasteloads for nitrogen and phosphorus:

Nitrogen Wasteload	Phosphorus Wasteload	Compliance Due Date
118 kg N/yr[1]	11 kg P/yr[1]	December 31, 2009
90 kg N/yr[1]	8 kg P/yr[1]	December 31, 2013
59 kg N/yr[1]	5 kg P/yr[1]	December 31, 2017
49 kg N/yr[1]	5 kg P/yr[1]	December 31, 2021

b. A directive to submit annual progress reports to the Regional Board detailing progress made on attaining the nutrient wasteload reductions in Rainbow Creek. The report shall be due on April 1 of each year shall be incorporated within Section 2, Program Management of Caltrans MS4 Order No. 99-06-DWQ, NPDES No. CAS000003. Reporting shall continue on an annual basis until the nutrient water quality objective is attained in Rainbow Creek.

2. **County of San Diego – Issue Water Code Governmental Water Quality Investigation Request Order for Nutrient Reduction and Management Plan** The Regional Board shall issue an Order under CWC §13225 requiring the County of San Diego to investigate excessive levels of nutrients in Rainbow Creek and feasible management strategies to reduce nutrient loading in Rainbow Creek. A Nutrient Reduction and Management Plan (NRMP) for the Rainbow Creek watershed containing the elements described below in Section C, County of San Diego Nutrient Reduction Management Plan Elements, would satisfy such an Order. The County may submit alternative or additional elements equivalent to those described in Section C that would result in equivalent protection from, or prevention of, nutrient discharges to Rainbow Creek.

3. **County of San Diego – Establish Management Agency Agreement (MAA)** The Regional Board shall consider, following concurrence with the County of San Diego's Nutrient Reduction and Management Plan (NRMP) for Rainbow Creek, entering into a Management Agency Agreement (MAA) with the County of San Diego. The MAA shall set forth the commitment of both parties to undertake various oversight responsibilities for the nonpoint source nutrient load reduction component of this TMDL, and the County's commitments to implement the NRMP.

[1] The term "statewide NPDES storm water permit " refers to Order No. 99-06-DWQ, NPDES No. CAS000003, National Pollutant Discharge Elimination System Permit, Statewide Storm Water Permit, and Waste Discharge Requirements for the State of California, Department of Transportation (Caltrans) or subsequent superceding NPDES renewal Orders.

4. **County of San Diego – Issue Water Code Governmental Water Quality Investigation Request for Groundwater Investigation and Characterization Report**
   The Regional Board could issue an Order under CWC §13225 directing the County of San Diego to prepare and submit a workplan and report described below in Section B, County of San Diego Actions, Item 3 Submit Groundwater Investigation and Characterization Workplan and Item 4 Groundwater Investigation and Characterization Report.

5. **CA Dept. of Forestry and Fire Protection – Issue Water Code Section 13267 Order**
   The Regional Board shall issue a CWC §13267 order directing the California Department of Forestry and Fire Protection, Rainbow Conservation Camp (CDFFP) to submit any additional technical information needed to 1) evaluate whether CDFFP's discharge is surfacing and/or contributing to the impairment of Rainbow Creek; and 2) estimate the actual nutrient load originating from the septic tank and percolation ponds to Rainbow Creek via groundwater flow. Based on the review of this information the Regional Board may further direct the CDFFP to implement an alternate means of wastewater disposal or additional treatment necessary to attain and maintain nutrient water quality objectives in Rainbow Creek.

6. **Establish Memorandum of Understanding (MOU) with Agencies or Organizations**
   The Regional Board shall consider entering into a memorandum of understanding (MOU) to document cooperative agreements with other agencies or organizations that are able to provide information, technical assistance, or financial assistance to dischargers to support the Regional Board's goals of attaining the nutrient load reductions required under this TMDL and compliance with the nutrient water quality objective. These agencies and organizations include, but are not limited to, the United States Department of Agriculture, Natural Resources Conservation Service (NRCS), Mission Resource Conservation District (MRCD), and the University Of California Cooperative Extension (UCCE).

7. **Adopt Waste Discharge Requirements (WDRs), Waivers, and Discharge Prohibitions**
   In conjunction with an MAA or MOU with another third-party representative, organization, or government agency describing an adequate NPS pollution control implementation program, the Regional Board shall adopt individual or general waivers or waste discharge requirements (WDRs) for NPS discharges in the Rainbow Creek watershed. The waivers or WDRs shall require NPS dischargers to either participate in the third party NPS program or, alternatively, submit individual pollution prevention plans that detail how they will comply with the waivers and WDRs. Alternatively, the Regional Board may adopt a discharge prohibition, which includes exceptions for those discharges that are adequately addressed in an acceptable third-party MAA or MOU NPS pollution control

implementation program.

8. **Take Enforcement Actions**
   The Regional Board shall take enforcement action[2], as necessary, against any discharger failing to comply with applicable waiver conditions, waste discharge requirements (WDRs), discharge prohibitions, or take enforcement action, as necessary, to control the discharge of nutrients to Rainbow Creek, to attain compliance with the nutrient wasteload and load reductions specified in this TMDL, or to attain compliance with the nutrient water quality objectives. The Regional Board may also terminate the applicability of waivers and issue waste discharge requirements or take other appropriate action against any discharger(s) failing to comply with the waiver conditions.

9. **Review and Revise Existing Waste Discharge Requirements**
   The Regional Board shall review and, if necessary, update existing waste discharge requirements for discharges to land as well as groundwater in the Rainbow Creek watershed to incorporate effluent limitations for nutrients consistent with applicable nutrient groundwater quality objectives and surface water quality objectives.[3]

10. **Recommend High Priority for Grant Funds**
    The Regional Board shall recommend that the State Board assign a high priority to awarding grant funding[4] for projects to implement the Rainbow Creek nutrient TMDLs. Special emphasis will be given to projects that can achieve quantifiable nutrient load reductions consistent with the specific nutrient TMDL load allocations.

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[2] An enforcement action is any formal or informal action taken to address an incidence of actual or threatened noncompliance with existing regulations or provisions designed to protect water quality. Potential enforcement actions include a notice of violation (NOV), notices to comply (NTC), imposition of time schedules (TSO), issuance of cease and desist orders (CDOs) and cleanup and abatement orders (CAOs), administrative civil liability (ACL), and referral to the attorney general (AG) or district attorney (DA). The Regional Board generally implements enforcement through an escalating series of actions to: (1) assist cooperative dischargers in achieving compliance; (2) compel compliance for repeat violations and recalcitrant violators; and (3) provide a disincentive for noncompliance.

[3] There are currently three dischargers in the Rainbow Creek watershed regulated under waste discharge requirements for the discharge of waste to land or groundwaters: Oak Crest Mobile Estates (Order No. 1993-69), Rainbow Conservation Camp (Order No. 1995-20), and Temecula Truck Inspection Facility (Order No. 1992-56). The Rainbow Truck Weigh and Inspection Facility, discharges under the terms of a waiver of waste discharge requirements (Order No. 2000-235)

[4] The State Water Resources Control Board administers the awarding of grants funded from Proposition 13, Proposition 50, Clean Water Act 319(h) and other federal appropriations to projects that can result in measurable improvements in water quality, watershed condition, and/or capacity for effective watershed management. Many of these grant fund programs have specific set-asides for expenditures in the areas of watershed management and TMDL implementation for NPS pollution.

11. **Incorporate Water Code Section 13291 Regulations in Basin Plan**
The Regional Board shall incorporate regulations currently under development by the State Water Resources Control Board pertaining to onsite wastewater treatment systems[5] into the Water Quality Control Plan for the San Diego Basin (Basin Plan) as soon as practicable upon their adoption by the State Board.[6]

B. County of San Diego Actions

1. **Control MS4 Discharges to Rainbow Creek**
For nutrient discharges to or from Municipal Separate Storm Sewer Systems (MS4) within the Rainbow Creek watershed, the County has an existing obligation under the NPDES requirements for MS4s in San Diego County [7] to require increasingly stringent best management practices, pursuant to the iterative process described in Receiving Water Limitation C.2.a.[8] of the MS4 Requirements, to reduce nutrients discharges in the Rainbow Creek watershed to the maximum extent practicable and restore compliance with the nutrient water quality objective.

2. **Submit Nutrient Reduction and Management Plan (NRMP)**
The County of San Diego shall, upon request by the Regional Board pursuant to CWC §13225, prepare and submit a NRMP for the Rainbow Creek watershed, consistent with the SWRCB NPS Implementation and Enforcement Policy and containing the elements described in Section C, County of San Diego Nutrient Reduction and Management Plan or their equivalent. The County may submit alternative or additional elements equivalent to those described in Section C that would result in equivalent protection from, or prevention of, nutrient discharges to Rainbow Creek.

3. **Submit and Implement Groundwater Investigation and Characterization Workplan**
The County of San Diego shall, upon request by the Regional Board pursuant to CWC §13225, undertake an investigation of groundwater quality within the Rainbow Creek watershed, and shall prepare and submit a workplan designed to guide the collection of information to produce the technical report described in Item 4, Groundwater Investigation and Characterization Report below. The workplan shall

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[5] "Onsite wastewater treatment system(s)" (OWTS) is any individual or community onsite wastewater treatment, pretreatment and dispersal system including, but not limited to, a conventional, alternative, or experimental sewage dispersal system such a septic tanks having a subsurface discharge.

[6] CWC §13291 directs the Regional Board to incorporate the regulations in the Basin Plan upon their adoption by the State Water Resources Control Board.

[7] The term "MS4 NPDES Storm Water Permit" refers to Order No.2001-001, NPDES No. CAS0108758, *Waste Discharge Requirements For Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities Of San Diego County, and the San Diego Unified Port District* or subsequent superceding NPDES renewal Orders.

include the following:

a. A schedule for completion of all activities and submission of a final Groundwater Investigation and Characterization Report.
b. A description of proposed actions including drilling methods, analytical methods, sampling locations, and purging and sampling methods.
c. The location of existing monitoring wells and the proposed location of additional monitoring wells needed to characterize nutrient concentrations and their lateral and vertical extent in groundwater.
d. Contingencies for collection of additional samples.
e. Sufficient scope to meet the objectives of assessing nutrient loading from surface sources to groundwater and the contribution of groundwater to the nutrient loading and nutrient concentrations in Rainbow Creek
f. Consideration of the following elements or factors:
    i. Nutrient mass loading to groundwater in the fractured rock aquifer and the alluvial deposits aquifer[8] from septic systems, deep percolation of applied irrigation water, and any other sources.
    ii. Base flow contribution to Rainbow Creek from the fractured rock aquifer and the alluvial deposits aquifer.
    iii. Mass balance of nutrients in the fractured rock aquifer and alluvial deposits aquifer (nutrient mass loading to groundwater, removals from the groundwater system including denitrification, plant uptake, and groundwater discharge, and change in the load and concentration of nutrients in groundwater.

The County of San Diego shall implement the workplan within sixty (60) days after submission of the workplan, unless otherwise directed in writing by the Regional Board. Before beginning these activities the County shall notify the Regional Board of the intent to initiate the proposed actions included in the workplan submitted; and comply with any conditions set by the Regional Board.

4. **Submit Groundwater Investigation and Characterization Report**
The County of San Diego shall, on a schedule agreed to in writing by the Regional Board, submit a Groundwater Investigation and Characterization Report containing a technical analysis and interpretation of the data to assess the contribution of groundwater to the nutrient loading and concentrations in Rainbow Creek. The report shall meet the objectives and address the considerations described in the Groundwater Investigation and Characterization Workplan. The report shall also present recommendations to refine assumptions, resolve uncertainties, and improve the scientific foundation of the TMDL with regard to quantifying groundwater nutrient loading to Rainbow Creek.

[8] Groundwater beneath the Rainbow Creek watershed is interpreted to occur in both the alluvial deposits where present and in the fractured rock. The groundwater investigation report shall assess the relative contribution from each aquifer

5. **Establish Management Agency Agreement (MAA)**
   The County of San Diego is requested to enter into a MAA with the Regional Board setting forth the commitment of both parties to undertake various implementation oversight responsibilities for the nonpoint source nutrient load reduction component of this TMDL and the County's commitments to implement the NRMP.

C. County Of San Diego Nutrient Reduction And Management Plan

1. **NPS Nutrient Reduction and Management Plan (NRMP)**
   A NRMP for the Rainbow Creek watershed shall describe the activities the County of San Diego could undertake to oversee discharger efforts to reduce nutrients in the runoff or groundwater discharges from new and existing (1) commercial nurseries; (2) agricultural fields; (3) orchards; (4) parks; (5) residential area; (6) urban areas; and; (7) septic tank disposal system land uses (hereinafter referred to as key nutrient sources). A NRMP should include the following elements as provided in items 2 through 17 below or alternative or additional elements equivalent to those described that would result in equivalent protection from, or prevention of, nutrient discharges to Rainbow Creek.

2. **Legal Authority**
   The County of San Diego should review its legal authority and evaluate its adequacy to mandate compliance with the nutrient load reductions specified in this TMDL through ordinance, statue, permit, contract or similar means. The County, at a minimum, should evaluate its authority to:

   a. Control the discharge of nutrients from nonpoint sources; and
   b. Prohibit discharges of nutrients which cause or contribute to exceedances of the nutrient load reductions specified in this TMDL or nutrient water quality objectives.

   Alternatively the County of San Diego may certify that its existing legal authority is adequate to mandate compliance with the nutrient load reductions specified in this TMDL and prevent increases in nutrient loading to Rainbow Creek.

3. **General Plan Modification**
   The County of San Diego should evaluate the adequacy of its General Plan to ensure that future land use and zoning decisions do not result in an increase in the nutrient loading to Rainbow Creek. The County should also describe the steps it will take to modify the General Plan as necessary. Alternatively the County of San Diego may certify that its existing General Plan is adequate to prevent an increase in nutrient loading to Rainbow Creek.

4. **Modify Development Project Approval Process**
   The County of San Diego should evaluate the adequacy of its development project approval / permitting process as necessary to ensure that discharges from proposed developments in the Rainbow Creek watershed will comply with the nutrient load reductions specified in this TMDL and ensure that nutrient water quality objectives are not exceeded. The County's evaluation should consider the need to ensure that all development in Rainbow Creek watershed will be in compliance with County's storm water ordinances, permits, and all other applicable ordinances and requirements. The County should also describe the steps it will take to modify the development project approval / permitting process as necessary. Alternatively the County of San Diego may certify that its project approval / permitting process is adequate to ensure that discharges from proposed developments in the Rainbow Creek watershed will comply with the nutrients load reductions specified in this TMDL and ensure that nutrient water quality objectives are not exceeded.

5. **CEQA Reviews**
   The County of San Diego should evaluate the adequacy of its environmental review process pursuant to CEQA to ensure that new development in the Rainbow Creek watershed does not contribute to exceedances of the nutrient load allocations specified in this TMDL or violations of the nutrient water quality objective. For example, diligent performance of environmental review under CEQA and requirements for mitigation of the adverse environmental consequences to water quality of new development and detrimental agricultural practices can significantly reduce nutrient loading to Rainbow Creek. The County's evaluation should consider the need to aggressively review proposed projects that have the potential to contribute nitrogen and phosphorus to the Rainbow Creek watershed and require appropriate mitigation. The County should also describe the steps it will take to revise the development project approval / permitting process as necessary. Alternatively the County of San Diego may certify that its environmental review process pursuant to CEQA is adequate to ensure that new development in the Rainbow Creek watershed does not contribute to exceedances of the nutrient load allocations specified in this TMDL or violations of the nutrient water quality objective.

6. **Pollution Prevention (Nutrients)**
   The County of San Diego should describe the steps it will take to implement pollution prevention[9] methods for nutrients at sites owned by the County and require its use by owners or operators of nutrient sources, where appropriate.

7. **Source Identification (Nutrients)**
   The County of San Diego should describe the steps it will take to develop and update annually an inventory of the individual nutrient sources within the residential, urban, commercial nursery, agricultural field, orchard, park, and septic tank disposal system category of land uses. The use of an automated database system, such as

[9] Pollution Prevention is defined as practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control, treatment, or disposal.

Geographical Information System (GIS) is highly recommended.

8. **Threat to Water Quality Prioritization (Nutrients)**
   The County of San Diego should describe the steps it will take to establish priorities for inspection and oversight activities. Each individual nutrient source in each nonpoint source category should be classified as high, medium, or low threat to water quality. The inventory should include the following minimum information for each site: name; address; SIC codes as appropriate which best reflects the type of site; a narrative description characterizing the nutrient waste generated; and the potential for nutrient discharges to Rainbow Creek.

9. **MP Implementation (Nutrients)**
   The County of San Diego should describe the steps it will take to:
   a. Designate a set of minimum MMs / MPs [10] for the high, medium, and low threat to water quality nutrient sources identified in item 7 above. The designated minimum MPs for the high threat to water quality nutrient sources should be site and source specific as appropriate.
   a. Establish a time line for installation of the designated minimum MPs at each nutrient source within its jurisdiction. If particular minimum MPs are infeasible for any specific site/source the county of San Diego should describe the steps it will take to require the implementation of other equivalent MPs.

10. **Inspection of Sites and Sources (Nutrients)**
    The County of San Diego should describe the steps it will take to inspect high priority sites and sources for compliance with its ordinances and permits as well as nutrient load reductions required under this TMDL. Inspections should include review of MP implementation plans and effectiveness. The County should also describe the steps it will take to implement all inspection follow-up actions, including enforcement actions, as necessary to obtain discharger compliance in implementing MPs.

11. **Enforcement of Sites and Sources (Nutrients)**
    The County of San Diego should describe the steps it will take to enforce its ordinances, statues, permits, and contracts as necessary to attain compliance with the nutrient load reductions specified in this TMDL.

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[10] In determining appropriate MPs the County of San Diego is encouraged to consult the State Water Resources Control Board's California Nonpoint Source Encyclopedia (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html). This publication contains extensive information on nutrient reduction management measures (MMs) and management practices (MPs) applicable to the NPS land use activities in the Rainbow Creek watershed. The County is also encouraged to consult the Regional Board's Watershed Management Approach for the San Diego Region, Nonpoint Source (http://www.waterboards.ca.gov/sandiego/programs/wmc.html) for additional information on management measures.

12. **Reporting of Non-compliant Sites (Nutrients)**
The County of San Diego should describe the steps it will take to provide oral notification to the Regional Board of non-compliant sites that are determined to be recalcitrant in implementing MPs or attaining compliance with nutrient load reductions required under this TMDL within 24 hours of the discovery of noncompliance. The notification process should also include procedures for a follow-up written report to be submitted to the Regional Board within 5 days of the incidence of non-compliance.

13. **Monitoring to Assess Compliance With Nutrient Load Reductions**
The County of San Diego should describe the steps it will take to conduct, or require nutrient sites or sources to conduct, a monitoring program to assess compliance of runoff or groundwater discharges with the load reductions from each of the land use categories assigned a load reduction. This can be accomplished by placing sampling stations at strategic nodes that would monitor nutrient discharges from individual sources of a common land use category.

14. **Community Education and Outreach**
The County of San Diego should describe the steps it will take to develop a focused educational program to raise community awareness of the nutrient impairment problem, promote pollution prevention, and increase the use of applicable management measures and practices where needed to control and reduce nutrient discharges to Rainbow Creek. Public education, outreach, and training programs should involve applicable user groups and the community[11].

15. **Seek Financial Assistance**
The County of San Diego is encouraged to seek grant funding[12] for projects to implement the Rainbow Creek nutrient TMDLs, particularly those that can achieve quantifiable nutrient load reductions consistent with the specific nutrient TMDL load allocations.

16. **Nutrient Reduction and Management Plan (NRMP) Effectiveness**
The County of San Diego should describe the steps it will take to develop a long-term strategy for assessing the effectiveness of the NRMP. The long-term assessment strategy should identify specific direct and indirect measurements that the County will use to track the long-term progress towards achieving the nutrient load reductions

[11] Consideration should be given to expanding the County of San Diego's ongoing community and education outreach program under the County's MS4 NPDES Storm Water Permit to address the Rainbow Creek nutrient impairment problem. Additional suggestions for the information to be included in pollution prevention and education programs is contained in the State Water Resources Control Board's *California Nonpoint Source Encyclopedia* (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html).

[12] Information on available grant funds is contained in the in the State Water Resources Control Board's *California Nonpoint Source Encyclopedia* (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html).

required under this TMDL. Methods used for assessing effectiveness should include the following or their equivalent: surveys, pollutant loading estimations, and receiving water quality monitoring. The long-term strategy shall also discuss the role of monitoring data in substantiating or refining the assessment.

17. **Nutrient Reduction and Management Plan (NRMP) Annual Report**
The County of San Diego should describe the steps it will take to submit an annual NRMP report to the Regional Board by January 31 of each year following USEPA approval of this TMDL. The reporting period for this annual report should be the previous fiscal year. For example, the report submitted January 31, 2006 would cover the reporting period July 1, 2004 to June 30, 2005. The report should be incorporated in the annual Jurisdictional URMP Annual Report and the Watershed Specific URMP Annual Reports under the County's MS4 NPDES Permit and include the following information:

    a. Comprehensive description of all activities conducted by the County of San Diego to oversee implementation of the NRMP.
    b. An accounting of all: inspections conducted; enforcement actions taken; and education efforts conducted.
    c. An assessment of whether actions to implement designated minimum MPs at each nutrient source were actually carried out by dischargers.
    d. An assessment of the compliance of runoff or groundwater discharges with the load reductions from each of the land use categories assigned a load reduction.
    e. Identification of water quality improvements or degradation in Rainbow Creek with regard to attainment of the nutrient water quality objectives.
    f. An evaluation of the effectiveness of the NRMP in achieving the nutrient load reductions required under this TMDL.

D. Discharger Actions

1. **State of California, Department of Transportation (Caltrans) Actions**
Caltrans shall take all actions necessary to meet the nutrient wasteload reductions assigned to Caltrans. These nutrient wasteload reductions will eventually be incorporated into Caltrans statewide NPDES storm water permit. It is assumed that compliance with the nutrient wasteload reductions will be accomplished through the development and implementation of best management practices (BMPs). Caltrans shall also prepare and submit progress reports in accordance with the Caltrans statewide NPDES storm water permit or as otherwise directed by the Regional Board in a CWC §13383 order.

2. **State of California Department of Forestry and Fire Protection (CDFFP) Actions**
CDFFP shall, upon direction by the Regional Board in a CWC §13267 order, undertake an investigation to 1) evaluate whether CDFFP's discharge is surfacing and/or contributing to the impairment of Rainbow Creek; and 2) estimate the actual nutrient load to Rainbow Creek from groundwater flow originating from the septic

tank and percolation ponds.

3. **Nonpoint Source Dischargers (NPS Dischargers) Actions**
NPS discharges of nutrients in the Rainbow Creek watershed result from (1) commercial nurseries; (2) agricultural fields; (3) orchards; (4) parks; (5) residential areas; (6) urban areas; and (7) septic tank disposal system land use activities. Individual landowners and other persons (NPS Dischargers) engaged in these land use activities shall implement pollution prevention[13] methods and increase the use of applicable management measures and practices[14] where needed to control and reduce nutrient discharges to Rainbow Creek and attain nutrient load reductions. Individual landowners and other persons are encouraged to seek grant funding[15] for projects to implement the Rainbow Creek nutrient TMDLs, particularly those that can achieve quantifiable nutrient load reductions consistent with the specific nutrient TMDL load allocations. NPS dischargers will be subject to Regional Board enforcement action for failing to: comply with applicable waiver conditions, waste discharge requirements (WDRs), discharge prohibitions; attain compliance with the nutrient load reductions specified in this TMDL; or attain compliance with the nutrient water quality objectives. The Regional Board may also terminate the applicability of waivers and issue waste discharge requirements to any NPS dischargers failing to comply with waiver conditions.

[13] Pollution Prevention is defined as practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control, treatment, or disposal.

[14] In determining appropriate management methods and practices to control nutrient discharges interested persons are encouraged to consult the State Water Resources Control Board's *California Nonpoint Source Encyclopedia* (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html. This publication contains extensive information on nutrient reduction management measures (MMs) and management practices (MPs) applicable to the NPS land use activities in the Rainbow Creek watershed. Interested persons are also encouraged to consult the Regional Board's Watershed Management Approach for the San Diego Region, Nonpoint Source (http://www.waterboards.ca.gov/sandiego/programs/wmc.html) for additional information on management measures.

[15] Information on available grant funds is contained in the in the State Water Resources Control Board's *California Nonpoint Source Encyclopedia* (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html).

TMDL Implementation Monitoring Plan
The necessary actions to monitor TMDL implementation are described in Section 10 of the *Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads (TMDLs) in Rainbow Creek*, dated February 9, 2005 and listed below.

A. Regional Board Actions

1. **Issue Order to Submit Monitoring Plan to Caltrans and County of San Diego**
   The Regional Board shall issue an Order to Caltrans under CWC §13383 and a Governmental Water Quality Investigation Request Order to the County of San Diego under CWC §13225, to prepare and submit an Implementation Monitoring Plan containing the elements described in **Section C. Implementation Monitoring Plan Elements** below. The Regional Board may amend this order at any time to include other nutrient dischargers in the Rainbow Creek watershed on a case-by case basis.

2. **Issue Order to Implement Monitoring Plan to Caltrans and County of San Diego**
   Upon concurrence with the County of San Diego's and Caltrans' Implementation Monitoring Plan the Regional Board shall issue an Order to Caltrans under CWC § 13383 and a Governmental Water Quality Investigation Request Order to the County of San Diego under CWC § 13225, to implement monitoring. The Regional Board may amend this order at any time to include other nutrient dischargers in the Rainbow Creek watershed on a case-by case basis.

B. County of San Diego and Caltrans Actions

1. **Prepare and Submit Monitoring Plan**
   The County of San Diego and Caltrans shall collaborate to prepare and submit an Implementation Monitoring Plan for the Rainbow Creek watershed containing the elements described in **Section C. Implementation Monitoring Plan Elements** below, upon direction by the Regional Board in a CWC §13225 / CWC §13383 Order. The number of monitoring stations in Rainbow Creek assigned to Caltrans should be based on the number of stations needed by Caltrans to demonstrate compliance with the nutrient wasteload allocation and the success of the TMDL in attaining the nutrient water quality objective in the portion of Rainbow Creek affected by its discharge. The Implementation Monitoring Plan shall be modified as requested by the Regional Board.

2. **Implement Monitoring Plan**
   The County of San Diego and Caltrans shall implement the Implementation Monitoring Plan upon direction by the Regional Board pursuant to a CWC §13225 / §13383 Order. The Regional Board may amend this order at any time to include other nutrient dischargers in the Rainbow Creek watershed on a case-by case basis.

C. Implementation Monitoring Plan Elements

The Implementation Monitoring Plan shall contain the following elements:

1. **Surface Water Monitoring Stations**
   Monitoring stations shall be proposed that best serve the monitoring objectives described above in Section 10.2 Monitoring Objectives. Previously monitored locations that shall be considered include Jubilee, Hines Nursery, Oak Crest, Rainbow Glen Tributary, Margarita Glen Tributary, Willow Glen-4, Willow Glen Tributary, Riverhouse, Via Milpas Tributary, and Stage Coach (See Figure A-3, in Appendix A). An additional sampling location between Oak Crest and Willow Glen-4 should also be considered. For instance, a monitoring location might be placed downstream of Oak Crest Mobile Estates to assess nutrient loading from this property. Monitoring stations shall also be considered at strategic nodes in Rainbow Creek and its tributaries that would monitor nutrient discharges from individual sources of a common land use category.

2. **Groundwater Monitoring Stations**
   The location of existing wells and the proposed location of additional monitoring wells needed to define nutrient concentration trends in groundwater. Methods for purging and sampling monitoring wells to provide representative samples for the waste constituents of interest should be described.

3. **Surface Water Monitoring Frequency**.
   Monitoring frequencies of the various monitoring parameters shall be proposed that best serve the monitoring objectives described above in Section 10.2 Monitoring Objectives. The frequencies should be adequate to evaluate ambient conditions and address any impact from low dissolved oxygen concentrations and algal growth.

4. **Groundwater Monitoring Frequency**
   Monitoring frequencies of the various monitoring parameters shall be proposed that best serve the monitoring objectives described above Section 10.2 Monitoring Objectives. The magnitude and timing of nutrient variability may vary significantly in monitoring wells that are located varying distances from nutrient sources. Sampling these wells will likely obtain water from varying depths in the aquifer. To define the nitrate variability at each well, the network will be sampled quarterly for two years. The observed variability will serve as a basis for determining the long-term sampling frequency for the network.

5. **Surface Water Quality Parameters**
   Surface Water Quality Parameters shall include nitrogen (including nitrate, nitrite, ammonia and total Kjeldahl nitrogen (TKN)), phosphorus (including orthophosphate and total), dissolved oxygen, pH, turbidity, and temperature.

6. **Groundwater Quality Parameters**
   Groundwater Quality Parameters shall include total nitrogen, nitrate, ammonia, nitrites, TKN, orthophosphate, total phosphorus, pH, dissolved Oxygen and TDS.

7. **Hydrology**
   Flow rate measurements shall be taken to calculate nutrient loading, to provide additional information about the hydrology of the watershed, and to identify patterns in algal growth.

8. **Algal Biomass**
   Characterization of algal species composition is needed to provide a more reliable indicator of trophic status and evidence of nutrient condition (USEPA 2000a). The growth of algae is stimulated principally by nutrients such as nitrogen and phosphorus, but also requires adequate water temperature, light, flow, and dissolved oxygen. It is assumed at this time that both factors are co-limiting. Characterization of algal species composition may give a better understanding of the relationships between all the factors that affect algal growth, including sunlight, nitrogen, phosphorus, temperature, and dissolved oxygen. Algal biomass should be quantified by mass and/or by % cover of bottom. Collection and measurement of algal biomass should be performed uniformly or by a standardized method.

9. **Biological Assessment Monitoring**
   It is recommended that biological assessment monitoring of benthic macroinvertebrates be performed at a minimum of three stations on Rainbow Creek and a reference stream. Biological assessment monitoring should be performed in accordance with the California Stream Bioassessment Methods Manual (Harrington and Born 2000). Changes in the stream's biological integrity (e.g., an increase or decrease in diversity and abundance of sensitive species) could be used as an indicator of changes in the health of the creek. Sampling done in 1998-99 for the San Diego Ambient Bioassessment Program (CDFG 2000a) indicates that benthic macroinvertebrate communities vary seasonally. The seasonal trend could be due in part to rainfall and consequent stream flow conditions (e.g., scouring). Thus, sites should be sampled for benthic macroinvertebrates at least twice each year: once during the spring (i.e., May), and again in the fall (preferably in October).

10. **Monitoring Reports**
    Monitoring reports shall be submitted in both electronic and paper formats and include the following information:

    a. An executive summary addressing all sections of the monitoring report, comprehensive interpretations and conclusions, and recommendations for future actions.
    b. A description of monitoring station locations by latitude and longitude coordinates, frequency of sampling, quality assurance/quality control procedures and sampling and analysis protocols.

c. The data/results, methods of evaluating the data, graphical summaries of the data, and an explanation/discussion of the data.
d. An assessment of the compliance of runoff characteristics with the required load reductions from each of the land use categories assigned a load reduction.
e. Identification and analysis of trends in surface and groundwater quality and assessment of compliance with nutrient water quality objectives.
f. An evaluation of the effectiveness of the TMDL implementation actions and the need for revisions to improve the implementation action plan.

Table 4-D.3. Required Monitoring Parameters

Parameter	Type of sample[1]
Surface Water Monitoring	
Total nitrogen, nitrate, ammonia[2], nitrites, TKN, orthophosphate, and total phosphorus concentrations	Grab
Temperature	In Situ
pH	In Situ
Dissolved Oxygen	In Situ
Turbidity	In Situ
TDS	Grab
Flow rate	Field Measurement
Algal biomass (% cover of bottom and/or Chl a/ash free dry weight (AFDM))	In Situ and/or Grab
Benthic macroinvertebrate community analysis (recommended)	Grab
Groundwater Monitoring	
Total nitrogen, nitrate, ammonia[2], nitrites, TKN, orthophosphate, and total phosphorus concentrations	Grab
pH	Grab or In Situ
Dissolved Oxygen	Grab or In Situ
TDS	Grab or In Situ

[1] A California certified laboratory should be used with an approved QA/QC plan.
[2] All laboratory detection limits should be sufficient to determine compliance with the water quality objective. For example, un-ionized ammonia in surface waters (25 µg/L).

11. **Quality Assurance / Quality Control Plan**

The monitoring program shall develop and implement a QA/QC plan for field and laboratory operations to ensure that data collected are of adequate quality given the monitoring objectives[16]. The QA/QC plan for field operations shall cover the following, at a minimum:

a. Quality assurance objectives;
b. Sample container preparation, labeling and storage;
c. Chain-of-custody tracking;
d. Field setup;
e. Sampler equipment check and setup;
f. Sample collection;
g. Use of field blanks to assess field contamination;
h. Use of field duplicate samples;
i. Transportation to the laboratory;
j. Training of field personnel; and
k. Evaluation, and enhancement if needed of the QA/QC plan.

The QA/QC plan for laboratory operations shall cover the following, at a minimum:

a. Quality assurance objectives;
b. Organization of laboratory personnel, their education, experience, and duties;
c. Sample procedures;
d. Sample custody;
e. Calibration procedures and frequency;
f. Analytical procedures;
g. Data reduction, validation, and reporting;
h. Internal quality control procedures;
i. Performance and system audits;
j. Preventive maintenance;
k. Assessment of accuracy and precision;
l. Correction actions; and
m. Quality assurance report.

12. **Reporting Period**

Annual reports should cover the period of October 1 through September 30. The reports should be submitted to the Regional Board by January 31 of the following year and should be incorporated within the annual receiving water monitoring reports required under the County of San Diego's MS4 NPDES Permit Receiving Waters Monitoring and Reporting Program.[17]

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[16] For more information on QA/QC activities, including guidelines and example QA/QC documents, refer to http://www.waterboards.ca.gov/swamp/qapp.html

[17] The term "MS4 NPDES Storm Water Permit" currently refers to Order No.2001-001, NPDES No. CAS0108758, Waste Discharge Requirements For Discharges Of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities Of San Diego County, and the San Diego Unified Port District or subsequent superceding NPDES renewal Orders. Attachment B to this Order contains the Receiving Waters

13. **Reporting Frequency**
The first report shall be due in the first January following initiation of the monitoring program. Reporting shall continue on an annual basis until the nutrient water quality objective has been attained and maintained in Rainbow Creek.

Compliance Schedule

Total nitrogen and total phosphorus reductions are required over a 16-year phased compliance schedule period during which incremental load and wasteload reductions are required as shown in Table 4 – E, below. Twenty percent (20%) reductions are required every fourth year for the first three phases (by the end of year 12). The last (fourth) phase requires the remaining 14% total nitrogen reduction and 25% total phosphorus reduction needed to meet the TMDLs.

Table 4 - E. Total Nitrogen and Total Phosphorus Phased Load Reduction Compliance Schedule

Compliance Date	Total Nitrogen		Total Phosphorus	
	Current Load & Annual Loads (LA + WLA) kg N/yr	Cumulative % Reduction	Current Load & Annual Loads (LA + WLA) kg P/yr	Cumulative % Reduction
	3,055[1]		278[1]	
12/31/2009	2,444	20	222	20
12/31/2013	1,833	40	167	40
12/31/2017	1,222	60	111	60
12/31/2021	796	74	41	85

[1] Current annual nutrient loads from identified point and nonpoint sources (See Tables 4 - B). This value does not include the contribution for background.

Regardless of what actions are taken to achieve load and wasteload reductions, there may not be an immediate response in the water quality or biological condition of Rainbow Creek. For example, there may be significant time lags between when actions are taken to reduce nutrient loads and resulting changes in nutrient concentrations in Rainbow Creek. This is especially likely if nutrients from past activities are tightly bound to sediments or if nutrient-contaminated groundwater has a long residence time before its release to Rainbow Creek waters. A three-year response time is projected for Rainbow Creek to attain compliance with nutrient water quality objectives after reaching the desired nutrient wasteload and load reductions in 2021. Accordingly the projected date when Rainbow Creek will attain and maintain compliance with nutrient water quality objectives is December 31, 2024.

Monitoring and Reporting Program for Order No. 2001-01. The annual receiving water monitoring report is described in Table 6, Item 28, page 51 of Order No. 2001-01.

Agricultural Program Costs and Potential Sources of Financing

Pursuant to CWC § 13141 the Regional Board has estimated the TMDL Implementation Program cost for agricultural water quality control in Table 4 - F.

Table 4 - F. Cost of Implementing Agricultural Water Quality Control

	Initial Capital Costs $ per Operation		Annual Operational Costs $ per Operation	
	Low	High	Low	High
Commercial Nurseries	$26	$41,075	$3	$4,108
Orchards	$26	$57,705	$3	$5,771
Agricultural Fields	$26	$57,705	$3	$5,771

Potential sources of financing include:

- Federal Clean Water Act Section 319(h) grants.
- Federal Clean Water Act Section 205(j) grants.
- State of California Proposition 13 funded grants.
- Small Communities Grants for Water Reclamation and Wastewater Treatment Facilities
- Other state, federal and business loans, grants, and other assistance programs. These may include assistance from U.S. Small Business Administration and from conservation programs through various agencies such as the U.S. Department of Agriculture and Natural Resource Conservation Service
- Various secured and unsecured loans, including home equity loans and business loans.

Recalculation Procedures

At the end of the Basin Plan, add the following Appendix D:

APPENDIX D
METHOD FOR RECALCULATION OF THE TOTAL MAXIMUM DAILY LOADS FOR NITOGEN AND PHOSPHORUS IN RAINBOW CREEK

This appendix describes the method for recalculating Rainbow Creek TMDLs for nitrogen and phosphorus if the water quality objectives are modified in the future.

Numeric Target
The numeric targets are set equal to the new water quality objectives.

Margin of Safety

The explicit margin of safety (MOS) equals five percent of the loading capacity. The equation to calculate the loading capacity is given below.

Loading Capacity

The annual total nitrogen loading capacity is determined by multiplying the flow volume (in ft^3/yr) by the new water quality objective (in mg N/L) that will allow the creek to attain water quality standards. The equations below also use terms to convert milligrams to kilograms and cubic feet to liters. The loading capacity for nitrogen is as follows:

Low Flow (0-2.9 cfs)

17,764 * 1 e–3 ft^3/yr * **new water quality objective** in mg N/L * 28.32 L/ft3 * 1 e –6 kg/mg

= **new low flow loading capacity** in kg N/yr

Moderate – High Flow (3 – 39 cfs)

40,775 * 1 e–3 ft^3/yr * **new water quality objective** in mg N/L * 28.32 L/ft3 * 1 e –6 kg/mg

= **new moderate - high flow loading capacity** in kg N/yr

Total Annual Nitrogen Loading Capacity = sum of low flow and moderate - high flow loading capacity

Similarly, the annual total loading capacity for phosphorus is as follows:

Low Flow (0-2.9 cfs)

17,764 * 1 e–3 ft^3/yr * **new water quality objective** in mg P/L * 28.32 L/ft3 * 1 e –6 kg/mg

= **new low flow loading capacity** in kg P/yr

Moderate – High Flow (3 – 39 cfs)

40,775 * 1e–3 ft^3/yr * **new water quality objective** in mg P/L * 28.32 L/ft3 * 1 e –6 kg/mg

= **new moderate-high flow loading capacity** in kg P/yr

Total Annual Phosphorus Loading Capacity = sum of low flow and moderate - high flow loading capacity

Total Maximum Daily Load

The TMDLs for nitrogen and phosphorous are set equal to the total annual loading capacity for each pollutant. The allocations in Table D-1 below use the following equation to determine the total load allocations for nonpoint sources (LA) by subtracting background, the margin of safety (MOS), and the point source waste load allocations (WLA) from the TMDL.

TMDL = ∑(WLA) + ∑(LA) + Background + MOS

Allocations

The allocations of the total annual nitrogen and phosphorous loading capacities to the margin of safety, background, and various point and non-point sources are presented in Table D-1.

Table D-1. Total Nitrogen and Phosphorus Allocations for Rainbow Creek TMDL

Source	Nitrogen Allocation	Phosphorus Allocation
Margin of Safety (MOS)	5%[1]	5%[1]
Background	779 kg	116 kg
Caltrans (WLA)	New WQO * volume of Caltrans runoff	New WQO * volume of Caltrans runoff
Unidentified and Future Point Sources (WLA)	2%[1]	2%[1]
Total Allocation for Nonpoint Sources (LA) = Total Annual Loading Capacity – MOS – Background – Caltrans – Unidentified and Future Point Sources		
Commercial nurseries	16%[2]	9%[2]
Agricultural fields	21%[2]	12%[2]
Orchards	25%[2]	18%[2]
Park	0.4%	0.3%
Residential areas	21%[2]	36%[2]
Urban areas	4%[2]	18%[2]
Septic tank disposal systems	6%[2]	0%[2]
Air deposition	6%[2]	6%[2]

[1] percent of the total annual nitrogen and phosphorous loading capacity
[2] percent of the total allocation for nonpoint sources

Administrative Record Page No. 026177

California Regional Water Quality Control Board
San Diego Region

Basin Plan Amendment and Final Technical Report for
Total Nitrogen and Total Phosphorus
Total Maximum Daily Loads
For Rainbow Creek



Rainbow Valley

Resolution No. R9-2005-0036
Basin Plan Amendment and Technical Report

March 22, 2006

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BASIN PLAN AMENDMENT AND FINAL TECHNICAL REPORT FOR TOTAL NITROGEN AND TOTAL PHOSPHORUS TOTAL MAXIMUM DAILY LOADS FOR RAINBOW CREEK

Resolution No. R9-2005-0036
Basin Plan Amendment and Final Technical Report

Adopted by the
California Regional Water Quality Control Board
San Diego Region
on February 9, 2005

Approved by the
State Water Resources Control Board
on November 16, 2005
and the
Office of Administrative Law
on February 1, 2006
and the
United States Environmental Protection Agency
on March 22, 2006

Cover Photograph: Rainbow Valley, California (2004) by John Phillips

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Acronyms and Abbreviations

1988 Plan – Nonpoint Source Management Plan, November 1988
ACL – Administrative Civil Liability
AG – Attorney General
Basin Plan – Water Quality Control Plan for the San Diego Basin – Region 9
BMP – Best Management Practices
CalEPA – California Environmental Protection Agency
CalTrans – California Department of Transportation
CAMMPR – Volume II: California Management Measures for Polluted Runoff
CAO – Cleanup and Abatement Orders
CARCD – California Association of Resource Conservation Districts
CCR – California Code of Regulations
CDFFP – California Department of Forestry and Fire Protection
CDO – Cease and Desist order
CEQA – California Environmental Quality Act
CESA – California Endangered Species Act
CFB – California Farm Bureau
CFR – Code of Federal Regulations
County – County of San Diego
CTR – California Toxics Rule
CWA – Clean Water Act
CWC – California Water Code
DA – District Attorney
DPR - Department of Parks and Recreation
EIR – Environmental Impact Report
FY – Fiscal Year
GIS – Geographic Information System
LA – Load Allocation
LC – Loading Capacity

MAA – Management Agency Agreement
MCRD – Mission Resource Conservation District
MM – management measure
MOA - Memorandum of Agreement
MOS – Margin of Safety
MOU – Memorandum of Understanding
MP – management practice
MS4 – Municipal Separate Storm Sewer Systems
N – total nitrogen
N:P – Nitrogen to Phosphorus Ratio
NGO – non-governmental organization
NO_3 – nitrate
NOV – Notice of violation
NPDES – National Pollutant Discharge Elimination System
NPS – nonpoint source
NRCS – Natural Resources Conservation Service
NRMP – Nutrient Reduction and Management Plan
NRPI – Natural Resources Project Inventory
OAL – State Office of Administrative Law
OSDS – Onsite Disposal System
P – Total phosphorus
Porter-Cologne Act - Porter Cologne Water Quality Control Act
PRC – Public Resources Code
Program – NPS Pollution Control Program
Program Plan – *Plan for California's Nonpoint Source Pollution Control Program 1998-2013*
QA/QC – Quality Assessment/Quality Control
Regional Board – California Regional Water Quality Control Board, San Diego Region
State Board – State Water Resources Control Board
RCDs –Resource Conservation Districts
RWQCB – Regional Water Quality Control Board
SbMA – Subdivision Map Act
Section – §
SSO – Site Specific Objective
SWPPP – Storm Water Pollution Prevention Program
SWRCB – State Water Resources Control Board
TAC – Technical Advisory Committee
TMDL – Total Maximum Daily Load
UC – University of California
UCCE University of California Cooperative Extension
USC – United States Code
USDA – U. S. Department of Agriculture
USEPA – U. S. Environmental Protection Agency
WDR – Waste Discharge Requirements
WLA – Wasteload Allocation

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
SAN DIEGO REGION

RESOLUTION NO. R9-2005-0036

A RESOLUTION ADOPTING AN AMENDMENT TO THE WATER QUALITY CONTROL PLAN FOR THE SAN DIEGO REGION (9) TO INCORPORATE TOTAL MAXIMUM DAILY LOADS (TMDLs) FOR TOTAL NITROGEN AND TOTAL PHOSPHORUS IN THE RAINBOW CREEK WATERSHED, SAN DIEGO COUNTY

WHEREAS, The California Regional Water Quality Control Board, San Diego Region (hereinafter, Regional Board), finds that:

1. **BASIN PLAN AMENDMENT:** The proposed amendment of the Water Quality Control Plan for the San Diego Region (Basin Plan) described in the recitals below was developed in accordance with California Water Code §13240 et seq.

2. **NECESSITY STANDARD [Government Code §11353(b)]:** This regulatory action meets the "Necessity" standard of the Administrative Procedures Act, Government Code, §11353, subdivision (b). Amendment of the Basin Plan to establish and implement total maximum daily loads (TMDLs) for Rainbow Creek is necessary because water quality in Rainbow Creek does not meet applicable water quality objectives for total nitrogen and total phosphorus (hereinafter nutrients) even with implementation of waste discharge requirements containing technology based effluent limits or water quality based effluent limits for discharges of pollutants to Rainbow Creek and its tributaries. These TMDLs for nutrients are necessary to ensure attainment of applicable water quality objectives and restoration of beneficial uses designated for Rainbow Creek.

3. **CLEAN WATER ACT SECTION 303(d):** Rainbow Creek is identified on the Clean Water Act Section 303(d) list of impaired waters due to excessive nutrient concentrations. Section 303(d) requires the Regional Board to develop and implement TMDLs under the conditions that exist in Rainbow Creek.

4. **BENEFICIAL USE IMPAIRMENTS**: Rainbow Creek supports a multitude of beneficial uses. The most sensitive beneficial uses are those designated for protection of aquatic life as described in the Basin Plan definition of the COLD and WARM beneficial uses. The municipal supply (MUN), warm freshwater habitat (WARM), cold freshwater habitat (COLD), wildlife habitat (WILD), contact water recreation (REC-1), and non-contact water recreation (REC-2) are threatened or impaired due to excessive levels of nutrients.

5. **WATER QUALITY OBJECTIVES**: The Basin Plan establishes that inland surface waters shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect beneficial uses. The Basin Plan establishes the following numerical water quality objective for biostimulatory substances for the protection of the COLD and WARM beneficial uses:

   Total Nitrogen 1.0 mg/L
   Total Phosphorus 0.1 mg/L

   These values are not to be exceeded more than 10% of the time unless studies of the specific water body in question clearly show that water quality objective changes are permissible and changes are approved by the Regional Board.

   The Basin Plan establishes that waters designated for use as domestic or municipal supply shall not contain concentrations of nitrate in excess of the maximum contaminant levels set forth in California Code of Regulations, Title 22. The maximum contaminant level (MCL) for nitrate (as nitrogen) is 10 mg/L.

6. **WATER QUALITY OBJECTIVE VIOLATIONS:** Concentrations for nutrients in Rainbow Creek routinely exceed applicable water quality objectives for nutrients and nitrate. Sampling surveys conducted by the Regional Board in Rainbow Creek in Year 2000 documented water column concentrations as high as 21 mg/L of nitrate as nitrogen, 23 mg/L of total nitrogen and 1.7 mg/L of total phosphorus.

7. **ADVERSE EFFECTS OF NUTRIENTS:** An overload of nutrients can result in an imbalance of the natural cycling processes and can lead to problems ranging from annoyance due to an overabundance of algae and emergent vegetation to human health problems and adverse ecological effects. Nutrient concentrations in Rainbow Creek appear to be contributing to excessive algal growth. Excessive algae present a nuisance that threatens to impair aesthetic and recreational uses (REC1 and REC2). Excessive algae can create conditions that are harmful to aquatic life and degrade water quality, and threaten to impair warm water (WARM), cold water (COLD), and wildlife (WILD) beneficial uses.

8. **NUMERIC TARGETS:** TMDL Numeric Targets interpret and implement water quality standards (i.e., numeric and narrative water quality objectives and beneficial uses) and are established at levels necessary to achieve water quality standards. The Regional Board has set the total nitrogen and total phosphorus TMDL Numeric Targets for both the numeric and narrative water quality objectives equal to the numeric water quality objectives cited in Finding 5. The numeric targets for nitrate (as nitrogen) is 10 mg/L, total nitrogen is 1.0 mg/L and total phosphorus is 0.1 mg/L. Attainment of the TMDL numeric targets will result in attainment of water quality standards in Rainbow Creek.

9. **TOTAL MAXIMUM DAILY LOADS [40 CFR 130.2(i)]:** The Total Maximum Daily Loads (TMDLs) for total nitrogen and total phosphorus discharges into Rainbow Creek are calculated to be 1,658 kilograms of nitrogen per year (kg N/yr) and 165 kilograms of phosphorus per year (kg P/yr). The TMDLs are equal to the assimilative or Loading Capacity (LC) of Rainbow Creek for total nitrogen and total phosphorus and are defined as the maximum amount of total nitrogen and total phosphorus that Rainbow Creek can receive and still attain water quality objectives and protection of designated beneficial uses. The TMDLs are comprised of the sum of all individual Wasteload Allocations (WLAs) for point source discharges of nutrients, the sum of all Load Allocations (LAs) for nonpoint source discharges of nutrients, and natural background. The TMDLs include a margin of safety (MOS) that takes into account any uncertainties in the TMDL calculation. (i.e. TMDL = LC =

∑ WLAs + ∑ LAs + MOS). The TMDL calculations also account for seasonal variations and critical conditions.

10. **ALLOCATIONS AND REDUCTIONS:** A 74 percent (74%) overall reduction of total nitrogen loading and an 85 percent (85%) overall reduction of total phosphorus to Rainbow Creek are required to meet the TMDLs of 1,658 kg N/yr and 165 kg P/yr. The assigned allocations from each source translate into a percent reduction of nutrients from current loading.

Percent Reduction by Source	Total Nitrogen	Total Phosphorus
Point Sources		
Caltrans	68%	64%
Nonpoint Sources		
Commercial Nurseries	77%	90%
Agricultural Fields	77%	90%
Orchards	77%	90%
Park	50%	50%
Residential Areas	77%	90%
Urban Areas	50%	50%
Septic Tank Disposal Systems	77%	Not Applicable

11. **DISCHARGERS:** The Regional Board has identified Caltrans, County of San Diego, commercial nurseries, agricultural fields, orchards, parks, residential areas, urban areas, and septic tank disposal systems as causing or permitting the discharge of total nitrogen and total phosphorus to Rainbow Creek.

12. **IMPLEMENTATION ACTIONS**: Strategies that the Regional Board could take to implement the TMDL are described in the *Basin Plan Amendment and Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads For Rainbow Creek, dated February 9, 2005*.

13. **IMPLEMENTATION MONITORING:** Water quality monitoring will be required to evaluate the overall TMDL implementation effectiveness and success in attaining nutrient water quality objectives in Rainbow Creek and its tributaries.

14. **COMPLIANCE SCHEDULE:** Nutrient wasteload and load reductions are required over a 16-year phased compliance schedule period. The first four-year phase consists of nutrient reductions to attain the nitrate water quality objective and reduced phosphorus concentrations in Rainbow Creek. Incremental reductions of nutrient load are required throughout the subsequent 12-year period.

15. **SCIENTIFIC PEER REVIEW:** The scientific basis of this Basin Plan amendment has undergone external peer review pursuant to Health and Safety Code Section 57004. The Regional Board has considered and responded to all comments submitted by the peer review panel.

16. **STAKEHOLDER PARTICIPATION:** Interested persons and the public have had reasonable opportunity to participate in the development of this amendment to the Basin Plan. Efforts to solicit public review and comment include four (4) public workshops held between April 1999 and December 2004; two (2) public review and comment periods of at least 45 days preceding the Regional Board public hearing; and written responses from the Regional Board to oral and written comments received from the public.

17. **ECONOMIC ANALYSIS:** The Regional Board has considered the costs of implementing this Basin Plan amendment, and finds these costs to be reasonable relative to the water quality benefits derived from implementing the amendment.

18. **CEQA REQUIREMENTS:** The Basin Planning process has been certified as functionally equivalent to the California Environmental Quality Act (CEQA) requirements for preparing environmental documents and is, therefore, exempt from those requirements (Public Resources Code Section 21000 et seq.). The required environmental documents (Basin Plan amendment, staff report, and environmental checklist) have been prepared.

19. **DE MINIMIS ENVIRONMENTAL EFFECTS**: This Basin Plan amendment results in no potential for adverse effect, either individually or cumulatively, on fish and wildlife resources or the habitat upon which they depend. Any and all effects on the environment are expected to be beneficial.

20. **PUBLIC NOTICE**: The Regional Board has notified all known interested parties and the public of its intent to consider adoption of this Basin Plan amendment in accordance with Water Code Section 13244.

21. **PUBLIC HEARING:** The Regional Board has, at public meetings on May 8, 2002 and December 8, 2004, held public hearings and heard and considered all comments pertaining to this Basin Plan amendment.

NOW, THEREFORE, BE IT RESOLVED that

1. **AMENDMENT ADOPTION**: The Regional Board hereby adopts this amendment to the Basin Plan to incorporate the Rainbow Creek Total Nitrogen and Total Phosphorus TMDLs as set forth in Attachment A hereto.

2. The Regional Board hereby approves the report *Basin Plan Amendment and Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads For Rainbow Creek, dated February 9, 2005*.

3. **CERTIFICATE OF FEE EXEMPTION**: The Executive Officer is authorized to sign a Certificate of Fee Exemption.

4. **AGENCY APPROVALS:** The Executive Officer is directed to submit the Basin Plan amendment to the State Water Resources Control Board (State Board) in accordance with California Water Code Section 13245. The Regional Board requests that the State Board approve the Basin Plan amendment and forward it to Office of Administrative Law (OAL) and the United States Environmental Protection Agency for approval.

5. **NON-SUBSTANTIVE CORRECTIONS:** If, during the approval process for this amendment, the State Board or OAL determines that minor, non-substantive corrections to the language of the amendment are needed for clarity or consistency, the Executive Officer may make such changes, and shall inform the Regional Board of any such changes.

I, John H. Robertus, Executive Officer, do hereby certify the foregoing is a full, true and correct copy of a Resolution adopted by the California Regional Water Quality Control Board, San Diego Region, on February 9, 2005.

_____

JOHN H. ROBERTUS
Executive Officer

ATTACHMENT A
TO RESOLUTION NO. R9-2005-0036
BASIN PLAN AMENDMENT

This Basin Plan Amendment establishes Total Maximum Daily Loads (TMDLs) and associated wasteload and load reductions for nutrients in Rainbow Creek, a tributary of the Santa Margarita River. This Amendment includes a program to implement the TMDLs and to monitor their effectiveness. Chapters 2, 3, and 4 of the Basin Plan are amended as follows:

1. **Chapter 2, Beneficial Uses**
   Table 2-2. ***Beneficial Uses of Inland Surface Waters, Santa Margarita River Watershed, Rainbow Creek, Hydrologic Unit Basin Numbers 2.23 and 2.22.***

Add the following footnote 3 to Rainbow Creek, Hydrologic Unit Basin Numbers 2.23 and 2.22:

> [3]Rainbow Creek is designated as an impaired water body for total nitrogen and total phosphorus pursuant to Clean Water Act Section 303(d). Total Maximum Daily Loads (TMDLs) have been adopted to address these impairments. See Chapter 3, Water Quality Objectives for Biostimulatory Substances and Chapter 4, Total Maximum Daily Loads.

2. **Chapter 3, Water Quality Objectives**
   Inland Surface Waters, Enclosed Bays and Estuaries, Coastal Lagoons, and Ground Waters

   Water Quality Objectives for Biostimulatory Substances:

Insert the following as new paragraph 5:

> Rainbow Creek is designated as an impaired water body for total nitrogen and total phosphorus pursuant to Clean Water Act Section 303(d). Total Maximum Daily Loads (TMDLs) have been adopted to address these impairments. See Chapter 2, Beneficial Uses Table 2-2. Beneficial Uses of Inland Surface Waters, Santa Margarita River Watershed, Rainbow Creek, Hydrologic Unit Basin Numbers 2.23 and 2.22, Footnote 3 and Chapter 4, Total Maximum Daily Loads.

3. **Chapter 4, Implementation**

Add the following new section to Chapter 4:

TOTAL MAXIMUM DAILY LOADS

Total Maximum Daily Loads (TMDLs) for Total Nitrogen and Total Phosphorus in the Rainbow Creek Watershed

On February 9, 2005, the Regional Board adopted Resolution No. R9-2005-0036, A Resolution Adopting An *Amendment To The Water Quality Control Plan For The San Diego Region (9) To Incorporate Total Maximum Daily Loads (TMDLs) For Total Nitrogen and Total Phosphorus In The Rainbow Creek Watershed, San Diego County*. The Basin Plan Amendment was subsequently approved by the State Water Resources Control Board on November 16, 2005, the Office of Administrative Law on February 1, 2006, and the United States Environmental Protection Agency on March 22, 2006.

The TMDL is described in the Basin Plan Amendment and Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads For Rainbow Creek, dated February 9, 2005.

Problem Statement

Nitrate, total nitrogen, and total phosphorus concentrations in Rainbow Creek exceed the Inorganic Chemicals nitrate and Biostimulatory Substances water quality objectives. These exceedances threaten to unreasonably impair the municipal supply (MUN), warm freshwater habitat (WARM), cold freshwater habitat (COLD), and wildlife habitat (WILD) beneficial uses of Rainbow Creek. 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. State highways, agricultural fields and orchards, commercial nurseries, residential and urban areas, and septic tank disposal systems contribute to increased nutrient levels in Rainbow Creek as a result of storm water runoff, irrigation return flows, and ground water contributions to the creek.

Numeric Targets

The Numeric Targets for nitrate, total nitrogen, and total phosphorus are set equal to the Inorganic Chemicals nitrate water quality objective for municipal water supply and the numeric goals of the Biostimulatory Substances water quality objective as defined in the Basin Plan and shown below.

Table 4 - A. Rainbow Creek Nitrate, Total Nitrogen, and Total Phosphorus Numeric Targets

Constituent	Water Quality Objective	Numeric Target
Nitrate (as nitrogen)	10 mg NO_3-N/L	10 mg NO_3-N/L
Total Nitrogen	1.0 mg N/L	1.0 mg N/L
Total Phosphorus	0.1 mg P/L	0.1 mg P/L

If the Inorganic Chemicals nitrate and Biostimulatory Substances water quality objectives in Rainbow Creek are modified in the future then the TMDL will be recalculated and the numeric targets will be set equal to the new water quality objectives.

Source Assessment

Seventy-nine percent (79%) and seventy percent (70%) of total nitrogen and total phosphorus mass loading, respectively, are attributable to controllable sources, which include certain land use activities, septic tank disposal systems (total nitrogen only), and Interstate 15 (I-15). The land use activities include commercial nurseries, agricultural fields, orchards, residential areas, urban areas, and park areas. Background and direct atmospheric deposition are not considered to be controllable sources.

Table 4 - B. Summary of Total Nitrogen and Total Phosphorus Sources to Rainbow Creek

Source	Total Nitrogen Mass Load (kg N/yr)	Percent Contribution (% N)	Total Phosphorus Mass Load (kg P/yr)	Percent Contribution (% P)
Land Uses Runoff	2,662	69	262	66
Background	779	20	116	29
Septic Tank Disposal Systems	200	5	0	0
I-15 Runoff (Caltrans)	153	4	14	4
Direct Atmospheric Deposition	40	1	2	1
Combined Sources	**3,834**	**100**	**394**	**100**

Total Maximum Daily Loads or Loading Capacity

The TMDLs for nutrients in Rainbow Creek are 1,658 kg N/yr for total nitrogen and 165 kg P/yr for total phosphorus in order to attain and maintain the Inorganic Chemicals – Nitrate and Biostimulatory Substances water quality objective in Rainbow Creek waters.

The annual loading limit of total nitrogen and total phosphorus to Rainbow Creek shall be reduced incrementally from the current load of 3,834 kg/yr and 394 kg/yr, respectively, to 1,658 kg/yr and 165 kg/yr, respectively, by no later than December 31, 2021. The annual nutrient loading limits to be attained by December 31, 2021 is listed in Table 4-C.

Table 4 - C. Annual Nutrient Loading Capacity and Compliance Date

TMDL	December 31, 2021[1]	
Total Nitrogen – Annual Load	1,658 kg/yr	3,648 lbs./yr
Total Phosphorus – Annual Load	165 kg/yr	365 lbs./yr

[1] Compliance to be achieved no later than this date. The Regional Board may require earlier compliance with these targets when it is reasonable and feasible.

Margin of Safety

Explicit and implicit margins of safety (MOS) were considered for these TMDLs. An explicit MOS of 5% is reserved to account for uncertainties and calculated to be 83 kg/year total nitrogen and 8 kg/year total phosphorus. An implicit MOS has been incorporated through conservative assumptions in the analysis.

Load Allocations and Wasteload Allocations

A seventy-four percent (74%) and an eighty-five percent (85%) overall reduction of total nitrogen and total phosphorus loading, respectively, to Rainbow Creek is required to meet the TMDLs described in Table 4 – C.

The load allocations for the initial annual loading are provided in Table 4 – D.1. and D.2., below. A margin of safety (MOS) of 5% is subtracted from this nutrient TMDL to account for unknowns, errors in assumptions, and potential future development in the watershed. This 5% is reserved for unknowns and is not allocated to any source. Allocations (other than for background and margin of safety) will be further reduced by 20% every 4 years until the biostimulatory targets for nitrogen and phosphorus are met. In the event that a nonpoint source becomes a permitted discharge, the portion of the load allocation that is associated with the source can become a wasteload allocation.

Table 4 – D.1. Annual Total Nitrogen Allocations for Rainbow Creek

Source	Annual Total Nitrogen Load Allocations			
	2009 kg/yr[1]	2013 kg/yr[1]	2017 kg/yr[1]	2021 kg/yr[1]
Load Allocations (LA)				
Commercial nurseries	390	299	196	116
Agricultural fields	504	386	253	151
Orchards	607	465	305	182
Park	5	3	3	3
Residential areas	507	390	260	149
Urban areas	40	27	27	27
Septic tank disposal systems	200	100	46	46
Air deposition	40	40	40	40
Wasteload Allocations (WLA)				
Caltrans highway runoff	118	90	59	49
Unidentified & future point sources	33	33	33	33
Total LA & WLA	**2,444**	**1,833**	**1,222**	**796**
Background[2]	779	779	779	779
MOS (not allocated)	83	83	83	83
Total	**3,306**	**2,695**	**2,084**	**1,658**

[1] To calculate pounds per year, multiply by 2.2.
[2] Background is calculated based on reference concentrations in San Diego streams and Rainbow Creek annual flow volumes.

Table 4 – D.2. Annual Total Phosphorus Allocations for Rainbow Creek

Source	Annual Total Phosphorus Load Allocations			
	2009 kg/yr[1]	2013 kg/yr[1]	2017 kg/yr[1]	2021 kg/yr[1]
Load Allocations (LA)				
Commercial nurseries	20	16	10	3
Agricultural fields	28	21	14	4
Orchards	50	37	24	6
Park	0.15	0.10	0.10	0.10
Residential areas	99	74	47	12
Urban areas	9	6	6	6
Air deposition	2	2	2	2
Wasteload Allocations (WLA)				
Caltrans highway runoff	11	8	5	5
Unidentified & future point sources	3	3	3	3
Total LA & WLA	**223**	**167**	**111**	**41**
Background[2]	116	116	116	116
Margin of Safety (not allocated)	8	8	8	8
Total	**346**	**291**	**235**	**165**

[1] To calculate pounds per year, multiply by 2.2.
[2] Background is calculated based on reference concentrations in San Diego streams and Rainbow Creek annual flow volumes.

Recalculations if Water Quality Objectives Change

If the water quality objectives for Biostimulatory Substances are changed in the future, then the MOS, TMDL and allocations and reductions will be recalculated using the method shown in Appendix D of the Basin Plan.

TMDL Implementation Action Plan

The necessary actions to implement the TMDLs are described in Section 9 of the *Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads (TMDLs) in Rainbow Creek*, dated February 9, 2005 and listed below.

A. Regional Board Actions

1. **Caltrans – Incorporate Wasteload Allocations in NPDES Storm Water Permit**
   The Regional Board shall request that the State Water Resources Control Board amend the Caltrans statewide NPDES storm water permit[1] to include the following

[1] The term "statewide NPDES storm water permit " refers to Order No. 99-06-DWQ, NPDES No. CAS000003, National Pollutant Discharge Elimination System Permit, Statewide Storm Water Permit, and Waste Discharge Requirements for the State of California, Department of Transportation (Caltrans) or subsequent superceding

requirements:

a. MS4 discharges to Rainbow Creek shall not exceed the following wasteloads for nitrogen and phosphorus:

Nitrogen Wasteload	Phosphorus Wasteload	Compliance Due Date
118 kg N/yr[1]	11 kg P/yr[1]	December 31, 2009
90 kg N/yr[1]	8 kg P/yr[1]	December 31, 2013
59 kg N/yr[1]	5 kg P/yr[1]	December 31, 2017
49 kg N/yr[1]	5 kg P/yr[1]	December 31, 2021

b. A directive to submit annual progress reports to the Regional Board detailing progress made on attaining the nutrient wasteload reductions in Rainbow Creek. The report shall be due on April 1 of each year shall be incorporated within Section 2, Program Management of Caltrans MS4 Order No. 99-06-DWQ, NPDES No. CAS000003. Reporting shall continue on an annual basis until the nutrient water quality objective is attained in Rainbow Creek.

2. **County of San Diego – Issue Water Code Governmental Water Quality Investigation Request Order for Nutrient Reduction and Management Plan**
The Regional Board shall issue an Order under CWC §13225 requiring the County of San Diego to investigate excessive levels of nutrients in Rainbow Creek and feasible management strategies to reduce nutrient loading in Rainbow Creek. A Nutrient Reduction and Management Plan (NRMP) for the Rainbow Creek watershed containing the elements described below in Section C, County of San Diego Nutrient Reduction Management Plan Elements, would satisfy such an Order. The County may submit alternative or additional elements equivalent to those described in Section C that would result in equivalent protection from, or prevention of, nutrient discharges to Rainbow Creek.

3. **County of San Diego – Establish Management Agency Agreement (MAA)**
The Regional Board shall consider, following concurrence with the County of San Diego's Nutrient Reduction and Management Plan (NRMP) for Rainbow Creek, entering into a Management Agency Agreement (MAA) with the County of San Diego. The MAA shall set forth the commitment of both parties to undertake various oversight responsibilities for the nonpoint source nutrient load reduction component of this TMDL, and the County's commitments to implement the NRMP.

4. **County of San Diego – Issue Water Code Governmental Water Quality Investigation Request for Groundwater Investigation and Characterization Report**
The Regional Board could issue an Order under CWC §13225 directing the County of San Diego to prepare and submit a workplan and report described below in Section B, County of San Diego Actions, Item 3 Submit Groundwater Investigation and

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NPDES renewal Orders.

Characterization Workplan and Item 4 Groundwater Investigation and Characterization Report.

5. **CA Dept. of Forestry and Fire Protection – Issue Water Code Section 13267 Order**
The Regional Board shall issue a CWC §13267 order directing the California Department of Forestry and Fire Protection, Rainbow Conservation Camp (CDFFP) to submit any additional technical information needed to 1) evaluate whether CDFFP's discharge is surfacing and/or contributing to the impairment of Rainbow Creek; and 2) estimate the actual nutrient load originating from the septic tank and percolation ponds to Rainbow Creek via groundwater flow. Based on the review of this information the Regional Board may further direct the CDFFP to implement an alternate means of wastewater disposal or additional treatment necessary to attain and maintain nutrient water quality objectives in Rainbow Creek.

6. **Establish Memorandum of Understanding (MOU) with Agencies or Organizations**
The Regional Board shall consider entering into a memorandum of understanding (MOU) to document cooperative agreements with other agencies or organizations that are able to provide information, technical assistance, or financial assistance to dischargers to support the Regional Board's goals of attaining the nutrient load reductions required under this TMDL and compliance with the nutrient water quality objective. These agencies and organizations include, but are not limited to, the United States Department of Agriculture, Natural Resources Conservation Service (NRCS), Mission Resource Conservation District (MRCD), and the University Of California Cooperative Extension (UCCE).

7. **Adopt Waste Discharge Requirements (WDRs), Waivers, and Discharge Prohibitions**
In conjunction with an MAA or MOU with another third-party representative, organization, or government agency describing an adequate NPS pollution control implementation program, the Regional Board shall adopt individual or general waivers or waste discharge requirements (WDRs) for NPS discharges in the Rainbow Creek watershed. The waivers or WDRs shall require NPS dischargers to either participate in the third party NPS program or, alternatively, submit individual pollution prevention plans that detail how they will comply with the waivers and WDRs. Alternatively, the Regional Board may adopt a discharge prohibition, which includes exceptions for those discharges that are adequately addressed in an acceptable third-party MAA or MOU NPS pollution control implementation program.

8. **Take Enforcement Actions**
   The Regional Board shall take enforcement action[2], as necessary, against any discharger failing to comply with applicable waiver conditions, waste discharge requirements (WDRs), discharge prohibitions, or take enforcement action, as necessary, to control the discharge of nutrients to Rainbow Creek, to attain compliance with the nutrient wasteload and load reductions specified in this TMDL, or to attain compliance with the nutrient water quality objectives. The Regional Board may also terminate the applicability of waivers and issue waste discharge requirements or take other appropriate action against any discharger(s) failing to comply with the waiver conditions.

9. **Review and Revise Existing Waste Discharge Requirements**
   The Regional Board shall review and, if necessary, update existing waste discharge requirements for discharges to land as well as groundwater in the Rainbow Creek watershed to incorporate effluent limitations for nutrients consistent with applicable nutrient groundwater quality objectives and surface water quality objectives.[3]

10. **Recommend High Priority for Grant Funds**
    The Regional Board shall recommend that the State Board assign a high priority to awarding grant funding[4] for projects to implement the Rainbow Creek nutrient TMDLs. Special emphasis will be given to projects that can achieve quantifiable nutrient load reductions consistent with the specific nutrient TMDL load allocations.

11. **Incorporate Water Code Section 13291 Regulations in Basin Plan**
    The Regional Board shall incorporate regulations currently under development by the State Water Resources Control Board pertaining to onsite wastewater treatment systems[5] into the Water Quality Control Plan for the San Diego Basin (Basin Plan) as soon as

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[2] An enforcement action is any formal or informal action taken to address an incidence of actual or threatened noncompliance with existing regulations or provisions designed to protect water quality. Potential enforcement actions include a notice of violation (NOV), notices to comply (NTC), imposition of time schedules (TSO), issuance of cease and desist orders (CDOs) and cleanup and abatement orders (CAOs), administrative civil liability (ACL), and referral to the attorney general (AG) or district attorney (DA). The Regional Board generally implements enforcement through an escalating series of actions to: (1) assist cooperative dischargers in achieving compliance; (2) compel compliance for repeat violations and recalcitrant violators; and (3) provide a disincentive for noncompliance.

[3] There are currently three dischargers in the Rainbow Creek watershed regulated under waste discharge requirements for the discharge of waste to land or groundwaters: Oak Crest Mobile Estates (Order No. 1993-69), Rainbow Conservation Camp (Order No. 1995-20), and Temecula Truck Inspection Facility (Order No. 1992-56). The Rainbow Truck Weigh and Inspection Facility, discharges under the terms of a waiver of waste discharge requirements (Order No. 2000-235)

[4] The State Water Resources Control Board administers the awarding of grants funded from Proposition 13, Proposition 50, Clean Water Act 319(h) and other federal appropriations to projects that can result in measurable improvements in water quality, watershed condition, and/or capacity for effective watershed management. Many of these grant fund programs have specific set-asides for expenditures in the areas of watershed management and TMDL implementation for NPS pollution.

[5] "Onsite wastewater treatment system(s)" (OWTS) is any individual or community onsite wastewater treatment, pretreatment and dispersal system including, but not limited to, a conventional, alternative, or experimental sewage dispersal system such a septic tanks having a subsurface discharge.

practicable upon their adoption by the State Board.[6]

B. County of San Diego Actions

1. **Control MS4 Discharges to Rainbow Creek**
   For nutrient discharges to or from Municipal Separate Storm Sewer Systems (MS4) within the Rainbow Creek watershed, the County has an existing obligation under the NPDES requirements for MS4s in San Diego County [7] to require increasingly stringent best management practices, pursuant to the iterative process described in Receiving Water Limitation C.2.a.[8] of the MS4 Requirements, to reduce nutrients discharges in the Rainbow Creek watershed to the maximum extent practicable and restore compliance with the nutrient water quality objective.

2. **Submit Nutrient Reduction and Management Plan (NRMP)**
   The County of San Diego shall, upon request by the Regional Board pursuant to CWC §13225, prepare and submit a NRMP for the Rainbow Creek watershed, consistent with the SWRCB NPS Implementation and Enforcement Policy and containing the elements described in Section C, County of San Diego Nutrient Reduction and Management Plan or their equivalent. The County may submit alternative or additional elements equivalent to those described in Section C that would result in equivalent protection from, or prevention of, nutrient discharges to Rainbow Creek.

3. **Submit and Implement Groundwater Investigation and Characterization Workplan**
   The County of San Diego shall, upon request by the Regional Board pursuant to CWC §13225, undertake an investigation of groundwater quality within the Rainbow Creek watershed, and shall prepare and submit a workplan designed to guide the collection of information to produce the technical report described in Item 4, Groundwater Investigation and Characterization Report below. The workplan shall include the following:

   a. A schedule for completion of all activities and submission of a final Groundwater Investigation and Characterization Report.
   b. A description of proposed actions including drilling methods, analytical methods, sampling locations, and purging and sampling methods.
   c. The location of existing monitoring wells and the proposed location of additional monitoring wells needed to characterize nutrient concentrations and their lateral and vertical extent in groundwater.
   d. Contingencies for collection of additional samples.

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[6] CWC §13291 directs the Regional Board to incorporate the regulations in the Basin Plan upon their adoption by the State Water Resources Control Board.

[7] The term "MS4 NPDES Storm Water Permit" refers to Order No.2001-001, NPDES No. CAS0108758, *Waste Discharge Requirements For Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities Of San Diego County, and the San Diego Unified Port District* or subsequent superceding NPDES renewal Orders.

e. Sufficient scope to meet the objectives of assessing nutrient loading from surface sources to groundwater and the contribution of groundwater to the nutrient loading and nutrient concentrations in Rainbow Creek
f. Consideration of the following elements or factors:
    i. Nutrient mass loading to groundwater in the fractured rock aquifer and the alluvial deposits aquifer[8] from septic systems, deep percolation of applied irrigation water, and any other sources.
    ii. Base flow contribution to Rainbow Creek from the fractured rock aquifer and the alluvial deposits aquifer.
    iii. Mass balance of nutrients in the fractured rock aquifer and alluvial deposits aquifer (nutrient mass loading to groundwater, removals from the groundwater system including denitrification, plant uptake, and groundwater discharge, and change in the load and concentration of nutrients in groundwater.

The County of San Diego shall implement the workplan within sixty (60) days after submission of the workplan, unless otherwise directed in writing by the Regional Board. Before beginning these activities the County shall notify the Regional Board of the intent to initiate the proposed actions included in the workplan submitted; and comply with any conditions set by the Regional Board.

4. **Submit Groundwater Investigation and Characterization Report**
The County of San Diego shall, on a schedule agreed to in writing by the Regional Board, submit a Groundwater Investigation and Characterization Report containing a technical analysis and interpretation of the data to assess the contribution of groundwater to the nutrient loading and concentrations in Rainbow Creek. The report shall meet the objectives and address the considerations described in the Groundwater Investigation and Characterization Workplan. The report shall also present recommendations to refine assumptions, resolve uncertainties, and improve the scientific foundation of the TMDL with regard to quantifying groundwater nutrient loading to Rainbow Creek.

5. **Establish Management Agency Agreement (MAA)**
The County of San Diego is requested to enter into a MAA with the Regional Board setting forth the commitment of both parties to undertake various implementation oversight responsibilities for the nonpoint source nutrient load reduction component of this TMDL and the County's commitments to implement the NRMP.

C. County Of San Diego Nutrient Reduction And Management Plan

1. **NPS Nutrient Reduction and Management Plan (NRMP)**
A NRMP for the Rainbow Creek watershed shall describe the activities the County of San Diego could undertake to oversee discharger efforts to reduce nutrients in the runoff or groundwater discharges from new and existing (1) commercial nurseries; (2) agricultural fields; (3) orchards; (4) parks; (5) residential area; (6) urban areas; and; (7) septic tank

[8] Groundwater beneath the Rainbow Creek watershed is interpreted to occur in both the alluvial deposits where present and in the fractured rock. The groundwater investigation report shall assess the relative contribution from each aquifer

disposal system land uses (hereinafter referred to as key nutrient sources). A NRMP should include the following elements as provided in items 2 through 17 below or alternative or additional elements equivalent to those described that would result in equivalent protection from, or prevention of, nutrient discharges to Rainbow Creek.

2. **Legal Authority**
   The County of San Diego should review its legal authority and evaluate its adequacy to mandate compliance with the nutrient load reductions specified in this TMDL through ordinance, statue, permit, contract or similar means. The County, at a minimum, should evaluate its authority to:

   a. Control the discharge of nutrients from nonpoint sources; and
   b. Prohibit discharges of nutrients which cause or contribute to exceedances of the nutrient load reductions specified in this TMDL or nutrient water quality objectives.

   Alternatively the County of San Diego may certify that its existing legal authority is adequate to mandate compliance with the nutrient load reductions specified in this TMDL and prevent increases in nutrient loading to Rainbow Creek.

3. **General Plan Modification**
   The County of San Diego should evaluate the adequacy of its General Plan to ensure that future land use and zoning decisions do not result in an increase in the nutrient loading to Rainbow Creek. The County should also describe the steps it will take to modify the General Plan as necessary. Alternatively the County of San Diego may certify that its existing General Plan is adequate to prevent an increase in nutrient loading to Rainbow Creek.

4. **Modify Development Project Approval Process**
   The County of San Diego should evaluate the adequacy of its development project approval / permitting process as necessary to ensure that discharges from proposed developments in the Rainbow Creek watershed will comply with the nutrient load reductions specified in this TMDL and ensure that nutrient water quality objectives are not exceeded. The County's evaluation should consider the need to ensure that all development in Rainbow Creek watershed will be in compliance with County's storm water ordinances, permits, and all other applicable ordinances and requirements. The County should also describe the steps it will take to modify the development project approval / permitting process as necessary. Alternatively the County of San Diego may certify that its project approval / permitting process is adequate to ensure that discharges from proposed developments in the Rainbow Creek watershed will comply with the nutrients load reductions specified in this TMDL and ensure that nutrient water quality objectives are not exceeded.

5. **CEQA Reviews**
   The County of San Diego should evaluate the adequacy of its environmental review process pursuant to CEQA to ensure that new development in the Rainbow Creek watershed does not contribute to exceedances of the nutrient load allocations specified in this TMDL or violations of the nutrient water quality objective. For example, diligent performance of

environmental review under CEQA and requirements for mitigation of the adverse environmental consequences to water quality of new development and detrimental agricultural practices can significantly reduce nutrient loading to Rainbow Creek. The County's evaluation should consider the need to aggressively review proposed projects that have the potential to contribute nitrogen and phosphorus to the Rainbow Creek watershed and require appropriate mitigation. The County should also describe the steps it will take to revise the development project approval / permitting process as necessary. Alternatively the County of San Diego may certify that its environmental review process pursuant to CEQA is adequate to ensure that new development in the Rainbow Creek watershed does not contribute to exceedances of the nutrient load allocations specified in this TMDL or violations of the nutrient water quality objective.

6. **Pollution Prevention (Nutrients)**
   The County of San Diego should describe the steps it will take to implement pollution prevention[9] methods for nutrients at sites owned by the County and require its use by owners or operators of nutrient sources, where appropriate.

7. **Source Identification (Nutrients)**
   The County of San Diego should describe the steps it will take to develop and update annually an inventory of the individual nutrient sources within the residential, urban, commercial nursery, agricultural field, orchard, park, and septic tank disposal system category of land uses. The use of an automated database system, such as Geographical Information System (GIS) is highly recommended.

8. **Threat to Water Quality Prioritization (Nutrients)**
   The County of San Diego should describe the steps it will take to establish priorities for inspection and oversight activities. Each individual nutrient source in each nonpoint source category should be classified as high, medium, or low threat to water quality. The inventory should include the following minimum information for each site: name; address; SIC codes as appropriate which best reflects the type of site; a narrative description characterizing the nutrient waste generated; and the potential for nutrient discharges to Rainbow Creek.

9. **MP Implementation (Nutrients)**
   The County of San Diego should describe the steps it will take to:
   a. Designate a set of minimum MMs / MPs [10] for the high, medium, and low threat to water quality nutrient sources identified in item 7 above. The designated minimum

[9] Pollution Prevention is defined as practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control, treatment, or disposal.

[10] In determining appropriate MPs the County of San Diego is encouraged to consult the State Water Resources Control Board's California Nonpoint Source Encyclopedia (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html). This publication contains extensive information on nutrient reduction management measures (MMs) and management practices (MPs) applicable to the NPS land use activities in the Rainbow Creek watershed. The County is also encouraged to consult the Regional Board's Watershed Management Approach for the San Diego Region, Nonpoint Source (http://www.waterboards.ca.gov/sandiego/programs/wmc.html) for additional information on management measures.

MPs for the high threat to water quality nutrient sources should be site and source specific as appropriate.

a. Establish a time line for installation of the designated minimum MPs at each nutrient source within its jurisdiction. If particular minimum MPs are infeasible for any specific site/source the county of San Diego should describe the steps it will take to require the implementation of other equivalent MPs.

10. **Inspection of Sites and Sources (Nutrients)**
The County of San Diego should describe the steps it will take to inspect high priority sites and sources for compliance with its ordinances and permits as well as nutrient load reductions required under this TMDL. Inspections should include review of MP implementation plans and effectiveness. The County should also describe the steps it will take to implement all inspection follow-up actions, including enforcement actions, as necessary to obtain discharger compliance in implementing MPs.

11. **Enforcement of Sites and Sources (Nutrients)**
The County of San Diego should describe the steps it will take to enforce its ordinances, statues, permits, and contracts as necessary to attain compliance with the nutrient load reductions specified in this TMDL.

12. **Reporting of Non-compliant Sites (Nutrients)**
The County of San Diego should describe the steps it will take to provide oral notification to the Regional Board of non-compliant sites that are determined to be recalcitrant in implementing MPs or attaining compliance with nutrient load reductions required under this TMDL within 24 hours of the discovery of noncompliance. The notification process should also include procedures for a follow-up written report to be submitted to the Regional Board within 5 days of the incidence of non-compliance.

13. **Monitoring to Assess Compliance With Nutrient Load Reductions**
The County of San Diego should describe the steps it will take to conduct, or require nutrient sites or sources to conduct, a monitoring program to assess compliance of runoff or groundwater discharges with the load reductions from each of the land use categories assigned a load reduction. This can be accomplished by placing sampling stations at strategic nodes that would monitor nutrient discharges from individual sources of a common land use category.

14. **Community Education and Outreach**
The County of San Diego should describe the steps it will take to develop a focused educational program to raise community awareness of the nutrient impairment problem, promote pollution prevention, and increase the use of applicable management measures and practices where needed to control and reduce nutrient discharges to Rainbow Creek. Public education, outreach, and training programs should involve applicable user groups and the community[11].

[11] Consideration should be given to expanding the County of San Diego's ongoing community and education outreach program under the County's MS4 NPDES Storm Water Permit to address the Rainbow Creek nutrient

15. **Seek Financial Assistance**
The County of San Diego is encouraged to seek grant funding[12] for projects to implement the Rainbow Creek nutrient TMDLs, particularly those that can achieve quantifiable nutrient load reductions consistent with the specific nutrient TMDL load allocations.

16. **Nutrient Reduction and Management Plan (NRMP) Effectiveness**
The County of San Diego should describe the steps it will take to develop a long-term strategy for assessing the effectiveness of the NRMP. The long-term assessment strategy should identify specific direct and indirect measurements that the County will use to track the long-term progress towards achieving the nutrient load reductions required under this TMDL. Methods used for assessing effectiveness should include the following or their equivalent: surveys, pollutant loading estimations, and receiving water quality monitoring. The long-term strategy shall also discuss the role of monitoring data in substantiating or refining the assessment.

17. **Nutrient Reduction and Management Plan (NRMP) Annual Report**
The County of San Diego should describe the steps it will take to submit an annual NRMP report to the Regional Board by January 31 of each year following USEPA approval of this TMDL. The reporting period for this annual report should be the previous fiscal year. For example, the report submitted January 31, 2006 would cover the reporting period July 1, 2004 to June 30, 2005. The report should be incorporated in the annual Jurisdictional URMP Annual Report and the Watershed Specific URMP Annual Reports under the County's MS4 NPDES Permit and include the following information:

a. Comprehensive description of all activities conducted by the County of San Diego to oversee implementation of the NRMP.
b. An accounting of all: inspections conducted; enforcement actions taken; and education efforts conducted.
c. An assessment of whether actions to implement designated minimum MPs at each nutrient source were actually carried out by dischargers.
d. An assessment of the compliance of runoff or groundwater discharges with the load reductions from each of the land use categories assigned a load reduction.
e. Identification of water quality improvements or degradation in Rainbow Creek with regard to attainment of the nutrient water quality objectives.
f. An evaluation of the effectiveness of the NRMP in achieving the nutrient load reductions required under this TMDL.

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impairment problem. Additional suggestions for the information to be included in pollution prevention and education programs is contained in the State Water Resources Control Board's *California Nonpoint Source Encyclopedia* (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html).

[12] Information on available grant funds is contained in the in the State Water Resources Control Board's *California Nonpoint Source Encyclopedia* (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html).

D. Discharger Actions

1. **State of California, Department of Transportation (Caltrans) Actions**
   Caltrans shall take all actions necessary to meet the nutrient wasteload reductions assigned to Caltrans. These nutrient wasteload reductions will eventually be incorporated into Caltrans statewide NPDES storm water permit. It is assumed that compliance with the nutrient wasteload reductions will be accomplished through the development and implementation of best management practices (BMPs). Caltrans shall also prepare and submit progress reports in accordance with the Caltrans statewide NPDES storm water permit or as otherwise directed by the Regional Board in a CWC §13383 order.

2. **State of California Department of Forestry and Fire Protection (CDFFP) Actions**
   CDFFP shall, upon direction by the Regional Board in a CWC §13267 order, undertake an investigation to 1) evaluate whether CDFFP's discharge is surfacing and/or contributing to the impairment of Rainbow Creek; and 2) estimate the actual nutrient load to Rainbow Creek from groundwater flow originating from the septic tank and percolation ponds.

3. **Nonpoint Source Dischargers (NPS Dischargers) Actions**
   NPS discharges of nutrients in the Rainbow Creek watershed result from (1) commercial nurseries; (2) agricultural fields; (3) orchards; (4) parks; (5) residential areas; (6) urban areas; and (7) septic tank disposal system land use activities. Individual landowners and other persons (NPS Dischargers) engaged in these land use activities shall implement pollution prevention[13] methods and increase the use of applicable management measures and practices[14] where needed to control and reduce nutrient discharges to Rainbow Creek and attain nutrient load reductions. Individual landowners and other persons are encouraged to seek grant funding[15] for projects to implement the Rainbow Creek nutrient TMDLs, particularly those that can achieve quantifiable nutrient load reductions consistent with the specific nutrient TMDL load allocations. NPS dischargers will be subject to Regional Board enforcement action for failing to: comply with applicable waiver conditions, waste discharge requirements (WDRs), discharge prohibitions; attain compliance with the nutrient load reductions specified in this TMDL; or attain compliance with the nutrient water quality objectives. The Regional Board may also terminate the applicability of waivers and issue

[13] Pollution Prevention is defined as practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control, treatment, or disposal.

[14] In determining appropriate management methods and practices to control nutrient discharges interested persons are encouraged to consult the State Water Resources Control Board's *California Nonpoint Source Encyclopedia* (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html. This publication contains extensive information on nutrient reduction management measures (MMs) and management practices (MPs) applicable to the NPS land use activities in the Rainbow Creek watershed. Interested persons are also encouraged to consult the Regional Board's Watershed Management Approach for the San Diego Region, Nonpoint Source (http://www.waterboards.ca.gov/sandiego/programs/wmc.html) for additional information on management measures.

[15] Information on available grant funds is contained in the in the State Water Resources Control Board's *California Nonpoint Source Encyclopedia* (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html).

waste discharge requirements to any NPS dischargers failing to comply with waiver conditions.

TMDL Implementation Monitoring Plan
The necessary actions to monitor TMDL implementation are described in Section 10 of the *Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads (TMDLs) in Rainbow Creek*, dated February 9, 2005 and listed below.

A. Regional Board Actions

1. **Issue Order to Submit Monitoring Plan to Caltrans and County of San Diego**
   The Regional Board shall issue an Order to Caltrans under CWC §13383 and a Governmental Water Quality Investigation Request Order to the County of San Diego under CWC §13225, to prepare and submit an Implementation Monitoring Plan containing the elements described in **Section C. Implementation Monitoring Plan Elements** below. The Regional Board may amend this order at any time to include other nutrient dischargers in the Rainbow Creek watershed on a case-by case basis.

2. **Issue Order to Implement Monitoring Plan to Caltrans and County of San Diego**
   Upon concurrence with the County of San Diego's and Caltrans' Implementation Monitoring Plan the Regional Board shall issue an Order to Caltrans under CWC § 13383 and a Governmental Water Quality Investigation Request Order to the County of San Diego under CWC § 13225, to implement monitoring. The Regional Board may amend this order at any time to include other nutrient dischargers in the Rainbow Creek watershed on a case-by case basis.

B. County of San Diego and Caltrans Actions

1. **Prepare and Submit Monitoring Plan**
   The County of San Diego and Caltrans shall collaborate to prepare and submit an Implementation Monitoring Plan for the Rainbow Creek watershed containing the elements described in **Section C. Implementation Monitoring Plan Elements** below, upon direction by the Regional Board in a CWC §13225 / CWC §13383 Order. The number of monitoring stations in Rainbow Creek assigned to Caltrans should be based on the number of stations needed by Caltrans to demonstrate compliance with the nutrient wasteload allocation and the success of the TMDL in attaining the nutrient water quality objective in the portion of Rainbow Creek affected by its discharge. The Implementation Monitoring Plan shall be modified as requested by the Regional Board.

2. **Implement Monitoring Plan**
   The County of San Diego and Caltrans shall implement the Implementation Monitoring Plan upon direction by the Regional Board pursuant to a CWC §13225 / §13383 Order. The Regional Board may amend this order at any time to include other nutrient dischargers in the Rainbow Creek watershed on a case-by case basis.

C. Implementation Monitoring Plan Elements

The Implementation Monitoring Plan shall contain the following elements:

1. **Surface Water Monitoring Stations**
   Monitoring stations shall be proposed that best serve the monitoring objectives described above in Section 10.2 Monitoring Objectives. Previously monitored locations that shall be considered include Jubilee, Hines Nursery, Oak Crest, Rainbow Glen Tributary, Margarita Glen Tributary, Willow Glen-4, Willow Glen Tributary, Riverhouse, Via Milpas Tributary, and Stage Coach (See Figure A-3, in Appendix A). An additional sampling location between Oak Crest and Willow Glen-4 should also be considered. For instance, a monitoring location might be placed downstream of Oak Crest Mobile Estates to assess nutrient loading from this property. Monitoring stations shall also be considered at strategic nodes in Rainbow Creek and its tributaries that would monitor nutrient discharges from individual sources of a common land use category.

2. **Groundwater Monitoring Stations**
   The location of existing wells and the proposed location of additional monitoring wells needed to define nutrient concentration trends in groundwater. Methods for purging and sampling monitoring wells to provide representative samples for the waste constituents of interest should be described.

3. **Surface Water Monitoring Frequency**.
   Monitoring frequencies of the various monitoring parameters shall be proposed that best serve the monitoring objectives described above in Section 10.2 Monitoring Objectives. The frequencies should be adequate to evaluate ambient conditions and address any impact from low dissolved oxygen concentrations and algal growth.

4. **Groundwater Monitoring Frequency**
   Monitoring frequencies of the various monitoring parameters shall be proposed that best serve the monitoring objectives described above Section 10.2 Monitoring Objectives. The magnitude and timing of nutrient variability may vary significantly in monitoring wells that are located varying distances from nutrient sources. Sampling these wells will likely obtain water from varying depths in the aquifer. To define the nitrate variability at each well, the network will be sampled quarterly for two years. The observed variability will serve as a basis for determining the long-term sampling frequency for the network.

5. **Surface Water Quality Parameters**
   Surface Water Quality Parameters shall include nitrogen (including nitrate, nitrite, ammonia and total Kjeldahl nitrogen (TKN)), phosphorus (including orthophosphate and total), dissolved oxygen, pH, turbidity, and temperature.

6. **Groundwater Quality Parameters**
   Groundwater Quality Parameters shall include total nitrogen, nitrate, ammonia, nitrites, TKN, orthophosphate, total phosphorus, pH, dissolved Oxygen and TDS.

7. **Hydrology**
   Flow rate measurements shall be taken to calculate nutrient loading, to provide additional information about the hydrology of the watershed, and to identify patterns in algal growth.

8. **Algal Biomass**
   Characterization of algal species composition is needed to provide a more reliable indicator of trophic status and evidence of nutrient condition (USEPA 2000a). The growth of algae is stimulated principally by nutrients such as nitrogen and phosphorus, but also requires adequate water temperature, light, flow, and dissolved oxygen. It is assumed at this time that both factors are co-limiting. Characterization of algal species composition may give a better understanding of the relationships between all the factors that affect algal growth, including sunlight, nitrogen, phosphorus, temperature, and dissolved oxygen. Algal biomass should be quantified by mass and/or by % cover of bottom. Collection and measurement of algal biomass should be performed uniformly or by a standardized method.

9. **Biological Assessment Monitoring**
   It is recommended that biological assessment monitoring of benthic microinvertebrates be performed at a minimum of three stations on Rainbow Creek and a reference stream. Biological assessment monitoring should be performed in accordance with the California Stream Bioassessment Methods Manual (Harrington and Born 2000). Changes in the stream's biological integrity (e.g., an increase or decrease in diversity and abundance of sensitive species) could be used as an indicator of changes in the health of the creek. Sampling done in 1998-99 for the San Diego Ambient Bioassessment Program (CDFG 2000a) indicates that benthic macroinvertebrate communities vary seasonally. The seasonal trend could be due in part to rainfall and consequent streamflow conditions (e.g., scouring). Thus, sites should be sampled for benthic macroinvertebrates at least twice each year: once during the spring (i.e., May), and again in the fall (preferably in October).

10. **Monitoring Reports**
    Monitoring reports shall be submitted in both electronic and paper formats and include the following information:

    a. An executive summary addressing all sections of the monitoring report, comprehensive interpretations and conclusions, and recommendations for future actions.
    b. A description of monitoring station locations by latitude and longitude coordinates, frequency of sampling, quality assurance/quality control procedures and sampling and analysis protocols.
    c. The data/results, methods of evaluating the data, graphical summaries of the data, and an explanation/discussion of the data.
    d. An assessment of the compliance of runoff characteristics with the required load reductions from each of the land use categories assigned a load reduction.
    e. Identification and analysis of trends in surface and groundwater quality and assessment of compliance with nutrient water quality objectives.
    f. An evaluation of the effectiveness of the TMDL implementation actions and the need for revisions to improve the implementation action plan.

Table 4-D.3. Required Monitoring Parameters

Parameter	Type of sample[1]
Surface Water Monitoring	
Total nitrogen, nitrate, ammonia[2], nitrites, TKN, orthophosphate, and total phosphorus concentrations	Grab
Temperature	In Situ
pH	In Situ
Dissolved Oxygen	In Situ
Turbidity	In Situ
TDS	Grab
Flow rate	Field Measurement
Algal biomass (% cover of bottom and/or Chl a/ash free dry weight (AFDM))	In Situ and/or Grab
Benthic macroinvertebrate community analysis (recommended)	Grab
Groundwater Monitoring	
Total nitrogen, nitrate, ammonia[2], nitrites, TKN, orthophosphate, and total phosphorus concentrations	Grab
pH	Grab or In Situ
Dissolved Oxygen	Grab or In Situ
TDS	Grab or In Situ

[1] A California certified laboratory should be used with an approved QA/QC plan.
[2] All laboratory detection limits should be sufficient to determine compliance with the water quality objective. For example, un-ionized ammonia in surface waters (25 µg/L).

11. **Quality Assurance / Quality Control Plan**

The monitoring program shall develop and implement a QA/QC plan for field and laboratory operations to ensure that data collected are of adequate quality given the monitoring objectives[16]. The QA/QC plan for field operations shall cover the following, at a minimum:

a. Quality assurance objectives;
b. Sample container preparation, labeling and storage;
c. Chain-of-custody tracking;
d. Field setup;
e. Sampler equipment check and setup;
f. Sample collection;
g. Use of field blanks to assess field contamination;
h. Use of field duplicate samples;
i. Transportation to the laboratory;
j. Training of field personnel; and
k. Evaluation, and enhancement if needed of the QA/QC plan.

The QA/QC plan for laboratory operations shall cover the following, at a minimum:

a. Quality assurance objectives;
b. Organization of laboratory personnel, their education, experience, and duties;
c. Sample procedures;
d. Sample custody;
e. Calibration procedures and frequency;
f. Analytical procedures;
g. Data reduction, validation, and reporting;
h. Internal quality control procedures;
i. Performance and system audits;
j. Preventive maintenance;
k. Assessment of accuracy and precision;
l. Correction actions; and
m. Quality assurance report.

12. **Reporting Period**

Annual reports should cover the period of October 1 through September 30. The reports should be submitted to the Regional Board by January 31 of the following year and should be incorporated within the annual receiving water monitoring reports required under the County of San Diego's MS4 NPDES Permit Receiving Waters Monitoring and Reporting Program.[17]

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[16] For more information on QA/QC activities, including guidelines and example QA/QC documents, refer to http://www.waterboards.ca.gov/swamp/qapp.html

[17] The term "MS4 NPDES Storm Water Permit" currently refers to Order No.2001-001, NPDES No. CAS0108758, Waste Discharge Requirements For Discharges Of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities Of San Diego County, and the San Diego Unified Port District or subsequent superceding NPDES renewal Orders. Attachment B to this Order contains the Receiving Waters Monitoring and Reporting Program for Order No. 2001-01. The annual receiving water monitoring report is described in Table 6, Item 28, page 51 of Order No. 2001-01.

13. **Reporting Frequency**
The first report shall be due in the first January following initiation of the monitoring program. Reporting shall continue on an annual basis until the nutrient water quality objective has been attained and maintained in Rainbow Creek.

Compliance Schedule

Total nitrogen and total phosphorus reductions are required over a 16-year phased compliance schedule period during which incremental load and wasteload reductions are required as shown in Table 4 – E, below. Twenty percent (20%) reductions are required every fourth year for the first three phases (by the end of year 12). The last (fourth) phase requires the remaining 14% total nitrogen reduction and 25% total phosphorus reduction needed to meet the TMDLs.

Table 4 - E. Total Nitrogen and Total Phosphorus Phased Load Reduction Compliance Schedule

Compliance Date	Total Nitrogen		Total Phosphorus	
	Current Load & Annual Loads (LA + WLA) kg N/yr	Cumulative % Reduction	Current Load & Annual Loads (LA + WLA) kg P/yr	Cumulative % Reduction
	3,055[1]		278[1]	
12/31/2009	2,444	20	222	20
12/31/2013	1,833	40	167	40
12/31/2017	1,222	60	111	60
12/31/2021	796	74	41	85

[1] Current annual nutrient loads from identified point and nonpoint sources (See Tables 4 - B). This value does not include the contribution for background.

Regardless of what actions are taken to achieve load and wasteload reductions, there may not be an immediate response in the water quality or biological condition of Rainbow Creek. For example, there may be significant time lags between when actions are taken to reduce nutrient loads and resulting changes in nutrient concentrations in Rainbow Creek. This is especially likely if nutrients from past activities are tightly bound to sediments or if nutrient-contaminated groundwater has a long residence time before its release to Rainbow Creek waters. A three-year response time is projected for Rainbow Creek to attain compliance with nutrient water quality objectives after reaching the desired nutrient wasteload and load reductions in 2021. Accordingly the projected date when Rainbow Creek will attain and maintain compliance with nutrient water quality objectives is December 31, 2024.

Agricultural Program Costs and Potential Sources of Financing

Pursuant to CWC § 13141 the Regional Board has estimated the TMDL Implementation Program cost for agricultural water quality control in Table 4 - F.

Table 4 - F. Cost of Implementing Agricultural Water Quality Control

	Initial Capital Costs $ per Operation		Annual Operational Costs $ per Operation	
	Low	High	Low	High
Commercial Nurseries	$26	$41,075	$3	$4,108
Orchards	$26	$57,705	$3	$5,771
Agricultural Fields	$26	$57,705	$3	$5,771

Potential sources of financing include:

- Federal Clean Water Act Section 319(h) grants.
- Federal Clean Water Act Section 205(j) grants.
- State of California Proposition 13 funded grants.
- Small Communities Grants for Water Reclamation and Wastewater Treatment Facilities
- Other state, federal and business loans, grants, and other assistance programs. These may include assistance from U.S. Small Business Administration and from conservation programs through various agencies such as the U.S. Department of Agriculture and Natural Resource Conservation Service
- Various secured and unsecured loans, including home equity loans and business loans.

Recalculation Procedures

At the end of the Basin Plan, add the following Appendix D:

APPENDIX D
METHOD FOR RECALCULATION OF THE TOTAL MAXIMUM DAILY LOADS FOR NITOGEN AND PHOSPHORUS IN RAINBOW CREEK

This appendix describes the method for recalculating Rainbow Creek TMDLs for nitrogen and phosphorus if the water quality objectives are modified in the future.

Numeric Target
The numeric targets are set equal to the new water quality objectives.

Margin of Safety
The explicit margin of safety (MOS) equals five percent of the loading capacity. The equation to calculate the loading capacity is given below.

Loading Capacity

The annual total nitrogen loading capacity is determined by multiplying the flow volume (in ft^3/yr) by the new water quality objective (in mg N/L) that will allow the creek to attain water quality standards. The equations below also use terms to convert milligrams to kilograms and cubic feet to liters. The loading capacity for nitrogen is as follows:

Low Flow (0-2.9 cfs)

17,764 * 1 e–3 ft^3/yr * **new water quality objective** in mg N/L * 28.32 L/ft3 * 1 e –6 kg/mg
= **new low flow loading capacity** in kg N/yr

Moderate – High Flow (3 – 39 cfs)

40,775 * 1 e–3 ft^3/yr * **new water quality objective** in mg N/L * 28.32 L/ft3 * 1 e –6 kg/mg
= **new moderate - high flow loading capacity** in kg N/yr

Total Annual Nitrogen Loading Capacity = sum of low flow and moderate - high flow loading capacity

Similarly, the annual total loading capacity for phosphorus is as follows:

Low Flow (0-2.9 cfs)

17,764 * 1 e–3 ft^3/yr * **new water quality objective** in mg P/L * 28.32 L/ft3 * 1 e –6 kg/mg
= **new low flow loading capacity** in kg P/yr

Moderate – High Flow (3 – 39 cfs)

40,775 * 1e–3 ft^3/yr * **new water quality objective** in mg P/L * 28.32 L/ft3 * 1 e –6 kg/mg
= **new moderate-high flow loading capacity** in kg P/yr

Total Annual Phosphorus Loading Capacity = sum of low flow and moderate - high flow loading capacity

Total Maximum Daily Load

The TMDLs for nitrogen and phosphorous are set equal to the total annual loading capacity for each pollutant. The allocations in Table D-1 below use the following equation to determine the total load allocations for nonpoint sources (LA) by subtracting background, the margin of safety (MOS), and the point source waste load allocations (WLA) from the TMDL.

$$TMDL = \sum(WLA) + \sum(LA) + Background + MOS$$

Allocations

The allocations of the total annual nitrogen and phosphorous loading capacities to the margin of safety, background, and various point and non-point sources are presented in Table D-1.

Table D-1. Total Nitrogen and Phosphorus Allocations for Rainbow Creek TMDL

Source	Nitrogen Allocation	Phosphorus Allocation
Margin of Safety (MOS)	5%[1]	5%[1]
Background	779 kg	116 kg
Caltrans (WLA)	New WQO * volume of Caltrans runoff	New WQO * volume of Caltrans runoff
Unidentified and Future Point Sources (WLA)	2%[1]	2%[1]
Total Allocation for Nonpoint Sources (LA) = Total Annual Loading Capacity – MOS – Background – Caltrans – Unidentified and Future Point Sources		
Commercial nurseries	16%[2]	9%[2]
Agricultural fields	21%[2]	12%[2]
Orchards	25%[2]	18%[2]
Park	0.4%	0.3%
Residential areas	21%[2]	36%[2]
Urban areas	4%[2]	18%[2]
Septic tank disposal systems	6%[2]	0%[2]
Air deposition	6%[2]	6%[2]

[1] percent of the total annual nitrogen and phosphorous loading capacity
[2] percent of the total allocation for nonpoint sources

Executive Summary

Rainbow Creek, a tributary to the Santa Margarita River, is approximately eight miles in length and located in northern San Diego County near the community of Fallbrook. (See Attachment A for Rainbow Creek vicinity and watershed maps.) The Rainbow Creek watershed encompasses 7,085 acres and is primarily rural, with sixty five percent of the watershed undeveloped. Rainbow Creek provides habitat to vegetation, and terrestrial and aquatic wildlife. The creek has a resident fish population of native arroyo chubs (*Gila orcutti*) that are listed as a "California Species of Special Concern," native amphibians that may be impacted by excessive nutrients, and an impaired aquatic insect population. The creek also has numerous trails that are frequented by hikers and horseback riders as well as residents that live along the riparian corridor.

Water Quality Impairments

Rainbow Creek waters currently violate the Inorganic Chemicals - Nitrate (as NO_3) and the Biostimulatory Substances nitrogen and phosphorus water quality objectives contained in the Water Quality Control Plan for the San Diego Region (Basin Plan). The exceedance of these water quality objectives in Rainbow Creek waters represents an actual or threatened impairment of the municipal supply, aquatic and terrestrial habitat, and recreational beneficial uses designated for Rainbow Creek in the Basin Plan.

Nitrate, nitrogen, and phosphorus are jointly referred to as nutrients in this document[18]. The introduction of excessive nutrients into the Rainbow Creek ecosystem is referred to as "nutrient enrichment" and can have a number of adverse water quality effects. One of the most common effects is acceleration of a natural process called eutrophication[19] which can lead to eutrophic conditions where prolonged blooms of algae deprive light and oxygen from other organisms while turning waterways green and foul smelling. The excessive nutrient concentrations in Rainbow Creek waters appear to be contributing to excessive algal growth, which can lead to eutrophic conditions resulting in decreased water clarity, loss of aquatic habitat, and a decrease in dissolved oxygen (DO) that is detrimental to aquatic life. While eutrophic conditions have not been observed in Rainbow Creek, the Regional Board found several areas susceptible to excessive algal growth during the spring, summer and fall that threaten to cause eutrophic conditions. Elevated nitrate levels in Rainbow Creek can also adversely affect the drinking water supplies of the downstream United States Marine Corps Base Camp Pendleton (Camp Pendleton).

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[18] Nutrients are chemical elements and compounds found in the environment that plants and animals need to grow and survive. In this document the various forms of nitrogen and phosphorus are the nutrients of interest. The forms include nitrate, nitrite, ammonia, organic nitrogen (in the form of plant material or other organic compounds), and phosphates (orthophosphate and others). Nitrate is the most common form of nitrogen and phosphates are the most common forms of phosphorus found in natural waters.

[19] Eutrophication is a process whereby water bodies, such as lakes, estuaries, or slow-moving streams receive excess nutrients that stimulate excessive plant growth (algae, periphyton attached algae, and nuisance plants weeds). This enhanced plant growth, often called an algal bloom, reduces dissolved oxygen in the water when dead plant material decomposes and can cause other organisms to die.

Clean Water Act Section 303(d) List and TMDLs

The federal Clean Water Act section 303(d) requires that each State establish a process to systematically identify impaired or threatened waterbodies and the pollutant(s) causing the impairment. The Clean Water Act also requires States to establish a scientifically-based strategy—a Total Maximum Daily Load (TMDL)—for correcting the impairment or eliminating the threat and restoring the waterbody. A TMDL defines the amount of a pollutant that a waterbody can receive without violating applicable water quality standards. It is the sum of the allowable loads of a pollutant from all contributing point and nonpoint sources plus a margin of safety. Once this amount or load is determined, the State allocates a portion to each source of that pollutant within a particular watershed. The portion allocated to point sources is known as a "wasteload allocation" or WLA, and is typically enforced through conditions inserted into NPDES permits. The portion allocated to nonpoint sources and naturally-occurring pollutants is known as a "load allocation" or LA, and is enforced through the state's nonpoint source management program.

Rainbow Creek is listed on the State of California's 2002 Clean Water Act section 303(d) list as an impaired water body due to excessive nitrogen and total phosphorus concentrations. The Clean Water Act provides that the Regional Board must establish TMDLs for nitrogen and phosphorus designed to attain the applicable Biostimulatory Substances water quality objective and restore municipal supply, aquatic and terrestrial habitat, and recreational beneficial uses in the Basin Plan. Pursuant to this mandate, the goal of the nitrogen and phosphorus TMDLs described in this document is to attain and maintain the Biostimulatory Substances water quality objective and restore beneficial uses in Rainbow Creek through nutrient wasteload and load reductions implemented over the next 16 years.

Nutrient Sources

The primary point source discharge of nutrients in Rainbow Creek is from Caltrans owned right-of-ways (state highways) in the Rainbow Creek watershed. The primary nonpoint source discharge of nutrients is from agricultural fields and orchards, commercial nurseries, residential and urban areas, septic tank disposal systems, and atmospheric deposition. Nutrients enter the creek by way of overland surface runoff during storm events and dry weather flows, through groundwater gains to the creek of groundwater containing elevated levels of nutrients from septic tank wastewater and irrigation water discharges, through springs of irrigation tailwater flows that feed tributaries, through atmospheric dry deposition, and from background sources.

Nutrient Wasteload and Load Allocations

Annual wasteloads and loads for nitrogen and phosphorus are calculated for the point source and nonpoint source discharges described above. A nitrogen load allocation of 714 kg N/yr is established for nonpoint sources and includes a 77% reduction of loading from commercial nurseries, agricultural fields, orchards, residential land uses, and septic tank disposal systems, and a 50% reduction from urban and park land uses. A wasteload allocation of 82 kg N/yr is established for point sources and includes a 68% reduction for Caltrans' NPDES discharges and a 2% placeholder for unknown and future point sources. A phosphorus load allocation of 33 kg P/yr was established for nonpoint source discharges and includes a 90% reduction of loading from residential, commercial nursery, agricultural fields, and orchard land uses, and a 50%

reduction from urban and park land uses. A wasteload allocation of 8 kg P/yr was established for point sources and includes a 64% reduction for Caltrans' discharges and a 2% placeholder for unknown and future sources.

Based on current nutrient loading calculations from point and nonpoint sources, the Basin Plan amendment requires a 20% reduction of the current annual load of both nitrogen and phosphorus by the end of fourth year following U.S. Environmental Protection Agency approval of the TMDL Basin Plan amendment. This reduction will result in the attainment of the "drinking water " nitrate water quality objective in Rainbow Creek waters. The Basin Plan Amendment requires subsequent reductions in nitrogen and phosphorus loading of 3,834 kg N/yr and 394 kg P/yr, respectively, to 1,658 kg N/yr and 165 kg P/yr respectively over a period of 16 years until the biostimulatory targets, total nitrogen of 1.0 mg N/L and total phosphorus of 0.1 mg P/L, have been achieved. An explicit margin of safety of 5% was selected to account for unknowns, errors in assumptions, and potential future development in the watershed. An implicit margin of safety was also included because of conservative assumptions made in developing load allocations.

TMDL Implementation

Sources of nutrients to Rainbow Creek include both point sources and nonpoint sources. Caltrans is a point source discharger of nutrients and will be responsible for meeting nutrient wasteload reductions to be incorporated in the MS4 NPDES Storm Water Permit. For nutrient discharges in the Rainbow Creek watershed subject to the County of San Diego's MS4 NPDES Storm Water Permit, the County will be directed to implement increasingly stringent best management practices to reduce nutrients discharges in the Rainbow Creek watershed to the maximum extent practicable and restore compliance with the nutrient water quality objective. The California Department of Forestry and Fire Protection (CDFFP) will be required to evaluate whether the Rainbow Conservation Camp discharge is surfacing and/or contributing nutrients to Rainbow Creek.

Controlling and reducing nutrient discharges in the Rainbow Creek watershed to meet the TMDL nutrient load reductions for nonpoint sources will be a long term and complicated undertaking. The Regional Board proposes to use a Third Party regulatory-based approach to mandate compliance with the nonpoint source (NPS) nutrient load reductions of this TMDL. The Regional Board will accomplish this by negotiating a Management Agency Agreement (MAA) between the Regional Board and the County of San Diego setting forth the commitments of both parties to undertake various implementation responsibilities for the NPS nutrient load reductions of this TMDL.

Under the terms of the proposed MAA, the County of San Diego will take the lead in establishing management measures (MMs) and management practices (MPs) and overseeing MP implementation by NPS dischargers to attain TMDL nutrient load reductions in the Rainbow Creek watershed. This will be accomplished through the County of San Diego's development of a Nutrient Reduction and Management Program (NRMP) for the watershed that incorporates nutrient management measures and a public outreach program to achieve the reductions. Additionally, the County of San Diego could be directed to investigate groundwater quality and

contribution to the creek to fill data gaps. Findings from the investigations will be used in the development of further implementation measures to attain subsequent nutrient load reductions.

The Regional Board will adopt, in conjunction with the MAA, individual or general waivers or waste discharge requirements (WDRs) for NPS discharges in the Rainbow Creek watershed. The waivers or WDRs may require NPS dischargers to either participate in the third party NPS program or, alternatively, submit individual pollution prevention plans that detail how they will comply with the waivers and WDRs. The Regional Board may also adopt a discharge prohibition, which includes exceptions for those discharges that are adequately addressed in an acceptable third-party MAA or MOU NPS pollution control implementation program.

The County of San Diego and Caltrans are directed to develop and implement a Rainbow Creek watershed monitoring program to:

- Evaluate progress toward meeting nutrient water quality objectives in Rainbow Creek
- Check attainment of numeric targets and TMDL allocations
- Verify or refine assumptions, resolve uncertainties, and improve scientific understanding; and
- Evaluate the effectiveness of the TMDL implementation actions over time and determine the need for revisions to improve the implementation action plan

Scientific Peer Review

Health and Safety Code section 57004 provides that the scientific basis of any TMDL Basin Plan amendment must undergo external peer review before adoption by the Regional Board. The "scientific basis" and "scientific portions" of the TMDL are those foundations of the TMDL that are premised upon, or derived from, empirical data or other scientific findings, conclusions, or assumptions establishing a regulatory level, standard, or other requirement for the protection of public health or the environment.

An earlier version of the Rainbow Creek TMDL was submitted in November 2001 for external scientific peer review pursuant to Health and Safety Code section 57004. Three reviewers with expertise in the area of nutrients were selected by the State Water Resources Control Board to review the Regional Board's Rainbow Creek TMDL 2001 report: two professors from the Department of Civil and Environmental Engineering at the University of California in Berkeley and one from the Department of Civil and Environmental Engineering at San Jose State University. The comments provided by the peer reviewers and the responses to those comments are provided Appendices J and K of this document.

On May 8, 2002, the Regional Board considered adoption of Tentative Resolution No. R9-2002-0108 to amend the Basin Plan to incorporate the Rainbow Creek Nutrients TMDLs. Based on public testimony at the hearing the Regional Board elected to revise the proposed Basin Plan amendment and to reconsider the amendment following adoption of the 2002 Clean Water Act section 303(d) List Update by the State Water Resources Control Board and the US Environmental Protection Agency (USEPA). This document constitutes the revised Rainbow Creek TMDL. The scientific basis of this revised TMDL has undergone a second external scientific peer review pursuant to Health and Safety Code Section 57004 in July 2004. The

comments provided by the peer reviewer and the responses to those comments are provided with this staff report in Appendix N.

Basin Plan Amendment Adoption

The Regional Board adopted Resolution No. R9-2005-0036 Amendment to the Water Quality Control Plan for the San Diego Region (9) to incorporate TMDLs for nitrogen and phosphorus in the Rainbow Creek Watershed, San Diego County on February 9, 2005.

As with any Basin Plan amendment involving surface waters, once adopted by the Regional Board, this TMDL will not take effect until it has undergone subsequent agency approvals by the State Water Resources Control Board (SWRCB), the Office of Administrative Law (OAL), and USEPA.

1.0 Introduction

In accordance with Section 303(d) of the Clean Water Act (CWA), the State must identify waterbodies that are not able to meet water quality standards based on available pollution controls. The CWA also requires States to establish a priority ranking for waters on the Section 303(d) list of impaired waters and establish Total Maximum Daily Loads (TMDLs) for such waters. A TMDL represents a strategy for meeting water quality objectives by allocating quantitative limits for point and non-point pollution sources.

The purpose of a TMDL is to attain water quality objectives and restore and protect the beneficial uses of an impaired water body. A TMDL is defined as "the sum of the individual wasteload allocations for point sources and load allocations for nonpoint sources and natural background (40 CFR 130.2) such that the capacity of the water body to assimilate pollutant loadings (i.e., loading capacity) is not exceeded."

The TMDL process begins with the development of a technical TMDL which includes the following 8 components: (1) A **Problem Statement** describing which water quality objectives are not being attained and which beneficial uses are impaired; (2) identification of **Numeric Targets** which will result in attainment of the water quality objectives and protection of beneficial uses; (3) A **Source Assessment** to identify all of the point and nonpoint sources in the watershed and estimate the current pollutant loading from each; (4) a calculation of the maximum **Loading Capacity**, or TMDL, of the waterbody for the pollutant; i.e., the maximum amount of the pollutant that may be discharged to the water body without causing exceedances of water quality objectives and impairment of beneficial uses; (5) a **Linkage Analysis** to confirm that the TMDL, or Loading Capacity, will result in the attainment of the water quality objectives; (6) the division and **Allocation** of the total Loading Capacity amongst each of the contributing sources in the watershed, wasteload allocations (WLA) for point sources and load allocations (LA) for non point sources; (7) a **Margin of Safety** (MOS) to account for uncertainties in the TMDL analysis; and (8) a description of how **Seasonal Variation and Critical Conditions** are accounted for in the TMDL. The document containing the above components is generally referred to as the Technical TMDL Report.

Upon completion of the Technical TMDL, a plan to implement the TMDL is developed along with a plan to monitor the results. The **Implementation Plan** describes the actions needed by each of the point and nonpoint source dischargers in the watershed to meet the load reductions specified in the TMDL and a time schedule for taking such actions. The Implementation Plan also identifies agencies with authority to take pollutant-reducing actions and describes such actions. The purpose of the Monitoring Plan is to assess the effectiveness of the load reduction activities in attaining water quality objectives and restoring beneficial uses.

Once the TMDL and Implementation Plan are completed, the regulatory provisions are incorporated into the *Water Quality Control Plan for the San Diego Basin (9)* (Basin Plan) of the California Regional Water Quality Control Board, San Diego Region (hereinafter, Regional Board) as a Basin Plan amendment. Additional requirements of the basin plan amendment process are the evaluation of economic and environmental considerations. As with any Basin Plan amendment involving surface waters, a TMDL adopted by the Regional Board will not take effect until it has undergone subsequent agency approvals by the State Water Resources Control

Board (SWRCB), the Office of Administrative Law (OAL), and the United States Environmental Protection Agency (USEPA).

TMDLs are not self-implementing; nor are they enforceable simply by incorporation into the Basin Plan. Rather a TMDL must be made enforceable by the Regional Board in one of two ways: (1) the TMDL and load allocations are incorporated into waste discharge requirements, conditional waivers pursuant to California Water Code §13269, or NPDES permits; or (2) a formal prohibition against a particular discharge of waste is established in the Basin Plan. The responsible point and nonpoint source dischargers of the pollutant within the watershed must then implement the TMDL. In other words, each responsible party must take any load reduction actions necessary to comply with its assigned load or wasteload allocation as specified in the TMDL.

2.0 Problem Statement

Nitrate concentrations in Rainbow Creek exceed the water quality objective for municipal supply (MUN) and 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. 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. Runoff from agriculture, nursery, and residential land uses contribute to increased pollutant nutrients in Rainbow Creek as a result of storm water runoff, irrigation return flows, and ground water contributions to the creek.

2.1 Nutrients and Nutrient Cycling

This section provides information about the nutrients that are discussed in this staff report, how they cycle through the environment, and how they are transported. The term nutrient refers to any organic or inorganic material that is necessary for life. In this staff report, nutrients refer to nitrogen and phosphorus. These nutrients occur naturally in the environment but are also contributed by human activities including, but not limited to, the use of fertilizers and the disposal of waste effluents. These human activities often result in excessive quantities of nutrients reaching freshwater systems. An overload of nutrients can result in an imbalance of the natural cycling processes and can lead to problems ranging from annoyance due to an overabundance of algae and emergent vegetation to human health problems and adverse ecological effects. Excessive nutrients can first promote algal growth followed by a cascade of ecological impacts that ultimately impair benthic invertebrates and fish species. There are several chemical, physical, and biological processes that govern the fate and transport of these nutrients from their sources to a waterbody.

Plants and animals require nitrogen in mineral form such as ammonium ions (NH_4^+) or nitrate ions (NO_3^-) for uptake. Conversion into usable forms, both in the terrestrial and aquatic environments, occurs through the four processes of the nitrogen cycle. Three processes convert gaseous nitrogen into usable chemical forms: biological nitrogen fixation, ammonification, and nitrification. The fourth process, denitrification, converts fixed nitrogen-to-nitrogen gas. Nitrification takes place under aerobic conditions, and denitrification takes place under anaerobic conditions. In the aquatic environment, organisms incorporate available dissolved inorganic nitrogen into plant and algae tissue, binding it as organic nitrogen. Dead organisms decompose, and organically bound nitrogen is released as ammonia ions and then converted to nitrite and nitrate, where the process begins again (USEPA 1999, 2000a).

Rocks and natural phosphate deposits are the main reservoirs of natural phosphorus. Release of these deposits occurs through weathering, leaching, erosion, and mining. Through these processes, phosphate mineral deposits dissolve producing inorganic phosphate ions (PO_4^{3-}), the biologically available form, that can be absorbed by plants from the soil or water. Phosphorus moves through the food web primarily as organic phosphorus, once it has been incorporated into plant or algal tissue. After organisms consume plant matter, phosphate may be released as urine or other waste product excreted by organisms where it may then be reabsorbed by plants or algae

to start another cycle. Additionally, phosphorus readily sorbs to clay particles in the water column and sediments, reducing its availability for uptake by algae, bacteria and macrophytes (USEPA 1999, 2000a). Sorption occurs under aerobic conditions and desorption under anaerobic conditions (Allan 1995).

Both nitrogen and phosphorus are transported to receiving waterbodies from rain, overland runoff, ground water, drainage networks, and industrial and residential waste effluents. Phosphorus, because of its tendency to sorb to soil particles and organic matter, is primarily transported in surface runoff with eroded sediments. Inorganic nitrogen, on the other hand, does not sorb as strongly and can be transported in both particulate and dissolved phases in surface runoff. Dissolved inorganic nitrogen also can be transported through the unsaturated zone and ground water. Phosphorus associated with fine-grained particulate matter also exists in the atmosphere. This sorbed phosphorus can enter natural waters by both dry fall and rainfall. Finally, nutrients can be directly discharged to a waterbody by point and nonpoint discharges such as residential runoff, or untreated wastewater (USEPA 1999, 2000a).

2.2 Watershed Description

Rainbow Creek is a small tributary to the Santa Margarita River located in northern San Diego County, near the community of Fallbrook (Figure A-1 in Appendix A). The Rainbow Creek watershed is designated in the Basin Plan as hydrologic unit subareas (HSAs) 902.22 and 902.23, and encompasses 7,085 acres (Figure A-2 in Appendix A). The watershed is primarily rural, with sixty five percent of the watershed undeveloped. Development within the watershed includes rural residential units (8.7%), agricultural field uses (6.1%), orchards (11.0%), commercial nurseries (4.8%), and a mix of other uses (5%) (MRCD 1999b).

Rainbow Creek headwaters begin in the hilly and sparsely developed area east of Rainbow Valley. The creek traverses the relatively flat Rainbow Valley Basin, located about 1.5 miles west of the headwaters and then enters another sparsely populated area with hilly terrain. Rainbow Creek eventually flows into the Santa Margarita River, approximately eight miles from the headwaters. For the purposes of this staff report, the creek is described as the upper, middle and lower reaches. The upper reaches include the creek and tributaries above Oak Crest sampling station, the middle reaches are the creek and tributaries between Willow Glen-4 and Oak Crest stations, and the lower reaches are the creek and tributaries between Stage Coach and Willow Glen-4 stations.

Rainbow Creek is an intermittent stream and is considered a gaining stream. The geology of Rainbow Valley Basin is much like a bowl, which has a restricted outlet. This condition limits ground water flowing from the basin (Peterson 1989). Ground water surfaces in the creek at the downstream edge of Rainbow Valley, in the vicinity of the Interstate 15 overpass (I-15). Ground water also surfaces in the lower reaches of the creek beginning approximately 1 mile below I-15. Additionally, several tributaries join the creek in the lower reaches of the watershed.

Rainbow Creek runs through the middle of Rainbow Valley and the community of Rainbow. Rainbow is the most developed part of the watershed, containing residential units, commercial and private nurseries, and other agricultural operations. In Rainbow Valley, the majority of the

length of the creek runs through nursery property, currently owned and operated by Hines Nurseries. The creek has been channelized on the nursery property and is currently being used as part of an irrigation water recovery system. Flynn Rainbow Nurseries, a previous owner, originally put in the recovery system as a best management practice (BMP) in 1989 to reduce downstream nursery discharges and to enable recycling of irrigation water.

According to Hines Nurseries, irrigation runoff is discharged directly into Rainbow Creek and one of its tributaries at numerous locations within the boundaries of the nursery site. An earthen dam located in the creek near the point of discharge from the site restricts water from leaving the site during normal operations. The runoff water is stored in the creek and in an adjacent storage pond within the boundaries of the nursery site. The stored runoff water is recycled back into the irrigation system. Periodic exceedances of the system capacity, either by increased storm water runoff or by allowing too much water into the system, causes the discharge of irrigation waters downstream of the nursery (Biernacka 2001).

The streambed has been altered over the years (Summers 2002). The creek has been channelized with un-engineered riprap and much of the riparian vegetation has been removed. The County and the U.S. Army Corps. of Engineers modified the creek, in cooperation with Flynn Rainbow Nurseries, to address flooding concerns raised by a severe flood in 1992. An adjacent nursery removed riparian vegetation and made channel modifications in connection with the construction of a greenhouse. Flynn Rainbow Nurseries made modifications in connection with the installation of the irrigation recycle system. Hines Nursery currently maintains the earthen dam, which is prone to occasional wash out during high storm flows, and performs occasional slope stabilization of the walls of the creek as needed to avoid subsidence problems. The Regional Board has not authorized these modifications to the creek.

Nursery representatives are currently working with the Regional Board to correct the discharge. In a letter dated July 28, 1999 (Taylor), nursery representatives stated their intention to install a new recycle system by mid-2000, once they acquire the land the nursery occupies. The land was successfully acquired on May 24, 2001. The system is expected to capture approximately 90% of the runoff through utilization of a system of canals, pipes and lift pumps, and an above ground storage pond. During storm conditions, storm water will be allowed to enter the creek, but only after a “first flush” (0.5 inches of rain) has been captured in the reservoir (Summers 2002). System installation is expected to take 3 years to complete.

All development in the Rainbow Creek Watershed, except the Oak Crest Mobile Estates and the Rainbow Conservation Camp, use sub-surface sewage disposal systems (e.g., septic tank – leach field disposal systems). Since 1970, the County of San Diego has prohibited the installation of new or replacement septic tank disposal systems in areas of Rainbow Valley impacted by a high ground water table. The prohibition was implemented because the high ground water table prevented systems from being installed in compliance with the requirements at the time (Whitman 1970). In 1989, a ground water evaluation of Rainbow Valley identified that the basin has a historically high ground water table due to the geology, which has been worsened by in-basin use of imported water that provides recharge through irrigation return flows and septic tank disposal tanks, and the lack of ground water production (Peterson 1989). Many of these septic

tank disposal systems have leachfields close to or submerged in the ground water table during all or part of the year (Lambert 2001).

The Oak Crest Mobile Estates utilizes a small wastewater treatment plant with two concrete-lined evaporation ponds. The treatment facility is operated by Oak Crest Estates and Rainbow Municipal Water District and serves 112 residential units. The wastewater is discharged by spray irrigation on an area of about 5 acres. It does not appear that this facility is contributing to the nutrient load of Rainbow Creek (Dorsey 2003a)

The Rainbow Conservation Camp utilizes an onsite sewage treatment and disposal system. The Rainbow Conservation Camp is operated by the Department of Forestry and Fire Protection under Waste Discharge Requirements (Order No. 95-20) and is located near the headwaters of Rainbow Creek. The Camp is a correctional facility that houses a maximum of 111 people. The treatment system consists of a 15,000-gallon septic tank and three evaporation/percolation ponds for disposal. The ponds have earthen fill side slopes, bottoms and containment berms. Evaporation and percolation from the ponds is the primary means of effluent disposal; however, for several days during the year, effluent from the ponds may be pumped to a spray irrigation field covering approximately 2 acres of the facility. The ponds are suspected to not have the proper separation from ground water and/or bedrock and the percolated effluent appears to be surfacing downslope of the ponds toward Rainbow Creek. Effluent from the percolation ponds likely contributes recharge to the shallow ground water table in this area, and could be contributing flow, and therefore, nitrates to Rainbow Creek (Dorsey 2003b).

2.3 Historical Information

Nitrogen and phosphorus loading to Rainbow Creek were not a concern until the 1980's, when agricultural practices used in Rainbow Valley resulted in significant increases of nitrate concentrations in Rainbow Creek (Leedshill-Herkenhoff 1988). Prior to the early 1980s, the concentration in the creek was fairly constant, with an average of 4.4 milligrams of nitrate per liter (mg NO_3/L), which is equivalent to 0.99 mg NO_3-N/L (Table B-1, Appendix B). Total nitrogen is a measure of all forms of nitrogen (i.e., ammonia, nitrite, nitrate, and organic nitrogen). Current nitrate data is also reported as nitrogen (Table B-2, Appendix B).

The historic nitrate concentration steadily increased through the early 1980's, peaking in 1986 with an average concentration of 215.8 mg NO_3/L (48.7 mg NO_3-N/L) and on several occasions in 1985 and 1986, exceeding 300 mg NO_3/L (68 mg NO_3-N/L). These elevated nitrate concentrations exceeded drinking water standards for nitrate of 45 mg NO_3/L (10 mg NO_3-N/L) and threatened drinking water supplies downstream in the Santa Margarita River. Although fieldwork was not conducted to verify actual stream conditions, nutrient concentrations in Rainbow Creek were elevated to a degree that eutrophic conditions were expected to occur in the creek and may also have contributed to known eutrophic conditions in the Santa Margarita Lagoon. Based upon those assumptions and because of the elevated nitrate levels, Rainbow Creek was listed as an impaired waterbody due to eutrophication and given a high priority on the Clean Water Act (CWA), Section 303(d) list in 1996. In 2002, the Regional Board recommended that the impairment listing be modified from the impairment condition of eutrophication to the causal pollutants of nitrogen and phosphorus in the 2002 303(d) List

Update. The State Water Resources Control Board approved the update on February 4, 2003. The U.S. Environmental Protection Agency approved the update on June 6, 2003.

Following the 1996 listing, nitrate concentrations have decreased significantly. The United States Marine Corps Base Camp Pendleton (Camp Pendleton) was concerned that the elevated nitrate concentrations in Rainbow Creek could impact Camp Pendleton's drinking water supplies. To address this concern, the Mission Resource Conservation District (MRCD), in cooperation with Camp Pendleton, investigated the sources of the elevated nitrates in the early 1990's. MRCD conducted two CWA Section 319(h) studies (MRCD 1997a, 1999) to educate homeowners and nurseries regarding nutrient problems in Rainbow Creek and provide them with best management practices to reduce discharges of nitrates. The programs developed by MRCD resulted in significant reductions of nitrate concentrations in Rainbow Creek. Monitoring performed during the latter study period shows the 1998-99 average (12 month average) nitrate concentration was 7.7 mg NO_3/L, or 1.7 mg NO_3-N/L at the Willow Glen-4 Station. This is an approximate 96% reduction from the 1986 average value (MRCD 1999b). Although the MRCD study did not include the reporting of the presence of algae, field investigations conducted by Regional Board staff in July 1999, at the end of the MRCD monitoring period, identified two areas in the lower reaches (downstream of Willow Glen-4) affected by excessive algal growth.

In addition to elevated nitrate concentrations, phosphorus was thought to be elevated (MRCD 1997a). However, no historic data for phosphorus have been found. This conclusion was likely based on the assumption that nutrient sources such as fertilizer use from urban and agricultural sources may also contribute phosphorus, and to the eutrophic conditions observed downstream of Rainbow Creek. In response to this assumption, MRCD collected phosphate data as part of the above referenced studies. The 1999 Report indicated a 12-month average orthophosphate, as phosphorus (PO_4-P), or phosphate, concentration of 0.6 mg PO_4-P/L.

2.4 Water Quality Objectives

The Basin Plan has several water quality objectives that address nutrient concentrations in inland surface waters. The numeric water quality objectives applicable to Rainbow Creek are presented in Table 2-1 below.

Table 2-1. Applicable Water Quality Objectives

Water Quality Objective	Constituent	Established Level[1]
Inorganic Chemicals in Municipal Supply:		
Nitrate	Nitrate, as N	**10 mg NO_3-N/L**
Nitrate + Nitrite	Nitrate + Nitrite, summed as N	10 mg N/L
Nitrite	Nitrite, As N	1 mg NO_2-N/L
Un-Ionized Ammonia	Ammonia, As N	0.025 NH_3-N/L
Biostimulatory Substances	Total Nitrogen	**1.0 mg N/L**
	Total Phosphorus	**0.1 mg P/L**

[1] Levels in bold are addressed by the proposed TMDLs.

The water quality objective for inorganic chemicals in municipal supplies states that nitrate in domestic or municipal supply water should not exceed 10 mg NO_3-N/L, nitrate plus nitrite summed as nitrogen should not exceed 10 mg N/L, and nitrite should not exceed 1 mg NO_2-N/L. This water quality objective is based on the maximum contaminant levels (MCLs) set forth in California Code of Regulations, Title 22. The nitrate and nitrite MCLs are based on human health toxicity in infants and are applicable to surface waters designated as domestic water supplies.

The water quality objective for un-ionized ammonia states that the discharge of wastes is not to result in concentrations of un-ionized ammonia in excess of 0.025 mg N/L. The fraction of ammonia present as un-ionized ammonia depends on temperature and pH. Un-ionized ammonia is toxic to fish and other aquatic organisms. Ammonia data was reported in quantities that were less than the laboratory detection limit of 0.1 NH_4-N/L in Rainbow Creek during the 2000 monitoring period. The data is not adequate to determine if un-ionized ammonia exceeds the water quality objective.

The water quality objective for biostimulatory substances is narrative and addresses tolerance levels for algal and emergent plant growth. It contains numeric goals for total nitrogen and total phosphorus. The biostimulatory substances water quality objective states in part:

> *"Inland surface waters, … shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect beneficial uses."*
>
> *Concentrations of nitrogen and phosphorus, by themselves or in combination with other nutrients, shall be maintained at levels below those which stimulate algae and emergent plant growth. Threshold total phosphorus (P) concentrations shall not exceed 0.05 mg/l in any stream at the point where it enters any standing body of water, nor 0.025 mg/l in any standing body of water. A desired goal in order to prevent plant nuisance in streams and other flowing waters appears to be 0.1 mg/l total P. These values are not to be exceeded more than 10% of the time unless studies of the specific water body in question clearly show that water quality objective changes are permissible and changes are approved by the Regional Board. Analogous threshold values have not been set for nitrogen compounds; however, natural ratios of nitrogen to phosphorus are to be determined by surveillance and monitoring and upheld. If data are lacking, a ratio of N:P = 10:1 , on a weight to weight basis shall be used.*

The biostimulatory substances water quality objective provides that "*a desired goal for total phosphorus appears to be 0.1 mg/L total P*" in order to prevent plant nuisance in streams and other flowing waters. This 0.1 mg/l total phosphorus value is not to be exceeded more than 10% of the time unless site-specific studies of the waterbody clearly show that water quality objective changes are permissible. Analogous threshold values are not set for nitrogen in the Basin Plan. The biostimulatory substances water quality objective provides that, if data are lacking on the natural ratios of nitrogen to phosphorus (N:P), a weight-to-weight ratio of 10:1 (N:P) shall be used for the determination of an analogous threshold value for total nitrogen of 1.0 mg N/L. The

use of a 10:1 ratio is a reasonable assumption and is supported by Allan (1995) who states that most estimates of the ratio of N:P in freshwaters are above 7:1 (by mass).

The Regional Board uses the 0.1 mg/l goal for phosphorus stated in the Biostimulatory Substances water quality objective as a phosphorus water quality objective unless site specific scientific studies demonstrate that a modified phosphorus objective is appropriate for a particular waterbody. (A modified water quality objective is referred to as a site-specific water quality objective (SSO).) Similarly the Regional Board uses the N:P ratio of 10:1 cited in the in the Biostimulatory Substances water quality objective as a basis for establishing a nitrogen water quality objective of 1.0 mg/l unless site specific scientific studies are conducted to establish a nitrogen site specific water quality objective based on different N:P ratios. SSOs must be approved by the Regional Board and incorporated into the Basin Plan.

USEPA's Recommended Ecoregional Nutrient Criteria

USEPA (2000b) has published recommended nutrient criteria for causal (total nitrogen and total phosphorus) and response (chlorophyll and turbidity) variables associated with the prevention and assessment of eutrophic conditions. The criteria are empirically derived from data in USEPA's STORET database to represent conditions of surface waters that are minimally impacted by human activities and protective of aquatic life and recreational uses. Ideally, USEPA wanted to base these criteria on actual reference conditions. The criteria would have been based on the 75th percentile of reference condition data. However, much of USEPA's data could not be considered to be reference conditions. Consequently, USEPA performed a statistical analysis of the entire body of non-reference data. The 25th percentile of each season (winter, spring, summer, fall) was calculated, and then the median of these four values was calculated. This approach assumes that the lower 25th percentile of all data overlaps with the 75th percentile of reference condition data, so therefore the 25th percentile data can be used to represent reference conditions.

Rainbow Creek watershed is located in subecoregion 6, the southern and central California chaparral and oak woodland of the Xeric West Ecoregion (Ecoregion III). USEPA's recommended criteria for total nitrogen and total phosphorus in streams in this subecoregion are presented in Table 2-2 below.

Table 2-2. USEPA's Recommended Nutrient Criteria for Subecoregion 6, Xeric West Ecoregion

Nutrient Parameter	Recommended Value
Total Nitrogen	0.5 mg N/L
Total Phosphorus	0.03 mg P/L

This Regional Board is mandated to adopt numeric nutrient water quality standards. The Regional Board has the option to adopt USEPA's recommended values or develop alternative criteria based on another scientifically defensible approach in establishing numeric nutrient water

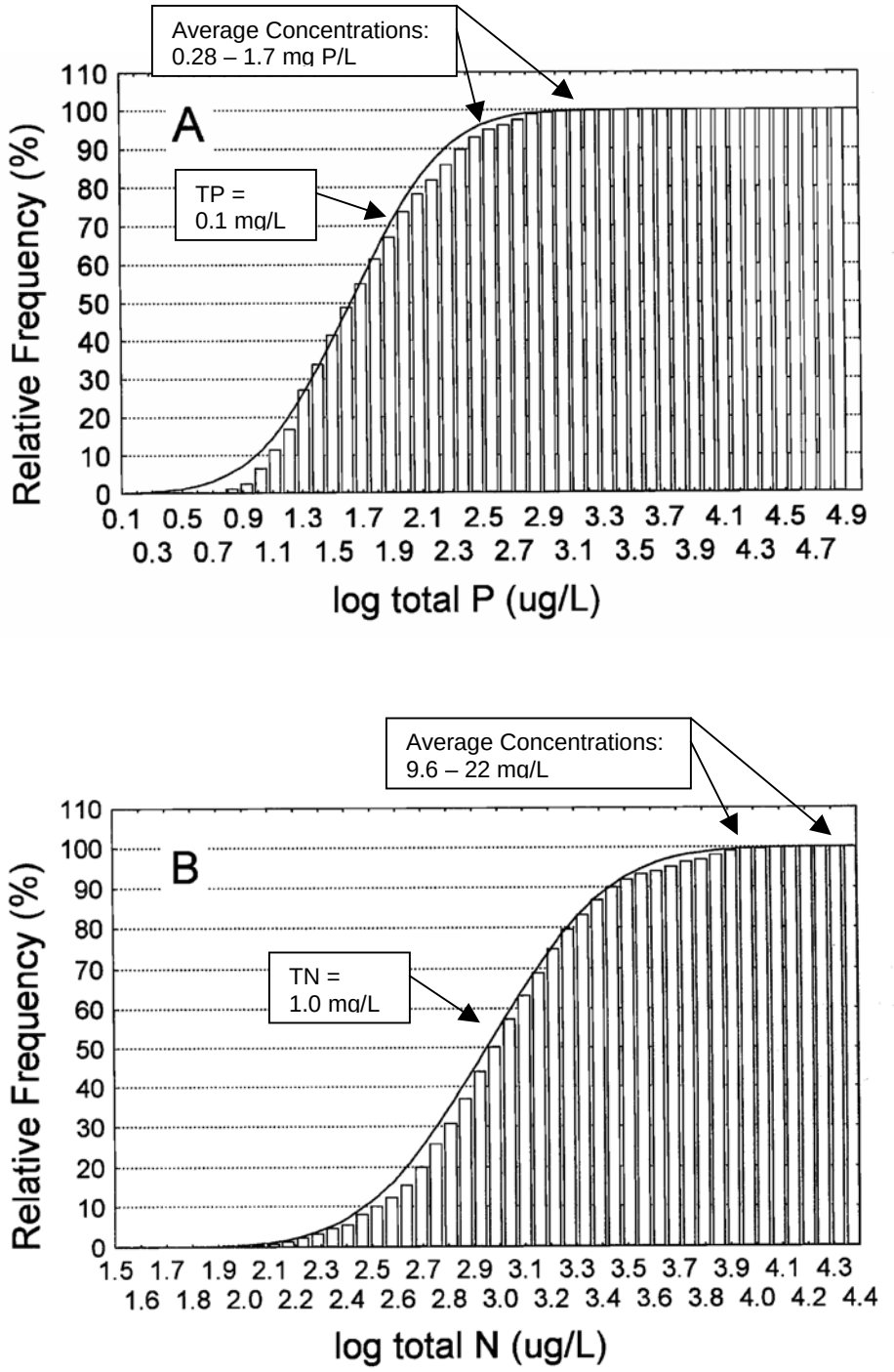
quality objectives for the Region. This Regional Board is participating with the USEPA's Regional Technical Advisory Group (RTAG) and the State and Regional Technical Advisory Group (STRTAG) to develop alternative region-specific criteria. The RTAG is a federal agency advisory body consisting of a subset of federal and state scientists and natural resources managers, university scientists and natural resources specialists, and interest groups (e.g., environmental groups, industry groups). The STRTAG is a subset of the RTAG, which consists of State Board and Regional Board RTAG members. The RTAG/STRTAG have drafted a work plan for criteria development that will use empirical data analysis and watershed modeling analysis. Once region-specific criteria are developed, they will be adopted as water quality objectives through the Basin Plan amendment process. New numeric nutrient water quality objectives may be available by 2007.

Scientific Support of Biostimulatory Substances Water Quality Objective

The numeric goals cited in the biostimulatory substances water quality objective of 1.0 mg N/L and 0.1 mg P/L are consistent with published scientific studies. Using the distribution of nutrient data from more than 1000 temperate streams (primarily located in North America and New Zealand), Dodds et al. (1998) defined the lowest third of the distribution as representing the oligotrophic category, the middle third the mesotrophic category, and the top third the eutrophic category. The cumulative frequency distributions suggest that total nitrogen and total phosphorus levels between 0.7 – 1.5 mg/L and 0.02 – 0.07 mg/L, respectively, define streams that are mesotrophic. Mesotrophic is a trophic state that has moderate concentrations of nutrients and plant growth. Oligotrophic is a trophic state that is deficient in plant nutrients, and does not support the development of extensive aquatic plant and animal communities. Eutrophic waters are characterized by high nutrient concentrations, resulting in high productivity of plant growth. Such waters have algal blooms and periods of oxygen deficiency.

Comparison of the numeric goals with the Dodds et al. (1998) distributions in Figure 2-1, show that total nitrogen is within the mesotrophic range and total phosphorus is near the lower end of the eutrophic range. This indicates that 75% of representative systems have less nutrient enrichment than a stream with 0.1 mg P/L. Presently, nutrient concentrations in Rainbow Creek are both on the plateau of the distribution curve in the eutrophic range.

Figure 2-1. Nutrient Cumulative Frequency Diagrams



Cumulative frequency diagram of TP (A, n=1366) and TN (B, n=1070) for temperate streams. The line indicates the log-normal distribution. (Dodds et al. 1998)

Allan (1995) reported that natural levels of dissolved inorganic nitrogen (DIN) are around 0.12 mg N/L and orthophosphate are around 0.01 mg PO_4-P/L (0.025 mg P/L for total dissolved phosphate) in minimally impacted small streams in the temperate zone and major rivers of the tropics and subarctic. In another paper, Dodds and Welch (2000) surveyed studies for the purpose of defining potential nutrient criteria that would address the concern of eutrophication. One study showed that total nitrogen should remain below 3 mg N/L and total phosphorus below 0.4 mg P/L for benthic chlorophyll to remain below what is considered to be not aesthetically pleasing or have compromised recreational uses. Levels of total nitrogen of 0.9 mg N/L and total phosphorus of 0.04 mg P/L were recommended based on the study by Dodds et al. (1998). Set at the median of the cumulative frequency distributions of nutrients, these recommended levels assume that approximately half the systems are impaired by excessive nutrients. Another study found that total nitrogen should be 0.47 mg N/L and total phosphorus should be 0.06 mg/L to ensure that chlorophyll is < 100 mg/m^2 most of the time.

Even with the nitrogen reductions made since the 1990s, both nitrogen and phosphorus concentrations in the creek exceed the numeric goals identified in the water quality objective for biostimulatory substances, and the numeric water quality objective of 10 mg NO_3-N/L for nitrate in drinking water. These nutrient concentrations also appear to be contributing to excessive algal and emergent plant growth during certain times of the year. As mentioned above, field investigations conducted by Regional Board staff on the lower reaches of Rainbow Creek (downstream of Willow Glen-4) in July 1999 identified two locations in the creek that were affected by excessive algal growth. The locations were at the Riverhouse monitoring station and at the property located at 2068 Willow Glen Road (2068WG) approximately 500 to 600 ft upstream of Riverhouse. In 2000, these two locations, as well as the Oak Crest and Willow Glen-4 monitoring stations, were determined to be affected by excessive algae growth. The Riverhouse station also exhibited excess emergent plant growth. Appendix C presents pictures illustrating the condition of the creek at these locations.

The University of California Cooperative Extension collected samples from the creek in Fall 2000 for algae identification. The following four green algae species were identified: *Cladophora*, *Enteromorpha*, *Odegonium* and *Chaetophora* (Mellano 2000). The sampling reflected the species that were present on the date of collection and does not reflect seasonal changes in species composition. The concentrations of nutrients are likely contributing to the observed excessive algal and emergent plant growth. There was at most limited or no riparian canopy at the sampled locations, allowing for maximum light availability and water temperature increase. A dense canopy of riparian vegetation exists along much of Rainbow Creek. The canopy can limit the availability of sunlight to aquatic plants, effectively limiting their development. Consequently, despite the presence of elevated nutrient concentrations, excessive quantities of green algae have not been observed to the same degree in the shady areas of Rainbow Creek.

2.5 Monitoring Data for Year 2000

From January through October 2000, Regional Board staff and Hines Nurseries monitored water quality to determine whether nutrient concentrations were still being maintained at 1998-99 levels, whether those levels were effectively limiting excessive algal growth and whether they were adequate for maintaining beneficial uses. The 1998-99 levels reported by the MRCD (MRCD 1999b) were not maintained in 2000 and the presence of algal growth at those levels could not be determined.

The 2000 monitoring data are presented in Table B-2 and a map of the monitoring locations can be found in Figure A-3 (in Appendix A). The monitoring was performed in accordance with protocols described in the respective monitoring plans (SDRWQCB 2000 and Hines Horticulture Inc. 2000).

The following observations are made about the data:

- The average nitrate concentrations were 9.2 mg NO_3-N/L and the average total nitrogen was 11.0 mg N/L between August and October 2000 at the Oak Crest station. Five (5) of nine (9) water samples exceeded the nitrate water quality objective (10 mg NO_3-N/L). All nine water samples exceeded the biostimulatory substances water quality objective for total nitrogen (1.0 mg N/L).

- The average orthophosphate concentration was 0.85 mg PO_4-P/L and the average total phosphorus (organic and inorganic) was 1.13 mg P/L between August and October 2000 at the Oak Crest station. All nine (9) water samples exceeded the biostimulatory substances water quality objective to total phosphorus (0.1 mg P/L).

- The average nitrate concentration was 9.0 mg NO_3-N/L and the average total nitrogen was 9.6 mg N/L from January through October 2000 at the Willow Glen-4 station. Ten (10) of 25 water samples exceeded the nitrate water quality objective during this period. All 25 water samples exceeded the biostimulatory substances water quality objective for total nitrogen.

- The average nitrate concentration at the Willow Glen-4 station was 13.4 mg NO_3-N/L February through July. Ten (10) of 13 water samples exceeded the nitrate water quality objective during this period. Concentrations during this time are assumed to be attributable to polluted runoff and irrigation return flows from orchards, commercial nurseries, and septic tank disposal systems. Erosion events leading to increased turbidity may also be a cause. (See Section 4.0 Source Assessment).

- The average phosphate concentration at the Willow Glen-4 station from January through October 2000 was 0.37 mg PO_4-P/L and the average total phosphorus was 0.43 mg P/L. All 25 water samples exceeded the biostimulatory substances water quality objective for total phosphorus.

- Concentrations of nitrate, total nitrogen, and total phosphorus in the lower reaches, illustrated in Figure A-3 (in Appendix A), exceeded the water quality objective for nitrates in drinking

water throughout the entire sampling period and appear to be influenced by the two tributaries, below the Willow Glen-4 location. The two tributaries, Willow Glen Tributary (WGT1) and Via Milpas Tributary (VMT1), provide natural drainage of irrigation return flows from orchard and residential land uses.

- At the 2068WG station, the average nitrate concentration was 14.1 mg NO_3-N/L and the average total nitrogen was 14.7 mg N/L. The average total phosphorus concentration was 0.29 mg P/L. Twenty-three (23) of 24 water quality samples exceeded the nitrate water quality objective and all samples exceeded the biostimulatory substances water quality objectives for total nitrogen and total phosphorus.

- At the River House station, the average nitrate concentration was 14.2 mg NO_3-N/L and the average total nitrogen was 14.5 mg N/L. The average total phosphorus concentration was 0.28 mg P/L. Twenty-four (24) of 25 water quality samples exceeded the nitrate water quality objective and all samples exceeded the biostimulatory substances water quality objectives for total nitrogen and total phosphorus.

- At Stage Coach station, the average nitrate concentration was 12.9 mg NO_3-N/L and the average total nitrogen was 13.7 mg N/L. The average total phosphorus concentration was 0.3 mg P/L. All nine (9) samples exceeded the nitrate and biostimulatory substances water quality objectives for total nitrogen and total phosphorus.

- At WGT1 station, the average nitrate concentration was 18.4 mg NO_3-N/L and the average total nitrogen was 18.6 mg N/L. The average total phosphorus concentration was 0.17 mg P/L. All nine (9) samples exceeded the nitrate and biostimulatory substances water quality objectives for total nitrogen. Of the nine (9) samples, six (6) total phosphorus samples were below the detection of 0.05 mg P/L, and one (1) sample met and two (2) samples exceeded the biostimulatory substances water quality objectives for total phosphorus.

- At VMT1 station, the average nitrate concentration was 15.0 mg NO_3-N/L and the average total nitrogen was 15.3 mg N/L. The average total phosphorus concentration was 0.16 mg P/L. All nine (9) samples exceeded the nitrate and biostimulatory substances water quality objectives for total nitrogen. Of the nine (9) samples, five (5) total phosphorus samples were below the detection of 0.05 mg P/L, and three (3) samples met and one (1) sample exceeded the biostimulatory substances water quality objectives for total phosphorus.

- Concentrations of both nitrogen and phosphorus appear to fluctuate considerably over the course of the monitoring period and indicate seasonal variation.

2.6 Beneficial Uses

The Basin Plan identifies the beneficial uses of Rainbow Creek. They include contact and non-contact water recreation, municipal, industrial and process supply, and warm water, cold water and wildlife habitats. The beneficial use designations for the Rainbow Creek segments of Santa Margarita River hydrologic area are presented in Table 2-3. The Basin Plan provides detailed descriptions of the various beneficial uses.

Table 2-3. Beneficial Uses for the Rainbow Creek Hydrologic Subareas

HYDROLOGIC AREAS AND SUBAREAS	BENEFICIAL USE																		
	MUN	AGR	IND	PROC	GWR	FRSH	NAV	POW	REC1	REC2	COMM	WARM	COLD	SAL	WILD	RARE	MAR	MIGR	SPWN	SHEL
HA 902.00 – Santa Margarita River																				
HSA 902.22 Rainbow Creek	●	●	●						●	●		●	●		●					
HSA 902.23 Rainbow Creek	●	●	●						●	●		●	●		●					

HA = Hydrologic Area
HSA = Hydrologic Subarea

● = Existing Beneficial Use (Basin Plan, 1994)

Excess nutrients can adversely impact the following beneficial uses: municipal supply (MUN), habitat (WARM, COLD, and WILD) and recreation uses (REC1, REC2). Elevated nitrate concentrations exceed the limits for municipal water supply. Camp Pendleton relies entirely on local ground water resources for its drinking water. Surface waters from the San Mateo, the San Onofre, the Las Flores, and the Santa Margarita River basins recharge the ground water system beneath Camp Pendleton, making municipal supply a concern.

Elevated nutrient concentrations also contribute to excessive algal growth, which can lead to eutrophic conditions. Eutrophic conditions can result in decreased water clarity, loss of aquatic habitat, an increase in pH that can result in the dissociation of ammonium to form un-ionized ammonia, and a decrease in dissolved oxygen (DO) that is detrimental to aquatic life (USEPA 2000a). Water flow, sunlight, and temperature are additional factors, which can either contribute to or limit the development of excessive algal growth even when nutrients are available in sufficient quantities (USEPA 2000a). Eutrophication is the aging process by which a body of water becomes enriched in dissolved nutrients that stimulate the growth of aquatic plant life. Eutrophic conditions are characterized by algal blooms, excessive plant growth, large unsightly algal mats, decomposing plant matter, offensive odors, stagnation and low DO concentrations.

Eutrophic conditions can impact aquatic life and habitat, resulting in a skewed benthic community composition that lacks diversity in aquatic macroinvertebrates (USEPA 2000a). Recreational and aesthetic values include numerous trails that are utilized by hikers, horseback riders and residential development. The development of large unsightly algal mats and offensive odors associated with eutrophic conditions can impact both recreation and habitat-related beneficial uses and can constitute a nuisance. The depletion of DO concentrations and the production of un-ionized ammonia by plant matter decomposition can cause fish kills and other adverse effects on aquatic life; thereby impacting habitat related beneficial uses (USEPA 1999).

While the creek does have several areas susceptible to excessive algal growth during the spring, summer and fall, eutrophic conditions were not observed during the monitoring period. Fish kills or water quality degradation from decomposition of plant matter were also not observed during the monitoring period. This may be due to the shade provided by the riparian canopy of the creek. Shading reduces the temperature of the water and limits the amount of light available for photosynthesis.

On June 4 and 5,1997, Regional Board staff conducted DO monitoring. The study measured temperature and DO concentrations from 1:00 p.m. in the afternoon until 6:00 a.m. the following morning at locations on the Santa Margarita River, Rainbow Creek, Sandia Creek, and De Luz Creek. The purpose was to identify the DO diel cycle (24-hour cycle) and to determine if the concentrations dropped below the DO water quality objective. The study looked at measurements in pool and riffle areas of the stream and in backwater areas with less flow. The monitoring showed concentrations above 5 mg DO/L in flowing waters and concentrations that dipped below 5 mg DO/L in backwater areas. The Basin Plan states that DO shall not be less than 5 mg/L for inland waters designated for warm water beneficial uses. Backwater areas that exhibited low DO were uninhabitable by fish because of dense algal mats or very shallow water. The study found that DO concentrations remained at levels above the DO water quality objective in flowing water, even just before dawn when DO depletion is most likely to occur (SDRWQCB 1997). DO depletion occurs when oxygen is used up through respiration of biological organisms and biodegradation of organic material at a time when it is not being produced through the photosynthesis of algae. This condition is most likely to occur just before sunrise when the absence of sunlight is the longest. At the time of the 1997 monitoring, DO concentrations were not low enough to cause adverse effects on aquatic life. DO is not expected to be depressed below the water quality standard; however, there are no current DO results to support the assumption. Additional DO monitoring will be required in the Implementation Plan.

Rainbow Creek provides habitat to vegetation, birds, fish and wildlife, including amphibians and benthic invertebrates. A survey performed by staff on December 8, 1998 described the creek as having a riparian canopy consisting of sycamores, willows and coast live oaks with an understory of a variety of low scrubs and herbaceous plants (Pardy 1998). Invasive exotic plants were also identified in the survey and included giant reed, castor bean, cockleburr, eucalyptus, palms, iceplant, tree tobacco, and tamarisk. The Least Bell's Vireo (*Vireo bellii pusillus*), a federally and state listed endangered species, is known to inhabit the riparian woodland of the Santa Margarita Watershed (Hunsacker II 1992).

Pardy (1998) also identified the presence of a resident population of arroyo chubs (*Gila orcutti*). These small minnows are omnivorous grazers that feed on algae and other plants as well as on small crustaceans and aquatic insect larvae (Moyle 1976). Arroyo chubs are native to the Santa Margarita River watershed and are listed as a "California Species of Special Concern" by the California Department of Fish and Game (2000b). This listing requires that special consideration be taken in addressing issues to secure long-term viability for the species, with an emphasis on their susceptibility to predation.

Amphibians are known to inhabit the Santa Margarita River (Hunsacker II 1992). Pacific treefrogs (*Hyla regilla*) and California treefrogs (*Hyla cadavarina*) were observed at the Rainbow Glen Tributary monitoring location as well as at locations in the lower reaches of the creek (below Willow Glen-4) during the 2000 monitoring period. Rouse et al. (1999) reviewed a number of studies on the effects of nitrate concentrations on amphibians (primarily tadpoles). Lethal nitrate concentrations for several species were in the range of 13-40 mg NO_3-N/L. Chronic effects occurred at concentrations below 10 mg NO_3-N/L. Lethal effects for fish egg and fry were below 10 mg NO_3-N/L. The paper concluded that it is highly probable that amphibian survival is adversely affected by nitrate levels of 2.5 mg NO_3-N/L and greater. Therefore, aquatic life habitat may be potentially affected by nitrate at current concentrations; however, it is important to recognize that the species tested do not include those present in the creek.

Rainbow Creek has an impaired aquatic insect population, which may be related to its elevated nutrient concentrations. The creek's benthic macroinvertebrate community may be sensitive, in varying degrees, to temperature, DO, sedimentation, scouring, nutrient enrichment and chemical and organic pollution (Giller and Malmqvist 1998, Johnson et al. 1993). Elevated concentrations of nutrients and other pollutants, such as herbicides and pesticides, may cause changes in the aquatic insect community. These changes can include loss of species diversity, loss of pollutant sensitive species, and an increase in pollutant tolerant species (Waters 1995).

Benthic macroinvertebrate surveys conducted in 1991-92 (Hunsaker II 1992) and in 1998-99 (CDFG 2000a) found an abundance of pollutant tolerant insects and a lack of pollutant sensitive insects. Hunsaker II (1992) found that benthic community indicators in Rainbow Creek were poor compared to other tributaries and the Santa Margarita River. The 1998-99 California Department of Fish and Game surveys indicate that Rainbow Creek was "below average" compared to other tributaries in the watershed in both the May 1998 and May 1999 surveys. Low species diversity, an absence of sensitive species, and a skewed benthic community, with one or two functional feeding groups dominating were observed during these two sampling periods. The creek was "average" in both the September 1998 and November 1998 monitoring events, showing improved species diversity and a more well-distributed community structure with four of five functional feeding groups represented, although it continued to show an absence of sensitive species. Shredding insects, which feed mostly on decomposing coarse particulate organic matter, were completely absent from all four sampling events. Their absence is notable because shedders are usually associated with streams that have an intact riparian canopy, such as exists along most of Rainbow Creek.

2.7 Summary

In summary, the nitrate concentration exceeds the water quality objective for municipal water supply (MUN) and total nitrogen and total phosphorus exceed the biostimulatory substances water quality objective. In addition, nitrate, total nitrogen, and total phosphorus may impair warm water (WARM), cold water (COLD), and wildlife (WILD) beneficial uses. Excessive algae also present a nuisance, and impair aesthetic and recreational uses (REC1 and REC2) in localized areas where shading by the riparian canopy is not sufficient to limit algal growth. Excessive algae may also impair warm water (WARM), cold water (COLD), and wildlife (WILD) beneficial uses by creating conditions that are harmful to aquatic life and degrade water quality. Runoff from agriculture, nursery and residential land uses contribute to increased nutrient concentrations in Rainbow Creek as a result of storm water runoff, irrigation return flows and ground water. Existing benthic community impairment is likely a result of nutrient-enriched runoff or other pollutants associated with these same land uses. The proposed TMDLs are intended to improve water quality, restore and protect the beneficial uses of the creek impacted by nutrient enrichment, and prevent the occurrence of future eutrophic conditions.

3.0 Numeric Targets

TMDL Numeric Targets interpret and implement water quality standards (i.e., numeric and narrative water quality objectives and beneficial uses) and are established at levels necessary to achieve water quality standards. Numeric targets are established at levels that will ensure attainment of water quality objectives and the protection of beneficial uses. The numeric targets for nutrients are intended to achieve the numeric water quality objective for nitrates in municipal water supply and ultimately the narrative water quality objective for stimulation of algal and emergent plant growth by nutrients. Water quality objectives are established for nitrates, total nitrogen, and total phosphorus to meet drinking water standards in the short-term, and to reduce existing periodic algal blooms and prevent future eutrophic conditions.

Lacking a quantitative method, ratios of nitrogen to phosphorus (N:P) concentrations are used to indicate which nutrient is limiting. Allan (1995) states that it has been shown that nitrogen and phosphorus occur in algal tissue in a remarkably consistent mole ratio of 16N:1P and that the N:P ratio indicates which nutrient is likely to be the limiting factor in algal growth. For example, ratios higher than the natural ratio of 16:1 indicate a surplus supply of nitrogen and suggest that the availability of phosphorus is more likely to limit algal growth. Conversely, ratios below 16:1 indicate a nitrogen limitation (Allan 1995). Allan (1995) states that joint limitation by both nutrients is likely where N:P ratios are between 10:1 and 20:1. Assuming the N:P ratio of 16:1, or 7:1 by mass, ratios can be calculated from the empirical data presented in Appendix B, Table B-2. Primarily, phosphorus appears to be the limiting nutrient during the spring and summer; however, there are occurrences where nitrogen or both may be limiting. Therefore, targets for both nitrogen and phosphorus are appropriate to provide greater assurance that eutrophic conditions and excessive algal growth are prevented, and beneficial uses are protected. Table 3-1 presents the numeric targets.

Table 3-1. Numeric Targets

Constituent or Factor	TMDL Targets
NITRATE, As N	10 mg NO_3-N/L
TOTAL NITROGEN	1.0 mg N/L
TOTAL PHOSPHORUS	0.1 mg P/L

If the Inorganic Chemicals nitrate and Biostimulatory Substances water quality objectives in Rainbow Creek are modified in the future, then the TMDL will be recalculated and the numeric targets will be set equal to the new water quality objectives.

3.1 Target for Nitrates

The purpose of this target is to meet the water quality objective for nitrates in municipal water sources. The numeric target for nitrates is set at 10 mg NO_3-N/L to ensure that these surface waters are protected as drinking water sources and to assure compliance with the numeric water quality objective at all times.

3.2 Targets for Biostimulatory Substances: Total Nitrogen and Total Phosphorus

The Basin Plan states that inland waters are not to contain concentrations of nitrogen and phosphorus that stimulate aquatic growth to the extent that they cause a nuisance or adversely affect beneficial uses. The targets for total nitrogen and total phosphorus are water quality objectives set forth in the Basin Plan, which are intended to prevent nuisance algae and emergent plant growth in flowing waters. The water quality objectives are 1.0 mg N/L and 0.1 mg P/L, respectively, and are not to be exceeded more than 10% of the time. These targets are established as final endpoints and are to be implemented by incremental load reductions over time. It is fully expected that reductions in nutrient concentrations will result in a reduction of algal biomass and emergent plant growth. The final goal is to eliminate algae-related nuisance and impairment of beneficial uses, and to improve aquatic life beneficial uses. Currently, no site-specific data are available that correlates in-stream nutrient concentrations with abundance of algae. Therefore, monitoring of algal biomass will be included in the monitoring strategy, but is not established as a target at this time.

4.0 Source Assessment

The source assessment phase of TMDL development identifies all known sources of nutrients that may contribute to both elevated nutrient concentrations and the stimulation of algal growth in Rainbow Creek. The source assessment phase also determines nutrient inputs, measured as loads, whose magnitude evaluation supports the formulation of the load allocation and wasteload allocation of the TMDL (USEPA 1999). The following load estimates are determined using the best available methods that were known at the time of calculation, and may be revised in the future. Nutrient sources in the Rainbow Creek watershed are:

- Agricultural fields
- Orchards
- Commercial nurseries
- Residential areas
  - Landscape maintenance
  - Septic tank disposal systems
  - Backyard livestock/pets
- Atmospheric deposition
- Undeveloped land
- Interstate 15

Agricultural fields around Rainbow Creek are largely used to raise row crops, such as pumpkin and aloe. Orchards in the watershed are mostly tree-crop orchards, such as citrus (oranges, lemons, limes) and avocado. Agricultural fields, orchards, and commercial nurseries all contribute nutrients to the watershed by fertilizer application. Residential areas contribute nutrients from septic tank disposal systems, landscape maintenance, and/or backyard livestock (e.g. horses) and pet wastes. Atmospheric deposition contributes nutrients directly to the waterbody through dryfall and rainfall. Undeveloped land contributes nutrients from decaying plant material, soil erosion, air deposition, and wild animal waste. These contributions are small and generally considered to represent background levels.

Nutrients from these sources reach Rainbow Creek primarily by two routes: directly in overland flow (storm water runoff and dry weather flows) and indirectly in ground water. Nutrients applied directly to land (e.g. fertilizers, pet wastes) can be carried overland in storm water runoff and irrigation or can percolate through the soil to reach ground water. Septic tank disposal systems contribute nutrients primarily into ground water.

Nutrient loads from both runoff and ground water have been evaluated for all of the identified nutrient sources in Rainbow Creek. Surface runoff pollutant loads from various land uses were calculated by applying appropriate coefficients from published literature to the corresponding land use areas. Numerous studies have derived land use based loading coefficients characteristic of various watershed conditions for estimating nonpoint source pollutant yields (Boynton et al. 1993). Best professional estimates of probable values for nutrient export coefficients were determined for each pollutant using a hierarchical approach. First, coefficients from a variety of studies and publications were accumulated. From these, values from Southern California watersheds were selected. In the absence of these data, median national values from Boynton et

al. (1993) were selected. Because there are no export coefficients for some land use types (e.g., commercial nursery and park), areas with these land uses were assigned export coefficients for similar land use types (e.g., agriculture and idle land).

Surface runoff pollutant loads from the I-15 corridor resulting from vehicle exhaust and air deposition were estimated based on information provided by Caltrans' Internet Water Quality Planning Tool (Caltrans 2002). Caltrans maintenance operations along the I-15 corridor were evaluated as nutrient sources from roadways and parkway/median maintenance, but were not significant (Tesoro 2001).

Natural or undeveloped lands also contribute surface water loads through natural processes (e.g., leaf litter decay or soil erosion). Background loads were estimated using reference water quality concentration data and streamflow data.

Ground water loads were estimated using both site-specific monitoring data and per-capita septic disposal system nutrient load calculations. Air deposition load was calculated using a literature value deposition rate, which accounts for the amount of nutrients that deposit on the surface of the water. These source-specific load estimates account for the differences in magnitudes between sources and provide a basis for allocating loads in Section 6.0 Margin of Safety and Pollutant Load Allocations.

4.1 Nitrate/Total Nitrogen

4.1.1 Surface Water Loads

Land use, storm water discharges from the I-15 corridor, and natural sources were identified as potential sources of nitrogen to Rainbow Creek. This section provides discussion and estimates of the surface water loads from each of these sources.

Land Uses

Several land uses in the Rainbow Creek watershed were identified as potential sources of nitrogen (see Table 4-1)(MRCD 1999b). Specifically, the land uses of concern are characterized by human influence. Nutrients from these various land use activities can reach Rainbow Creek in storm water and in dry weather runoff.

Nitrogen loads from these land uses were calculated by multiplying the nitrogen export coefficient for the land use by the area. Table 4-1 contains nitrogen export coefficients and the corresponding annual nitrogen loads for the various land uses in the watershed.

Table 4-1. Calculated Annual Total Nitrogen Surface Water Loads to Rainbow Creek from Various Land Uses

Land Use	Nitrogen Export Coefficient kg/ha/yr	Area acres (ha)	Annual Total Nitrogen Load kg/yr
Commercial nurseries	3.7[1]	339 (137)	507
Agricultural fields	3.7[1]	436 (177)	655
Orchards	2.5[2]	781 (316)	790
Park	3.4[3]	5 (2)	7
Residential	2.6[1]	618 (250)	650
Urban	3.8[1]	34 (14)	53
Total		6,591 (2,668)	**2,662**

1. Source: SCCWRP 2000
2. Source: Boynton et al. 1993
3. Source: North Carolina State University 2001

Nutrient export coefficients were obtained from literature values since no site-specific values existed for Rainbow Creek. Efforts were made to select export coefficients that most appropriately represented the land use types in Rainbow Creek, and that best represented the environmental conditions in Southern California.

Caltrans I-15

Rainbow Creek receives storm water runoff from both highway surfaces and adjacent land areas via a storm drain system with outfalls discharging from both the north and south at the Rainbow Creek Bridge. Storm water from highways can contain pollutants from vehicle exhaust and atmospheric deposition. Storm water discharges from I-15 are considered point source discharges.

Rainfall runoff from I-15 can be calculated using the equation provided by Horner (1994):

$Rv = 0.007\ IMP + 0.10$

The runoff coefficient (Rv) is the ratio of runoff volume to rainfall volume, or the amount of rainfall that becomes runoff, and IMP is the percent impervious area. The total approximate drainage area is 120 acres, consisting of approximately 23 acres of impervious roadway and median, and 98 acres of vegetated land area (Tesoro 2001). Using the equation and converting the results to percentages, a 19% impervious catchment would deliver 23% in rainfall as runoff to Rainbow Creek.

The average annual rainfall in the vicinity of I-15 in the Rainbow Creek Watershed is 18 inches (Allan 2002). The estimated total annual volume of annual rainfall discharged as storm water runoff to Rainbow Creek is calculated by multiplying the surface area (in acres), amount of

rainfall (in inches/yr), and the percentage of rainfall that would run off of impervious surfaces (23%). The calculation is as follows:

120 acres * 18 in/yr * 43,560 ft^2/acre * 0.08 ft/in = 7.53 E +6 ft^3/yr * 0.23 = 1.73 E +6 ft^3/yr

The estimated storm water runoff load can be calculated using the representative concentrations of total nitrogen in freeway runoff in California (Caltrans 2003 CTSW-RT-03-065, in mg N/L) and volume of runoff discharged to Rainbow Creek (in ft^3/yr).

3.13 mg N/L * 1.73 E +6 ft^3/yr * 28.32 L/ft3 * 1 E –6 kg/mg = 153 kg N/yr

Background

Soil erosion and the decay of plant material and wild animal waste contribute background nitrogen and phosphorus loads from undeveloped land to Rainbow Creek. Available water quality concentrations from local streams similar to Rainbow Creek are used to determine background concentrations. Reference sites are relatively undisturbed by human influences. The definition of a reference condition ranges from a pristine, undisturbed stream, to merely the "best available" or "best attainable" conditions. In the case of the San Diego streams used in this study, least and minimally impacted sites have been identified and used to determine background water quality (See Appendix D).

The background load to Rainbow Creek is calculated by multiplying the representative flow volume (ft^3/yr) determined in Appendix E using United States Geological Survey (USGS) flow gage data and the background concentration (in mg N/L) determined in Appendix D. The flow volume from the first two flow tiers (low and moderate-high) represents approximately 98% of the flows in Rainbow Creek and it is this quantity that is used to represent Rainbow Creek's flow volume. The third, or "very high", flow tier represents less than 2%, thus it will not be used in TMDL calculations because it is due to extreme weather conditions.

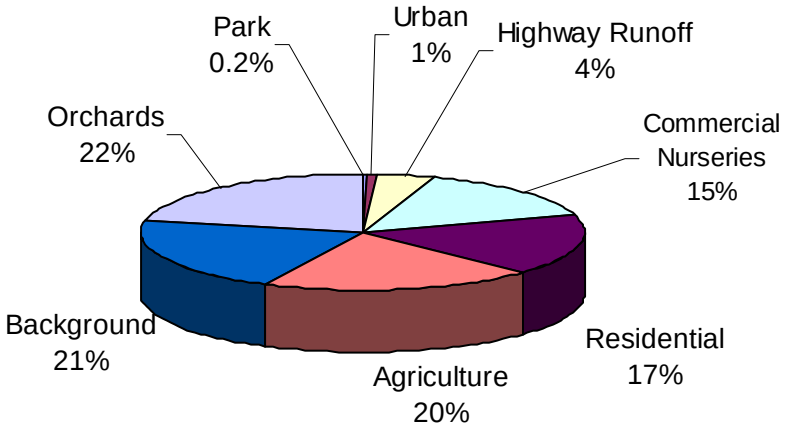
Low Flow (0-2.9 cfs)
17,764 e 3 ft^3/yr * 0.47 mg N/L * 28.32 L/ft3 * 1 e –6 kg/mg = 236 kg N/yr

Moderate – High Flow (3 – 39 cfs)
40,775 e 3 ft^3/yr * 0.47 mg N/L * 28.32 L/ft3 * 1 e –6 kg/mg = 543 kg N/yr

Total Nitrogen Load Attributable to Background Sources = 779 kg N/yr

Figure 4-1 shows a visual representation of the percentage of the total nitrogen contribution to the watershed for each of the identified surface water sources.

Figure 4-1. Land Use Contributions to Annual Total Nitrogen Surface Water Loads in Rainbow Creek



4.1.2 Ground Water Loads

Overview

Ground water that surfaces in Rainbow Creek also contributes to the nitrogen load. Nitrogen in ground water comes from two main sources: wastewater disposal systems and fertilizers that migrate to ground water via infiltration of rain or irrigation water. The total nitrogen load to Rainbow Creek from ground water is estimated to be 200 kg N/yr. This number is calculated using flow and nitrogen concentration data from Rainbow Creek during dry weather conditions.

Two different aquifer types underlie the channels of Rainbow Creek and its tributaries: alluvial deposits in the Rainbow Valley area, and crystalline bedrock everywhere else. The fact that Rainbow Creek is a gaining stream in both the Rainbow Valley area and bedrock areas of the watershed during dry weather conditions indicates that both the alluvial deposits and bedrock contribute baseflow to Rainbow Creek. However, because of the concentration of agricultural operations, population, and therefore septic tank disposal systems and because a high number of these are non-functioning systems, only baseflow discharged from the alluvial deposits is likely to contribute significant loads of nitrogen to Rainbow Creek.

Calculations

The total annual nitrogen load from ground water to Rainbow Creek was calculated using nitrogen concentration and flow data during dry weather conditions from the Oak Crest-3 Station. This station is located near the downstream (western) end of Rainbow Valley, near the point where the alluvial deposits pinch out against the bedrock. During the dry weather it is assumed that the flow measured at Oak Crest-3 Station is from ground water (i.e. baseflow).

Because the creek channel upstream of the Oak Crest-3 Station is dammed by an earthen berm at the Hines Nursery that captures all of the streamflow in the creek, only the baseflow entering the channel of Rainbow Creek below the berm is measured at the Oak Crest-3 Station. Because of this berm and because the baseflow may be higher outside of the dry season, the total nitrogen load calculated using the Oak Crest-3 Station dry season data may underestimate the total ground water load.

Total nitrogen concentrations at Oak Crest-3 Station were averaged for samples taken between August 22 and October 17, 2000 (during low flow conditions). The average total nitrogen concentration was 11 mg N/L. The average flow rate at Oak Crest-3 Station from August 22 to October 17, 2000, was 0.02 cfs (ft^3/s). Assuming the flow at Oak Crest-3 Station is comprised entirely of baseflow during this time period, and assuming that the average flow rate of 0.02 cfs represents the average year-round base flow component of stream flow in Rainbow Creek, the calculated total annual nitrogen load is:

0.02 ft^3/s * 11 mg N/L * 28.3185 L/ft^3 * 3,600 s/hr * 24 hr/d *365 d/yr * $kg/10^6$ mg ≈ 200 kg N/yr

Nitrogen Sources

The total annual nitrogen load to ground water in Rainbow Creek watershed has two possible sources: waste water disposal systems and fertilizer application in agricultural areas. Data on fertilizer application rates, volumes of applied water, and consumptive use of water and nitrogen uptake by plants in agricultural areas are not available, thus, the annual nitrogen load to ground water from fertilizer application could not be calculated. Total nitrogen contributions to ground water from fertilizer application will be evaluated further under the Implementation Plan and Monitoring Strategy.

The total annual nitrogen load to ground water from wastewater systems in the watershed is estimated to be 3,830 kg N/yr. The estimate does not account for plant uptake removal. With few exceptions, all wastewater disposal systems in the watershed are septic tank systems. For San Diego County, the estimated mass nitrogen loading from a typical septic tank system is 10.4 g/capita/day (San Diego County 1994). The estimated number of functioning septic tank systems in the watershed is roughly 237 units and the average number of people per household (and per septic tank disposal system) is 2.91 (Van Rhyn 2001). The estimated number of non-functioning septic tank disposal systems, defined as systems that are a threat to water quality because they are located in areas of high ground water, is 170 units (Rainbow Municipal Water District 2002). The total annual nitrogen load to ground water from functioning septic tank systems in the watershed therefore would be:

10.4 g/capita/day * 237 units * 2.91 capita/unit * 365 days/yr * 1 e –3 kg/g ≈ 2,600 kg N/yr

This nitrogen load should be reduced by denitrification in the leach fields of a functioning system. Typically, denitrification in the leach field removes 30 percent of the total nitrogen by loss to the atmosphere as nitrogen gas (N_2) (Oakley 1999). Therefore, the nitrogen load to ground water from the functioning leach fields would be 1,800 kg N/yr.

Because the non-functioning systems do not have adequate separation from ground water to allow denitrification to occur, a reasonable assumption is that all of the nitrogen from a septic tank system discharge reaches ground water and the 30 percent reduction does not occur. Therefore, the total annual nitrogen load to ground water from non-functioning septic tank systems in the watershed would be:

10.4 g/capita/day * 170 units * 2.91 capita/unit * 365 days/yr * 1 E –3 kg/g ≈ 1,900 kg N/yr

The total nitrogen load to ground water from septic tank system leach fields would be the sum of the functioning and nonfunctioning septic tank system loads, or 3,700 kg N/yr.

In addition to the small septic systems in the watershed, the Rainbow Conservation Camp, identified as "prison" on Figure A-2, is located in the eastern end of the watershed and has evaporation/percolation ponds that contribute nitrogen to the ground water and may be contributing nitrogen to Rainbow Creek. Wastewater from the camp is discharged to the onsite sewage treatment and disposal system. The treatment system effluent is transferred to one of three evaporation/percolation ponds. Evaporation and percolation from the ponds is the primary means of effluent disposal; however, for several days during the year, effluent from the ponds may be pumped to a spray irrigation field located on approximately 2 acres of the facility.

The estimated nitrogen load to ground water is calculated using the average pond inflow minus evaporation losses, which is then multiplied by the average pond concentrations. Since the waste discharge requirements (WDRs) for the facility only require annual monitoring, the wastewater nitrogen concentration value was averaged from data provided for the years 2000 to the present. The evaporation losses were estimated using the same approach required by the Camp's WDRs. However, the calculation was revised to account for only one pond instead of two, due to that fact that only one pond is operating at any given time. This approach used surface area of the ponds and the average mean evaporation rate reported from the USGS Vail Lake Station by the California Department of Water Resources (CDWR 1979). The annual nitrogen load from the percolation ponds to ground water is as follows (Dorsey 2003b):

(11,353,529 L inflow/yr – 3,400,962 L evap./yr) * 16.5 mg N/L * 1 E –6 kg/mg ≈ 130 kg N/yr

Implementation measures will be taken to determine the impacts of the Camp treatment system on Rainbow Creek.

The estimated total annual nitrogen load to ground water from wastewater disposal systems is the sum of the annual nitrogen load from functioning septic systems, non-functioning septic systems, and the Camp treatment system, or 3,830 kg N/yr. The total nitrogen load to Rainbow Creek from ground water was calculated to be 200 kg N/yr. A comparison of these two numbers suggest that only a small fraction of the total annual nitrogen load to ground water is discharged to Rainbow Creek each year. In addition to discharge to the creek, some of the nitrogen load will be removed through plant uptake. Site-specific uptake rates are not known. The actual removal rates will vary seasonally, with higher removal rates occurring in the spring and summer months, but an annual average removal rate for nitrogen will be accounted for when site-specific uptake rates are determined. Nonetheless, the plant uptake of nitrogen from ground water and the

discharge of nitrogen laden ground water to the creek is not expected to be high enough to prevent nitrogen concentrations in ground water from rising over time because of the high annual nitrogen load to ground water from the disposal systems. Consequently, the nitrogen concentration in the ground water that discharges into Rainbow Creek may increase over time, increasing the total annual nitrogen load from ground water to Rainbow Creek over time.

4.1.3 Atmospheric Deposition

Air pollutants are deposited to the earth, in most cases directly to a water body or to a land area that drains into a water body. These pollutants are deposited by wet or dry deposition. In wet deposition, pollutants are removed from the air by a precipitation event such as rain. Dry deposition occurs when particles settle out of the air and onto surfaces. Total nitrogen loads from atmospheric deposition are most significant in large lakes or reservoirs when the waterbody is large compared to the total watershed area (USEPA 1999). In the Rainbow Creek watershed, nutrient loads from atmospheric deposition are not likely to be significant as compared to other sources, because the surface area of the creek is small compared to the area of the watershed. Atmospheric deposition is calculated using water surface area only, since total nitrogen depositions on land are included in the nutrient export coefficients. Atmospheric deposition loads to Rainbow Creek were estimated using established atmospheric deposition rates.

The length of the creek, including tributaries, is approximately 15 miles, and the average width of the creek is approximately 5 feet. The surface area of the creek is approximately 0.01 square miles, or 4 hectares. With an atmospheric deposition rate of 10 kg N/ha/yr (USEPA 1994), the load from air deposition would be approximately 40 kg N/yr.

4.1.4 Summary of Current Annual Total Nitrogen Load by Source

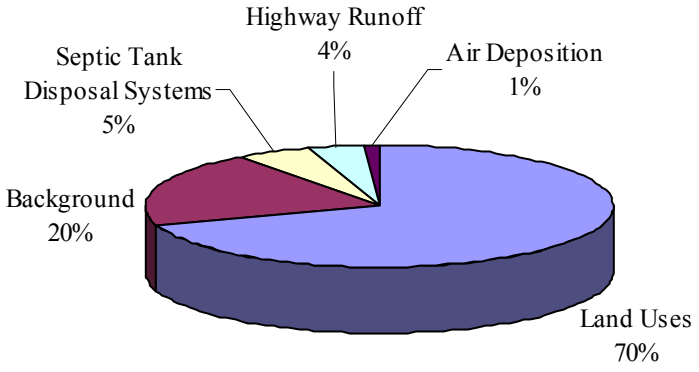
The annual load based on the calculations from the identified sources described in this section is 3,868 kg N/yr, and is summarized below in Table 4-2.

Table 4-2. Summary of Annual Total Nitrogen Load by Source Type in Rainbow Creek Watershed

Source Type	Annual Total Nitrogen Load Estimate kg N/yr
Land Uses (surface runoff)	2,662
Caltrans I-15 (storm water runoff)	153
Background (surface runoff)	779
Septic Tank Disposal Systems (ground water)	200
Air Deposition (surface water)	40
Total	3,834

Figure 4-2 shows the percentage of total nitrogen load contributions to the Rainbow Creek watershed from the five sources listed in Table 4-2.

Figure 4-2. Annual Total Nitrogen Load by Source Type in the Rainbow Creek Watershed



4.2 Total Phosphorus

4.2.1 Surface Water Flows

Land use, storm water discharges from I-15, and natural sources were identified as potential sources of phosphorus to Rainbow Creek. This section provides discussion and estimates of the surface water loads from each of these sources.

Land Uses

It is assumed that the sources of total phosphorus in runoff from various land uses are the same as those identified for total nitrogen. To estimate total phosphorus loads from different land uses, phosphorus export coefficients can be used. Land uses in the Rainbow Creek watershed identified as potential sources of phosphorus are listed in Table 4-3, with corresponding export coefficients and annual loads.

Table 4-3. Calculated Annual Total Phosphorus Loads to Rainbow Creek from Various Land Uses

Land Use	Phosphorus Export Coefficient kg/ha/yr	Area Acres (ha)	Annual Total Phosphorus Load kg P/yr
Commercial nurseries	0.2[1]	339 (137)	27.4
Agricultural fields	0.2[1]	436 (177)	35.4
Orchards	0.2[2]	781 (316)	63.2
Park	0.1[3]	5 (2)	0.2
Residential areas	0.5[1]	618 (250)	125
Urban areas	0.8[1]	34 (14)	11.2
Land Uses Total		6,591 (2,668)	**262**[4]

1. Source: SCCWRP 2000
2. Source: Boynton et al. 1993
3. Source: North Carolina State University 2001
4. Rounded to three significant figures

Caltrans I-15

As with nitrogen, the estimated storm water runoff load is calculated using the representative concentration of total phosphorus in freeway runoff in California (Caltrans 2003 CTSW-RT-03-065) and the volume of runoff discharged to Rainbow Creek (see Section 4.1.1 for calculation).

0.29 mg P/L * 1.7 E +6 cfs/yr * 28.32 L/ft3 * 1 E –6 kg/mg = 14 kg P/yr

Background

Soil erosion and the decay of plant material and wild animal waste contribute background nitrogen and phosphorus loads from undeveloped land to Rainbow Creek. Available water quality concentrations from local streams similar to Rainbow Creek are used to determine background concentrations. Reference sites are relatively undisturbed by human influences. The definition of a reference condition ranges from a pristine, undisturbed stream, to merely the "best available" or "best attainable" conditions. In the case of the San Diego streams used in this study, least and minimally impacted sites have been identified and used to determine background water quality (See Appendix D).

As with nitrogen, the background load for phosphorus to Rainbow Creek is calculated by multiplying the representative flow volume (tiers 1 and 2, in ft^3/yr) determined in Appendix E using USGS flow gage data and the background concentration (in mg P/L) determined in Appendix D.

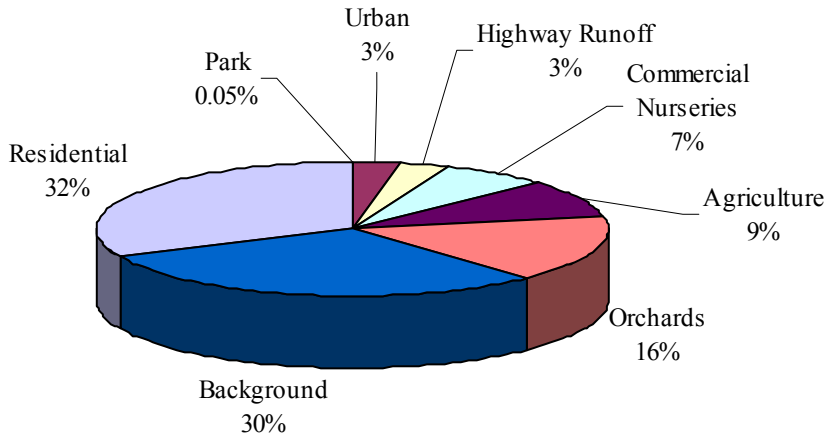
Low Flow (0-2.9 cfs)
17,764 e 3 ft^3/yr * 0.07 mg P/L * 28.32 L/ft3 * 1 e –6 kg/mg = 35 kg P/yr

Moderate – High Flow (3 – 39 cfs)
40,775 e 3 ft^3/yr * 0.07 mg P/L * 28.32 L/ft3 * 1 e –6 kg/mg = 81 kg P/yr

Total Phosphorus Load Attributable to Background Sources = 116 kg P/yr

Figure 4-3 is a visual representation of the percentage of the total phosphorus contribution to the watershed for each of the identified land uses.

Figure 4-3. Land Use Contributions to Annual Total Phosphorus Surface Water Loads in the Rainbow Creek Watershed



Total phosphorus can be released into the surface water from sediment. Total phosphorus releases from sediment in Rainbow Creek are not known at this time. They will be determined during the implementation phase.

4.2.2 Ground Water Loads

Septic tank disposal systems are not considered to be significant total phosphorus sources in ground water. Phosphates readily adsorb to soil particles; consequently, phosphates do not travel far with ground water. Existing data for total phosphorus concentrations in soil below leach fields demonstrate this phenomenon. Phosphate concentrations 1 ft below a leach field were 10 mg P/L, while at 3 ft below the leach field they were 1 mg P/L (Oakley 1999). Infiltration of phosphate from land applications is not considered significant for the same reason. Therefore, ground water loads of total phosphorus are not considered significant in Rainbow Creek. Total phosphorus contributions to ground water from septic tank disposal systems will be further investigated and is discussed in the Implementation Plan and Monitoring Strategy.

4.2.3 Atmospheric Deposition

Atmospheric phosphorus can be found in both organic and inorganic dust particles. Particles of organic origin, such as pollen, will contain phosphorus, as do all living organisms. Mineral dust will contain varying levels of phosphorus depending on its source. The general atmospheric deposition rate for total phosphorus is 0.6 kg P/ha/yr (USEPA 1994). With a creek surface area of 4 hectares, this source would contribute approximately 2 kg/year.

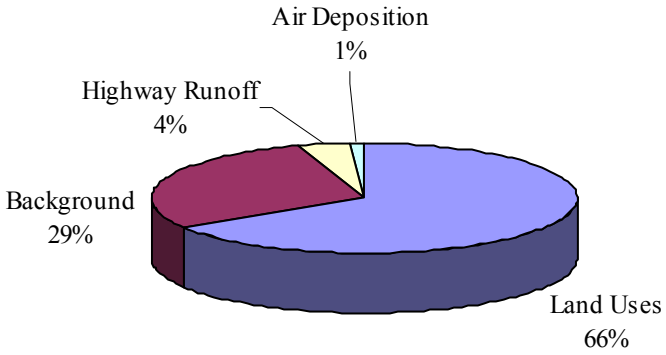
4.2.4 Summary of Current Annual Total Phosphorus Load by Source

The current annual load based on the calculations from the identified sources described in this section is 393 kg P/yr, and is summarized below in Table 4-4.

Table 4-4. Summary of Annual Total Phosphorus Load by Source Type in Rainbow Creek Watershed

Source Type	Annual Total Phosphorus Load Estimate (kg P/yr)
Land Uses (surface runoff)	262
Caltrans I-15 (storm water runoff)	14
Background (surface runoff)	116
Septic Tank Disposal Systems (Ground water)	0
Air Deposition (surface water)	2
Total	**394**

Figure 4-4. Annual Total Phosphorus Load by Source Type in the Rainbow Creek Watershed



5.0 Loading Capacity and Linkage Analysis

The Linkage Analysis describes the relationship between the numeric target and the allowable pollutant-level by determining the waterbody's total assimilative capacity, or loading capacity, for the pollutant. The loading capacity is the maximum amount of pollutant loading that a waterbody can receive while meeting its water quality objectives. The Linkage Analysis therefore represents the critical quantitative link between the TMDL and attainment of the water quality standards.

The proposed TMDLs will result in the attainment of the Biostimulatory Substances water quality objective and the restoration of beneficial uses in Rainbow Creek watershed. This is because the numeric targets are set equal to the nutrient water quality objectives as concentrations of nutrients that will prevent plant nuisance in flowing waters. The numeric targets are used directly to calculate the loading capacity (TMDLs).

If the Biostimulatory Substances water quality objectives change in the future, the numeric targets would be equal to the new water quality objectives, and a new loading capacity would be calculated to meet the new numeric targets.

5.1 Total Nitrogen

For Rainbow Creek, the total nitrogen loading capacity is the maximum amount of total nitrogen that can enter the water column without exceeding the numeric target, in this case the biostimulatory target. The Regional Board reviewed daily streamflow-gage data from the U.S. Geological Survey's gaging station located near the Willow Glen-4 station for the period of November 11, 1989 to September 30, 2000 for Rainbow Creek and selected daily flow records from 8 years of records (USGS 2002). The daily streamflow data was evaluated for seasonal flow variations and to determine the annual flow volume for Rainbow Creek (See Appendix E).

The flow data was divided into three flow tiers, which were determined based on frequency of flow rates and consideration of the time of year of occurrence. The first two flow tiers (low and moderate-high) represent approximately 98% of the flows in Rainbow Creek and will be used to calculate the TMDL. The third, or "very high", flow tier represents less than 2% of the total flow and will not be used in the TMDL calculation because it is due to extreme weather conditions. It is believed that very high flows would produce a mass load with a short residence time that would not create a nutrient-related problem within the watershed. In other words, compliance with the TMDL is required during flows with a magnitude of less than 40 cfs.

The annual total nitrogen loading capacity is determined by multiplying the flow volume (in ft^3/yr) and the water quality concentration (in mg N/L) that will allow the creek to attain water quality standards. The loading capacity is as follows:

Low Flow (0-2.9 cfs)
17,764 e 3 ft^3/yr * 1 mg N/L * 28.32 L/ft3 * 1 e –6 kg/mg = 503 kg N/yr

Moderate – High Flow (3 – 39 cfs)
40,775 e 3 ft^3/yr * 1 mg N/L * 28.32 L/ft3 * 1 e –6 kg/mg = 1,155 kg N/yr

Total Annual Loading Capacity = 1,658 kg N/yr

5.2 Total Phosphorus

Using the same approach as for total nitrogen, the annual flow volume for the low and moderate-high flow tiers and the biostimulatory numeric target of 0.1 mg P/L are used to calculate the total phosphorus loads for Rainbow Creek. The annual total phosphorus loading capacity is presented below:

Low Flow (0-2.9 cfs)
17,764 e 3 ft^3/yr * 0.1 mg P/L * 28.32 L/ft3 * 1 e –6 kg/mg = 50 kg P/yr

Moderate – High Flow (3 – 39 cfs)
40,775 e 3 ft^3/yr * 0.1 mg P/L * 28.32 L/ft3 * 1 e –6 kg/mg = 115 kg P/yr

Total Annual Loading Capacity = 165 kg P/yr

Table 5-1 summarizes the initial loading capacities of Rainbow Creek for total nitrogen and total phosphorus.

Table 5-1. Rainbow Creek Loading Capacities for Total Nitrogen and Total Phosphorus

Numeric Target	Load Capacity	
	kg/yr	lbs/yr
Total Nitrogen	1,658	3,648
Total Phosphorus	165	365

For convenience, the initial load capacity has been provided in the units of kilograms per year and pounds per year.

6.0 Margin of Safety and Pollutant Load Allocations

A TMDL is less than or equivalent to the loading capacity after taking into account the allocations for all sources and a margin of safety. A TMDL can be divided into a wasteload allocation (WLA) for point sources subject to an NPDES permit, and a load allocation (LA) for all other sources including nonpoint and natural background. Presently, only one point source was found to be a contributing source, e.g., Caltrans. Additionally, 2% of the TMDLs will be set aside to account for unknown or future point sources. If, in the future, a source that is considered a nonpoint source in this document becomes a point source (i.e., a permitted discharge), then the portion of the load allocation that is associated with that source can be become a WLA. The TMDL must also contain an explicit and/or implicit margin of safety (MOS), which accounts for unknowns and uncertainties in the analysis. The TMDL is represented by the following equation:

$$TMDL = \sum(WLA) + \sum(LA) + MOS$$

6.1 Margin of Safety

TMDLs are required to include an MOS that accounts for limitations in the accuracy of the modeling used to develop the TMDL and for the uncertainty in the relationship between pollutant loads and receiving water quality. The MOS can be expressed either implicitly or explicitly. An implicit MOS is incorporated through making conservative assumptions in the TMDL analysis. An explicit MOS can be applied by reserving a portion of the TMDL and not allocating it to any other sources. These nutrient TMDLs utilize both an implicit and an explicit MOS. An explicit MOS of 5% is reserved to account for uncertainties. An implicit MOS has been incorporated through conservative assumptions in the analysis by treating nutrients as conservative pollutants (i.e., did not consider nutrient cycling within the environment).

If the water quality objectives for Biostimulatory Substances change in the future, then the TMDL would be recalculated and the new explicit MOS would be equal to 5 percent of the recalculated loading capacity.

Uncertainties in the source analysis and linkage analysis of the total nitrogen and total phosphorus TMDLs are:

For total nitrogen:

- Actual site-specific nutrient export coefficients and air deposition rates
- Actual condition and maintenance status of septic tank disposal systems
- Actual effect of rising ground water table on septic tank disposal systems
- Actual contribution of nutrients from the Conservation Camp percolation ponds to surface water
- Actual data on ground water contributions to surface water
- Actual loading of nutrients to ground water from irrigation
- The relationship between nutrient loads and corresponding creek concentrations
- Future watershed development

For total phosphorus:

- Actual site-specific nutrient export coefficients and air deposition rates
- Actual loading from overland surface runoff during storm events
- Actual loading from stream sediment
- The relationship between nutrient loads and creek concentrations
- Future watershed development

6.2 Total Nitrogen Load Allocations

The Linkage Analysis (see Table 5-1) determined that the allowable total nitrogen mass load in Rainbow Creek is 1,658 kg N/year.

In determining the load allocations for the total nitrogen TMDL, the allowable pollutant load of 1,658 kg N/yr is divided between the MOS, background, point and nonpoint source discharges. As described above, an explicit MOS of 5% is reserved to account for uncertainties. The MOS is 83 kg N for the year.

For the purposes of this TMDL, background total nitrogen loads are subtracted separately from the load allocations. Background loads of nitrogen occur naturally through decaying plant material (such as leaf litter), soil erosion, and wild animal waste. The background load was determined in Section 4.1.1 to be 779 kg N/yr and is based on the San Diego reference stream concentration and Rainbow Creek annual flow.

Based on available information, highway runoff is the only identified point source of total nitrogen to Rainbow Creek. Using the same method as used in Section 4.1.1 to calculate the load from highway runoff, the wasteload allocation is determined to be 49 kg N/yr if Caltrans' discharge is at the water quality standard of 1.0 mg N/L. In addition, 2% of the TMDL, or 33 kg N/L, will be set aside as a placeholder for unknown or future point sources. The total wasteload allocation (WLA) for the creek is 82 kg N/yr. The remaining allocation for nonpoint sources (LAs) is therefore:

Total Maximum Daily Load – Margin of Safety – Background Load – Point Source Allocation = Remaining Allocation for Nonpoint Sources

1,658 kg N/yr – 83 kg N/yr – 779 kg N/yr – 82 kg N/yr = 714 kg N/yr

The total LAs do not include an allocation for undeveloped land or preserve, because they are considered as part of background loads.

In summary, the nitrogen TMDL equation is:

TMDL = ∑(WLA) + ∑(LA) + Background + MOS

∑ WLA	82 kg N/yr
∑ LA	714 kg N/yr
Background	779 kg N/yr
MOS	83 kg N/yr
TMDL	1,658 kg N/yr

The allocations to the various sources are shown in Table 6-1, below. Appendix F provides additional information, which is summarized here:

1. The largest contributors to the current load are required to make the largest reductions. Commercial nurseries, agricultural fields, orchards, residential, and septic tanks are required to make a 77% reduction

2. Parks and urban areas are required to make a 50% reduction since their relative contribution is very small, less than 2% of the current load.

3. The Caltrans allocation, as discussed above, is based on multiplying their estimated discharge times the numeric target of 1.0 mg N/L.

4. Air deposition on the water surface receives no reduction because it is least practical to achieve.

5. Future point sources are allocated 33 kg N per year.

Table 6-1 lists the load allocations for the identified point and nonpoint nitrogen sources. For convenience to the reader, the allocations are provided in the units of kilograms per year and pounds per year.

Table 6-1. Total Nitrogen Wasteload and Load Allocations for Rainbow Creek Nitrogen TMDL

Source	Current Annual Load kg N/yr	Reduction %	Annual Load Allocations	
			kg N/yr	lbs. N/yr
Caltrans highway runoff	153	68	49	108
Unidentified and future point source discharge			33	72
Point Source (WLA) Subtotal			**82**	**180**
Commercial nurseries	507	77	116	255
Agricultural fields	655	77	151	332
Orchards	790	77	182	400
Park	7	50	3	7
Residential areas	650	77	149	328
Urban areas	53	50	27	60
Septic tank disposal systems	200	77	46	101
Air deposition	40	0	40	88
Non-Point Source (LA) Subtotal			**714**	**1,571**
Total	**3,055**	**74**	**796**	**1,751**

6.3 Total Phosphorus Load Allocations

The Linkage Analysis (Table 5-1) determined that the total phosphorus mass loading capacity of Rainbow Creek required to attain the biostimulatory numeric target is 165 kg P/yr.

In determining the load allocations for the total phosphorus TMDL, the allowable pollutant load of 165 kg P/yr is divided between MOS, background, point and nonpoint source discharges. As described above, a 5% MOS is set aside to account for uncertainties. The MOS is 8 kg P/yr.

For the purposes of this TMDL, background total phosphorus sources are subtracted separately from the load allocations. The background load was determined in Section 4.2.1 to be 116 kg P/yr and is based on San Diego reference stream concentration for total phosphorus and Rainbow Creek annual flow.

Based on available information, highway runoff is the only identified total phosphorus point sources to Rainbow Creek. Using the same method as used in Section 4.2.1 to calculate the load from highway runoff, the wasteload allocation is determined to be 5 kg P/yr if Caltrans' discharge is at the water quality standard of 0.1 mg P/L. In addition, 2% of the TMDL, or 3 kg

P/L, will be set aside as a placeholder for unknown or future point sources. The total wasteload allocation (WLA) for the creek is 8 kg P/yr. The remaining allocations for nonpoint sources (LAs) are therefore:

Total Maximum Daily Load – Margin of Safety – Background Load – Point Source Allocation = Remaining Allocation for Nonpoint Sources

165 kg P/yr – 8 kg P/yr – 116 kg P/yr – 8 kg P/yr = 33 kg P/yr

These total LAs do not include an allocation for undeveloped land or preserve, since they are considered as part of background loads.

In summary, the phosphorus TMDL equation is:

TMDL = ∑(WLA) + ∑(LA) + Background + MOS

∑ WLA	8 kg P/yr
∑ LA	33 kg P/yr
Background	116 kg P/yr
MOS	8 kg P/yr
TMDL	165 kg P/yr

The allocation to the various sources are presented in Table 6-2 and are based on the following (Appendix F provides additional information):

1. The largest contributors to the current load are required to make the largest reductions. Commercial nurseries, agricultural fields, orchards, and residential are required to make a 90% reduction.

2. Parks and urban areas are required to make a 50% reduction since their relative contribution is very small, less than 3% of the current load.

3. The Caltrans allocation, as discussed above, is based on multiplying their estimated discharge times the numeric target of 0.1 mg P/L.

4. Air deposition on the water surface receives no reduction because it is least practical to achieve.

5. Future point sources are allocated 3 kg P per year.

Table 6-2 lists the load allocations for the identified point and nonpoint total phosphorus sources. For convenience to the reader, the allocations are provided in the units of kilograms per year and pounds per year.

Table 6-2. Total Phosphorus Wasteload and Load Allocations for Rainbow Creek Phosphorus TMDL

Source	Current Annual Load Kg P/yr	Reduction %	Annual Load Allocations	
			Kg P/yr	lbs. P/yr
Caltrans highway runoff	14	64	5	11
Unidentified and future point source discharge			3	7
Point Source (WLA) Subtotal			**8**	**18**
Commercial nurseries	27.4	90	3	7
Agricultural fields	35.4	90	4	9
Orchards	63	90	6	13
Park	0.2	50	0.1	0.2
Residential areas	125	90	12	26
Urban areas	11	50	6	13
Air deposition	2	0	2	4
Non-Point Source (LA) Subtotal			**33.1**	**73**
Total	**279**	**85**	**41.1**	**91**

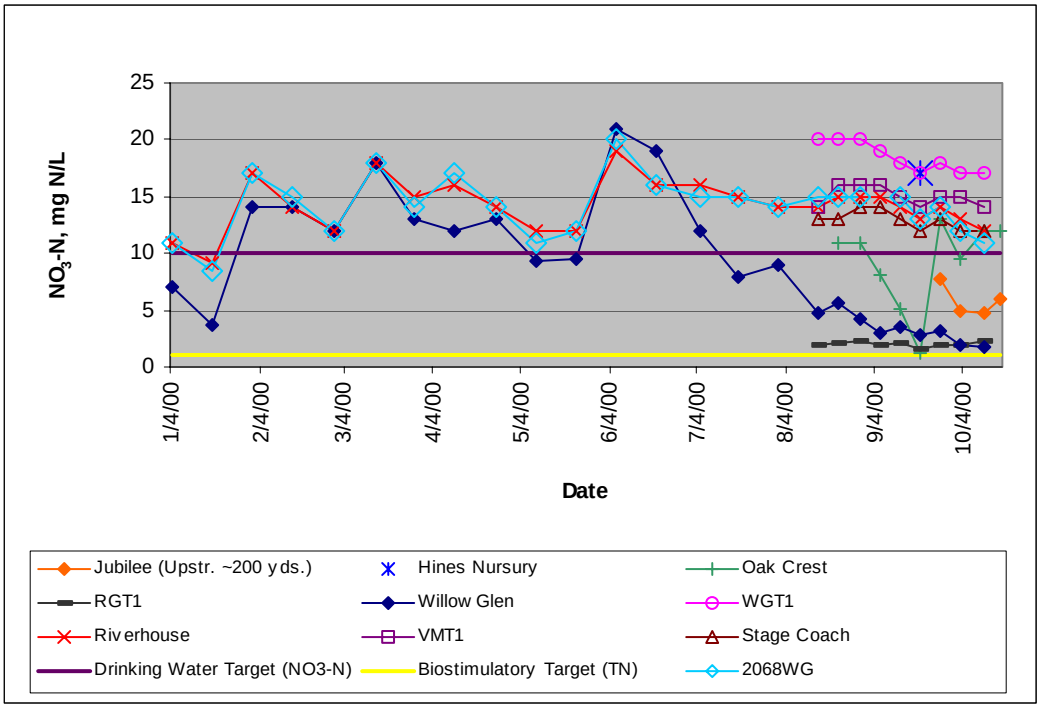
7.0 Seasonal Variations and Critical Conditions

Defining and calculating the TMDLs using site-specific flow data addresses seasonal variation. Stream flow data includes the variability of discharge rates and receiving water flows. It assumes that the higher flows during the winter months will provide a shorter residence time. Summer is the critical time period for eutrophic conditions because of available nutrients, low flows, warmer temperatures, and longer daylight hours. The loads are expected to be protective of beneficial uses because the TMDLs are based on the water quality objective.

There are essentially two weather seasons in Southern California, a dry season, which makes up most of the year and intermittent wet weather events that primarily occur between November and March, and averaging about 16 inches annually for inland North County (Escondido)(WRCC 2003). The Fallbrook area has a temperate climate with the warmest daytime temperatures (> 90°F) occurring in August and September and the coolest daytime temperatures (< 60°F) occurring between November and March. Winter is the least critical time of year for algal growth because its growth is limited as a result of cooler temperatures, less available light, and generally higher flows. Field surveys performed in December 1999 and January 2000 did not find algae in excessive quantities.

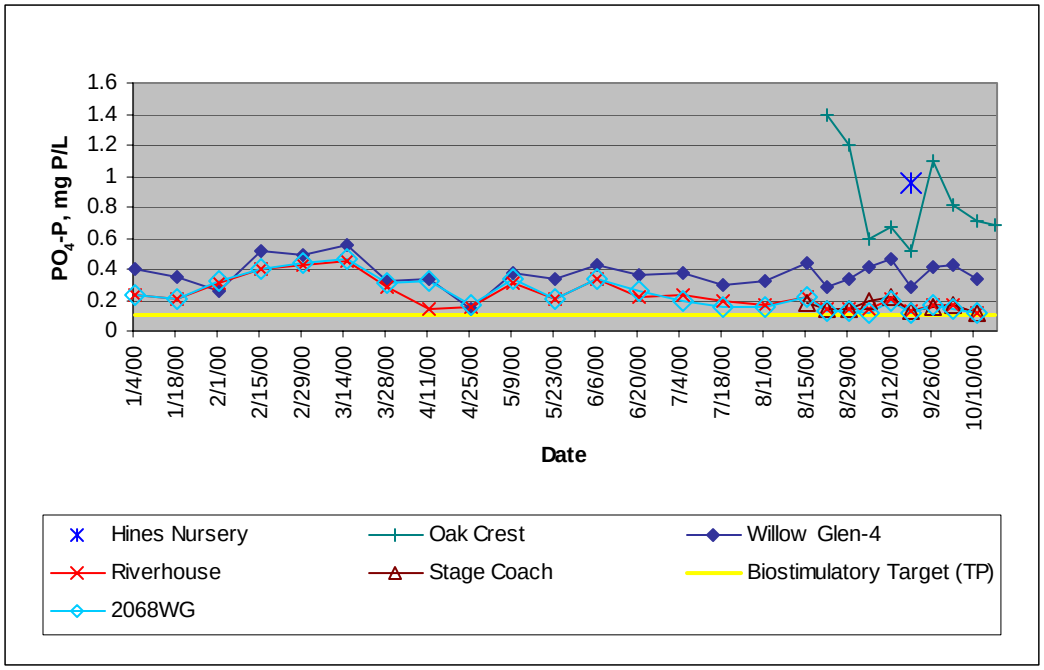
Although late summer is the critical time period for the development of eutrophic conditions, the critical time period for algal growth begins much earlier. Algal growth, illustrated in a sample of photographs presented in Appendix C (additional photographs are available in the Administrative Record), begins flourishing in February, is well established by May, and is present through the summer months. Emergent plants and additional localized algal blooms were found to be present in June, and continue to grow into October. When optimum conditions of adequate light, stream flow, water temperature and substrate exist, adequate nutrient quantities are needed for algal growth. Figure 7-1 shows the nitrate concentrations (Appendix B, Table B-2) at monitoring locations on Rainbow Creek and its tributaries (see Appendix A, Figure A-3 for map). Data in Figure 7-1 reveals the impact of land uses on nitrate nitrogen concentrations in the creek. Jubilee and RGT1 are both mostly surrounded by vacant lands, and are less impacted by irrigated fields and orchards. Levels at these sites are relatively low. Concentrations at Oak Crest Mobile Estates range from 1.2 to 17 mg NO_3-N/L. In the lower reaches of the creek, below Willow Glen-4, nitrate levels are above 10 mg NO_3-N/L in February, and average 14 mg NO_3-N/L through mid-October. WGT1 and VMT1 receive orchard drainage and nitrate levels are quite high. Riverhouse and Stagecoach are similarly heavily impacted by orchards. Riverhouse levels are high year round, possibly a result of tributary effects and orchard input. Willow Glen-4 has seasonally elevated winter concentrations, followed by a reduction in the late summer months. This is possibly because of lower flows, and assimilation during the longer flow through time between Rainbow Valley and this station.

Figure 7-1. Rainbow Creek Nitrate Concentrations During 2000



Orthophosphate concentrations in Rainbow Creek average 0.33 mg PO_4-P/L (range 0.12 to 1.4 mg PO_4-P/L). Creek concentrations (Appendix B, Table B-2) are illustrated in Figure 7-2. Levels in all tributaries and the most upstream location (Jubilee) were below the detection limit of 0.05 mg P/L, and do not appear in the figure. Orthophosphate concentrations at Oak Crest Mobile Estates vary more (range 0.52 to 1.4 mg PO_4-P/L). Concentrations in the lower reaches range from 0.12 to 0.55 mg PO_4-P/L. In the lower reaches of the creek, concentrations may increase during the period of January through March and decline between March and April. This appears to coincide with the 2002 wet season and with field observations that found an increase in algal biomass.

Figure 7-2. Rainbow Creek Orthophosphate Phosphorus Concentrations During 2000



Based on observations of seasonal variation and critical conditions (development of excessive algae) during the 2000 monitoring period, nutrient loading controls appear to be needed between February and September. Because sediments act as a sink for nutrients, availability of plentiful nutrients during the initial growth period can result in accumulations of algae later in the year. The target for nitrates is also applicable to the entire year because it is health-related and is not to be exceeded at any time. Therefore, controls on nutrient loading should be implemented all year long. Water quality monitoring will be required to demonstrate compliance with targets and will be discussed in the Implementation Plan (Section 9).

8.0 Legal Authority and Regulatory Framework

This Section presents the legal authority and regulatory framework used as a basis for assigning specific responsibilities to implement and monitor the Rainbow Creek TMDL. The laws and policies governing point source[20] and nonpoint source[21] discharges are described. Discharger accountability for attaining nutrient wasteload and load reductions is established. An approach for providing the necessary regulatory oversight of the nonpoint source nutrient load reduction is proposed. The legal authority and regulatory framework is described in terms of the following:

- Controllable Water Quality Factors
- Point Source Discharges
- Nonpoint Source Discharges
- Third Party Regulatory Based Approach

8.1 Controllable Water Quality Factors

The Rainbow Creek watershed lies within an unincorporated portion of the County of San Diego. Sources of nutrients to Rainbow Creek that result from human habitation and land use practices include wet and dry weather runoff, agricultural, orchard, and nursery irrigation return flows, septic wastewater discharges, and atmospheric deposition. Construction, maintenance, and operation of State-owned highways are also sources of nutrient discharges to Rainbow Creek. These nutrient discharges result from controllable water quality factors which are defined as those actions, conditions, or circumstances resulting from man's activities that may influence the quality of the waters of the State and that may be reasonably controlled. This TMDL establishes wasteload and load allocations for these controllable discharges. This TMDL does not require reduction of uncontrollable discharges of nutrients such as those resulting from wildlife and natural sources.

[20] The term ‘‘point source’’ is defined in Clean Water Act section 502(6) to mean any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, or vessel or other floating craft, from which pollutants are or may be discharged. This term does not include agricultural storm water discharges and return flows from irrigated agriculture.

[21] The term ‘‘nonpoint source’’ refers to diffuse, widespread sources of pollution. The major sources of nonpoint source pollution in California are related to land use activities that occur throughout watersheds and include: (1) agriculture, (2) forestry (silviculture), (3) urban runoff, (e.g., from construction sites, roads and highways, septic systems), (4) marinas and boats, (5) hydromodification activities, and (6) resource extraction. As rainfall, snowmelt, irrigation water or any other type of water moves over or through the ground, it picks up and transports natural pollutants and pollutants resulting from human activity, ultimately depositing them into rivers, lakes, wetlands, coastal waters, and groundwater.

8.2 Point Source Discharges

Dischargers responsible for actual or potential point source discharges of nutrients to Rainbow Creek are discussed in this subsection. These dischargers have specific roles and responsibilities assigned to them for achieving compliance with the total nitrogen and total phosphorus wasteload described in Section 10.0 Implementation Action Plan.

8.2.1 Regulatory Background

Clean Water Act § 402 establishes the National Pollutant Discharge Elimination System (NPDES Program) to regulate the ‘‘discharge of a pollutant,’’ other than dredged or fill materials, from a ‘‘point source’’ into ‘‘waters of the United States[22].’’ Under Clean Water Act § 402, discharges of pollutants to waters of the United States are authorized by obtaining and complying with the terms of an NPDES permit. NPDES permits commonly contain numerical discharge limits for specified pollutants and required best management practices[23] (BMPs) designed to minimize water quality impacts. These numerical effluent limitations and BMPs (or other non-numerical effluent limitations) implement both technology-based and water quality based requirements of the Clean Water Act. Technology-based limitations represent the degree of control that can be achieved by point sources using various levels of pollution control technology. If necessary to achieve compliance with applicable water quality standards, NPDES permits must contain water quality-based limitations more stringent than the applicable technology-based standards.

Within each TMDL a “wasteload allocation[24]” is determined which is the maximum amount of a pollutant that may be contributed to a waterbody by “point source” discharges of the pollutant in order to attain and maintain water quality objectives. NPDES permits must include water quality-based effluent limits or conditions that are consistent with the assumptions and requirements of the wasteload allocation. The principle regulatory means of implementing TMDLs for point source discharges regulated under NPDES permit are:

1. Allocate the total wasteload allocation calculated for point source facilities regulated under NPDES permits among each individual NPDES point source facility that is discharging the pollutant that needs to be controlled;

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[22] See 40 CFR §122.2(c)(e). The USEPA has interpreted “waters of the United States” to include “intrastate lakes, rivers, streams (including intermittent streams) . . . the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce,” and “tributaries of [those] waters”. Rainbow Creek, a tributary of the Santa Margarita River, is a water of the United States.

[23] See 40 CFR §122.2 Best management practices (“BMPs”) means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of “waters of the United States.” BMPs also include treatment requirements, operating procedures, and practices to control site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. The term BMP is extensively used in the point source program in connection with NPDES permits where implementation of BMPs is enforceable.

[24] See 40 CFR 130.2(h). A wasteload allocation is the portion of the receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution.

2. Evaluate whether the effluent limitations or conditions within the NPDES permit are consistent with the wasteload allocation. If not, incorporate effluent limitations that are consistent with the wasteload allocation into the NPDES permit[25] or otherwise revise the NPDES permit to make it consistent with the assumptions and requirements of the TMDL wasteload allocation.[26] A time schedule to achieve compliance should also be incorporated into the NPDES permit in instances where the discharger is unable to immediately comply with the required wasteload reduction;

3. Mandate discharger compliance with the wasteload allocation in accordance with the terms and conditions of the revised NPDES permit;

4. Implement a monitoring and/or modeling plan designed to measure the effectiveness of the controls implementing the wasteload allocations and the progress the waterbody is making toward attaining water quality objectives; and

5. Establish criteria to determine that substantial progress toward attaining water quality standards is being made and if not, the criteria for determining whether the TMDL or wasteload allocation needs to be revised.

8.2.2 California Department of Transportation

The California Department of Transportation (Caltrans) is responsible for the design, construction, maintenance, and operation of the California State Highway System, including the portion of the Interstate Highway System within the State's boundaries. The roads and highways operated by Caltrans are legally defined as municipal separate storm sewer systems (MS4s) and discharges of pollutants from Caltrans MS4s to waters of the United States, such as Rainbow Creek, constitute a point source discharge that is subject to regulation under an NPDES permit.

Discharges of storm water from the Caltrans owned right-of-ways, properties, facilities, and activities, including storm water management activities in construction, maintenance, and operation of State-owned highways are regulated under Order No. 99-06-DWQ, *National Pollutant Discharge Elimination System Permit, Statewide Storm Water Permit, and Waste Discharge Requirements for the State of California, Department of Transportation (Caltrans)* (Caltrans MS4 NPDES Storm Water Permit). Caltrans is responsible, under the terms and conditions of the MS4 NPDES Storm Water Permit for ensuring that their operations do not contribute to violations of water quality objectives in Rainbow Creek.

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[25] In the case of NPDES storm water permits, effluent limitations may include best management practices that evidence shows are consistent with the wasteload allocation.

[26] See 40 CFR §122.44(d)(1)(vii)(B). NPDES water quality-based limits must be consistent with the assumptions and requirements of any available TMDL wasteload allocation. The regulations do not require the effluent limits to be identical to the wasteload allocation. The regulations leave open the possibility that the Regional Board could determine that fact-specific circumstances render something other than literal incorporation of the wasteload allocation to be consistent with the TMDL assumptions and requirements. The rationale for such a finding could include a trade amongst dischargers of portions of their load or wasteload allocations, performance of an offset program that is approved by the Regional Board, or any number of other considerations bearing on facts applicable to the circumstances of the specific discharger.

Caltrans is a point source discharger of nutrients to Rainbow Creek. Caltrans discharges storm water runoff containing nutrients from both Interstate-15 freeway surfaces and adjacent land areas via a storm drain system with outfalls discharging from both the north and south at the Rainbow Creek Bridge. Storm water runoff from highways can contain pollutants, including nutrients, from vehicle exhaust and atmospheric deposition. These discharges are contributing to the exceedances of the nitrate and biostimulatory substances water quality objectives in Rainbow Creek.

8.2.3 CA Department of Forestry and Fire Protection

The California Department of Forestry and Fire Protection (CDFFP) owns and operates a wastewater treatment plant (septic tank and percolation ponds) that receives sewage wastewater flows from the Rainbow Conservation Camp. The treatment system consists of a 15,000-gallon septic tank and effluent evaporation/percolation ponds. The septic tank effluent is transferred to one of three evaporation/percolation ponds for disposal. The ponds have earthen fill side-slopes, bottoms and containment berms. Evaporation and percolation from the ponds is the primary means of effluent disposal; however, for several days during the year, effluent from the ponds may be pumped to a spray irrigation field covering approximately 2 acres of the facility. The nutrients in the wastewater are introduced directly into the groundwater as the result of percolation pond infiltration.

CDFFP's discharge from the treatment plant is regulated under Order No. 95-20, *Waste Discharge Requirements for the California Department of Forestry and Fire Protection, Rainbow Conservation Camp*. Order No. 95-20 requires that CDFFP prevent surfacing of wastes on their property. Order No. 95-20 also requires that surface runoff of any wastes that surfaces on property not owned or controlled by the CDFFP must be prevented. The CDFFP is required to evaluate, monitor, and take measures necessary to ensure that their current and future waste water disposal operations do not contribute to the impairment of Rainbow Creek.

The percolation ponds are suspected of not having the proper separation from groundwater and/or bedrock and the percolated effluent appears to be surfacing down gradient of the ponds and flowing into Rainbow Creek[27]. Surfacing groundwater that is recognizable as sewage from the Rainbow Conservation Camp facility constitutes a potential point source discharge of nutrients to Rainbow Creek. The Regional Board has directed CDFFP, pursuant to Water Code section 13267, to conduct an investigation of the possible impacts from the Camp's wastewater discharge to the Creek, and the results of the investigation are currently under review by the Regional Board for additional follow-up actions. The discharge of waste to Rainbow Creek resulting from the CDFFP discharge is not allowed under the terms and conditions of Order No. 95-20. Accordingly no wasteload allocation will be assigned to the CDFFP Rainbow Creek facility for the discharge of nutrients to Rainbow Creek.

[27] Further details are contained in Regional Board letters to CDFFP dated March 8, 2002 and June 4, 2002. Regional Board observations of these conditions during a January 28, 2003 inspection of the facility are described in a February 26, 2003 memorandum (Dorsey 2003b).

8.2.4 County of San Diego

The County of San Diego's discharge of urban runoff from Municipal Separate Storm Sewer Systems (MS4) is subject to Order No. 2001-01, *Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems Draining the Watersheds of the County of San Diego, the Incorporated Cities of San Diego County, and the San Diego Unified Port District*, NPDES No. CAS0108758. Under the terms and conditions of Order No. 2001-01 the County is responsible for controlling all storm and non-storm water flows (i.e., urban runoff) that is transported through an MS4 conveyance system to surface waters.

Nutrients are present in runoff from commercial nurseries, orchards, parks, residential areas, urban areas, and septic tank disposal system land use activities[28] in the Rainbow Creek watershed. Discharges from these land use activities to an MS4 operated by the County of San Diego are regulated under the NPDES Storm Water Permit. The County's NPDES Storm Water Permit prohibits discharges from municipal storm water MS4s that cause or contribute to violations of water quality objectives. To the extent that there is an MS4 discharge in the Rainbow Creek watershed from these land use activities, it is contributing to the exceedance of the nutrient water quality objective in Rainbow Creek waters.

8.3 Nonpoint Source Discharges

Nonpoint source discharges of nutrients to Rainbow Creek are discussed in this subsection. Specific roles and responsibilities assigned to nonpoint source dischargers for achieving compliance with the total nitrogen and total phosphorus load allocations are described in Section 9.0 Implementation Action Plan.

8.3.1 Regulatory Background

While point source discharges are controlled directly by the federal Clean Water Act's NPDES permit program, direct control of nonpoint source pollution is left to state programs developed under state law. Within each TMDL a " load allocation[29]" is determined which is the maximum amount of a pollutant that may be contributed to a waterbody by "nonpoint source" discharges of the pollutant in order to attain and maintain water quality objectives. Load allocations for nonpoint sources are not directly enforceable under the Clean Water Act and are only enforceable to the extent they are made so by state laws and regulations. California's Porter-Cologne Water Quality Control Act[30] applies to both point and nonpoint sources of pollution and serves as the principle legal authority in California for the application and enforcement of TMDL load allocations for nonpoint sources.

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[28] Agricultural storm water discharges and return flows from irrigated agriculture in the Rainbow Creek watershed are exempt form NPDES Permit regulation under Clean Water Act §402(k)(1)(1).

[29] See 40 CFR 130.2(g). A load allocation is the portion of a receiving water's loading capacity that is attributed either to one of its existing or future nonpoint sources of pollution or to natural background sources.

[30] CWC §13000 et seq.

California's Nonpoint Source Pollution Control Program

In December 1999, the State Water Resources Control Board (SWRCB), in its continuing efforts to control nonpoint source (NPS) pollution in California, adopted the Plan for California's Nonpoint Source Pollution Control Program (NPS Program Plan) (SWRCB, 1999). The NPS Program Plan upgraded the State's first Nonpoint Source Management Plan adopted by the SWRCB in 1988 (1988 Plan). The primary objective of the NPS Program Plan is to reduce and prevent NPS pollution so that the waters of California support a diversity of biological, educational, recreational, and other beneficial uses. Towards this end, the NPS Program Plan focuses on implementation of 61 management measures[31] (MMs) and related management practices[32] (MPs) in six land use categories by the year 2013.[33]

The success of the NPS Program Plan depends upon individual discharger implementation of MPs. Pollutants can be effectively reduced in NPS discharges by the application of a combination of pollution prevention,[34] source control, and treatment control MPs. Source control MPs (both structural and non-structural) minimize the contact between pollutants and flows (e.g., rerouting run-on around pollutant sources or keeping pollutants on-site and out of receiving waters). Treatment control (or structural) MPs remove pollutants from NPS discharges. MPs can be applied before, during, and after pollution producing activities to reduce or eliminate the introduction of pollutants into receiving waters.

California's NPS Implementation and Enforcement Policy

In May 2004, pursuant to CWC §13369 the SWRCB adopted the *Policy for the Implementation and Enforcement of the Nonpoint Source Pollution Control Program* (NPS Implementation and Enforcement Policy), setting forth how the NPS Program Plan should be implemented and enforced to control NPS pollution. The NPS Implementation and Enforcement Policy provides guidance on the statutory and regulatory authorities of the SWRCB and the RWQCBs to prevent and control NPS pollution. The policy also provides guidance on the structure of NPS source

[31] MMs serve as general goals for the control and prevention of nonpoint source polluted runoff.

[32] MPs are the implementation actions taken by nonpoint source dischargers to achieve the management measure goals. USEPA and the SWRCB have dropped the word 'best' when describing the implementation actions taken by nonpoint source dischargers to control NPS pollution because "best" is considered too subjective. The "best" management practice in one area or situation might be entirely inappropriate in another area or situation. In this document the term "best management practices (BMPs)" is used exclusively in reference to schedules of activities, prohibitions of practices, maintenance procedures, and other management practices taken by NPDES permit dischargers.

[33] MMs are identified in Volume II of the *Plan for California's Nonpoint Source Pollution Control Program* (NPS Program Plan) 1999 Program Plan: *California's Management Measures for Polluted Runoff* (CAMMPR) (http://www.waterboards.ca.gov/nps/cammpr.html). The State Water Resources Control Board's California Nonpoint Source Encyclopedia (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html) also contains extensive information on nutrient reduction MMs and MPs applicable to the NPS land use activities in the Rainbow Creek watershed.

[34] Pollution prevention, the initial reduction/elimination of pollutant generation at its source should be used in conjunction with source control and treatment control MPs. Pollutants that are never generated do not have to be controlled or treated.

control implementation programs, including third-party implementation programs, and the mandatory five key elements applicable to all NPS implementation programs.

The NPS Implementation and Enforcement Policy emphasizes the fact that the RWQCBs have primary responsibility for ensuring that appropriate NPS control implementation programs are in place throughout the State. RWQCB responsibilities include, but are not limited to regulating all current and proposed NPS discharges under Waste Discharge Requirements (WDRs), waivers of WDRs, or a basin plan prohibition, or some combination of these administrative tools.

Third-party NPS Implementation Programs

Under the NPS Implementation and Enforcement Policy, RWQCBs continue to have primary responsibility for ensuring that there are appropriate NPS control implementation programs in place to meet water quality objectives and to protect the beneficial uses of the waters of the State. A NPS pollution control implementation program is a program developed to comply with SWRCB or RWQCB Waste Discharge Requirements (WDRs), waivers of WDRs, or basin plan prohibitions. Implementation programs for NPS pollution control may be developed by a RWQCB, the SWRCB, an individual discharger or by or for a coalition of dischargers in cooperation with a third-party representative, organization, or government agency. The latter programs are collectively known as "third-party" programs and the third-party role is restricted to entities that are not actual dischargers under RWQCB/SWRCB permitting and enforcement jurisdiction. These may include NGOs, citizen groups, industry groups (including discharger groups represented by entities that are not dischargers), watershed coalitions, government agencies (e.g. cites or counties), or any mix of the above.

Under existing law, there are various ways in which the RWQCBs can use third-party programs in their NPS pollution control programs. For example, the RWQCBs can conditionally waive regulation of a particular nonpoint pollution source based on the existence of an adequate third-party program that addresses this source. Similarly, the RWQCBs can adopt individual or general WDRs for NPS discharges that build upon third-party programs. These WDRs can, for example, require that the dischargers either participate in an acceptable third party NPS program or, alternatively, submit individual pollution prevention plans that detail how they will comply with the WDRs. Likewise, the RWQCBs can adopt discharge prohibitions, which include exceptions based on third-party programs. For example, a RWQCB can except from the discharge prohibition those discharges that are adequately addressed in an acceptable third-party NPS pollution control program.

Given the extent and diversity of NPS pollution discharges, the Regional Board needs to be as creative and efficient as possible in devising approaches to prevent or control NPS pollution. Third-party programs can enhance the Regional Board's ability to reach multiple numbers of NPS dischargers who individually may be unknown to the Regional Board. Under this approach, oversight of discharger NPS pollution control efforts can be achieved more efficiently and with less impact on the Regional Board's limited NPS program staffing and financial resources.

Key Elements of an NPS Implementation Programs

Under the NPS Implementation and Enforcement Policy the Regional Board is required to ensure that NPS implementation programs developed by dischargers or third parties meet the

requirements of the five key structural elements described below:

Key Element 1: The objectives of an NPS control implementation program shall be explicitly stated and must, at a minimum, address NPS pollution in a manner designed to achieve State and regional water quality standards, including whatever higher level of water quality the RWQCB determines is appropriate in accordance with antidegradation principles.

Key Element 2: The NPS control implementation program shall include a discussion of the MPs that are expected to be implemented to ensure attainment of program objectives, and a discussion of the process to be used to verify proper MP implementation.

Key Element 3: Where a RWQCB determines it is necessary to allow time to achieve water quality standards, the NPS control implementation program shall include a specific time schedule and corresponding quantifiable milestones designed to measure progress toward reaching the program's objectives.

Key Element 4: The NPS control implementation program shall include sufficient feedback mechanisms so that the RWQCB, dischargers, and the public can determine if the program is achieving its stated objectives or if further MPs or other measures are needed.

Key Element 5: The Regional Board shall make clear, in advance, the potential consequences for failure to achieve a NPS control implementation program's stated purposes.

8.3.2 Rainbow Creek Nonpoint Source Discharges

The major NPS nutrient discharges in the Rainbow Creek watershed result from (1) commercial nurseries, (2) agricultural fields, (3) orchards, (4) parks, (5) residential areas, (6) urban areas, and (7) septic tank disposal system land use activities, as described below. Some of these discharges are regulated under the terms and conditions of the Regional Board's Basin Plan waiver policy.[35] Individual landowners and other persons (e.g. homeowners, nurseries, businesses) engaged in these land use activities are required to be held accountable for attaining nutrient load reductions in Rainbow Creek.

Commercial Nurseries

Greenhouses and container crop industries apply nutrients in the form of chemical fertilizers (e.g., liquid or time release) to optimize production. When fertilizer applications exceed plant needs, the excess can wash into Rainbow Creek during rain events or through irrigation runoff. Excessive irrigation can affect water quality by causing erosion, and transporting nutrients, pesticides, and heavy metals to nearby waterways and groundwater. Commercial nursery impacts on surface water and groundwater can be minimized by properly managing nutrient applications and irrigation practices, and by controlling sediment erosion and runoff.

[35] The Regional Board may waive issuance of waste discharge requirements for a specific discharge or types of discharge pursuant to CWC §13269 if such waiver is determined to be in the public interest. The waiver of waste discharge requirements is conditional and may be terminated at any time by the Regional Board for any specific discharge or any specific type of discharge.

Nursery Irrigation Return Water Waiver
Discharges of irrigation return water from nurseries[36] in the San Diego Region currently are regulated under the terms and conditions of the Regional Board's Basin Plan waiver policy.[37] Under the terms of this policy the Regional Board waives the obligation of nursery owners and operators to obtain waste discharge requirements for discharges of irrigation return water from nurseries subject to the following conditions:

- There is no discharge to waters of the United States;
- Management practices are implemented for the discharge as described in the NPS Program Plan (SWRCB, 1999);
- The discharge shall not create a nuisance as defined in the California Water Code;
- The discharge shall not cause a violation of any applicable water quality standard; and
- The discharge of any substance in concentrations toxic to animal or plant life is prohibited.

Agricultural Fields
Agricultural activities that cause nonpoint source pollution include plowing, fertilizing, irrigation, pesticide spraying, planting, and harvesting. The major agricultural nonpoint source pollutants that result from these activities are nutrients, sediment, pathogens, pesticides, herbicides, and salts. Agricultural producers apply nutrients in the form of chemical fertilizers, manure, or sludge to optimize production. Excess fertilizers and irrigation runoff, as well as rainfall runoff, can wash nutrients and sediments off of properties into nearby waterways. Agricultural impacts on surface water and groundwater can be minimized by properly managing nutrient applications and irrigation practices, and by controlling sediment erosion and runoff.

Agricultural Irrigation Return Water Discharge Waiver
Discharges of irrigation return water from agriculture [38] fields in the San Diego Region are regulated under terms and conditions of the Regional Board's Basin Plan waiver policy. Under the terms of this policy the Regional Board waives the obligation of agricultural field owners and operators to obtain waste discharge requirements for agricultural irrigation return water discharges to waters of the state subject to the following conditions:

- Management practices are implemented for the discharge as described in the NPS Program Plan (SWRCB, 1999);

[36] For the purposes of the waiver, a "nursery" is defined as a facility engaged in growing plants (shrubs, trees, vines, etc.) for sale.

[37] The Regional Board may waive issuance of waste discharge requirements for a specific discharge or types of discharge pursuant to California Water Code §13269 if such waiver is determined to be in the public interest. The waiver of waste discharge requirements is conditional and may be terminated at any time by the Regional Board for any specific discharge or any specific type of discharge.

[38] For the purposes of the waiver , "agriculture" is defined as the production of fiber and/or food (including food for animal consumption, e.g., alfalfa).

- The discharge shall not create a nuisance as defined in the California Water Code;
- The discharge shall not cause a violation of any applicable water quality standard; and
- The discharge of any substance in concentrations toxic to animal or plant life is prohibited.

Orchards

Agricultural activities that cause nonpoint source pollution include fertilizing, irrigation, pesticide spraying, planting, and harvesting. The major agricultural nonpoint source pollutants that result from these activities are nutrients, sediment, pathogens, pesticides, herbicides, and salts. Agricultural producers apply nutrients in the form of chemical fertilizers and irrigate to optimize production. Excess fertilizers and irrigation runoff, as well as rainfall runoff, can wash or leach nutrients and sediments off of properties into nearby waterways and groundwater. Agricultural impacts on surface water and groundwater can be minimized by properly managing nutrient applications and irrigation practices, and by controlling sediment erosion and runoff.

Agricultural Orchard Irrigation Return Water Discharge Waiver

Discharges of irrigation return water from orchards in the San Diego Region are regulated under terms and conditions of the Regional Board's Basin Plan waiver policy for agricultural irrigation return water. (See above discussion on *Agricultural Irrigation Return Water Discharge Waiver*.)

Park

The San Diego County Parks and Recreation Department perform landscape maintenance of the community park (Rainbow Park). The park includes a children's playground, restroom facilities, a parking lot and a large grassy area with some landscaped areas. Sources of nutrients are organic matter such as fertilizer usage, leaves, lawn clippings, pet wastes, street dirt, and automobile exhaust. The restroom facilities utilize an on-site holding tank that is regularly pumped for disposal at a wastewater treatment facility outside of the watershed rather than a septic tank disposal system.

Residential Areas

In residential areas, sources of nutrients are organic matter such as leaves, lawn clippings, pet and domestic livestock wastes, and faulty septic tank disposal systems (see discussion below), as well as, fertilizer usage, street dirt, and automobile exhaust.

Urban Areas

In the Rainbow Creek watershed, the urban land use category includes commercial and public establishments (e.g., market, restaurant, gas station, school, and fire station). Sources of nutrients from these areas can be organic matter (lawn clippings and leaves) as well as street dirt, automobile exhaust, and excessive use of fertilizers.

Septic Tank Disposal Systems

All properties in the Rainbow Creek Watershed utilize septic tank disposal systems for sewage disposal. By design, septic tank disposal systems use bacteria to digest organic matter and chemically break down ammonia and organic nitrogen into nitrate, and organic phosphorus into

orthophosphate (Huntley 1987). Septic tank disposal systems can contaminate groundwater with nitrate. Since orthophosphate tends to bind to soils, its mobility is considered to be minimal (Huntley 1987). These systems can potentially impact Rainbow Creek when contaminated groundwater surfaces in the Creek (Rainbow Creek is a gaining stream).

Additionally, landowners in Rainbow Valley have been prohibited by the County of San Diego from installing or replacing septic tank disposal systems since 1970 because of a high groundwater table (Whitman 1970). Septic tank disposal systems in the Rainbow Creek watershed do not have the required separation to provide adequate treatment to wastewater. The high groundwater condition can cause septic tank disposal systems to malfunction and release bacteria, pathogens, and nutrients into the environment, contaminating groundwater and nearby streams.

Conventional Septic Tank Discharges / Subsurface Disposal Systems for Residential Units Waivers

Discharges of wastewater from conventional septic tank/subsurface disposal systems for residential units in the San Diego Region are regulated under the terms and conditions of the Regional Board's Basin Plan waiver policy. Under the terms[39] of this policy the Regional Board waives the obligation of residential septic tank owners and operators to obtain waste discharge requirements for discharges to groundwater subject to the following conditions:

- The design of the system is approved by the county health agency having jurisdiction where the system is located to the conditions set forth in the *Basin Plan, Chapter 4, (Implementation)* section entitled *Guidelines for New Community and Individual Sewerage Facilities*, and where systems are not constructed within areas designated as Zone A as defined by the California Department of Health Services' *Drinking Water Source Assessment and Protection Program*.

- The discharge shall not create a nuisance as defined in the California Water Code;

- The discharge shall not cause a violation of any applicable water quality standard; and

- The discharge of any substance in concentrations toxic to animal or plant life is prohibited.

Proposed Regulations for Onsite Wastewater Treatment Systems

California Water Code §13291 requires the State Water Resources Control Board to develop and adopt regulations for the permitting and operation of onsite wastewater treatment systems[40] (OWTS) in the State and further directs the Regional Board to incorporate the regulations into the Basin Plan. These regulations are currently under development and will include mandated nitrogen reduction performance requirements for OWTS, including septic tanks that are

[39] This waiver is applicable until six months after the State Water Resources Control Board adopts statewide criteria for on-site disposal systems pursuant to the CWC §13291 regulations for onsite sewage treatment systems.

[40] "Onsite wastewater treatment system(s)" (OWTS) is any individual or community onsite wastewater treatment, pretreatment and dispersal system including, but not limited to, a conventional, alternative, or experimental sewage dispersal system such a septic tanks having a subsurface discharge.

identified as contributing to the impairment of surface water bodies listed as impaired pursuant to Section 303(d) of the Clean Water Act. As currently drafted, the new regulations would also require the Regional Board to issue waste discharge requirements for all OWTS beginning in January 1, 2009, unless the County of San Diego assumes responsibility for enforcement of the regulations through a Memorandum of Understanding (MOU) with the Regional Board. The implementation of these new regulations on septic tank disposal systems in the Rainbow Creek watershed will be an important vehicle for attaining the required nutrient load reductions for septic tank disposal systems.

8.4 Third Party Regulatory Based Approach

The Regional Board supports a Third-Party regulatory-based approach[41] to implement the nutrient load reductions assigned to nonpoint sources in the Rainbow Creek watershed. The purpose of this section is to provide the rationale for that recommendation and to present some additional features of this approach that would be beneficial to implementing this TMDL.

As previously discussed, the State Water Board has adopted a *Plan for California's Nonpoint Source Pollution Control Program* (NPS Program Plan) (1999) and a *Policy for the Implementation and Enforcement of the Nonpoint Source Pollution Control Program* (2004). These documents describe alternative strategies that can be employed to control NPS pollution. In general, the approach that is used depends on four key factors:

- Discharger compliance in implementing MPs and other strategies that effectively prevent or control NPS discharges;
- The progress being made toward reducing NPS polluted runoff;
- The complexity and persistence of the water quality problem; and
- The need for increased regulatory oversight to attain water quality objectives.

8.4.1 Persistence and Complexity of Water Quality Problem

Excessive nutrient concentrations in Rainbow Creek have persisted since the 1980s, when agricultural practices used in Rainbow Valley resulted in significant increases of nitrate concentrations in Rainbow Creek. Although voluntary implementation of MP in the watershed resulted in significant reductions of nutrient concentrations in Rainbow creek since 1996, nutrient concentrations in the creek still exceed the applicable nutrient water quality objectives.[42]

Controlling and reducing nutrient discharges in the Rainbow Creek watershed to meet the TMDL nutrient load reductions for nonpoint sources will be a long term, complicated undertaking.

[41] The term "third party regulatory based approach" refers to an approach where a local governmental agency can oversee and enforce a NPS implementation program in the Rainbow Creek watershed.

[42] The term nutrient water quality objectives as used in this document refers to both the inorganic nitrate and biostimulatory nutrient water quality objectives described in Chapter 3 of the Water Quality Control Plan for the San Diego Basin (9) (Basin Plan) September 8, 1994.

There are multiple sources of nutrients in the watershed in seven different land use categories with an array of agencies and dischargers whose actions need to be coordinated. MMs and MPs need to be identified and implementation tracked and monitored. Water quality levels in Rainbow Creek need to be monitored and accessed to determine the effectiveness of the nutrient load reduction efforts, water quality trends, and success in attaining water quality objectives. A responsible regulatory agency is needed to lead and coordinate the effort.

8.4.2 Management Agency Agreement (MAA) with Local Land Use Agency

In light of the persistence of the nutrient water quality impairment conditions and the need for increased regulatory oversight, the Regional Board proposes to use a Third Party regulatory based approach to mandate compliance with the NPS nutrient load reductions of this TMDL. The Regional Board will accomplish this under the authority of CWC §13225[43] by negotiating a MAA[44] between the Regional Board and the County of San Diego setting forth the commitments of both parties to undertake various implementation responsibilities for the NPS nutrient load reductions of this TMDL.

Under the terms of the proposed MAA, the County of San Diego will take the lead in establishing MMs and overseeing MPs implementation by NPS dischargers to attain TMDL nutrient load reductions in the Rainbow Creek watershed. The County of San Diego's actions to implement the MAA will be taken under the County's own legal authority and using the County's own regulatory processes. The fundamental purpose in applying the MAA approach is to employ the capabilities of the County of San Diego to achieve at least the same degree of control over NPS pollution in the Rainbow Creek watershed as could be attained through direct regulation under Regional Board authority. Under this approach, regulatory oversight of the Rainbow Creek TMDL implementation can be achieved more efficiently and with less impact on the Regional Board's limited NPS program staffing and financial resources. While a cooperative partnership between the Regional Board and the County of San Diego is possible without a formal agreement, an MAA will enhance the effectiveness of the partnership by documenting commitments and clarifying roles and responsibilities of each party over the next 20 years until compliance with the nutrient water quality objectives is attained.

The Regional Board cannot delegate its NPS authorities and responsibilities to the County of San Diego. The Regional Board will not defer taking necessary action if the County of San Diego

[43] CWC §13225 provides authority for the Regional Board to enter into a Management Agency Agreement (MAA) with local agencies to encourage development of appropriate planning or regulatory programs to control nonpoint source pollution. CWC §13225 also provides authority for the Regional Board to require local agencies such as the County of San Diego to submit technical reports on water quality control, even though those entities may not be waste dischargers. Local agencies can be required to investigate the scope, causes, and sources of nonpoint source pollution, and potential practices or control measures to prevent it. The only restriction is that the burden of preparing the reports bear a reasonable relationship to the need for and the benefits to be obtained from the reports.

[44] Management Agency Agreement (MAA) refers to an agreement between the Regional Board and federal or state agencies or local land use agencies having either 1) enforcement authority over nonpoint sources or 2) management responsibility for publicly owned or controlled land and the ability to control NPS discharges from activities on that land. The actions taken by these agencies under the MAA are taken under their own authorities and using their own regulatory processes.

does not properly implement the MAA or if the nutrient water quality problem persists. Any Regional Board enforcement action taken will be against individual dischargers and not the County of San Diego. The Regional Board will also provide assistance to the County of San Diego as necessary to enforce implementation of MPs and the nutrient load reductions specified in this TMDL.

8.4.3 County of San Diego Legal Authority

The success of the MAA approach is contingent on the County of San Diego's willingness to undertake the role of a lead NPS management agency for the Rainbow Creek watershed and its ability to act effectively in that role. The County of San Diego's capability of acting effectively as a lead NPS control agency stems from its role as the principal land use planning authority governing land use practices in the Rainbow Creek watershed.

The legal framework within which the County exercises local planning and land use functions plays a critical pivotal role in controlling NPS nutrient pollution in the Rainbow Creek watershed. The County of San Diego performs land use planning in order to identify important community issues (such as new growth, housing needs, and environmental protection), project future demand for services (such as sewer, water, roads, etc.), anticipate potential problems (such as overloaded sewer facilities or crowded roads), and establish goals and policies for directing and managing growth. The County uses a variety of tools in the planning process including the general plan, specific plans, zoning, and the subdivision ordinance. The following is a review of the County of San Diego's local planning and land use functions which could be used to support implementation of NPS load reductions in this TMDL.

State Law And Local Planning

State law is the foundation for local planning in California. The California Government Code (Sections 65000 et seq.) contains many of the laws pertaining to the regulation of land uses by local governments including: the general plan requirement, specific plans, subdivisions, and zoning. This framework is provided in California Planning Law (Government Code §§ 65000 et seq.), the California Zoning Law (Government Code §§ 68000 et seq.), the Subdivision Map Act (Government Code §§ 66410 et seq.), and the California Environmental Quality Act (Public Resources Code §§ 21000 et seq.).

The County of San Diego General Plan

Under California's Planning Law (Government Code §§65000 et seq.), the County of San Diego must adopt a comprehensive, long-term general plan for the physical development of the county and any land outside its jurisdiction that bears relation to its planning. This general plan is the official County policy regarding the location of housing, business, industry, roads, parks, and other land uses, protection of the public from noise and other environmental hazards, and for the conservation of natural resources.

The general plan is the County's basic planning document and serves as the blue print for future development throughout the County including the Rainbow Creek watershed. It represents the County's view of its future; a constitution made up of the goals and policies upon which the County Board of Supervisors bases their land use decisions. The general plan and its diagrams have a long-term outlook, identifying the types of development that will be allowed, the spatial relationships among land uses, and the general pattern of future development. Following the

adoption of a general plan, the County may also prepare specific plans and community plans that have a finer level of detail than that provided by the general plan for particular geographic areas.

State law establishes a set of basic issues for consideration in local general plans and the County of San Diego determines the relative importance of each issue to local planning and decides how they are to be addressed in its general plan. Pursuant to Government Code § 65302, general plans must contain seven elements: (1) land use, (2) circulation, (3) housing, (4) conservation, (5) open space, (6) noise, and (7) safety[45]. The County of San Diego is free to adopt a wide variety of additional elements as necessary covering subjects of particular interest to local jurisdictions, such as the need to control NPS nutrient discharges in the Rainbow Creek watershed.

All subdivisions, public works projects, and zoning decisions must be consistent with the general plan. The County's corporate and police powers, and zoning and subdivision ordinances (see below) are the primary tools used to implement the general plan.

Zoning

Government Code §§65800 et seq. provides that San Diego County can adopt and administer zoning laws, ordinances (including pollution control ordinances), and rules and regulations to implement the general plan. A zoning ordinance is the local law that spells out the immediate, allowable uses for each piece of property within the community. The purpose of zoning is to implement the policies of the general plan. Each property in the community is assigned a "zone" listing the kinds of uses that will be allowed on that land (e.g., single family residential, multi-family residential, neighborhood commercial, agricultural, etc.) and setting development standards (e.g., minimum lot size, maximum building height, minimum front-yard depth). The distribution of agricultural, residential, commercial and other zones is based on the pattern of land uses established in the community's general plan.

Zoning is adopted by ordinance and is basically a "permit" type of land use control. Land may be put only to those uses listed in the zone assigned to it. The permit is issued for a specific project, such as building construction, grading projects for roads and bridges, new septic tank disposal system installations as well as repairs. These permits can be conditioned based on conformance with the zoning ordinance or other applicable authorities.

Subdivision Map Act

In general, land cannot be divided in California without local government approval. Dividing land for sale, lease, or financing is regulated by local ordinances based on the State Subdivision Map Act (commencing with Government Code § 66410). This Act vests in the County of San Diego the power to regulate and control the design of subdivisions within its jurisdiction.

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[45] Land use, conservation, open space and circulation are the elements most relevant to NPS pollution prevention and control: The conservation element addresses the identification, conservation, development and use of natural resources including water, forests, soils, waterways, wildlife and mineral deposits. The conservation element of the County's general plan may establish controls to deal with water pollution issues such as the nutrient impairment of Rainbow Creek.

There are basically two types of subdivisions: (1) parcel maps, which are limited to divisions resulting in fewer than five lots (with certain exceptions), and (2) final map subdivisions (also called tract maps), which apply to divisions resulting in five or more lots.

Applications for both types of subdivisions must be submitted to the County of San Diego for consideration in accordance with the its subdivision ordinance and the Subdivision Map Act. Subdivision regulation, like zoning, is another enforcement tool that the County uses for implementing its general plan. The County can deny a subdivision if it finds that the design of the subdivision or the proposed improvements will likely cause substantial environmental damage or substantially injure fish, wildlife, or their habitats.

Other Ordinances and Regulations

The County of San Diego adopts other ordinances besides zoning and subdivision to protect the general health, safety, and welfare of their inhabitants. Common types include flood protection, historic preservation, design review, hillside development control, growth management, impact fees, traffic management, and sign control.

Local ordinances may also be adopted in response to state requirements. Examples include local coastal programs (California Coastal Act), surface mining regulations (Surface Mining and Reclamation Act), earthquake hazard standards (Alquist-Priolo Special Studies Zone Act), and hazardous material disclosure requirements. These regulations are generally based on applicable state law.

California Environmental Quality Act

The California Environmental Quality Act (CEQA) (Public Resources Code §§21000 et seq.) requires local and state governments to consider the potential environmental effects of a project before deciding whether to approve it or not. CEQA's purpose is to disclose the potential impacts of a project, suggest methods to minimize those impacts, and discuss alternatives to the project so that decision makers will have full information upon which to base their decision. CEQA is a complex law with a great deal of subtlety and local variation.

The County of San Diego serves as the lead agency[46] in practically all local planning matters (such as rezoning, conditional use permits, and specific plans) for lands within its jurisdiction. CEQA also provides that the County of San Diego, in its role as lead agency, prepare an Environmental Impact Report (EIR)[47] before it approves a public or private project[48] having a

[46] CEQA provides for the assignment of a "lead agency" responsible for seeing that environmental review of projects is done in accordance with CEQA and that environmental analyses are prepared when necessary. The agency with the principal responsibility for issuing permits to a project (or for carrying out the project) is deemed to be the "lead agency." As lead agency, it may prepare the environmental analysis itself or it may contract for the work to be done under its direction.

[47] An EIR discusses the proposed project, its environmental setting, its probable impacts, realistic means of reducing or eliminating those impacts, its cumulative effects, and alternatives to the project.

[48] See Public Resources Code § 21065. The term “project” is defined as any activity undertaken, supported or authorized by a public agency which may cause a direct physical change, or reasonably foreseeable indirect physical change in the environment, including activities involving the issuance of permits and entitlements.

significant effect[49] on the environment if the County has the discretion to approve or disapprove the project. The EIR must describe feasible mitigation measures to minimize the project's significant environmental impacts. The County can impose conditions to mitigate significant environmental impacts. The County can also impose a reporting or monitoring program to ensure that mitigation measures are implemented.

8.4.4 Memorandum of Understanding (MOU) with Assistance Agencies

Another proposed action of the Third Party regulatory based approach is for the Regional Board to seek less formal agreements with federal, state, and local agencies, and special districts that can provide technical or financial assistance to support implementation of MPs. These agreements are referred to as memoranda of understanding (MOUs).[50] Agencies and organizations such as Natural Resources Conservation Service, Mission Resource Conservation District (MRCD), and the University Of California Cooperative Extension can provide valuable assistance in defining appropriate management measures (MMs) and helping NPS dischargers implement MPs. Formalizing these arrangements in a MOU with the Regional Board would assist the various agencies and districts in targeting technical and financial resources for Rainbow Creek nutrient NPS problems.

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[49] See Public Resources Code § 21068. A " significant effect" is an effect that has a substantial or potentially substantial adverse effect on the environment.

[50] There are two general types of MOUs: (1) cooperative agreements made with other agencies or organizations that are able to provide information or technical or financial assistance to further the State's goal of preventing or controlling NPS pollution; and (2) cooperative agreements made with land management agencies with authority to control NPS discharges through inclusion of MPs in their land lease agreements.

9.0 Implementation Action Plan

This Chapter describes the actions necessary to implement the TMDL to attain and maintain nutrient water quality objectives[51] in Rainbow Creek. The plan describes implementation responsibilities assigned to cooperating agencies and dischargers and describes the schedule and key milestones for the actions to be taken. A monitoring strategy to assess the success of this implementation action plan is presented in Section 10 Implementation Monitoring Plan.

9.1 Regulatory Authority

Basin Plans must have a program of implementation to achieve water quality objectives.[52] The implementation program must include a description of actions that are necessary to achieve the objectives, a time schedule for these actions, and a description of surveillance to determine compliance with the water quality objectives.[53] State law requires that a TMDL include an implementation action plan because the TMDL normally is, in essence, an interpretation or refinement of an existing water quality objective. The TMDL must be incorporated into the Basin Plan[54], and, because the TMDL supplements, interprets, or refines an existing water quality objective, state law requires a program of implementation.

9.2 Implementation Action Plan Objectives

The specific objectives of this Implementation Action Plan are as follows:

1. Mandate nutrient wasteload reductions in NPDES permits in the Rainbow Creek watershed for the point source component of this TMDL;

2. Mandate nutrient load reductions for seven critical Rainbow Creek watershed land use areas[55] for the non point source component of this TMDL;

3. Promote establishment of a Management Agency Agreement (MAA) between the Regional Board and the County of San Diego setting forth each party's commitment to undertake various implementation oversight responsibilities for the nonpoint source component of this

[51] The term nutrient water quality objectives as used in this document refers to both the inorganic nitrate and biostimulatory nutrient water quality objectives described in Chapter 3 of the Water Quality Control Plan for the San Diego Basin (9) (Basin Plan) dated September 8, 1994.

[52] See CWC § 13050(j). A "Water quality control plan" or "Basin Plan" consists of a designation or establishment for the waters within a specified area of all of the following: (1) Beneficial uses to be protected, (2) Water quality objectives and (3) A program of implementation needed for achieving water quality objectives.

[53] See CWC § 13242

[54] See Clean Water Act § 303(e).

[55] These land use activities are commercial nurseries; agricultural fields; orchards; parks; residential areas; urban areas, and septic tank disposal systems.

TMDL;

4. Promote establishment of a Memorandum of Understanding (MOU) to document cooperative agreements between the Regional Board and other agencies or organizations (e.g. Natural Resources Conservation Service, Mission Resource Conservation District, and the University of California Cooperative Extension) that are able to provide technical or financial assistance to dischargers in the Rainbow Creek watershed; and

5. Establish mechanisms to track management measures (MMs), and management practices (MPs) / best management practices (BMPs) implementation, monitor MM/MP/BMP effectiveness in controlling nutrient pollution, assess success in achieving TMDL objectives and milestones, and report on TMDL program effectiveness in attaining the nitrate and nutrient water quality objectives.

9.3 Phased Nutrient Load Reduction Approach

The nutrient TMDLs shall be implemented in a phased approach with a monitoring component to determine the effectiveness and guide the selection of MPs / BMPs of each phase. Load allocations shall be reduced by approximately 20% every four years until the TMDLs have been achieved. Table 9-1 provides the schedule for total nitrogen and total phosphorus reductions. The initial reductions will achieve the nitrate target of 10 mg NO_3-N/L and begin the first phase of reductions for the total nitrogen and total phosphorus targets. The subsequent phases target loading reductions in incremental steps towards the ultimate goal of attaining and maintaining compliance with nutrient water quality objectives.

Table 9-1. Total Nitrogen and Total Phosphorus Phased Load Reduction Schedule

Compliance Date	Total Nitrogen		Total Phosphorus	
	Target Annual Loads (LA + WLA) kg N/yr	Cumulative % Reduction	Target Annual Loads (LA + WLA) kg P/yr	Cumulative % Reduction
2005[1]	3,055[2]		278[2]	
2009	2,444	20	223	20
2013	1,833	40	167	40
2017	1,222	60	111	60
2021	796	74	41	85

[1] Estimated effective date begins upon approval by USEPA. Compliance dates follow every fourth year until TMDL is achieved.
[2] Current annual nutrient load from identified point and nonpoint sources (See Tables 4-2 and 4-4). This value does not include the contribution for background.

The target load and wasteload allocations for total nitrogen and total phosphorus are presented in Table 9-2 and 9-3.

Table 9-2. Total Nitrogen Wasteload and Load Allocations

Source	Total Nitrogen Allocations			
	2009 kg N/yr[1]	2013 kg N/yr[1]	2017 kg N/yr[1]	2021 kg N/yr[1]
Caltrans highway runoff	118	90	59	49
Unidentified and future point source discharge	33	33	33	33
Point Source (WLA) Subtotal	**151**	**123**	**92**	**82**
Commercial nurseries	390	299	196	116
Agricultural fields	504	386	253	151
Orchards	607	465	305	182
Park	5	3	3	3
Residential areas	507	390	260	149
Urban areas	40	27	27	27
Septic tank disposal systems	200	100	46	46
Air deposition	40	40	40	40
Non-Point Source (LA) Subtotal	**2,293**	**1,710**	**1,130**	**714**
Total WLA & LA[2]	**2,444**	**1,833**	**1,222**	**796**
Background	**779**	**779**	**779**	**779**
Margin of Safety	**83**	**83**	**83**	**83**
Total Allocations for Total Nitrogen TMDL	**3,306**	**2,695**	**2,084**	**1,658**

[1] To calculate pounds per year, multiply by 2.2
[2] From Table 9-1

Table 9-3. Total Phosphorus Wasteload and Load Allocations

Source	Total Phosphorus Allocations			
	2009 kg P/yr[1]	**2013 kg P/yr[1]**	**2017 kg P/yr[1]**	**2021 kg P/yr[1]**
Caltrans highway runoff	11	8	5	5
Unidentified and future point source discharge	3	3	3	3
Point Source (WLA) Subtotal	**14**	**11**	**8**	**8**
Commercial nurseries	20	16	10	3
Agricultural fields	28	21	14	4
Orchards	50	37	24	6
Park	0.15	0.10	0.10	0.10
Residential areas	99	74	47	12
Urban areas	9	6	6	6
Air deposition	2	2	2	2
Non-Point Source (LA) Subtotal	**208**	**156**	**103**	**33**
Total WLA & LA[2]	**222**	**167**	**111**	**41**
Background	**116**	**116**	**116**	**116**
Margin of Safety	**8**	**8**	**8**	**8**
Total Allocations for Total Phosphorus TMDL	**346**	**291**	**235**	**165**

[1] To calculate pounds per year, multiply by 2.2
[2] From Table 11-1

9.4 Milestone Dates For Attainment Of Nutrient Water Quality Objective

Tables 9-1, 9-2, and 9-3 describe the general time schedule for nutrient sources to achieve compliance with wasteload and load reductions and allocations. Point source discharges in the Rainbow Creek watershed are projected to achieve compliance with wasteload reductions by December 31, 2013. Nonpoint sources are projected to implement nutrient reduction strategies by December 31, 2009 with all resultant nutrient load reductions being achieved by December 31, 2021. Regardless of what actions are taken to achieve load and wasteload reductions, there may not be an immediate response in the water quality or biological condition of Rainbow Creek. For example, there may be significant time lags between when actions are taken to reduce nutrient loads and resulting changes in nutrient concentrations in Rainbow Creek. This is especially likely if nutrients from past activities are tightly bound to sediments or if nutrient-contaminated groundwater has a long residence time before its release to Rainbow Creek waters. A three-year response time is projected for Rainbow Creek to attain compliance with nutrient

water quality objectives after reaching the desired nutrient wasteload and load reductions in 2021. Accordingly the projected date when Rainbow Creek will attain and maintain compliance with nutrient water quality objectives is December 31, 2024.

9.5 Regional Board Actions

This section describes the actions the Regional Board shall take to mandate compliance with the nutrient wasteload and load reductions specified in this TMDL.

1. **Caltrans – Incorporate Wasteload Allocations in NPDES Storm Water Permit**
   The Regional Board shall request that the State Water Resources Control Board amend Caltrans statewide NPDES storm water permit[56] to include the following requirements:

   a. MS4 discharges to Rainbow Creek shall not exceed the following wasteloads for nitrogen and phosphorus:

Nitrogen Wasteload	Phosphorus Wasteload	Compliance Due Date
118 kg N/yr[1]	11 kg P/yr[1]	December 31, 2009
90 kg N/yr[1]	8 kg P/yr[1]	December 31, 2013
59 kg N/yr[1]	5 kg P/yr[1]	December 31, 2017
49 kg N/yr[1]	5 kg P/yr[1]	December 31, 2021

[1] To calculate pounds per year, multiply by 2.2

   b. A directive to submit annual progress reports to the Regional Board on the progress in attaining the nutrient wasteload reductions in Rainbow Creek. The report shall be due on April 1 of each year and shall be incorporated within Section 2, Program Management of Caltrans MS4 Order No. 99-06-DWQ, NPDES No. CAS000003. Reporting shall continue on an annual basis until the nutrient water quality objective is attained in Rainbow Creek.

2. **County of San Diego – Issue Water Code Governmental Water Quality Investigation Request Order for Nutrient Reduction and Management Plan**
   The Regional Board shall issue an Order under CWC §13225 requiring the County of San Diego to investigate excessive levels of nutrients in Rainbow Creek and feasible management strategies to reduce nutrient loading in Rainbow Creek. A Nutrient Reduction and Management Plan (NRMP) for the Rainbow Creek watershed, containing the elements described below in Section 9.7 - County of San Diego Nutrient Reduction Management Plan Elements, would satisfy such an Order. The County may submit alternative or additional elements equivalent to those described in Section 9.7 that would result in equivalent

[56] The term "statewide NPDES storm water permit "refers to Order No. 99-06-DWQ, NPDES No. CAS000003, National Pollutant Discharge Elimination System Permit, Statewide Storm Water Permit, and Waste Discharge Requirements for the State of California, Department of Transportation (Caltrans) or subsequent superceding NPDES renewal Orders.

protection from, or prevention of, nutrient discharges to Rainbow Creek.

3. **County of San Diego – Establish Management Agency Agreement (MAA)**
The Regional Board shall consider, following concurrence with the County of San Diego's Nutrient Reduction and Management Plan (NRMP) for Rainbow Creek, entering into a Management Agency Agreement (MAA) with the County of San Diego. The MAA shall set forth the commitment of both parties to undertake various oversight responsibilities for the nonpoint source nutrient load reduction component of this TMDL and the County's commitments to implement the NRMP.

4. **County of San Diego – Issue Water Code Governmental Water Quality Investigation Request for Groundwater Investigation and Characterization Report**
The Regional Board could issue an Order under CWC §13225 directing the County of San Diego to prepare and submit a workplan and report described below in Section 9.6 - County of San Diego Actions, Item 3 - Submit Groundwater Investigation and Characterization Workplan and Item 4 - Groundwater Investigation and Characterization Report.

5. **CA Dept. of Forestry and Fire Protection – Issue Water Code Section 13267 Order**
The Regional Board shall issue a CWC §13267[57] order directing the California Department of Forestry and Fire Protection, Rainbow Conservation Camp (CDFFP) to submit any additional technical information needed to 1) evaluate whether CDFFP's discharge is surfacing and/or contributing to the impairment of Rainbow Creek; and 2) estimate the actual nutrient load originating from the septic tank and percolation ponds to Rainbow Creek via groundwater flow. Based on the review of this information the Regional Board may further direct the CDFFP to implement an alternate means of wastewater disposal or additional treatment necessary to attain and maintain nutrient water quality objectives in Rainbow Creek.

6. **Establish Memorandum of Understanding (MOU) with Agencies or Organizations**
The Regional Board shall consider entering into a MOU to document cooperative agreements with other agencies or organizations that are able to provide information, technical assistance, or financial assistance to dischargers to support the Regional Board's goals of attaining the nutrient load reductions required under this TMDL and compliance with the nutrient water quality objective. These agencies and organizations include, but are not limited to, the United States Department of Agriculture, Natural Resources Conservation Service , Mission Resource Conservation District, and the University Of California Cooperative Extension.

7. **Adopt Waste Discharge Requirements (WDRs), Waivers, and Discharge Prohibitions**
In conjunction with an MAA or MOU with another third-party representative, organization, or government agency describing an adequate NPS pollution control implementation

[57] CWC §13267 provides that the Regional Board can require any person who has discharged, discharges, proposes to discharge or is suspected of discharging waste to investigate, monitor, and report information. The only restriction is that the burden of preparing the reports bear a reasonable relationship to the need for and the benefits to be obtained from the reports.

program, the Regional Board shall adopt individual or general waivers or WDRs for NPS discharges in the Rainbow Creek watershed. The waivers or WDRs shall require NPS dischargers to either participate in the third party NPS program or, alternatively, submit individual pollution prevention plans that detail how they will comply with the waivers and WDRs. Alternatively, the Regional Board may adopt a discharge prohibition, which includes exceptions for those discharges that are adequately addressed in an acceptable third-party MAA or MOU NPS pollution control implementation program.

8. **Take Enforcement Actions**
The Regional Board shall consider enforcement action[58], as necessary, against any discharger failing to comply with applicable waiver conditions, WDRs, discharge prohibitions, or take enforcement action, as necessary, to control the discharge of nutrients to Rainbow Creek, to attain compliance with the nutrient wasteload and load reductions specified in this TMDL, or to attain compliance with the nutrient water quality objectives. The Regional Board may also terminate the applicability of waivers and issue waste discharge requirements or take other appropriate action against any discharger(s) failing to comply with the waiver conditions.

9. **Review and Revise Existing Waste Discharge Requirements**
The Regional Board shall review and, if necessary, update existing waste discharge requirements for discharges to land as well as groundwater in the Rainbow Creek watershed to incorporate effluent limitations for nutrients consistent with applicable nutrient groundwater quality objectives and surface water quality objectives.[59]

10. **Recommend High Priority for Grant Funds**
The Regional Board shall recommend that the State Board assign a high priority to awarding grant funding[60] for projects to implement the Rainbow Creek nutrient TMDLs. Special emphasis will be given to projects that can achieve quantifiable nutrient load reductions

[58] An enforcement action is any formal or informal action taken to address an incidence of actual or threatened noncompliance with existing regulations or provisions designed to protect water quality. Potential enforcement actions including notices of violation (NOVs), notices to comply (NTCs), imposition of time schedules (TSO), issuance of cease and desist orders (CDOs) and cleanup and abatement orders (CAOs), administrative civil liability (ACL), and referral to the attorney general (AG) or district attorney (DA). The Regional Board generally implements enforcement through an escalating series of actions to: (1) assist cooperative dischargers in achieving compliance; (2) compel compliance for repeat violations and recalcitrant violators; and (3) provide a disincentive for noncompliance.

[59] There are three dischargers in the Rainbow Creek watershed currently regulated under waste discharge requirements for the discharge of waste to land or groundwaters: Oak Crest Mobile Estates (Order No. 1993-69), Rainbow Conservation Camp (Order No. 1995-20), and Temecula Truck Inspection Facility (Order No. 1992-56). The Rainbow Truck Weigh and Inspection Facility, discharges under the terms of a waiver of waste discharge requirements (Order No. 2000-235)

[60] The State Water Resources Control Board administers the awarding of grants funded from Proposition 13, Proposition 50, Clean Water Act 319(h) and other federal appropriations to projects that can result in measurable improvements in water quality, watershed condition, and/or capacity for effective watershed management. Many of these grant fund programs have specific set-asides for expenditures in the areas of watershed management and TMDL implementation for NPS pollution.

consistent with the specific nutrient TMDL load allocations.

11. **Incorporate Water Code Section 13291 Regulations in Basin Plan**
The Regional Board shall incorporate regulations currently under development by the State Water Resources Control Board pertaining to onsite wastewater treatment systems[61] into the Water Quality Control Plan for the San Diego Basin (Basin Plan) as soon as practicable upon their adoption by the State Board.[62]

9.6 County Of San Diego Actions

1. **Control MS4 Discharges to Rainbow Creek**
For nutrient discharges to or from Municipal Separate Storm Sewer Systems (MS4) within the Rainbow Creek watershed, the County has an existing obligation under the NPDES requirements for MS4s in San Diego County[63] to require increasingly stringent best management practices, pursuant to the iterative process described in Receiving Water Limitation C.2.a.[64] of the MS4 Requirements, to reduce nutrient discharges in the Rainbow Creek watershed to the maximum extent practicable and to restore compliance with the nutrient water quality objective.

2. **Submit Nutrient Reduction and Management Plan (NRMP)**
The County of San Diego shall, upon request by the Regional Board pursuant to CWC §13225, prepare and submit a NRMP for the Rainbow Creek watershed, consistent with the SWRCB NPS Implementation and Enforcement Policy and containing the elements described in Section 9.7, County of San Diego Nutrient Reduction and Management Plan. The County may submit alternative or additional elements equivalent to those described in Section 9.7 that would result in equivalent protection from, or prevention of, nutrient discharges to Rainbow Creek.

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[61] "Onsite wastewater treatment system(s)" (OWTS) is any individual or community onsite wastewater treatment, pretreatment and dispersal system including, but not limited to, a conventional, alternative, or experimental sewage dispersal system such a septic tanks having a subsurface discharge.

[62] CWC §13291 directs the Regional Board to incorporate the regulations in the Basin Plan upon their adoption by the State Water Resources Control Board.

[63] The term "MS4 NPDES Storm Water Permit" refers to Order No.2001-001, NPDES No. CAS0108758, *Waste Discharge Requirements For Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities Of San Diego County, and the San Diego Unified Port* District or subsequent superceding NPDES renewal Orders.

[64] Receiving Water Limitation C.2.a provides that... "Upon a determination by either the Copermittee or the SDRWQCB that MS4 discharges are causing or contributing to an exceedance of an applicable water quality standard, the Copermittee shall promptly notify and thereafter submit a report to the SDRWQCB that describes BMPs that are currently being implemented and additional BMPs that will be implemented to prevent or reduce any pollutants that are causing or contributing to the exceedance of water quality standards…"

3. **Submit and Implement Groundwater Investigation and Characterization Workplan**
The County of San Diego shall, upon request by the Regional Board pursuant to CWC §13225, undertake an investigation of groundwater quality within the Rainbow Creek watershed, and shall prepare and submit a workplan designed to guide the collection of information to produce the technical report described in Item 4, Groundwater Investigation and Characterization Report below. The workplan shall include the following:

    a. A schedule for completion of all activities and submission of a final Groundwater Investigation and Characterization Report.
    b. A description of proposed actions including drilling methods, analytical methods, sampling locations, and purging and sampling methods.
    c. The location of existing monitoring wells and the proposed location of additional monitoring wells needed to characterize nutrient concentrations and their lateral and vertical extent in groundwater.
    d. Contingencies for collection of additional samples.
    e. Sufficient scope to meet the objectives of assessing nutrient loading from surface sources to groundwater and the contribution of groundwater to the nutrient loading and nutrient concentrations in Rainbow Creek.
    f. Consideration of the following elements or factors:
        i. Nutrient mass loading to groundwater in the fractured rock aquifer and the alluvial deposits aquifer[65] from septic systems, deep percolation of applied irrigation water, and any other sources.
        ii. Base flow contribution to Rainbow Creek from the fractured rock aquifer and the alluvial deposits aquifer.
        iii. Mass balance of nutrients in the fractured rock aquifer and alluvial deposits aquifer (nutrient mass loading to groundwater, removals from the groundwater system including denitrification, plant uptake, and groundwater discharge, and change in the load and concentration of nutrients in groundwater.

The County of San Diego shall implement the workplan within sixty (60) days after submission of the workplan, unless otherwise directed in writing by the Regional Board. Before beginning these activities the County shall notify the Regional Board of the intent to initiate the proposed actions included in the workplan submitted; and comply with any conditions set by the Regional Board.

4. **Submit Groundwater Investigation and Characterization Report**
The County of San Diego shall, on a schedule agreed to in writing by the Regional Board, submit a Groundwater Investigation and Characterization Report containing a technical analysis and interpretation of the data to assess the contribution of groundwater to the nutrient loading and concentrations in Rainbow Creek. The report shall meet the objectives and address the considerations described in the Groundwater Investigation and Characterization Workplan**.** The report shall also present recommendations to refine

[65] Groundwater beneath the Rainbow Creek watershed is interpreted to occur in both the alluvial deposits where present and in the fractured rock. The groundwater investigation report shall assess the relative contribution from each aquifer.

assumptions, resolve uncertainties, and improve the scientific foundation of the TMDL with regard to quantifying groundwater nutrient loading to Rainbow Creek.

5. **Establish Management Agency Agreement (MAA)**
   The County of San Diego is requested to enter into a MAA with the Regional Board setting forth the commitment of both parties to undertake various implementation oversight responsibilities for the nonpoint source nutrient load reduction component of this TMDL and the County's commitments to implement the NRMP.

9.7 County Of San Diego Nutrient Reduction And Management Plan

1. **NPS Nutrient Reduction and Management Plan (NRMP)**
   A NRMP for the Rainbow Creek watershed shall describe the activities the County of San Diego could undertake to oversee discharger efforts to reduce nutrients in the runoff or groundwater discharges from new and existing (1) commercial nurseries; (2) agricultural fields; (3) orchards; (4) parks; (5) residential area; (6) urban areas; and; (7) septic tank disposal system land uses (hereinafter referred to as key nutrient sources). A NRMP should include the following elements as provided in items 2 through 17 below or alternative or additional elements equivalent to those described that would result in equivalent protection from, or prevention of, nutrient discharges to Rainbow Creek.

2. **Legal Authority**
   The County of San Diego should review its legal authority and evaluate its adequacy to mandate compliance with the nutrient load reductions specified in this TMDL through ordinance, statue, permit, contract or similar means. The County, at a minimum, should evaluate its authority to:

   a. Control the discharge of nutrients from nonpoint sources; and
   b. Prohibit discharges of nutrients which cause or contribute to exceedances of the nutrient load reductions specified in this TMDL or nutrient water quality objectives.

   Alternatively the County of San Diego may certify that its existing legal authority is adequate to mandate compliance with the nutrient load reductions specified in this TMDL and prevent increases in nutrient loading to Rainbow Creek.

3. **General Plan Modification**
   The County of San Diego should evaluate the adequacy of its General Plan to ensure that future land use and zoning decisions do not result in an increase in the nutrient loading to Rainbow Creek. The County should also describe the steps it will take to modify the General Plan as necessary. Alternatively the County of San Diego may certify that its existing General Plan is adequate to prevent an increase in nutrient loading to Rainbow Creek.

4. **Modify Development Project Approval Process**
   The County of San Diego should evaluate the adequacy of its development project approval / permitting process as necessary to ensure that discharges from proposed development in the Rainbow Creek watershed will comply with the nutrients load reductions specified in this TMDL and ensure that nutrient water quality objectives are not exceeded. The County's evaluation should consider the need to ensure that all development in Rainbow Creek watershed will be in compliance with County storm water ordinances, permits, and all other applicable ordinances and requirements. The County should also describe the steps it will take to modify the development project approval / permitting process as necessary. Alternatively the County of San Diego may certify that its project approval / permitting process is adequate to ensure that discharges from proposed developments in the Rainbow Creek watershed will comply with the nutrients load reductions specified in this TMDL and ensure that nutrient water quality objectives are not exceeded.

5. **CEQA Reviews**
   The County of San Diego should evaluate the adequacy of its environmental review process pursuant to CEQA to ensure that new development in the Rainbow Creek watershed does not contribute to exceedances of the nutrient load allocations specified in this TMDL or violations of the nutrient water quality objective. For example, diligent performance of environmental review under CEQA and requirements for mitigation of the adverse environmental consequences to water quality of new development and detrimental agricultural practices can significantly reduce nutrient loading to Rainbow Creek. The County's evaluation should consider the need to aggressively review proposed projects that have the potential to contribute nitrogen and phosphorus to the Rainbow Creek watershed and require appropriate mitigation. The County should also describe the steps it will take to revise the development project approval / permitting process as necessary. Alternatively the County of San Diego may certify that its environmental review process pursuant to CEQA is adequate to ensure that new development in the Rainbow Creek watershed does not contribute to exceedances of the nutrient load allocations specified in this TMDL or violations of the nutrient water quality objective.

6. **Pollution Prevention (Nutrients)**
   The County of San Diego should describe the steps it will take to implement pollution prevention[66] methods for nutrients at sites owned by the County and require its use by owners or operators of nutrient sources, where appropriate.

7. **Source Identification (Nutrients)**
   The County of San Diego should describe the steps it will take to develop and update annually an inventory of the individual nutrient sources within the residential, urban, commercial nursery; agricultural field, orchard, park, and septic tank disposal system category of land uses. The use of an automated database system, such as Geographical

[66] Pollution Prevention is defined as practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control, treatment, or disposal.

Information System (GIS) is highly recommended.

8. **Threat to Water Quality Prioritization (Nutrients)**
   The County of San Diego should describe the steps it will take to establish priorities for inspection and oversight activities. Each individual nutrient source in each nonpoint source category should be classified as high, medium, or low threat to water quality. The inventory should include the following minimum information for each site: name, address, SIC codes as appropriate which best reflects the type of site, a narrative description characterizing the nutrient waste generated, and the potential for nutrient discharges to Rainbow Creek.

9. **MP Implementation (Nutrients)**
   The County of San Diego should describe the steps it will take to:
   a. Designate a set of minimum MMs / MPs [67] for the high, medium, and low threat to water quality nutrient sources identified in item 7 above. The designated minimum MPs for the high threat to water quality nutrient sources should be site and source specific as appropriate.
   b. Establish a time line for installation of the designated minimum MPs at each nutrient source within its jurisdiction. If particular minimum MPs are infeasible for any specific site/source the county of San Diego should describe the steps it will take to require the implementation of other equivalent MPs.

10. **Inspection of Sites and Sources (Nutrients)**
    The County of San Diego should describe the steps it will take to inspect high priority sites and sources for compliance with its ordinances and permits as well as nutrient load reductions required under this TMDL. Inspections should include review of MP implementation plans and effectiveness. The County should also describe the steps it will take to implement all inspection follow-up actions, including enforcement actions, as necessary to obtain discharger compliance in implementing MPs.

11. **Enforcement of Sites and Sources (Nutrients)**
    The County of San Diego should describe the steps it will take to enforce its ordinances, statues, permits, and contracts as necessary to attain compliance with the nutrient load reductions specified in this TMDL.

12. **Reporting of Non-compliant Sites (Nutrients)**
    The County of San Diego should describe the steps it will take to provide oral notification to the Regional Board of non-compliant sites that are determined to be

[67] In determining appropriate MPs the County of San Diego is encouraged to consult the State Water Resources Control Board's California Nonpoint Source Encyclopedia (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html). This publication contains extensive information on nutrient reduction management measures (MMs) and management practices (MPs) applicable to the NPS land use activities in the Rainbow Creek watershed. The County is also encouraged to consult the Regional Board's Watershed Management Approach for the San Diego Region, Nonpoint Source (http://www.waterboards.ca.gov/sandiego/programs/wmc.html) for additional information on management measures.

recalcitrant in implementing MPs or attaining compliance with nutrient load reductions required under this TMDL within 24 hours of the discovery of noncompliance. The notification process should also include procedures for a follow-up written report to be submitted to the Regional Board within 5 days of the incidence of non-compliance.

13. **Monitoring to Assess Compliance With Nutrient Load Reductions**
The County of San Diego should describe the steps it will take to conduct, or require nutrient sites or sources to conduct, a monitoring program to assess compliance of runoff or groundwater discharges with the load reductions from each of the land use categories assigned a load reduction. This can be accomplished by placing sampling stations at strategic nodes that would monitor nutrient discharges from individual sources of a common land use category.

14. **Community Education and Outreach**
The County of San Diego should describe the steps it will take to develop a focused educational programs to raise community awareness of the nutrient impairment problem, promote pollution prevention, and increase the use of applicable management measures and practices where needed to control and reduce nutrient discharges to Rainbow Creek. Public education, outreach, and training programs should involve applicable user groups and the community.[68]

15. **Seek Financial Assistance**
The County of San Diego is encouraged to seek grant funding[69] for projects to implement the Rainbow Creek nutrient TMDLs, particularly those that can achieve quantifiable nutrient load reductions consistent with the specific nutrient TMDL load allocations.

16. **Nutrient Reduction and Management Plan (NRMP) Effectiveness**
The County of San Diego should describe the steps it will take to develop a long-term strategy for assessing the effectiveness of the NRMP. The long-term assessment strategy should identify specific direct and indirect measurements that the County will use to track the long-term progress towards achieving the nutrient load reductions required under this TMDL. Methods used for assessing effectiveness should include the following or their equivalent: surveys, pollutant loading estimations, and receiving water quality monitoring. The long-term strategy shall also discuss the role of monitoring data in substantiating or refining the assessment.

[68] Consideration should be given to expanding the County of San Diego's ongoing community and education outreach program under the County's MS4 NPDES Storm Water Permit to address the Rainbow Creek nutrient impairment problem. Additional suggestions for the information to be included in pollution prevention and education programs is contained in the State Water Resources Control Board's *California Nonpoint Source Encyclopedia* (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html).

[69] Information on available grant funds is contained in the in the State Water Resources Control Board's *California Nonpoint Source Encyclopedia* (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html).

17. **Nutrient Reduction and Management Plan (NRMP) Annual Report**
The County of San Diego should describe the steps it will take to submit an annual NRMP report to the Regional Board by January 31 of each year following USEPA approval of this TMDL. The reporting period for this annual report should be the previous fiscal year. For example, the report submitted January 31, 2006 would cover the reporting period July 1, 2004 to June 30, 2005. The report should be incorporated in the annual Jurisdictional URMP Annual Report and the Watershed Specific URMP Annual Reports under the County's MS4 NPDES Permit and include the following information:

    a. Comprehensive description of all activities conducted by the County of San Diego to oversee implementation of the NRMP.
    b. An accounting of all: inspections conducted; enforcement actions taken; and education efforts conducted.
    c. An assessment of whether actions to implement designated minimum MPs at each nutrient source were actually carried out by dischargers.
    d. An assessment of the compliance of runoff or groundwater discharges with the load reductions from each of the land use categories assigned a load reduction.
    e. Identification of water quality improvements or degradation in Rainbow Creek with regard to attainment of the nutrient water quality objectives.
    f. An evaluation of the effectiveness of the NRMP in achieving the nutrient load reductions required under this TMDL.

9.8 Discharger Actions

State of California, Department of Transportation (Caltrans) Actions
Caltrans shall take all actions necessary to meet the nutrient wasteload reductions assigned to Caltrans. These nutrient wasteload reductions will eventually be incorporated into the Caltrans statewide NPDES storm water permit. It is assumed that compliance with the nutrient wasteload reductions will be accomplished through the development and implementation of best management practices (BMPs). Caltrans shall also prepare and submit progress reports in accordance with the Caltrans statewide NPDES storm water permit or as otherwise directed by the Regional Board in a CWC §13383[70] order.

State of California Department of Forestry and Fire Protection (CDFFP) Actions
CDFFP shall, upon direction by the Regional Board in a CWC §13267 order, undertake an investigation to 1) evaluate whether CDFFP's discharge is surfacing and/or contributing to the impairment of Rainbow Creek; and 2) estimate the actual nutrient load to Rainbow Creek from groundwater flow originating from the septic tank and percolation ponds.

[70] CWC §13383 provides that the Regional Board may establish monitoring requirements for any person who discharges pollutants or dredged or fill material or proposes to discharge pollutants to navigable waters of the United States.

Nonpoint Source Dischargers (NPS Dischargers) Actions
NPS discharges of nutrients in the Rainbow Creek watershed result from (1) commercial nurseries; (2) agricultural fields; (3) orchards; (4) parks; (5) residential areas; (6) urban areas; and (7) septic tank disposal system land use activities. Individual landowners and other persons (NPS Dischargers) engaged in these land use activities shall implement pollution prevention[71] methods and increase the use of applicable management measures and practices[72] where needed to control and reduce nutrient discharges to Rainbow Creek and attain nutrient load reductions. Individual landowners and other persons are encouraged to seek grant funding[73] for projects to implement the Rainbow Creek nutrient TMDLs, particularly those that can achieve quantifiable nutrient load reductions consistent with the specific nutrient TMDL load allocations. NPS dischargers will be subject to Regional Board enforcement action for failing to: comply with applicable waiver conditions, waste discharge requirements (WDRs), or discharge prohibitions; attain compliance with the nutrient load reductions specified in this TMDL; or attain compliance with the nutrient water quality objectives. The Regional Board may also terminate the applicability of waivers and issue waste discharge requirements to any NPS dischargers failing to comply with waiver conditions.

9.9 Implementation Action Plan Summary

The following table is provided to summarize the County of San Diego's and discharger's implementation of the TMDLs.

[71] Pollution Prevention is defined as practices and processes that reduce or eliminate the generation of pollutants, in contrast to source control, treatment, or disposal.

[72] In determining appropriate management methods and practices to control nutrient discharges interested persons are encouraged to consult the State Water Resources Control Board's *California Nonpoint Source Encyclopedia* (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html. This publication contains extensive information on nutrient reduction management measures (MMs) and management practices (MPs) applicable to the NPS land use activities in the Rainbow Creek watershed. Interested persons are also encouraged to consult the Regional Board's Watershed Management Approach for the San Diego Region, Nonpoint Source (http://www.waterboards.ca.gov/sandiego/programs/wmc.html) for additional information on management measures.

[73] Information on available grant funds is contained in the in the State Water Resources Control Board's *California Nonpoint Source Encyclopedia* (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html).

Table 9-4. Summary of Implementation Actions

Action	Description	Regional Board Authority
County of San Diego Actions		
1. Control MS4 Discharges to Rainbow Creek	• Implement the requirements of Order No. 2001-01 where the permit applies	San Diego RWQCB Order No. 2001-01
2. Submit a Nutrient Reduction and Management Plan	• Develop a NRMP • Review Legal Authority • Review and revise Land Use and Planning policies and practices • Review and revise environmental review process (CEQA) • Implement pollution prevention • Inventory and prioritize nutrient sources • Designate MMs and MPs for nutrient sources • Inspect priority nutrient sites and sources • Enforce existing ordinances and adopt new ordinances as necessary • Report non-compliant sites • Monitor to Assess Compliance with Load Reductions • Provide community outreach and assistance • Seek financial assistance • Assess Effectiveness of NRMP • Review and/or revise plan annually • Submit plan and subsequent revisions to Regional Board • Develop and implement a monitoring program • Submit a monitoring and reporting program plan to Regional Board • Submit monitoring reports annually to the Regional Board	CWC § 13225
3. Submit and Implement Groundwater Investigation and Characterization Workplan	• Submit investigative workplan to Regional Board • Investigate nutrient loads to groundwater and the groundwater contribution to Rainbow Creek	CWC § 13225
4. Submit Groundwater Investigation and Characterization Report	• Submit Report to Regional Board on a schedule to be agreed to in writing by the Regional Board.	CWC § 13225
5. Establish MAA	• Enter into MAA with the Regional Board	CWC § 13225
State of California, Department of Transportation (Caltrans) Actions		
1. Meet Wasteload Allocations	• Implement the requirements of Order No. 99-06-DWQ • Submit a report on the determination of water quality exceedances and BMP implementation • Meet wasteload allocations by 2021	CWC § 13377
2. Perform Water Quality Monitoring	• Perform water quality monitoring • Submit reports annually to Regional Board	CWC § 13383
State of California, Department of Forestry and Fire Protection (CDFFP) Actions		
1. Investigate Impact of Percolation Ponds and Remediate if necessary	• Comply with the requirements of Order No. 95-20 • Investigate, monitor, and take necessary measures to ensure operations do not contribute to impairment	CWC § 13267

Action	Description	Regional Board Authority
	• Submit technical report to Regional Board	
Nonpoint Source Dischargers (NPS Dischargers) Actions		
1. Meet Load Allocations with MAA oversight	• Participate in load reductions with MAA direction and oversight • Iterative evaluation and implementation of MPs • Meet load allocations in compliance with schedule in Table 9-1	CWC § 13260 & § 13269 & § 13243

10.0 Implementation Monitoring Plan

This section describes an Implementation Monitoring Plan to assess the success of the implementation action plan presented in Section 9 in 1) achieving the nutrient wasteload and load reductions and 2) attaining nutrient water quality objectives in Rainbow Creek. The plan assigns monitoring responsibilities and describes a schedule and key milestones.

10.1 Regulatory Authority

10.1.1 Implementation Monitoring Plan as Part of a TMDL Basin Plan Amendment

Basin Plans must have a program of implementation to achieve water quality objectives.[74] The implementation program must include a description of actions that are necessary to achieve water quality objectives, a time schedule for these actions, and a description of "surveillance" to determine compliance with the water quality objectives[75]. The term "surveillance " in a TMDL context refers to an implementation monitoring plan designed to measure the effectiveness of the TMDL point and nonpoint source control measures and the progress the waterbody is making toward attaining water quality objectives. Such a plan would necessarily include collection of water quality data. State law requires that a TMDL include an implementation monitoring plan because the TMDL normally is, in essence, an interpretation or refinement of an existing water quality objective. The TMDL must be incorporated into the Basin Plan,[76] and because the TMDL supplements, interprets, or refines an existing water quality objective, state law requires an implementation monitoring plan be included to determine the success of the implementation action plan measures.

10.1.2 Local Agency Monitoring

CWC §13225 provides authority for the Regional Board to require local agencies such as the County of San Diego to submit technical reports on water quality control, even though those entities may not be waste dischargers. The only restriction is that the burden of preparing the reports bears a reasonable relationship to the need for, and the benefits to be obtained from, the reports.

[74] See CWC § 13050(j) A "Water Quality Control Plan" or "Basin Plan" consists of a designation or establishment for the waters within a specified area of all of the following: (1) Beneficial uses to be protected, (2) Water quality objectives and (3) A program of implementation needed for achieving water quality objectives.

[75] See CWC § 13242.

[76] See Clean Water Act § 303(e)

10.1.3 Discharger Monitoring

CWC §13267 provides that the Regional Board can require any person who has discharged, discharges, proposes to discharge or is suspected of discharging waste to investigate, monitor, and report information. The only restriction is that the burden of preparing the reports bear a reasonable relationship to the need for, and the benefits to be obtained from, the reports.

CWC § 13283 provides that the Regional Board may establish monitoring requirements for any person who discharges pollutants or dredged or fill material or proposes to discharge pollutants to navigable waters of the United States.

10.2 Monitoring Objectives

The specific objectives of this Implementation Monitoring Plan are as follows:

1. Establish a monitoring program for Rainbow Creek and its tributaries using monitoring, sampling and analytical methods consistent with the SWRCB Surface Water Ambient Monitoring Program (SWAMP); SWAMP data quality assurance protocols; and SWAMP data management;

2. Characterize baseline conditions in Rainbow Creek and its tributaries with respect to nutrients to place future monitoring data into perspective and document progress towards cleaner water;

3. Establish a groundwater monitoring network in the Rainbow Creek watershed to define nutrient concentration trends. Results from the network will be used to document whether implementation of MPs /BMPs by dischargers translate to decreased nutrient concentrations in groundwater and reduced nutrient loading to Rainbow Creek from groundwater.

4. Track changes in water quality over time in Rainbow Creek and its tributaries with respect to nutrients and enable comparison of baseline data and TMDL target values with conditions. Determine whether the "trajectory" of the measured water quality values points toward attainment of the nutrient water quality objectives;

5. Evaluate the effectiveness of the TMDL implementation actions over time and determine the need for revisions to improve the implementation action plan;

6. Provide the monitoring data needed to verify or refine assumptions, resolve uncertainties, and improve the scientific foundation of the TMDL; and

7. Provide the monitoring data needed to evaluate the overall TMDL implementation effectiveness and success in attaining nutrient water quality objectives in Rainbow Creek and its tributaries.

10.3 Regional Board Actions

1. **Issue Order to Submit Monitoring Plan to Caltrans and County of San Diego**
   The Regional Board shall issue an Order to Caltrans under CWC §13383 and a Governmental Water Quality Investigation Request Order to the County of San Diego under CWC §13225, to prepare and submit an Implementation Monitoring Plan containing the elements described in **Section 10.5 Implementation Monitoring Plan Elements** below. The Regional Board may amend this order at any time to include other nutrient dischargers in the Rainbow Creek watershed on a case-by case basis.

2. **Issue Order to Implement Monitoring Plan to Caltrans and County of San Diego**
   Upon concurrence with the County of San Diego's and Caltrans' Implementation Monitoring Plan the Regional Board shall issue an Order to Caltrans under CWC § 13383 and a Governmental Water Quality Investigation Request Order to the County of San Diego under CWC § 13225, to implement monitoring. The Regional Board may amend this order at any time to include other nutrient dischargers in the Rainbow Creek watershed on a case-by case basis.

10.4 County of San Diego and Caltrans Actions

1. **Prepare and Submit Monitoring Plan**
   The County of San Diego and Caltrans shall collaborate to prepare and submit an Implementation Monitoring Plan for the Rainbow Creek watershed containing the elements described in **Section 10.5 Implementation Monitoring Plan Elements** below, upon direction by the Regional Board in a CWC §13225 / CWC §13383 Order. The number of monitoring stations in Rainbow Creek assigned to Caltrans should be based on the number of stations needed by Caltrans to demonstrate compliance with the nutrient wasteload allocation and the success of the TMDL in attaining the nutrient water quality objective in the portion of Rainbow Creek affected by its discharge. The Implementation Monitoring Plan shall be modified as requested by the Regional Board.

2. **Implement Monitoring Plan**
   The County of San Diego and Caltrans shall implement the Implementation Monitoring Plan upon direction by the Regional Board pursuant to a CWC §13225 / §13383 Order. The Regional Board may amend this order at any time to include other nutrient dischargers in the Rainbow Creek watershed on a case-by case basis.

10.5 Implementation Monitoring Plan Elements

The Implementation Monitoring Plan shall contain the following elements:

1. **Surface Water Monitoring Stations**
   Monitoring stations shall be proposed that best serve the monitoring objectives described above in Section 10.2 Monitoring Objectives. Previously monitored locations that shall be considered include Jubilee, Hines Nursery, Oak Crest, Rainbow Glen Tributary, Margarita Glen Tributary, Willow Glen-4, Willow Glen Tributary, Riverhouse, Via Milpas Tributary, and Stage Coach (See Figure A-3, in Appendix A). An additional sampling location between Oak Crest and Willow Glen-4 should also be considered. For instance, a monitoring location might be placed downstream of Oak Crest Mobile Estates to assess nutrient loading from this property. Monitoring stations shall also be considered at strategic nodes in Rainbow Creek and its tributaries that would monitor nutrient discharges from individual sources of a common land use category.

2. **Groundwater Monitoring Stations**
   The location of existing wells and the proposed location of additional monitoring wells needed to define nutrient concentration trends in groundwater. Methods for purging and sampling monitoring wells to provide representative samples for the waste constituents of interest should be described.

3. **Surface Water Monitoring Frequency**.
   Monitoring frequencies of the various monitoring parameters shall be proposed that best serve the monitoring objectives described above in Section 10.2 Monitoring Objectives. The frequencies should be adequate to evaluate ambient conditions and address any impact from low dissolved oxygen concentrations and algal growth.

4. **Groundwater Monitoring Frequency**
   Monitoring frequencies of the various monitoring parameters shall be proposed that best serve the monitoring objectives described above Section 10.2 Monitoring Objectives. The magnitude and timing of nutrient variability may vary significantly in monitoring wells that are located varying distances from nutrient sources. Sampling these wells will likely obtain water from varying depths in the aquifer. To define the nitrate variability at each well, the network will be sampled quarterly for two years. The observed variability will serve as a basis for determining the long-term sampling frequency for the network.

5. **Surface Water Quality Parameters**
   Surface Water Quality Parameters shall include nitrogen (including nitrate, nitrite, ammonia and total Kjeldahl nitrogen (TKN)), phosphorus (including orthophosphate and total), dissolved oxygen, pH, turbidity, and temperature.

6. **Groundwater Quality Parameters**
   Groundwater Quality Parameters shall include total nitrogen, nitrate, ammonia, nitrites, TKN, orthophosphate, total phosphorus, pH, dissolved Oxygen and TDS.

7. **Hydrology**
   Flow rate measurements shall be taken to calculate nutrient loading, to provide additional information about the hydrology of the watershed, and to identify patterns in algal growth.

8. **Algal Biomass**
   Characterization of algal species composition is needed to provide a more reliable indicator of trophic status and evidence of nutrient condition (USEPA 2000a). The growth of algae is stimulated principally by nutrients such as nitrogen and phosphorus, but also requires adequate water temperature, light, flow, and dissolved oxygen. It is assumed at this time that both factors are co-limiting. Characterization of algal species composition may give a better understanding of the relationships between all the factors that affect algal growth, including sunlight, nitrogen, phosphorus, temperature, and dissolved oxygen. Algal biomass should be quantified by mass and/or by % cover of bottom (USEPA 2000a). Collection and measurement of algal biomass should be performed uniformly or by a standardized method (see USEPA 2000a).

9. **Biological Assessment Monitoring**
   It is recommended that biological assessment monitoring of benthic microinvertebrates be performed at a minimum of three stations on Rainbow Creek and a reference stream. Biological assessment monitoring should be performed in accordance with the California Stream Bioassessment Methods Manual (Harrington and Born 2000). Changes in the stream's biological integrity (e.g., an increase or decrease in diversity and abundance of sensitive species) could be used as an indicator of changes in the health of the creek. Sampling done in 1998-99 for the San Diego Ambient Bioassessment Program (CDFG 2000a) indicates that benthic macroinvertebrate communities vary seasonally. The seasonal trend could be due in part to rainfall and consequent streamflow conditions (e.g., scouring). Thus, sites should be sampled for benthic macroinvertebrates at least twice each year: once during the spring (i.e., May), and again in the fall (preferably in October).

10. **Monitoring Reports**
    Monitoring reports shall be submitted in both electronic and paper formats and include the following information:

    a) An executive summary addressing all sections of the monitoring report, comprehensive interpretations and conclusions, and recommendations for future actions;
    b) A description of monitoring station locations by latitude and longitude coordinates, frequency of sampling, quality assurance/quality control procedures and sampling and analysis protocols;
    c) The data/results, methods of evaluating the data, graphical summaries of the data, and an explanation/discussion of the data;
    d) An assessment of the compliance of runoff characteristics with the required load reductions from each of the land use categories assigned a load reduction;
    e) Identification and analysis of trends in surface and groundwater quality and assessment of compliance with nutrient water quality objectives; and

f) An evaluation of the effectiveness of the TMDL implementation actions and the need for revisions to improve the implementation action plan.

Table 10-1. Required Monitoring Parameters

Parameter	Type of sample[1]
Surface Water Monitoring	
Total nitrogen, nitrate, ammonia[2], nitrites, TKN, orthophosphate, and total phosphorus concentrations	Grab
Temperature	In Situ
pH	In Situ
Dissolved Oxygen	In Situ
Turbidity	In Situ
TDS	Grab
Flow rate	Field Measurement
Algal biomass (% cover of bottom and/or Chl a/ash free dry weight (AFDM))	In Situ and/or Grab
Benthic macroinvertebrate community analysis (recommended)	Grab
Groundwater Monitoring	
Total nitrogen, nitrate, ammonia[2], nitrites, TKN, orthophosphate, and total phosphorus concentrations	Grab
pH	Grab or In Situ
Dissolved Oxygen	Grab or In Situ
TDS	Grab or In Situ

[1] A California certified laboratory should be used with an approved QA/QC plan.
[2] All laboratory detection limits should be sufficient to determine compliance with the water quality objective. For example, un-ionized ammonia in surface waters (25 µg/L).

11. **Quality Assurance / Quality Control Plan**

The monitoring program shall develop and implement a QA/QC plan for field and laboratory operations to ensure that data collected are of adequate quality given the monitoring objectives.[77] The QA/QC plan for field operations shall cover the following, at a minimum:

a. Quality assurance objectives;
b. Sample container preparation, labeling and storage;
c. Chain-of-custody tracking;
d. Field setup;
e. Sampler equipment check and setup;
f. Sample collection;
g. Use of field blanks to assess field contamination;
h. Use of field duplicate samples;
i. Transportation to the laboratory;
j. Training of field personnel; and
k. Evaluation, and enhancement if needed of the QA/QC plan.

The QA/QC plan for laboratory operations shall cover the following, at a minimum:

a. Quality assurance objectives;
b. Organization of laboratory personnel, their education, experience, and duties;
c. Sample procedures;
d. Sample custody;
e. Calibration procedures and frequency;
f. Analytical procedures;
g. Data reduction, validation, and reporting;
h. Internal quality control procedures;
i. Performance and system audits;
j. Preventive maintenance;
k. Assessment of accuracy and precision;
l. Correction actions; and
m. Quality assurance report.

12. **Reporting Period**

Annual reports should cover the period of October 1 through September 30. The reports should be submitted to the Regional Board by January 31 of the following year and should be incorporated within the annual receiving water monitoring reports required under the County of San Diego's MS4 NPDES Permit Receiving Waters Monitoring and Reporting Program.[78]

[77] For more information on QA/QC activities, including guidelines and example QA/QC documents, refer to http://www.waterboards.ca.gov/swamp/qapp.html

[78] The term "MS4 NPDES Storm Water Permit" currently refers to Order No.2001-001, NPDES No. CAS0108758, Waste Discharge Requirements For Discharges Of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4s) Draining the Watersheds of the County of San Diego, the Incorporated Cities Of San Diego County, and the San Diego Unified Port District or subsequent superceding NPDES renewal Orders. Attachment B

13. **Reporting Frequency**
The first report shall be due in the first January following initiation of the monitoring program. Reporting shall continue on an annual basis until the nutrient water quality objective has been attained and maintained in Rainbow Creek.

to this Order contains the Receiving Waters Monitoring and Reporting Program for Order No. 2001-01. The annual receiving water monitoring report is described in Table 6, Item 28, page 51 of Order No. 2001-01.

11.0 Environmental Review

This Section presents the Regional Board's environmental analysis of the amendment to the "Water Quality Control Plan for the San Diego Basin (9)" (Basin Plan) to incorporate a Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus in Rainbow Creek.

11.1 Legal Authority

The Regional Board must comply with the California Environmental Quality Act (CEQA) when the Board amends the Basin Plan[79]. The CEQA process requires the Regional Board to analyze and disclose the potential adverse environmental impacts of a Basin Plan amendment it is initiating or approving. The Regional Board's Basin Plan amendment process must consider alternatives, develop proposals to mitigate or avoid environmental impacts to the extent feasible, and involve the public and other public agencies in the evaluation process.

11.1.1 CEQA Requirements Exemption

CEQA authorizes the Secretary of the Resources Agency to certify state regulatory programs, designed to meet the goals of CEQA, as exempt from CEQA's requirements to prepare an Environmental Impact Report (EIR), Negative Declaration, or Initial Study. These programs are often referred to as being "functionally equivalent" to the CEQA process

The State Resources Agency has certified the Regional Board's basin plan amendment process as "functionally equivalent" to the CEQA process.[80] State Water Resources Control Board (SWRCB) regulations[81] describe the environmental documents required for Basin Plan Amendment actions. These documents are: a written report, a Basin Plan Amendment and an Environmental Checklist Form.[82] This report, *Basin Plan Amendment and Technical Report for Total Nitrogen and Total Phosphorus, Total Maximum Daily Loads For Rainbow Creek,* fulfills the requirements of CEQA for preparation of an environmental document for this Basin Plan amendment.

11.1.2 Scope of Environmental Analysis

TMDL Basin Plan amendments typically include "performance standards."[83] TMDLs normally contain a quantifiable numeric target that interprets the applicable water quality objective. TMDLs also include wasteload allocations for point sources, load allocations for nonpoint sources and natural background. The quantifiable target together with the allocations may be

[79] See Public Resources Code § 21080

[80] See CCR, Title 14, § 15251(g).

[81] See 23 CCR 3720 et seq, "Implementation of the Environmental Quality Act of 1970"

[82] See 23 CCR 3776

[83] The term "performance standard" is defined in the rulemaking provisions of the Administrative Procedure Act (Government Code §§ 11340-l 1359). A "performance standard" is a regulation that describes an objective with the criteria stated for achieving the objective. (Government Code §11342(d)).

considered a performance standard.

CEQA has specific provisions governing the Regional Board's adoption of regulations such as the regulatory provisions of Basin Plans that establish "performance standards" or treatment requirements.[84] These provisions require that the Regional Board perform an environmental analysis of the reasonably foreseeable methods of compliance with the wasteload and load allocations prior to the adoption of the TMDL Basin Plan amendment. Specifically the Regional Board must provide an environmental analysis including at least the following:

1. A summary of the proposed TMDL Basin Plan amendment including an analysis of issues voiced by the public during the course of the TMDL Basin Plan development;

2. An analysis of the reasonably foreseeable environmental impacts of the implementation methods that may be employed to comply with the TMDL Basin Plan Amendment. The Environmental Checklist Form[85] should be used to identify any environmental impacts;

3. An analysis of the reasonably foreseeable feasible mitigation measures relating to those environmental impacts; and

4. An analysis of reasonably foreseeable alternatives to the proposed TMDL Basin Plan amendment.

The Regional Board's method of analysis to identify environmental impacts associated with the Rainbow Creek TMDLs is based on a "tiering"[86] approach to provide increased efficiency in the CEQA process. Tiering allows the Regional Board to limit its analysis in this document to the broad environmental issues at the Basin Plan amendment "performance standard" adoption stage which are ripe for decision. The Regional Board is not required, at the Basin Plan amendment adoption stage, to evaluate environmental issues associated with specific projects to be undertaken later to comply with the performance standard.[87] CEQA provisions allow for project level environmental considerations to be deferred so that more detailed examination of the effects of these projects in subsequent second tier CEQA environmental documents can be made by the appropriate lead agency.[88]

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[84] See Public Resources Code §§ 21159 and 21159.4

[85] 23 CCR § 3777

[86] See Public Resources Code § 21068.5

[87] See Public Resources Code (PRC) §§ 21159 through 21159.4 and CCR 14 § 15187. See also the legislative intent in PRC § 21156, and the statutes regarding "tiered" environmental review in PRC §§ 21068.5, and 21093-21094.

[88] See Public Resources Code § 21067. "Lead Agency" means the public agency which has the principal responsibility for carrying out or approving a project. The Lead Agency will decide whether an EIR or Negative Declaration will be required for the project and will cause the document to be prepared.

11.2 Project Description

The purpose of this project is to amend the Basin Plan to incorporate total maximum daily loads (TMDLs) for nitrogen and phosphorus and to assign wasteload and load allocations in order to attain and maintain water quality objectives in Rainbow Creek. A wasteload allocation is assigned to a point source discharger (Caltrans) and load allocations are assigned to commercial nursery, agricultural field, orchard, park, residential area, urban area, and septic tank disposal system land use activities to reduce nutrient loading to Rainbow Creek.

The Basin Plan amendment contains an Implementation Action Plan describing:

1. Actions that are specific to the pollutant and waterbody for which the TMDLs are being established;
2. Persons responsible for implementing specified control actions;
3. A timeline description of when activities necessary to implement the TMDL will occur;
4. A description of the legal authorities under which implementation will occur;
5. A description of milestones that will be used to measure progress; and
6. The time required to attain water quality objectives.

The Basin Plan amendment also contains an Implementation Monitoring Plan to evaluate the overall TMDL implementation effectiveness and success in attaining nutrient water quality objectives in Rainbow Creek and its tributaries.

The Basin Plan amendment establishes nutrient wasteload and load reductions over a 16-year period. During the first four years, nutrient wasteload and load reductions are projected to attain the nitrates water quality objective and reduced total nitrogen and total phosphorus concentrations in Rainbow Creek. Additional incremental nutrient wasteload and load reductions are required throughout the subsequent 12-year reduction period until December 31, 2021. A three-year response time is projected for Rainbow Creek to attain compliance with nutrient water quality objectives after reaching the desired nutrient wasteload and load reductions in 2021. Accordingly, the projected date when Rainbow Creek will attain and maintain compliance with nutrient water quality objectives is December 31, 2024.

11.3 Analysis of Public Comment on Technical Issues

This section summarizes the Regional Board's analysis of issues associated with the project that were identified by commenters in meetings with the Regional Board during the development of the Rainbow Creek TMDLs. This section also summarizes the Regional Board's analysis of issues presented at a Board public hearing on May 8, 2002 to consider the adoption of an earlier draft nutrient TMDL version for Rainbow Creek.

11.3.1 Issue: Are the Rainbow Creek Nutrient TMDLs Necessary?

Comment Summary: Over the course of the development of the TMDL, some commenters noted that current nutrient concentrations in Rainbow Creek are substantially less than the concentrations observed in the mid-1980s, and that evidence regarding actual beneficial use impairment is lacking. These commenters suggested that no TMDLs are necessary for Rainbow

Creek.

Analysis: The Regional Board carefully considered these comments but is proceeding with amending the Basin Plan to establish nutrient TMDLs for Rainbow Creek. Clean Water Act § 303(d) requires the states to identify waters within their borders that are not attaining water quality standards and to establish the total maximum daily load (TMDL) for pollutants impairing those waters. Amendment of the Basin Plan to establish and implement Total Maximum Daily Loads (TMDLs) for Rainbow Creek is necessary because the existing water quality does not meet applicable numeric water quality objectives for nitrate, total nitrogen, and total phosphorus. Applicable state and federal laws require the adoption of this Basin Plan amendment. The discussion in the problem statement section of this report provides additional detailed information on the need for TMDLs to address the nutrient water quality impairment conditions in Rainbow Creek.

11.3.2 Issue: Are the TMDL Targets and Load Reductions Feasible?

Comment Summary: Over the course of the development of the TMDL, some commenters expressed concern that it will not be technically feasible to attain the TMDL biostimulatory targets or reduce loading to the levels required to meet the proposed TMDLs. These commenters indicated that the Rainbow Creek watershed agricultural community would not be able to completely reduce nutrient loads to the very low quantities necessary to attain the load allocations for irrigated agriculture and nurseries.

Analysis: The Regional Board recognizes that it is difficult to ensure with precision that agricultural operations implementing nonpoint source management practices (MPs) controls will achieve the required nutrient load reductions. Nutrient MPs for agricultural operations may not perform according to expectations to achieve expected pollutant load reductions despite best efforts. The TMDL Implementation Action Plan provides for interim, measurable, milestones for determining whether nutrient MPs are being implemented, and a process for implementing stronger and more effective management measures if necessary. This type of approach might involve very long time frames before the nutrient water quality objectives are attained. The Regional Board is currently projecting that attainment of the nutrient water quality objectives may not occur until December 2024.

There is extensive information available to the agricultural community in the Rainbow Creek watershed to assist them in identifying and implementing proven practices to reduce nutrient discharges and restore the impaired waters of Rainbow Creek. One such source of information is the SWRCB's California Nonpoint Source Encyclopedia (2004) (http://www.waterboards.ca.gov/nps/encyclopedia.html). This publication contains extensive information on seven management measures designed to address agricultural nonpoint source (NPS) pollution of state waters.

The management measures referenced in California Nonpoint Source Encyclopedia were developed by the SWRCB, California Coastal Commission (CCC), and other state agencies and consist of a suite of plans, practices, technologies, operating methods, or other alternatives that may be used in combination to control NPS pollution. Associated with each management

measure are management practices designed to reduce the quantities of pollutants entering receiving waters. Many of the agricultural management practices listed under each management measure were approved for use on agricultural lands by the California Natural Resources Conservation Service (NRCS). Some practices are recommended by the U.S. Department of Agriculture (USDA) NRCS as components of Resource Management Systems (RMSs). RMSs, also known as conservation planning, are whole-farm plans that incorporate economic, social, and ecological considerations to meet the demands of crop and animal production and long-term environmental sustainability. RMSs contain pollution control criteria for soil, air, water, plant, animal, and human resources, which are described in the USDA NRCS *Field Office Technical Guide*. These organizations can also provide technical assistance to increase the ability of agricultural professionals and landowners in making sustainable nutrient management decisions to minimize or eliminate NPS pollution attributable to nutrient discharges.

Management Measure 1C in the California Nonpoint Source Encyclopedia addresses the development and implementation of comprehensive nutrient management plans for areas where nutrient runoff is a problem affecting coastal waters and/or water bodies listed as impaired by nutrients. The purpose of this management measure is to reduce the nutrient loss from agricultural lands, which occurs through edge-of-field runoff or leaching from the root zone.

Nutrients can be effectively managed to markedly reduce the potential for NPS pollution through development of a nutrient management plan (NMP) in accordance with USDA NRCS Standard 590. NMPs should be updated at least once every 5 years or once per crop rotation period. Such plans would include a plant tissue analysis to determine crop nutrient needs; crop nutrient budget; identification of the types, amounts, and timing of nutrients necessary to produce a crop based on realistic crop yield expectations; identification of hazards to the site and adjacent environment; soil sampling and tests to determine crop nutrient needs; and proper calibration of nutrient equipment. When manure from confined animal facilities that are not confined animal feeding operation (CAFOs) is to be used as a soil amendment and/or is disposed of on land, the plan should discuss steps to ensure that subsequent irrigation of that land does not leach excess nutrients to surface or groundwater. Components of an NMP include the following:

1. Farm and field maps showing acreage, crops, soils, and water bodies;

2. Realistic yield expectations for the crop(s) to be grown based primarily on the producer's yield history, State Land Grant University yield expectations for the soil series, or USDA NRCS Soils-5 information for the soil series;

3. A summary of the nutrient resources available to the producer, which at a minimum include (a) soil test results for pH, phosphorus, nitrogen, and potassium; (b) nutrient analysis of manure, sludge, mortality compost (birds, pigs, etc.), or effluent (if applicable); (c) nitrogen contribution to the soil from legumes grown in rotation (if applicable); and (d) other significant nutrient sources (e.g., irrigation water);

4. An evaluation of the field limitations based on environmental hazards or concerns such as (a) sinkholes, shallow soils over fractured bedrock, and soils with high leaching potential; (b) lands near surface water; (c) highly erodible soils; and (d) shallow aquifers;

5. Use of the limiting nutrient concept to establish a mix of nutrient sources and requirements for the crop based on realistic yield expectations;

6. Identification of timing and application methods for nutrients to (a) provide nutrients at rates necessary to achieve realistic yields, (b) reduce losses to the environment, and (c) avoid applications as much as possible to frozen soil and during periods of leaching or runoff;

7. Provisions for the proper calibration and operation of nutrient application equipment; and

8. Provisions to ensure that, when manure from confined animal facilities (excluding CAFOs) is to be used as a soil amendment or is disposed of on land, subsequent irrigation of the land does not leach excess nutrient to surface or groundwater.

11.3.3 Issue: Is the Methodology for Estimating Nutrient Loading from Land Use Activities Accurate?

Comment Summary: Commenters expressed concerns that the nutrient export coefficients the Regional Board used to estimate nutrient loading from various land use activities are not site-specific or tailored to the local topography, soil and vegetation types. The use of the export coefficients could introduce unacceptable errors in the loading estimates and overestimate load reduction

***Analysis*:** The calculation methodology is reasonable and consistent with approaches used in scientific literature and EPA guidance documents for estimating NPS loading rates for use in TMDLs. The current nutrient loadings were estimated using peer reviewed literature values of nutrient export rates for particular land use types. The Regional Board recognizes it is difficult to calculate nutrient loading from nonpoint sources with precision and acknowledges that the development of the nutrient loads from NPS discharges is characterized by uncertainties. The Regional Board has structured an adaptive implementation action plan that simultaneously makes progress toward achieving nutrient water quality objectives while relying on monitoring data to reduce uncertainty and fill data as time progresses. This monitoring data can be used to revise and improve the initial TMDL forecast for nutrient loading from non point sources over time if necessary.

11.3.4 Issue: Are the Nutrient TMDLs Consistent With the Clean Water Act § 303(d) List?

Comment Summary: Commenters objected at the May 8, 2002 public hearing to establishing total nitrogen and total phosphorus TMDLs because the proposed TMDLs did not explicitly match the "eutrophic conditions" impairment condition for Rainbow Creek contained in the Clean Water Act (CWA) § 303(d) listing that was in effect at that time.

***Analysis*:** The Regional Board's consideration of Nutrient TMDLs for Rainbow Creek in 2002 was entirely appropriate even though Rainbow Creek waters were not at that time explicitly listed as impaired due to nitrogen and phosphorus concentrations. Clean Water Act (CWA) §

303(d)(1)(A) requires each state to identify the waters within its jurisdiction that are not attaining water quality standards. The result of that process is commonly known as the CWA § 303(d) list. The federal regulations additionally require the 303(d) list to include an identification of the pollutants causing or expected to cause violations of standards.[89]

For the waters on the CWA § 303(d) list, CWA § 303(d) (1)(C) requires the state to develop TMDLs for the pollutants that are impairing those waters. In many instances waters on the CWA § 303(d) list are not identified as impaired by a specific pollutant, but by conditions that are caused in whole or in part by pollutants. Examples of these stressors include accelerated eutrophication (typically associated with excessive nutrients), toxicity (miscellaneous toxic constituents), and temperature (thermal discharges and sediment). CWA § 303(d)(1)(A) does not prohibit identifying waters as impaired by such conditions, and the United States Environmental Protection Agency (USEPA) has approved this approach, for example, by approving the 1998 and 2002 303(d) lists. Such listings, however, do not impact the state's obligation under CWA § 303(d) (1)(C) to develop TMDLs for the pollutants impairing those waters. Accordingly, where waters are listed as impaired for conditions commonly associated with pollutants, the Regional Board must identify the pollutants underlying or contributing to the conditions, and either establish TMDLs for those pollutants, or establish TMDLs that otherwise correct the conditions leading to the impairment.

In any event, the latest listing of impaired waters in the CWA § 303(d) List for 2002 renders the issue moot. During the public comment period on the CWA § 303(d) List for 2002, the Regional Board recommended that the SWRCB and USEPA change the Rainbow Creek impairment listing from "eutrophic conditions" to a pollutant-based listing based on exceedances of nitrogen and phosphorus water quality objectives. The SWRCB and USEPA concurred with this recommendation and the current CWA § 303(d) List for 2002 describes Rainbow Creek's pollutant impairment as "nitrogen and phosphorus."

11.3.5 Issue: Do Eutrophic Conditions Exist in Rainbow Creek?

Comment Summary: Some commenters at the May 8, 2002 public hearing also expressed the view that the Regional Board did not observe severe eutrophic conditions during the TMDLs development, and therefore, no impairment existed in Rainbow Creek.

Regional Board Analysis: As documented in Section 2.4 and 2.5 of this technical report, Rainbow Creek monitoring performed by the Regional Board in January through October 2000 found nitrogen and phosphorus enrichment, localized excessive filamentous algae, and exceedance of the Biostimulatory Substances water quality objective numeric values, strongly indicating impairment of the waterbody.

[89] See 40 C.F.R. § 130.7(b)(1)(4)

11.3.6 Issue: Is the Regional Board Interpreting the Biostimulatory Substances Water Quality Objective Properly?

Comment Summary: Several commenters asserted at the May 8, 2002 public hearing that the Regional Board is misinterpreting the Biostimulatory Substances water quality objective and that the water quality objective does not contain numeric values.

Analysis: The Biostimulatory Substances water quality objective is stated in Section 2.4 of this report. The Regional Board uses the 0.1 mg/l goal for phosphorus stated in the Biostimulatory Substances water quality objective as a phosphorus water quality objective unless site specific scientific studies demonstrate that a modified phosphorus objective is appropriate for a particular waterbody. (A modified water quality objective is referred to as a site-specific water quality objective (SSO).) Similarly the Regional Board uses the N:P ratio of 10:1 cited in the in the Biostimulatory Substances water quality objective as a basis for establishing a nitrogen water quality objective of 1.0 mg/l unless site specific scientific studies are conducted to establish a nitrogen site specific water quality objective based on different N:P ratios. SSOs must be approved by the Regional Board and incorporated into the Basin Plan. The Regional Board's use and interpretation of the Biostimulatory Substances water quality objective in this manner is well established and consistent with applicable laws and regulations.

The 0.1 mg/l goal for phosphorus stated in the Biostimulatory Substances water quality objective is the phosphorus water quality objective applicable to Rainbow Creek. Simarly the N:P ratio of 10:1 stated in the Biostimulatory Substances water quality objective serves as the basis for determining allowable concentrations of nitrogen in Rainbow Creek. Applying the the N:P ratio of 10:1 to a phosphorus water quality objective of 0.1 mg/l yields 1.0 mg/l total nitrogen as the applicable nitrogen water quality objectives for Rainbow Creek

The Biostimulatory Substances water quality objective requires the use of 0.1 mg/l phosphorus and 1.0 mg/l nitrogen as water quality objectives unless scientific studies show that alternative site specifc water quality objectives (SSOs) for nitrogen and phosphorus are appropriate for Rainbow Creek. The SSOs would need to (1) be based on sound scientific rationale; (2) protect the designated beneficial uses of Rainbow Creek waters; and (3) be adopted by the Regional Board in a Basin Plan amendment. Dischargers or other interested parties would need to fund and initiate the scientific studies to develop the SSO. It is possible the studies could reveal the need for more stringent nutrient water quality objectives.

In Section 2.4, an expanded discussion of academic literature and currently proposed USEPA numeric nutrient criteria are presented to support the reasonableness of the Biostimulatory Substances water quality objective numeric values. This issue is also addressed in Appendix M – Response to Public Comments, Public Hearing on May 8, 2002 under comments related to Water Quality Standards. It should be noted that USEPA's recommended water quality criteria for the subecoregion that includes Rainbow Creek are 0.5 mg N/L for total nitrogen and 0.03 mg P/L for total phosphorus which is even more stingent than the Regional Board's 1.0 mg/l nitrogen and 0.1 mg/l phosphorus that the Regional Board is using as the basis for the Rainbow Creek TMDL.

The Regional Board is currently participating in the development of new numeric nutrient water quality objecitves in an effort underway in California by the USEPA Region IX Regional Technical Advisory Group (RTAG). The RTAG group is currently working on developing alternative regional nutrient water quality criteria for the Southern and Central California due to the number of nutrient TMDLs being completed in this region. Basin Plan resources are assigned to continue participation in the RTAG effort over the next three years. Information on the National Nutrient Strategy, the status of the RTAG effort, and technical guidance can be found at http://www.epa.gov/ost/standards/nutrient.html.

11.3.7 Issue: Is the TMDL Overburdened with Data Gaps?

***Comment Summary*:** Several commenters asserted at the May 8, 2002 public hearing that the technical basis of the Rainbow Creek TMDLs under consideration at that time, was overburdened with data gaps and numerous mentions of having a lack of data, filling data gaps, re-evaluating the TMDLs, and adjusting allocations.

***Analysis*:** The Regional Board acknowledges that the technical basis of the Rainbow Creek TMDL is characterized by data gaps and uncertainties. Scientific uncertainty is a reality within all water quality programs, including the TMDL program, and it cannot be entirely eliminated. The TMDL program must move forward in the face of these uncertainties if progress in establishing TMDLs and attaining water quality objectives in impaired waters is to be made.

The National Research Council addressed this issue in their report for the US Congress entitled *Assessing the TMDL Approach to Water Quality Management* (2000) and concluded that

> "… the ultimate way to improve the scientific foundation of TMDLs is to incorporate the scientific method, and not simply the results from analysis of particular data sets or models, into TMDL planning. The scientific method starts with limited data and information from which a tentatively held hypothesis about cause and effect is formed. The hypothesis is tested, and new understanding and new hypotheses can be stated and tested. By definition, science is this process of continuing inquiry. Thus, calls to make policy decisions based on the "the science," or calls to wait until "the science is complete," reflect a misunderstanding of science. Decisions to pursue some actions must be made, based on a preponderance of evidence, but there may be a need to continue to apply science as a process (data collection and tools of analysis) in order to minimize the likelihood of future errors."

In accordance with this approach the Regional Board has structured an adaptive implementation action plan in the revised Rainbow Creek TMDL that simultaneously makes progress towards achieving nutrient water quality objectives while relying on monitoring data to reduce uncertainty and fill data gaps as time progresses. This monitoring data can be used to revise and improve the initial TMDL forecast over time. This type of approach will help ensure that the Rainbow Creek TMDL program is not halted because of a lack of data and information, but rather progresses while better data are collected to verify or refine assumptions, resolve uncertainties, and improve the scientific foundation of the TMDL.

The Regional Board has extensively modified the Rainbow Creek TMDL to improve the scientific basis and validity of the wasteload and load allocations. The revised Rainbow Creek TMDL report now includes eight years of site-specific flow data to calculate the TMDLs, and City of San Diego water quality data from 12 minimally impacted streams within the County to calculate the background load. (See Sections 4.1.1, and 5 and Appendix D)

11.3.8 Issue: Is the Nutrient Load Defining Background Conditions Calculated Properly?

***Comment Summary*:** Several commenters expressed the view at the May 8, 2002 public hearing that it was unreasonable and unobtainable to achieve a TMDL below background conditions, and that the TMDL proposed at that time was scientifically flawed. These comments were directed towards the Regional Board's March 22, 2002 report on Rainbow Creek TMDLs where the background nutrient load to Rainbow Creek was estimated by multiplying the export coefficient for open space and the acreage of undeveloped land. This method resulted in a background load estimate that was higher than the total nitrogen TMDL. Using this methodology, Rainbow Creek would have no assimilative capacity for additional nutrient loading from anthropogenic sources.

***Analysis*:** The Regional Board agreed with these commenters and has recalculated the background nutrient loading from natural sources. The Regional Board reviewed and considered additional data from minimally impacted streams in the San Diego region to better define background nutrient concentrations from natural sources and eight years of site-specific Rainbow Creek flow data to calculate a background load for Rainbow Creek (See Section 4.1.1 and Appendix D of this report). The revised background loads for total nitrogen and total phosphorus in the revised TMDL described in this report are less than the nutrient water quality objective. Using this methodology, Rainbow Creek does have some limited assimilative capacity for additional nutrient loading from anthropogenic sources.

This issue was also addressed in Appendix M – Response to Public Comments, Public Hearing on May 8, 2002 under comments related to Technical Issues.

11.3.9 Issue: Should Site Specific Flow Data be Used?

Comment Summary: USEPA commented that the Regional Board should use site-specific stream flow records from the USGS Gaging Station located on Rainbow Creek for use in determining the nutrient loading capacity.

***Analysis*:** The TMDLs are now based on the site-specific flow records from the USGS Gaging Station located on Rainbow Creek. (Section 5.0 and Appendix E).

11.3.10 Issue: Did the Regional Board Properly Address Economic Considerations?

Comment Summary: Several commenters raised the issue at the May 8, 2002 public hearing that the Regional Board did not adequately address implementation costs and effectiveness of MPs to landowners and land users.

***Analysis*:** Section 12.0 and Appendix H now provides a more expanded analysis of MPs as they may be utilized by various land uses. Irrigation MPs, nutrient reduction MPs, and runoff/erosion control management MPs are evaluated at low, medium, and high levels of effort for each land use.

11.4 Analysis of Reasonably Foreseeable Environmental Impacts

This section identifies the reasonably foreseeable methods of compliance with the Rainbow Creek TMDL Basin Plan amendment and describes the environmental impacts of those methods.

Point source discharges of nutrients in the Rainbow Creek watershed result from storm water runoff of nutrients from both Interstate-15 freeway surfaces and adjacent land areas. Nonpoint source discharges occur from commercial nursery, agricultural field, orchard, park, residential area, urban area, and septic tank disposal system land use activities. Attainment of the nutrient wasteload and load reductions to comply with the requirements of the Rainbow Creek TMDL Basin Plan amendment depends upon discharger implementation of best management practices (BMPs) for point source discharges and management practices (MPs) for nonpoint source discharges to control these nutrient sources.

Controlling and reducing nutrient discharges in the Rainbow Creek watershed to meet the TMDL nutrient load reductions for nonpoint sources will be a long term, complicated undertaking. The Regional Board proposes to use a Third Party regulatory-based approach to mandate compliance with the nonpoint source (NPS) nutrient load reductions of this TMDL.

Reasonably foreseeable compliance methods for implementing the third party agreement and the BMPs and MPs that may be employed by dischargers to comply with the nutrient wasteload and load reductions of the Rainbow Creek TMDL are summarized below.

11.4.1 Reasonably Foreseeable Compliance Methods

County Of San Diego

The Regional Board proposes to use a Third Party regulatory based approach to mandate compliance with the nonpoint source (NPS) nutrient load reductions of this TMDL. The Regional Board will accomplish this by negotiating a Management Agency Agreement (MAA) between the Regional Board and the County of San Diego setting forth the commitments of both parties to undertake various implementation responsibilities for the NPS nutrient load reductions of this TMDL.

Under the terms of the proposed MAA, the County of San Diego will take the lead in establishing management measures (MMs) and management practices (MPs) and overseeing MP

implementation by NPS dischargers to attain TMDL nutrient load reductions in the Rainbow Creek watershed. This will be accomplished through the County of San Diego's development of a Nutrient Reduction and Management Program (NRMP) for the watershed that incorporates nutrient management measures and a public outreach program to achieve these reductions. Additionally, the County of San Diego may be directed to investigate ground water quality and contribution to the creek to fill data gaps. Findings from the investigations will be used in the development of further implementation measures to attain subsequent nutrient load reductions.

In conjunction with an MAA or MOU with another third-party representative, organization, or government agency describing an adequate NPS pollution control implementation program, the Regional Board may adopt individual or general waivers or waste discharge requirements (WDRs) for NPS discharges in the Rainbow Creek watershed. The waivers or WDRs may require NPS dischargers to either participate in the third party NPS program or, alternatively, submit individual pollution prevention plans that detail how they will comply with the waivers and WDRs. Alternatively, the Regional Board may adopt a discharge prohibition, which includes exceptions for those discharges that are adequately addressed in an acceptable third-party MAA or MOU NPS pollution control implementation program.

Agricultural, Parks and Commercial Nursery Sources

Nutrient reduction management measures for agricultural sources are directed towards reducing the nutrient loss from agricultural lands, which occurs through edge-of-field runoff or leaching from the root zone. Management practices to achieve this goal might include:

- Developing, implementing, and periodically updating a nutrient management plan to (1) apply nutrients at rates necessary to achieve realistic crop yields, (2) improve the timing of nutrient application, and (3) use agronomic crop production technology to increase nutrient use efficiency.

- Operating irrigation systems so that the timing and amount of irrigation water applied match crop water needs. This requires, as a minimum, (a) the accurate measurement of soil-water depletion volume and the volume of irrigation water applied, and (b) uniform application of water.

- Controlling the manner and application of water to minimize water runoff and soil erosion. USDA NRCS-recommended irrigation systems include microirrigation, sprinklers, surface and subsurface systems, and tailwater recovery.

- Managing the drainage water from the irrigation system to control deep percolation, to move tailwater to the reuse system, and to control erosion and adverse impacts on surface and ground.

- Preventing or reducing the amount of soil entering surface water by installing filter strips, field borders, fiber mats, and buffers to filter and trap sediment. Grassed waterways can be installed to prevent gullies and to filter and trap sediment, and sediment ponds, basins, and traps can be used to treat sediment-laden runoff.

- Maintaining soil quality through crop rotation which involves planting crops in a recurring sequence on the same field, and by using conservation tillage to improve soil properties and improve water infiltration.

- Reducing or prevented soil erosion by leaving crop residues on the field, planting cover crops or other vegetative cover, and applying mulch to bare fields. In addition, fields can be graded to reduce slope length, steepness, or unsheltered distance (i.e., contour farming), and terraces and diversions can be used to reduce slope length. Finally, cross-wind strips can be installed and hedgerows, trees, and shrubs can be maintained along edges of fields or against prevailing winds to prevent wind erosion.

Septic Tank Sources

Management measures for septic tanks are directed towards ensuring that existing septic tank systems prevent the discharge of pollutants to the surface of the ground and, to the extent practicable, reduce the discharge of pollutants into ground water. Meeting these objectives may involve the reduced use of garbage disposals, the use of low-volume plumbing fixtures, use of low-level phosphate detergents, and establishment and implementation of policies that require a septic tank system to be repaired, replaced, or modified when the septic tank system fails or threatens or impairs surface waters.

Management practices may entail development of an effective operation and maintenance program for septic tanks that can be directed by regulatory agencies, wastewater utilities or districts, or voluntary programs. Operation and maintenance programs might include system inventories; management, operation, and maintenance policies; inspection and monitoring requirements; guidelines for the disposal or reuse of residuals; and public education. Public education and outreach are important to improve homeowner and industry awareness of the importance of operation and maintenance procedures. Typical public outreach and education programs address the benefits of the onsite management program, water conservation, and household and commercial/industrial hazardous waste discharge prevention.

Management practices may also entail retrofitting existing septic tank systems to provide for denitrification to reduce nitrogen loadings. For instance, whereas conventional septic systems remove 10 to 45 percent of total nitrogen, anaerobic up-flow filters remove 40 to 75 percent, and recirculating sand filters remove 60 to 85 percent. These options typically involve circulation loop or tanks in series, and it is possible to retrofit conventional, systems to improve denitrification performance. Other factors that affect the degree of nitrogen removal include temperature and the density of the soil in the septic tank fields.

State Highway Sources

Caltrans is the agency responsible for managing California's highway system. Caltrans implements a storm water management program pursuant to its MS4 NPDES storm water permit to reduce the discharge of pollutants, such as nutrients, to receiving waters through implementation of BMPs such as:

- Runoff treatment facilities located within existing rights-of-way, medians, or interchange loops, or on adjacent lands. Where no additional land is available, underground runoff

storage and treatment (e.g., sand filters) can be used.

- Vegetative filter strips along roadsides and in medians to slow runoff velocities and increase storm water infiltration.

- Elimination of curbs to allow highway and road runoff to be filtered through vegetated shoulders and medians. Eliminating curbs also increases infiltration to ground water.

- Designing curbs with breaks and energy dissipaters to direct sheet flow to vegetated surfaces. These infiltration areas require periodic inspection for damage, rilling, ponding, and trash accumulation, and will also require mowing or cropping of vegetation to prevent nuisance.

Residential Area Sources

Management measures to reduce or eliminate nutrient discharges from residential areas typically involves implementation of educational programs to provide greater understanding of watersheds and to raise awareness and increase the use of applicable urban management practices where needed to control and prevent adverse impacts on surface and ground waters. Outreach campaigns would inform both commercial lawn care specialists and residents of the importance of proper application of lawn fertilizers and timing of fertilizer application to provide citizens with the tools to use these fertilizers efficiently and reduce overall fertilizer use.

11.4.2 Environmental Impacts of Reasonably Foreseeable Compliance Methods

The environmental checklist, found in Appendix G, describes the potential for environmental impacts associated with the reasonably foreseeable compliance methods discussed above. The environmental checklist indicates that the TMDL Basin Plan amendment will not have any direct adverse environmental impacts. The implementation of TMDLs will lead to an overall improvement in the quality of water and therefore the quality of the environment.

The environmental checklist does indicate that potential, or indirect, environmental impacts could arise from BMP or MP projects implemented to comply with the Rainbow Creek TMDL. However these projects and their impacts are speculative at this time. The precise nature, location, and significance of the environmental impacts cannot be determined at this time, since the TMDL implementation action plan establishes a process for identifying subsequent projects rather than specifying particular remedial projects at specific locations. Accordingly, an analysis of the reasonably foreseeable feasible mitigation measures relating to those speculative environmental impacts is not presented. Future CEQA documents prepared for specific BMP or MP implementation projects will identify site-specific environmental impacts and the need for feasible mitigation measures.

11.5 Reasonable Alternatives to the TMDL Basin Plan Amendment

This section describes the Regional Board's analysis of reasonable alternatives to the proposed project. The purpose of this analysis is to determine if the alternatives would feasibly attain the basic objective of the TMDL Basin Plan amendment but would avoid or substantially lessen any potential significant effects of the proposed amendment. The four alternatives include taking "no action", using a regulatory approach to TMDL implementation, and deferring adoption of the TMDLs until either site-specific water quality objectives are developed or new nutrient criteria are established.

11.5.1 No Action Alternative

Under the "no action" alternative the Regional Board would not adopt the proposed TMDL Basin Plan amendment and nutrient loading would likely continue at current levels. The no action alternative 1) does not comply with the Clean Water Act (CWA); 2) is inconsistent with the mission of the Regional Board; and 3) does not meet the purpose of the proposed TMDL Basin Plan Amendment. Under CWA § 303(d), the Regional Board is obligated to adopt a TMDL for waters such as Rainbow Creek that are not meeting water quality standards.[90] The mission of the Regional Board is to ensure the protection of receiving water beneficial uses through attaining and maintaining applicable water quality objectives. Consistent with the Regional Board's mission, the purpose of the proposed TMDL Basin Plan Amendment is to attain water quality objectives for biostimulatory substance and to restore and protect the wildlife and aquatic habitat beneficial uses of Rainbow Creek.

The proposed Basin Plan Amendment mandates an overall 74% reduction of total nitrogen loading and 85% reduction of total phosphorus loading from current levels to Rainbow Creek in order to attain water quality standards. Implementation of MPs will eventually be required for control of surface runoff under the statewide Nonpoint Source Plan, which could lead to some improvement in the water quality of the creek. However in the absence of the TMDL wasteload and load allocations needed to achieve the steep nutrient load reductions, violations of the biostimulatory substances water quality objective and impairment of beneficial uses will continue in Rainbow Creek.

Ultimately, the USEPA is required to develop and adopt TMDLs pursuant to CWA § 303(d) if the State does not adopt the proposed TMDLs and implementation plan. It is possible that the USEPA would adopt TMDLs based on their recommended nutrient criteria of 0.5 mg/L total nitrogen and 0.03 mg/L total phosphorus for streams in the subecoregion 6, Xeric West Ecoregion (USEPA 2000b). The use of this nutrient criteria as the TMDL Numeric Targets would result in wasteload and load allocations in the Rainbow Creek watershed that are more restrictive than those proposed by the Regional Board.

[90] Water quality standards are comprised of designated beneficial uses, the applicable numeric and/or narrative water quality objectives to protect those uses, and the SWRCB's anti-degradation policy provisions (Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality of Waters in California).

11.5.2 Develop Site Specific Nutrient Water Quality Objectives

It may be appropriate to develop a modified biostimulatory substances water quality objective for Rainbow Creek based on site-specific environmental conditions in Rainbow Creek. A modified water quality objective is referred to as a site-specific water quality objective (SSO).

The legally applicable water quality objective for biostimulatory substances in Rainbow Creek is 1.0 mg N/L of total nitrogen and 0.1 mg P/L of total phosphorus. Scientific studies could be conducted to examine the appropriateness of establishing a less stringent biostimulatory substances (i.e. nutrients) water quality objective (i.e., an SSO). A TMDL based on an SSO that is less stringent than 1.0 mg N/L and 0.1 mg P/L, would require a smaller reduction in nutrient loading than the 74% point source wasteload and 85% nonpoint source load reduction required under the proposed Basin Plan Amendment. An SSO for nutrients in Rainbow Creek could potentially eliminate the need for a TMDL, if the SSO is currently attained in the receiving waters. The SSO would need to (1) be based on sound scientific rationale; (2) protect the designated beneficial uses of Rainbow Creek waters; and (3) be adopted by the Regional Board in a Basin Plan amendment.

The language for the Biostimulatory Substances (nutrients) water quality objective for total phosphorus in the Basin Plan originates from the rationale for phosphate phosphorus included in USEPA's Quality Criteria for Water (USEPA 1976). A total phosphorus criterion to control nuisance aquatic growths was not presented; however, a rationale to support such a criterion was included for consideration. The rationale included limits for the entry point of streams into a standing body of water and for standing bodies of water, as well as a desired goal of 0.1 mg P/L in flowing waters for the prevention of plant nuisance. While the scientific data appear to be more specific with regard to lakes and reservoirs, the rationale indicated that establishing a phosphorus criterion for flowing waters is important to protect downstream receiving waters, such as lakes and estuaries. The rationale also provides that streams and rivers exist that may need either more stringent or less stringent nutrient limits and that other factors (i.e., turbidity, other limiting nutrient) may influence whether phosphorus is a contributor to eutrophy. Thus the Basin Plan's current nutrients objective may be over protective or under protective for Rainbow Creek.

If scientific studies demonstrate that the ambient water chemistry and/or biological communities at Rainbow Creek are significantly different from the chemistry and biological communities upon which the current limits were based, an SSO for nutrients may be appropriate. However, the development of a nutrient SSO for Rainbow Creek waters, including the scientific studies necessary to support it, would be costly, time consuming and resource intensive. Dischargers or other interested parties would need to fund and initiate the scientific studies to develop the SSO. It is possible that the studies could reveal the need for more stringent nutrient water quality objectives.

There is no effort currently underway or planned by interested persons to fund the scientific studies needed to develop SSOs for nutrients in Rainbow Creek. Even in the event that scientific studies were initiated and SSOs for nutrients were developed and adopted by the Regional Board, it would likely not obviate the need for a TMDL. Accordingly, the appropriate strategy for addressing the nutrient water quality problem in Rainbow Creek is for the Regional Board to

proceed with adoption of the proposed TMDL Basin Plan amendment at this time. If SSOs for nutrients are developed in the future and adopted by the Regional Board, this TMDL Basin Plan Amendment would be modified accordingly. If interested parties are willing to fund and oversee development of scientific studies to investigate SSOs, the most effective and expeditious means to improve water quality would be to conduct these studies concurrent with actions necessary to achieve compliance with the current TMDL.

11.5.3 Develop Region-Wide Nutrient Water Quality Objectives

The Regional Board is currently participating in a statewide joint U.S. EPA Regional Technical Advisory Group (RTAG) that is overseeing nutrient water quality objective development for California. This group is currently working on developing proposed regional nutrient water quality criteria for the Southern and Central California as a priority target due to the number of nutrient TMDLs being completed in this region of the state. Under this alternative the adoption of the nutrient TMDLs for Rainbow Creek would be delayed until after the RTAG effort is completed and an updated nutrient water quality objective is incorporated into the Basin Plan.

U.S. EPA has developed stringent new nutrient water quality criteria under Clean Water Act § 304 of 0.5 mg/L total nitrogen and 0.03 mg/L total phosphorus for streams in the subecoregion 6, Xeric West Ecoregion (USEPA 2000b). Rainbow Creek is located in the Xeric West Ecoregion defined by USEPA and would be subject to this nutrient water quality criteria if it is promulgated as water quality standards. In addition, USEPA guidance documents are available that detail methods for developing alternative site specific criteria for nutrients. California currently has three options: 1) employ methods outlined in USEPAs guidance documents to develop nutrient water quality objectives; 2) directly adopt USEPAs CWA §304(a) criteria of 0.5 mg/L total nitrogen and 0.03 mg/L total phosphorus into Basin Plans as water quality objectives or 3) use other scientifically defensible methods to develop nutrient water quality objectives.

It is not known at this time with any definition when or if an updated nutrient water quality objective will come out of the RTAG effort. If a nutrient water quality objective does emerge from the RTAG effort it will probably be more stringent than the Regional Board's current Biostimulatory Substances (nutrient) water quality objectives. If California fails to adopt an updated water quality objective for nutrients, USEPA will eventually begin to promulgate its nutrient criteria of 0.5 mg/L total nitrogen and 0.03 mg/L total phosphorus as water quality standards that would be applicable to Rainbow Creek waters. Based on these considerations, a delay in the adoption of the TMDL until after the RTAG effort is completed, is not warranted.

11.5.4 Regional Board Adoption of a Nutrient Discharge Prohibition

California Water Code § 13243 provides that the Regional Board, in a water quality control plan or in waste discharge requirements, may specify certain conditions or areas where the discharge of waste, or certain types of waste, will not be permitted. Accordingly the Regional Board could elect to amend the Basin Plan to prohibit the discharge of waste of nutrients at any concentration or load into Rainbow Creek waters. Under this alternative, nutrient dischargers in the Rainbow Creek watershed (i.e. Caltrans and commercial nurseries, agricultural field, orchard, park, residential area, urban area, and septic tank disposal system land use activities) would need to

take immediate action to eliminate all nutrient discharges to Rainbow Creek waters.

Compliance with the prohibition would require the dischargers to achieve an immediate 100% nutrient load reduction. In contrast the proposed TMDL Basin Plan Amendment requires a 74% point source nutrient wasteload reduction and an 85% nonpoint source nutrient load reduction over a 21 year time frame. Both the nutrient discharge prohibition and the proposed TMDL Basin Plan Amendment would result in attainment of the nutrient water quality objectives and protection of beneficial uses in Rainbow Creek. Both alternatives would require the same types of nutrient reduction management practices (MP) activities. However implementation of an outright prohibition on nutrient discharges to Rainbow Creek would be unwarranted, cost prohibitive and extremely disruptive to the community. For these reasons, establishment of a nutrient discharge prohibition in lieu of a TMDL is not an acceptable alternative.

12.0 Economic Considerations

This section presents the Regional Board's economic analysis of the amendment to the "Water Quality Control Plan for the San Diego Basin (9)" (Basin Plan) to incorporate a Total Maximum Daily Loads for Total Nitrogen and Total Phosphorus in Rainbow Creek.

12.1 Legal Authority

Under state law, there are two triggers that require Regional Board consideration of economics or costs when considering adoption of a TMDL Basin Plan amendment. These triggers are:

- Adoption of a treatment requirement or performance standard (CEQA)
- Adoption of an agricultural water quality control program

Each of these categories is briefly discussed below.

12.1.1 CEQA Requirement for Consideration of Economic Analysis

The Regional Board must comply with the California Environmental Quality Act (CEQA) when the Board amends the Basin Plan.[91] The CEQA process requires the Regional Board to analyze and disclose the potential adverse environmental impacts of a Basin Plan amendment that it is initiating or approving. The Regional Board's Basin Plan amendment process must consider alternatives, develop proposals to mitigate or avoid environmental impacts to the extent feasible, and involve the public and other public agencies in the evaluation process.

TMDL Basin Plan amendments typically include "performance standards."[92] TMDLs normally contain a quantifiable numeric target that interprets the applicable water quality objective. TMDLs also include wasteload allocations for point sources and load allocations for nonpoint sources and natural background. The quantifiable target together with the allocations may be considered a performance standard.

CEQA has specific provisions governing the Regional Board's adoption of regulations such as the regulatory provisions of Basin Plans that establish "performance standards" or treatment requirements.[93] These provisions require that the Regional Board perform an environmental analysis of the reasonably foreseeable methods of compliance with the wasteload and load allocations prior to the adoption of the TMDL Basin Plan amendment. The Regional Board must consider the economic costs of the methods of compliance in this analysis.[94] The Regional Board is not required to do a formal cost-benefit analysis.

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[91] See Public Resources Code § 21080

[92] The term "performance standard" is defined in the rulemaking provisions of the Administrative Procedure Act (Government Code §§ 11340-l 1359). A "performance standard" is a regulation that describes an objective with the criteria stated for achieving the objective. (Government Code §11342(d)).

[93] See Public Resources Code §§ 21159 and 21159.4

[94] See Public Resources Code § 21159(c)

12.1.2 Agricultural Water Quality Control Program

Agricultural activities are significant sources of nutrient pollution in the Rainbow Creek watershed. As a result, the Rainbow Creek TMDL Basin Plan amendment includes nutrient load allocations applicable to agricultural activities and mandates nutrient load reductions from these activities as part of the TMDL implementation action plan. Under the Porter-Cologne Water Quality Control Act,[95] before a Regional Board implements an agricultural water quality control program, it must identify the total cost of the program and potential sources of financing.[96] This information must be included in the basin plan. The statute does not require the Regional Boards to do, for example, a cost-benefit analysis or an economic analysis.

12.2 TMDL Implementation Costs

The Rainbow Creek TMDLs specify an overall 74% reduction of total nitrogen loading and 85% reduction of total phosphorus loading from current levels to Rainbow Creek in order to attain water quality standards. The most reasonably foreseeable method of compliance involves reducing nutrient use and controlling the discharge of nutrients to surface or groundwater by applying best management practices (BMPs) for nutrient point source discharges and management practices (MPs) for nutrient nonpoint source discharges.

Section 12.2.1 below provides the estimated costs for the County of San Diego to develop a Nutrient Reduction Management Plan (NRMP) and to implement the monitoring, investigation, and outreach elements. The estimated implementation costs for potential MPs that may be implemented by landowners and land users are provided in Section 12.2.2. Potential sources of funding are listed in Section 12.3.

12.2.1 Investigation, Monitoring, and NRMP Costs

Under the terms of the TMDL Implementation Action Plan and Implementation Monitoring Plan, the County of San Diego will be directed, upon request by the Regional Board, to develop a NRMP, investigate groundwater nutrient contributions to Rainbow Creek, regularly monitor ground and surface water quality and act as program coordinator to work with the community and provide assistance in accordance with a Management Agency Agreement (MAA) entered into with the Regional Board for nonpoint source discharges. The County has provided preliminary cost estimates for monitoring and program elements expected to be included in this program. These costs are estimates and the actual costs may be lower depending upon the actual scope of the work. A summary of these estimated costs is provided in Table 12-1.

[95] See Water Code §§ 13000 et seq.
[96] See Water Code § 13141 et seq.

Table 12-1. Summary of First Year and Subsequent Annual Cost for Conducting Rainbow Creek TMDL Studies

Item	First Year Cost[1]	Subsequent Annual Cost[1]
Develop/Revise NRMP	$10,000 - $50,000	$2,000 - $10,000
Surface Water Monitoring Program[2]	$70,600 - $125,000	$70,600 - $125,000
Groundwater Investigation Program[3]	$54,000 - $104,400	$31,400 - $59,400
Equipment and Outreach[4]	$45,500 - $66,000	$9,000 - $20,000
Total	$180,100 - $345,400	$113,000 - $214,400

1. Estimates provided by the County and ranges added by the Regional Board. Actual costs may be lower. For example annual costs for sampling may be significantly lower if the initial results indicate that a reduction in number of samples and analyses are appropriate.
2. See Table 12-2
3. See Table 12-3
4. See Table 12-4

Costs to Develop Nutrient Reduction and Management Plan (NRMP)

The estimated cost to prepare the initial Draft and Final NRMP is $10,000 to $50,000. It is anticipated that revisions will be made to the NRMP based on the results of investigations, and to incorporate lessons learned regarding MP effectiveness and community responsiveness. The revisions to the NRMP in subsequent years may cost $2,000 to $10,000 per year. The costs to develop and implement the NRMP are presented in Table 12-1.

Surface Water Monitoring Program Costs

Consistent with the Implementation Monitoring Plan described in Section 10.5, the surface water monitoring program could include bimonthly monitoring for nutrients, physical parameters, and flow, monthly monitoring of chlorophyll a (water column), and algal biomass monitoring (algae sample) every other month, at 11 stations on Rainbow Creek and its tributaries. Bioassessment could also be performed at 4 locations on Rainbow Creek and at 1 reference station twice per year. Staff time to perform monitoring, data management, and report preparation have also been estimated. Table 12-2 presents the estimated annual costs associated with a surface water monitoring program.

Table 12-2. Total Annual Cost Estimates for Surface Water Monitoring Program

Monitoring Parameters	Total Number of Samples	Cost per sample	Total Estimated Annual Cost
Nutrients	132 - 264	$140	$18,480 - $36,960
Physical	132 - 264	$30	$3,960 - $7,920
Chlorophyll a	66 - 132	$50	$3,300 - $6,600
Algal Biomass	33 - 66	$15	$495 - $990
Bioassessment	18 - 30	$500	$9,000 - $15,000
Staff Time	**Hours**	**Rate**	
Field Staff Time (field preparation, equip. maintenance, water sampling, field measurements, sample submission, etc.)	240 - 480	$50	$12,000 - $24,000
Data Management	120 - 160	$60	$7,200 - $9,600
Data Analysis	90 - 120	$60	$5,400 - $7,200
Report Preparation	120 - 160	$60	$7,200 - $9,600
Other	60 - 120	$60	$3,600 - $7,200
Total			**$70,635 - $125,070**

Groundwater Investigation Program Costs

The groundwater investigations could likely include the quarterly monitoring of 6 to 10 wells or hydropunch locations. Other costs may include soil characterization, well drilling and hydropunch, and tracer studies. County of San Diego staff time to perform such monitoring, data management, and report preparation has also been estimated. The equipment costs (i.e., well installations) are assumed to be incurred in the first year only. Costs for continued groundwater monitoring and additional studies could be up to $58,000 per year in subsequent years. The Groundwater Investigations should be concluded at the end of the first two years. Table 12-3 presents the estimated annual costs associated with groundwater monitoring.

Table 12-3. Total Annual Cost Estimates for Groundwater Investigation Program

Monitoring Parameters	Total Number of Samples	Cost per sample	Total Estimated Annual Cost	
			First Year	Subsequent Years
Nutrients	12 - 30	$140	$1,680 - $4,200	$1,680 - $4,200
Physical	12 - 30	$30	$360 - $900	$360 - $900
General Mineral	12 - 30	$150	$1,800 - $4,500	$1,800 - $4,500
Other Costs				
Well Drilling/Hydropunch			$10,000 - $20,000	N/A
Consultant Services			$10,000 - $20,000	N/A
Soil Characterizations			$2,500 - $5,000	N/A
Special Studies (tracer, other)			$10,000 - $20,000	$10,000 - $20,000
Additional Sampling Equipment (steel tape, chalk, gloves, disposable bailers, buckets, 55-gallon drums, disposal, etc.)			$1,000 - $5,000	$1,000 - $5,000
Staff Time	**Hours**	**Rate**		
Field Staff Time (transportation time, manual well purging, sampling, equipment, etc.)	80 - 160	$50	$4,000 - $8,000	$4,000 - $8,000
Data Management	30 - 40	$60	$1,800 - $2,400	$1,800 - $2,400
Data Analysis	90 - 120	$60	$5,400 - $7,200	$5,400 - $7,200
Report Preparation	60 - 80	$60	$3,600 - $4,800	$3,600 - $4,800
Other	30 - 40	$60	$1,800 - $2,400	$1,800 - $2,400
		Total	**$53,940 - $104400**	**$31,440 – 59,400**

Equipment and Outreach Costs

The majority of equipment and installation costs are expected to be incurred in the first year. Costs between $9,000 to $20,000 per year for rain gauge maintenance, follow-up rainfall chemistry, miscellaneous field equipment, and public outreach is anticipated in subsequent years. Potential equipment and outreach costs were identified and are presented in Table 12-4.

Table 12-4. Estimated Equipment and Outreach Costs

Item	Total Estimated Costs	
	First Year	Subsequent Years
Flow monitoring equipment and installation	$25,000 - $30,000	N/A
Multi-parameter probe	$4,000 - $5,000	N/A
Rain gauge installation and maintenance	$5,000 - $6,000	$1,000 - $2,500
Rainfall Chemistry	$5,000 - $10,000	$2,000 - $5,000
Miscellaneous field equipment	$2,500 - $5,000	$1,000 - $2,500
Public Outreach	$5,000 - $10,000	$5,000 - $10,000
Total	$45,500 - $66,000	$9,000 - $20,000

12.2.2 Management Practices and Other Implementation Costs

Nonpoint source discharges occur from commercial nursery, agricultural field, orchard, park, residential area, urban area, and septic tank disposal system land use activities. Persons conducting these land use activities (e.g. landowners, homeowners, nursery operators, farmers, etc) are responsible for implementing management practices (MPs) to reduce and/or control nutrient discharges (e.g., surface runoff, or septic tank discharge) from their properties to assure compliance with the TMDLs described in this report. It is expected that management practices (MPs) will include, but are not limited to, the practical management of wet and dry weather runoff, fertilizer usage, and irrigation practices. The cost of implementing these TMDLs will range widely, depending on which MPs the responsible parties select to meet the load allocations.

Table 12-5 summarizes the range of costs for implementing potential MPs for each land use category. For each land use category, three scenarios were evaluated corresponding to low, medium, and high levels of effort. Within each scenario a low to high range of costs are presented. The MPs considered fall into three general categories: Nutrient, Irrigation, and Runoff/Erosion Management. A low level of effort consists solely of Nutrient Management MPs, a medium level of effort consists of Nutrient and Irrigation Management MPs, and a high level of effort includes all three MP categories. Caltrans is the exception because Irrigation Management MPs are less likely along the Interstate 15 corridor than Nutrient and Runoff/Erosion Management. The capital costs are the initial costs of implementing a BMP, assuming that the BMP does not currently exist on the property. The annual operation and maintenance costs are assumed to be 10% of the capital cost. Additional details regarding the MPs are provided in Appendix H.

Table 12-5 provides estimated costs for selected MPs.

Table 12-5. Estimated Management Practice Costs[1]

Land Use Category	BMP Level of Effort	Capital Costs		Annual Operation and Maintenance[2]	
		Range		Range	
Commercial Nurseries	Low	$26	$10,105	$3	$1,011
	Medium	$4,926	$39,455	$493	$3,946
	High	$5,508	$41,075	$551	$4,108
Agriculture	Low	$26	$10,105	$3	$1,011
	Medium	$4,926	$39,455	$493	$3,946
	High	$9,296	$57,705	$930	$5,771
Orchard	Low	$26	$10,105	$3	$1,011
	Medium	$4,926	$39,455	$493	$3,946
	High	$9,296	$57,705	$930	$5,771
Park	Low	$0	$0	$0	$0
	Medium	$50	$750	$5	$75
	High	$950	$27,250	$95	$2,725
Residential	Low	$0	$0	$0	$0
	Medium	$50	$750	$5	$75
	High	$833	$14,186	$83	$1,419
Urban	Low	$0	$0	$0	$0
	Medium	$50	$750	$5	$75
	High	$3,369	$26,175	$337	$2,618
Septic Tank Disposal Systems	Low	$18,000	$46,000	$1,800	$4,600
	Medium	$22,500	$57,500	$2,250	$5,750
	High	$3,490,000	$7,030,000	$349,000	$703,000
Caltrans	Low	$105	$10,150	$11	$1,015
	Medium	$77,880	$401,850	$7,788	$40,185
	High[3]	$78,768	$1,408,100	$7,877	$140,810

[1] This table is a summary. See Appendix H for more detail.
[2] Operation and Maintenance cost assumed to be 10% of total cost estimate.
[3] Caltrans 2004 BMP Retrofit Program Final Report CTSW-RT-01-050 found that the cost for sediment basins in a retrofit situation range from $303 to $1,307 per WQVm^3. This would be a cost of $602,000 to $2,586,000 to treat the 1,986m^3 of WQV for the 4.1 miles of I-15 in this watershed. Cost for sand filters range from $748 to $2,118 per WQVm^3 ($1,486,000 to $4,206,000 to treat 1,986m^3 of WQV).

Centralized Sewer Treatment Disposal Facility

The high groundwater table in Rainbow Valley has resulted in septic tank disposal systems that no longer function properly. Table H-7 (Appendix H) includes costs for replacing these conventional systems with enhanced systems that are designed to provide for nitrification/denitrification to reduce nitrogen loadings.

Another potential solution is to construct a centralized sewage treatment disposal facility for the community that would replace failing septic tank systems in the area defined by the County of

San Diego's moratorium and reduce the nutrient loading to the groundwater. A preliminary cost estimate for a secondary treatment facility that might be considered for Rainbow Valley is approximately $11 million. This cost estimate is based on a facility that provides secondary treatment and utilizes land disposal to an irrigated crop (e.g., alfalfa) that is harvested and removed from the watershed to eliminate the nutrient loading. This cost estimate includes a secondary sewage treatment facility with the design capacity to treat wastewater from 170 to 306 connections, the purchase of 40 acres of land for the facility and spray irrigation area, construction of 8.5 miles of sewage collection system pipe, and administrative costs. The lower number (170) of connections is the number of septic tank disposal systems in the moratorium area that would be replaced by the sewer treatment facility. The higher number (306) is the number of systems that generate a total nitrogen load that is equal to the amount of source load reduction identified to achieve the load allocation in Table 6-1 (Honma 2004).

Table 12-6 presents the assumptions and calculations that were used to make the estimates. The potential monthly costs to the community, including operation and maintenance (O & M), and connection to the system are also presented. This estimate assumes that the community will bear the complete cost of the facility. Grant funding may offset some of the community's cost.

Table 12-6. Cost Estimates Associated with Construction of a Sewer Treatment Disposal Facility

Facility Costs	Description[1]	Cost Estimate
Facility	170 connections * 250 gal/con. * $20/gal = 306 connections * 250 gal/con. * $20/gal =	$850,000 – $1,530,000
Facility Land Acquisition	40 acres * $75,000/acre =	$3,000,000
Sewer Main Pipe Construction	57,200 feet (10.8 miles) * $100/foot =	$5,720,000
Administrative Costs	Engineering, Environmental Impact Review, Construction Administration, etc.	$1,000,000
	Total Cost of Facility Construction	**$10,570,000 - $11,250,000**
Potential Monthly Costs		
Cost of Facility per connection over 20 years	$10.6 E +6 * 170^{-1} connections * 20^{-1} years^{-1} * 12^{-1} year/month = $11 E +6 * 306^{-1} connections * 20^{-1} years^{-1} * 12^{-1} year/month =	$150 - $259/month
O & M	Operation and Maintenance Cost	$30/month
	Total Monthly Cost to Property Owner	**$180 - $289/month**
Connection Fee		
Connection Fee	One-time fee for each connection to system (i.e., lateral).	**$10,000 - $15,000**

[1] Supporting information for assumptions (Honma 2004)

12.3 Potential Sources of Funding

Potential sources of funding include:

1. Federal Clean Water Action Section 319(h) grants.
2. Federal Clean Water Action Section 205(j) grants.
3. State of California Proposition 13 funded grants.
4. Small Communities Grants for Water Reclamation and Wastewater Treatment Facilities
5. Other state, federal and other business loans, grants, and other assistance programs. These may include assistance from U.S. Small Business Administration and from conservation programs through various agencies such as the U.S. Department of Agriculture and Natural Resource Conservation Service.
6. Various secured and unsecured loans, including home equity loans and business loans.

13.0 Public Participation

40 CFR 130.7 requires that TMDLs be subject to public review. Public participation has been provided for through public workshops and by a Technical Advisory Committee (TAC). The Regional Board conducted three public workshops. The first was held in April 1999, the second in November 1999, the third in November 2004. The TAC was formed in November 1999 and has met on an as needed basis. The TAC provided review, technical and local input and comments on both the draft TMDL staff report (submitted to EPA in April 2000) and drafts of the technical sections of this TMDL staff report. Participants on the TAC included representatives from: Camp Pendleton, Mission Resource Conservation District, Fallbrook Public Utility District, Hines Nurseries, Inc., County of San Diego, San Diego State University/Santa Margarita Ecological Reserve, the Santa Margarita River Watermaster, UC Cooperative Extension, Farm Bureau – San Diego County, and Caltrans (District 11). Public participation will also be provided through the Regional Board's Basin Plan amendment process. A chronological list of events, including dates of workshops and meetings, is provided in Appendix I.

14.0 Necessity of Regulatory Provisions

The Office of Administrative Law (OAL) is responsible for reviewing administrative regulations proposed by state agencies for compliance with standards set forth in California's Administrative Procedure Act, Government Code §11340 et seq., for transmitting these regulations to the Secretary of State and for publishing regulations in the California Code of Regulations. Following State Water Resources Control Board approval of this TMDL Basin Plan amendment, any regulatory portions of the amendment must be approved by OAL (Government Code §11352). The State Water Resources Control Board must include in its submittal to OAL a summary of the necessity[97] for the regulatory provision.

This TMDL Basin Plan Amendment for Rainbow Creek meets the "necessity standard" of Government Code §11353(b). Amendment of the Basin Plan to establish and implement TMDLs for Rainbow Creek is necessary because the existing water quality does not meet applicable numeric water quality objectives for nitrate, total nitrogen, and total phosphorus. Applicable state and federal laws require the adoption of this Basin Plan amendment and regulations as provided below.

The State Water Resources Control Board (State Board) and Regional Water Quality Control Boards (Regional Boards) are delegated the responsibility for implementing California's Porter Cologne Water Quality Control Act and the federal Clean Water Act (CWA). Pursuant to relevant provisions of both of these Acts, the State and Regional Boards establish water quality standards, including designated (beneficial) uses and criteria or objectives to protect those uses.

Section 303(d) of the CWA (33 USC § 1313(d)) requires the states to identify certain waters within their borders that are not attaining water quality standards and to establish the TMDL for certain pollutants impairing those waters. USEPA regulations in 40 CFR 130.2 provide that a TMDL is a numerical calculation of the amount of a pollutant that a water body can assimilate and still meet standards. A TMDL includes one or more numerical targets that represent attainment of the applicable standards, considering seasonal variations and a margin of safety, in addition to the allocation of the target or load among the various sources of the pollutant. These include wasteload allocations (WLAs) for point sources, and load allocations (LAs) for nonpoint sources and natural background. TMDLs established for impaired waters must be submitted to the USEPA for approval.

CWA § 303(e) requires that TMDLs, upon USEPA approval, be incorporated into the state's water quality management plans (Basin Plan). State law (CWC § 13050(j) and 13242) in turn requires that basin plans have a program of implementation to achieve water quality objectives. The implementation program must include a description of actions that are necessary to achieve the objectives, a time schedule for these actions, and a description of surveillance to determine compliance with the objectives. State law requires that a TMDL include an implementation plan because the TMDL normally is an interpretation or refinement of an existing water quality objective. The TMDL has to be incorporated into the basin plan under CWA § 303(e), and,

[97] "Necessity" means that the record of the rulemaking proceeding demonstrates by substantial evidence the need for a regulation to effectuate the purpose of the statute, court decision, provision of law that the regulation implements, interprets, or makes, taking into account the totality of the record. For purposes of this standard, evidence includes, but is not limited to, facts, studies, and expert opinion. (Government Code §11349(a)).

because the TMDL supplements, interprets, or refines an existing objective, state law requires a program of implementation.

15.0 References

References are relied upon unless otherwise noted.

Allan, J. D., 1995. Stream Ecology, Structure and function of running waters. New York, NY, Chapman & Hall, Chapter 13.

Allan, R., 2002. County of San Diego, Department of Public Works, Flood Control – Hydrology, personal communication. October 24, 2002.

Biernacka, B., 2001. Technical Services Manager for Hines Nurseries Inc., personal communication, March 22, 2001.

Boynton, W. R., L. Murray, W. M. Kemp, J. D. Hagy, C. Stokes, F. Jacobs, J. Bowers, S. Souza, B. Krinsky, J. Seibel. 1993. Maryland's Coastal Bays: An Assessment of Aquatic Ecosystems, Pollutant Loadings, Management Options, Submitted to Maryland Department of the Environment, Chesapeake Bay and Special Projects Branch pp. 2-19.

California Department of Fish and Game (CDFG), 2000a. San Diego Regional Water Quality Control Board: 1999 Biological Assessment Annual Report. CDFG, Office of Spill Prevention and Response, Water Pollution Control Laboratory, Rancho Cordova, CA.

CDFG, 2000b. Special Animals. CDFG, Wildlife and Habitat Data Analysis Branch, California Natural Diversity Data Base, Sacramento, CA. July 2000.

California Department of Transportation (Caltrans), 2002. Internet Water Quality Planning Tool, http://stormwater.water-programs.com/webctswpfinal/wqptLAR.htm, queried on October 7, 2002.

California Department of Transportation (Caltrans), 2003. Discharge Characterization Study Report. CTSW-RT-03-065.51.42

California Department of Transportation (Caltrans), 2004. BMP Retrofit Pilot Program - Final Report. CTSW-RT-01-050

California State Water Resources Control Board (SWRCB) and California Coastal Commission (CCC), 2000. Volume I: Nonpoint Source Program Strategy and Implementation Plan for 1998-2013 (PROSIP). State of California, Sacramento, CA. January 2000. **(Not relied upon).**

California Department of Water Resources (CDWR), 1975. Impact of Waste Treatment and Disposal on the Quality of Water Supplies, Santa Margarita Watershed, District Report. State of California, The Resources Agency, Department of Water Resources Southern District, January 1975.

CDWR, 1979. Evaporation from Water Surfaces in California. State of California, The Resources Agency, Department of Water Resources, Bulletin 73-79, November 1979.

Clark, G. M., D. K. Mueller, and M. A. Mast, 2000. Nutrient Concentrations and yields in Undeveloped Stream Basins of the United States. Journal of the American Water Resources Association, Vol. 36, No. 4, August 2000.

Davy, P., 2003. Supervising Agricultural Inspector, Stormwater Management, County of San Diego, Department of Agricultural, Weights & Measures, personal communication. May 21, 2003.

Dodds, W. K., J. R. Jones, and E. B. Welch, 1998. Suggested Classification of Stream Trophic State: Distributions of Temperate Stream Types by Chlorophyll, Total Nitrogen, and Phosphorus. Great Britain: Elsevier Science Ltd., Water Research, Journal of the International Water Association, Volume 32:5, pp. 1455-1462.

Dodds, W. K., and E. B. Welch, 2000. Establishing Nutrient Criteria in Streams. Journal of North American Benthological Society, Volume 19:1, pp. 186-196.

Dorsey, K., 2003a. Internal memo to Lisa Brown-Honma regarding "Oak Crest Estates Observations". California Regional Water Quality Control Board, San Diego, CA. February 26, 2003.

Dorsey, K., 2003b. Internal memo to Lisa Brown-Honma regarding "Rainbow Conservation Camp Observations and Recommendations". California Regional Water Quality Control Board, San Diego, CA. February 26, 2003.

Giller, P. S., and B. Malmqvist, 1998. The Biology of Streams and Rivers. New York, Oxford University Press.

Harrington, J., and M. Born, 2000. Measuring the Health of California Streams and Rivers, A methods Manual for: Water Resource Professionals, Citizen Monitors, and Natural Resources Students, Second Edition, Revision 3. Sustainable Land Stewardship International Institute, Sacramento, CA. **(Not relied upon).**

Hines Horticulture Inc., 2000. Water Quality Monitoring Plan 2000-2001. Fallbrook, CA. November 13, 2000.

Honma, L., 2004. Memo to file, "Supporting Information for the Sewer Treatment Facility Estimate for Rainbow Creek Total Nitrogen and Total Phosphorus TMDLs". California Regional Water Quality Control Board, San Diego, CA. January 16, 2004.

Horner, R. R., 1994. Constituents and Sources of Water Pollutants in Highway Stormwater Runoff. Report to Natural Resources Defense Council, Los Angeles Office. Seattle, WA, October 1994.

Hunsaker II, D., 1992. Santa Margarita River Monitoring Program, Final Report, Task Order Two. Eastern Municipal Water District and Rancho California Water District, CA. March 1992.

Huntley, D. 1987. Technical Report, Review of Subsurface Wastewater Disposal Policy, San Diego Regional Water Quality Control Board. California Regional Water Quality Control Board, San Diego, CA. September 30, 1987. pp. 3-8.

Johnson, R. K., T. Wiederholm, and D. M. Rosenberg, 1993. Freshwater Biomonitoring Using Individual Organisms, Populations, and Species Assemblages of Benthic Macroinvertebrates. In: D. M. Rosenburg and V.H. Resh, Freshwater Biomonitoring and Benthic Macroinvertebrates. Chapman and Hall, New York, pp 40-158.

Karr, J. R., and E. W. Chu, 1999. Restoring Life in Running Waters: Better Biological Monitoring. Island Press, Covelo, CA.

Lambert, T., 2001. Environmental Health Specialist III, County of San Diego, Department of Environmental Health, personal communication, March 26, 2001.

Leedshill-Herkenhoff, Inc, 1988. Basewide Water Requirement/Availability Study. Appendix J, Upper Santa Margarita River Basin Water Quality, Table J-4.

Mellano, V. J., 2000. Report on Algal Species in the Rainbow Creek Area. UC Cooperative Extension, San Diego County. October 2000.

Metcalf and Eddy, 1991. Wastewater Engineering, Treatment, Disposal, and Reuse. Third edition. Irwin McGraw-Hill, San Francisco, CA, 1991. Page 1040.

Mission Resource Conservation District (MRCD), 1997a. Rainbow Creek Non-Point Source Nitrate Reduction Program, Final Report. MRCD, Fallbrook, CA. January 1997.

MRCD, 1997b. Brochure: Irrigation Water Management – Water Quality Analysis. Fallbrook, CA. Printed May 1997.

MRCD, 1997c. Brochure: Mission Resource Conservation District – Soil Nutrient Analysis. Fallbrook, CA. Printed May 1997.

MRCD 1999a. Focus on Resource Conservation: Septic System Operation, Inspection, and Maintenance - The Homeowner's Guide. Fallbrook, CA. Summer 1999.

MRCD, 1999b. Willow Glen Basin Non-Point Source Nitrate Reduction Program, Final Report. MRCD, Fallbrook, CA, November 1999.

Moyle, P. B., 1976. Inland Fishes of California. University of California Press, Berkeley and Los Angeles, California.

North Carolina State University, 2001. Pollutant Budget Estimation Form at http://h2osparc.wq.ncsu.edu/lake/rec/spread1.html, October 18, 2001.

Oakley, S. M., 1999. Onsite Wastewater & Nitrogen Removal. California Wastewater Training & Research Center and California State University at Chico, Department of Civil Engineering. Chico, CA. December 6, 1999.

Pardy, L., 1998. Internal memo to Greig Peters, Bob Morris, David Barker, and John Phillips regarding "December 8, 1998 Survey of Rainbow Creek from Willow Glen Crossing Upstream to Rainbow Creek Ranch". California Regional Water Quality Control Board, San Diego, CA. December 9, 1998.

Peterson, J., 1989. Goundwater Evaluation of Rainbow Valley. San Diego County. Department of Planning and Land Use, San Diego, CA. April 1989.

Rainbow Municipal Water District (RMWD), 2003. Grant Application for Rainbow Valley Basin Groundwater Management Plan. Submitted to the CA Department of Water Resources Local Groundwater Assistance Fund, October 24, 2002.

Rouse, J. D., C. A. Bishop, and J. Struger, 1999. Nitrogen Pollution: An Assessment of Its Threat to Amphibian Survival. Environmental Health Perspectives, Volume 107:10, pp 799-803. October 1999.

San Diego Association of Governments (SANDAG), 2003. Regional Economic Development Information (REDI) interactive mapping application. http://www.sandag.org/index.asp?subclassid=70&fuseaction=home.subclasshome

San Diego County, 1994. San Diego County On-Site Sewage Disposal Systems and Water Quality Objectives, Revision 1. San Diego County, California, November 2, 1994.

San Diego Regional Water Quality Control Board (SDRWQCB), 1997. Field Notes for 1997 Dissolved Oxygen Study for Santa Margarita River. San Diego, CA. June 4-5, 1997.

SDRWQCB, 2000. Rainbow Creek TMDL, Water Quality Monitoring Plan, 2000-2001. San Diego, CA. California Environmental Protection Agency, Regional Water Quality Control Board, San Diego Region, August 14, 2000.

Southern California Coastal Water Research Project (SCCWRP), 2000. Pollutant Mass Emissions to the Coastal Ocean of California: Initial Estimates and Recommendations to Improve Stormwater Emission Estimates, Appendix A. November 10, 2000.

Summers, E. G., 2002. Letter to Lisa Brown regarding "November 20, 2001 Draft TMDL for Rainbow Creek." Hines Nurseries, Fallbrook, CA, January 30, 2002.

Taylor, G., 1999. Letter to John H. Robertus describing intent to recycle irrigation tailwater at Fallbrook operation. Hines Horticulture, Inc., Irvine, CA, July 28, 1999.

Tesoro, C., 2001. Letter to Lisa Brown regarding "Requested Data within HAS 909.23 for Rainbow Creek TMDL." California Department of Transportation District 11, San Diego, CA, April 2, 2001.

U.S. Department of Agriculture (USDA), May 1995. Calleguas Creek Watershed Erosion and Sediment Control Plan for Mugu Lagoon. USDA Natural Resources Conservation Service, in cooperation with Ventura County Resource Conservation District and the California State Coastal Conservancy. Davis, CA, May 1995. Table 4-b.

USDA, 1997. 1997 Census of Agriculture Highlights for San Diego County, California. USDA, National Agricultural Statistic Service, 1997 Census of Agriculture, Volume 1 Geographic Area Series, "Table 1. County Summary Highlights: 1997," http://www.nass.usda.gov/census/census97/highlights/ca/cac037.txt, printed on December 17, 2003.

U.S. Environmental Protection Agency (USEPA), 1986. Quality Criteria for Water 1986. EPA 440/5-86-001. USEPA, Office of Water, Washington, D.C. May 1, 1986. **(Not relied upon).**

USEPA, 1994. "Chesapeake Bay Program: Watershed Model Application to Calculate Bay Nutrient Loadings: Final Findings and Recommendations," and Appendices. USEPA, Region III, Modeling Subcommittee of the Chesapeake Bay Program, Annapolis, MD. CBP/TRS 157/96, EPA 903-R-94-042. July 1994.

USEPA, 1999. Protocol for Developing Nutrient TMDLs, First Edition. EPA 841-B-99-007. USEPA, Office of Water, Washington, D.C. November 1999.

USEPA, 2000a. Nutrient Criteria Technical Guidance Manual, Rivers and Streams. EPA 822-B-00-002. USEPA, Office of Water, Washington, D.C. July 2000.

USEPA, 2000b. Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Nutrient Ecoregion III. EPA 822-B-00-016. USEPA, Office of Water, Washington, D.C. December 2000.

U.S. Geological Survey (USGS), 2002. Daily mean streamflow data for USGS 11044250 RAINBOW C NR FALLBROOK CA, November 7, 1989 through September 30, 2000. USGS National Water Information System, http://water.usgs.gov/realtime.html, queried on April 4, 2002.

University of Rhode Island (URI) Cooperative Extension, 2001. Septic System Information for Rhode Islanders, Frequently Asked Questions Fact Sheet. Rhode Island Regional Water Quality Program, University of Rhode Island College of Environment & Life Sciences Department of Natural Resources Science, Cooperative Extension On-Site Wastewater Training Center. May 2001.

Van Rhyn, J., 2001. Letter to Kyle Olewnik and Lisa Brown regarding "County of San Diego Comments on 'Internal Review Draft of Technical Portions, Nutrient Total Maximum Daily Load for Rainbow Creek, June 25, 2001'." County of San Diego, Department of Environmental Health & Land and Water Quality Division, San Diego, CA, July 12, 2001.

Waters, T. F., 1995. Sediment in Streams: Sources, Biological Effects and Control. American Fisheries Society Monograph 7.

Western Regional Climate Center (WRCC), 2003. Southern California Climate Summaries: Monthly Total Precipitation at Escondido 2, California, (042863). http://www.wrcc.dri.edu/cgi-bin/cliMONtpre.pl?caesc2, queried on April 16, 2003.

Whitman, J.H., 1970. Internal memorandum to Division Chief W. B. Walshe regarding "Building Permits – Rainbow, California." County of San Diego, Division of Sanitation, July 22, 1970

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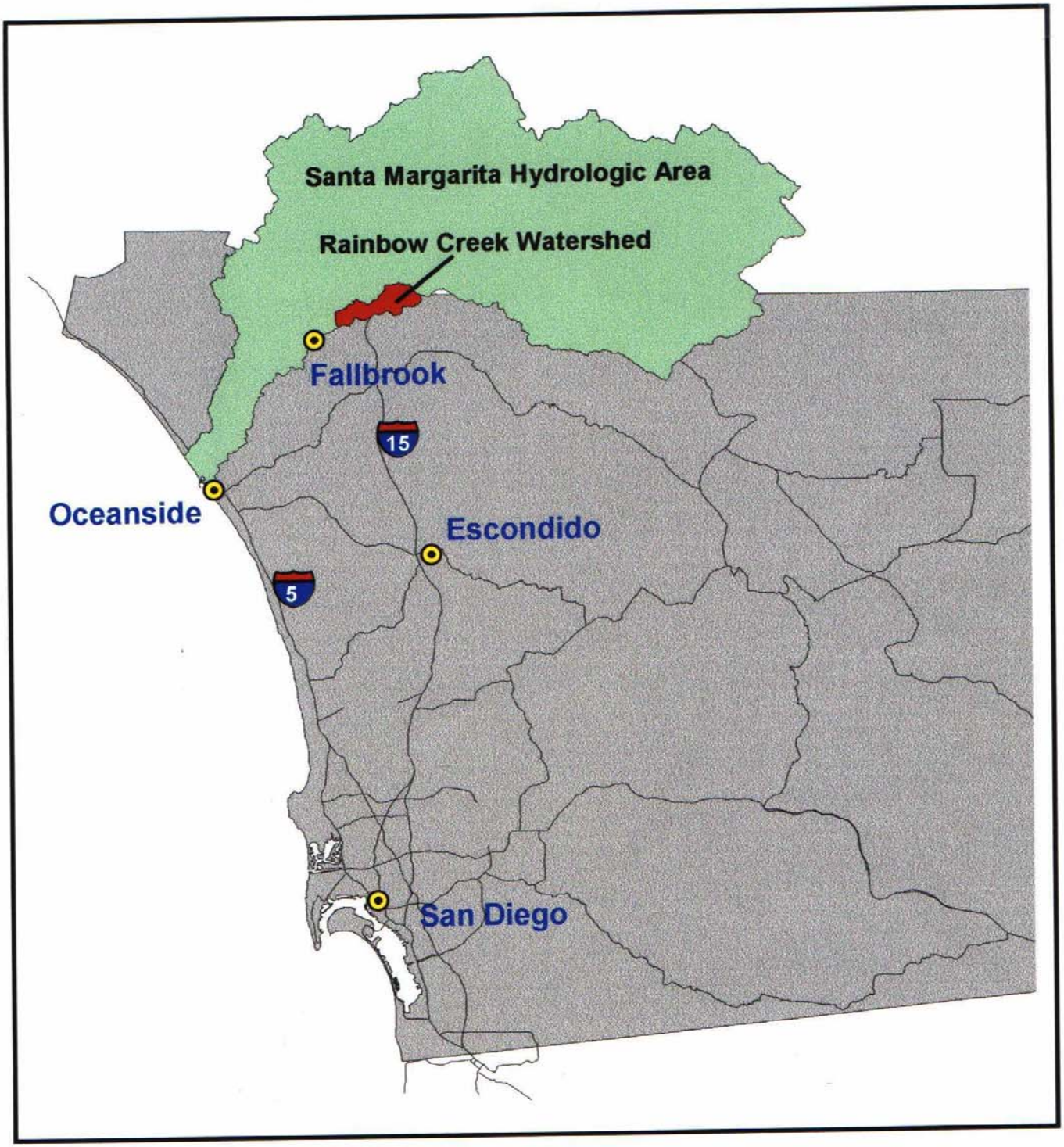
Appendix A – Figures

Figure A-1 Location Map

Figure A-2 Rainbow Creek Watershed Land Use

Figure A-3 Rainbow Creek Sampling Sites with Topography and Water Courses

Figure A-1
Location Map



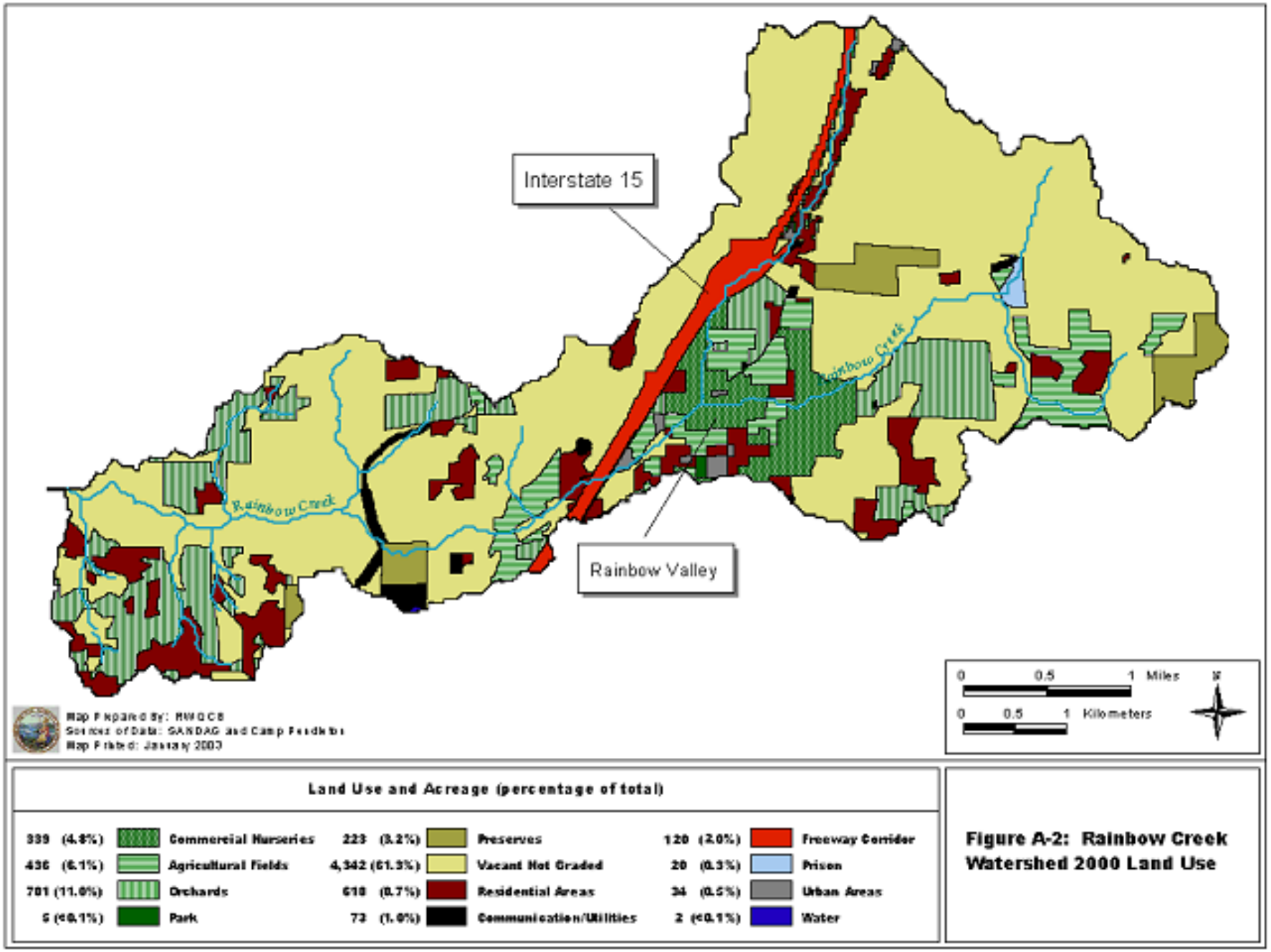
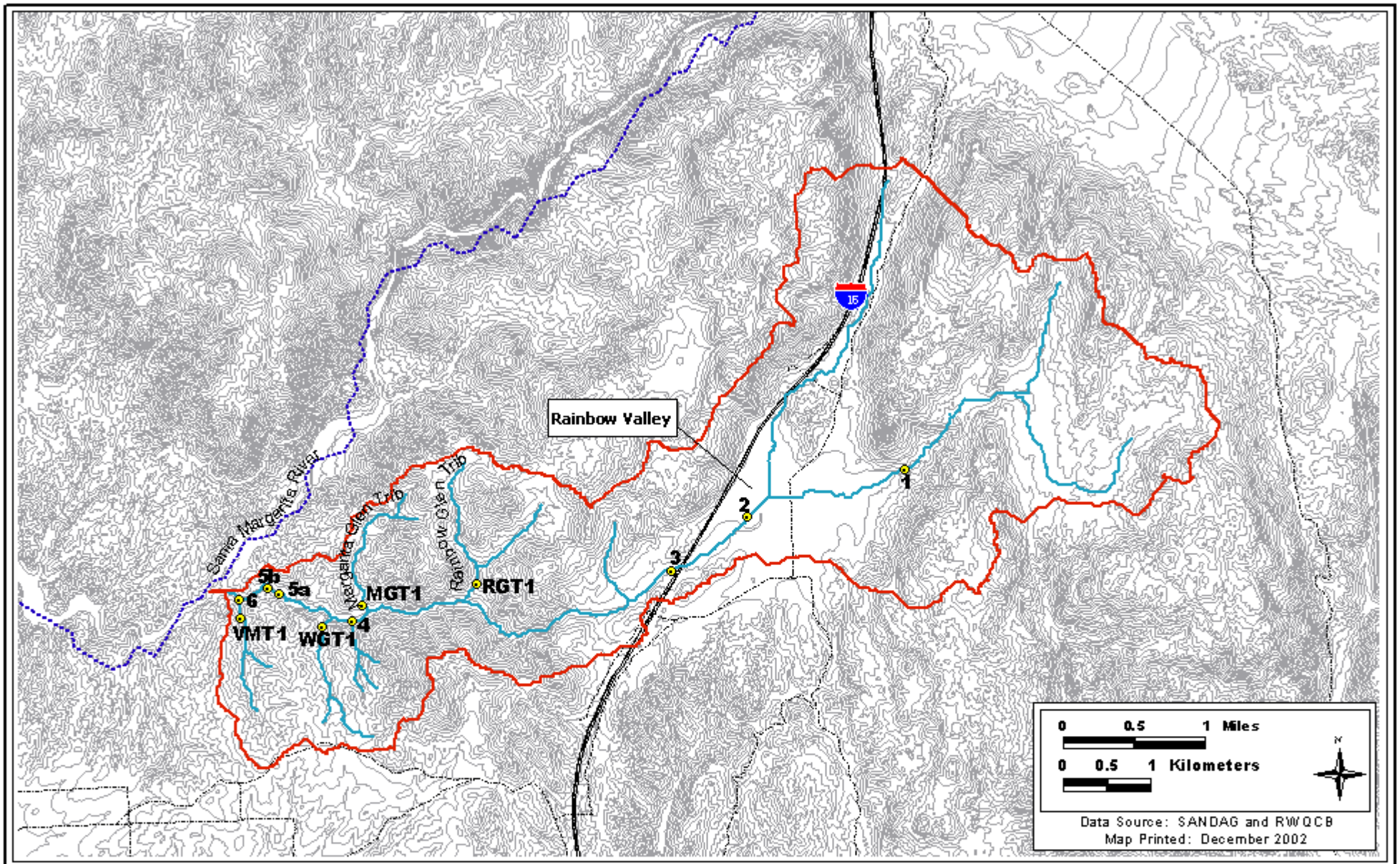


Figure A-2: Rainbow Creek Watershed 2000 Land Use



Water Sampling Sites

1	Jubilee Way	6	Stagecoach
2	Hines Nursery	RGT1	Rainbow Glen
3	Oak Crest	MGT1	Margarita Glen
4	Willow Glen-4	WGT1	Willow Glen
5a	2068WG	VMT1	Via Milpas
5b	River House		

Legend

- Rainbow Creek
- Tributaries of Rainbow Creek
- Santa Margarita River
- 40-foot Elevation Contours
- Interstate 15
- Major Roads
- Rainbow Creek Watershed Boundary
- Water Sampling Sites

Figure A-3: Rainbow Creek sampling sites with topography and water courses

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Appendix B – Tables

B-1 Historical Annual Averages for Nitrate, 1970 -87

B-2 Water Quality Monitoring Results, 2000

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Appendix B - Tables

Table B-1. Historic Annual Averages for Nitrate, 1970-87

Historic Annual Averages
Station: Willow Glen
All Values In mg/L Nitrate

	NO_3 ave.	# of samples	max	min	median
1970	3.74	10	7.50	0.00	3.90
1971	3.69	11	6.20	0.90	3.50
1972	4.22	11	12.00	0.50	3.50
1973	4.23	12	21.20	0.00	1.05
1974	0.92	12	2.30	0.00	0.60
1975	4.03	12	16.00	0.40	2.65
1976	6.27	12	21.00	3.00	4.60
1977	8.78	9	25.00	3.50	6.50
1978	5.71	11	13.00	2.40	5.00
1979	3.20	11	8.00	1.00	2.40
1980	3.50	11	6.60	1.70	3.10
1981	10.19	12	40.00	0.50	8.10
1982	25.94	12	72.00	1.70	19.00
1983	55.82	11	177.00	0.30	25.00
1984	50.97	7	180.00	14.00	35.00
1986	215.83	11	338.00	22.80	242.50
1987	185.09	8	256.00	77.00	208.50

1970-1980 NO_3 ave.	**4.4**
NO_3 as N ave.	0.99
1981-1987 NO_3 ave.	**90.6**
NO_3 as N ave.	20.5

Drinking Water Standard
NO_3 = 45 mg/L
as N = 10 mg/L

Maximum NO_3 Values

Date	Result
Oct-85	319.3
Jun-86	310.3
Jun-86	338

Note: 1985 only contained one sample point, therefore it was included with the 1986 data
Source: Leedshill-Herkenhoff, Inc., 1988

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Table B-2. Water Quality Monitoring Results, 2000
San Diego Regional Water Quality Control Board

Date	Willow Glen - 4 (Station 4)							Date	Riverhouse (Station 5b)						
	Flow[1]	Temp	NO_3-N	Total N	PO_4-P	Total P	TDS		Flow[2]	Temp	NO_3-N	Total N	PO_4-P	Total P	TDS
	cfs	°F	mg/L	mg/L	mg/L	mg/L	mg/L		cfs	°F	mg/L	mg/L	mg/L	mg/L	mg/L
1/4/00	0.42	52	7.1	7.7	0.40	0.38		1/4/00		53	11	11	0.23	0.21	
1/18/00	0.38	55	3.7	4	0.35	0.37		1/18/00		58	9.1	9.2	0.21	0.21	
2/1/00	0.5	54	14	15	0.26	0.47		2/1/00		56	17	17	0.31	0.34	
2/15/00	0.85	56	14	15	0.51	0.52		2/15/00		58	14	15	0.40	0.40	
2/29/00	1.4	52	12	12	0.49	0.55		2/29/00		54	12	12	0.42	0.46	
3/15/00	0.85	54	18	19	0.55	0.52	1140	3/15/00		56	18	18	0.45	0.44	1070
3/28/00	0.4	55	13	14	0.32	0.37	1110	3/28/00		58	15	15	0.28	0.36	1140
4/11/00	0.53	54	12	13	0.33	0.34	1130	4/11/00		58	16	17	0.14	0.32	1200
4/25/00	0.56	62	13	13	0.14	0.32	1110	4/25/00		63	14	15	0.15	0.34	1110
5/9/00	0.53	62	9.4	9.8	0.37	0.46	1090	5/9/00		63	12	13	0.31	0.31	1140
5/23/00	0.53	NR	9.5	9.9	0.33	0.35	1120	5/23/00		63	12	12	0.21	0.26	1180
6/6/00	0.59	60	21	23	0.43	0.51	1240	6/6/00		61	19	19	0.33	0.41	1210
6/20/00	0.27	64	19	20	0.36	0.38	1190	6/20/00		66	16	17	0.22	0.23	1200
7/5/00	0.1	63	12	12	0.37	0.36	1120	7/5/00		65	16	16	0.23	0.23	1190
7/18/00	0.07	68	7.9	8.6	0.30	0.39	1090	7/18/00		68	15	15	0.19	0.24	1140
8/1/00	0.09	68	8.9	9.4	0.32	0.43	1310	8/1/00		68	14	14	0.17	0.25	1230
8/15/00	0.06	71	4.7	5.3	0.44	0.49	1100	8/15/00	0.13	71	14	15	0.22	0.22	1240
8/22/00	0.07	66	5.6	6.1	0.29	0.39	1000	8/22/00	0.18	68	15	16	0.14	0.27	1180
8/29/00	0.06	66	4.3	5	0.33	0.52	1020	8/29/00	0.15	67	15	15	0.14	0.36	1190
9/5/00	0.05	66	3	3.6	0.41	0.39	1010	9/5/00	0.15	65	15	15	0.14	0.23	1150
9/12/00	0.05	68	3.5	4.1	0.47	0.45	1010	9/12/00	0.16	67	14	14	0.21	0.20	1180
9/19/00	0.05	66	2.8	3.4	0.29	0.49	980	9/19/00	0.15	66	13	14	0.13	0.16	1190
9/26/00	0.06	67	3.2	3.5	0.41	0.44	1060	9/26/00	0.13	68	14	14	0.17	0.20	1240
10/3/00	0.07	NR	2	2.3	0.42	0.46	1070	10/3/00	0.21	NR	13	13	0.17	0.18	1240
10/10/00	0.07	64	1.7	2.1	0.33	0.45	1020	10/10/00	0.18	64	12	12	0.12	0.20	1100
mean	0.3	61	9.0	9.6	0.37	0.43	1096	mean	0.16	63	14.2	14.5	0.23	0.28	1176
st. dev	0.3	6	5.6	5.9	0.09	0.07	83	st. dev	0.03	5	2.2	2.3	0.09	0.09	48
st. error	0.07	1	1.13	1.17	0.02	0.01	19	st. error	0.01	1	0.44	0.45	0.02	0.02	11

Note: These stations include data collected as part of the Algae Presence Survey, January 4 - August 1, 2000. NR not reported

[1] Flow measurements are from USGS Gaging Station (#11044250)

[2] Flow based on USGS measurements, adding calculated flow from WGT1

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Table B-2. Water Quality Monitoring Results, 2000 – Cont.

San Diego Regional Water Quality Control Board

Date	2068 Willow Glen (Station 5a)						
	Flow[2]	Temp	NO_3-N	Total N	PO_4-P	Total P	TDS
	cfs	°F	mg/L	mg/L	mg/L	mg/L	mg/L
1/4/00		52	11	11	0.23	0.22	
1/18/00		58	8.5	8.5	0.21	0.22	
2/1/00		54	17	18	0.32	0.34	
2/15/00		56	15	16	0.4	0.4	
2/29/00		54	12	13	0.44	0.49	
3/15/00		56	18	19	0.47	0.47	1140
3/28/00		56	14	15	0.31	0.38	1140
4/11/00		59	17	17	0.32	0.33	1210
4/25/00		63	14	14	0.17	0.36	1180
5/9/00		63	11	12	0.33	0.34	1120
5/23/00		62	12	12	0.21	0.27	1160
6/6/00		62	20	21	0.33	0.77	1210
6/20/00		65	16	16	0.26	0.29	1170
7/5/00		66	15	15	0.2	0.22	1170
7/18/00		68	15	15	0.16	0.2	1210
8/1/00		68	14	14	0.16	0.25	1220
8/15/00	0.13	70	15	15	0.22	0.24	1250
8/22/00	0.18	68	15	18	0.13	0.21	1360
8/29/00	0.15	67	15	15	0.13	0.21	1170
9/5/00	0.15	65	ND[3]	ND[3]	0.11	0.18	1120
9/12/00	0.16	66	15	15	0.19	0.19	1190
9/19/00	0.15	66	13	14	0.11	0.18	1230
9/26/00	0.13	66	14	15	0.17	0.2	1250
10/3/00	0.21	NR	12	12	0.14	0.18	1250
10/10/00	0.18	64	11	12	0.12	0.17	1120
mean	0.16	62	14.1	14.7	0.23	0.29	1194
st. dev	0.03	5	2.6	2.8	0.10	0.14	59
st. error	0.01	1	0.52	0.56	0.02	0.03	13.08

NR not reported

[2] Flow based on USGS measurements, adding calculated flow from WGT1

[3] Sample result was deemed an outlier. Assumed to be laboratory error.

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Table B-2. Water Quality Monitoring Results, 2000 – Cont.

San Diego Regional Water Quality Control Board

Date	Oak Crest (Station 3)							Date	Willow Glen Tributary (WGT1)						
	Flow[4]	Temp	NO_3-N	Total N	PO_4-P	Total P	TDS		Flow[5]	Temp	NO_3-N	Total N	PO_4-P	Total P	TDS
	cfs	°F	mg/L	mg/L	mg/L	mg/L	mg/L		cfs	°F	mg/L	mg/L	mg/L	mg/L	mg/L
8/22/00	0.03	70	11	14	1.4	1.5	1590	8/15/00	0.07	70	20	20	< 0.05	< 0.05	1420
8/29/00	0.03	68	11	12	1.2	1.3	1680	8/22/00	0.11	66	20	20	< 0.05	< 0.05	1370
9/5/00	0.06	70	8.1	9.4	0.59	0.93	1580	8/29/00	0.09	66	20	20	< 0.05	0.16	1360
9/12/00	0.03	67	5.1	7.6	0.67	0.78	1800	9/5/00	0.10	63	19	19	< 0.05	< 0.05	1250
9/19/00	0.01	67	1.2	3.1	0.52	0.93	1580	9/12/00	0.11	67	18	18	< 0.05	0.06	1370
9/26/00	0.00	68	13	15	1.1	1.3	1940	9/19/00	0.10	64	17	17	< 0.05	0.28	1370
10/3/00	0.00	66	9.5	11	0.81	0.99	1830	9/26/00	0.07	66	18	18	< 0.05	< 0.05	1430
10/10/00	0.03	63	12	14	0.71	0.88	1640	10/3/00	0.14	NR	17	18	< 0.05	< 0.05	1440
10/17/01	0.03	61	12	13	0.68	1.6	1760	10/10/00	0.11	63	17	17	< 0.05	< 0.05	1290
mean	0.02	67	9.2	11.0	0.85	1.13	1711	mean	0.10	66	18.4	18.6		0.17	1367
st. dev	0.02	3	3.9	3.8	0.31	0.30	128	st. dev	0.02	2	1.3	1.2		0.11	64
st. error	0.01	1.0	1.28	1.27	0.10	0.10	45	st. error	0.01	0.6	0.45	0.42		0.06	23

Date	Via Milpas Tributary (VMT1)							Date	Stage Coach (Station 6)						
	Flow[5]	Temp	NO_3-N	Total N	PO_4-P	Total P	TDS		Flow[6]	Temp	NO_3-N	Total N	PO_4-P	Total P	TDS
	cfs	°F	mg/L	mg/L	mg/L	mg/L	mg/L		cfs	°F	mg/L	mg/L	mg/L	mg/L	mg/L
8/15/00	0.11	67	14	14	< 0.05	0.08	1330	8/15/00	0.24	68	13	13	0.18	0.20	1200
8/22/00	0.10	66	16	17	< 0.05	0.1	1320	8/22/00	0.23	68	13	14	0.14	0.21	1210
8/29/00	0.11	66	16	17	< 0.05	0.38	1370	8/29/00	0.26	66	14	14	0.14	0.79	1240
9/5/00	0.16	62	16	16	< 0.05	0.08	1170	9/5/00	0.31	62	14	16	0.20	0.43	1110
9/12/00	0.12	64	15	15	< 0.05	< 0.05	1390	9/12/00	0.28	64	13	14	0.22	0.36	1260
9/19/00	0.14	62	14	15	< 0.05	< 0.05	1360	9/19/00	0.29	63	12	14	0.13	0.19	1200
9/26/00	0.12	64	15	15	< 0.05	< 0.05	1090	9/26/00	0.25	65	13	13	0.16	0.19	1260
10/3/00	0.14	NR	15	15	< 0.05	< 0.05	1460	10/3/00	0.35	NR	12	12	0.17	0.17	990
10/10/00	0.17	62	14	14	< 0.05	< 0.05	1440	10/10/00	0.35	63	12	13	0.12	0.18	1170
mean	0.13	64	15.0	15.3		0.16	1326	mean	0.28	65	12.9	13.7	0.16	0.30	1182
st. dev	0.02	2	0.9	1.1		0.15	122	st. dev	0.04	2	0.8	1.1	0.03	0.20	86
st. error	0.01	0.7	0.29	0.37		0.07	41	st. error	0.01	0.8	0.26	0.37	0.01	0.07	29

[4] Flow measured by Hines Nursery staff using 24-hr water level recorder and Parshall flume installation. Flume installation was damaged during a storm event and was out of commission 9/24 through 10/4/00.

[6] Flow calculated in the field using the float method (leaf).

[6] Flow based on USGS measurements, adding calculated flow from WGT1 and VMT1

NR not reported

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Table B-2. Water Quality Monitoring Results, 2000 – Cont.

San Diego Regional Water Quality Control Board

Date	Rainbow Glen Tributary (RGT1)							Date							
	Flow[4]	Temp	NO_3-N	Total N	PO_4-P	Total P	TDS		Flow[7]	Temp	NO_3-N	Total N	PO_4-P	Total P	TDS
	cfs	°F	mg/L	mg/L	mg/L	mg/L	mg/L		cfs	°F	mg/L	mg/L	mg/L	mg/L	mg/L
8/15/00	0.10	68	2	2.4	< 0.05	< 0.05	890								
8/22/00	0.10	64	2.1	2.5	< 0.05	< 0.05	1210		Margarita Glen Tributary (MGT1)[8]						
8/29/00	0.10	68	2.3	2.7	< 0.05	0.12	890	8/29/00	0.01	66	20	21	< 0.05	0.32	1340
9/5/00	0.08	60	1.9	2.1	< 0.05	< 0.05	710								
9/12/00	0.05	62	2.2	2.6	< 0.05	0.08	880		Jubilee (Upstream ~200 yards)[9]						
9/19/00	0.09	62	1.6	2	< 0.05	< 0.05	790	9/26/00	< 0.01	NR	7.8	8.5	< 0.05	< 0.05	1160
9/26/00	0.10	62	2	2.3	< 0.05	< 0.05	870	10/3/00	< 0.01	66	5	5.3	< 0.05	< 0.05	1200
10/3/00	0.09	NR	2	2.2	< 0.05	< 0.05	900	10/11/00	< 0.01	64	4.8	5.2	< 0.05	< 0.05	1160
10/10/00	0.11	62	2.3	2.6	< 0.05	< 0.05	820	10/17/00	< 0.01	63	5.9	6.5	< 0.05	< 0.05	1170
mean	0.09	64	2.0	2.4		0.10	884			64	6	6			1173
st. dev	0.02	3	0.2	0.2		0.03	137			2	1	2			19
st. error	0.01	1.1	0.07	0.08		0.02	46			1	1	1			9

[4] Flow calculated in the field using the float method (leaf).

NR not reported

[7] Flow calculated in the field using a timed-volume (bucket) method.

[8] The monitoring location was dry and was not sampled. Surface water was found upstream of this location and was sampled on 8/29/00. It was located on the property at the base of the drainage area.

[9] Jubilee Station was found to be dry. Groundwater was found surfacing upstream on 9/26/00 by RB staff. The location was sampled for the remainder of the monitoring period by Hines Nursery.

Date	Hines Nurseries (Station 2)							
	Flow[10]	ADF[11]	Temp	NO_3-N	Total N	PO_4-P	Total P	TDS
	cfs	cfs	°F	mg/L	mg/L	mg/L	mg/L	mg/L
8/15/00								
8/22/00	0	0						
8/29/00	0	0.003						
9/5/00	0	0						
9/12/00	0	0						
9/19/00	0.41	0.279	67	17	22	0.96	1.7	1510
9/26/00	0	0						
10/3/00	0	0						
10/11/00	0	0						
10/17/00	0	0.025						
mean	0.05	0.03						
st. dev	0.14	0.09						
st. error	0.05	0.03						

[10] Flow measurement recorded at time of sampling. Flow measured by Hines Nursery staff using 24-hr water level recorder and Parshall flume installation. Only one sample was collected from flowing water being discharged from the Hines Property at the time of sample collection.

[11] ADF is average daily flow measured by water level recorder.

Appendix C – Photos Illustrating Algal Growth in Rainbow Creek

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Photos Illustrating Algal Growth in Rainbow Creek




Upstream view from Station 3 and the Oak Crest Mobile Estates, under I-15 overpass on July 17, 2000 (left) and September 5, 2000 (right).




Oak Crest Station 3 on May 22, 2000 (left) and September 5, 2000 (right)




Riverhouse Station 5 on July 7, 1999 (left) and June 6, 2000 (right)- Pictures show extensive algal growth.

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Photos Illustrating Algal Growth in Rainbow Creek – Cont.

Illustration of emergent plant growth.





Two views looking downstream of Riverhouse station on March 15, 2000 (top) and August 15, 2000 (bottom)

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Photos Illustrating Algal Growth in Rainbow Creek – Cont.

Chronological Series at Riverhouse Station


February 1, 2000


April 11, 2000


May 23, 2000


June 20, 2000


September 12, 2000


October 10, 2000

Appendix D – Background Concentrations

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Appendix D — Background Concentrations

This Technical Support Document (TSD) provides an analysis of reference stream data that is used to calculate the background load contribution to Rainbow Creek. This TSD presents local data sets from the City of San Diego's Monitoring Network for the determination of background concentrations. Evaluation of reference water quality provides a baseline for establishing background concentrations.

Overview

Soil erosion, the decay of plant material, and the decay of wild animal waste contribute background nitrogen and phosphorus loads from undeveloped land to Rainbow Creek. There is insufficient data to determine site-specific background concentrations in Rainbow Creek. A review of historic monitoring data for Rainbow Creek revealed only two nitrate samples from 1954 (CDWR 1975). Since agricultural irrigation and citrus and avocado orchards were present in the Fallbrook area in the early 1940's (CDWR 1975), this data is considered insufficient to determine background concentrations.

Water quality concentrations from local streams similar to Rainbow Creek will therefore be used as an alternative to site-specific background concentrations. Reference sites are relatively undisturbed by human influences. The definition of a reference condition ranges from a pristine, undisturbed state of a stream, to merely the "best available" or "best attainable" conditions. In the case of the San Diego streams used in this TSD, the "least" and "minimally" impacted sites have been identified to be reference.

Reference Data from City of San Diego's Monitoring Network

The City of San Diego (City) monitors streams that drain into the drinking water reservoirs for the purpose of maintaining the quality of the supply. The City performs monthly monitoring for ammonia, nitrite, nitrate, total Kjeldahl nitrogen, and ortho-phosphate. In 2003, the City began monitoring for total nitrogen and total phosphorus.

For this analysis, each monitoring location was characterized to determine its potential to be a reference site (see Attachment D-1). The locations were reviewed for stream order and proximity to land use. The stream order and existing land use as shown on the San Diego Association of Governments' Regional Economic Development Information (REDI) interactive mapping application was reviewed and noted (SANDAG 2003).

Each monitoring site was scored using an a priori classification system for ranking streams according to intensity of human influence (Karr and Chu 1999). This classification system has been modified for application to San Diego streams and is referred to as the Gibson Score. It is a measure developed by David Gibson, Environmental Scientist, Regional Board that integrates multiple aspects of land use impairment. The score, which ranges from 1 to 72, takes into account the presence of effluent discharges, availability of sources of stressors (e.g., presence of land uses), riparian condition, and instream habitat. Scores of 1 to 9 are considered to be "least"

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impacted and scores of 10 to 18 are “minimally” impacted. Both of these categories identify streams with very little or no effluent from land use, and have no identified nearby sources of sediment or wastes. Sites with a score of 1 to 18 are considered to represent reference. Scores higher than 18 are impacted by effluent and are not considered reference. Attachment D-1 presents the evaluation results of each monitoring location in the City of San Diego Monitoring Network.

Using a score of 18 as the threshold value, 19 out of a pool of 47 streams were identified as candidate reference sites. After the reference sites were identified, the City's monitoring data were reviewed for available data. Seven from the 19 streams had insufficient data and could not be used in this analysis. Data sets with at least two sampling events and reported results for nitrate, nitrite, and total Kjeldahl nitrogen (needed for the total nitrogen calculation) were considered for the analysis. The monitoring data consists of samples collected in 2001 through mid-2003, and from a study performed at San Vicente Reservoir in 1997 and 1998. Total nitrogen was calculated by adding nitrate, nitrite, and total Kjeldahl nitrogen for data collected prior to 2003. For the 2003 data, the total nitrogen and total phosphorus results were used in this analysis. Half the detection limit is used for those samples reported as less than the detection limit.

Table D-1 summarizes the reference stream results and provides the reference concentrations for total nitrogen and total phosphorus in San Diego streams. Attachment D-2 presents the reference stream data sets that is used to calculate the average values presented in the summary table. Although the detection limits are not low enough to measure actual values, the concentrations are reasonable when compared with other reference concentrations (see discussion of Alternative Data Sets).

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Table D-1. Average Nutrient Concentrations for Reference Streams in San Diego

Monitoring Station	Average Total Nitrogen[1] (mg/L)	No. of Positive Results (No. of NDs)[1]	Average Total Phosphorus (mg/L)	No. of Positive Results (No. of NDs)
WLC4	0.36	10 (7)	0.09	1 (1)
PVC5	0.26	7 (10)	0.06	1 (1)
KTC7	0.1	0 (6)	NM	0 (0)
TOL2	0.67	13 (5)	NM	0 (0)
CWD9	1.14	62 (24)	0.04	1 (1)
AQA3	0.85	20 (5)	NC	1 (0)
CON3	0.3	11 (21)	0.12	2 (0)
BDC3	0.22	6 (11)	0.04	0 (2)
SDR2b	0.3	6 (8)	0.08	1 (1)
CED3	0.31	5 (6)	0.06	1 (1)
BMD1	0.6	5 (2)	NC	1 (0)
WCH1	0.54	14 (11)	NC	1 (0)
Average	0.47		0.07	
St. Deviation	0.30		0.03	
St. Error	0.09		0.01	

ND – Non detection, sample result was less than the detection limit.
NM – Not measured
NC – Not considered for analysis because only one sampling event was available.
[1]Except for data collected in 2003, total nitrogen was calculated by adding nitrate, nitrite, and total Kjeldahl nitrogen. Therefore, the number of positive results and non detections for each parameter is used.

Alternative Data Sets

For comparison purposes, USEPA proposed nutrient criteria and USGS undeveloped stream basins in the United States were reviewed. Table D-2 summarizes reference concentrations from these alternative data sources. The background reference concentration for San Diego of 0.47 mg N/L is nearly the same as the USEPA result and somewhat higher than the USGS results. The San Diego value for total phosphorus is slightly higher than both the USEPA and the USGS results. Information on both alternative data sets is provided below.

Table D-2. Comparison of San Diego Reference Stream Concentrations with Alternative Data Sources

Data Set/Study	Total N mg/L	Total P mg/L
USEPA, Ecoregion III, Subecoregion 6[a]	0.50	0.03
USGS, Undeveloped Stream Basins[b]	0.26	0.02
San Diego Reference Streams	0.47	0.07

[a] Source: USEPA Ambient Water Quality Criteria Recommendations 2000

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[b] Source: Clark et al. 2000

USEPA Nutrient Criteria

USEPA developed criteria recommendations for nutrients using data from the STORET Database for each ecoregion and subecoregion. San Diego County is in Ecoregion III (Xeric West) and Subecoregion 6 (Southern and Central California Chaparral and Oak Woodlands). Ecoregions are defined as regions with relatively similar characteristics, such as, soils, vegetation, climate, geology, land cover, and physiology.

USGS Data from Undeveloped Stream Basins

Nutrient data collected as part of three USGS programs were used to evaluate nutrient concentrations in 85 streams draining relatively undeveloped basins across the nation (Clark et al. 2000). The three programs are the Hydrologic Benchmark Network (HBN), the National Water Quality Assessment (NAWQA), and the Research Program. The HBN program was initiated in 1958 to track water quality trends in streams draining basins free from anthropogenic influence. The NAWQA program, initiated in 1990, was designed to identify and describe major factors that affect observed water quality conditions over large spatial and temporal scales. Research basins were selected that studied the affects of atmospheric deposition on biogeochemical cycling within small, undisturbed watersheds were used in the evaluation.

References

California Department of Water Resources (CDWR), 1975. Impact of Waste Treatment and Disposal on the Quality of Water Supplies, Santa Margarita Watershed, District Report. State of California, The Resources Agency, Department of Water Resources Southern District. January 1975.

Clark, G. M., D. K. Mueller, and M. A. Mast, 2000. Nutrient Concentrations and yields in Undeveloped Stream Basins of the United States. Journal of the American Water Resources Association, Vol. 36, No. 4, August 2000.

Karr, J. R., and E. W. Chu, 1999. Restoring Life in Running Waters: Better Biological Monitoring. Island Press, Covelo, CA.

San Diego Association of Governments (SANDAG), 2003. Regional Economic Development Information (REDI) interactive mapping application.
http://www.sandag.org/index.asp?subclassid=70&fuseaction=home.subclasshome

U.S. Environmental Protection Agency (USEPA), 2000. Ambient Water Quality Criteria Recommendations, Information Supporting the Development of State and Tribal Nutrient Criteria, Rivers and Streams in Nutrient Ecoregion III. EPA 822-B-00-016. USEPA, Office of Water, Washington, D.C. December 2000.

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Attachment D-1. Evaluation of Station Locations for the City of San Diego Monitoring Network

Watershed	Site	Steam Order	Land Uses[1]	Gibson Score[2]	Scoring Considerations
Otay/ Dulzura	UOR1	1	Open Space, Agriculture	54	Ephemeral drainage with major construction throughout its drainage area.
	JAM4	3	Open, w/ Industrial and Agriculture Use Upstream	28	Agricultural areas and rural residential areas upstream. Major campground and road crossings. Evidence of instream erosion and channel incision on Dulzura Creek.
	DUL1a	2*	Agriculture & Residential *surrounding, water from Barrett	NS	Not Scored. Reservoir discharge point into Dulzura Creek.
	PVR2	1	Open, Park	18	Proctor Valley has been heavily grazed and is the site for frequent trash dumping and illegal activities.
	HOL3	2	Sample location in Agriculture dominated area	31	Intermittent stream in previously grazed area. Rural residential and agricultural activities in drainage area.
Barrett/ Dulzura	WLC4	2	Open	10	Minor rural residential area upstream (<10 units). Historic grazing on tributary ceased in 1999.
	BHC3	2	Public Facility, Open	50	Located below Barrett Honor Camp and site of historic accidental waste water discharges. Area is heavily grazed.
	NPC3a	2	Open	10	Located above Pine Valley Recreational Cabin area in the Cleveland National Forest. Minor grazing activities and recreation in drainage area.
	NPC3b	2	Open	13	Located in the Pine Valley Recreational Cabin area.
	NPC3c	2	Open	13	Located in the Pine Valley Recreational Cabin area.
	NPC3d	2	Open	13	Located below the Pine Valley Recreational Cabin area and above the community of Pine Valley.
	PVC1	2	Agriculture & Residential immediately upstream, then Open	28	Located below Pine Valley at the Pine Creek Trailhead. Significant septic drainage fields, a wastewater treatment facility and two major horse stables.
	PVC1A	2	Agriculture & Residential immediately upstream, then Open	28	Located below Pine Valley at the Pine Creek Trailhead. Significant septic drainage fields, a wastewater treatment facility and two major horse stables.
	PVC5	2	Open	10	Located at the mouth of Pine Creek at Barrett Reservoir. Most of the upstream drainage area lies in the Pine Creek Wilderness area. Located approximately 15 river miles below PVC1(a).

[1] Source: Regional Economic Development Information, SANDAG
[2] Source: A measure developed by SDRWQCB staff, David Gibson, using the scoring system developed by Karr and Chu (1999).

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Attachment D-1. Evaluation of Station Locations for the City of San Diego Monitoring Network Continued

Watershed	Site	Steam Order	Land Uses[1]	Gibson Score[2]	Scoring Considerations
Barrett/ Dulzura	SKY1	2	Open	28	Located in a remote area above Barrett Reservoir. Some light dry land agriculture. The Corral Canyon Offroad Vehicle recreational area is at the top of the watershed approximately 7 river miles away. Two impoundments approximately 1 mile upstream.
	CWD9	3	Open but downstream of illegal immigrant camp	13	Located approximately 5 miles downstream of Morena Reservoir. A major undocumented immigrant encampment is located in Salazar Canyon approximately 2 miles upstream. Historic grazing in Hauser Canyon.
	DUL0	*	*Reservoir Tailwater	NS	Not scored.
Morena/ Dulzura	MOR3	2	Open	13	Located in a largely undisturbed drainage above Morena Reservoir. Some light grazing and recently constructed rural residences (2).
	KTC7	2	Open	10	Located in Kitchen Creek Canyon approximately 2 river miles downstream of Cibbets Flats campground. Minimal grazing activity in upper watershed approximately 5 river miles upstream.
	CWD4	2	Agriculture	32	Low gradient site in alluvial valley. Significant impacts upstream including intensive grazing, plowed field agriculture, community high school, freeway and road crossings, and rural residences.
	LAP4	2	Agriculture	33	Significant grazing pressure onsite and immediately upstream. Also, freeway and road crossings and rural residential areas.
San Vicente	TOL2	2	Park, Open	5	Mostly undeveloped unincorporated county area with natural park reserve areas.
	KIM4	2	Park, Open, Res.(Fernbrook)	53	Heavily developed rural residential, road crossings, and upstream agriculture.
	AQA3	1	Park, Small amount of Residential	10	Small intermittent stream with minor agriculture and rural residential. Some road runoff from Hwy 67 and driveway roads.

[1] Source: Regional Economic Development Information, SANDAG
[2] Source: A measure developed by SDRWQCB staff, David Gibson, to integrate multiple aspects of land use impairment.

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Attachment D-1. Evaluation of Station Locations for the City of San Diego Monitoring Network Continued

Watershed	Site	Steam Order	Land Uses[1]	Gibson Score[2]	Scoring Considerations
San Vicente	SNC4	3*	Park, Open, Residential, Agriculture, * receives raw water from Sutherland	53	Major developments and golf course immediately upstream. Historic waste water runoff less than 0.5 miles upstream. Road crossings, horse stables, and trash.
	SNC5	2	Residential, Park, Commercial, Agriculture (Barona)	53	Major developments and golf course immediately upstream. Historic waste water runoff upstream. Agriculture, road crossings, horse stables, and trash.
	BAR4	2	Park, Open, Agriculture, Residential (Barona)	54	Historically overgrazed valley. Rural residential area. Major site of new development associated with Tribal Casino including golf course and wastewater treatment and land application areas.
El Capitan	CON3	3	Open	1	Very undeveloped watershed, but benthic habitat limited by bedrock bottom canyon. Some tribal grazing historically in upper canyons.
	PZC3	2	Open, Residential (Alpine)	32	Rural residential with septic and numerous road crossings.
	CHC3	2	Open, Residential (Alpine)	50	Rural residential and dense subdivision residential with numerous road crossings, freeway crossing, agriculture, and septic fields.
	BDC3	2*	Open, Park, small amount of Residential & Agriculture *Bottom of Lake Cuyamaca Drainage,	10	Located approximately 12 miles downstream of Lake Cuyamaca. Flows regulated by water transfers from Cuyamaca to El Capitan Reservoirs. Some agriculture and rural residential areas approximately 5 river miles upstream.
	SDR2b	3*	Open, *Julian near headwaters	1	Located approximately 15 miles downstream of Julian. Rural residential and agricultural areas in Julian, but almost none between Julian (Coleman Creek) and this site. Some potential agricultural and rural residential impacts from Ritchie Creek drainage
	CED3	2	Open, Residential & Agriculture (Pine Hills) may or may not effect	1	Located approximately10 miles downstream from Sandy Creek rural residential area and approximately 12 miles downstream from the Harrison and Pine Hills rural residential areas.
	CUY2	*	Park, Some Residential, *drains from Lake Cuyamaca	14	Reservoir discharge point into Boulder Creek. Minor natural flows, mostly regulated flows. Rural residential and recreational activities.

[1] Source: Regional Economic Development Information, SANDAG
[2] Source: A measure developed by SDRWQCB staff, David Gibson, to integrate multiple aspects of land use impairment.

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Attachment D-1. Evaluation of Station Locations for the City of San Diego Monitoring Network Continued

Watershed	Site	Steam Order	Land Uses[1]	Gibson Score[2]	Scoring Considerations
Hodges	DDC3	1	Residential	72	Potentially significant pollutant sources present.
	FEL3	2	Escondido	68	Potentially significant pollutant sources present.
	KCC3	2	Escondido	71	Potentially significant pollutant sources present.
	MON2	1	Open, Adjacent Residential Surrounding	68	Potentially significant pollutant sources present.
	GVC2	2	Open, Adjacent Residential Surrounding	64	Potentially significant pollutant sources present.
	SYC2	2	Agriculture, Residential	23	Potentially significant pollutant sources present.
	CDC4	2	Agriculture & Residential Surrounding	50	Potentially significant pollutant sources present.
	SMC4	3	Adjacent Agriculture, Open, Ramona	36	Potentially significant pollutant sources present.
	GJC4	2	Adjacent Agriculture, Open	36	Potentially significant pollutant sources present.
	YSA8	3*	Adjacent Agriculture, Park, Open, *Sutherland tailwater	36	Potentially significant pollutant sources present.
	TEM1	3	Agriculture along corridor, Open at headwaters	33	Site is actually Santa Ysabel Creek below confluence with Temescal Creek. Significant agriculture (grazing and plowed field) immediately upstream. Fair to poor riparian and instream habitat.
Sutherland	BMD1	2	Open, Agriculture near headwaters	11	Grazing activities upstream of sample site approximately 4 river miles upstream. Minor mining activities without drainage problems. Instream habitat is fair and riparian habitat is excellent.
	WCH1	2	Open, large area of Agriculture near headwaters which may not be maintained. No plowed fields.	18	Site is actually Santa Ysabel Creek below the Witch Creek confluence and above high water line of Sutherland Reservoir. Rural residential, road crossings and septic fields approximately 4 river miles upstream. Extensive local grazing pressure historically. Riparian condition is depressed and instream condition is fair to poor.

[1] Source: Regional Economic Development Information, SANDAG
[2] Source: A measure developed by SDRWQCB staff, David Gibson, to integrate multiple aspects of land use impairment.

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Attachment D-2. City of San Diego Monitoring Network Data Set

Station	Date	Ammonia-N mg/L	Nitrate-N mg/L	Nitrite – N mg/L	TKN mg/L	TN[a] mg/L	PO_4-P mg/L	TP mg/L
Wilson Creek (WLC4)	1/17/01	< 0.02	< 0.05	< 0.002	0.17	0.20	< 0.07	NM
	2/6/01	< 0.02	< 0.05	< 0.002	0.16	0.18	< 0.07	NM
	2/27/01	< 0.02	< 0.05	0.004	0.31	0.34	< 0.07	NM
	3/20/01	< 0.02	< 0.05	< 0.002	0.21	0.23	< 0.07	NM
	4/10/01	0.09	0.33	0.061	0.74	1.12	< 0.07	NM
	3/4/03	< 0.04	< 0.05	< 0.003	NM	0.38[b]	< 0.07	0.14[b]
	4/8/03	< 0.04	< 0.05	< 0.003	NM	< 0.16[b]	< 0.07	< 0.08[b]
Average[c]		**0.02**	**0.07**	**0.01**	**0.32**	**0.36**	**0.04**	**0.09**
St. Deviation		**0.03**	**0.12**	**0.02**	**0.24**	**0.35**	**0.00**	**0.07**
St. Error		**0.01**	**0.04**	**0.01**	**0.11**	**0.13**	**0.00**	**0.05**
Pine Valley Creek (PVC5)	1/17/01	< 0.02	< 0.05	< 0.002	0.19	0.21	< 0.07	NM
	2/6/01	< 0.02	< 0.05	< 0.002	0.17	0.19	< 0.07	NM
	2/27/01	< 0.02	< 0.05	< 0.002	0.28	0.30	< 0.07	NM
	3/20/01	< 0.02	< 0.05	< 0.002	0.23	0.25	< 0.07	NM
	4/10/01	< 0.02	< 0.05	< 0.002	0.28	0.30	< 0.07	NM
	3/4/03	< 0.04	< 0.05	< 0.003	NM	0.35[b]	< 0.07	< 0.08[b]
	4/8/03	< 0.04	< 0.05	< 0.003	NM	0.19[b]	< 0.07	0.07[b]
Average[c]		**0.01**	**0.02**	**0.001**	**0.23**	**0.26**	**0.04**	**0.06**
St. Deviation		**0.005**	**0.00**	**0.000**	**0.05**	**0.06**	**0.00**	**0.02**
St. Error		**0.002**	**0.00**	**0.000**	**0.02**	**0.02**	**0.00**	**0.02**
Kitchen Creek (KTC7)	1/18/01	< 0.02	< 0.05	< 0.002	< 0.15	0.10	< 0.07	NM
	2/7/01	< 0.02	< 0.05	< 0.002	< 0.15	0.10	< 0.07	NM
Average[c]		**0.01**	**0.02**	**0.001**	**0.08**	**0.10**	**0.03**	
St. Deviation		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
St. Error		**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
San Vicente Reservoir, above high water line (TOL2)	1/27/97	< 0.02	1.70	0.005	0.68	2.39	< 0.003	NM
	2/10/97	< 0.02	0.03	0.002	0.35	0.39	< 0.003	NM
	3/24/98	< 0.02	< 0.05	< 0.002	0.20	0.23	< 0.065	NM
	4/27/98	0.02	< 0.002	0.002	0.41	0.41	< 0.007	NM
	3/26/98	0.02	< 0.05	< 0.002	0.30	0.33	< 0.065	NM
	6/22/98	< 0.02	0.01	0.002	0.30	0.31	< 0.007	NM
Average[c]		**0.02**	**0.30**	**0.002**	**0.37**	**0.67**	**0.01**	
St. Deviation		**0.0005**	**0.69**	**0.002**	**0.17**	**0.8**	**0.02**	
St. Error		**0.0002**	**0.28**	**0.001**	**0.07**	**0.3**	**0.01**	

NM – not measured.
Non detection results are presented as less than the detection limit.
[a] Except for data collected in 2003, Total N calculated by adding nitrate, nitrite, and TKN and using half the reported minimum detection limit (MDL) as a surrogate value for non detections.
[b] In 2003, the City began reporting Total Nitrogen and Total Phosphorus, and discontinued reporting TKN.
[c] Averages calculated using half the reported MDL as a surrogate value for non detections.

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Attachment D-2. City of San Diego Monitoring Network Data Set - Continued

Station	Date	Ammonia -N mg/L	Nitrate-N mg/L	Nitrite – N mg/L	TKN mg/L	TN[a] mg/L	PO_4-P mg/L	TP mg/L
Cottonwood Creek (CWD9)	1/17/01	0.09	< 0.05	0.003	0.59	0.61	< 0.07	NM
	2/6/01	0.03	< 0.05	< 0.002	0.52	0.54	< 0.07	NM
	2/27/01	0.83	< 0.05	0.013	1.52	1.56	< 0.07	NM
	3/14/01	< 0.02	< 0.05	< 0.002	0.33	0.35	< 0.07	NM
	3/20/01	< 0.02	2.48	0.024	0.93	3.44	< 0.07	NM
	3/28/01	0.10	0.33	0.036	0.93	1.29	< 0.07	NM
	4/4/01	0.15	0.36	0.054	1.15	1.56	< 0.07	NM
	4/10/01	0.10	0.50	0.054	1.07	1.63	< 0.07	NM
	4/18/01	< 0.02	0.63	0.024	0.80	1.46	< 0.07	NM
	4/25/01	< 0.02	0.66	0.013	0.95	1.63	0.05	NM
	5/9/01	< 0.02	0.71	0.013	0.80	1.52	< 0.07	NM
	5/16/01	< 0.02	0.75	0.014	0.85	1.61	< 0.07	NM
	5/22/01	< 0.02	0.77	0.017	0.78	1.57	< 0.07	NM
	6/6/01	< 0.02	0.87	0.023	0.92	1.81	0.09	NM
	6/20/01	< 0.02	0.96	0.019	0.85	1.83	0.11	NM
	6/27/01	< 0.02	0.84	0.014	1.06	1.91	0.11	NM
	7/5/01	< 0.02	0.71	0.007	1.02	1.73	0.10	NM
	7/11/01	< 0.02	0.63	0.005	0.70	1.34	0.09	NM
	7/17/01	< 0.02	0.26	< 0.002	1.38	1.64	0.03	NM
	7/25/01	< 0.02	0.12	< 0.002	1.38	1.51	0.03	NM
	7/31/01	< 0.02	0.19	< 0.002	0.99	1.18	0.08	NM
	8/8/01	< 0.02	0.02	< 0.002	0.42	0.45	< 0.07	NM
	12/4/01	< 0.02	< 0.05	< 0.002	0.28	0.30	< 0.07	NM
	1/2/02	< 0.02	< 0.05	< 0.002	< 0.10	0.07	< 0.07	NM
	2/5/02	< 0.02	< 0.05	< 0.002	< 0.10	0.07	< 0.07	NM
	4/3/02	< 0.02	< 0.05	< 0.002	0.25	0.28	< 0.07	NM
	5/7/02	< 0.02	< 0.05	< 0.002	0.38	0.40	< 0.07	NM
	11/5/02	< 0.04	< 0.05	0.008	< 0.16	0.11	0.14	NM
	3/4/03	< 0.04	< 0.05	< 0.003	NM	0.23[b]	< 0.07	0.04[b]
	4/8/03	< 0.04	0.36	< 0.003	NM	0.51[b]	< 0.07	< 0.08[b]
Average[c]		**0.05**	**0.41**	**0.01**	**0.75**	**1.14**	**0.05**	**0.04**
St. Deviation		**0.15**	**0.51**	**0.01**	**0.41**	**0.77**	**0.03**	**0.00**
St. Error		**0.03**	**0.09**	**0.00**	**0.08**	**0.14**	**0.01**	**0.00**

NM – not measured.

Non detection results are presented as less than the detection limit.

[a] Except for data collected in 2003, Total N calculated by adding nitrate, nitrite, and TKN and using half the reported minimum detection limit (MDL) as a surrogate value for non detections.

[b] In 2003, the City began reporting Total Nitrogen and Total Phosphorus, and discontinued reporting TKN.

[c] Averages calculated using half the reported MDL as a surrogate value for non detections.

Attachment D-2. City of San Diego Monitoring Network Data Set - Continued

Station	Date	Ammonia-N mg/L	Nitrate-N mg/L	Nitrite – N mg/L	TKN mg/L	TN[a] mg/L	PO_4-P mg/L	TP mg/L
San Vicente Reservoir, above high water line (AQA3)								
	1/27/97	< 0.02	2.84	0.013	0.73	3.59	0.01	NM
	2/10/97	< 0.02	0.03	0.002	0.43	0.47	< 0.08	NM
	2/24/97	< 0.02	< 0.02	< 0.002	0.62	0.63	< 0.08	NM
	3/24/98	< 0.02	0.20	0.005	0.29	0.50	< 0.07	NM
	4/27/98	0.02	0.22	0.003	0.45	0.67	< 0.07	NM
	5/26/98	0.02	< 0.05	< 0.002	0.32	0.35	< 0.07	NM
	6/22/98	< 0.02	< 0.002	0.002	0.34	0.34	0.01	NM
	3/26/01	< 0.02	0.18	0.002	0.25	0.43	< 0.07	NM
	3/10/03	< 0.04	0.15	< 0.003	NM	0.65[b]	< 0.07	0.17[b]
Average[c]		**0.01**	**0.41**	**0.003**	**0.43**	**0.85**	**0.03**	
St. Deviation		**0.005**	**0.918**	**0.004**	**0.169**	**1.036**	**0.012**	
St. Error		**0.002**	**0.306**	**0.001**	**0.060**	**0.345**	**0.004**	
Conejos Creek (CON3)								
	1/22/01	< 0.02	< 0.05	< 0.002	0.30	0.32	< 0.07	NM
	2/12/01	< 0.02	< 0.05	< 0.002	0.20	0.22	< 0.07	NM
	3/5/01	< 0.02	< 0.05	< 0.002	0.48	0.51	0.04	NM
	3/26/01	< 0.02	< 0.05	< 0.002	0.36	0.38	< 0.07	NM
	4/16/01	< 0.02	< 0.05	< 0.002	0.15	0.18	< 0.07	NM
	5/7/01	< 0.02	< 0.05	< 0.002	0.46	0.48	< 0.07	NM
	5/29/01	< 0.02	< 0.05	< 0.002	0.16	0.18	< 0.07	NM
	2/11/02	< 0.02	< 0.05	< 0.002	< 0.10	0.07	< 0.07	NM
	3/11/02	< 0.02	< 0.05	< 0.002	0.18	0.20	< 0.07	NM
	4/8/02	< 0.02	< 0.05	< 0.002	0.24	0.26	< 0.07	NM
	3/10/03	< 0.04	< 0.05	< 0.003	NM	0.49[b]	< 0.07	0.09[b]
	4/14/03	< 0.04	< 0.05	< 0.003	NM	0.26[b]	< 0.07	0.16[b]
Average[c]		**0.01**	**0.02**	**0.001**	**0.26**	**0.30**	**0.03**	**0.12**
St. Deviation		**0.004**	**0.00**	**0.00**	**0.14**	**0.14**	**0.002**	**0.047**
St. Error		**0.001**	**0.00**	**0.00**	**0.04**	**0.04**	**0.001**	**0.033**
Boulder Creek (BDC3)	3/6/01	< 0.02	< 0.05	< 0.002	0.24	0.28	< 0.07	NM
	3/27/01	< 0.02	< 0.05	< 0.002	0.22	0.26	< 0.07	NM
	4/17/01	< 0.02	< 0.05	< 0.002	0.31	0.36	< 0.07	NM
	5/8/01	< 0.02	< 0.05	< 0.002	0.27	0.32	< 0.07	NM
	5/30/01	< 0.02	< 0.05	< 0.002	< 0.10	0.15	< 0.07	NM
	3/11/03	< 0.04	< 0.05	< 0.003	NM	0.16[b]	< 0.07	< 0.08[b]
	4/15/03	< 0.04	< 0.05	0.024	NM	0.25[b]	< 0.07	< 0.08[b]
Average[c]		**0.01**	**0.02**	**0.005**	**0.22**	**0.22**	**0.03**	**0.04**
St. Deviation		**0.005**	**0.00**	**0.01**	**0.10**	**0.10**	**0.00**	**0.00**
St. Error		**0.002**	**0.00**	**0.003**	**0.04**	**0.04**	**0.00**	**0.00**

NM – not measured.
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[a] Except for data collected in 2003, Total N calculated by adding nitrate, nitrite, and TKN and using half the reported minimum detection limit (MDL) as a surrogate value for non detections.
[b] In 2003, the City began reporting Total Nitrogen and Total Phosphorus, and discontinued reporting TKN.
[c] Averages calculated using half the reported MDL as a surrogate value for non detections.

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Attachment D-2. City of San Diego Monitoring Network Data Set - Continued

Station	Date	Ammonia-N mg/L	Nitrate-N mg/L	Nitrite – N mg/L	TKN mg/L	TN[a] mg/L	PO_4-P mg/L	TP mg/L
San Diego River (SDR2b)	3/6/01	< 0.02	< 0.05	< 0.002	0.41	0.44	< 0.07	NM
	3/27/01	< 0.02	< 0.05	< 0.002	0.23	0.26	< 0.07	NM
	4/17/01	< 0.02	< 0.05	< 0.002	0.17	0.20	< 0.07	NM
	5/8/01	< 0.02	< 0.05	< 0.002	0.24	0.26	< 0.07	NM
	3/11/03	< 0.04	< 0.05	< 0.003	NM	0.38[b]	< 0.07	0.12[b]
	4/15/03	< 0.04	< 0.05	< 0.003	NM	0.29[b]	< 0.07	< 0.08[b]
Average[c]		**0.01**	**0.02**	**0.001**	**0.26**	**0.30**	**0.03**	**0.08**
St. Deviation		**0.01**	**0.00**	**0.000**	**0.10**	**0.09**	**0.00**	**0.06**
St. Error		**0.002**	**0.00**	**0.000**	**0.05**	**0.04**	**0.00**	**0.04**
Cedar Creek (CED3)	3/6/01	< 0.02	< 0.05	< 0.002	0.43	0.45	< 0.07	NM
	3/27/01	0.02	< 0.05	< 0.002	0.20	0.23	< 0.07	NM
	4/17/01	< 0.02	< 0.05	< 0.002	0.13	0.15	< 0.07	NM
	3/11/03	< 0.04	< 0.05	< 0.003	NM	0.46[b]	< 0.07	< 0.08[b]
	4/15/03	< 0.04	< 0.05	0.003	NM	0.27[b]	< 0.07	0.08[b]
Average[c]		**0.02**	**0.02**	**0.002**	**0.25**	**0.31**	**0.03**	**0.06**
St. Deviation		**0.006**	**0.00**	**0.001**	**0.155**	**0.138**	**0.00**	**0.03**
St. Error		**0.003**	**0.00**	**0.000**	**0.089**	**0.062**	**0.00**	**0.02**
Bloomdale Creek (BMD1)								
	3/13/01	< 0.02	0.35	0.004	0.77	1.12	< 0.07	NM
	4/24/01	< 0.02	< 0.05	< 0.002	0.35	0.36	< 0.07	NM
	3/25/03	< 0.04	< 0.05	0.003	NM	0.31[b]	< 0.07	0.09[b]
Average[c]		**0.01**	**0.12**	**0.003**	**0.56**	**0.60**	**0.03**	
St. Deviation		**0.01**	**0.20**	**0.002**	**0.29**	**0.46**	**0.00**	
St. Error		**0.003**	**0.12**	**0.001**	**0.21**	**0.26**	**0.00**	
Santa Ysabel Creek (WCH1)	6/30/01	< 0.02	< 0.05	< 0.002	0.38	0.40	< 0.07	NM
	3/13/01	0.11	0.53	0.012	1.20	1.74	< 0.07	NM
	4/3/01	0.17	< 0.05	0.005	0.55	0.58	< 0.07	NM
	4/24/01	0.09	< 0.05	0.004	0.35	0.38	< 0.07	NM
	6/5/01	< 0.02	< 0.05	< 0.002	0.36	0.38	< 0.07	NM
	1/23/02	< 0.02	0.20	< 0.002	0.12	0.32	< 0.07	NM
	3/26/02	< 0.02	< 0.05	< 0.002	0.26	0.28	< 0.07	NM
	4/23/02	< 0.02	< 0.05	< 0.002	0.47	0.49	< 0.07	NM
	3/25/03	< 0.04	< 0.05	0.003	NM	0.30[b]	< 0.07	0.11[b]
Average[c]		**0.05**	**0.10**	**0.003**	**0.46**	**0.54**	**0.03**	
St. Deviation		**0.06**	**0.17**	**0.003**	**0.33**	**0.46**	**0.00**	
St. Error		**0.02**	**0.06**	**0.001**	**0.12**	**0.15**	**0.00**	

NM – not measured.
Non detection results are presented as less than the detection limit.
[a] Except for data collected in 2003, Total N calculated by adding nitrate, nitrite, and TKN and using half the reported minimum detection limit (MDL) as a surrogate value for non detections.
[b] In 2003, the City began reporting Total Nitrogen and Total Phosphorus, and discontinued reporting TKN.
[c] Averages calculated using half the reported MDL as a surrogate value for non detections.

Appendix E – Streamflow, Seasonal Variation, and Flow Tiers

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Appendix E—Streamflow, Seasonal Variation, and Flow Tiers

This appendix is a Technical Support Document (TSD) that provides additional analysis of streamflow in Rainbow Creek. This TSD examines rainfall patterns, daily streamflow rates and their frequency of occurrence, and flow-based tiers and their associated flow volumes.

Overview

In the semi-arid climate of Southern California there are two seasons—dry weather occurs during most of the year and intermittent wet weather events occur typically between November and March. This two-season climate creates significant differences in freshwater flow through the creeks and streams. In general, storm events yield both high flow rates and high flow volumes; the vast majority of flow volume occurs during the months of January, February, and March. Nonetheless, some storms occur in other months of the year.

The Regional Board has evaluated the merits of developing TMDLs for each pollutant (or group of pollutants) by using the seasonal variation approach (i.e., loading determined for wet versus dry weather seasons) and by using a flow-based approach. The flow-based approach divides stream flow into ranges or tiers. This method incorporates high flows that may occur outside of the wet season as well as low flows that happen in between rain events. Thus the applicable loading capacity and total allocation for a given pollutant does not depend on the time of year, but on the actual stream flow.

The following discussion concentrates on establishing flow tiers for Rainbow Creek. The flow-based approach is applied to total nitrogen and total phosphorus TMDLs in Section 5.0 Loading Capacity and Linkage Analysis. Three flow tiers have been identified: low flows, moderate to high flows, and very high flows. The flow data used in this analysis is from U.S. Geological Service (USGS) records (1989 – 2000) for Rainbow Creek near sampling station Willow Glen-4 (Gage No. 11044250).

Annual Precipitation

Precipitation during a water year (defined from July 1 to June 30) will influence the total flow volume within each freshwater system. Average annual rainfall is approximately 15 inches annually for inland North County (Escondido). During water year 1998, 29.86 inches of rain fell (El Nino conditions), whereas in 1999, 8.57 inches of rain fell. Table E-1 summarizes rainfall records at Escondido from 1980 to 2002.

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Table E-1. Annual Precipitation Records at Escondido 2 (42863)

Water Year*	Annual Rainfall (inches)	Water Year*	Annual Rainfall (inches)	Comment
1980	30.4	1994	14.08	
1981	10.96	1995	26	
1982	15.74	1996	9.84	
1983	24.63	1997	10.84	
1984	8.16	1998	29.86	
1985	13.14	1999	8.57	
1986	20.89	2000	7.76	
1987	12.98	2001	10.3	
1988	17.02	2002	5.89	
1989	8.15			
1990	9.83	Summary		
1991	15.24	1980--2002	15.27	Annual average
1992	11.54	2002	5.89	Minimum value
1993	29.31	1980	30.4	Maximum value

Source: Western Regional Climate Center (2003), Southern California Climate Summaries, Monthly Total Precipitation

*For example, the 1998 water year is defined from June 30, 1997 to July 1, 1998.

Annual Flow Volume

The Regional Board reviewed daily flow records from the USGS record for the period of November 11, 1989 to September 30, 2000 for Rainbow Creek. We selected daily flow records corresponding to water year records (USGS, 2002). For example, July 1, 1990 to June 30, 1991 is water year 1991. This approach yielded 8 water year records for Rainbow Creek. Incomplete USGS data for the period 1989/90, 1992-93, and 1993-94 were not used because only partial records were available for each year.

USGS reports the daily median flow rate for each day of the record. This information is used to determine the annual flow volume of Rainbow Creek. This is accomplished by calculating and summing the daily volume for each day of the record. Table E-2 shows the annual flow volume for each year of the reviewed record.

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Table E-2. Annual Flow Volumes and Rainfall Totals for Rainbow Creek

Water Year	Avg. Flow Rate (cfs)	Annual Flow Volume (cubic feet)	Annual Rainfall (inches)
91	2.4	69,465,600	15.24
92	1.93	61,031,232	11.54
95	9.58	298,804,032	26
96	1.22	38,579,328	9.84
97	2.19	69,063,840	10.84
98	7.87	240,028,704	29.86
99	1	31,536,000	8.57
2000	0.68	21,503,232	7.76

As can be expected, total flow volumes are directly related to annual precipitation. For example, the total flow volumes recorded for Rainbow Creek were 240,028,704 ft^3 (5,510 acre-ft) in 1998 (due to El Niño conditions) and 31,536,000 ft^3 (724 acre-ft) in 1999 (due to slightly below normal annual rainfall).

Daily Flow Records

The Regional Board's review of the daily flow records for Rainbow Creek revealed a wide range of flow rates. In dry weather, low flows are less than 3 cubic feet per second (cfs) and can occur year around. Flows of 3 cfs and above occur with less frequency by comparison and appear to be related to rainfall. However, it is reasonable to assume that some of the flows can be attributed to irrigation. Flows of 40 cfs or greater occur during the months with the highest rainfall and occur less than five days a year (averaged over 8 years). These very high flows are considered to be due to extreme weather conditions.

Figure E-1 presents the frequency of occurrence of flow rates in Rainbow Creek for the 8-water years evaluated. This figure also illustrates the month of the year that the flows occur. Figure E-2 provides another graphical representation of the frequency of occurrence.

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Figure E-1 Annual Distribution of Flow Rate Frequency of Occurrence

Flow Rate (cfs)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	No. Days (in 8 yrs)
0.04 - 0.09							●	●					141
0.1					●	●	●	●	●	●	●	●	386
0.2	●				●	●	●	●	●	●	●	●	205
0.3	●	●	●	●	●	●	●	●	●	●	●	●	228
0.4	●	●	●	●	●	●	●	●	●	●	●	●	261
0.5	●	●	●	●	●	●	●	●	●	●	●	●	268
0.6	●	●	●	●	●	●	●	●	●	●	●	●	164
0.7	●	●	●	●	●	●	●	●	●	●	●	●	120
0.8	●	●	●	●	●	●	●	●	●	●	●	●	122
0.9	●	●	●	●	●	●	●		●	●	●	●	103
1	●	●	●	●	●	●	●	●	●	●	●	●	355
2	●	●	●	●	●	●			●		●	●	122
3	●	●	●	●	●	●			●		●		58
4	●	●	●	●	●	●				●	●	●	45
5	●	●	●	●	●						●	●	42
6	●	●	●	●					●			●	34
7	●	●	●	●	●							●	19
8		●	●								●	●	18
9	●	●	●	●	●							●	18
10	●		●	●									7
11	●	●	●	●							●	●	13
12	●	●	●	●									10
13	●	●	●	●									14
14	●	●	●	●									7
15	●	●	●	●									11
16	●		●	●									6
17	●	●	●	●									9
18	●	●	●	●									4
19	●		●										6
20	●	●	●	●	●						●		28
30	●	●	●	●	●							●	16
40	●	●	●										10
50		●	●										4
60	●	●	●								●	●	5
70		●											1
90		●	●										2
100		●	●										2
120	●		●										2
130	●	●											2
140	●												1
150		●											1
180	●												1
220			●										1
242		●											1
293		●	●										2
333		●											1
442			●										1

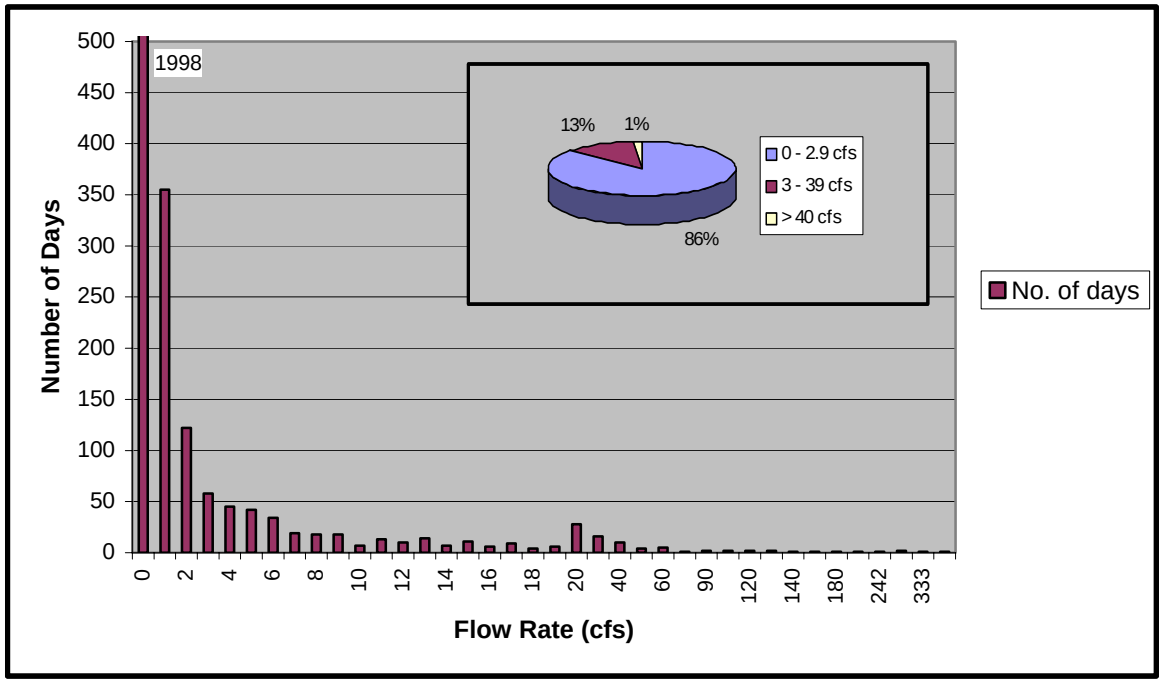


Figure E-2 Flow Rate Frequency of Occurrence During 8-Year Record

Flow Tiers for TN and TP TMDLs

Based on the flow data discussed above, flow tiers and their corresponding annual flow volumes are used to calculate the loading capacity for the total nitrogen and total phosphorus TMDLs in the Technical Report. Three flow tiers were defined for the complete range of flows (Table E-3). The three flow tiers are low flow (0 to 2.9 cfs), moderate to high flows (3 to 39 cfs), and very high flows (> 40 cfs). A comparison of the frequency of occurrences of flow rates and the distribution of the flows over the course of the eight years determined the flow tiers. To determine the total flow volume associated with each tier, the daily flow volume was calculated and summed for each tier.

$$\textbf{Total Flow Volume}_{(\text{tier 1, 2, 3})} = \Sigma_{(t=1,\,2,\,3)}\ \textbf{Daily Flow Volume}$$

Next the total flow volume is divided by the number of days in the flow tier to determine the mean daily flow volume.

$$\textbf{Mean Daily Flow}_{(\text{tier 1, 2, 3})} = \frac{\textbf{Total Flow Volume}_{(\text{tier 1, 2, 3})}}{\textbf{No. Days}_{(\text{tier 1, 2, 3})}}$$

Then the mean daily flow volume for each tier is annualized by multiplying by the percentage of days that the flow rate occurs during the eight years of data.

$$\textbf{Annual Flow Volume}_{(\text{tier 1, 2, 3})} = \textbf{Mean Daily Flow}_{(\text{tier 1, 2, 3})} * (\textbf{\% of Total Days}_{(\text{tier 1, 2, 3})} * 365\ \textbf{Days})$$

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Table E-4 presents the annual flow volume for Rainbow Creek for a typical year.

Table E-3. Flow-based Tiers and Corresponding Mean Daily Flow Volume in Rainbow Creek

Flow Tier	Corresponding Flow Rate (cfs)	Total Flow Volume Associated with Tier (cubic feet)	Total No. days (for 8 yrs)	% of Total Days	Mean Daily Flow Volume for Tier (cfd)
Low flow	0 – 2.9	140,024,160	2475	86	56,575
Mod – High flows	3 – 39	321,399,360	365	12.7	880,546
Very High flows	> 40	368,928,000	37	1.3	9,971,027

Table E-4. Flow-based Tiers and Corresponding Annual Flow Volume in Rainbow Creek

Flow Tier	Corresponding Flow Rate (cfs)	Mean Daily Volume for Tier (cfd)	Avg. No. of Days for Year [#]	Annual Flow Volume (cubic feet)
Low flow	0 – 2.9	56,575	314	17,764,622
Mod – High flows	3 – 39	880,546	46	40,775,379
Very High flows	> 40	9,971,027	5	46,805,255

[#] Calculate by multiplying percentage of total days for each tier and 365 days

References

U.S. Geological Survey (USGS), 2002. Daily mean streamflow data for USGS 11044250 RAINBOW C NR FALLBROOK CA, November 7, 1989 through September 30, 2000. USGS National Water Information System, http://water.usgs.gov/realtime.html, queried on April 4, 2002.

Western Regional Climate Center (WRCC), 2003. Southern California Climate Summaries: Monthly Total Precipitation at Escondido 2, California, (042863). http://www.wrcc.dri.edu/cgi-bin/cliMONtpre.pl?caesc2, queried on April 16, 2003.

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Appendix F – Load Allocation Analysis

Appendix F - Load Allocation Analysis

Nitrogen Load Allocation Analysis

2009

	current annual load	% Reduction	Annual load Allocation	Rounded
nurseries	507	23.1%	389.9	390
ag fields	655	23.1%	503.7	504
orchards	790	23.1%	607.5	607
park	7	25.0%	5.3	5
residential	650	22.0%	507.0	507
urban	53	25.0%	39.8	40
septic disposal	200	0.0%	200.0	200
air depo.	40	0.0%	40.0	40
Caltrans	153	23.1%	117.7	118
UnID'd/Future PS			33	33
Total NPS & PS loads	3055	20.0%	2443.7	2444
			Target WLA & Load Allocation	2444

2013

	current annual load	% Reduction	Annual load Allocation	Rounded
nurseries	507	41.1%	298.6	299
ag fields	655	41.1%	385.8	386
orchards	790	41.1%	465.3	465
park	7	50.0%	3.5	3
residential	650	40.0%	390.0	390
urban	53	50.0%	26.5	27
septic disposal	200	50.0%	100.0	100
air depo.	40	0.0%	40.0	40
Caltrans	153	41.1%	90	90
Unid'd/Future PS			33.0	33
Total NPS & PS loads	3055	40.0%	1832.8	1833
			Target WLA & Load Allocation	1833

2017

	current annual load	% Reduction	Annual load Allocation	Rounded
nurseries	507	61.4%	195.7	196
ag fields	655	61.4%	252.8	253
orchards	790	61.4%	304.9	305
park	7	50.0%	3.5	3
residential	650	60.0%	260	260
urban	53	50.0%	27	27
septic disposal	200	77.0%	46	46
air depo.	40	0.0%	40	40
Caltrans	153	61.4%	59	59
Unid'd/Future PS			33	33
Total NPS & PS loads	3055	60.0%	1221.5	1222
			Target WLA & Load Allocation	1222

Appendix F - Load Allocation Analysis

Nitrogen Load Allocation Analysis

Final Target (1.0 mg/L) Load Reduction

2021	current annual load	% Reduction	Annual load Allocation	Rounded
nurseries	507	77.0%	116.6	116
ag fields	655	77.0%	150.7	151
orchards	790	77.0%	181.7	182
park	7	50.0%	3.5	3
residential	650	77.0%	149.5	149
urban	53	50.0%	26.5	27
septic disposal	200	77.0%	46.0	46
air depo.	40	0.0%	40.0	40
Caltrans	153	68.0%	49	49
UnID'd/Future PS			33	33
Total NPS & PS loads	3055	74.0%	796.4	796
Background	779		Target WLA & Load Allocation	796
Total RC Load Estimate	3834			

Shading indicates that the load reduction is at its maximum reduction/allocation.

Rationale for Allocation Decisions for Final Target TMDLs

1. The Source's ability to generate a load. This is based on coefficients/deposition rates and the land area. See Tables 1 and 2 below.

2. Proximity of Land Uses with high phosphorus concentrations in the creek. Monitoring data (Table B-2, Figure 7-2) and land use map (Figure A-2) were used.

3. The concentrations are high for the most part throughout the watershed. All tributaries in the lower watershed, draining off of residential and orchard land uses are high. The high concentrations in the lower reaches are likely influenced by the tributaries. WG-4 is high in the winter and spring months. The sources above WG-4 are agricultural fields and Rainbow Valley. Rainbow Glen Tributary does not appear to be influencing RC. Jubilee has moderate concentrations (6 ppm) and appears to be influenced by the orchard immediately upstream of it and potentially the Conservation Camp and other uses in the upper watershed.

4. Ag, Orch, Nurs., and Res. - have highest potential to generate load based on (coefficients * area), and are identified as sources in high concentration areas.

5. Ag, Orch, Nurs. - fertilizer use and irrigation inherent to the type of business. However, it is feasible to exercise effective control over fertilizer and irrigation application and runoff.

6. Residential areas are expected to have landscaping, private orchards, and large animals (e.g., horses, llamas).

7. Urban: small in area with highest coefficient. Large reductions will show small returns. However, urban uses can feasibly take measures to better manage and reduce runoff from properties.

8. Air Deposition is very small and not easily controllable from within watershed.

9. Load from non-functioning septic tank disposal systems (representing 42% of all systems) are responsible for approx. half of the total load to groundwater from septic tank disposal systems. While only 200 kg/yr is estimated to get into the creek, they will continue to be sources to groundwater and therefore the creek. Reduction of load will be phased in over 3 phase-in period and the issue of non-functioning systems should be completely resolved by the end of the TMDL compliance.

10. Park (assume to be a maintained park): actions can be taken to reduce nutrients and over-irrigation and control runoff and erosion. Total reductions should be made at first compliance point because more than 4 years of phasing is unnecessary.

11. Urban and Caltrans load reductions are phased in over the first two phase periods.

12. A placeholder of 2% of the TMDL (1,658 kg N/yr) is in place for unidentified and future point sources.

13. Land designated as "Preserve" is undeveloped/open land.

Appendix F - Load Allocation Analysis

Nitrogen Reduction Time Schedule		Final WLA + LA Target:		796 kg/yr
completion date	load (kg/yr)	Percent reduction		compliance time
current[1]	3055			
2009	2444	0.2	20 percent	4 years
2013	1833	0.4	20 percent	4 years
2017	1222	0.6	20 percent	4 years
2021	796	0.74	14 percent	4 years
				16 years

[1] Current load estimate of nonpoint and point sources in the watershed (exludes background).

Table 1 - Current TN Load Estimates

	rank (lo - hi)	original loads
park	1	7
urban	2	53
air depo.	3	40
septic	8	200
nurseries	4	507
residential	5	650
ag fields	6	655
orchards	7	790

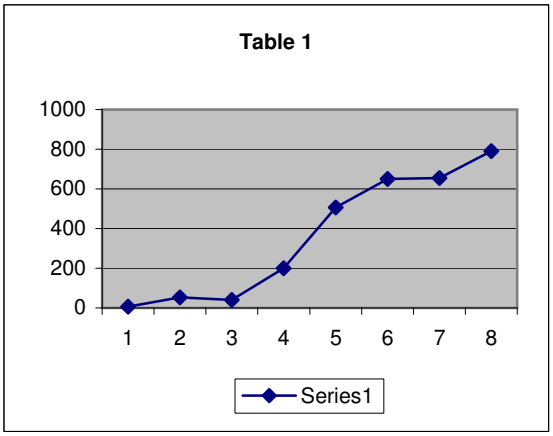
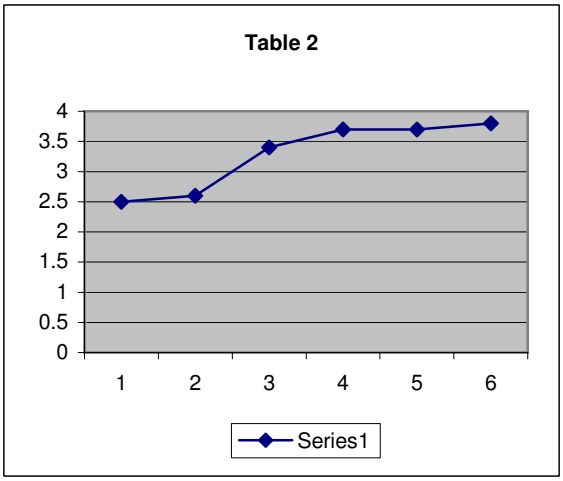


Table 2 - TN Land Use Coefficients

LU (hectares)	low to high	N coefficient
orchards (316)	1	2.5
residential (250)	2	2.6
park (2)	3	3.4
nurseries (137)	4	3.7
ag fields (177)	5	3.7
urban (14)	6	3.8



Appendix F - Load Allocation Analysis

Phosphorus Load Reductions

2009

	current annual load	% Reduction	Annual load Allocation	Rounded
nurseries	27.4	21.0%	21.6	20
ag fields	35.4	21.0%	28.0	28
orchards	63.2	21.0%	49.9	50
park	0.2	25.0%	0.15	0.15
residential	125	21.0%	98.8	99
urban	11.2	24.5%	8.5	9
septic	0	0.0%	0	0
air depo.	2	0.0%	2.0	2
Caltrans	14	21.0%	11.1	11
UnID'd/Future PS			3.0	3
	278.4	20.0%	223.0	222.15
			Target WLA & Load Allocation	223

2013

	current annual load	% Reduction	Annual load Allocation	Rounded
nurseries	27.4	42.0%	15.9	16
ag fields	35.4	42.0%	20.5	21
orchards	63.2	42.0%	36.7	37
park	0.2	50.0%	0.1	0.1
residential	125	41.0%	73.8	74
urban	11.2	50.0%	5.6	6
septic	0	0.0%	0	0
air depo.	2	0.0%	2.0	2
Caltrans	14	42.0%	8.1	8
UnID'd/Future PS			3.0	3
	278.4	40.0%	165.7	167.1
			Target WLA & Load Allocation	167

2017

	current annual load	% Reduction	Annual load Allocation	Rounded
nurseries	27.4	62.0%	10.4	10
ag fields	35.4	62.0%	13.5	14
orchards	63.2	62.0%	24.0	24
park	0.2	50.0%	0.1	0.1
residential	125	62.0%	47.5	47
urban	11.2	50.0%	5.6	6
septic	0	0.0%	0	0
air depo.	2	0.0%	2.0	2
Caltrans	14	62.0%	5.3	5
UnID'd/Future PS			3.0	3
	278.4	60.0%	111.4	111.1
			Target WLA & Load Allocation	111

Appendix F - Load Allocation Analysis

Phosphorus Load Allocations

Final Target (0.1 mg/L) Load Reduction				
2021	current annual load	% Reduction	Annual load Allocation	Rounded
nurseries	27.4	90.0%	2.7	3
ag fields	35.4	90.0%	3.5	4
orchards	63.2	90.0%	6.3	6
park	0.2	50.0%	0.1	0.1
residential	125	90.0%	12.5	12
urban	11.2	50.0%	5.6	6
septic	0	0.0%	0	0
air depo.	2	0.0%	2	2
Caltrans	14	64.0%	5	5
UnID'd/Future PS			3	3
Total NPS & PS loads	278.4	85.0%	40.8	41.1
Background	116		Target WLA & Load Allocation	41
	394			

Shading indicates that the load reduction is at its maximum reduction/allocation.

Rationale for Allocation Decisions for Final Target TMDLs

1. The Source's ability to generate a load. This is based on coefficients/deposition rates and the land area. See Tables 3 and 4 below.

2. Proximity of Land Uses with high phosphorus concentrations in the creek. Monitoring data (Table B-2, Figure 7-2) and land use map (Figure A-2) were used.

3. The concentrations are highest in Rainbow Valley and decrease as one goes downstream indicating that land uses in the valley are primary sources. The tributaries are predominantly non-detect results with some positive results ranging from 0.06 - 0.38 mg/L. The elevated, positive results in WGT1, VMT1, and MGT1 indicate that the surrounding land uses are sources. It also indicates that sediment erosion and overland surface runoff are important factors in linking these sources to the creek.

4. Residential - has highest potential to generate load, followed by Ag, Orchards, & Nursuries based on load (coefficients * area). These land uses are also indicated based on monitoring data.

5. Residential areas are expected to have landscaping, private orchards, and large animals (e.g., horses, llamas).

6. Ag, Orch, Nurs. - fertilizer use and irrigation are inherent to the type of business. However, it should be feasible to exercise effective control over fertilizer and irrigation application and runoff.

7. Urban - is small in area with the highest coefficient. Large reductions will show small returns. However, urban uses can feasibly take measures to better manage and reduce runoff from properties.

8. Air Deposition is very small and not easily controllable from within watershed. No reductions are expected.

9. Septic tank disposal systems are assumed to not contribute P to creek.

10. Park - actions can be taken to reduce fertilizer use and over-irrigation of landscape, and to control runoff and erosion. Total reductions should be made at first compliance point because more than 4 years of phasing is unnecessary.

11. Urban and Caltrans are phased over the first two phase periods.

12. A placeholder of 2% of the TMDL (165 kg P/yr) is in place for unidentified and future point sources.

13. Land designated as "Preserve" is undeveloped/open land and is part of background.

Appendix F - Load Allocation Analysis

Phosphorus Reduction Time Schedule		Final WLA + LA Target:		41 kg/yr
completion date	load (kg/yr)	Percent reduction		compliance time
current[1]	278.4			
2009	223	0.2	20 percent	4 years
2013	167	0.4	20 percent	4 years
2017	111	0.6	20 percent	4 years
2021	41	0.85	25 percent	4 years
				16 years

[1] Current load estimate of nonpoint and point sources in the watershed (exludes background).

Table 3 Current TP Load Estimates*

	rank (lo - hi)	original loads
park	1	0.2
air dep.	2	3
urban	3	11.2
nurseries	4	27.4
ag fields	5	35.4
orchards	6	63.2
res.	7	125

* calculated by multiplying area and coefficient.

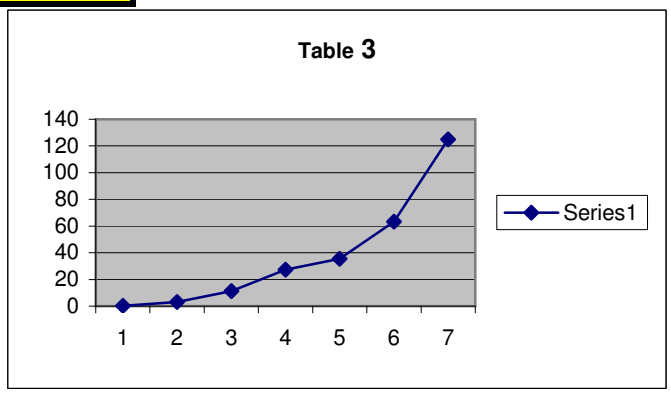
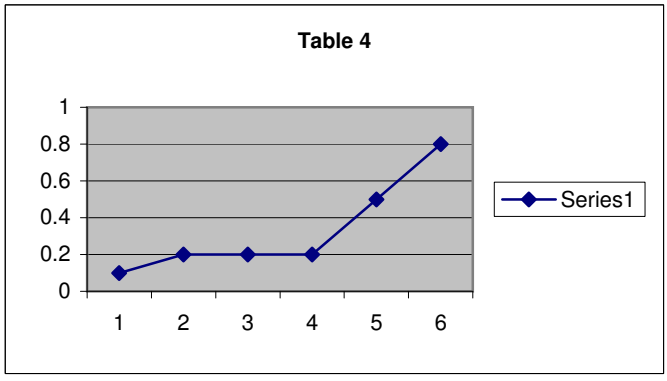


Table 4 - TP Land Use Coefficients

LU (hectares)	rank (lo - hi)	N coefficient
park (2)	1	0.1
nurseries (137)	2	0.2
ag fields (177)	3	0.2
orchards (316)	4	0.2
residential (250)	5	0.5
urban (14)	6	0.8



Appendix G – Environmental Checklist and Certificate of Fee Exemption

Basin Plan Amendment for
Total Nitrogen and Total Phosphorus
Total Maximum Daily Loads

For Rainbow Creek

Environmental Checklist and Certificate of Fee Exemption

Resolution No. R9-2005-0036
Basin Plan Amendment and Technical Report

Administrative Record Page No. 026387

January 27, 2005

California Environmental Quality Act (CEQA) Requirements

The attached checklist and the "Technical Report for Total Nitrogen and Total Phosphorus TMDLs for Rainbow Creek" fulfill the requirements specified under section 3777 [California Code of Regulations, Title 23].

The adoption of a Basin Plan amendment to incorporate TMDLs and a TMDL implementation plan for Rainbow Creek will not in itself have a significant adverse effect on the environment. A significant effect on the environment is defined under CEQA as a substantial, or potentially substantial, adverse change in the environment (Public Resources Code §21000 et seq.). The implementation of TMDLs will in effect lead to an overall improvement in the quality of water and therefore the quality of the environment. However, implementation of the TMDLs will involve projects, which may have environmental impacts. The precise nature, location, and significance of these impacts cannot be determined at this time, since the implementation program establishes a process for identifying subsequent projects rather than specifying particular remedial projects at specific locations. Separate environmental review and mitigation may be required for such implementation projects depending on the projects that are selected. Therefore, impacts from such projects are considered indirect to this action. Possible implementation projects are discussed in general for the purpose of providing insight to the potential effects that may result from TMDL implementation.

I. Aesthetics – Would the proposal:	**Impact**	**Maybe**	**No Impact**
a. Adversely affect a scenic vista?			X
b. Adversely affect a scenic highway, including but not limited to trees, rock outcroppings, and historic buildings?			X
c. Substantially degrade the existing visual character or quality of the site and its surroundings?		X	
d. Create a new source of substantial light or glare?			X

Administrative Record Page No. 026388

Comment: There may be a potential for the installation of structural or vegetative best management practices (BMPs) or management practices (MPs) that may change views in the watershed from the local community. However, it is not expected that such changes will be significantly adverse. For example, stabilization of eroding areas or increases in riparian vegetation (e.g., riparian restoration such as the creation of a buffer zone in Rainbow Valley) would be an aesthetic improvement.

II. Agricultural Resources – Would the proposal:	**Impact**	**Maybe**	**No Impact**
a. Convert Prime Farmland, unique farmland, or farmland of statewide importance (farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?		X	
b. Conflict with existing zoning for agricultural use, or a Williamson Act contract?			X
c. Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?			X

Comment: This TMDL Basin Plan amendment will make necessary the changing of residents/businesses behavior or operation and possibly the expenditure for the installation and maintenance of BMPs or MPs. Since the precise nature, location, and significance of these impacts cannot be determined at this time, it is unknown whether the needed changes or expenditure will lead to the conversion of farmland to non agricultural uses. The current prohibition on installation of new septic tank systems in Rainbow Valley and the lack of a sewage collection system in the area to accommodate new housing developments may prevent agricultural lands from being converted to other non agricultural uses, such as housing. However, if the septic issues in Rainbow Valley are resolved, for instance by placing residents and businesses on a sewer system, there could be a potential for increased development and conversion of nursery lands to residential. Potential solutions to septic tank contributions are pending further investigation, as required by this proposed action, and will likely be subject to more in-depth environmental review at that time.

Information provided by the Mission Resource Conservation District indicated that costs associated with water, pumping, and pests are more significant than costs for implementation of TMDLs. For example, reduction in fertilizers and better irrigation management would provide cost savings. Additionally, the UC Cooperative Extension provides farmers with alternatives to selling their property.

III. Air Quality – Would the proposal:	**Impact**	**Maybe**	**No Impact**
a. Conflict with or obstruct implementation of the applicable air quality plan?			X
b. Violate any air quality standard or contribute to an existing or protected air quality violation?			X
c. Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?			X
d. Expose sensitive receptors to substantial pollutant concentrations?			X
e. Create objectionable odors affecting a substantial number of people?			X

Administrative Record Page No. 026389

Comment: It is not expected at this time that any projects arising from TMDL implementation will involve air emissions, thereby affecting air quality.

IV. Biological Resources – Would the proposal result in:	**Impact**	**Maybe**	**No Impact**
a. Adversely affect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		X	
b. Adversely affect any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?		X	
c. Adversely affect federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?			X
d. Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?			X
e. Conflict with local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			X
f. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional or state habitat conservation plan?			X

Comment: The California Department of Fish and Game has identified the arroyo chub (*Gila orcutti*) as a species of special concern. Implementation of BMPs / MPs and/or changes in irrigation practices to reduce/control wet and dry season overland surface runoff may reduce flows in the creek, which may impact aquatic and terrestrial life. In regard to the arroyo chub, reduced flows are expected to be beneficial, as they are adapted to survive in slow-moving water with warm temperature fluctuations (Moyle 1976).

Installation of BMPs / MPs or stream restoration activities, which may result from this proposal, may temporarily disturb aquatic or terrestrial habitat. However, the overall purpose of the TMDL is to provide for long-term improvements in water quality and aquatic habitat. To the extent that they may increase amounts of riparian vegetation in the watershed, nonpoint source controls are expected to be beneficial to wildlife. Additionally, TMDL implementation may modify riparian habitat that could support Least Bell's Vireo (*Vireo bellii pusillus*) – a federally listed species.

Administrative Record Page No. 026300

V. Cultural Resources – Would the proposal:	**Impact**	**Maybe**	**No Impact**
a. Cause a substantial adverse change in the significance of a historical resource as defined in § 15064.5?			X
b. Cause a substantial adverse change in the significance of an archaeological resource pursuant to § 15064.5?			X
c. Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?			X
d. Disturb any human remains, including those interred outside of formal cemeteries?			X

Comment: Significant excavation or disturbance of cultural resources is not expected to result from this proposal or from projects that result from this proposal.

VI. Geology and Soils – Would the proposal:	**Impact**	**Maybe**	**No Impact**
a. Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving fault rupture, strong seismic ground shaking, seismic-related ground failure (e.g. liquefaction), and landslides?			X
b. Result in substantial soil erosion or the loss of topsoil?			X
c. Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?			X
d. Be located on expansive soil, as defined in Table 19-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?			X
e. Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?			X

Comment: The implementation of BMPs / MPs to reduce wet and dry season overland surface runoff would be expected to reduce the potential for soil erosion. Additionally this proposal identifies the need for further investigation to determine if existing septic tanks are contributing to the impairment of Rainbow Creek and if alternative wastewater disposal systems or a sewer system is needed to replace any septic tanks.

VII. Hazards and Hazardous Materials – Would the proposal:	**Impact**	**Maybe**	**No Impact**
a. Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X
b. Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X
c. Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?			X
d. Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?			X
e. For a project located within an airport land use plan or where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?			X
f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?			X
g. Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X
h. Expose people or structures to a significant risk of loss, injury or death involving wildlands fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?			X

Administrative Record Page No. 026391

VIII. Hydrology and Water Quality – Would the proposal:	**Impact**	**Maybe**	**No Impact**
a. Violate any water quality standards or waste discharge requirements?			X
b. Substantially deplete ground water supplies or interfere substantially with ground water recharge such that there would be a net deficit in aquifer volume or a lowering of the local ground water table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?		X	
c. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?		X	
d. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?			X
e. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?			X
f. Otherwise substantially degrade water quality?			X
g. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?			X
h. Place within a 100-year flood hazard area, structures that would impede or redirect flood flows?		X	
i. Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?			X
j. Inundation by seiche, tsunami, or mudflow?			X

Administrative Record Page No. 026392

Comment: The purpose of the TMDL Basin Plan amendment is to provide for attainment of water quality standards and restoration of beneficial uses. This proposal identifies the need for further investigation to determine ground water management needs in Rainbow Valley to address septic tank issues and the issue of ground water as a source to the surface waters of Rainbow Creek. One possibility is to utilize ground water resources and draw down the high ground water table in order to minimize septic system source contributions by alleviating ground water interference with septic systems and to possibly reduce contaminated ground water contribution from Rainbow Valley basin to the creek. This option could affect the local hydrology and present water quantity issues. Further environmental review would be needed before this option could be selected.

Existing drainage will need to be altered to remove structures, which discharge to the creek and cause the damming of the creek for the purpose of irrigation return flows capture and storage at the Hines Nursery facility. Removal of these structures would restore the natural drainage and would be a beneficial impact.

There may be a potential for the installation of structural or vegetative best management practices (BMPs) / management practices (MPs) that may be located within a 100-year flood hazard area and may impede or redirect flood flows. The precise location and significance of these impacts cannot be determined at this time. Specific structural BMPs and MPs should be evaluated for site-specific environmental impacts prior to installation.

IX. Land Use and Planning – Would the proposal:	Impact	Maybe	No Impact
a. Physically divide an established community?			X
b. Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?			X
c. Conflict with any applicable habitat conservation plan or natural community conservation plan?			X

Comment: The purpose of the TMDL Basin Plan amendment is to provide for long-term improvements in water quality and aquatic habitat. To the extent that they increase amounts of riparian vegetation in the watershed, nonpoint source controls will be beneficial to wildlife.

X. Mineral Resources – Would the proposal:	Impact	Maybe	No Impact
a. Result in the loss of availability of a known mineral resource that would be a value to the region and the residents of the state?			X
b. Result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?			X

XI. Noise – Would the proposal:	Impact	Maybe	No Impact
a. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?			X
b. Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?		X	
c. A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?			X
d. A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?			X
e. For projects located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?			X
f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?			X

Administrative Record Page No. 026999

Comment: Although this TMDL Basin Plan amendment does not identify the use of specific BMPs / MPs, the construction/installation of structural BMPs / MPs may cause a temporary increase in ambient noise levels in the vicinity of the activity. The ground water investigation may involve activities, such as the installation or testing of monitoring wells, may also cause a temporary increase in ambient noise levels in the vicinity of the activity. Neither of which is expected to be substantial in nature.

XII. Population and Housing – Would the proposal:	**Impact**	**Maybe**	**No Impact**
a. Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, thorough extension of roads or other infrastructure)?		X	
b. Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?		X	
c. Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?		X	

Comment: This TMDL Basin Plan amendment identifies the need for further investigation to determine if existing septic tanks are contributing to the impairment of Rainbow Creek and if alternative wastewater disposal systems, a sewer system, or ground water production could be used to decrease septic tanks as nutrient sources. The result of this investigation may identify these or additional actions that could be used to remedy the problem of inundation of septic tanks and leach lines with ground water. Resolution of this issue may result in an increase or a decrease in the allowable housing currently in existence in Rainbow Valley depending on the actions that are taken. Such actions would require separate environmental review.

XIII. Public Services –	**Impact**	**Maybe**	**No Impact**
Will the proposal have an effect upon, or result in a need for new or altered governmental services in any of the following areas:			
a. Fire protection?			X
b. Police protection?			X
c. Schools?			X
d. Parks or other recreational facilities?			X
e. Maintenance of public facilities, including roads?		X	
f. Other governmental services?		X	

Comment: Although this TMDL Basin Plan amendment does not identify the use of specific BMPs / MPs , should structural or vegetative BMPs / MPs need to be installed and maintained on public lands or easements, local government services could be impacted. Additionally, local government will need to expend resources to perform the investigation of ground water and septic tank issues, and to develop and implement a watershed management plan. Since the purpose of the TMDLs is to provide for attainment of water quality standards and restoration of beneficial uses, such expenditure of resources could be considered to be for the public good.

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XIV. Recreation – Would the proposal:	**Impact**	**Maybe**	**No Impact**
a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?		X	
b. Does the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?			X

Comment: The purpose of the TMDL Basin Plan amendment is to provide for attainment of water quality standards and restoration of beneficial uses, including contact and non-contact recreation. Such improvements in water quality may cause an increase in the number of people who recreate along the creek because the creek will become more aesthetically pleasing. The area is more commonly used by the local community and is not expected to draw large numbers of the general public or require expansion of existing trails. Additional maintenance of the trails may be needed.

XV. Transportation/Traffic – Would the proposal:	Impact	Maybe	No Impact
a. Cause an increase in traffic, which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?			X
b. Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?			X
c. Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?			X
d. Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?			X
e. Result in inadequate emergency access?			X
f. Result in inadequate parking capacity?			X
g. Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?			X

XVI. Utilities and Service Systems – Would the proposal:	Impact	Maybe	No Impact
a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?			X
b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?		X	
c. Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?		X	
d. Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?			X
e. Result in a determination by the wastewater treatment provider, which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?			X
f. Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?			X
g. Comply with federal, state, and local statutes and regulations related to solid waste?			X

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Comment: This TMDL Basin Plan amendment identifies the need for further investigation to determine if existing septic tanks are contributing to the impairment of Rainbow Creek and if alternative wastewater disposal systems or a sewer system is needed. The result of this investigation may necessitate that further action is necessary to remedy further inundation of septic tanks with ground water, to ultimately achieve water quality objectives in the surface waters. Additionally, the County of San Diego is expected to evaluate the need for stormwater control of urban and residential areas during the development of the watershed management plan. These evaluations may potentially result in new water or wastewater facilities, or new stormwater conveyance depending on the actions that are needed. Such actions would require separate environmental review.

XVII. Mandatory Findings of Significance – Would the proposal:	**Impact**	**Maybe**	**No Impact**
a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?			X
b. Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			X
c. Does the project have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?		X	

Comment: The purpose of the TMDL Basin Plan amendment is to provide for attainment of water quality standards and restoration of beneficial uses. Residents of the watershed will be impacted in that they will have to take actions to reduce their nutrient contributions to Rainbow Creek. However, they will benefit as a result of improved quality of the environment that will come from restoration of beneficial uses.

Determination: On the basis of this initial evaluation,

☒ I find that the Proposed Project COULD NOT have a significant effect on the environment

☐ I find that although the Proposed Project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the Project have been made by or agreed to by the Project proponent

☐ I find that the Proposed Project MAY have a significant effect on the environment.

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☐ I find that the Proposed Project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect: (1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and (2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the Proposed Project could have a significant effect on the environment because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the Proposed Project, nothing further is required.

for John H. Robertus
Executive Officer

1/27/05
Date

CALIFORNIA DEPARTMENT OF FISH AND GAME
CERTIFICATE OF FEE EXEMPTION

De Minimis Impact Finding

Project Title/Location Name and Address of Project Proponent:

AMENDMENT TO THE 'WATER QUALITY CONTROL PLAN FOR THE SAN DIEGO REGION (9)' TO INCORPORATE TOTAL MAXIMUM DAILY LOADS (TMDLs) FOR TOTAL NITROGEN AND TOTAL PHOSPHORUS AND A TMDL IMPLEMENTATION ACTION PLAN AND AN IMPLMENTATION MONITORING PLAN FOR THE RAINBOW CREEK WATERSHED, SAN DIEGO COUNTY

The project proponent is:
California Regional Water Quality Control Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4340

The contact person is:
Lisa Honma
(858) 467-2960
Lhonma@waterboards.ca.gov

Project Description:

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Total Maximum Daily Loads (TMDLs) for nitrogen and phosphorus are described and quantified to attain water quality objectives and restore beneficial uses in Rainbow Creek. A wasteload allocation is assigned to a point source discharger (Caltrans) and load allocations are assigned to nonpoint source dischargers (commercial nursery, agricultural field, orchard, park, residential area, urban area, and septic tank disposal system land use activities) to reduce nutrient loading to Rainbow Creek.

Caltrans is a point source discharger of nutrients and will be responsible for meeting nutrient wasteload reductions to be incorporated in the MS4 NPDES Storm Water Permit. For nutrient discharges in the Rainbow Creek watershed subject to the County of San Diego's MS4 NPDES Storm Water Permit, the County is directed to implement increasingly stringent best management practices to reduce nutrients discharges in the Rainbow Creek watershed to the maximum extent practicable and restore compliance with the nutrient water quality objective.

The Regional Board will use a Third Party regulatory-based approach to mandate compliance with the nonpoint source (NPS) nutrient load reductions of this TMDL. The Regional Board will accomplish this by negotiating a Management Agency Agreement (MAA) between the Regional Board and the County of San Diego setting forth the commitments of both parties to undertake

various implementation responsibilities to oversee actions by dischargers to attain NPS nutrient load reductions.

The Regional Board may adopt, in conjunction with an MAA or MOU with another third-party representative, organization, or government agency describing an adequate NPS pollution control implementation program, individual or general waivers and WDRs for NPS discharges in the Rainbow Creek watershed. The waivers and WDRs may require NPS dischargers to either participate in the third party NPS program or, alternatively, submit individual pollution prevention plans that detail how they will comply with the waivers and WDRs. The Regional Board may also adopt a discharge prohibition, which include exceptions for those discharges that are adequately addressed in an acceptable third-party MAA or MOU NPS pollution control implementation program.

The County of San Diego and Caltrans are directed to develop a Rainbow Creek watershed monitoring program to evaluate the overall TMDL implementation effectiveness and success in attaining nutrient water quality objectives in Rainbow Creek and its tributaries.

Findings of Exemption:

1. A written report and environmental checklist have been prepared by the California Regional Water Quality Control Board, San Diego Region (SDRWQCB) in order to evaluate the potential for an adverse environmental impact from this project.

2. Considering the record as a whole, there is no evidence before the SDRWQCB that the proposed project could have any potential for an adverse effect on fish and wildlife resources or the habitat upon which they depend.

3. The CEQA Checklist documents that there may be changes to components of the environment as a result of this project. The SDRWQCB rebuts the presumption that the proposed project will have an adverse effect on the environment for each situation that may be impacted. As determined in SDRWQCB Resolution No. 2005-0036 and CEQA Checklist (copies attached), there will be no significant adverse effects on the environment, and, therefore, no mitigation is necessary. Any and all effects on the environment are expected to be beneficial.

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Certification:

I hereby certify that the California Regional Water Quality Control Board, San Diego Region, has made the above findings of fact and that based upon the Environmental Checklist, written report and hearing record the project will not individually or cumulatively have an adverse effect on wildlife resources, as defined in Section 711.2 of the Fish and Game Code.

John H. Robertus

22 February 2005
Date

John H. Robertus
Executive Officer
San Diego Regional Water Quality Control Board

Appendix H – Economic Consideration Tables

Appendix H - Economic Considerations Tables

ESTIMATED COSTS FOR IMPLEMENTING MPs / BMPs

divided into eight sections, one for each of the following land use categories: commercial nurseries, agriculture, orchards, parks, residential, urban, septic tank disposal systems, and Caltrans.

For each land use category, three scenarios were evaluated, corresponding to low, medium, and high levels of effort. Within each scenario a low to high range of costs are presented. The MPs / BMPs considered fall into 3 general categories: Nutrient Management, Irrigation Management, and Runoff/Erosion Management. A low level of effort consists solely of Nutrient Management MPs / BMPs, a medium level of effort consists of Nutrient and Irrigation Management MPs / BMPs, and a high level of effort includes all three MP / BMP categories. Caltrans is the exception because Irrigation Management BMPs are less likely along the Interstate 15 corridor than Nutrient and Runoff/Erosion Control Management.

The capital costs are the initial costs of implementing a MP / BMP, assuming that the MP / BMP does not currently exist on the property. Therefore the actual costs may be lower depending upon the level of existing MPs / BMPs. The annual operation and maintenance costs are assumed to be 10 percent of the capital cost.

While the table implies that Nutrient Management MPs / BMPs will be implemented before Irrigation and Runoff/Erosion Control Management MPs / BMPs, this is done solely for developing a range of costs. The most appropriate and cost effective MPs / BMPs will vary for each land user/owner based on their operations and existing improvements. MPs / BMPs are typically most effective when a combination of Nutrient, Irrigation, and Runoff/Erosion Control Management MPs / BMPs are considered. Moreover, it is also possible that MPs / BMPs not presented herein would be identified and implemented.

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Appendix H
Cost Estimates For Implementing Best Management Practices (BMPs)

Table H-1. Commercial Nurseries

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs	Nutrient Management Effectiveness (percent)	Water Management Effectiveness (percent)	Components				Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
COMMERCIAL NURSERIES 339 Acres	LOW	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ 10,000	$ -	$ 10,000		
		Soil nutrient analysis 1			each	3	$ 7	$ 25	$ 21	$ 75		
		Irrigation water analysis2			each	1	$ 5	$ 30	$ 5	$ 30		
		Subtotal							$ 26	$ 10,105		
		Irrigation Management										
		None										
		Runoff/Erosion Management										
		None										
								TOTAL	**$ 26**	**$ 10,105**	**$ 3**	**$ 1,011**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
COMMERCIAL NURSERIES 339 Acres	MEDIUM	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ 10,000	$ -	$ 10,000		
		Soil nutrient analysis [1]			each	3	$ 7	$ 25	$ 21	$ 75		
		Irrigation water analysis[2]			each	1	$ 5	$ 30	$ 5	$ 30		
		Subtotal							$ 26	$ 10,105		
		Irrigation Management										
		Irrigation system upgrades (441, 442)[3 4 5]	5-35	40-85	each	1	$ 350	$ 3,600	$ 350	$ 3,600		
		Irrigation system - tailwater recovery (447)[3 5]	5-15	40-45	each	1	$ 4,500	$ 25,000	$ 4,500	$ 25,000		
		Irrigation water management (449)[3 5]	20-35	45-60	each	1	$ 50	$ 750	$ 50	$ 750		
		Subtotal							$ 4,900	$ 29,350		
		Runoff/Erosion Management										
		None										
								TOTAL	**$ 4,926**	**$ 39,455**	**$ 493**	**$ 3,946**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
COMMERCIAL NURSERIES 339 Acres	HIGH	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ 10,000	$ -	$ 10,000		
		Soil nutrient analysis [1]			each	3	$ 7	$ 25	$ 21	$ 75		
		Irrigation water analysis[2]			each	1	$ 5	$ 30	$ 5	$ 30		
		Subtotal							$ 26	$ 10,105		
		Irrigation Management										
		Irrigation system upgrades (441, 442)[3 4 5]	5-35	40-85	each	1	$ 350	$ 3,600	$ 350	$ 3,600		
		Irrigation system - tailwater recovery (447)[3 5]	5-15	40-45	each	1	$ 4,500	$ 25,000	$ 4,500	$ 25,000		
		Irrigation water management (449)[3 5]	20-35	45-60	each	1	$ 50	$ 750	$ 50	$ 750		
		Subtotal							$ 4,550	$ 25,750		
		Runoff/Erosion Management										
		Access road management (560)[3 5]										
		Paved Drives		55-60	square yard	480	$ 2	$ 4	$ 816	$ 1,920		
		Runoff management system (570)[3 5]							$ -	$ -		
		Filter Trap	10-25		acre	0.25	$ 375	$ 12,500	$ 94	$ 3,125		
		Filter Strips (393)[3 5]							$ -	$ -		
		Landscaping		5-15	acre	0.05	$ 450	$ 3,500	$ 23	$ 175		
		Subtotal							$ 932	$ 5,220		
								TOTAL	**$ 5,508**	**$ 41,075**	**$ 551**	**$ 4,108**

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Appendix H
Cost Estimates For Implementing Best Management Practices (BMPs)

Table H-2. Agriculture

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs	Nutrient Management Effectiveness (percent)	Water Management Effectiveness (percent)	Components				Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
AGRICULTURE												
436 Acres	LOW	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ 10,000	$ -	$ 10,000		
		Soil nutrient analysis 1			each	3	$ 7	$ 25	$ 21	$ 75		
		Irrigation water analysis2			each	1	$ 5	$ 30	$ 5	$ 30		
		Subtotal							$ 26	$ 10,105		
		Irrigation Management										
		None										
		Runoff/Erosion Management										
		None										
								TOTAL	**$ 26**	**$ 10,105**	**$ 3**	**$ 1,011**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
AGRICULTURE												
436 Acres	MEDIUM	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ 10,000	$ -	$ 10,000		
		Soil nutrient analysis [1]			each	3	$ 7	$ 25	$ 21	$ 75		
		Irrigation water analysis[2]			each	1	$ 5	$ 30	$ 5	$ 30		
		Subtotal							$ 26	$ 10,105		
		Irrigation Management										
		Irrigation system upgrades (441, 442)[3 4 5]	5-35	40-85	each	1	$ 350	$ 3,600	$ 350	$ 3,600		
		Irrigation system - tailwater recovery (447)[3 5]	5-15	40-45	each	1	$ 4,500	$ 25,000	$ 4,500	$ 25,000		
		Irrigation water management (449)[3 5]	20-35	45-60	each	1	$ 50	$ 750	$ 50	$ 750		
		Subtotal							$ 4,900	$ 29,350		
		Runoff/Erosion Management										
		None										
								TOTAL	**$ 4,926**	**$ 39,455**	**$ 493**	**$ 3,946**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
AGRICULTURE												
436 Acres	HIGH	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ 10,000	$ -	$ 10,000		
		Soil nutrient analysis [1]			each	3	$ 7	$ 25	$ 21	$ 75		
		Irrigation water analysis[2]			each	1	$ 5	$ 30	$ 5	$ 30		
		Subtotal							$ 26	$ 10,105		
		Irrigation Management										
		Irrigation system upgrades (441, 442)[3 4 5]	5-35	40-85	each	1	$ 350	$ 3,600	$ 350	$ 3,600		
		Irrigation system - tailwater recovery (447)[3 5]	5-15	40-45	each	1	$ 4,500	$ 25,000	$ 4,500	$ 25,000		
		Irrigation water management (449)[3 5]	20-35	45-60	each	1	$ 50	$ 750	$ 50	$ 750		
		Subtotal							$ 4,900	$ 29,350		
		Runoff/Erosion Management										
		Access road management (560)[3 5]										
		Pave Roads		85-90	square yard	1000	$ 2	$ 4	$ 2,150	$ 4,300		
		Pave Drives		55-60	square yard	1000	$ 2	$ 4	$ 1,700	$ 4,000		
		Runoff management system (570)[3 5]										
		Filter Trap	10-25		acre	0.2	$ 375	$ 12,500	$ 75	$ 2,500		
		Filter Strips (393)[5]										
		Filter strip (10-20 ft wide)	2-10		acre	0.5	$ 375	$ 12,500	$ 188	$ 6,250		
		Buffer strip (20-30 ft wide)	10-20		acre	0.5	$ 425	$ 1,700	$ 213	$ 850		
		Landscaping	5-15		acre	0.1	$ 450	$ 3,500	$ 45	$ 350		
		Subtotal							$ 4,370	$ 18,250		
								TOTAL	**$ 9,296**	**$ 57,705**	**$ 930**	**$ 5,771**

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Table H-3. Orchards

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs	Nutrient Management Effectiveness (percent)	Water Management Effectiveness (percent)	Components				Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
ORCHARDS												
781 Acres	LOW	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ 10,000	$ -	$ 10,000		
		Soil nutrient analysis 1			each	3	$ 7	$ 25	$ 21	$ 75		
		Irrigation water analysis2			each	1	$ 5	$ 30	$ 5	$ 30		
		Subtotal							$ 26	$ 10,105		
		Irrigation Management										
		None										
		Runoff/Erosion Management										
		None										
								TOTAL	**$ 26**	**$ 10,105**	**$ 3**	**$ 1,011**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
ORCHARDS												
781 Acres	MEDIUM	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ 10,000	$ -	$ 10,000		
		Soil nutrient analysis [1]			each	3	$ 7	$ 25	$ 21	$ 75		
		Irrigation water analysis[2]			each	1	$ 5	$ 30	$ 5	$ 30		
		Subtotal							$ 26	$ 10,105		
		Irrigation Management										
		Irrigation system upgrades (441, 442)[3 4 5]	5-35	40-85	each	1	$ 350	$ 3,600	$ 350	$ 3,600		
		Irrigation system - tailwater recovery (447)[3 5]	5-15	40-45	each	1	$ 4,500	$ 25,000	$ 4,500	$ 25,000		
		Irrigation water management (449)[3 5]	20-35	45-60	each	1	$ 50	$ 750	$ 50	$ 750		
		Subtotal							$ 4,900	$ 29,350		
		Runoff/Erosion Management										
		None										
								TOTAL	**$ 4,926**	**$ 39,455**	**$ 493**	**$ 3,946**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
ORCHARDS												
781 Acres	HIGH	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ 10,000	$ -	$ 10,000		
		Soil nutrient analysis [1]			each	3	$ 7	$ 25	$ 21	$ 75		
		Irrigation water analysis[2]			each	1	$ 5	$ 30	$ 5	$ 30		
		Subtotal							$ 26	$ 10,105		
		Irrigation Management										
		Irrigation system upgrades (441, 442)[3 4 5]	5-35	40-85	each	1	$ 350	$ 3,600	$ 350	$ 3,600		
		Irrigation system - tailwater recovery (447)[3 5]	5-15	40-45	each	1	$ 4,500	$ 25,000	$ 4,500	$ 25,000		
		Irrigation water management (449)[3 5]	20-35	45-60	each	1	$ 50	$ 750	$ 50	$ 750		
		Subtotal							$ 4,900	$ 29,350		
		Runoff/Erosion Management										
		Access road management (560)[3 5]								$ -		
		Pave roads		85-90	square yard	1000	$ 2	$ 4	$ 2,150	$ 4,300		
		Pave drives		55-60	square yard	1000	$ 2	$ 4	$ 1,700	$ 4,000		
		Runoff management system (570)[3 5]								$ -		
		Filter trap	10-25		acre	0.2	$ 375	$ 12,500	$ 75	$ 2,500		
		Filter Strips (393)[5]							$ -	$ -		
		Filter strip (10-20 ft wide)	2-10		acre	0.5	$ 375	$ 12,500	$ 188	$ 6,250		
		Buffer strip (20-30 ft wide)	10-20		acre	0.5	$ 425	$ 1,700	$ 213	$ 850		
		Landscaping	5-15		acre	0.1	$ 450	$ 3,500	$ 45	$ 350		
		Subtotal							$ 4,370	$ 18,250		
								TOTAL	**$ 9,296**	**$ 57,705**	**$ 930**	**$ 5,771**

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Appendix H
Cost Estimates For Implementing Best Management Practices (BMPs)

Table H-4. Parks

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs	Nutrient Management Effectiveness (percent)	Water Management Effectiveness (percent)	Components				Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
PARKS												
5 Acres	LOW	**Nutrient Management**										
		Facility nutrient reduction management plan			each	0	$ -	$ -	$ -	$ -		
		Subtotal							$ -	$ -	$ -	$ -
		Irrigation Management										
		None										
		Runoff/Erosion Management										
		None										
								TOTAL	**$ -**	**$ -**	**$ -**	**$ -**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
PARKS												
5 Acres	MEDIUM	**Nutrient Management**										
		Facility nutrient reduction management plan			each	0	$ -	$ -	$ -	$ -		
		Subtotal							$ -	$ -		
		Irrigation Management										
		Irrigation water management (449)[5]	20-35	45-60	each	1	$ 50	$ 750	$ 50	$ 750		
		Subtotal							$ 50	$ 750		
		Runoff/Erosion Management										
		None										
								TOTAL	**$ 50**	**$ 750**	**$ 5**	**$ 75**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
PARKS												
5 Acres	HIGH	**Nutrient Management**										
		Facility nutrient reduction management plan			each	0	$ -	$ -	$ -	$ -		
		Subtotal							$ -	$ -		
		Irrigation Management							$ -	$ -		
		Irrigation water management (449)[5]	20-35	45-60	each	1	$ 50	$ 750	$ 50	$ 750		
		Subtotal							$ 50	$ 750		
		Runoff/Erosion Management							$ -	$ -		
		Runoff management system (570)[3 5]							$ -	$ -		
		Parking lot water retention		5-10	each	1	$ 150	$ 1,500	$ 150	$ 1,500		
		Filter strips	5-15		acre	1	$ 375	$ 12,500	$ 375	$ 12,500		
		Filter trap	10-25		acre	1	$ 375	$ 12,500	$ 375	$ 12,500		
		Subtotal							$ 900	$ 26,500		
								TOTAL	**$ 950**	**$ 27,250**	**$ 95**	**$ 2,725**

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Appendix H
Cost Estimates For Implementing Best Management Practices (BMPs)

Table H-5. Residential

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs	Nutrient Management Effectiveness (percent)	Water Management Effectiveness (percent)	Components				Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
RESIDENTIAL												
618 Acres	LOW	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ -	$ -	$ -		
		Subtotal							$ -	$ -		
		Irrigation Management										
		None										
		Runoff/Erosion Management										
		None										
								TOTAL	**$ -**	**$ -**	**$ -**	**$ -**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
RESIDENTIAL												
618 Acres	MEDIUM	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ -	$ -	$ -		
		Subtotal							$ -	$ -		
		Irrigation Management										
		Irrigation water management (449)[5]	20-35	45-60	each	1	$ 50	$ 750	$ 50	$ 750		
		Subtotal							$ 50	$ 750		
		Runoff/Erosion Management										
		None										
								TOTAL	**$ 50**	**$ 750**	**$ 5**	**$ 75**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
RESIDENTIAL												
618 Acres	HIGH	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ -	$ -	$ -		
		Subtotal							$ -	$ -		
		Irrigation Management										
		Irrigation water management (449)[5]	20-35	45-60	each	1	$ 50	$ 750	$ 50	$ 750		
		Subtotal							$ 50	$ 750		
		Runoff/Erosion Management										
		Runoff management system (570)[3 5]										
		Paved parking	80-85		square yard	480	$ 1	$ 2	$ 408	$ 936		
		Filter trap	10-25		acre	1	$ 375	$ 12,500	$ 375	$ 12,500		
		Subtotal							$ 783	$ 13,436		
								TOTAL	**$ 833**	**$ 14,186**	**$ 83**	**$ 1,419**

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Appendix H
Cost Estimates For Implementing Best Management Practices (BMPs)

Table H-6. Urban

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs	Nutrient Management Effectiveness (percent)	Water Management Effectiveness (percent)	Components				Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
URBAN												
34 Acres	LOW	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ -	$ -	$ -		
		Subtotal							$ -	$ -		
		Irrigation Management										
		None										
		Runoff/Erosion Management										
		None										
								TOTAL	**$ -**	**$ -**	**$ -**	**$ -**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
URBAN												
34 Acres	MEDIUM	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ -	$ -	$ -		
		Subtotal							$ -	$ -		
		Irrigation Management										
		Irrigation water management (449)[5]	20-35	45-60	each	1	$ 50	$ 750	$ 50	$ 750		
		Subtotal							$ 50	$ 750		
		Runoff/Erosion Management										
		None										
								TOTAL	**$ 50**	**$ 750**	**$ 5**	**$ 75**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
URBAN												
34 Acres	HIGH	**Nutrient Management**										
		Facility nutrient reduction management plan			each	1	$ -	$ -	$ -	$ -		
		Subtotal							$ -	$ -		
		Irrigation Management										
		Irrigation water management (449)[5]	20-35	45-60	each	1	$ 50	$ 750	$ 50	$ 750		
									$ -	$ -		
		Subtotal							$ 50	$ 750		
		Runoff/Erosion Management										
		Access road management (560)[3 5]										
		Pave roads		85-90	square yard	1000	$ 2	$ 4	$ 2,150	$ 4,300		
		Runoff management system (570)[3 5]							$ -	$ -		
		Filter strips	5-15		acre	1	$ 375	$ 12,500	$ 375	$ 12,500		
		Filter trap	10-25		acre	0.25	$ 375	$ 12,500	$ 94	$ 3,125		
		Stream corridor improvement (204)[3]		60-75	acre	1	$ 700	$ 5,500	$ 700	$ 5,500		
		Subtotal							$ 3,319	$ 25,425		
								TOTAL	**$ 3,369**	**$ 26,175**	**$ 337**	**$ 2,618**

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Table H-7. Septic Tank Disposal Systems

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs	Nutrient Management Effectiveness (percent)	Water Management Effectiveness (percent)	Components				Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
SEPTIC TANK DISPOSAL SYSTEMS												
407 Units	LOW	Facility nutrient reduction management plan			each	1	$ -	$ -	$ -	$ -		
		Septic tank inspection[6]			each	160	$ 75	$ 200	$ 12,000	$ 32,000		
		Septic system pumping[6]			each	40	$ 150	$ 350	$ 6,000	$ 14,000		
		Subtotal							$ 18,000	$ 46,000		
								TOTAL	**$ 18,000**	**$ 46,000**	**$ 1,800**	**$ 4,600**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
SEPTIC TANK DISPOSAL SYSTEMS												
407 Units	MEDIUM	Facility nutrient reduction management plan			each	1	$ -	$ -	$ -	$ -		
		Septic tank inspection[6]			each	200	$ 75	$ 200	$ 15,000	$ 40,000		
		Septic system pumping[6]			each	50	$ 150	$ 350	$ 7,500	$ 17,500		
		Subtotal							$ 22,500	$ 57,500		
								TOTAL	**$ 22,500**	**$ 57,500**	**$ 2,250**	**$ 5,750**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
SEPTIC TANK DISPOSAL SYSTEMS												
407 Units	HIGH	Facility nutrient reduction management plan			each	1	$ -	$ -	$ -	$ -		
		Septic tank inspection[6]			each	400	$ 75	$ 200	$ 30,000	$ 80,000		
		Septic system pumping[6]			each	100	$ 150	$ 350	$ 15,000	$ 35,000		
		Replace Conventional Systems with Enhanced System[7]			each	170	$ 10,000	$ 20,000	$ 1,700,000	$ 3,400,000		
									$ -	$ -		
									$ -	$ -		
									$ -	$ -		
		Subtotal							$ 1,745,000	$ 3,515,000		
								TOTAL	**$ 3,490,000**	**$ 7,030,000**	**$ 349,000**	**$ 703,000**

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Table H-8. Caltrans - (See note below)

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs	Nutrient Management Effectiveness (percent)	Water Management Effectiveness (percent)	Components				Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
CALTRANS												
120 Acres	LOW	**Nutrient Management**										
		Stormwater Chemical Analysis (nitrogen and phosphorous only)			each	3	$ 35	$ 50	$ 105	$ 150		
		Facility nutrient reduction management plan			each	1	$ -	$ 10,000	$ -	$ 10,000		
		Subtotal							$ 105	$ 10,150		
		Irrigation Management										
		None7										
		Runoff/Erosion Management										
		None										
								TOTAL	**$ 105**	**$ 10,150**	**$ 11**	**$ 1,015**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
CALTRANS												
120 Acres	MEDIUM	**Nutrient Management**										
		Stormwater Chemical Analysis (nitrogen and phosphorous only)			each	3	$ 35	$ 50	$ 105	$ 150		
		Stormwater Chemical Analysis (Metals, Organics, Pesticides, and PCBs)			each	3	$ 800	$ 1,400	$ 2,400	$ 4,200		
		Facility nutrient reduction management plan			each	1	$ -	$ 10,000	$ -	$ 10,000		
		Subtotal							$ 2,505	$ 14,350	$ 251	$ 1,435
		Irrigation Management										
		None[7]							$ -	$ -		
		Runoff/Erosion Management										
		Runoff management system (570)[3 5]										
		Filter strips	5-15		acre	1	$ 375	$ 12,500	$ 375	$ 12,500		
		Infiltration Trench	5-10		per foot	5000	$ 15	$ 75	$ 75,000	$ 375,000		
		Subtotal							$ 75,375	$ 387,500	$ 7,538	$ 38,750
								TOTAL	**$ 77,880**	**$ 401,850**	**$ 7,788**	**$ 40,185**

LAND USE CATEGORY	BMP LEVEL OF EFFORT	POTENTIAL MPs / BMPs							Capital Costs		Annual Operation and Maintenance	
					Unit	Number of Units	Cost per unit (low)	Cost per unit (high)	Low	High	Low	High
CALTRANS												
120 Acres	HIGH	**Nutrient Management**										
		Stormwater Chemical Analysis (nitrogen and phosphorous only)			each	3	$ 35	$ 50	$ 105	$ 150		
		Stormwater Chemical Analysis (Metals, Organics, Pesticides, and PCBs)			each	3	$ 800	$ 1,400	$ 2,400	$ 4,200		
		Facility nutrient reduction management plan			each	1	$ -	$ 10,000	$ -	$ 10,000		
		Subtotal							$ 2,505	$ 14,350		
		Irrigation Management										
		None[8]							$ -	$ -		
		Runoff/Erosion Management										
		Runoff management system (570)[3 5]							$ -	$ -		
		Filter strips	5-15		acre	1	$ 375	$ 12,500	$ 375	$ 12,500		
		Filter trap	10-25		acre	0.5	$ 375	$ 12,500	$ 188	$ 6,250		
		Infiltration Trench	5-10		per foot	5000	$ 15	$ 75	$ 75,000	$ 375,000		
		Sediment Basin (350)[3]			each	1	$ 700	$ 1,000,000	$ 700	$ 1,000,000		
		Subtotal							$ 76,263	$ 1,393,750		
								TOTAL	**$ 78,768**	**$ 1,408,100**	**$ 7,877**	**$ 140,810**

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Appendix H
Cost Estimates For Implementing Best Management Practices (BMPs)

Footnotes for Table:

1. Mission Resource Conservation District (MRCD) 1997. Brochure: Mission Resource Conservation District - Soil Nutrient Analysis. Fallbrook, CA. Printed May 1997.
2. MRCD 1997. Brochure: Irrigation Water Management - Water Quality Analysis. Fallbrook, CA. Printed May 1997.
3. Soil Conservation Practice Numbers from U.S. Department of Agriculture (USDA), May 1995. Calleguas Creek Watershed Erosion and Sediment Control Plan for Mugu Lagoon. USDA Natural Resources Conservation Service, in cooperation with Ventura County Resource Conservation District and the California State Coastal Conservancy. Davis, CA, May 1995.
4. Upgrades include sprinkler, drip irrigation, and microspray systems
5. BMP practices, cost estimates, and percent effectiveness from U.S. Department of Agriculture (USDA), May 1995. Calleguas Creek Watershed Erosion and Sediment Control Plan for Mugu Lagoon. USDA Natural Resources Conservation Service, in cooperation with Ventura County Resource Conservation District and the California State Coastal Conservancy. Davis, CA, May 1995. Table 4-b.
6. MRCD 1999. Focus on Resource Conservation: Septic System Operation, Inspection, and Maintenance - The Homeowner's Guide. Fallbrook, CA. Summer 1999.
7. Enhanced septic tank disposal systems can provide additional treatment to household wastewater, such as reduction of waste strength, removal of pathogens, and/or removal of nitrate-nitrogen, by adding components that utilize a combination of aerobic and anaerobic treatment before effluent is released to the environment. University of Rhode Island (URI) Cooperative Extension, 2001. Septic System Information for Rhode Islanders, Frequently Asked Questions Fact Sheet. Rhode Island Regional Water Quality Program, University of Rhode Island College of Env. & Life Sciences, Dept.of Natural Resources Science, Cooperative Extension On-Site Wastewater Training Center. May 2001.
8. Assumed no significant irrigation by Caltrans occurs along the Interstate 15 corridor

Assumptions:

For Commercial Nurseries, Agriculture, Orchards, and Caltrans land use categories, the Facility NRMP is estimated to range from $0 to $10,000.

For Parks, Residential, Septic Tank Disposal Systems, and Urban land use categories, the County of San Diego NRMP is assumed to cover this issue.

Average commercial nursery size in Fallbrook is approximately 12 acres. Based on personal communication with Paul Davy, Supervising Agricultural Inspector, Stormwater Management, County of San Diego, Department of Agricultural, Weights & Measures on May 21, 2003.

Average agricultural operation size in San Diego County is approximately 13 acres. Based on USDA, 1997. 1997 Census of Agriculture Highlights for San Diego County, California. USDA, National Agricultural Statistic Service, 1997 Census of Agriculture, Volume 1 Geographic Area Series, "Table 1. County Summary Highlights: 1997," http://www.nass.usda.gov/census/census97/highlights/ca/cac037.txt, printed on December 17, 2003.

Appendix I – List of Events

Appendix I – List of Events

	Item or Event	Date
1.	Draft Problem Statement – Released for public review	8/2/99
2.	Draft Numeric Targets – Released for public review	8/2/99
3.	EPA letter: Comments on Draft TMDL	10/6/99
4.	Public Workshop	4/20/99
5.	Stakeholders Group	4/26/99
6.	Form Public Participation Group	11/1/99
7.	Public Workshop	11/18/00
8.	Draft Source Analysis – Released for public review	11/30/99
9.	Technical Advisory Committee (TAC) Meeting	12/15/99
10.	TAC Meeting	1/13/00
11.	Draft Technical TMDL submitted to TAC for review	2/18/00
12.	TAC Meeting (note: a meeting was scheduled; no attendance log found)	3/1/00
13.	Draft Pollutant Load Allocation – Released for public review	3/31/00
14.	Draft Technical TMDL Submitted	4/25/00
15.	Hines Nurseries submits draft implementation plan (deliverable due on 6/18/00; deemed incomplete and sent back for revision)	6/12/00
16.	TAC Meeting	6/28/00
17.	Santa Margarita River Water Quality Monitoring Group (SMRWQMG) Meeting, Report update on TMDL progress	7/19/00
18.	Draft Water Quality Monitoring Plan 2000-2001, Rev. 0	8/14/00
19.	Year 2000 water quality and flow monitoring begins (9 weeks)	8/15/00
20.	Algae Sample Collection w/ UC Coop. Extension (Valerie Melano)	9/20/00
21.	SMRWQMG Meeting, Report on TMDL progress	11/1/00
22.	TAC Meeting	11/1/00
23.	Biological Assessment Monitoring (2 R.C. & 1 Sandia Cr.)(Samples given to San Diego Stream Team)	11/16/00
24.	Draft Summary Report for 2000 TMDL Monitoring	1/17/01
25.	TAC Meeting: Working Session (Discuss Summary Report)	2/1/01
26.	Attend SMRWQMG Meeting	12/20/00
27.	TAC Meeting, Working Session (Discuss Summary Report)	2/1/01
28.	Attend SMRWQMG Meeting	2/7/01
29.	Technical staff met with CalTrans to discuss TMDL and the potential for nutrient sources from I-15.	2/9/01
30.	TAC Meeting, Working Session (Discuss Summary Report)	2/14/01
31.	Submit Draft Problem Statement to TAC	3/21/01
32.	TAC Meeting, (Discuss Draft Problem Statement)	3/29/01
33.	Submit Drafts, Numeric Targets, Source Analysis, Linkage Analysis to TAC	4/30/01
34.	TAC Meeting (Discuss Draft TMDL Sections)	5/8/01
35.	E-mail – informal peer review request to Gerald Bowes	6/19/01
36.	Meet with County of San Diego Environmental Health staff to discuss septic issues	6/21/01

Appendix I – List of Events

	Item or Event	Date
37.	Technical TMDL Review – sent out for review (2 weeks) to TAC Participants, State Board, and in-house review.	6/25/01
38.	Technical staff met with County Environmental Health staff to discuss County's comments to technical TMDL	7/31/01
39.	Submit formal request letter to initiate scientific peer review to Gerald Bowes	8/1/01
40.	Technical staff met with County Environmental Health, and Planning and Land Use staff to discuss ground water issues.	8/8/01
41.	Technical staff met with County Environmental Health staff to discuss implementation plan and monitoring strategy	8/13/01
42.	Meet with in-house staff for technical support re: septic loading calculations	8/28-29/01
43.	Submit draft staff report (including technical TMDL, Implementation Plan and Monitoring Strategy) and draft amendment language for management review.	8/30/01
44.	Receive notice of peer review selection. Three reviewers selected: Professors David Jenkins, Rhea Williams, and John A. Dracup	8/31/01
45.	Send peer reviewers the request letter and TMDL package for review via e-mail and overnight mail.	11/20/01
46.	TAC Meeting, discuss implementation plan, environmental impacts, and economic considerations	12/13/01
47.	Meet with County Environmental Health staff to discuss economic considerations	12/18/01
48.	Peer reviewer comments received	1/1/02-2/14/02
49.	Draft Technical TMDL posted on RWQCB website	3/22/02
50.	Notice of Filing published in newspaper	3/23/02
51.	Draft Technical TMDL mailed to the public for 45 day comment period	3/23/02
52.	Public Workshop	4/11/02
53.	Meeting with County (Conference Call)	4/16/02
54.	Public Hearing	5/8/02
55.	Conference call with USEPA (Peter Kozelka); discuss revisions to source analysis	6/28/02
56.	Site Visit/Field Trip: County, Hines Nursery, SDSU, MRCD, and Dept. of Agriculture representatives attended	9/11/02
57.	Meeting with County staff to discuss revisions to Implementation Plan	11/4/02
58.	Convene RC TAC to discuss economic considerations	12/18/02
59.	Meeting with Corey Binns of Caltrans to discuss Source Loads	12/30/02
60.	Meeting with Corey Binns of Caltrans to discuss Source Loads and Implementation	3/19/03
61.	Meeting with County staff to discuss Implementation Plan	9/3/03
62.	Received Comments of Implementation Plan from County of San Diego	12/31/03
63.	Submit formal request letter to initiate additional scientific peer review to Gerald Bowes	5/7/04
64.	Submit Technical Report for scientific peer review to Dr. David Jenkins	7/14/04
65	Notice of Filing sent to Interested Parties list electronically	10/14/04

Appendix I – List of Events

	Item or Event	Date
66	Notice of Filing published in newspaper	10/14/04
67	Draft Technical TMDL posted on RWQCB website	10/22/04
68	Meeting with County	10/21/04
69	Meeting with County	10/27/04
70	Meeting with County	11/09/04
71	Public Workshop	11/17/04
72	Public Hearing	12/08/04
73	Additional public notice sent to Rainbow Valley landowners	12/15/04
74	Article published in Village News (Fallbrook) paper	12/16/04
75	Public notice published in Village News (Fallbrook) paper	12/16/04
76	Written public comment period closed	12/29/04
77	Revised Basin Plan Amendment, revised Technical Report and Appendices, and Response to Comments document posted on Regional Board website	1/27/05
78	Adoption of Resolution R9-2005-0036	2/09/05

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Appendix J – Scientific Peer Review No. 1
November 2001 – February 2002

J-1 Dr. John A. Dracup

J-2 Dr. Rhea Williamson

J-3 Dr. David Jenkins

Appendix J – Scientific Peer Review No. 1

J-1 Dr. John A. Dracup

MEMORANDUM 14 February 2002

To: John H. Robertus

From: John A. Dracup

Subject: Scientific peer review for the Draft Staff Report of the Rainbow Creek Total Maximum Daily Loads for (TMDL) for Nutrients

---

In your letter dated 20 November 2001, you asked that I answer the following questions in my review of the Draft Staff Report of the Rainbow Creek TMDL for Nutrients:

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

   Yes.

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?*

   The role of algae and its response to nutrients and other limiting factors is explained well. However, how to distinguish between “eutrophic conditions” and “excessive algal growth” was not clear. Does “excessive algal growth” have to be recurrent before “eutrophic conditions” can be declared? Or do fish kills, excess decomposition of plant matter, and/or DO depletion to below 5.0 mg/L have to be observed to warrant a declaration that the creek is “eutrophic”?

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

   The hydrology of the watershed seems adequately and correctly addressed.

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

   The staff’s report on nutrient sources in the watershed appears to be adequate and correctly addressed.

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

   The data appear to be reliable and appropriate. The staff has sufficiently treated the data in a defensible manner.

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

The approach presented in Sections 4.0 and 5.0 on the calculation of nutrient loading to the creek seems valid and reasonable given the available data. It is clear and easy to follow. The uncertainties about linking the mass loading throughout the watershed to observed concentrations of nitrogen and phosphorus in the creek are explained well. The decision to implement an iterative approach to determine appropriate load reductions of nitrogen and phosphorus seems reasonable.

8. *Is the approach used to assign load allocations reasonable?*

The approach sets the TMDL = ΣWLA + ΣLA + Background + MOS. The reservation of 10 percent of the TMDL to MOS seems reasonable. The approach for computing background versus ΣLA raises question. Why were developed land areas included in the background computation? This method implies a 0.9 (0.1) kg/ha/yr nitrogen (phosphorous) load reduction for developed lands, even though these background loads can theoretically never occur while the lands remain developed (i.e. other loading factors for developed lands apply to these lands, as reported in Tables 4-1 and 4-3). For each nutrient constituent, it seems more reasonable to base the background load on the present area of undeveloped land. If you followed this approach, the background load allocation would decrease and the ΣLA would increase. The result is a more flexible load allocation for developed landowners without reducing the total TMDL goals.

9. *Have the correct data gaps been identified for groundwater and septic system issues?*

The set of data gaps presented in Section 9.5.1.1 seems comprehensive and should provide sufficient information to clarify groundwater and septic system issues. It is also a reasonable set of gaps to investigate during Tier I of the Nutrient Reduction and Management Plan (NRMP).

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

The material is scientifically sound and thorough and will provide good support for the Regional Board's proposed actions. Toward this end, it is recommended that the following comments be addressed during preparation of the Final Report.

(a) The biostimulatory objective (Section 2.5) is more restrictive than the drinking water objective, in terms of NO_3-N concentration allowed in the creek. It is clear that the drinking water objective is mandated by the MCL set forth in California Code of Regulations, Title 22. However, it is not clear what regulation mandates the biostimulatory objective set forth in this TMDL. If there is no regulation, you should state this in the report. Also, if there is no regulation, it is not made clear what would legally compel responsible parties that are existing land users with non-point-source loads to modify their activities to meet the biostimulatory objectives.

(b) Are Sections 3.2 and 2.5 consistent when discussing the total nitrogen objective? Section 2.5 says that the Basin Plan does not state a threshold value for nitrogen and that a weight-to-weight ratio of 10:1 between total-N:total-

P was adopted during the preparation of this draft TMDL to set the total-N threshold. Section 3.2 says that the total nitrogen target is a "numeric goal set forth in the Basin Plan." Which is correct?

(c) At the end of the last paragraph before Section 4.1, you might list all potential sources "not found to be a significant source of either nitrogen or phosphorous," just to be complete. Currently you only mention CalTrans operations as one of those potential sources determined to not be significant.

(d) On p. 36, 2nd paragraph, you state that landowners/land users (such as homeowners, nurseries, businesses, etc.) are identified as responsible parties and are required to comply with all local, state, and federal laws and regulations. From the report, it is not clear which laws would force existing land owners in unincorporated areas to change their management practices if their nutrient loads were non-point-sources. Could they be taxed or fined? Could they have land-use permits revoked? The preceding discussion in Section 9.4 was helpful, but it seemed to address control over land use changes rather than static development.

(e) In the Draft Amendment (20 November 2001), under "Total Maximum Daily Loads for Rainbow Creek," the TMDL for biostimulatory nutrients in Rainbow Creek is set equal to 1,507 kg/yr for total nitrogen. In footnote 1, you say that this value equals the present annual load estimate from undeveloped land, leaving zero load allocation for developed land uses. However, based on the reasoning for load allocation present in Section 6.0 of the Draft Report, even if the entire watershed were undeveloped, the background load to the creek would still be 2,403 kg/yr. How is it reasonable to set the TMDL for biostimulatory nutrients equal to 1,507 kg/yr when it doesn't seem to be theoretically possible based on your loading factor assumptions?

Appendix J – Scientific Peer Review No. 1

J-2 Dr. Rhea Williamson

21 January 2002

Lisa Brown
Environmental Scientist
Regional Water Quality Control Board: San Diego Region
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Please find attached my comments on nutrients in Rainbow Creek located in San Diego County, California. Concerns about the draft staff report and attachments are summarized in general, followed by page/paragraph specific comments. Comments are meant to be constructive. The documents reviewed were as follows:

- Draft Staff Report for Nutrient Total Maximum Daily Load for Rainbow Creek. November 20, 2001. Prepared by Lisa Brown and Kyle Olewnik.
- Miscellaneous attachments.

General Comments: Draft Staff Report: Total Maximum Daily Load for Nutrients.

In general, the document provides a good review of the problem, the regulatory compliance issues, data summary, assumptions used, load calculations and areas of uncertainty. There are, however, considerable data gaps, assumptions and omissions that need correction or clarification. Many of the references cited are not provided in the reference list, or are incomplete. These are identified as noted. In general, the scientific issues identified in Attachment 2 (effects of nutrients in freshwater stream systems, nutrient dynamics, role of algae, watershed hydrology, sources of nutrients in the watershed, reliability and treatment of the data, validity of approach to nutrient loading calculations, assignment of load allocations, and data gaps) are addressed, but not always adequately: These are noted in the specific comments section that follows.

Specific Comments: Attachment 1: page 2.

Discussions related to second tier load reductions should indicate that nutrients will be reduced to concentrations **less than** the biostimulatory substances targets.

Specific Comments: Draft Staff Report: Total Maximum Daily Load for Nutrients.

Page	Comment
2	Section 2.1. The description of sources of nitrogen is incomplete. Organic nitrogen is omitted from discussion. Nitrogen fixation by actinomycetes (soil bacteria) and cyanobacteria (blue-green algae) results in the utilization of nitrogen in the form of nitrogen gas. Discussion of the required oxygen environments is not addressed.
3	Section 2.2. Paragraph 3. The reaches of the creek (described as upper and lower portions) are inconsistent with Figure A-3. MGT1 and RGT1 are not in either reach. The entire "middle reach of the creek is not assessed.
4	Section 2.3. Paragraph 1. The annual average for 1986 includes the single 1985 data point, which was one of the highest recorded values recorded (Table B-1). This will artificially elevate the 1986 annual average.
5	Top paragraph. Two areas are identified as having excessive algae growth in the lower reached. Was this assessment determined visually or was it based on water quality data such as pH and dissolved oxygen? The former can be misleading. Paragraph 2. The assumption of elevated historic phosphorus concentrations should be avoided unless knowledge of the fertilizer types is available. The presence of eutrophic downstream conditions does not mean that phosphorus levels are elevated. The assumption being made is that the creek is a phosphorus limited system. In addition, data (*e.g.,* diel dissolved oxygen, pH values; evidence of fish kills) are needed to support the statement that eutrophic conditions exist. Section 2.4. Paragraph 1. Table B-2 does not include data for Station 1 (Jubilee Way). This station is important in that it is lthe most upstream site and includes land uses that are different (*e.g.,* the prison) from the other stations. Section 2.4. Paragraph 2. Data for 1998-1999 are compared to 2000, however the historical data table does not include the 1998-1999 data for review. It is difficult, as a result, to know how different the values in these two data sets are. Movement of the Oak Crest station 0.2 miles more downstream may or may not place it below the unnamed tributary on Figure A-2. There is also no attempt to address the precipitation effect (assumed to be insignificant?) on a seasonal or annual basis, or when comparing different years. Details of this type are important when assessing the validity of the decision to use 2000 data for determination of load allocations.

Section 2.4. Paragraph 3. The average nitrate nitrogen concentration is based on data collected between August and October from the Oak Crest location; this means that the peak months of February to July are not assessed. Data from this site are "expected to be representative" of water quality throughout the Rainbow Valley Basin, yet this site has the lowest nitrate nitrogen concentrations and the highest ortho-phosphate concentrations of all the creek stations (Table B-2). In addition, groundwater surfaces at this location, making it non-representative of stations above the site.

6 Paragraph 2. The statement that there does not appear to be the same degree of seasonal variation in nutrients may be premature. Seasonal variation (based on percent difference) of nitrate nitrogen (97%) and phosphate phosphorus (75%) is quite high at Willow Glen-4. Both nutrient parameters fluctuate considerably. Reasons may also include erosion events leading to increased turbidity.

Section 2.5. Bottom Paragraph. The allowable levels of un-ionized ammonia have been amended (CFR, 1999) such that allowable levels are now based on the presence and/or absence of salmonid fish. This section should be updated to reflect the amendments.

7 Top. It is stated that ammonia has not been found in reportable quanitities. What were the reporting limits used? Levels less than 25 µg/L are considered toxic. If reporting limits are set at 0.1 mg/L, as is often the case, then ammonia will never be found at reportable levels.

8 Last paragraph. Unclear. Does Camp Pendleton rely entirely in groundwater, or on surface waters for its drinking water supply.

9 Paragraph 1. Add to this section that eutropic conditions can result in an increase in pH that can result in the dissociation of ammonium to form the toxic ammonia species.

Paragraph 1. Last sentence. The formation of un-ionized ammonia is not restricted to the decomposition of organic matter. In addition, such decompostion yields ammonium; the transformation to ammonia requires a pH increase.

Paragraph 2. It is stated that eutrophic conditions in Rainbow Creek have not been observed and that dissolved oxygen concentrations are not expected to fall below 5 mg/L. This statement is based on limited data and on assumptions. What time period is included in this assessment? Were the dissolved oxygen concentrations taken to assess oxygen sag conditions measured at several locations? in pool and riffle areas? in locations with and without flow, algae, light, substrate for attachment? Data for 1997 are not included in Table B-1, which should include all historic data for the creek. These data may answer some of the questions above. Importantly, the lack of a fish kill DOES NOT indicate that dissolved oxygen levels are above 5 mg/L. Dissolved oxygen concentrations can vary spatially; the fish will

migrate from areas with low dissolved oxygen. ADDITIONAL DISSOLVED OXYGEN DATA ARE NEEDED.

10 Paragraph 2. In the discussion of the insect population, inpacts of nutrients, herbicides, and pesticides are mentioned. Have there been any analyses of other pollutants, sedimentation, scouring, and other impacts in the Creek?

12 Section 3.2. Paragraph 1. Add substrate for attachment to the criteria that affect the growth of algae in creeks. The targets SHOULD include dissolved oxygen. This document does not provide the data needed to substantiate the claim that "DO concentrations exist below tolerance levels for the designated beneficial use".

14 Table 4-1. The reference should be for Boynton, *et.al.,* 1993.
Nitrogen export coefficients are for coastal regions in California. Were more appropriate values available from the Natural Conservation and Resources Service (NCRS) specific to the area?

15 References. San Diego County, 1994; San Diego County, 2001; SANDAG, 2001, Dames and Moore, 1996 are all missing from the reference list.

Paragraph 2. Are the numbers for nitrogen loss via denitrification specific to the soil types in the region? This is very important, particularly given the fact that the area is not conducive to septic systems and leach fields as a means of waste treatment and that losses may be much lower. Also note that for denitrification to occur, anaerobic conditions must exist.

16 Paragraph 1. Use of 3150 kg/yr may be an underestimate. Information on the prison impacts should be included. Thousands of percolation pond systems exist (as well as design equations) from which estimates of nitrogen loading can be made.

Paragraph 2. Nitrogen in ground water is not removed via transpiration. It is removed via active transport and uptake by the plants. Uptake rates are specific to a plant species. In addition, uptake does not result in a loss from the system, but rather a transformation of form (unless the plant is harvested and removed from the site).

Paragraph 3. Groundwater reaching the creek is not limited to that that surfaces at Oak Crest 3. The estimated load to the creek from groundwater is potentially an underestimate. What about irrigation return flows, inputs from upstream and other contributing sources to Oak Crest 3 during dry weather?

Last paragraph. The assumption that flows at Willow Glen are the same as at Oak Crest ignores the

impacts of several tributaries, of groundwater intrusion between the two sites and other sources of water. This may result in an overestimate of the load.

17 Paragraph 2. The use of the mean to estimate the nitrogen load from groundwater to Rainbow Creek does not make sense. Dry weather conditions exist for 3-4 months. A weighted average using this information could be determined.

References. Chesapeake Bay Program is missing from the reference list.

20 Section 4.2.2. What is the concentration of phosphorus in Rainbow Creek at Oak Crest in the summer?. Summer data of this type for nitrogen were used to estimate groundwater loads of nitrogen. The assumption that all phosphorus is adsorbed to soil particles is erroneous. Note that the highest levels of P were during the early part of the monitoring period.

Table 4-4. Disagree that the load from groundwater is 0.

21 Paragraph 3. The iterative approach can be difficult to apply with parameters that vary temporally (seasonal and diel) and spatially (depth, location). This approach needs to be considered carefully in that reliable data can take years to collect.

Section 5.1. Paragraph 1. The current estimated load of 5,740 kg/yr may be an underestimate. Using Willow Glen-4 station data, the estimated load would be 11,815 kg/yr based on the mean of 9.1 mg/L and the flow of 0.3 cfs.

The estimate of a 28% reduction of nitrate nitrogen assumes that the load, which is based on total nitrogen, consistently results in the same proportion of nitrate nitrogen. This is not likely. Contributions to the total nitrogen load from organic decomposition, runoff and other sources will vary seasonally and spatially.

22 Section 5.2. Paragraph 1. The phosphorus mass load reduction should be 573 not 576 kg/yr. The statement that the reduction is near zero should be corrected. The allowable load is 22 kg/yr.

Table 5-1. The last column should be labeled the Interim Load Capacity.

24 Paragraph 3. The number for background loads for undeveloped land needs a reference. In addition,the calculation for background sources assumes that there is a background load for the areas of the watershed that are already developed. Approximately 62% of the watershed is undeveloped (Figure A-2) resulting in a background of 1560 kg/yr and not of 2403 kg/yr. This change effectively increases the

allocation for nonpoint sources (LAs) to 2157 kg/yr. All of these numbers assume the the TMDL of 4,130 kg/yr is properly estimated.

25 Top paragraph. It is stated that nitrogen contributions from parks, urban areas, and preserves are relatively insignificant. These land uses represent an insignificant percentage of the total watershed, however loads from these areas have not been assessed.

Table 6-1. If the annual load allocations are increased to 2157 kg/yr for the reasons stated above, then the percent reduction is reduced to 52%.

28 Figure 7-1. Data in Figure 7-1 reveal the impact of land uses on nitrate nitrogen concentrations in the creek. Jubilee and RGT-1 are both surrounded by mostly vacant lands, and are least impacted by irrigated fields and orchards. Levels at these sites are relatively low. WGT-1 and VMT-1 receive orchard drainage; nitrate levels are quite high. Riverhouse and Stagecoach are similarly impacted heavily by orchards. Riverhouse levels are high year round, possibly a result of tributary effects and orchard input. Willow Glen has seasonally elevated winter concentrations, followed by a reduction in the late summer months. Sources, loads and seasonal variations at these sites are needed.

29 Paragraph 1. Controls on nutrient loading should be implemented all year long. The sediments act as a sink for phosphorus, so controls that reduce P-loading are essential. Sediments can also act as a sink for nitrogen compounds. In addition, algae growth is year round in Rainbow Creek. Availability of plentiful nutrients during the initial growth period can result in accumulations of algae later in the year.

37 Paragraph 3. Add the sentence to the end of the paragraph: If monitoring data indicate that load reductions are not adequate to result in the nutrient target concentrations, then load allocations will be reevaluated and reduced.

Section 9.5.1. The numbered measures or alternatives are stated as being equally effective in meeting the 28% reduction. The items help assess, plan, develop regulations and the like, but none of the items actually reduce the nitrogen or phosphorus load.

38 Bullet 2nd from the bottom. Transpiration rates are not used to describe nitrogen removal.

44 Table 9-1. Tier I (A) should require interim reports 2 years after USEPA approval.

45 Section 9.7.1. Paragraph 1. Targets for biostimulatory substances should be collected year round for the reasons stated above.

Paragraph 2. The Margarita Glen Tributary should be retained as a site. This site has very high total nitrogen and nitrate nitrogen (Table B-2). A long reach of the creek getween Oak Crest-3 and Willow Glen-4 is not assessed. Major differences in nutrient concentrations exist between these two sites

(Based on the averages for 8/22/00-10/10/00, TN and nitrate are 10.8 and 8.9 mg/L at Oak Crest and are 3.8 and .3. at Willow Glen. Phosphate was always less than 0.5 mg/L at Oak Crest, but was 0.37 at Willow Glen per Table B-2). For this reason, a station should be added on Rainbow Creek between these two stations and below the agricultural fields.

47 Table 9-2. Add turbidity to the surface water monitoring. Change the type of sample from grab to field for pH, dissolved oxygen, and conductivity for both surface and groundwater monitoring. Investigate use of chlorophyll (planktonic and attached) for the algae growth quantification.

Appendix J – Scientific Peer Review No. 1

J-3 Dr. David Jenkins

Administrative Record Page No. 026428

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2001 DEC 31 A 11:32
SAN DIEGO REGIONAL
WATER QUALITY
CONTROL BOARD

December 23, 2001

Dear Mr. Robertus,

Enclosed please find a marked up copy of the Draft Staff Report on the Rainbow Creek Nutrient TMDL. I have made many handwritten comments. Those marked with asterisks are substantive and are summarized later. The others are to improve the readability of the report. In addition to these extensive comments I would like to make the following general comments that impact on the approach taken in the TMDL.

1. Nowhere in the report is there any proof or data showing whether N, P or both are limiting to algal growth.

2. The approach to meeting the municipal water supply NO_3-N limit of 10 mg N/L in the initial step of the TMDL is reasonable.

3. An arbitrary assumption that the P limit should be one-tenth of the N limit is absolutely insupportable, bordering on the ridiculous! Reductions in P and further reductions in NO_3-N must be justified on the basis of determining which limits algal growth in the Creek.

4. The report should show historic trends of all nutrient forms being addressed (NO_3-N, total N, ortho P, total P).

5. The report confuses NO_3-N and total N in many places. This confusion seems to stem from an inadequate initial definition of terms.

Administrative Record Page No. 026429

Summary of asterisked comments

p.2	•	nutrients are both organic and inorganic
	•	most ammonification and nitrification does not involve, or follow from, N fixation
	•	P in rocks is already PO_4
	•	N_2 gas is an insignificant part of the N cycle issue
p.3	•	"wastewater effluents", not "untreated wastewater"
p.5	•	confusion between NO_3-N and total N. Please define each clearly and use the correct terms throughout
p.6	•	give "less than" values
p.7	•	give "less than" values
p.8	•	where are the data on emergent plant and algal numbers to support your statement that these are both "excessive"
p.11	•	Total N/ NO_3-N confusion and inconsistency
	•	repetition "ad nauseum"
p.12	•	logic is unclear
	•	nothing said about emergent plant growth
	•	otherwise from what?
p.16	•	N is not lost by transpiration - just water
p.20-2	•	5.0 Linkage Analysis… entire section needs a rewrite in plain non-repetitive english
p.21	•	NO_3-N/total N confusion throughout
p.25	•	"balancing the equation" is indefensible
p.26	•	last sentence is unintelligible (to me)
p.28-9	•	make symbols consistent between Figures 7-1 and 7-2
p.38	•	vague sentence
p.39	•	vague sentence again
p.43	•	meaning unclear

p.45
- be specific about which "biostimulatory substances"
- what is "quantified algae abundance"

p.46
- key statement about not knowing what nutrient limits algae (?plant) growth is hidden away here. You must be up-front, loud and clear about this or you will lose all credibility
- what is a "biodynamic analysis" - please provide a method so that it can be done by the County of San Diego

p.47
- several comments in Table 9-2

Appendix K. Response to Peer Review No. 1 Comments

Section: **Subsection:**

Commentor: Professor John Dracup

Comment: The approach presented in Sections 4.0 and 5.0 on the calculation of nutrient loading to the creek seems valid and reasonable given the available data. It is clear and easy to follow. The uncertainties about linking the mass loading throughout the watershed to observed concentrations of nitrogen and phosphorus in the creek are explained well. The decision to implement an iterative approach to determine appropriate load reductions of nitrogen and phosphorus seems reasonable.

Response: Comment noted.

Section: **Subsection:**

Commentor: Professor David Jenkins

Comment: The report should show historic trends of all nutrient forms being addressed (NO3-N, total N, ortho P, total P).

Response: While it would be optimum to include historic data for total N, ortho P, and total P, this information is not available.

Section: **Subsection:**

Commentor: Professor David Jenkins

Comment: Assuming an N:P ratio of 10:1 is unfounded. Rather than making across-the-board reductions of both, the TMDL targets (and associated load reductions) should be set based on whichever nutrient is determined to limit algal growth in the Creek.

Response: Federal regulations require that TMDLs shall be established at levels necessary to attain and maintain the applicable narrative and numerical water quality standards [40 CFR 130.7(c)(1)]. As stated in the staff report (Section 2.5 Water Quality Objectives) the Basin Plan's water quality objective for Biostimulatory Substances allows for the use of a weight to weight ratio of 10:1 (N:P) for determination of a threshold value for total nitrogen, in absence of data to determine the natural ratio. Since historic values of P were not available to calculate the natural ratio, the ratio of 10:1 is assumed.

Section: **Subsection:**

Commentor: Professor David Jenkins

Comment: The approach to meeting the municipal water supply NO_3-N limit of 10 mg N/L in the initial step of the TMDL is reasonable.

Response: Comment noted.

Section: **Subsection:**

Commentor: Professor David Jenkins

Comment: The report does not adequately establish that either N, P or both, affect the growth of algae.

Response: Language has been added to clarify this issue in two sections of the report. The discussion in Section 2.1 Nutrients and Nutrient Cycling has been clarified to explicitly state that algal growth is related to nutrient concentrations in water.

The discussion in Section 3.0 Numeric Targets includes a more descriptive explanation of the use of nitrogen to phosphorus ratios as an indication of which nutrient is likely to limit algal growth. Although targets for both N and P are essentially required by regulation (i.e., the Basin Plan), N:P ratios of the empirical data presented in the report are discussed for the purpose of providing an indication that both nutrients may be limiting and add further support to setting TMDL targets for both nutrients. The ratios are not presented but can be easily calculated by the reader.

Section: **Subsection:**

Commentor: Professor John Dracup

Comment: In the Draft Amendment (20 November 2001), under "Total Maximum Daily Loads for Rainbow Creek," the TMDL for biostimulatory nutrients in Rainbow Creek is set equal to 1,507 kg/yr for total nitrogen. In footnote 1, you say that this value equals the present annual load estimate from undeveloped land, leaving zero load allocation for developed land uses. However, based on the reasoning for load allocation present in Section 6.0 of the Draft Report, even if the entire watershed were undeveloped, the background load to the creek would still be 2,403 kg/yr. How is it reasonable to set the TMDL for biostimulatory nutrients equal to 1,507 kg/yr when it doesn't seem to be theoretically possible based on your loading factor assumptions?

Administrative Record Page No. 026434

Response: This inconsistency has been resolved. Background allocations in Section 6.0 were revised and calculated based on undeveloped land area.

Section: **Subsection:**

Commentor: Professor John Dracup

Comment: The material is scientifically sound and thorough and will provide good support for the Regional Board's proposed actions.

Response: Comment noted.

Section: **Subsection:**

Commentor: Professor David Jenkins

Comment: The report confuses NO_3-N and total N in many places. This confusion seems to stem from an inadequate initial definition of terms.

Response: Comment noted. Clarifications have been made to the document as appropriate.

Section: **Subsection:**

Commentor: Professor John Dracup

Comment: In evaluating the approach, the reservation of 10 percent of the TMDL to MOS seems reasonable. The approach for computing background versus the load allocations raises question. Why were developed land areas included in the background computation? This method implies a 0.9 (0.1) kg/ha/yr nitrogen (phosphorous) load reduction for developed lands, even though these background loads can theoretically never occur while the lands remain developed (i.e. other loading factors for developed lands apply to these lands, as reported in Tables 4-1 and 4-3). For each nutrient constituent, it seems more reasonable to base the background load on the present area of undeveloped land. If you followed this approach, the background load allocation would decrease and the load allocations would increase. The result is a more flexible load allocation for developed landowners without reducing the total TMDL goals.

Administrative Record Page No. 026435

Response: The recommended change has been incorporated into the draft. Background allocations in Section 6.0 were revised and calculated based on undeveloped land area, as all other land uses were assigned load allocations.

Section: **Subsection:**

Commentor: Professor David Jenkins

Comment: Numerous handwritten comments were made throughout the document.

Response: Handwritten comments were considered while revising the draft staff report.

Section: **Subsection:**

Commentor: Professor John Dracup

Comment: The data appear to be reliable and appropriate. The staff has sufficiently treated the data in a defensible manner.

Response: Comment noted.

Section: **Subsection:**

Commentor: Professor John Dracup

Comment: The staff's report on nutrient sources in the watershed appears to be adequate and correctly addressed.

Response: Comment noted.

Section: **Subsection:**

Commentor: Professor John Dracup

Comment: The hydrology of the watershed seems adequately and correctly addressed.

Response: Comment noted.

Administrative Record Page No. 026436

Section: **Subsection:**

Commentor: Professor John Dracup

Comment: The role of algae and its response to nutrients and other limiting factors is explained well. However, how to distinguish between "eutrophic conditions" and "excessive algal growth" was not clear. Does "excessive algal growth" have to be recurrent before "eutrophic conditions" can be declared? Or do fish kills, excess decomposition of plant matter, and/or DO depletion to below 5.0 mg/L have to be observed to warrant a declaration that the creek is "eutrophic"?

Response: The latter statement is correct, fish kills, excess decomposition of plant matter, and/or low DO would be need to be observed to warrant a declaration that a waterbody is eutrophic. These signs of eutrophication has not been observed or documented to date; however, excess algal growth has been documented. Excess algal growth is considered to not only pose an problem of nuissance but can also create a potential for eutrophic conditions to develop.

Section: **Subsection:**

Commentor: Professor John Dracup

Comment: Nutrient dynamics, including physical and chemical processes, and biological uptake and assimilation are adequately and correctly addressed.

Response: Comment noted.

Section: **Subsection:**

Commentor: Professor John Dracup

Comment: The staff report adequately and correctly addresses the effects of nutrients in the freshwater stream.

Response: Comment noted.

Section: **Subsection:**

Commentor: Professor Rhea Williamson

Comment: In general, the document provides a good review of the problem, the regulatory compliance issues, data summary, assumptions used, load calculations and areas of uncertainty. There are, however, considerable data gaps, assumptions and omissions that need correction or clarification. Many of the references cited are not provided in the reference list, or are incomplete. These are identified as noted. In general, the scientific issues identified in Attachment 2 to the "Request for Scientific Peer Review" (effects of nutrients in freshwater stream systems, nutrient dynamics, role of algae, watershed hydrology, sources of nutrients in the watershed, reliability and treatment of the data, validity of approach to nutrient loading calculations, assignment of load allocations, and data gaps) are addressed, but not always adequately: These are noted in the specific comments section that follows.

Response: Comment noted.

Section: **Subsection:**

Commentor: Professor John Dracup

Comment: The set of data gaps presented in Section 9.5.1.1 seems comprehensive and should provide sufficient information to clarify ground water and septic system issues. It is also a reasonable set of gaps to investigate during Tier I of the Nutrient Reduction and Management Plan (NRMP).

Response: Comment noted.

Section: 2.1 **Subsection:**

Commentor: Professor Rhea Williamson

Comment: The description of sources of nitrogen is incomplete. Organic nitrogen is omitted from discussion. Nitrogen fixation by actinomycetes (soil bacteria) and cyanobacteria (blue-green algae) results in the utilization of nitrogen in the form of nitrogen gas. Discussion of the required oxygen environments is not addressed.

Response: Organic nitrogen has been added to the discussion. Nitrogen fixation is already included in the list of processes that convert gaseous nitrogen into usable chemical forms. Information about the required oxygen environments has been added.

Section: 2.1 **Subsection:** Paragraph 1

Commentor: Professor David Jenkins

Comment: The sentence should reflect that the term nutrient refers to any organic or inorganic material that is necessary for life.

Response: The recommended change has been incorporated into the draft.

Section: 2.1 **Subsection:** Paragraph 2

Commentor: Professor David Jenkins

Comment: Most ammonification and nitrification does not involve, or follow from, N fixation.

Response: The referenced statement provides a list of three of the processes of the nitrogen cycle. There was no intent to imply that one cycle followed the other. The language has been rewritten to be more clear.

Section: 2.1 **Subsection:** Paragraph 3

Commentor: Professor David Jenkins

Comment: The phosphorus in rocks is already in the form of PO_4.

Response: Comment noted. The statement refers to decomposition, or "breakdown", of rock containing phosphate through weathering, leaching, etc., and not chemical breakdown. The sentence has been modified to be more clear.

Section: 2.1 **Subsection:** Paragraph 4

Commentor: Professor David Jenkins

Comment: Omit statement, "Because nitrogen has a gaseous phase, it can be transported to surface water via atmospheric deposition", because nitrogen gas is an insignificant part of the nitrogen cycle.

Response: Comment noted. The sentence was removed.

Administrative Record Page No. 026439

Section: 2.1 **Subsection:** Paragraph 4

Commentor: Professor David Jenkins

Comment: It is better to say "wastewater effluents", rather than "untreated wastewater".

Response: The recommended change was incorporated into the draft.

Section: 2.2 **Subsection:** Paragraph 3

Commentor: Professor Rhea Williamson

Comment: The reaches of the creek (described as upper and lower portions) are inconsistent with Figure A-3. MGT1 and RGT1 are not in either reach. The entire “middle" reach of the creek is not assessed.

Response: Language has been added to clarify the reach descriptions in Section 2.2. The middle reach is characterized by Willow Glen-4. MGT1 and RGT1 are part of the middle reach. Furthermore, there is little development in much of the middle reach and results show that RGT1 contributes low nutrient concentrations (see Table B-2).

Section: 2.3 **Subsection:** Paragraph 2

Commentor: Professor Rhea Williamson

Comment: The annual average for 1986 includes the single 1985 data point, which was one of the highest recorded values recorded (Table B-1). This will artificially elevate the 1986 annual average.

Response: Comment noted. The average for 1986 (without the 1985 data point) is 205.48 mg NO_3/L. A difference of 10.35 mg NO_3/L between the two calculated averages.

Section: 2.3 **Subsection:** Paragraph 3

Commentor: Professor Rhea Williamson

Comment: Two areas are identified as having excessive algae growth in the lower reaches. Was this assessment determined visually or was it based on water quality data such as pH and dissolved oxygen? The former can be misleading.

Response: The assessment was visually determined. The proposed monitoring in the Implementation Plan includes provisions to gather such data in the future.

Section: 2.3 **Subsection:** Paragraph 4

Commentor: Professor Rhea Williamson

Comment: The assumption of elevated historic phosphorus concentrations should be avoided unless knowledge of the fertilizer types is available. The presence of eutrophic downstream conditions does not mean that phosphorus levels are elevated. The assumption being made is that the creek is a phosphorus limited system. In addition, data (e.g., diel dissolved oxygen, pH values; evidence of fish kills) are needed to support the statement that eutrophic conditions exist.

Response: This paragraph summarizes the basis used to introduce the potential for elevated phosphorus in the absence of historic data. This was established by the Mission Resource Conservation District during the Nitrate Reduction Program in 1997, which provided data demonstrating that phosphorus was present in concentrations above the biostimulatory substances objective. The language has been modified to clarify this point and the reference to the 1997 report has been added.

Additionally, the statement that eutrophic conditions were found downstream of Rainbow Creek is based on the fact that the Santa Margarita Lagoon was listed for eutrophication on Region 9's Clean Water Section 303(d) List of Impaired Waterbodies.

Section: 2.4 **Subsection:**

Commentor: Professor David Jenkins

Comment: The appears to be confusion between NO_3-N and total N in the report. Terms should be defined clearly and used correctly through the report.

Response: Terms have been defined and clarified throughout the report.

Administrative Record Page No. 026441

Section: 2.4 **Subsection:** Paragraph 1

Commentor: Professor Rhea Williamson

Comment: Table B-2 does not include data for Station 1 (Jubilee Way). This station is important in that it is the most upstream site and includes land uses that are different (e.g., the prison) from the other stations.

Response: Data collected for the Jubilee Station is included in Table B-2. As noted in the footnote of Table B-2, the Jubilee monitoring location was found to be dry and was not sampled. Ground water was found surfacing approximately 200 yards upstream of the station and was monitored for the remainder of the monitoring period.

Section: 2.4 **Subsection:** Paragraph 2

Commentor: Professor Rhea Williamson

Comment: There is also no attempt to address the precipitation effect (assumed to be insignificant?) on a seasonal or annual basis, or when comparing different years. Details of this type are important when assessing the validity of the decision to use 2000 data for determination of load allocations.

Response: No conclusions were made based on the one year of rainfall data. The annual total rainfall for 2000 in Rainbow Valley and Fallbrook was 11 and 9 inches, respectively. The 2000 rainfall data was reviewed and did not correlate well with flow data. No conclusions could be drawn from one year of data. Some observations about trends in nutrient concentrations relating to the rainy season is discussed in Section 7.0 Seasonal Variations. Additional data will be collected and evaluated during the implementation phase of the TMDL.

Section: 2.4 **Subsection:** Paragraph 2

Commentor: Professor Rhea Williamson

Comment: Data for 1998-1999 are compared to 2000, however the historical data table does not include the 1998-1999 data for review. It is difficult, as a result, to know how different the values in these two data sets are. Movement of the Oak Crest station 0.2 miles more downstream may or may not place it below the unnamed tributary on Figure A-2.

Administrative Record Page No. 026442

Response: The 1998-1999 data, reported by the Mission Resource Conservation District, is introduced, discussed, and referenced in Section 2.3. The comparison between the two data sets has been deleted as a result of differences in analytical methods and quality control measures used between the two monitoring programs suggest a greater uncertainty associated with the MRCD data sets. MRCD used an ion specific electrode method performed in-house whereas the Regional Board used an ion chromatography method performed by a California certified analytical laboratory.

Another difference between the two data sets was that the physical location of the Oak Crest station is different. The MRCD station is at the downstream edge of the mobile home park and the Regional Board station is at the upstream edge of the mobile home park. The MRCD station was not below the unnamed tributary.

Section: 2.4 **Subsection:** Paragraph 3

Commentor: Professor Rhea Williamson

Comment: The average nitrate nitrogen concentration is based on data collected between August and October from the Oak Crest location; this means that the peak months of February to July are not assessed. Data from this site are "expected to be representative" of water quality throughout the Rainbow Valley Basin, yet this site has the lowest nitrate nitrogen concentrations and the highest ortho-phosphate concentrations of all the creek stations (Table B-2). In addition, ground water surfaces at this location, making it non-representative of stations above the site.

Response: The commentor has correctly identified that the data used to determine average concentrations does not cover peak flow months. In fact, the original monitoring plan only evaluated the critical time of year for eutrophic conditions to occur - the time of lowest flowlonger daylight hours, and warmest temperatures. Due to the limits of the data, monitoring during peak flow months is included in the implementation plan.

Section 2.4 was bulletized to improve readability and the reference to the representativeness of the concentrations found at Oak Crest to concentrations in Rainbow Valley is no longer contained in this section.

Section: 2.4 **Subsection:** Paragraph 5

Commentor: Professor Rhea Williamson

Comment: The statement that there does not appear to be the same degree of seasonal variation in nutrients may be premature. Seasonal variation (based on percent difference) of nitrate nitrogen (97%) and phosphate phosphorus (75%) is quite high at Willow Glen-4. Both nutrient parameters fluctuate considerably. Reasons may also include erosion events leading to increased turbidity.

Response: The referenced statement has been removed and the information provided has been added to the text.

Section: 2.5 **Subsection:**

Commentor: Professor John Dracup

Comment: The biostimulatory objective is more restrictive than the drinking water objective, in terms of NO_3-N concentration allowed in the creek. It is clear that the drinking water objective is mandated by the MCL set forth in California Code of Regulations, Title 22. However, it is not clear what regulation mandates the biostimulatory objective set forth in this TMDL. If there is no regulation, you should state this in the report. Also, if there is no regulation, it is not made clear what would legally compel responsible parties that are existing land users with non-point-source loads to modify their activities to meet the biostimulatory objectives.

Response: Pursuant to the Federal Clean Water Act and the California Water Code, the Water Quality Control Plan for the San Diego Region (Basin Plan) is the regulatory basis which mandates limits for biostimulatory substances. The Basin Plan contains the water quality objectives and beneficial uses that have been established for the San Diego Region. Both objectives, nitrates in drinking water and biostimulatory substances, are designated in the Basin Plan.

Section: 2.5 **Subsection:** Paragraph 2

Commentor: Professor David Jenkins

Comment: Use "less than" values when discussing nitrite data.

Response: The recommended change has been incorporated into the draft.

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Section: 2.5 **Subsection:** Paragraph 3

Commentor: Professor David Jenkins

Comment: Use "less than" values when discussing ammonia data.

Response: The recommended change has been incorporated into the draft.

Section: 2.5 **Subsection:** Paragraph 3

Commentor: Professor Rhea Williamson

Comment: It is stated that ammonia has not been found in reportable quanitities. What were the reporting limits used? Levels less than 25 ug/L are considered toxic. If reporting limits are set at 0.1 mg/L, as is often the case, then ammonia will never be found at reportable levels.

Response: The commentor has correctly identified that the laboratory detection limit is not low enough to determine if concentrations are below the objective. Language has been added to clarify this point.

Additionally, lower detection limits will be required for future monitoring.

Section: 2.5 **Subsection:** Paragraph 3

Commentor: Professor Rhea Williamson

Comment: The allowable levels of un-ionized ammonia have been amended (CFR, 1999) such that allowable levels are now based on the presence and/or absence of salmonid fish. This section should be updated to reflect the amendments.

Response: This comment applies to the potential need to re-assess the Basin Plan's water quality objective for un-ionized ammonia for consistency with updated federal regulations.

Section: 2.5 **Subsection:** Paragraph 6

Commentor: Professor David Jenkins

Comment: Where are the data on emergent plant and algal numbers to support your statement that these are both "excessive"?

Response: Excessive algae and emergent plant growth was evaluted qualitatively. Photographs illustrating the amount of algae and emergent plant growth are in Attachment C, as referenced.

Section: 2.6 **Subsection:** Paragraph 2

Commentor: Professor Rhea Williamson

Comment: Unclear. Does Camp Pendleton rely entirely on ground water, or on surface waters for its drinking water supply.

Response: Camp Pendleton relies entirely on ground water, which is recharged by the surface waters of the Santa Margarita Watershed. The language has been rewritten to be more clear.

Section: 2.6 **Subsection:** Paragraph 3

Commentor: Professor Rhea Williamson

Comment: Add to this section that eutropic conditions can result in an increase in pH that can result in the dissociation of ammonium to form the toxic ammonia species.

Response: The recommended change has been incorporated into the draft.

Section: 2.6 **Subsection:** Paragraph 3

Commentor: Professor Rhea Williamson

Comment: The formation of un-ionized ammonia is not restricted to the decomposition of organic matter. In addition, such decompostion yields ammonium; the transformation to ammonia requires a pH increase.

Response: Comment noted.

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Section: 2.6 **Subsection:** Paragraph 4

Commentor: Professor Rhea Williamson

Comment: It is stated that eutrophic conditions in Rainbow Creek have not been observed and that dissolved oxygen concentrations are not expected to fall below 5 mg/L. This statement is based on limited data and on assumptions. What time period is included in this assessment? Were the dissolved oxygen concentrations taken to assess oxygen sag conditions measured at several locations? in pool and riffle areas? in locations with and without flow, algae, light, substrate for attachment? Data for 1997 are not included in Table B-1, which should include all historic data for the creek. These data may answer some of the questions above. Importantly, the lack of a fish kill DOES NOT indicate that dissolved oxygen levels are above 5 mg/L. Dissolved oxygen concentrations can vary spatially; the fish will migrate from areas with low dissolved oxygen. ADDITIONAL DISSOLVED OXYGEN DATA ARE NEEDED.

Response: The commentor has correctly identified that statements about the presence of eutrophic conditions and DO concentrations are based on limited data and assumptions. In response to this comment, the reference to fish kills has been deleted. Additionally, the implementation plan will require more monitoring, including monitoring for DO.

To answer your questions, the following information has been added to the draft:

On June 4-5,1997, Regional Board staff conducted DO monitoring. The study measured temperature and DO concentrations from 1:00 p.m. in the afternoon until 6:00 a.m. the following morning at locations on the Santa Margarita River, Rainbow Creek, Sandia Creek, and De Luz Creek. The purpose was to identify the DO diel cycle and to determine if the concentrations dropped below the DO objective. The study looked at measurements in pool and riffle areas of the stream and in backwater areas with less flow. The monitoring showed concentrations above 5 mg DO/L in flowing waters and concentrations that dipped below 5 mg DO/L in backwater areas. Backwater areas that exhibited low DO were uninhabitable by fish because of dense algal mats or very shallow water.

Section: 2.6 **Subsection:** Paragraph 8

Commentor: Professor Rhea Williamson

Comment: In the discussion of the insect population, inpacts of nutrients, herbicides, and pesticides are mentioned. Have there been any analyses of other pollutants, sedimentation, scouring, and other impacts in the Creek?

Response: Data of other pollutants, sedimentation, scouring, and other impacts in the Creek are not available.

Section: 3.0 **Subsection:**

Commentor: Professor David Jenkins

Comment: Again, the report appears to show a confusion between NO_3-N and total N. Concurrent numeric targets for both nitrate and total nitrogen are inconsistent. Total N is a measure that includes NO_3-N, yet NO_3-N is set at a higher limit than total N.

Response: Section 3.0 identifies the three numeric targets that will be used to evaluate compliance during TMDL implementation. The numeric targets will be implemented consecutively rather than concurrently. The nitrate target is proposed as an interim goal and the total N target is the final goal. Language has been added to clarify this point.

Section: 3.1 **Subsection:**

Commentor: Professor David Jenkins

Comment: Stating the water quality objective and numeric target for nitrates in municipal water supply is 10 mg NO_3-N/L is redundant.

Response: Comment noted. According to requirements set out by the U.S. EPA, numeric targets must be clearly identified and an adequate basis for why they were selected provided.

Section: 3.2 **Subsection:**

Commentor: Professor John Dracup

Comment: Are Sections 3.2 and 2.5 consistent when discussing the total nitrogen objective? Section 2.5 says that the Basin Plan does not state a threshold value for nitrogen and that a weight-to-weight ratio of 10:1 between total-N:total-P was adopted during the preparation of this draft TMDL to set the total-N threshold. Section 3.2 says that the total nitrogen target is a "numeric goal set forth in the Basin Plan." Which is correct?

Response: Section 2.5 presents the objectives that apply to Rainbow Creek in accordance with the Basin Plan. In the absence of site-specific data to determine natural ratios, the objective allows for the use of a weight to weight ratio of 10:1 (N:P) for the determination of an analogous threshold value for total nitrogen. Since the objective for total phosphorus in flowing waters is 0.1 mg P/L, then total nitrogen objective is 1.0 mg N/L. Section 3.2 establishes the numeric targets for the TMDLs, which are set equivalent to the objectives designated by the Basin Plan.

Section: 3.2 **Subsection:**

Commentor: Professor David Jenkins

Comment: It is not clear what the exception to exceeding the biostimulatory targets more than 10% of the time is.

Response: Site-specific studies may be used to demonstrate that the N and P limits may be exceeded more than 10% of the time. Since this requirement is discussed in section 2.5, the referenced phrase has been deleted.

Section: 3.2 **Subsection:**

Commentor: Professor David Jenkins

Comment: The report states that a reduction in N and P concentrations is expected result in a reduction in emergent plant growth. The link between the numeric targets and emergent plant growth should be clearly established.

Response: The recommended change has been incorporated into the draft.

Section: 3.2 **Subsection:**

Commentor: Professor David Jenkins

Comment: It is unclear how the statement, "Nuisance levels of algae can develop as a result of nutrient enrichment when factors, such as sunlight, temperature and flow are not limiting", supports the selection of total N and total P targets.

Response: The discussion for biostimulatory substances targets has been revised.

Section: 3.2 **Subsection:** Paragraph 1

Commentor: Professor Rhea Williamson

Comment: Add substrate for attachment to the criteria that affect the growth of algae in creeks. The targets SHOULD include dissolved oxygen. This document does not provide the data needed to substantiate the claim that “DO concentrations exist below tolerance levels for the designated beneficial use”.

Response: The recommended change has been incorporated into the draft.

DO will not be considered as a numeric target at this time. Current data do not indicate that potential oxygen depletion would be a direct result of discharge (e.g., discharge of sewer wastewater effluent) but rather a secondary response from algal growth resulting from the availability of elevated nutrients. Monitoring data collected during TMDL implementation will be used to evaluate the need for modification of the TMDLs, including addition of numeric targets, if necessary.

Section: 4.0 **Subsection:** Paragraph 4

Commentor: Professor John Dracup

Comment: In the last paragraph of Section 4.0, you might list all potential sources “not found to be a significant source of either nitrogen or phosphorous,” just to be complete. Currently CalTrans operations is only mentioned as one of those potential sources determined to not be significant.

Response: CalTrans was the only nutrient source identified as a potential source but found to be insignificant. The language in the paragraph has been changed to reflect this.

Section: 4.1.1 **Subsection:** Table 4-1

Commentor: Professor Rhea Williamson

Comment: The reference should be for Boynton, et.al., 1993.
Nitrogen export coefficients are for coastal regions in California. Were more appropriate values available from the Natural Conservation and Resources Service (NCRS) specific to the area?

Response: The recommended change has been incorporated into the draft. Inquiries to the local office of the Natural Resources Conservation Service and UC Cooperative Extension were made. Local nutrient export coefficients were not found to be available.

Section: 4.1.2 **Subsection:**

Commentor: Professor Rhea Williamson

Comment: References. San Diego County, 1994; San Diego County, 2001; SANDAG, 2001, Dames and Moore, 1996 are all missing from the reference list.

Response: The appropriate references have been added to Section 10.0 References.

Section: 4.1.2 **Subsection:** Paragraph 2

Commentor: Professor Rhea Williamson

Comment: Are the numbers for nitrogen loss via denitrification specific to the soil types in the region? This is very important, particularly given the fact that the area is not conducive to septic systems and leach fields as a means of waste treatment and that losses may be much lower. Also note that for denitrification to occur, anaerobic conditions must exist.

Response: The denitrification estimates are not specific to soil types in the region. Reasonable estimates were used because the site-specific information was not available. The Implementation Plan includes measures to acquire such information, which will be used to re-evaluate the loading estimates in the future.

Section: 4.1.2 **Subsection:** Paragraph 4

Commentor: Professor Rhea Williamson

Comment: Use of 3,150 kg/yr may be an underestimate. Information on the prison impacts should be included. Thousands of percolation pond systems exist (as well as design equations) from which estimates of nitrogen loading can be made.

Response: The commentor correctly identifies that the estimated total nitrogen load from ground water may be underestimated. As stated in the report, the total nitrogen load to ground water should be higher than the estimated annual load of 3,150 kg N/yr, but there is currently no data available to calculate the actual value. The influence of the Rainbow Conservation Camp on the ground water in the Rainbow Valley Basin is not known at this time. However, the facility is a permitted facility with this agency and the additional information is being requested. This information will be used in future evaluations of the TMDLs and allocations.

Section: 4.1.2 **Subsection:** Paragraph 5

Commentor: Professor Rhea Williamson

Comment: Nitrogen in ground water is not removed via transpiration. It is removed through active transport and uptake by plants. Uptake rates are specific to a plant species. In addition, uptake does not result in a loss from the system, but rather a transformation of form (unless the plant is harvested and removed from the site).

Response: The referenced paragraph intended to introduce nutrient removal by plants during the process of transpiration. The language has been changed to clearly reflect "plant uptake".

Section: 4.1.2 **Subsection:** Paragraph 6

Commentor: Professor David Jenkins

Comment: The report appears to claim that N is lost by transpiration, which is incorrect.

Response: The referenced paragraph intended to introduce nutrient removal by plants during the process of transpiration. The language has been changed to clearly reflect "plant uptake".

Section: 4.1.2 **Subsection:** Paragraph 6

Commentor: Professor Rhea Williamson

Comment: Ground water reaching the creek is not limited to that that surfaces at Oak Crest 3. The estimated load to the creek from ground water is potentially an underestimate. What about irrigation return flows, inputs from upstream and other contributing sources to Oak Crest 3 during dry weather?

Response: The commentor correctly identified that the estimated load to the creek from ground water based on Oak Crest 3 data is potentially an underestimate. As stated in the report in Section 2.2 Watershed Description, the ground water basin below Rainbow Valley is semi-confined and that the more than 30 years of imported water use for irrigation and domestic water use has caused a condition of high ground water. Because of this, the assumption was made that the concentrations in ground water surfacing at the Oak Crest Location would be indicative of ground water concentrations that may exist in Rainbow Valley. Unfortunately, no monitoring well nutrient data was available. The Implementation plan includes ground water monitoring to address this issue.

Section: 4.1.2 **Subsection:** Paragraph 7

Commentor: Professor Rhea Williamson

Comment: The assumption that flows at Willow Glen are the same as at Oak Crest ignores the impacts of several tributaries, of ground water intrusion between the two sites and other sources of water. This may result in an overestimate of the load.

Response: The commentor correctly identifies that the use of flow rates recorded at Willow Glen-4 station instead of those at Oak Crest potentially overestimate the calculated load. However, as stated in the report, sufficient flow rate data at Oak Crest-3 were not collected. A Parshall flume was installed at the Oak Crest station for 10 weeks of monitoring, but was compromised when a small rainstorm undermined the installation. Several weeks of flow data were lost as a result. The Willow Glen-4 flow data has a USGS gauging station and was determined to be more reliable.

Section: 4.1.2 **Subsection:** Paragraph 9

Commentor: Professor Rhea Williamson

Comment: The use of the mean to estimate the nitrogen load from ground water to Rainbow Creek does not make sense. Dry weather conditions exist for 3-4 months. A weighted average using this information could be determined.

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Response: The two approaches provide approximations of nitrogen loads from ground water. It was determined to be reasonable to select a ground water loading within the range of the approximations because of the substantial uncertainty that exists in the calculations. However, in addressing your comment, the use of the term "mean" has been changed to "simple average". Additionally, the "dry weather" data set is not complete and can not be used to effectively determine a weighted average.

Section: 4.1.3 **Subsection:** Paragraph 2

Commentor: Professor Rhea Williamson

Comment: References. Chesapeake Bay Program is missing from the reference list.

Response: The Chesapeake Bay Program reference was erroneously cited in the document. It can be found in Section 10.0 References as "USEPA 1996". The citation has been corrected.

Section: 4.2.2 **Subsection:**

Commentor: Professor Rhea Williamson

Comment: What is the concentration of phosphorus in Rainbow Creek at Oak Crest in the summer?. Summer data of this type for nitrogen were used to estimate ground water loads of nitrogen. The assumption that all phosphorus is adsorbed to soil particles is erroneous. Note that the highest levels of P were during the early part of the monitoring period.

Response: The average concentration of total phosphorus is 1.13 mg/L, and orthophosphate is 0.85 mg/L. The assumption that all phophorus is adsorbed to soil particles is specifically used in the case with ground water loading. This assumption was necessary because ground water monitoring data was not available. Surface water samples taken at Oak Crest, although assumed to be surfacing ground water, would be influenced by phosphorus in sediments that were deposited during surface flows. We could not, with any certainty, distinguish how much phosphorus is being contributed by either source. Therefore, similar treatment as with the nitrogen ground water loading calculations was not determined to be appropriate. Phosphorus loading pertaining to surface water has been calculated.

Section: 4.2.3 **Subsection:** Table 4-4

Commentor: Professor Rhea Williamson

Comment: Disagree that the load from ground water is 0.

Response: The commentor has correctly identified that the ground water load is not likely 0 mg/L. Actual ground water concentrations were not available and could not be determined therefore the assumption that phophorus easily adsorbs to soil particles and does not move as readily in subsurface flows was accepted. Ground water data will be collected during implementation and will be used to revaluate the TMDLs and load allocations.

Section: 5.0 **Subsection:**

Commentor: Professor David Jenkins

Comment: Section 5.0 Linkage Analysis is overcomplicated. Rewrite the section so that it is more clear.

Response: The recommended changes have been incorporated into the draft.

Section: 5.0 **Subsection:** Paragraph 4

Commentor: Professor Rhea Williamson

Comment: The iterative approach can be difficult to apply with parameters that vary temporally (seasonal and diel) and spatially (depth, location). This approach needs to be considered carefully in that reliable data can take years to collect.

Response: The commentor has correctly identified that ecological data vary temporally and spatially and can make an iterative approach difficult to implement. In the Implementation Plan, the TMDLs are to be re-evaluated after four years of data have been gathered and then every four years following. This schedule should be adequate to assess temporal and spatial variations.

Section: 5.1 **Subsection:**

Commentor: Professor David Jenkins

Comment: The use of NO_3-N and total N in this section is confusing to the reader.

Response: The section has been clarified.

Section: 5.1 **Subsection:** Paragraph 1

Commentor: Professor Rhea Williamson

Comment: The current estimated load of 5,740 kg/yr may be an underestimate. Using Willow Glen-4 station data, the estimated load would be 11,815 kg/yr based on the mean of 9.1 mg/L and the flow of 0.3 cfs.

Response: The calculation showing the estimated nitrogen load as 11,815 kg/yr was not provided and could not be replicated. Our calculation of the load using average concentration and flow from Willow Glen-4 indicated a nitrogen load of 2,437 kg/yr. This indicates that the estimated load of 5,740 kg/yr is more than likely an overestimate, which is a conservative approach. This calculation appears consistent with the expectation that a load estimate using site-specific data would account for assimilative capacity.

Section: 5.1 **Subsection:** Paragraph 1

Commentor: Professor Rhea Williamson

Comment: The estimate of a 28% reduction of nitrate nitrogen assumes that the load, which is based on total nitrogen, consistently results in the same proportion of nitrate nitrogen. This is not likely. Contributions to the total nitrogen load from organic decomposition, runoff and other sources will vary seasonally and spatially.

Response: In Section 5.0 Linkage Analysis, it is acknowledged that it is unlikely that a directly proportional relationship exists between mass loading and observed concentrations because of biological and chemical processes, which uptake and release nutrients at varying rates. The implementation monitoring will provide data needed to better understand the relationship between mass loading reduction and the reduction in concentrations in the creek.

Section: 5.2 **Subsection:** Paragraph 1

Commentor: Professor Rhea Williamson

Comment: The phosphorus mass load reduction should be 573 not 576 kg/yr. The statement that the reduction is near zero should be corrected. The allowable load is 22 kg/yr.

Response: As determined in Section 4.2, the phosphorus mass load is correctly stated as 576 kg/yr. The load includes 573 kg/yr from land uses and 3 kg/yr from air deposition.

The commentor correctly identifies that the allowable load for meeting the biostimulatory numeric target of 0.1 mg/L is 22 kg/yr. However, setting aside a 10% margin of safety would result in a load of only 3 kg/yr that would be allocated to existing sources. The statement that the reduction is near zero has been replaced with 3 kg/yr.

Section: 5.2 **Subsection:** Table 5-1

Commentor: Professor Rhea Williamson

Comment: The last column should be labeled the Interim Load Capacity.

Response: The recommended change has been incorporated into the draft.

Section: 6.2 **Subsection:**

Commentor: Professor David Jenkins

Comment: In regards to basis for determination of septic system load allocations, the argument given "to balance the equation" is indefensible.

Response: The referenced phrase has been deleted. As discussed in Section 6.2, reductions in septic system loads will be more significant in the long-term. For the purpose of the short-term target, emphasis is placed on the remaining land-uses because they directly contribute to surface water.

Section: 6.2 **Subsection:**

Commentor: Professor David Jenkins

Comment: There is no justification to have a lower initial % N reduction for septic systems (70%) than for agriculture and residential (75%) … especially since the septic system N estimated contribution is the largest of these. The argument given "to balance the equation" is indefensible.

Response: The septic system load reduction of 70% is less than the 75% reduction for the other four land uses because reductions in septic system loads will be less significant in the short-term, as a result of the residence time in the ground water. In the context of meeting a short-term target, the emphasis is being placed on land-uses such as agriculture and residential, which directly contribute to surface water and are therefore more easily controlled. Additionally, investigation and monitoring data will be collected and used to reassess load allocations. On the second statement, the referenced phrase has been deleted.

Section: 6.2 **Subsection:** Paragraph 4

Commentor: Professor Rhea Williamson

Comment: The number for background loads for undeveloped land needs a reference. In addition, the calculation for background sources assumes that there is a background load for the areas of the watershed that are already developed. Approximately 62% of the watershed is undeveloped (Figure A-2) resulting in a background of 1,560 kg/yr and not of 2,403 kg/yr. This change effectively increases the allocation for nonpoint sources (LAs) to 2,157 kg/yr. All of these numbers assume that the TMDL of 4,130 kg/yr is properly estimated.

Response: A reference has been provided for background loads. Additionally, background allocations in Section 6.0 have been revised and calculated based on the undeveloped land area. Park and preserve was not included because these land uses are assigned load allocations.

Section: 6.2 **Subsection:** Paragraph 7

Commentor: Professor Rhea Williamson

Comment: It is stated that nitrogen contributions from parks, urban areas, and preserves are relatively insignificant. These land uses represent an insignificant percentage of the total watershed, however loads from these areas have not been assessed.

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Response: The commentor correctly identified that contributions from parks, urban areas, and preserves represent an insignificant percentage of the total watershed; however, the loads for these areas are presented in Table 4-1.

Section: 6.2 **Subsection:** Table 6-1

Commentor: Professor Rhea Williamson

Comment: If the annual load allocations are increased to 2,157 kg/yr for the reasons stated above, then the percent reduction is reduced to 52%.

Response: The annual load allocation has been changed to 2,210 kg N/yr (total nitrogen) and 206 kg P/yr (total phosphorus), as a result of basing the background load on the undeveloped land area.

Section: 6.3 **Subsection:**

Commentor: Professor David Jenkins

Comment: The last sentence of the section does not make sense.

Response: The referenced sentence states that the allocated load is the portion of the total P load that is above background. In other words, the amount that is in excess of what would be generated if all of the watershed were undeveloped land. This is consistent with the background load calculation, which was conservatively calculated by applying the export coefficient to the acreage of the watershed. The sentence has been rewritten to be more clear.

Section: 7.0 **Subsection:**

Commentor: Professor David Jenkins

Comment: It is recommended that the symbols used in Figures 7-1 and 7-2 be consistent.

Response: The recommendation has been incorporated into the draft.

Section: 7.0 **Subsection:** Figure 7-1

Commentor: Professor Rhea Williamson

Comment: Data in Figure 7-1 reveal the impact of land uses on nitrate nitrogen concentrations in the creek. Jubilee and RGT-1 are both surrounded by mostly vacant lands, and are least impacted by irrigated fields and orchards. Levels at these sites are relatively low. WGT-1 and VMT-1 receive orchard drainage; nitrate levels are quite high. Riverhouse and Stagecoach are similarly impacted heavily by orchards. Riverhouse levels are high year round, possibly a result of tributary effects and orchard input. Willow Glen has seasonally elevated winter concentrations, followed by a reduction in the late summer months. Sources, loads and seasonal variations at these sites are needed.

Response: The commentor's assessment of Figure 7-1 is in agreement with staff's and the text offered by the commentor has been incorporated. In response to the suggestion to identify sources, loads and seasonal variations at each site, the decision was made to develop two TMDLs that would be generally applied over the entire watershed instead of creating multiple TMDLs for each reach and tributary. Data collected during implementation will fill data gaps and provide additional information that will be used to determine if the TMDLs and load allocations should be revised or if localized TMDLs are needed.

Section: 7.0 **Subsection:** Paragraph 5

Commentor: Professor Rhea Williamson

Comment: Controls on nutrient loading should be implemented all year long. The sediments act as a sink for phosphorus, so controls that reduce P-loading are essential. Sediments can also act as a sink for nitrogen compounds. In addition, algae growth is year round in Rainbow Creek. Availability of plentiful nutrients during the initial growth period can result in accumulations of algae later in the year.

Response: The recommendation has been incorporated into the draft.

Section: 9.4 **Subsection:**

Commentor: Professor John Dracup

Comment: The report states that landowners/land users (such as homeowners, nurseries, businesses, etc.) are identified as responsible parties and are required to comply with all local, state, and federal laws and regulations. From the report, it is not clear which laws

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would force existing land owners in unincorporated areas to change their management practices if their nutrient loads were non-point-sources. Could they be taxed or fined? Could they have land-use permits revoked? The preceding discussion in Section 9.4 was helpful, but it seemed to address control over land use changes rather than static development.

Response: To the extent that laws apply to the land users in the watershed, land users could be subject to permits and fines. As stated in Section 9.2.3 Porter-Cologne Water Quality Control Act, the Regional Board has the authority to specify certain conditions or areas where the discharge of waste, or certain types of waste, will not be permitted. The Regional Board may issue permits (e.g., waste discharge requirements) or waivers of waste discharge. Enforcement actions include cease and desist orders, cleanup and abatement orders, administrative civil liability orders, civil court actions, and criminal prosecutions.

Section: 9.5 **Subsection:** Paragraph 5

Commentor: Professor Rhea Williamson

Comment: Add the sentence to the end of the paragraph: If monitoring data indicate that load reductions are not adequate to result in the nutrient target concentrations, then load allocations will be reevaluated and reduced.

Response: The recommended change has been incorporated into the draft.

Section: 9.5.1 **Subsection:**

Commentor: Professor Rhea Williamson

Comment: The numbered measures or alternatives are stated as being equally effective in meeting the 28% reduction. The items help assess, plan, develop regulations and the like, but none of the items actually reduce the nitrogen or phosphorus load.

Response: The commentor has correctly identified that the implementation actions do not directly reduce the nutrient loading. The proposed implementation actions describe a range of potential actions that could be taken to correct the nutrient loading problem. These actions are regulatory mechanisms that provide a framework for reductions to be made. In essence, implementing the recommended actions will lead to reductions in nutrient loading.

Section: 9.5.1.1 **Subsection:**

Commentor: Professor David Jenkins

Comment: The statement identifying hydrologic study monitoring parameters is vague and does not specify what chemical and physical parameters are to be monitored.

Response: The monitoring parameters are discussed and presented in Section 9.7 Monitoring Strategy for TMDL Implementation and Refinement of Source Analysis. A reference to the information has been added.

Section: 9.5.1.1 **Subsection:**

Commentor: Professor David Jenkins

Comment: The bullet refering to the feasibility of establishing a "Septic System Mangement District" is vague.

Response: Creating an entity that can evaluate, manage, and resolve the sewage disposal issues that are unique to this community needs to be evaluated. Language has been added to clarify this point.

Section: 9.5.1.1 **Subsection:** Ground Water

Commentor: Professor Rhea Williamson

Comment: In the bullet discussing transpiration rates and nutrient removal, transpiration rates are not used to describe nitrogen removal.

Response: The language has been changed to clearly reflect "plant uptake".

Section: 9.5.1.4 **Subsection:** Paragraph 6

Commentor: Professor David Jenkins

Comment: It is not clear to the reader what "is considered to be inadequate" in addressing the concerns of the TMDL.

Response: As a result of recent correspondence with Hines Nursery, the referenced statement is no longer applicable and has been deleted.

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Section: 9.6 **Subsection:** Table 9-1

Commentor: Professor Rhea Williamson

Comment: Tier I (A) should require interim reports 2 years after USEPA approval.

Response: The recommended change has been incorporated into the draft.

Section: 9.7.1 **Subsection:** Paragraph 1

Commentor: Professor Rhea Williamson

Comment: Targets for biostimulatory substances should be collected year round for the reasons stated above.

Response: The recommended change has been incorporated into the draft.

Section: 9.7.1 **Subsection:** Paragraph 1

Commentor: Professor David Jenkins

Comment: The sentence should specifically state which biostimulatory substances are being refered to.

Response: The recommendation has been incorporated into the draft.

Section: 9.7.1 **Subsection:** Paragraph 2

Commentor: Professor Rhea Williamson

Comment: The Margarita Glen Tributary should be retained as a site. This site has very high total nitrogen and nitrate nitrogen (Table B-2). A long reach of the creek between Oak Crest-3 and Willow Glen-4 is not assessed. Major differences in nutrient concentrations exist between these two sites (Based on the averages for 8/22/00-10/10/00, TN and nitrate are 10.8 and 8.9 mg/L at Oak Crest and are 3.8 and .3. at Willow Glen. Phosphate was always less than 0.5 mg/L at Oak Crest, but was 0.37 at Willow Glen per

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Table B-2). For this reason, a station should be added on Rainbow Creek between these two stations and below the agricultural fields.

Response: The recommended changes have been incorporated into the draft.

Section: 9.7.1 **Subsection:** Paragraph 3

Commentor: Professor David Jenkins

Comment: What is "quantified algae abundance"?

Response: The language has been changed to "algal biomass".

Section: 9.7.1 **Subsection:** Paragraph 4

Commentor: Professor David Jenkins

Comment: The statement that "it is not known at this time which factor is the limiting factor" is a key statement and is hidden away here. This statement should be made in an up-front way and be loud and clear or the report will loose all credibility. Additionally, how can N and P be regulated for biostimulatory substances without knowing which limits growth?

Response: A discussion is provided in Section 3.0 Numeric Targets regarding using the ratio of nitrogen to phosphorus (N:P) to indicate which nutrient is expected to limit algal growth. The referenced statement has been modified to state that it is assumed that N and P are co-limiting.

Section: 9.7.1 **Subsection:** Paragraph 4

Commentor: Professor David Jenkins

Comment: What is a "biodynamic analysis"? Please provide a method so that it can be done by the County of San Diego.

Response: The language has been changed to "algal species composition" and a reference has been provided.

Section: 9.7.1 **Subsection:** Table 9-2

Commentor: Professor Rhea Williamson

Comment: Add turbidity to the surface water monitoring. Change the type of sample from grab to field for pH, dissolved oxygen, and conductivity for both surface and ground water monitoring. Investigate use of chlorophyll (planktonic and attached) for the algae growth quantification.

Response: The recommended changes have been incorporated into the draft. The comment regarding chlorophyll as a method for quantifying algal growth is noted.

Section: 9.7.1 **Subsection:** Table 9-2

Commentor: Professor David Jenkins

Comment: Comments in Table 9-2 include:
What is total nitrogen?
What is the difference between total nitrogen and TKN?
Change "grab" to "in situ" for pH and dissolved oxygen.
Why perform both conductivity and TDS?
What type of sample is required for "Quantification of algae growth"?

Response: Total nitrogen is a measure of all forms of nitrogen (i.e., ammonia, nitrite, nitrate, and organic nitrogen). Total Kjeldahl Nitrogen, or TKN, is a measure of ammonia nitrogen and organic nitrogen. "Grab" sample was changed to "in situ" for pH and dissolved oxygen. Since previous monitoring data has been collected, TDS only will be required. "Quantification of algae growth" has been changed to read "Algal biomass (% cover of bottom and/or collection of algal samples)" and can be sampled using in situ or grab sample methods described in USEPA (2000).

Section: Peer Review Request Letter **Subsection:** Attachment 1, page 2

Commentor: Professor Rhea Williamson

Comment: Discussions related to second tier load reductions should indicate that nutrients will be reduced to concentrations "less than" the biostimulatory substances targets.

Response: Comment noted.

Appendix L – Public Comment Letters For Public Hearing on May 8, 2002

L-1 County of San Diego

L-2 Hines Nurseries

L-3 U.S. Environmental Protection Agency

L-4 San Diego County Farm Bureau

Appendix L – Public Comment Letters

L-1 Gary Erbeck, Director
Department of Environmental Health
County of San Diego
Letter dated April 23, 2002

County of San Diego

GARY W. ERBECK
DIRECTOR

DEPARTMENT OF ENVIRONMENTAL HEALTH
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RICHARD HAAS
ASSISTANT DIRECTOR

April 23, 2002

SAN DIEGO REGIONAL
WATER QUALITY
CONTROL BOARD
2002 APR 24 P 1:02

Mr. John H. Robertus, Executive Officer
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Dear Mr. Robertus:

WRITTEN COMMENTS ON PROPOSED BASIN PLAN AMENDMENT MODIFYING PORTIONS OF CHAPTER 4, IMPLEMENTATION TO INCLUDE RAINBOW CREEK NUTRIENT TMDLS AND IMPLEMENTATION PLAN

Attached are the County of San Diego's written comments on the proposed Basin Plan Amendment, modifying portions of Chapter 4, Implementation, to include Rainbow Creek Nutrient TMDLs and Implementation. The County welcomes any comments on its submission and encourages the California Regional Water Quality Control Board, San Diego Region, to consider a meeting to discuss our response prior to the Public Hearing and Notice of Filing Scheduled on May 8, 2002.

Please contact Jack Miller at (619) 338-2201, if you have any questions concerning our comments or would like to establish a meeting time.

Sincerely,

GARY W. ERBECK, Director
Department of Environmental Health

cc: Lisa Brown, SDRWQCB
Don Steuer, Land Use & Environment Group
Rod Lorang, County Counsel
Jack Miller, DEH
Jon Van Rhyn, DEH

County of San Diego Comments on
Proposed RWQCB Resolution R9-2002-0108
Rainbow Creek TMDL and WLA
(Submitted April 23, 2002)

Introduction

The Rainbow Creek Total Maximum Daily Load (TMDL) proposal addresses Nitrogen (N) and Phosphorus (P) loadings to Rainbow Creek from point source discharges to surface water, non-point source discharges to surface water, and from groundwater discharges into the creek. The current 303(d) listing for Rainbow Creek was put in place in 1996, and is for eutrophic conditions. However, Regional Water Quality Control Board (RWQCB) staff have acknowledged in their draft reports and in response to peer reviewer comments that there is presently no evidence of eutrophic conditions in Rainbow creek. A revised proposed 303(d) listing for Rainbow Creek is scheduled for a hearing before the State Water Resources Control Board (State Board) in late May of this year.

Based on the draft RWQCB staff report that supports this TMDL proposal, the most significant sources of N (in descending order) are undeveloped land, residential septic systems, orchards, agricultural fields, and commercial nurseries. Septic systems are not a significant source of P. The RWQCB proposal includes a Waste Load Allocation (WLA) for N and P for each of these categories of sources.

None of these identified categories of significant sources involves discharges by the County.

Despite the fact that it is not a significant discharger, the County should play a significant part in regional efforts to address water quality in Rainbow Creek. The County is the principle land use authority for this watershed. The County issues or denies permits to install most conventional septic systems County-wide under an existing RWQCB delegation.[1] The County also responds when sewage from septic systems surfaces and poses a health threat. Finally, the County has established working relations with the agricultural community that are

[1] The RWQCB remains the principle agency regulating wastewater system discharges to groundwater; the County's delegated authority is limited. For example, the County cannot issue permits for or require installation of advanced domestic wastewater systems. The RWQCB and the County will need to review their programs for onsite sewage treatment systems to implement A.B. 885, enacted last year. This could results in significant program changes sometime after 2004.

likely to be helpful in seeking to reduce N and P loadings from nurseries, orchards and crops.

The County also has a role to play in this process as a "local agency" subject to Water Code section 13225(c). The County acknowledges that the RWQCB has authority pursuant to that subsection "to require as necessary [the County] to investigate and report on any technical factors involved in water quality control or to obtain and submit analyses of water . . . ." The County notes however that this authority is subject to conditions.[2]

While the County is not a significant discharger in this watershed, the County intends to continue to work with the RWQCB to address water quality issues in this watershed (and County-wide) on a coordinated and cooperative basis. The County has recently demonstrated its resolve to cooperate with the RWQCB in many ways—e.g., by accepting the municipal stormwater permit;[3] by stepping forward as principle copermittee under that permit without seeking reimbursement for coordination costs; by developing model ordinances and program elements that were adapted and used by other copermittees; and by continuing its support for and leadership of Project Clean Water (also without reimbursement). The County is also cooperating with other local governments and state and federal agencies to ensure that appropriate watershed planning is undertaken throughout the County.

Summary of County Position on the Proposed TMDL and WLA

The County as a governmental entity hopes and intends to work with the RWQCB to address water quality issues affecting Rainbow Creek. However, the County will not be able to support the implementation of this TMDL and WLA as currently proposed by RWQCB staff. Significant changes are needed to gain the County's support and to allow effective RWQCB/County cooperation.

County staff have worked with RWQCB staff during the development of this proposal. The County agrees with RWQCB staff on many fundamental points, e.g., that any strategy for improving water quality in Rainbow Creek should

[2] Conditions imposed by the Water Code are included in subsection 13225(c). First, the requirement must be "necessary." Necessary reports can be required "provided that the burden including costs, of such reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained therefrom." State laws concerning unfunded mandates may also require that the state provide funding to the County to carry out any directives issued pursuant to subsection 13225(c). The County does not waive its right to assert in the appropriate forum that directions issued to the County pursuant to this subsection are unfunded state mandates.

[3] The County's decision not to petition or appeal this permit was made only after significant modifications were made to the permit in response to comments by the County and others.

include phased implementation of a TMDL and WLA; that more study is needed to define problems, to track progress and to better inform key decisions; and that an appropriate opportunity should be provided to achieve "voluntary" reductions in loadings before drastic regulatory measures are applied to septic systems, orchards and crops. The County also agrees with RWQCB staff that the County should play a substantial role both in conducting further studies where needed, and in securing load reductions from septic systems and agricultural activities.

The County acknowledges that some of the most significant comments it provided during the development of this proposal were accepted and implemented by RWQCB staff and/or legal counsel. In particular, the County wants to acknowledge that the proposal calls for "requests" that the County take action in many areas where RWQCB staff had formerly proposed to attempt to compel County action.

These areas of agreement are significant and provide a good foundation for cooperation. However, many other significant County concerns were not resolved by RWQCB staff. This TMDL/WLA proposal remains fundamentally flawed for the following reasons:

1. The proposal has not been peer reviewed. (A less stringent proposal was peer reviewed.)

2. The proposal is not consistent with the law or with the available data.

3. The proposal is not realistic in seeking a 50% reduction in releases of N from residential septic systems.

4. The proposal sets policy precedents that are unacceptable to the County, and that are likely to be unacceptable to the San Diego community generally once those policies are understood.

These concerns are addressed further in the text that follows.

We appreciate the opportunities for dialog that RWQCB staff and mid-level managers have provided to County staff and legal counsel. The County offers these written comments in the same spirit of cooperation as its prior comments. Many of these comments were offered to RWQCB staff orally after the release of the proposed resolution package. We understand that RWQCB staff are still considering some of those comments, and we do not mean by repeating a comment here to imply that RWQCB staff have finally and firmly determined to oppose the County's position on the point addressed.

While the County will continue to work with RWQCB staff, these formal comments are direct and specific. The County believes that at this stage in the TMDL promulgation process, a clear written statement of its concerns and positions may assist RWQCB senior managers, legal counsel, and Board members. We hope to resolve the issues raised in these comments in a manner that would make continued County / RWQCB cooperation possible. We hope that RWQCB managers and Board members will accept the offer of cooperation that the County is extending with these comments. The County does of course welcome further discussion of its proposals—before, during, or after any public hearing or RWQCB action on this proposal.

The County's efforts to resolve these issues are not based solely on the effects this TMDL would have on the County or on Rainbow Creek. This TMDL will be one of the first TMDLs implemented in this region, and it will be closely watched. Therefore, this TMDL should be crafted and implemented in a manner that will lay a strong foundation for public and stakeholder acceptance of TMDLs in San Diego. As proposed, however, this TMDL would likely have the opposite effect: it is likely to undermine public confidence in the RWQCB's TMDL process, to the ultimate detriment of water quality in the San Diego region.

The specific comments that follow address timing, scientific flaws in the proposed TMDL, and cost sharing and other changes to this proposal that would facilitate continued RWQCB/County cooperation.

This TMDL Should Be Delayed Until a Revised 303(d) Listing is in Place

The current 303(d) listing for Rainbow Creek was put in place in 1996, and is for eutrophic conditions. But, RWQCB staff have acknowledged in their draft reports and in response to peer reviewer comments that there is presently no evidence of eutrophic conditions in Rainbow creek. This may be due in part to reductions in nutrient loadings achieved since 1996.

In response to changed conditions, the RWQCB has proposed to revise the impairment listing for Rainbow Creek. That proposed revision is set for review by the State Board in late May of this year. The revised listing would directly address loadings of N and P that (1) are causing violations of the drinking water standard for nitrate; and (2) are believed to be causing N and P levels in the creek in excess of the Basin Plan's narrative objective for biostimulatory substances. That narrative objective states: "Inland surface waters, . . . shall not contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect beneficial uses."

As a matter of law, TMDLs must be promulgated after and must be based on impairment listings. Peer reviewers have noted and RWQCB staff have acknowledged that the current impairment listing for Rainbow Creek no longer has a basis in fact. Moreover, it is clear that RWQCB staff are not proposing a TMDL to address the eutrophication-based impairment listing for Rainbow Creek, but are instead proposing a TMDL that *anticipates* the modifications to the Rainbow Creek impairment listing that are now pending at the State Water Resources Control Board. This sequencing is backwards, legally and scientifically. It is an abuse of the public participation processes the law mandates for 303(d) listings and for TMDLs. No TMDL for Rainbow Creek should go forward until a revised impairment listing for Rainbow Creek is in place.

The County recognizes that the RWQCB is committed to promulgating a TMDL for Rainbow Creek in the very near future. This appears to be achievable. Rainbow Creek is assigned an MUN beneficial use in the basin plan, and available data show directly that parts of Rainbow Creek sometimes contain nitrates in excess of the applicable drinking water standard. Therefore, there is little doubt that a revised 303(d) listing will support a TMDL for nitrates based on this drinking water standard. The March 2002 staff report would support this TMDL. Therefore, it should be feasible to promulgate an appropriate TMDL to address this drinking water standard with virtually no delay, once a revised 303(d) listing is in place.

A TMDL for Rainbow Creek should be delayed briefly, and should be limited in its initial scope, for two additional reasons.

First, this basin has not yet reaped the full benefits that can be expected when appropriate technology-based controls have been in place at all commercial nurseries for a reasonable period of time. These nurseries are discrete and significant sources of contamination, and they are still in the process of developing and implementing nutrient control and irrigation control BMPs to limit N and P in their discharges. In addition, the draft Staff Report notes (at pp. 3-4) that one commercial nursery in the watershed has actually placed a dam in Rainbow Creek, and uses the creek to impound and recirculate irrigation water. Restoring the natural flow of the creek may have significant effects. Whether the controls put in place at these sources are "voluntary" or "mandatory" is not the key issue here.[4]

[4] RWQCB staff have asserted to County staff and legal counsel that discharges from these nurseries are "agricultural return flows" and therefore are not point source discharges subject to the federal Clean Water Act. If this were correct, then the Clean Water Act would not require that these nurseries be placed under permit before a TMDL was developed. Without commenting on the assertion that nurseries may be exempt from *federal* discharge permits, the County notes that state Water Code section 13260(a) allows the RWQCB to issue and enforce WDRs to "any person discharging waste," and that Water Code section 13050 defines "waste" to

In either case, it is clear there are further reductions in pollutant discharges that can be attained using cost-effective technology-based measures. It will take some time to see what further effects these reductions in N and P loadings will have on Rainbow Creek. The interim reductions already achieved have had a significant beneficial effect on the creek.

A second reason to limit the scope of an intial TMDL is that the state has just established and is in the process of implementing a new program, complete with financial incentives, that may allow some properly functioning conventional septic systems in this watershed to be replaced with advanced systems, that would discharge less N. TMDL implementation in this watershed should be tied to the phased implementation of AB 885, but those new programs will not be in place until 2004.

The short delay and initial limitations proposed here are consistent with the federal Clean Water Act and the state Water Code. TMDLs are intended to be "second-step" programs, deployed to address water quality problems that persist after technology-based controls have been implemented. TMDLs that are promulgated before reasonable technology-based controls are in place may be unnecessary or poorly calibrated.

It is important to note that the initial TMDL that the County proposes here need not interfere with progress on water quality improvement in Rainbow Creek, in comparison to the TMDL proposed by RWQCB staff. The TMDL proposed by RWQCB staff would allow four years to achieve this drinking water standard. Before these initial efforts to attain the drinking water standard were completed, a revised 303(d) listing would be in place, more would be known about the creek, and the AB 885 program would be taking shape. A revised TMDL for N and P could take this new information into account, and still be promulgated before implementation of an initial TMDL had been completed.

The Proposed TMDL is Scientifically Flawed

The proposed TMDL has not been peer reviewed. The RWQCB's peer reviewers examined a November, 2001 draft staff report. That report proposed a TMDL for N of 3,400 kg/yr, plus a 2,400 kg/yr allowance for undeveloped land and margin of safety. (November, 2001 draft staff report at pp. 25-27.) No peer

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include discharges from "any producing operation." Commercial nurseries that discharge polluted water from a pipe into a creek could therefore be required under state law to obtain WDRs, whether or not the nurseries are required to have permits under the federal Clean Water Act.

reviewer has endorsed the much more stringent TMDLs actually proposed in the draft Basin Plan Amendment.

A TMDL program for Rainbow Creek is also subject to two special complications that increase the importance of basing the TMDL on sound science.

First, because this is one of the first TMDLs in San Diego, it will receive extra scrutiny as an indicator of RWQCB's intentions and standards for the TMDL program in San Diego generally. Stakeholders with no interest in Rainbow Creek itself will review this TMDL looking for flaws in the RWQCB's use of data, adherence to the law, scientific process, and decision-making process. If this TMDL is to advance the cause of water quality region-wide, it should merit the support of stakeholders broadly as a model for future TMDLs. It must have a strong scientific foundation, must set reasonable goals that will be broadly acknowledged to be appropriate and important, and must allocate costs and other pain in a manner that is generally acknowledged to be fair. It must be capable of being implemented at a reasonable cost, i.e., at a cost that can be justified by the benefits that will be obtained.

Second, a Rainbow Creek TMDL is unlikely to be limited to imposing more stringent numerical limits on effluent discharges by significant point sources. Instead, people will be affected where they live, and agriculture will be affected. Success in reducing loading of pollutants from existing septic systems, from agricultural activities, and from land uses such as parks and preserves is not merely a matter of governments wanting to do the right thing and having the political will to impose necessary regulations. Success in these areas will ultimately depend on the consent of the governed. Therefore, a Rainbow Creek TMDL must also be a tool for building consensus among those directly affected.

These aspects of this process increase the importance of proposing a TMDL that is both well founded scientifically, and well calibrated. The TMDL proposed by staff does not appear to be calibrated to fit the available science, or fundamental policies for TMDLs.

<u>The Proposed TMDL Is Not Realistic in Seeking a 50% Reduction in Releases of N from Residential Septic Systems</u>

Achieving a 50% reduction in septic system-derived loadings of N to Rainbow Creek is almost certainly not feasible, and is probably physically impossible under the most ideal of soil conditions, unless significant numbers of properly functioning conventional septic systems are replaced with very costly alternative systems. Properly functioning conventional septic systems are not designed to remove large quantities of N. They are designed to convert organic N and

ammonia to nitrate, to remove some N altogether through denitrification, and to remove all pathogens. Additional N is removed by plant assimilation in the septic system leach field. While failing septic systems would undoubtedly add more N to the subsurface than functioning systems, most of the systems in the Rainbow Creek watershed are functioning properly.

The AB 885 program will provide new tools to address releases of N from septic systems, where those releases impair beneficial uses. Those tools may include a revolving, low-interest loan fund. The determination of a realistic WLA for septic systems should be deferred until further progress is made in defining and implementing programs based on AB 885.

If reduction in loadings from onsite wastewater treatment systems must be achieved more quickly than would be the case under AB 885, or if ultimate reductions must exceed what AB 885 programs would achieve, then the RWQCB must take the responsibility to secure those reductions. As noted above, the regulation of discharges to ground water from onsite wastewater treatment systems is primarily an RWQCB responsibility, and the delegation that County has accepted (i.e., to administer a permit program for new conventional septic systems) is limited in scope. The County should not be asked to accept responsibility to secure greater reductions in septic system loadings of N than AB 885 programs will achieve.

The Proposed TMDL Is Not Internally Consistent

The proposed TMDL is scientifically and mathematically flawed. In recent discussions with County staff and legal counsel, RWQCB staff were unable to explain how the allowable loadings proposed in this TMDL are related to estimated natural loadings to Rainbow Creek, or to estimated loadings required to reach the staff's numerical water quality targets.

A simple table that is not contained in the draft staff report or the proposed Resolution or Basin Plan Amendment, but which is based entirely on the numbers included in those documents, is enlightening:

How Much Nitrogen?

Item	Value	Source
N loading from remaining undeveloped land	1,507 kg/yr	Staff Report, p. 13
% of land in the basin that is still undeveloped	63 %	Staff Report, p. 13
Total N loading if all land was undeveloped	2,403 kg/yr	calculated[5]
Total N nominally[6] allowed by the TMDL	≤1,507 kg/yr	Plan, p. 2
Total N to achieve target of 1.0 mg N/L	≤402 kg/yr	Plan, p. 2, note 1
Total N actually allowed by the Resolution	≤402 kg/yr	Plan, pp. 2-3

Even though pre-human nitrogen loadings to Rainbow Creek were likely to have been about 2,400 kg/yr, this TMDL package proposes a nominal TMDL for N that would require total N loadings to be reduced to less than two-thirds that level. Under this scenario, undeveloped land could be left to nature and could continue to release N to the creek, but all N discharges from land touched by man (even if only touched by designation as a "preserve") would eventually have to be eliminated. It would *not* be sufficient merely to reduce discharges back to natural levels.

Moreover, RWQCB staff's proposed approach to actually implementing this TMDL would not treat the TMDL itself as a stopping point. Instead, the draft Basin Plan Amendment proposes that incremental reductions in N loading must continue to be achieved somehow until the numerical objective of 1.0 mg N/L is met in the creek. (See draft Amendment at pp. 2-3.) If RWQCB staff are correct that meeting these targets will require reducing loadings to 402 kg N/yr as stated in footnote 1 to the Resolution, then the effective TMDL for N is 402 kg/yr, not

[5] Calculated at 1507 kg/yr divided by 0.627. This applies the loading rate for remaining undeveloped land to the entire land area of the basin, to approximate the "natural" or "baseline" load of N to Rainbow Creek prior to any human intervention. The calculation is potentially inaccurate to the extent already developed land would have had a different natural loading factor than remaining undeveloped lands.

[6] The draft Resolution nominally sets a Nitrogen TMDL of 1,507 kg/yr. (Resolution, p. 2.) However, the Resolution also states that incremental reductions of 10% every four years will be required "*until the biostimulatory targets for nitrogen and phosphorus are met.*" (Resolution, pp. 2-3.) In other words, it is these numeric targets for water quality, not the nominal TMDL that would define the stopping point for further controls.

1,507 kg/yr. This would require total loadings of nitrogen to be reduced to 402 kg/yr—*less than one fifth of estimated natural levels.*

Efforts to reduce N to these levels would themselves have environmental consequences for the lands affected. Reducing loadings of N and P to Rainbow Creek to below the level of natural loadings could also have environmental impacts on Rainbow Creek—under the plan proposed by RWQCB staff, Rainbow Creek would receive less N and P than it did in its natural condition. The environmental effects of driving nutrient loadings down to these unnatural levels were not disclosed or addressed in the environmental checklists and analyses prepared for this project.

None of these numbers are certain, of course. But it is nonetheless clear that the RWQCB should not launch the TMDL process in San Diego by proposing to set TMDLs for Rainbow Creek at levels that are two-thirds to one-fifth of natural loadings, based on an impairment listing that staff concedes has no basis in fact. To do so would be scientifically unsupportable, inconsistent with the Water Code, and politically unwise. Any such proposal would be damaging to the successful implementation of TMDLs in San Diego and elsewhere.

Whether the Basin Plan Water Quality Objective for Biostimulatory Substances in Rainbow Creek is Exceeded or Not is Still Uncertain

The Basin Plan's narrative water quality objective for biostimulatory substances prohibits substances in concentrations that promote growth "to the extent such growths cause nuisance or adversely affect beneficial uses."

RWQCB staff consider the algal and emergent plant growth they have visually observed in Rainbow Creek to be excessive. (See draft Staff Report, p. 7.) This observed condition is not creek-wide. Rainbow Creek is about five to six miles long. Much of it is shaded by a plant canopy, and no excess algae have been observed in shaded areas. The growth of algae was visually judged by staff to be excessive at only two locations in 1999, and at only four locations in 2000. All of these areas have shallow slow moving water and no overhanging canopy. (Draft Staff Report at p. 7-8, and attached photos.)

Moreover, these visual characterizations may not be reliable even as to the locations called out by staff. Two of the RWQCB's three peer reviewers have questioned the use of visual observations alone to determine whether algae and plant growth is "excessive." Dr. Rhea Williamson notes that determining visually whether there is excessive algae growth "can be misleading." (Attachment F.2, at second [unnumbered] page, first comment re page 5 of the staff report.) Dr. David Jenkins asks, "where are the data on emergent plant and algal numbers to support

your statement that both are 'excessive'." RWQCB staff were unable to respond with data, as no data are available yet to make this showing. (Attachment F. 3 at "Summary of asterisked comments" for page 8 of the staff report).

Another factor not explicitly considered in the draft Staff Report is that the Basin Plan water quality objective is not violated merely by accelerated or "excessive" growth of algae or emergent plants. The plan narrative objective is violated only if growth is so excessive it is a nuisance, or so excessive it adversely affects beneficial uses.

A principle reason RWQCB staff have not made a convincing scientific case for impairment by biostimulatory substances may be that staff misconstrue the Basin Plan as also setting numerical Water Quality Objectives for N and P. The Basin Plan states that "a desired goal for total phosphorus appears to be 0.1 mg/L total P." Staff would style this as creating a Water Quality Objective. Staff admit that no "analogous threshold value" for N is set in the Basin Plan. (Staff Report at p.7.) They nevertheless derive a limit of 1.0 mg/L for N from a discussion in the Basin Plan of natural ratios of N to P that should be used as default values in the absence of any water-body-specific data. Staff characterize even this constructed number, which is derived from rather than called out in the Basin Plan, as a "Water Quality Objective." (Draft Staff Report p.6, and draft Resolution p.1, Finding No. 5).

The scientific basis for both of these targets is weak. Dr. David Jenkins of U.C. Berkeley, one of the RWQCB's peer reviewers for the draft staff report, addressed these targets as follows: "An arbitrary assumption that the P limit should be one-tenth of the N limit is absolutely insupportable, bordering on the ridiculous! Reductions in P and further reductions in NO_3-N must be justified on the basis of determining which limits algal growth in the Creek." (Attachment F.3, transmittal letter at page 1.)

In the RWQCB staff's response to this comment, "absolutely insupportable, bordering on the ridiculous" becomes merely "unfounded." Staff's more substantive response is essentially that the Basin Plan allows the use of a 0.1 mg/L target for P, and a ratio-based 1.0 mg/L target for N, when no data are available. (Response to comments at page 2.) RWQCB staff have chosen to respond to a stinging scientific objection by a designated peer reviewer by (1) softening the true force of that comment in their summary, and (2) by offering up a legal rather than a scientific response to the comment.

But, RWQCB staff are also incorrect on the application of the law. The "apparent" or "desired" "goal" for phosphorus that staff would rely on was not identified during the Basin Plan amendment process as a numerical Water Quality

Objective, for informed public comment and RWQCB adoption. It is therefore not a Water Quality Objective, but is only what the Basin Plan says it is: a number that appears to be a desirable goal. Similarly, the limit of 1.0 mg/L total N that staff derive by applying a 10:1 ratio to this apparent desirable goal is also not legally a Water Quality Objective, or even an identified "desirable goal." It is a default in the absence of any data. The RWQCB should be gathering the data to avoid a resort to such defaults, rather than proclaiming default values to be Water Quality Objectives that should drive the TMDL process.

Any TMDL for biostimulatory substances in inland surface waters in San Diego must be based on the Basin Plan narrative standard as the applicable Water Quality Objective. Staff's targets of 0.1 and 1.0 mg/L for P and N respectively should be properly identified as interim numerical targets, rather than as Water Quality Objectives. Basic studies should be completed in the near future to allow replacement of these default values with numerical targets that reflect actually going on in Rainbow Creek.

The evidence currently available to the RWQCB to establish and characterize a biostimulatory impairment of Rainbow Creek is weak and equivocal. It does not provide an adequate basis for the public to accept the very stringent TMDL that RWQCB staff have proposed.

County Proposals for TMDL Amendments and Inter-Agency Cooperation

TMDL programs for Rainbow Creek should be implemented on a phased basis, both to sequence regulatory actions properly and to ensure that appropriate science is in place to support policy decisions.

Phase one of this process is underway, and should continue with promulgation of an interim TMDL for nitrates based on the applicable drinking water standard for nitrates. This interim TMDL should be put in place after completion of the 303(d) listing amendment process for Rainbow Creek.

During the early stages of implementing this interim TMDL, appropriate studies should be pursued on a cooperative and shared-cost basis to determine whether and if so where Rainbow Creek is actually impaired for biostimulatory substances based on the narrative standard in the Basin Plan. These studies should also determine the actual levels of N and P that are limiting for biostimulatory effects in the potentially impaired portions of this creek. The studies should confirm or refine estimates of natural N and P loadings to Rainbow Creek, and should determine the characteristics the creek would have if only natural loadings entered the creek.

During this period the County and the RWQCB should also cooperate to pursue the best available opportunities to reduce incremental man-made loadings of N and P to Rainbow Creek. This should include securing all appropriate additional reductions at commercial nurseries.

The County and RWQCB should also cooperate to implement AB 885 programs for onsite wastewater treatment systems.

A second phase of TMDL implementation should be based on a revised 303(d) listing and on the results of phase one studies. This could mean that more stringent TMDLs for N and P would be put in place. However, because the numbers in the draft Staff Report do not add up, the RWQCB should also be open to revising the designated beneficial uses of Rainbow creek, or numerical targets for N and P to support those uses, to reflect conditions in the creek that would be consistent with natural loadings. Any numerical targets for N and P concentrations in the creek, and any revised TMDLs, should be set at levels that will allow N and P loadings to remain at levels at least equal to base-line or natural loadings. Higher loadings should be tolerated if those existing loadings do not cause a nuisance or impair valid beneficial uses. Unless the RWQCB agrees that the results of future studies will be used appropriately during the regulatory process, the County would have little interest in coordinating and in helping to fund such studies.

Some specific actions that would be needed to implement this two-phased strategy are as follows:

1. Respect the Basin Plan. Staff's numeric targets for N and P should not be characterized anywhere in the Resolution, Basin Plan Amendment, or Staff Report as Water Quality Objectives. Only the narrative standard for biostimulatory substances actually established by the Basin Plan, after clear public notice and an opportunity to comment, has this status.

2. Cooperate to practice good science. The RWQCB must progress beyond invocations of the Basin Plan in ways that peer reviewers can characterize as scientifically "absolutely insupportable, bordering on the ridiculous," to solid science. Impairments must be verified and localized. The RWQCB must determine how N and P interact to stimulate algal growth in specific parts of the creek. TMDL implementation must be focused on these specific problems. The County is prepared to participate in this study process.

3. Set realistic TMDLs. In phase two, TMDLs must not be set lower than estimated natural loadings for the basin, and should be set higher if that is consistent with protecting the beneficial uses of Rainbow Creek that are identified as being achievable after further study.

4. Give the County more flexibility re study designs, monitoring, and reporting. The County remains willing to *coordinate and to contribute* to the cost of the studies and monitoring that are needed in this watershed.[7] However, read together, the draft Basin Plan amendment and draft Staff Report set very specific mandatory parameters for this work. Those specifications would lock in future research for a four-year period, and would require the County (or the County and others) to spend more than $1.0 million for studies, monitoring and reports. Much more flexibility is needed for the County to willingly undertake this work.[8]

5. Do not characterize the County as a "responsible party" or as a "discharger" for this watershed. The County acknowledges that is a "local agency" that is subject to RWQCB direction related to studies and monitoring, under certain conditions, pursuant to Water Code section 13225(c). The County also acknowledges that it has a significant role to play in this watershed as a land use authority, a public health agency, and a permitting agency for some new septic system installations. However, these various roles do not make the County a "discharger" or a "responsible party" for N and P loadings to Rainbow Creek.

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[7] The draft Resolution (at page 2, item 8.a) proposes to direct the County to "undertake an investigation to access [sic] nutrient loadings to Rainbow Creek from groundwater and septic systems." This section further states that the County "has indicated a willingness to undertake this investigation." That statement is incorrect. The County indicated a willingness to coordinate this study effort. County staff also provided basic study parameters and a cost estimate for an "ideal" study effort, including not only a study of loadings from septic systems but also other research. RWQCB staff have proposed to transform these study parameters and cost estimates into mandatory requirements—including a requirement that the County in fact spend the amounts it estimated would be needed for an ideal study of all issues. The County did not state that it was willing to do this work in exactly the manner postulated in its cost estimate, and thereafter specified in the draft Staff Report. The County did not indicate that it was willing to pay the entire cost of this work. The County is not willing to be locked into an inflexible four-year research plan, and is not willing to bear the entire cost of any studies of Rainbow Creek by itself.

[8] In the absence of an agreement concerning this work, the County would consider whether to challenge directives based on Water Code section 13225(c) as being inconsistent with the Water Code, and as unfunded state mandates. See footnote 2.

6. Make and support required findings before imposing investigation, reporting or analysis requirements on the County. Water Code section 13225(c) allows the RWQCB to impose these requirements on a local agency only if the requirements are "necessary" and only provided the burdens of the imposition including costs are reasonable in comparison to the need for the report and the benefits to be obtained therefrom. RWQCB staff have not done the work required to support the imposition of study requirements on the County under these standards. They have reported the costs of an ideal study as reported to them by County staff, but analysis and findings concerning necessity, burden, and benefits are lacking. The draft Resolution includes proposed Finding No. 17, but that is a general finding concerning all benefits and all costs of the TMDL, not a finding that addresses the requirements of section 13225(c).

7. Share study costs equitably, including a substantial state contribution. The County is not a significant discharger in this watershed, and is not the principle governmental agency with responsibility for promulgating and implementing TMDLs. The studies the RWQCB is seeking would provide basic data and science that should underlie any TMDL. This work should be the RWQCB's job. The County is willing to contribute to needed study efforts, but will not bear the entire cost of needed studies, plans and monitoring. The RWQCB or state, and major dischargers in the watershed, must also provide significant funding. The County's obligations to do work pursuant to section 13225(c) must be contingent on receipt of funds from those sources.

8. Set realistic load reduction targets for onsite wastewater treatment systems, tied to AB 885 program implementation. As discussed above, achieving a 50% reduction in septic system loadings watershed-wide is almost certainly not feasible and is probably physically impossible under the most ideal of soil conditions, unless properly functioning systems are replaced. Replacement are only likely to be achievable to the extent state financial subsidies are provided under the AB 885 program. Waste load allocations and implementation schedules must reflect these limitations.

9. Don't require reduced discharges of N or P from preserves. Discharges from preserves are natural, background discharges. They cannot be reduced without interfering with preservation of the land in its natural state. Yet, the proposed TMDL would require the same

proportional reductions in N and P loadings from these lands as from agriculture and septic systems.

10. Take reasonable technology-based reductions in loadings from nurseries into account. The RWQCB should secure reasonable further reductions in loadings from commercial nurseries (by voluntary means or through regulation) and should observe the effects of those reductions on Rainbow Creek, before promulgating a TMDL to address biostimulatory impairment of Rainbow Creek. When TMDLs are promulgated, waste loads allocated to these nurseries should begin from their discharges after reasonable technology-based controls are in place.

11. Evaluate alternatives to "proportional" waste load allocations. RWQCB staff have proposed to reduce allowable loads from significant categories of sources in proportion to baseline loads. That approach does not take into account the feasibility, costs, or cost-effectiveness of further controls, and does not address fairness issues. The resulting WLA for septic systems is infeasible, as discussed above. The resulting allocation for other categories of sources may not take advantage of opportunities to secure further reductions in loadings at modest cost.

Appendix L – Public Comment Letters

L-2 E. G. (Bud) Summers Ph.D.
Hines Nurseries
Letter dated April 23, 2002

Testimony of E.G. (Bud) Summers, Ph.D.
Hines Nurseries
Before the SDRWQCB on May 8, 2002

Testimony of Richard A. Watson
For Hines Nurseries
Before the SDRWQCB on May 8, 2002

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Hines Nurseries
A Hines Horticulture, Inc. Company

SAN DIEGO REGIONAL
WATER QUALITY
CONTROL BOARD

2002 APR 24 A 10: 11

April 23, 2002

**VIA FACSIMILE AND
FIRST CLASS MAIL**

Ms. Lisa Brown
California Regional Water Quality Control
Board, San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92124-1324

Re: March 22, 2002, Nutrient Total TMDL for Rainbow Creek

Dear Ms. Brown:

On behalf of Hines Nurseries, I want to thank you for the opportunity to comment on the Nutrient Total Maximum Daily Load (TMDL) for Rainbow Creek. We also appreciate your consideration of our prior comments submitted in connection with the TMDL, including those forwarded to you by letter dated January 24, 2002, along with the comments provided on behalf of Hines at the workshop on April 11, 2002. Hines recognizes that in response to our January 24, 2002 letter, certain factual issues have already been addressed and that additional factual information has been included in the TMDL. These changes provide a more accurate explanation of the background involving Rainbow Creek and the modifications made previously to the Creek in the area in and around what is now the Hines Nursery. Our prior correspondence also confirmed Hines' commitment to voluntarily cooperate with the Regional Board in achieving its nutrient goals for Rainbow Creek, particularly through Hines' commitment to implement a new recycling system at a cost to Hines of $1.5 to $2 million or more, to be expended over the next approximately 3 years. A comprehensive set of plans has already been provided to your office for review and consideration, and Hines is working with the County of San Diego to obtain their approval of the plans and to obtain all other necessary approvals.

The following comments are designed to follow up on our prior comments to the Regional Board, including the comments submitted at the recent workshop, and to emphasize some of the more significant concerns that Hines has with the draft TMDL. Hines respectfully requests that the comments that follow be considered in the Regional

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Board's evaluation and adoption of any TMDL for Rainbow Creek, along with all previous comments submitted on behalf of Hines.

1. Certain Statements Referencing Hines in the TMDL Should Be Deleted.

Initially, Hines requests that the language on page 47 of the Draft TMDL in connection with Hines purportedly being in violation of waste discharge prohibitions for discharges of waste to waters of the State in a manner causing a condition of pollution, contamination or nuisance, be deleted for the reasons previously set forth in our prior correspondence of January 24, 2002, and for reasons previously raised with Board staff in discussions involving Hines' involvement with the Site (only since 1996) and its operations. Hines has continued to operate the tailwater recovery system that was originally installed by Flynn-Rainbow Nurseries. This recovery system was discussed in the Final Report of the Rainbow Creek Non-Point Source Nitrate Reduction Program dated January 31, 1997 (a Report funded through the Regional Board), as a demonstration of the "potential for reducing nursery runoff with an irrigation system retrofit". In fact, the Report concludes that Flynn-Rainbow Nurseries was one of three major nurseries (along with Hines' Irvine Nursery) with "very successful tailwater recovery and recycling programs." (See Report, p. 44.) Moreover, now that Hines owns the subject property, it has moved ahead with design of an improved recycling system, and plans for such system have already been submitted to and reviewed with the Regional Board.[1]

In short, Hines firmly believes that the evidence shows that Hines has not caused or in any way contributed to a condition of pollution, contamination, or nuisance, and that to the contrary, its actions, and those of its predecessor have significantly improved the condition of Rainbow Creek. These improvements are also evidenced by the Regional Board's report entitled "Total Maximum Daily Load for Nutrients, Rainbow Creek, San Diego County," dated April 2000. This report concludes that tests conducted in 1998-1999 have shown a reduction in average nitrate concentrations in Rainbow Creek at Willow Glen Road from the 1986 maximum annual average of 215.8 mg/l down to 7.7 mg/l. This monitoring report, combined with the existing recycling system Hines has been implementing for several years in connection with its irrigation waters, and the fact that a large majority (up to 80% or more) of its irrigation waters are

[1] The current tailwater recovery system captures and recycles nutrients discharged to the creek by other nurseries as well as other land uses upstream of the temporary berm used to deflect water into Hines' recovery pond. Hines is currently removing constituents contributed by others, but these will not be removed by its new recycling system which, when completed, will avoid the creek.

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already recycled, is strong evidence that Hines has not taken any action that has created a condition of pollution, contamination, or nuisance.

In discussions with your office over the language on page 47, Regional Board staff have indicated that this language would be deleted from the TMDL, in light of the actions of Hines over the years, and the lack of evidence to justify such statements.

2. Rainbow Creek Is Not Listed As Being Impaired For Nutrients, and the TMDL Shows There Is No Visible Eutrophication.

The TMDL in issue is entitled a "Nutrient TMDL" for Rainbow Creek. Yet, language in the TMDL itself shows that Rainbow Creek is presently only listed on the Clean Water Act's Section 303(d) list for "eutrophication." There is no present listing of Rainbow Creek for nutrients. Hines is aware that the issue of whether Rainbow Creek should be listed as being impaired for nutrients is being addressed by State Board staff, in its review of the 2002 303(d) list. However, as of this date Rainbow Creek has ***not*** been listed as an impaired water body because of nutrients.

Thus, the "Nutrient" TMDL in issue is being proposed to address "eutrophication," not nutrients. Yet, the TMDL itself provides, in very clear terms, that "***eutrophic conditions have not been observed in the creek*** . . . ." Accordingly, as eutrophic conditions have not been observed in the creek, and as Rainbow Creek has not been listed as being impaired as a result of "nutrients," until such time as Rainbow Creek is identified on an adopted 303(d) list as impaired for nutrients, or at least until eutrophication has been identified, it is inappropriate to establish a TMDL for Rainbow Creek.

3. A Nutrient TMDL is Not Yet Suitable for Calculation.

An additional concern created by the premature establishment of a Nutrient TMDL for Rainbow Creek, is the requirement within the Clean Water Act that only those TMDLs that are "suitable for such calculation" are to be developed. (See 33 U.S.C. § 1313(d)(1)(c).) In the regulations to the Clean Water Act, EPA defined when TMDLs are "suitable for calculation" by finding that all pollutants are suitable for calculation under "proper technical conditions" in which to base the development of the TMDL. (See 43 Fed. Reg. 60662). The phrase "Proper Technical Conditions" was explained by EPA as referring to "the availability of the analytical methods, modeling techniques and a data base necessary to develop a technically defensible TMDL." EPA went on to conclude that "these elements were to vary in their level of sophistication depending on the nature of the pollutant and characteristics of the segment in question. It must be determined on a case-by-case basis." (Id.)

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As further discussed herein, at this time, it does not appear that sufficient proper technical conditions exist in which to develop a TMDL for nutrients. Accordingly, as sufficient proper technical conditions do not exist, a Nutrient TMDL for Rainbow Creek is not at this time "suitable for such calculation." (33 U.S.C. § 1313(d)(1)(c).)

4. An Assimilative Capacity Study Must Be Prepared Prior to Establishing Any TMDL.

In developing a TMDL for any impaired water body, an assimilative capacity study should first be conducted in order to determine the pollutant load the water body can assimilate before becoming impaired. That is, the TMDL "load allocations" and "waste load allocations" which may be discharged into a water body without impairing the beneficial uses, can only be developed ***after*** the assimilative capacity of the water body has first been identified. There is thus no basis to determine a load allocation or a waste load allocation (i.e., there is no basis to develop a TMDL), where the assimilative capacity of the water body has not been established. Hines would thus recommend that additional monitoring and a study of the assimilative capacity of the various reaches of the creek be conducted ***before*** adopting the subject TMDL, as the assimilative capacity of the water body is the cornerstone of any properly developed TMDL.

5. The Translator For The Numeric Objectives Has Not Been Developed.

In the instant case, the Basin Plan includes a narrative objective that inland surface waters are not to "contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect beneficial uses." It also indicates that "[a] desired goal in order to prevent plant nuisance in streams and other flowing waters appears to be 0.1 mg/l total P." The Basin Plan clearly states that "[a]nalogous thresholds have not been set for nitrogen compounds; however, natural ratios of nitrogen to phosphorus are to be determined by surveillance and monitoring and upheld."

The TMDL then proceeds to assert a numeric objective of 1.0 mg for total nitrogen and .1 mg for total phosphorus, in part based on the fact that "data are lacking," and that the objective allows for the use of a weight to weight ratio. Yet, no data or analysis is included in the TMDL to support the translation of the narrative objective "to the numeric objectives," i.e., there has been no translator established to translate the narrative objective that inland surface waters shall not contain biostimulatory substances that promote aquatic growth which "cause nuisance or adversely affect beneficial uses," into the numeric objectives of 1.0 mg. and .1 mg. for total nitrogen and total phosphorus, respectively. In fact, at one point the TMDL provides that: "currently, no site-specific data are available that correlates in-stream nutrient concentrations with

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abundance of algae." (TMDL, p. 12.) In effect, no "translator" has been developed for the TMDL to translate the narrative objective of not causing a nuisance or adversely affecting beneficial uses, into the 1.0 mg. and .1 mg. numeric objectives.

6. The TMDLs Should Be Properly Developed, Not Modeled.

Throughout the TMDL, there are references to data gaps and the lack of data necessary to develop numeric objectives. In addition, there are various statements that the data collected during implementation will be used to fill such data gaps and to provide additional information needed to be used to determine if the TMDL and load allocations should thereafter be revised or if localized TMDLs are needed. For example, on page 22 of the draft TMDL, the TMDL provides that: "The total nitrogen and total phosphorus load capacities will be adjusted as necessary once additional data have been obtained from the Implementation Plan and Monitoring Strategy." As a result of the lack of data at this juncture, the draft TMDLs established for nutrients for Rainbow Creek are merely modeled using "simple models and assumptions. TMDLs based on "the lack of data." They are, therefore, not "technically defensible TMDLs" based on the availability of analytical methods, modeling techniques and a data base. (See 43 Fed. Reg. 60662).

One significant data gap recognized in the TMDL itself is the lack of data on releases from septic tank disposal systems in the area. In fact, the TMDL identifies these septic systems as an area requiring further study. Releases from septic tanks must be evaluated to determine the amount of nutrients released to groundwater from such disposal systems, and furthermore, to then determine the impact of groundwater on surface waters at various locations within Rainbow Creek. Septic tank releases may play a significant role in the release of nutrients and possibly other contaminants to Rainbow Creek. The TMDL identifies and recognizes the need for a groundwater investigation to, at a minimum, "identify the contribution of groundwater discharge to surface flow," as well as a number of other items worthy of groundwater investigation.

In short, the use of a "modeled" TMDL without proper technical conditions and sufficient monitoring data has resulted in the development of a TMDL that is unsupported and unobtainable.[2]

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[2] Another example of the data gap in developing the TMDL is the lack of any flow analysis to convert the concentrations detected from monitoring into load allocations for the nutrients in issue. The monitoring data which has identified concentrations in samples at various points along the Creek, is only relevant if the total flow or quantity of water that would contain such concentrations is also determined. Without this information, insufficient data exists to develop a "load" allocation for the TMDL.

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7. The Annual Load Allocation for Commercial Nurseries is Unsupported and Unobtainable.

The TMDL also establishes annual load allocations for commercial nurseries for both nitrogen and phosphorus (see Tables 6-1 and 6-2) that are both unrealistic and unobtainable. The data and analysis in the TMDL simply do not support the load allocations developed thereunder, specifically for commercial nurseries. For example, under Table 4-1 of the TMDL, the TMDL assumes an annual total nitrogen load of 611 kilograms per year for commercial nurseries. The reference to 611 kilograms per year is apparently based on a figure of 4.1 kilograms per hector per year as an export co-efficient, which, according to the reference, was derived from a 2000 report from the SCCWRP. Yet, a review of the SCCWRP 2000 report shows that it does ***not*** contain any co-efficients for commercial ***nurseries***. Rather, and to the contrary, it only contains co-efficients for general commercial facilities (e.g., shopping centers, restaurants and the like), and for agriculture.

Futhermore, the SCCWRP study indicates that the co-efficient for agriculture was based on one site located in Ventura County. For the subject TMDL, co-efficients should be developed for inland San Diego County commercial nurseries, field agriculture and orchards. The co-efficients used in the SCCWRP study may have been appropriate for a regional study of coastal waters, however, they are not appropriate for a regulatory document such as a TMDL. Additional research is required to develop appropriate co-efficients.

8. The Economic Consideration Section Should Be Revised.

The economic consideration section of the TMDL includes a Section discussing BMPs and the incursion of other implementation costs for landowners and land uses, including for commercial nurseries. The estimated best management practice costs identified in this Section, although acknowledging Hines' new recycling system in the narrative in Section 11.2, do not incorporate into the costs described in Table 11-5, the $1.5 to $2 million recycling system that Hines Nurseries has voluntarily committed to undertake to further reduce the amount of runoff entering Rainbow Creek. Nor does the discussion on economics in this Section scale up these costs to the commercial nursery industry as a whole.

Please also recognize that the costs of this recycling system are in addition to other costs for best management practices incurred by Hines and others in implementing other BMPs to reduce the discharge of nutrients to Rainbow Creek. For example, in addition to its regular monitoring of irrigation waters and ongoing adjustment of irrigation, Hines primarily uses dry slow release fertilizers in its nursery's

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operations and rarely uses liquid fertilizers, even though liquid feed fertilizers would allow the nursery to vary the quantity of fertilizer according to the needs of the plants. Dry slow release fertilizers are used even though liquid fertilizers can better improve plant growth, and make certain plants more resistant to diseases and pests.

The primary reason Hines has decided to use dry slow release fertilizers at its Fallbrook facility as the predominant means of fertilizing its plants, is because of its desire to minimize the discharge of nutrients into Rainbow Creek. (It should be recognized that adjacent and nearby nurseries, to the best of Hines' knowledge, continue to regularly use liquid fertilizers in their operations).[3]

In conclusion, Hines appreciates the efforts of the Regional Board in developing a Nutrient TMDL for Rainbow Creek, and is committed to continuing to work with the Regional Board to reduce the discharge of nutrients to the Creek, and to developing a TMDL that is based on sound data and analysis. Hines thanks the Regional Board for its cooperation to date, and looks forward to assisting the Regional Board in developing proper technical conditions, and appropriate load reductions to remove Rainbow Creek as a 303(d) listed water body for eutrophication and/or nutrients.

Please do not hesitate to contact the undersigned should you have any questions with respect to the above or need any additional information in connection with any of the comments provided herein.

Sincerely,

HINES HORTICULTURE

E.G. (Bud) Summers, Ph.D.
Vice President, General Manager

[3] Another important best management practice adopted by Hines is the use of a drip irrigation system in areas around the perimeter of the nursery and along those areas requiring heavier fertilization. The drip irrigation system has resulted in a significant reduction in water usage as well as a reduction in fertilizer usage, and is one of several BMPs that Hines has already installed to reduce the discharge of nutrients in its runoff.

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Hines Nurseries
A Hines Horticulture, Inc. Company

Testimony of E.G. (Bud) Summers, Ph.D.
Hines Nurseries

Before the

California Regional Water Quality Control Board, San Diego Region

8 May 2002 (06 May Draft)

Good morning, Chairman Minan and members of the Board. My name is Bud Summers. I am Hines Nurseries' Vice President of the Nursery Division and General Manager of the Fallbrook and Irvine, California nurseries. I have both Ph.D. and Masters degrees in Horticulture, as well as a Bachelor of Science degree in Biology. I have over 25 years' experience in horticulture, including teaching horticulture at the university level and serving as a Statistical Analyst and Consultant for the U.S. Department of Agriculture. I am here today to comment on the Draft Nutrient Total Maximum Daily Load for Rainbow Creek.

Hines Nurseries

First, I would like to briefly review our relation to Rainbow Creek and the proposed TMDL. Last May we closed the purchase of a 256-acre nursery that straddles Rainbow Creek in the Rainbow Valley area upstream from I-15. We have managed the site since 1996, but were only able to secure title to the property last year.

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Barbara Biernacka, our Propagation Manager in Fallbrook, has participated on the TMDL Technical Advisory Committee since 1999, although that committee has not met since December 2001. Earlier, other staff members also attended TAC meetings. We also participated in the supplemental monitoring program during the year 2000.

Hines Nurseries has been commended for our efforts with respect to our tailwater recovery and recycling systems, and we continue to do more. Through the existing recycling system, we currently recycle up to 80% or more of our irrigation waters. This system was originally installed by Flynn-Rainbow Nurseries to help reduce nutrients in Rainbow Creek, and Hines Nurseries continues to operate this tailwater recovery system today. The effectiveness of this system was discussed in the Regional Board-funded Final Report of the Rainbow Creek Non-Point Source Nitrate Reduction Program dated January 31, 1997. This system was noted as a demonstration of the "potential for reducing nursery runoff with an irrigation system retrofit." We presently utilize the Creek as part of the recycling system, but have no dry-weather discharges off site.

However, we agree that we now need to discontinue discharging into the creek, and we are proceeding to do so. Hines has now committed to implementing a new recycling system that will be completed in the next two to three years at a cost of between $ 1.5 and 2 million. The new recycling system, the plans for which have been already reviewed with your staff and County staff, will recycle more than 95% of our irrigation waters. We are currently working with the County of San Diego in order to expedite implementation of the system. Hines Nurseries is committed to working with

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the Regional Board to achieve its nutrient goals for Rainbow Creek, and continues taking responsible action toward those goals.

Statements Regarding Hines Nursery are Inaccurate

I would like thank the Board for steps it has already taken to improve the factual content of the document. We appreciate the efforts Staff has made to address our concerns. Some of the required changes have been addressed in the circulated draft, and staff has informed us that they propose to make others.

The two most important statements about Hines that remain to be corrected are in Section 9.5.1.4. Specifically, the first sentence of the third paragraph regarding a condition of pollution and nuisance should be deleted as it is inaccurate. We firmly believe that Hines Nurseries has not caused or contributed to a condition of pollution, contamination, or nuisance. To the contrary, Hines' actions, and those of its predecessor, have significantly improved the condition of Rainbow Creek downstream from the nursery.

In addition, the last sentence in the same paragraph should be deleted because it also is inaccurate. We have reviewed the plans with staff and they indicated their support for the project. However, as a regulatory agency, I do not believe the Regional Board would normally approve specific construction plans. We have addressed these issues with staff, and understand that they intend to correct these sentences in the next draft.

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General Comments on the Proposed TMDL

Further, we firmly believe it would have been more appropriate to have deferred this hearing until we and the other members of the regulated community were able to see how staff proposed to respond to both the comments made at the workshop and the written comments received by the date specified in the hearing notice. We were under the impression that this hearing would focus on a revised draft – not a draft that is in the process of being revised.

In addition, there are numerous problems inherent in this TMDL that make it inappropriate for adoption . Today, I will review only a few key points concerning the proposed TMDL. Additional comments are in our previous written statement that I have attached and distributed for your review.

The Board is clearly under pressure to do something, and considering the lack of data, this constitutes a valiant attempt – however, it is not what we understand to be a valid TMDL. What this document succeeds in demonstrating is the lack of any need for a TMDL and the lack of sufficient technically valid data to establish a TMDL.

We are particularly concerned with the unreasonably restrictive load allocations. For example, Table 4–Y specifies a daily load allocation of 1.8 pounds of nitrogen for all commercial nurseries in the watershed. Using the municipal drinking water criterion of 10 mg Nitrate as N per liter, a discharge of approximately 21,580 gallons of potable water would exceed the total daily nitrogen allocation for all commercial nurseries in the watershed. That is only about 1.7 per cent of Hines' average daily water use. A small malfunction in the irrigation system or even a small storm event could put us over the

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allocation for all commercial nurseries in the watershed if you assume drinking water standard levels of nitrogen in the discharges. The TMDL needs to be more flexible to permit us to comply in a manageable way.

I will conclude my statement today with a few suggestions for making the TMDL more workable, if there is going to be one adopted in the near future, but first I want to briefly review some of our concerns with the draft.

Inappropriateness of the TMDL

The proposed TMDL is billed as a draft "Nutrient TMDL" in the Staff Report and in the Draft Resolution, but Rainbow Creek is not listed as impaired for nutrients. The assertion in Attachment A to Resolution No. R9-2002-0108 that "Rainbow Creek is currently identified on the Clean Water Act Section 303(d) list of impaired waters due to excessive nutrient concentrations" is incorrect. The Staff Report itself notes in the very first sentence of the Executive Summary that Rainbow Creek's listing is for "eutrophication." A paragraph later it is noted that, "eutrophic conditions have not been observed in the creek . . ." This fact is repeated in the last paragraph of page 9, where it is also noted that "Rainbow Creek is not stagnant or experiencing fish kills or excess decomposition of plant matter and their related adverse impacts."

A "Nutrient TMDL" is being proposed to address "eutrophication," not nutrient load, and "eutrophic conditions have not been observed in the creek." On what grounds, then, could the Board propose adoption of any TMDL – either for nutrients or eutrophication? TMDLs must be based on impairment listings -- they should not anticipate listings. Only if the State Water Resources Control Board revises the listing

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for Rainbow Creek following its hearing currently scheduled for September should a Nutrient TMDL for Rainbow Creek be considered. Since there is no eutrophication, and nutrient concentrations have been greatly reduced since the 1980s, it would be more appropriate to delist the Creek for eutrophication and put it on a watch list for nutrients.

Scientific/Technical Problems with the Draft TMDL

The Staff Report is rife with scientific and technical problems. From the first page of the Executive Summary, Staff attempts to substitute assumptions for data: "nutrient concentrations appear to be contributing to excessive algal growth which can lead to eutrophic conditions that may result in decreased water clarity…" Speculation does not amount to science. We have been told that staff is going to revise the methodology to reduce the emphasis on nutrient concentrations through the use of flow data that was brought to their attention by EPA Region IX, however we have not seen the revised methodology. Any new methodology should moreover be peer reviewed. In fact, as the County has pointed out in their written comments, the current draft has yet to be peer reviewed.

The revised draft that staff proposes should be distributed for peer review and then re-circulated for public comment. When it is peer reviewed, we recommend that the aerial deposition assumptions and estimates also be reviewed. We understand that Dr. Keith Stolzenbach at UCLA is currently doing work on aerial deposition of nutrients in the Santa Monica Bay watershed and has indicated a willingness to review the aerial deposition aspects of this proposed Nutrient TMDL.

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There are additional technical and regulatory problems with the TMDL as proposed by staff. I will ask our consultant, Mr. Richard Watson, to address these. However, before I do, I want to make a few recommendations to make the TMDL more workable should you decide to proceed with the TMDL despite the technical deficiencies with the draft.

Recommended Revisions to the TMDL

1. The initial target should be the drinking water standard, for which there is a more solid scientific basis. At a specified review date, numeric biostimulatory criteria could be added, if required.

2. The first phase of the TMDL should last for five years to allow the results of the new Hines Nursery recycling system and septic tank improvements made with AB 885 funds to become apparent.

3. If the stated or inferred desired goals taken from the explanation of the narrative water quality objective in the Basin plan for biostimulatory substances are to be used as numeric targets in a nutrient TMDL, another part of the explanatory material should also be included. The TMDL should specify that the defined "values are not to be exceeded more than 10% of the time unless studies of [Rainbow Creek] clearly show that water quality objective changes are permissible and changes are approved by the Regional Board." This would be consistent with the Basin Plan and provided needed flexibility in the proposed TMDL.

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4. The daily load allocations specified in Table 4 – Y should be enforced based on running 30-day averages. This would provide an allowance for irrigation system malfunctions or other problems while meeting the objectives of the TMDL. Since the proposed biostimulatory criteria are so low and there is no actual nutrient impairment, this should more that protect beneficial uses.

5. The two incorrect references to Hines should be deleted from the TMDL.

Thank you for this opportunity to comment on the proposed TMDL. Hines Nurseries recognizes its responsibilities and has committed to spend more than $1.5 million to replace the tailwater system that we inherited with a state-of-the-art recycling system.

I would be pleased to answer any questions you might have concerning the operation of our nursery facility, but before I do, I would like to ask Mr. Watson to address other technical and regulatory concerns that we have with the TMDL as proposed.

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Testimony of Richard A. Watson

For Hines Nurseries

Before the

California Regional Water Quality Control Board, San Diego Region

8 May 2002

Good Morning Chairman Minan and Members of the Board. My name is Richard Watson. I am a planning consultant with over eleven years' experience in analyzing and implementing storm water quality regulations. I have been an active participant on the California Stormwater Quality Task Force since 1991 and currently chair its Impaired Waters/TMDL/Watershed Management Work Group. Today, I am before you representing Hines Nurseries. I will address the situation facing the Board through a series of questions and answers. Then I will suggest some actions, in addition to those mentioned by Dr. Summers, that we recommend you take to properly address water quality in Rainbow Creek.

When is a TMDL required?

The State Board staff points out in Volume I of the Staff Report entitled *Revisions of the Clean Water Act Section 303(d) List of Water Quality Limited Segments* that, "CWA section 303(d) requires states to identify waters that do not meet applicable water quality standards with technology-based controls alone." Once a waterbody is listed, Section 303(d) mandates development of a Total Maximum Daily Load (TMDL). In other words, a TMDL is required if a waterbody is

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determined to be impaired and the application of technology-based controls cannot bring it into compliance with water quality objectives.

How Should a TMDL be Prepared?

A properly developed TMDL must be based on *data* with respect to exceedances of "load allocations" and "waste load allocations" for a given waterbody. Allocations can only be developed after the assimilative capacity (also called loading capacity) of the water body has been identified. No such identification has been made for Rainbow Creek. We do not know its assimilative capacity; the necessary studies have not been performed. We, therefore, cannot know what pollutant load the waterbody can assimilate before impairment. Staff has attempted to guess at the assimilative capacity of Rainbow Creek. Without the necessary background studies about this specific waterbody, there really is no valid basis to determine a load allocation or a waste load allocation.

In fact, EPA Region 9 in its draft comments on the draft TMDL, has said that the "Regional Board must change its approach to defining the loading capacity and TMDL for nitrogen." EPA urged Regional Board staff to directly determine the loading capacity by starting with the desired water quality objective(s) and use stream flow records to calculate loading capacity and TMDLs for total nitrogen and total phosphorus. This requested change presents an opportunity to institute adaptive management as recommended by the National Research Council.

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What is the Correct 303(d) Listing for Rainbow Creek at this Time?

The State Board's staff report on the 2002 revision to the 303(d) list identifies the following assumptions on which the report was based:

> "1. The 1998 section 303(d) list forms the basis for the 2002 list submittal.
>
> "2. RWQCB recommendations to change existing listings would be considered by the SWRCB."

State Board Staff understands that although they may make recommendations, only the State Board can make changes to the 303(d) list in 2002. In the past, the 303(d) listing process has been inconsistent. This year the State Board has implemented a more structured program.

However, review of the 1998 California 303(d) List and your staff's *Final Draft Clean Water Act 303(d) List of Impaired Waters, 2002 Update* reveals that Regional Board Staff has misunderstood the process and consequently has made two mistakes. First, Rainbow Creek is currently listed for eutrophic conditions, not for nutrient pollution. Staff has either written the wrong TMDL or submitted a draft TMDL prematurely. Second, Regional Board Staff has exceeded its authority by attempting to make changes to the 303(d) list without recommending the changes to the State Board or even obtaining a formal approval by your Board.

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On page 17 of the 2002 Update, Regional Board staff explains that; "*The impairment for Rainbow Creek has been changed from 'eutrophication' to 'nitrate and phosphorus.' The original designation was based on a faulty assumption that eutrophic conditions existed because of the elevated levels of nutrients.*" It appears that Regional Board Staff, in noting that the current designation was "faulty" have simply changed it themselves. They argue on page 1 of the 2002 Update that, "*...changes were minor and primarily add clarity.*" The wholesale change of a 303(d) listing is not minor. The State's 303(d) List is the determiner of impairment. What is the correct listing? The answer is the one in the approved 1998 303(d) list.

What Are the Applicable Water Quality Objectives?

Tentative Resolution No. R9-2002-0108 Finding No. 5, states that the Basin Plan establishes the following numerical water quality objectives for biostimulatory substances: Total Nitrogen of 1.0 mg/l and Total Phosphorus of 0.1 mg/l. This is inaccurate. Numerical biostimulatory water quality objectives have not been set for either nitrogen or phosphorus in the Basin Plan. The Basin Plan includes a narrative objective that inland surface waters are not to "contain biostimulatory substances in concentrations that promote aquatic growth to the extent that such growths cause nuisance or adversely affect beneficial uses." However, there is a numeric water quality objective for Nitrate in drinking water.

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The erroneously asserted numeric objectives of 1.0 mg for total nitrogen and .1 mg for total phosphorus are, in part, based on the fact that "data are lacking," and that the Basin Plan includes an explanation of the narrative water quality objectives. The explanation includes the statement that "A desired goal in order to prevent plant nuisance in flowing waters appears to be 0.1 mg/L total P" and allows the use of a weight-to-weight ratio in estimating a nitrogen threshold. One of the scientists charged with peer review of the November draft of this document called this assumption "arbitrary" and "unsupportable."

No data or analysis is included in the Basin Plan or the Staff Report to support the translation of the narrative objective to the proposed numeric objectives for Rainbow Creek. In fact, in Section 3.2 of their Report, Staff concedes, "currently, no site-specific data are available that correlates in-stream nutrient concentrations with abundance of algae." (Staff Report, p. 12.) What are the applicable water quality objectives? The answer for Rainbow Creek is the nitrate objective for drinking water; there is no numeric water quality objective for biostimulatory substances.

Furthermore, EPA has identified a critical water quality objective problem. The issue of naturally occurring pollutant levels that exceed applicable water quality objectives must be addressed. A site-specific water quality objective for Rainbow Creek may be needed. Alternatively, an exclusion from meeting water quality

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objectives due to naturally occurring sources could be defined. If this issue is not addressed, Rainbow Creek will never meet water quality objectives.

What are the Data Problems with the Draft TMDL?

Throughout the Staff Report there are numerous references to data gaps. In addition, there are various statements that the data collected during *implementation* will be used to fill such data gaps and to provide additional information to determine the need for revision. For example, on page 22, it is noted that: "The total nitrogen and total phosphorus load capacities will be adjusted as necessary once additional data have been obtained from the Implementation Plan and Monitoring Strategy." The implementation phase is not the time to gather the vital data upon which to base a TMDL. Due to lack of data, this draft TMDL is merely modeled using "simple models and assumptions." TMDLs based on "assumptions" are, by definition, not "technically defensible TMDLs," which require the availability of analytical methods, modeling techniques and a database. (See 43 Fed. Reg. 60662).

The Clean Water Act requires that only those TMDLs "suitable for such calculation" be developed. (See 33 U.S.C. § 1313(d)(1)(c).) In the regulations to the Clean Water Act, EPA states that such suitability can be met under "proper technical conditions." (See 43 Fed. Reg. 60662.) This phrase refers to "the availability of the analytical methods, modeling techniques and a data base necessary to develop a technically defensible TMDL." Those requirements are

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not met in the case of Rainbow Creek. Theoretical susceptibility does not constitute the basis for establishing a TMDL. The scientific basis of the TMDL program must be strengthened, and your Board has an opportunity to contribute to that effort.

We note that in the scientific peer review of the draft Rainbow Creek TMDL, all three scientists questioned recognized the need for additional data and/or for clarification of contradictory statements. The draft TMDL before you today should be rejected. Unfortunately, this TMDL has been rushed to meet a promised time schedule. Under Federal Regulations, establishing proper technical conditions for calculating a TMDL takes priority over meeting an arbitrary time schedule.

The draft TMDL establishes load allocations for commercial nurseries and indicates that the figures are derived from a 2000 report from the Southern California Coastal Water Research Project (SCCWRP). Review of the referenced report, however, shows that it does not, in fact, contain any co-efficients for commercial nurseries. It contains only co-efficients for general commercial facilities, such as shopping centers and restaurants, and for agriculture. (See Tables 6-1 and 6-2, Staff Report)

Further, the SCCWRP study indicates that the co-efficient for agriculture was based on one site located in Ventura County. Clearly, such a co-efficient has little, if any, application for a commercial nursery located adjacent to a creek near

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an interstate highway in inland San Diego County. For a regulatory document such as a TMDL, specific regional co-efficients should be developed.

Why is This TMDL Before You?

The Regional Board is under pressure to do something to improve water quality in the region. This Regional Board, together with others, was criticized by EPA and environmental groups for not preparing TMDLs in a timely manner. The Board committed to develop two initial TMDLs. This is one of them. However, the difficulty of establishing a coherent and acceptable nutrient TMDL for Rainbow Creek has been greater than anticipated. Despite the lack of data and the statement from EPA Region 9 that, "As presented, EPA cannot approve the Rainbow Creek TMDL," Staff apparently feels the need to move ahead to meet their current schedule.

What Should the Regional Board Do?

The Regional Board should defer taking action at least until after the State Board has adopted the 2002 303(d) listings. This will allow any future TMDL to accurately reflect the listing status of the waterbody. Adoption of the new 303(d) list is scheduled for September. After that time, should a change in listing be made, your Board can proceed to take action toward any required TMDL. This hearing should be continued, not closed. The regulated community deserves a chance to comment on Staff's final recommendations.

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Your Board should provide adequate opportunity for additional voluntary reductions. We respectfully disagree that the waterbody is not able to meet water quality standards using available pollution controls. We agree in this instance with the County of San Diego, whose Director of the Department of Environmental Health, Gary W. Erbeck, noted in a letter to your Board dated April 23, 2002 that, "...an appropriate opportunity should be provided to achieve 'voluntary' reductions in loadings before drastic regulatory measures are applied..."

Furthermore, your Board should take the opportunity to develop a TMDL in accordance with the recommendations of the National Research Council in their report *Assessing the TMDL Approach to Water Quality Management*, prepared at the request of Congress. Specifically, your Board should follow the adaptive management approach advocated by the National Research Council once a TMDL is adopted. The initial target should be the drinking water standard, for which there is solid scientific basis. The first phase of the TMDL should last for five years to allow the results of the new Hines Nursery recycling system and septic tank improvements made with AB 885 funds to become apparent.

The Regional Board should establish scientifically valid numeric objectives for biostimulatory substances and strengthen the scientific foundations on which a TMDL can be properly established. We recognize that your Board is under

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pressure to act, and encourage you to demonstrate your commitment to improving the region's storm water quality by promoting a science-based approach.

Thank you for the opportunity to comment on the proposed TMDL on behalf of Hines Nurseries. As Dr. Summers noted, Hines is a responsible corporate citizen and has committed to making further improvements to its storm water program. The proposed TMDL, however, is not flexible enough to allow Hines and others in the region to carry out their activities while remaining in compliance. If the Regional Board defers taking further action until after the State Board's review of the 303(d) list, and then makes critical changes with respect to its application of science, it may be able to craft a workable, defensible TMDL. Until that time, no TMDL should be adopted.

Appendix L – Public Comment Letters

L-3 Peter Kozelka, Ph.D.
U.S. Environmental Protection Agency
Letter dated May 7, 2002

Administrative Record Page No. 026511

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD
2002 MAY 13 P 12:42

MAY 07 2002

David Barker, Supervising Engineer
San Diego Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

EPA Region 9 has received the *Draft* staff report for Nutrient Total Maximum Daily Loads (TMDL) for Rainbow Creek and *Draft* Basin Plan Amendment, dated March 22, 2002. These documents address impairment to Rainbow Creek, which is currently on the 303(d) list. This TMDL is designed to ensure attainment of water quality objectives and restore designated beneficial uses.

Here are some specific comments or other areas for revision.

1. The *Draft TMDL*, in section 5.1, states the biostimulatory TMDL for total nitrogen is set at 1507 kg/yr, based on this current load from undeveloped [or background sources] land.

   The Regional Board must change its approach to defining the loading capacity and TMDL for total nitrogen. As presented, EPA cannot approve the Rainbow Creek Nutrient TMDL since it has not utilized water quality objectives to establish the loading capacity which ultimately affects the allowable allocations. (See future actions outlined in #5 below.) Therefore the proposed TMDL will not result in attainment of all applicable water quality objectives.

2. Also, the *Draft TMDL*, in section 5.1, utilizes an indirect approach to calculating the loading capacity for total nitrogen. This indirect approach relies on interpretation of the current loading estimate and proportional reduction to define the biostimulatory loading capacity.

   EPA Region 9 urges Regional Board staff to *directly* determine the loading capacity by starting with the desired water quality objective(s) and using stream flow records to calculate the loading capacity and TMDLs for total nitrogen and total phosphorus.

3. As a consequence to modifying the loading capacity, the Draft TMDL will also need to modify the allocations and margin of safety. These values are dependent on the quantity defined as the assimilative or loading capacity.

   EPA Region 9 would support interim allocation levels as part of implementation, as long as the TMDL clearly documents quantitative performance levels associated with desired water quality conditions and potential responses to achieving these interim levels. The attainment of all applicable water quality objectives must be clearly presented in the document.

4. The *Draft TMDL* needs some written revisions. As presented, section 5 does not clearly define the loading capacity for total nitrogen and total phosphorus and present these bottom line values in a

table. Section 5 should be titled "Loading Capacity and Linkage Analysis" to clarify its contents. Also, Table 5-1 should be modified to remove information about current load and interim loading capacity or postpone this table until a later section of the document. Instead Table 5-1 shall define the loading capacity for biostimulatory total nitrogen and total phosphorus.

The first sentence of Section 6.0 is misleading. It could be changed to…..A TMDL is less than or equivalent to the loading capacity after taking into account "allocations for all sources and a margin of safety."

5. The *Draft TMDL* implies the quantity of nutrients from undeveloped land is sufficient to determine the loading capacity and to interpret applicable water quality objectives. This assumption conflicts with 40 CFR 130.2(f) which defines loading capacity as "the greatest amount of loading that a water can receive without violating water quality standards." TMDLs are based on the existing water quality standards. We do not believe the Basin Plan provides an exemption from application of water quality objectives based on the idea that naturally occurring pollutant levels exceed other applicable objectives.

   In the future, the Regional Board could address this issue via two options; both would require a Basin Plan amendment:
   a) adopt a different water quality objective for Rainbow Creek, presumably a site-specific value based on credible data, or
   b) define an exclusion for Rainbow Creek from meeting water quality objectives due to naturally occurring sources; again with sufficient rationale.

EPA recognizes the complexity of establishing TMDLs and the desired expediency for developing such strategies for improving water quality in freshwater systems like Rainbow Creek. We anticipate working collectively to produce a coherent and acceptable nutrient TMDL, both to Regional Board members and staff and for EPA approval.

Our most recent discussions (on May 2nd) with you and Lisa Brown, regarding modifications outlined above, provide more confidence that San Diego Regional Board will produce a TMDL that meets requirements outlined in the Clean Water Act and will be approved by EPA Region 9. Please keep us informed with subsequent revisions of the TMDL and appropriate attachments sent to Regional Board members.

Sincerely,

Peter Kozelka, Ph.D.
TMDL Liaison, Water Division

Appendix L – Public Comment Letters

L-4 Eric Larson
San Diego County Farm Bureau
Letter dated May 8, 2002

Administrative Record Page No. 026514

FARM BUREAU SAN DIEGO COUNTY

1670 East Valley Parkway, Escondido, CA 92027-2409
Phone: (760) 745-3023 • Fax: (760) 489-6348 • E-mail: sdcfb@sdfarmbureau.org

May 8, 2002

Mr. John Minan, Chair
California Regional Water Quality Control Regional Board San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Dear Chairman Minan:

The Farm Bureau of San Diego County has had an opportunity to review the Staff Report for Nutrient Total Maximum Daily Loads for Rainbow Creek (TMDL) under consideration by your Regional Water Quality Control Regional Board (Regional Board). That review has generated a number of questions and concerns regarding content, assumptions, policies, and methodology. Our comments follow, corresponding to the sections of the draft TMDL.

Executive Summary

Page two of the executive summary indicates that there are no wasteload allocations made for this TMDL, however, there are urban areas within the watershed. If the urban areas are served by publicly (or privately) owned treatment facilities (i.e. Oak Crest Mobile Estates, Rainbow Conservation Camp) then there are point sources within the watershed that must be considered.

2.0 Problem Statement

We are unclear as to whether the listed beneficial uses are specifically designated to Rainbow Creek or are they designated by the Regional Board pursuant to the tributary rule because the Santa Margarita River is so designated. If designated pursuant to the tributary rule, we would ask for evidence as to the appropriateness of the listed beneficial uses within the watershed.

2.3 Historical Information

Monitoring data clearly shows significant decreases in nutrient levels following the 1996 303(d) listing. This improvement calls into question the need to make Rainbow Creek a priority TMDL. Because a 96% reduction was achieved through the program of education administered by the Mission Resource

Conservation District we question why the Regional Board did not pursue a similar approach before choosing to pursue a TMDL.

2.5 Water Quality Objectives

The document states that nutrients are likely contributing to the excessive algal and emergent plant growth. The next sentence then recognizes that where the growth occurred there was no riparian canopy yet where there was riparian canopy there was no algal growth. The Regional Board must be able to make the easy assumption based on actual observation that sunlight has a direct effect on the algal growth. Perhaps the easier solution to the problem is to increase the riparian canopy throughout the watershed and should be addressed.

2.6 Beneficial Uses

Page nine discusses how Dissolved Oxygen (DO) concentrations were not low enough to cause an adverse effect and that DO is not expected to be depressed below the water quality standard. Yet, it then states that there are no results to support that assumption. However, there are clearly no results to not support the assumption either. Since there is not reason to suspect DO problems, then DO monitoring is not necessary. The TMDL is specific to nutrients and algal growth and should therefore stay focused on the problem statement and not go looking for other issues.

Also, it appears that the arroyo chubs need algae. If this TMDL has a detrimental effect on the chubs there is a risk of environmental law conflicts.

4.0 Source Identification

The source identification incorrectly characterizes undeveloped land contributions as small when in fact Figure 4-1 identifies undeveloped land as the single biggest contributor at 33%. Also, the draft TMDL is relying on a CalTrans document to state that their contribution was not significant. Perhaps there should be further review on CalTrans' actual contribution. Individual farmers may have insignificant contributions but they will be subject to the provisions of the TMDL. No one should be exempt in that cumulative impacts do add up.

6.2 Initial Total Nitrogen Load Allocations

The stated inability to reduce loads from parks, preserves, and urban areas places an additional burden on agricultural uses, among others. Any load generated by human activity can be reduced and should carry its fair share, even if its contribution is small.

8.0 Public Review

In reviewing the fifty-two listed events on Attachment D preceding today's public hearing, three involved public participation. Two in 1999, and one on April 11th of

this year. While technically meeting the letter of the law, it is our hope that the Regional Board feels that every means available has been used to notify and engage the residents, property owners, farmers and nurserymen of the Rainbow Creek Watershed.

9.0 Implementation Plan and Monitoring Strategy

The primary implementation component for this TMDL is a county prepared Nutrient Reduction and Management Plan (NRMP). It is our belief that this is a new implementation approach, not seen in other TMDLs. We would like assurances that agriculture will have a place at the table when the County prepares the plan, but see no such mention in the TMDL. We also believe it would be appropriate to have participation by the University of California Cooperative Extension Service. There should also be assurances that the plan will be subject to public review and Regional Board approval.

Page 39, Land Use Planning, indicates the Regional Board's desire to direct and evaluate county land use ordinances and their provisions. We must state our concern with the Regional Board injecting itself into land use decision making. It is one thing for the Regional Board to make the County the lead agency for the NRMP, but quite another to have the County answer to the Regional Board on land use matters. We can think of no other regulatory agency that assumes such a role.

Page 40, CEQA Responsibilities Section, also raises concerns about Regional Board participation in local land use decisions. A reading of this paragraph implies that the Regional Board is asking the County to apply CEQA requirements and mitigation measures on agricultural operations, a condition that does not currently exist. As in the preceding paragraph, the Regional Board's concern should be meeting water quality objectives, not influencing land use decision making.

11.0 Economic Considerations

This section fails to adequately address the costs that may be incurred by agricultural operations to implement Best Management Practices (BMPs). For example, the Table 11-5 statement that BMPs may offer costs savings as a result of lower fertilizer and water usage is contrary to the fact that the Hines Nursery investment may be as much as $2 million.

When the document discusses the cost of BMPs, it does not consider whether the BMPs will actually help to meet the load allocations given. There must be some evaluation of the suggested BMPs and their effectiveness.

General Comments

We are unclear whether this document is the Regional Board's basin plan amendment or just the TMDL that is to be submitted to the U.S. Environmental

Protection Agency. This must be clear. The U.S. Environmental Protection Agency (U.S. EPA) has no implementation authority over nonpoint sources of pollution. Therefore, it is not necessary for the state to submit the implementation components of a TMDL to U.S. EPA. We suggest that the Regional Board not submit such implementation components to U.S. EPA in that the U.S. EPA has no authority or jurisdiction and there is no reason to give them the opportunity to review and comment on such implementation plans.

Finally, we have found that this TMDL is overburdened with data gaps. In many instances data is incomplete, leading to numerous comments about re-evaluating the TMDLs, adjusting allocations, and the need for better data. These data gaps create a situation where the Regional Board is considering a TMDL that sets an unachievable allocation of zero nutrient loads and explains it away by stating better data will be collected at a future date. Successful implementation of any plan needing the cooperation of stakeholders must show that the goals and remedies are reasonable, achievable, and based on reliable information.

Sincerely,

Eric Larson
Executive Director

Administrative Record Page No. 026518

Appendix M - Response to Public Comments, Public Hearing on May 8, 2002

1. Comment Code: 303(d) Listing

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

As a matter of law, TMDLs must be promulgated after and must be based on impairment listings. Peer reviewers have noted and the Regional Board has acknowledged that the current impairment listing for Rainbow Creek no longer has a basis in fact. Moreover, it is clear that the Regional Board is not proposing a TMDL to address the eutrophication-based impairment listing for Rainbow Creek, but are instead proposing a TMDL that anticipates the modifications to the Rainbow Creek impairment listing that are now pending at the State Water Resources Control Board. This sequencing is backwards, legally and scientifically. It is an abuse of the public participation processes the law mandates for 303(d) listings and for TMDLs. No TMDL for Rainbow Creek should go forward until a revised impairment listing for Rainbow Creek is in place.

Response:

The 2002 303(d) List was adopted by the State Water Resources Control Board on February 4, 2003 and was approved by the USEPA on June 6, 2003. In the updated list, the impairment for Rainbow Creek was revised from "eutrophic" to "nitrogen and phosphorus".

The fact remains that even with the nutrient reduction observed in Rainbow Creek, water quality standards are still being exceeded and action is needed to bring the water quality to acceptable levels that support all beneficial uses.

The stream monitoring data collected from Rainbow Creek by the Regional Board from January 2000 to October 2000 indicates that:

1. Water quality standards for nitrogen are still not being met.
2. The exceedence of water quality standards for TN generally increases the farther downstream the sampling locations are in the watershed.
3. Total P also exceeds water quality standards throughout Rainbow and appears at the highest concentrations downstream from Station 2.
4. Nitrogen and phosphorus results for 2000 are higher than levels reported for the 1996-1998 Mission Resource Conservation District (MRCD) monitoring.

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2. Comment Code: 303(d) Listing

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

The TMDL in issue is entitled a "Nutrient TMDL" for Rainbow Creek. Yet, language in the TMDL Staff Report dated March 22, 2002 shows that Rainbow Creek is presently only listed on the Clean Water Act's Section 303(d) list for "eutrophication." There is no present listing of Rainbow Creek for nutrients. Hines is aware that the issue of whether Rainbow Creek should be listed as being impaired for nutrients is being addressed by State Board staff, in its review of the 2002 303(d) list. However, as of April 23, 2002 Rainbow Creek has not been listed as an impaired water body because of nutrients.

Response:

The Regional Board's consideration of Nutrient TMDLs for Rainbow Creek in May 2002 was entirely appropriate even though Rainbow Creek waters were not at that time explicitly listed as impaired due to nitrogen and phosphorus concentrations. Clean Water Act (CWA) § 303(d)(1)(A) requires each state to identify the waters within its jurisdiction that are not attaining water quality standards. The result of that process is commonly known as the CWA § 303(d) list. The federal regulations additionally require the 303(d) list to include an identification of the pollutants causing or expected to cause violations of standards[1].

For the waters on the CWA § 303(d) list, CWA § 303(d) (1)(C), requires the state to develop TMDLs for the pollutants that are impairing those waters. In many instances waters on the CWA § 303(d) list are not identified as impaired by a specific pollutant, but by conditions that are caused in whole or in part by pollutants. Examples of these stressors include accelerated eutrophication (typically associated with excessive nitrogen and phosphorus concentrations), toxicity (miscellaneous toxic constituents), and temperature (thermal discharges and sediment). CWA § 303(d)(1)(A) does not prohibit identifying waters as impaired by such conditions, and the United States Environmental Protection Agency (USEPA) has approved this approach, for example, by approving the State of California's 1998 and 2002 303(d) lists. Such listings, however, do not impact the state's obligation under CWA § 303(d) (1)(C) to develop TMDLs for the pollutants impairing those waters. Accordingly, where waters are listed as impaired for conditions commonly associated with pollutants, the Regional Board must identify the pollutants underlying or contributing to the conditions, and either establish TMDLs for those pollutants, or establish TMDLs that otherwise correct the conditions leading to the impairment.

[1] See 40 C.F.R. § 130.7(b)(1)(4)

In any event the latest listing of impaired waters in the CWA § 303(d) List for 2002 renders the issue moot. The 2002 303(d) List was adopted by the State Water Resources Control Board on February 4, 2003 and was approved by the USEPA on June 6, 2003. In the updated list, the impairment for Rainbow Creek was revised from "eutrophic" to "nitrogen and phosphorus".

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3. Comment Code: 303(d) Listing

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

Monitoring data clearly show significant decreases in nutrient levels following the 1996 303(d) listing. This improvement calls into question the need to make Rainbow Creek a priority TMDL. Because a 96% reduction was achieved through the program of education administered by the Mission Resource Conservation District, we question why the Regional Board did not pursue a similar approach before choosing to pursue a TMDL.

Response:

In 1996 Rainbow Creek was listed as impaired for Clean Water Act's Section 303(d) list for "eutrophication" . The current CWA § 303(d) List for 2002 describes Rainbow Creek's pollutant impairment as "nitrogen and phosphorus". The Regional Board is obligated under CWA § 303(d) (1)(C) to develop TMDLs for pollutants impairing Rainbow Creek because Rainbow Creek is an impaired waterbody listed on the CWA § 303(d) list.

The fact remains that even with the nutrient reduction observed in Rainbow Creek, nutrient water quality standards are still being exceeded and action is needed to bring the water quality to acceptable levels that support all beneficial uses.

The stream monitoring data collected from Rainbow Creek by the Regional Board from January 2000 to October 2000 indicates that:

1. Water quality standards for nitrogen are still not being met.
2. The exceedence of water quality standards for total nitrogen generally increases the farther downstream the sampling locations are in the watershed.
3. Total phosphorus also exceeds water quality standards throughout Rainbow Creek and appears at the highest concentrations downstream from Station 2.
4. Nitrogen and phosphorus results for 2000 are higher than levels reported for the 1996-1998 Mission Resource Conservation District (MRCD) monitoring.

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The Regional Board recognizes and appreciates the reductions accomplished by the work of the MRCD (through their public outreach efforts and their work to cease the downstream discharge from the nursery formerly known as Rainbow-Flynn Nursery). Encouragement of voluntary implementation of management practices through a public outreach campaign is the ideal place to begin the implementation of the TMDLs. The implementation plan includes the public outreach program pioneered in the watershed by the MRCD. However, that success is not a reason to delay development of the TMDLs, which are needed to establish and allocate pollutant loads that will allow attainment of water quality standards.

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4. Comment Code: Beneficial Uses

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

It appears that the arroyo chubs need algae. If the implementation of these TMDLs have a detrimental effect on the chubs, there is a risk of environmental law conflicts.

Response:

The Regional Board disagrees with this statement. As stated in the Technical Report, the arroyo chub is an omnivorous grazer and feeds on aquatic plants, algae, aquatic insects, and small crustaceans. It is thought that most of the nutrition derived from the ingestion of plant material comes from the invertebrates associated with the algae or plant material. Thus, the chubs use algae as one substrate to feed upon. This TMDL will reduce the nutrient rich induced algae growth in the water but will not limit other naturally occurring aquatic plants from growing or plant material from entering into the creek.

Preservation of suitable habitat is probably the most important factor in maintaining arroyo chub populations in Rainbow Creek. The chub prefers slow moving water with sand or mud bottoms and will move into large pools for breeding. If algae growth is not controlled, it is possible the chubs may lose their ideal habitat by being displaced by algal mats and reduced dissolved oxygen.

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5. Comment Code: Beneficial Uses

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

We are unclear as to whether the listed beneficial uses are specifically designated to Rainbow Creek or are they designated by the Regional Board pursuant to the tributary rule because the Santa Margarita River is so designated. If designated pursuant to the tributary rule, we would ask for evidence as to the appropriateness of the listed beneficial uses within the watershed.

Response:

The beneficial uses of Rainbow Creek are specifically designated in Chapter 2, Table 2-2 of the Regional Board's Basin Plan. The eight designated beneficial uses are: MUN, AGR, IND, REC1, REC2, WARM, COLD, and WILD. The Santa Margarita River has the same beneficial uses with the addition of RARE. The appropriatess of the beneficial uses designated for Rainbow Creek is not a relevant issue in the Regional Board's deliberations on adopting the Rainbow Creek TMDL Basin Plan amendment.

The appropiateness of beneficial use designations for Rainbow Creek is an issue that should be raised in the context of the Regional Board's triennial review of Basin Plan water quality standards. The Water Quality Control Plan for the San Diego Basin (Basin Plan) designates beneficial uses for water bodies in the San Diego Region, and establishes water quality objectives and implementation plans to protect those beneficial uses. The Regional Board reviews the appropriateness of beneficial uses, water quality objectives and implementation plans designated in the Basin Plan every three years pursuant to federal and state law. The most recent 2004 Basin Plan Triennial Review was completed in June 2004. Based on that review no changes in the beneficial use designations for Rainbow Creek are currently being considered.

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6. Comment Code: Data Gaps

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Cooperate to practice good science. The Regional Board must progress beyond invocations of the Basin Plan in ways that peer reviewers can characterize as scientifically "absolutely insupportable, bordering on the ridiculous," to solid science. Impairments must be verified and localized. The Regional Board must determine how nitrogen and phosphorus interact to stimulate algal growth in specific parts of the creek.

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TMDL implementation must be focused on these specific problems. The County is prepared to participate in this study process.

Response:

The Regional Board uses the 0.1 mg/l goal for phosphorus stated in the Biostimulatory Substances water quality objective as a phosphorus water quality objective unless site specific scientific studies demonstrate that a modified phosphorus objective is appropriate for a particular waterbody. (A modified water quality objective is referred to as a site-specific water quality objective (SSO).) Similarly the Regional Board uses the N:P ratio of 10:1 cited in the in the Biostimulatory Substances water quality objective as a basis for establishing a nitrogen water quality objective of 1.0 mg/l unless site specific scientific studies are conducted to establish a nitrogen site specific water quality objective based on different N:P ratios. SSOs must be approved by the Regional Board and incorporated into the Basin Plan. The Regional Board's use and interpretation of the Biostimulatory Substances water quality objective is well established and consistent with applicable laws and regulations.

The Biostimulatory Substances water quality objective requires the use of 0.1 mg/l phosphorus and 1.0 mg/l nitrogen as water quality objectives unless scientific studies show that alternative site specifc water quality objectives (SSOs) for nitrogen and phosphorus are appropriate for Rainbow Creek. The SSOs would need to (1) be based on sound scientific rationale; (2) protect the designated beneficial uses of Rainbow Creek waters; and (3) be adopted by the Regional Board in a Basin Plan amendment. Dischargers or other interested parties would need to fund and initiate the scientific studies to develop the SSO. It is possible the studies could reveal the need for more stringent nutrient water quality objectives.

There is no effort currently underway or planned by interested persons to fund the scientific studies needed to develop SSOs for nutrients in Rainbow Creek. Even in the event that scientific studies were initiated and SSOs for nutrients were developed and adopted by the Regional Board, it would likely not obviate the need for a TMDL. Accordingly, the appropriate strategy for addressing the nutrient water quality problem in Rainbow Creek is for the Regional Board to proceed with adoption of the proposed TMDL Basin Plan amendment at this time. If SSOs for nutrients are developed in the future and adopted by the Regional Board, this TMDL Basin Plan Amendment would be modified accordingly. If interested parties are willing to fund and oversee development of scientific studies to investigate SSOs, the most effective and expeditious means to improve water quality would be to conduct these studies concurrent with actions necessary to achieve compliance with the current TMDL.

Development of new numeric nutrient criteria are currently underway in California by the USEPA Region IX Regional Technical Advisory Group. USEPA's recommended criteria for the subecoregion that includes Rainbow Creek are 0.5 mg total N/L and 0.03 mg total P/L, which are significantly lower than the Basin Plan objectives. Unless USEPA formally adopts these nutrient criteria or the Regional Board adopts alternative

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nutrient criteria, the biostimulatory substances water quality objective currently in the Basin Plan is the applicable water quality objective the TMDL should be based on.

Research into the appropriateness of numeric goals of 1.0 mg total N/L and 0.1 mg total P/L indicates that these values are consistent with published scientific studies. Dodds et al. (1998), using the cumulative frequency distributions of nutrient data from more than 1000 temperate streams primarily in North America and New Zealand, suggest total nitrogen and total phosphorus levels between 0.7 to 1.5 mg N/L and 0.02 to 0.07 mg/PL, respectively, define streams that are mesotrophic. Eutrophic is a trophic state that has an abundance of nutrients and plant growth, and mesotrophic is a trophic state that has moderate concentrations of nutrients and plant growth.

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7. Comment Code: Data Gaps

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

In short, the use of a "modeled" TMDL without proper technical conditions and sufficient monitoring data has resulted in the development of a TMDL that is unsupported and unobtainable.2

2Another example of the data gap in developing the TMDL is the lack of any flow analysis to convert the concentrations detected from monitoring into load allocations for the nutrients in issue. The monitoring data which has identified concentrations in samples at various points along the Creek, is only relevant if the total flow or quantity of water that would contain such concentrations is also determined. Without this information, insufficient data exists to develop a "load" allocation for the TMDL.

Response:

The Regional Board has modified the TMDL to include 8 years worth of site-specific flow data collected by USGS and water quality data collected by Regional Board staff in 2000. Furthermore, water quality information from minimally impacted streams within the region has been incorporated into the document to establish background nutrient conditions (see Section 4.0 and Appendix D of the Technical Report). The Regional Board has adequate analytical information and has used accepted calculation methods to estimate the nutrient loading to Rainbow Creek and to develop a TMDL.

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8. Comment Code: Data Gaps

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

We have found that this Staff Report is overburdened with data gaps. In many instances data is incomplete, leading to numerous comments about re-evaluating the TMDLs, adjusting allocations, and the need for better data. These data gaps create a situation where the Regional Board is considering TMDLs that set an unachievable allocation of zero nutrient loads and explains it away by stating better data will be collected at a future date. Successful implementaiton of any plan needing the cooperation of stakeholders must show that the goals and remedies are reasonable, achievable, and based on reliable information.

Response:

The Regional Board has extensively revamped the Rainbow Creek TMDL to improve the scientific basis and validity of the wasteload and load allocations. The revised Rainbow Creek TMDL report now includes eight years of site-specific flow data to calculate the TMDLs, and City of San Diego water quality data from a number of minimally impacted streams within the County to calculate the background load. (See Section 4, and Appendix D and E.).

The TMDL implementation action plan is designed to include evaluations by the Regional Board to determine if the TMDLs, allocations, or implementation strategy need to be changed or modified. The Regional Board has structured an adaptive implementation action plan in the revised Rainbow Creek TMDL that simultaneously makes progress towards achieving nutrient water quality objectives while relying on monitoring data to reduce uncertainty and fill data gaps as time progresses. This monitoring data can be used to revise and improve the initial TMDL forecast over time. This type of approach will help ensure that the Rainbow Creek TMDL program is not halted because of a lack of data and information, but rather progresses while better data are collected to verify or refine assumptions, resolve uncertainties, and improve the scientific foundation of the TMDL.

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9. Comment Code: Data Gaps

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

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During the early stages of implementing an interim TMDL, appropriate studies could be pursued on a cooperative and shared-cost basis to determine whether and if Rainbow Creek is actually impaired for biostimulatory substances based on the narrative standard in the Basin Plan. These studies could also determine the actual levels of nitrogen and phosphorus that are limiting for biostimulatory effects in the potentially impaired portions of this creek. The studies could confirm or refine estimates of natural nitrogen and phosphorus loadings to Rainbow Creek, and could determine the characteristics the creek would have if only natural loadings entered the creek.

During this period the County and the RWQCB could also cooperate to pursue the best available opportunities to reduce incremental man-made loadings of nitrogen and phosphorus to Rainbow Creek. This could include securing all appropriate additional reductions at commercial nurseries.

Response:

The federal Clean Water Act requires that TMDLs be developed to attain water quality standards through wasteload and load reduction actions taken during implementation. The Clean Water Act precludes the Regional Board from adopting an “interim TMDL” that does not require sufficient nutrient wasteload and load reduction actions to attain the Biostimulatory Substances water quality objecitve.

The Regional Board acknowledges that the technical basis of the Rainbow Creek TMDL is characterized by data gaps and uncertainties. Scientific uncertainty is a reality within all water quality programs, including the TMDL program, and it cannot be entirely eliminated. The TMDL program must move forward in the face of these uncertainties if progress in establishing TMDLs and attaining water quality objectives in impaired waters is to be made.

In accordance with this approach the Regional Board has structured an adaptive implementation action plan in the revised Rainbow Creek TMDL that simultaneously makes progress towards achieving nutrient water quality objectives while relying on monitoring data to reduce uncertainty and fill data gaps as time progresses. This monitoring data can be used to revise and improve the initial TMDL forecast over time. This type of approach will help ensure that the Rainbow Creek TMDL program is not halted because of a lack of data and information, but rather progresses while better data are collected to verify or refine assumptions, resolve uncertainties, and improve the scientific foundation of the TMDL.

The Regional Board appreciates the County's willingness to work cooperatively. Pursuit of opportunities to reduce incremental man-made loading of total nitrogen and total phosphorus to Rainbow Creek, including all appropriate nutrient load reductions at commercial nurseries, is consistent with the proposed Implementation Plan.

10. Comment Code: Data Gaps

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

One significant data gap recognized in the Staff Report itself is the lack of data on releases from septic tank disposal systems in the area. In fact, the Staff Report identifies these septic systems as an area requiring further study. Releases from septic tanks must be evaluated to determine the amount of nutrients released to groundwater from such disposal systems, and furthermore, to then determine the impact of groundwater on surface waters at various locations within Rainbow Creek. Septic tank releases may play a significant role in the release of nutrients and possibly other contaminants to Rainbow Creek. The Staff Report identifies and recognizes the need for a groundwater investigation to, at a minimum, "identify the contribution of groundwater discharge to surface flow," as well as a number of other items worthy of groundwater investigation.

Response:

The Regional Board agrees that a groundwater and septic tank investigation are important components to assessing the nutrient loading to Rainbow Creek.

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11. Comment Code: Data Gaps

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

Throughout the Staff Report, there are references to data gaps and the lack of data necessary to develop numeric objectives. In addition, there are various statements that the data collected during implementation will be used to fill such data gaps and to provide additional information needed to be used to determine if the TMDL and load allocations should thereafter be revised or if localized TMDLs are needed. For example, on page 22 the draft Staff Report dated March 22, 2002 provides that: "The total nitrogen and total phosphorus load capacities will be adjusted as necessary once additional data have been obtained from the Implementation Plan and Monitoring Strategy." As a result of the lack of data at this juncture, the draft TMDLs established for nutrients for Rainbow Creek are merely modeled using "simple models and assumptions. TMDLs based on "the lack of data" are therefore, not "technically defensible TMDLs"

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based on the availability of analytical methods, modeling techniques, and a database (See 43 Fed. Reg. 60662).

Response:
The Regional Board acknowledges that the technical basis of the Rainbow Creek TMDL is characterized by data gaps and uncertainties. Scientific uncertainty is a reality within all water quality programs, including the TMDL program, and it cannot be entirely eliminated. However the TMDL program must move forward in the face of these uncertainties if progress in establishing TMDLs and attaining water quality objectives in impaired waters is to be made.

The Regional Board has revised the TMDL based on the comments received on the earlier 2002 proposed TMDL document. The Regional Board has extensively revamped the Rainbow Creek TMDL to improve the scientific basis and validity of the wasteload and load allocations. In establishing the nutrient TMDLs and load allocations, the Regional Board has incorporated the following sources of data and information into the Technical Report:

- Eight years of site-specific USGS stream flow data.
- Site-specific water quality data collected by the Regional Board in 2000.
- Published nutrient export coefficients.
- City of San Diego water quality data from minimally impacted streams within the County.

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12. Comment Code: Economic Considerations

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

The economic consideration section of the Staff Report includes a Section discussing BMPs and the incursion of other implementation costs for landowners and land uses, including for commercial nurseries. The estimated best management practice costs identified in this Section, although acknowledging Hines' new recycling system in the narrative in Section 11.2, do not incorporate into the costs described in Table 11-5, the $1.5 to $2 million recycling system that Hines Nurseries has voluntarily committed to undertake to further reduce the amount of runoff entering Rainbow Creek. Nor does the discussion on economics in this Section scale up these costs to the commercial nursery industry as a whole.

Response:

The Economic Considerations section (Section 12) has been revised and expanded to address this comment and the comments received at the May 8, 2002 Regional Board hearing. Specifically, text and tables have been added that outline a range of likely best management practices (BMPs) and management practices (MPs) with cost and efficiency estimates of each BMP / MP based on literature sources.

The Regional Board appreciates the measures Hine Nursery is undertaking to reduce nutrient discharges to Rainbow Creek. A brief discussion of the Hines Nursery operation is presented in Section 2.2 of the Technical Report. However, the Hine Nursery's water recycling system is not considered a typical or likely BMP / MP for commercial nurseries. The Hines Nursery system altered the streambed and discharges irrigation water directly to Rainbow Creek. The proposed new recycling system is an effort to remove their current irrigation recycling system and earthen dam from the streambed. It is unlikely that others will incur similar expenses.

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13. Comment Code: Economic Considerations

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

The Economic Considerations section fails to adequately address the costs that may be incurred by agricultural operations to implement Best Management Practices (BMPs). For example, Table 11-5 of the Staff Report dated March 22, 2002, states that BMPs may offer costs savings as a result of lower fertilizer and water usage is contrary to the fact that the Hines Nursery investment may be as much as $2 million.

Response:

The Economic Considerations section (now Section 12.0) has been revised and expanded to address this comment and the comments received at the May 8, 2002 Regional Board hearing. Specifically, text and tables have been added that outline a range of likely MPs, provide cost estimates, and efficiency of each MP based on literature sources.

The Regional Board appreciates the measures Hine Nursery is undertaking to reduce nutrient discharges to Rainbow Creek. A brief discussion of Hines Nursery operation is presented in Section 2.2 of the Technical Report. However, Hines Nursery's water recycling system is not considered a typical or likely MP for commercial nurseries. The current Hines Nursery system altered the streambed and discharged irrigation water directly to Rainbow Creek. The new recycling system is an effort to remove their current irrigation recycling system and earthen dam from the streambed.

14. Comment Code: Economic Considerations

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

When the document discusses the cost of BMPs, it does not consider whether the BMPs will actually help to meet the load allocations given. There must be some evaluation of the suggested BMPs and their effectiveness.

Response:

It is expected that the MPs used in Rainbow Creek will fall into three general categories: Irrigation MPs, Nutrient Reduction MPs, and Run off/Erosion Control MPs. The estimated effectiveness and cost of each MP are presented in Appendix H of the Technical Report. Flexibility has been intentionally incorporated into the implementation plan to accommodate modifications and changes to the MPs as new water quality monitoring data and information on the effectiveness of the MPs becomes available during implementation.

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15. Comment Code: Economic Considerations

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Share study costs equitably, including a substantial State contribution. The County is not a significant discharger in this watershed, and is not the principle governmental agency with responsibility for promulgating and implementing TMDLs. The studies the Regional Board is seeking would provide basic data and science that should underlie any TMDL. This work should be the Regional Board's job. The County is willing to contribute to needed study efforts, but will not bear the entire cost of needed studies, plans and monitoring. The Regional Board or state, and major dischargers in the watershed, must also provide significant funding. The County's obligations to do work pursuant to CWC Section 13225(c) must be contingent on receipt of funds from those sources.

Response:

The State Water Resources Control Board administers the awarding of grants funded from Proposition 13, Proposition 50, Clean Water Act 319(h) and other federal appropriations to projects that can result in measurable improvements in water quality, watershed condition, and/or capacity for effective watershed management. Many of these grant fund programs have specific set-asides for expenditures in the areas of watershed management and TMDL implementation for NPS pollution.

The Regional Board understands that the County of San Diego has recently been awarded a Federal Clean Water Act Section 319(h) Nonpoint Source Implementation Grant Program in the amount of $321,436 for the development of a Nutrient Reduction Management Plan for the Rainbow Creek watershed. The Regional Board will continue to recommend that the State Board assign a high priority to awarding grant funding for projects to implement the Rainbow Creek nutrient TMDLs. Special emphasis for grant funding will be given to projects that can achieve quantifiable nutrient load reductions consistent with the specific nutrient TMDL load allocations.

In conjunction with an MAA or MOU with the County of San Diego describing an adequate NPS pollution control implementation program, the Regional Board will adopt individual or general waivers or waste discharge requirements (WDRs) for NPS discharges in the Rainbow Creek watershed. The waivers or WDRs will require NPS dischargers to either participate in the third party NPS program or, alternatively, submit individual pollution prevention plans that detail how they will comply with the waivers and WDRs. Alternatively, the Regional Board may adopt a discharge prohibition, which includes exceptions for those dischargers who participate in the County's non point source pollution control implementation.

CWC §13225 provides authority for the Regional Board to enter into a Management Agency Agreement (MAA) with the County of San Diego to encourage development of appropriate planning or regulatory programs to control nonpoint source pollution. CWC §13225 also provides authority for the Regional Board to require local agencies such as the County of San Diego to submit technical reports on water quality control, even though those entities may not be waste dischargers. Local agencies can be required to investigate the scope, causes, and sources of nonpoint source pollution, and potential practices or control measures to prevent it. The only restriction is that the burden of preparing the reports bear a reasonable relationship to the need for and the benefits to be obtained from the reports. The Regional Board will provide a rationale relating the need for reports to the projected cost of the reports in CWC §13225 Orders it issues to the County requesting the submission of technical reports.

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16. Comment Code: Economic Considerations

Agency ID: County of San Diego

Commenter: Gary Erbeck

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Comment:

Evaluate alternatives to "proportional" load allocations. The Regional Board has proposed to reduce allowable loads from significant categories of sources in proportion to baseline loads. That approach does not take into account the feasibility, costs, or cost-effectiveness of further controls, and does not address fairness issues. The resulting load allocation (LA) for septic tank disposal systems is infeasible, as discussed in this letter. The resulting allocation for other categories of sources may not take advantage of opportunities to secure further reductions in loadings at modest cost.

Response:

The TMDL has been modified from using proportional load allocations to equal load allocations with the exception of Parks and Urban areas. See Table 6-1 in the Technical Report for the new allocations. Appendix F provides additional information about the rationale that was used in assigning load allocations. The Regional Board will consider any specific information submitted by the public that address the concerns of fairness, feasibility, costs, and cost effectiveness.

The Regional Board recognizes that significant nutrient reductions in Rainbow Creek will be a long-term project. As Management Practices (MPs) are considered by dischargers for nutrient reduction, it is expected that their effectiveness and cost will be taken into consideration.

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17. Comment Code: Implemenation Language

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Give the County more flexibility regarding study designs, monitoring, and reporting. The County remains willing to coordinate and to contribute to the cost of the studies and monitoring that are needed in this watershed.[7] However, read together, the draft Basin Plan amendment and draft Staff Report set very specific mandatory parameters for this work. Those specifications would lock in future research for a four-year period, and would require the County (or the County and others) to spend more than $1.0 million for studies, monitoring, and reports. Much more flexibility is needed for the County to willingly undertake this work.[8]

[7]The draft Resolution (at page 2, item 8.a) proposes to direct the County to "undertake an investigation to access [sic] nutrient loadings to Rainbow Creek from groundwater and

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septic systems." This section further states that the County "has indicated a willingness to undertake this investigation." That statement is incorrect. The County indicated a willingness to coordinate this study effort. County staff also provided basic study parameters and a cost estimate for an "ideal" study effort, including not only a study of loadings from septic systems but also other research. The Regional Board has proposed to transform these study parameters and cost estimates into mandatory requirements—including a requirement that the County in fact spend the amounts it estimated would be needed for an ideal study of all issues. The County did not state that it was willing to do this work in exactly the manner postulated in its cost estimate, and thereafter specified in the draft Staff Report. The County did not indicate that it was willing to pay the entire cost of this work. The County is not willing to be locked into an inflexible four-year research plan, and is not willing to bear the entire cost of any studies of Rainbow Creek by itself.

[8]In the absence of an agreement concerning this work, the County would consider whether to challenge directives based on Water Code section 13225(c) as being inconsistent with the Water Code, and as unfunded state mandates. See footnote 2.

Footnote 2: Conditions imposed by the Water Code are included in subsection 13225(c). First, the requirement must be "necessary." Necessary reports can be required "provided that the burden including costs, of such reports shall bear a reasonable relationship to the need for the report and the benefits to be obtained therefrom." State laws concerning unfunded mandates may also require that the state provide funding to the County to carry out any directives issued pursuant to subsection 13225(c). The County does not waive its right to assert in the appropriate forum that directions issued to the County pursuant to this subsection are unfunded state mandates.

Response:

CWC §13225 provides authority for the Regional Board to enter into a Management Agency Agreement (MAA) with the County of San Diego to encourage development of appropriate planning or regulatory programs to control nonpoint source pollution. CWC §13225 also provides authority for the Regional Board to require local agencies such as the County of San Diego to submit technical reports on water quality control, even though those entities may not be waste dischargers. Local agencies can be required to investigate the scope, causes, and sources of nonpoint source pollution, and potential practices or control measures to prevent it. The only restriction is that the burden of preparing the reports bear a reasonable relationship to the need for and the benefits to be obtained from the reports.

The revised Rainbow Creek TMDL provides that the Regional Board will direct the County of San Diego to submit the following three major technical reports:

1. Nutrient Reduction Management Plan

2. Groundwater Investigation and Characterization Report; and a

3 Implementation Monitoring Plan

The Regional Board will provide a rationale relating the need for these reports to the projected cost of the reports in CWC §13225 Orders it issues to the County requesting the submission of technical reports. These reports have required elements that are explained in further detail in Sections 9 and 10 of the revised TMDL technical report. The Regional Board has detailed the elements to be included in the reports to ensure that the County understands the information the Board is seeking. The Basin Plan amendment language provides for the submittal of alternative or additional elements equivalent to the elements prescribed by the Regional Board that would result in equivalent protection from, or prevention of, nutrient discharges to Rainbow Creek. The Basin Plan amendment does not indicate exactly how the studies or required elements are to be accomplished and provides the County with sufficient latitude to structure a report that meets the Board's needs. The County is encouraged to submit comments on the proposed Basin Plan amendment as to what elements should be required in these reports.

The language in regard to the County's willingness to undertake the investigation has been removed from the draft Basin Plan amendment. As a part of Section 12.0 Economic Considerations, the cost estimates of water quality monitoring and studies were provided as information for the TMDL. The costs are clearly characterized in the text as "estimates" and "preliminary."

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18. Comment Code: Implementation

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

We are unclear whether this document is the Regional Board's basin plan amendment or just the TMDLs that are to be submitted to the U.S. Environmental Protection Agency (USEPA). This must be clear. The USEPA has no implementation authority over nonpoint sources of pollution. Therefore, it is not necessary for the state to submit the implementation components of a TMDL to USEPA. We suggest that the Regional Board not submit such implementation components to USEPA in that the USEPA has no authority or jurisdiction and there is no reason to give them the opportunity to review and comment on such implementation plans.

Response:

The Regional Board's proposed action in the revised TMDL is a Basin Plan amendment incorporating the language described in Attachment A to tentative Resolution No. 2004-

0401 into the Basin Plan. The Basin Plan amendment includes language describing all elements of the Rainbow Creek TMDL including problem statement, numeric targets, source assessment, total maximum daily loads, load allocations, wasteload allocations, implementation action plan and implementation monitoring plan.

The Regioanl Board agrees that USEPA has no direct authority under the Clean Water Act to implement or enforce nonpoint source controls.

TMDL implementaiton plans are not currently required under federal law; however, it is USEPA policy that TMDLs should include implementation plans. TMDL implementation plans are required under state law.

CWA § 303(e) requires that TMDLs, upon USEPA approval, be incorporated into the state's water quality management plans (Basin Plan). State law in turn, CWC §§ 13050(j) and 13242 require that basin plans have a program of implementation to achieve water quality objectives. The implementation program must include a description of actions that are necessary to achieve the objectives, a time schedule for these actions, and a description of surveillance to determine compliance with the objectives. State law requires that a TMDL include an implementation plan because the TMDL normally is, in essence, an interpretation or refinement of an existing water quality objective. The TMDL has to be incorporated into the basin plan under CWA § 303(e), and, because the TMDL supplements, interprets, or refines an existing objective, state law requires a program of implementation.

The revised Rainbow Creek TMDL is a Basin Plan amendment that must be approved by the USEPA in its entirety pursuant to Clean Water Act § 303(d)(2), and federal regulations in 40 CFR 130.6, and 40 CFR 130.10. Accordingly, the Regional Board will be seeking USEPA approval of the Rainbow Creek TMDL Basin Plan amendment in its entirety, including the implementation plan component, following adoption by the Regional Board and approval by the State Water Resources Control Board.

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19. Comment Code: Implementation

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

The first phase of the TMDL implementation should last for five years to allow the results of the new Hines Nursery recycling system and septic tank improvements made with AB 885 funds to become apparent.

Response:

The revised Rainbow Creek TMDL requires that the first phase of nutrient load reductions be achieved by December 31, 2009. This provides an appropriate amount of time to implement MPs to attain the nutrient load reductions. The timing of the implementation and funding provisions of AB 885 is uncertain and the Regional Board in not willing to further delay or extend the first phase of implementation beyond 2009.

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20. Comment Code: Implementation

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

Section 9.5.1.1(C) Land Use Planning of the Staff Report dated March 22, 2002, indicates the Regional Board's desire to direct and evaluate county land use ordinances and their provisions. We must state our concern with the Regional Board injecting itself into land use decision making. It is one thing for the Regional Board to make the County the lead agency for the NRMP, but quite another to have the County answer to the Regional Board on land use matters. We can think of no other regulatory agency that assumes such a role.

Section 9.5.1.1(D) CEQA Responsibilities, also raises concerns about Regional Board participation in local land use decisions. A reading of this paragraph implies that the Regional Board is asking the County to apply CEQA requirements and mitigation measures on agricultural operations, a condition that does not currently exist. As in the preceding paragraph, the Regional Board's concern should be meeting water quality objectives, not influencing land use decision making.

Response:

The Regional Board has authority to regulate discharges of waste that could affect the quality of the waters of the state by issuance and enforcement of waste discharge requirements that will ensure the attainment of water quality consistent with the water quality objectives established in the basin plan. While the Regional Board should not interfere in land use planning by local governments, it may properly require municipalities to consider the water quality consequences of land use planning decisions involving development projects and construction, and to exercise local government authority to ensure that the consequence of land use planning decisions will not cause or contribute to the threat of pollution in waters of the state associated with discharges of pollutants.

The revised Rainbow Creek TMDL does not specifically limit or restrict land use or CEQA in the Rainbow Creek Watershed. In light of the persistence of the nutrient water quality impairment conditions in the Rainbow Creek watershed and the need for

increased regulatory oversight, the Regional Board proposes to use a Third Party regulatory based approach to mandate compliance with the nonpoint source (NPS) nutrient load reductions of this TMDL. The Regional Board proposes to accomplish this by negotiating a Management Agency Agreement (MAA) between the Regional Board and the County of San Diego setting forth the commitments of both parties to undertake various implementation responsibilities for the NPS nutrient load reductions of this TMDL. The success of the MAA approach is contingent on the County of San Diego's willingness to undertake the role of a lead NPS management and use its principal land use planning authority governing land use practices in the Rainbow Creek watershed to control NPS nutrient pollution in the Rainbow Creek watershed.

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21. Comment Code: Implementation

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

The primary implementation component for these TMDLs is a County prepared Nutrient Reduction and Management Plan (NRMP). It is our belief that this is a new implementation approach, not seen in other TMDLs. We would like assurances that agriculture will have a place at the table when the County prepares the plan, but see no such mention in the TMDL. We also believe it would be appropriate to have participation by the University of California Cooperative Extension Service. There should also be assurances that the plan will be subject to public review and Regional Board approval.

Response:

Under the terms of revised Rainbow Creek TMDL ,the County of San Diego will be the lead agency in developing the Nutrient Reduction and Management Plan (NRMP). It is anticipated that all interested parties and stakeholders will have a chance to review and comment on the NRMP. The Regional Board will consider, following concurrence with the County of San Diego's (NRMP) for Rainbow Creek, entering into a Management Agency Agreement (MAA) with the County of San Diego. The MAA would set forth the commitment of both parties to undertake various oversight responsibilities for the nonpoint source nutrient load reduction component of this TMDL, and the County's commitments to implement the NRMP.

In conjunction with an MAA or MOU with the County of San Diego describing an adequate NPS pollution control implementation program, the Regional Board will adopt individual or general waivers or waste discharge requirements (WDRs) for NPS discharges in the Rainbow Creek watershed. The waivers or WDRs will require NPS

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dischargers to either participate in the third party NPS program or, alternatively, submit individual pollution prevention plans that detail how they will comply with the waivers and WDRs. Alternatively, the Regional Board may adopt a discharge prohibition, which includes exceptions for those dischargers who participate in the County's non point source pollution control implementation.

The Regional Board shall will also consider entering into a memorandum of understanding (MOU) to document cooperative agreements with other agencies or organizations that are able to provide information, technical assistance, or financial assistance to dischargers to support the Regional Board's goals of attaining the nutrient load reductions required under this TMDL and compliance with the nutrient water quality objective. These agencies and organizations would include, but are not limited to, the United States Department of Agriculture, Natural Resources Conservation Service (NRCD), Mission Resource Conservation District (MRCD), and the University Of California Cooperative Extension (UCCE).

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22. Comment Code: Implementation

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

TMDL programs for Rainbow Creek should be implemented on a phased basis, both to sequence regulatory actions properly and to ensure that appropriate science is in place to support policy decisions.

Response:

The Regional Board has structured an adaptive implementation action plan in the revised Rainbow Creek TMDL that simultaneously makes progress towards achieving nutrient water quality objectives while relying on monitoring data to reduce uncertainty and fill data gaps as time progresses. This monitoring data can be used to revise and improve the initial TMDL forecast over time. This type of approach will help ensure that the Rainbow Creek TMDL program is not halted because of a lack of data and information, but rather progresses while better data are collected to verify or refine assumptions, resolve uncertainties, and improve the scientific foundation of the TMDL.

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23. Comment Code: Legal Issues

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Make and support required findings before imposing investigation, reporting or analysis requirements on the County. Water Code section 13225(c) allows the Regional Board to impose these requirements on a local agency only if the requirements are "necessary" and only provided the burdens of the imposition including costs are reasonable in comparison to the need for the report and the benefits to be obtained therefrom. The Regional Board has not done the work required to support the imposition of study requirements on the County under these standards. They have reported the costs of an ideal study as reported to them by County staff, but analysis and findings concerning necessity, burden, and benefits are lacking. The draft Resolution includes proposed Finding No. 17, but that is a general finding concerning all benefits and all costs of TMDL implementation, not a finding that addresses the requirements of section 13225(c).

Response:

CWC §13225 provides authority for the Regional Board to require local agencies such as the County of San Diego to submit technical reports on water quality control, even though those entities may not be waste dischargers. Local agencies can be required to investigate the scope, causes, and sources of nonpoint source pollution, and potential practices or control measures to prevent it. The only restriction is that the burden of preparing the reports bear a reasonable relationship to the need for and the benefits to be obtained from the reports. The Regional Board will provide a rationale relating the need for these reports to the projected cost of the reports in CWC §13225 Orders it issues to the County requesting the submission of technical reports.

In the Economic Considerations Section of the Regional Board's Rainbow Creek TMDL Report, cost estimates are provided for monitoring and implementation of selected BMPs.

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24. Comment Code: Legal Issues

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

In reviewing the fifty-two listed events on Attachment D of the Staff Report dated March 22, 2002 preceding today's public hearing, three involved public participation. Two in 1999, and one on April 11th of this year. While technically meeting the letter of the law, it is our hope that the Regional Board feels that every means available has been used to notify and engage the residents, property owners, farmers and nurserymen of the Rainbow Creek Watershed.

Response:

The Regional Board has provided adequate opportunities for public participation. In addition to the events listed in Appendix I of the revised Rainbow Creek TMDL, the Regional Board has posted the draft documents, public presentations, and other relevant documents on Regional Board's website as they became available.

Since the release of the draft Staff Report in 2002, the Regional Board has met with the TAC on December 18, 2002 to discuss the Economic Considerations. Furthermore, the Regional Board met with Caltrans on December 30, 2002 and again on March 19, 2003 to discuss Caltrans specific issues.

In 2004, the revised Rainbow Creek TMDL will be released for another public review in mid October 2004. Notice of the release of the revised Rainbow Creek TMDL documents has been circulated to all known interested parties. The revised Rainbow Creek TMDL documents will be posted on the Regional Board website during this public review period which ends December 8, 2004. The Regional Board will be holding a workshop to consider public comments on November 17, 2004. It is the Regional Board's intent to continue with meetings, public participation, and solicitation of comments during throughout the comment period until the public hearing on December 8, 2004. At any time during this period, public comments may be submitted to the Regional Board.

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25. Comment Code: Legal Issues

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

An additional concern created by the premature establishment of a Nutrient TMDL for Rainbow Creek, is the requirement within the Clean Water Act that only those TMDLs that are "suitable for such calculation" are to be developed. (See 33 U.S.C. § 1313(d)(1)(c).) In the regulations to the Clean Water Act, EPA defined when TMDLs are "suitable for calculation" by finding that all pollutants are suitable for calculation under "proper technical conditions" in which to base the development of the TMDL. (See 43 Fed. Reg. 60662). The phrase "Proper Technical Conditions" was explained by EPA as referring to "the availability of the analytical methods, modeling techniques and a data base necessary to develop a technically defensible TMDL." USEPA went on to conclude that "these elements were to vary in their level of sophistication depending on the nature of the pollutant and characteristics of the segment in question. It must be determined on a case-by-case basis." (Id.)

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Response:

The Regional Board has adequate analytical information to calculate and establish technically defensible TMDLs. In establishing the nutrient TMDL and load allocations, the Regional Board incorporated the following sources of data and information into the Technical Report:

- 8 years of site specific USGS stream flow data.
- Site specific water quality data collected by the Regional Board in 2000.
- Published nutrient export coefficients.
- City of San Diego water quality data from selected streams within the County.

The Rainbow Creek TMDLs have been peer reviewed twice by technical experts and none of the peer review comments suggested that the TMDLs were not "suitable for calculation." It is worth noting that if a high level of scientific certainty was required regarding every TMDL, a margin of safety would not be included in the TMDL equation.

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26. Comment Code: Rainbow Creek Draft Document

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

The two incorrect references to Hines should be deleted from the Staff Report.

Response:

The two statements referred to in this comment have been deleted from the revised Rainbow Creek TMDL. The two statements were the first and last sentences of the fourth paragraph of Section 9.5.1.4 if the Staff Report dated March 22, 2002. This paragraph is now located in Section 2.2.

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27. Comment Code: Rainbow Creek Draft Document

Agency ID: US EPA- Region 9

Commenter: Peter Kozelka

Comment:

The first sentence of Section 6.0 is misleading. It could be changed to…..A TMDL is less than or equivalent to the loading capacity after taking into account "allocations for all sources and a margin of safety."

Response:

The recommended change has been made.

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28. Comment Code: Rainbow Creek Draft Document

Agency ID: US EPA- Region 9

Commenter: Peter Kozelka

Comment:

Section 5.0 should be titled "Loading Capacity and Linkage Analysis" to clarify its contents.

Response:

The recommended change has been made.

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29. Comment Code: Responsible Parties/Dischargers

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Do not characterize the County as a "responsible party" or as a "discharger" for this watershed. The County acknowledges that it is a "local agency" that is subject to Regional Board direction related to studies and monitoring, under certain conditions, pursuant to California Water Code section 13225(c). The County also acknowledges that it has a significant role to play in this watershed as a land use authority, a public health agency, and a permitting agency for some new septic system installations. However, these various roles do not make the County a "discharger" or a "responsible party" for nitrogen and phosphorus loadings to Rainbow Creek.

Response:

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The revised Rainbow Creek TMDL documents does not refer to the County of San Diego as a responsible party for NPS discharges that are not under the County's direct control. Under the terms of revised Rainbow Creek TMDL , the County of San Diego will be the lead agency in developing the Nutrient Reduction and Management Plan (NRMP). The Regional Board will consider, following concurrence with the County of San Diego's (NRMP) for Rainbow Creek, entering into a Management Agency Agreement (MAA) with the County of San Diego. The MAA would set forth the commitment of both parties to undertake various oversight responsibilities for the nonpoint source nutrient load reduction component of this TMDL, and the County's commitments to implement the NRMP.

In conjunction with an MAA or MOU with the County of San Diego describing an adequate NPS pollution control implementation program, the Regional Board will adopt individual or general waivers or waste discharge requirements (WDRs) for NPS discharges in the Rainbow Creek watershed. The waivers or WDRs will require NPS dischargers to either participate in the third party NPS program or, alternatively, submit individual pollution prevention plans that detail how they will comply with the waivers and WDRs. Alternatively, the Regional Board may adopt a discharge prohibition, which includes exceptions for those dischargers who participate in the County's non point source pollution control implementation.

Any Regional Board enforcement action taken will be against individual dischargers and not the County of San Diego (unless the waste discharge is directly caused or permitted by the County). The Regional Board will also provide assistance to the County of San Diego as necessary to enforce implementation of MPs and the nutrient load reductions specified in this TMDL.

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30. Comment Code: Responsible Parties/Dischargers

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

In short, Hines firmly believes that the evidence shows that Hines has not caused or in any way contributed to a condition of pollution, contamination, or nuisance, and that to the contrary, its actions, and those of its predecessor have significantly improved the condition of Rainbow Creek. The evidence of the benefit of these improvements are supported by the Regional Board's report entitled "Total Maximum Daily Load for Nutrients, Rainbow Creek, San Diego County," dated April 2000. This report concluded that monitoring conducted in 1998-1999 reported a reduction in average nitrate concentrations in Rainbow Creek at Willow Glen Road from the 1986 annual average of 48.7 mg NO3-N/L down to 1.73 mg NO3-N/L. This monitoring report, combined with the existing recycling system Hines has been implementing for several years in

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connection with its irrigation waters, and the fact that a large majority (up to 80% or more) of its irrigation waters are already recycled, is strong evidence that Hines has not taken any action that has created a condition of pollution, contamination, or nuisance.

Response:

The Regional Board is aware that Hines Nursery has taken actions to reduce impact of their discharge to Rainbow Creek downstream of their facility. Significant reductions to the nitrogen (N) and phosphorus (P) concentrations in the Creek have been noted. Unfortunately, the nutrient concentrations downstream from Hines Nursery are still above desired levels. Most notable is the total phosphorus levels recorded in 2000 at Oak Crest which is just downstream from Hines Nursery. The average recorded total phosphorus was 1.13 mg/L based on 9 samples. Further downstream at Willow Glen and Riverhouse sampling stations, the total phophorus ranged from 0.39 to 0.49 mg P/L and 0.12 to 0.21 mgP/L respectively, during the same sampling period. Hines Nursery is still discharging irrigation water into Rainbow Creek and the Regional Board believes this unpermitted discharge is contributing to the nutrient loading of Rainbow Creek. The assertion that "Hines has not taken any action that has created a condition of pollution, contamination, or nuisance" is contrary to past and present irrigation practices at the nursery.

The sentence in Section 9.5.1.6 in the Rainbow Creek TMDL document dated March 22, 2002, which states "Hines Nursery is in violation of the waste discharge prohibition for discharge of waste to waters of the state in a manner causing a condition of pollution, contamination, or nuisance" has been deleted.

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31. Comment Code: Septic Tank Disposal Systems

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Properly functioning conventional septic systems are not designed to remove large quantities of nitrogen. They are designed to convert organic nitrogen and ammonia to nitrate, to remove some nitrogen altogether through denitrification, and to remove all pathogens. Additional nitrogen is removed by plant assimilation in the septic system leach field. While failing septic disposal systems would undoubtedly add more nitrogen to the subsurface than functioning systems, most of the systems in the Rainbow Creek watershed are functioning properly.

Response:

Although most of the septic tank systems in the watershed may be functioning proprerly, the majority of the failing septic tank systems are located in the alluvial valley, where the

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groundwater has the highest potential to discharge to Rainbow Creek. The failing systems are discharging nitrogen (N) directly to groundwater because there is minimal or no separation between the leach field discharge point and the water table. Without the proper separation between the leach field and the groundwater, reduction of the N from the effluent does not occur. While no septic system removes all N before the effluent reaches groundwater, ensuring that all systems in the watershed are working and constructed properly will reduce the N load to groundwater and Rainbow Creek.

The Environmental Considerations Section 8.4.1 of the revised Rainbow Creek TMDL describes management measures and practices that can be used to reduce nitrogen loadings from septic tanks.

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32. Comment Code: Septic Tank Disposal Systems

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Set realistic load reduction targets for onsite wastewater treatment systems that are tied to AB 885 program implementation. As previously discussed in this letter, achieving a 50% reduction in septic tank disposal system loadings watershed-wide is almost certainly not feasible and is probably physically impossible under the most ideal of soil conditions, unless properly functioning systems are replaced. Replacements are only likely to be achievable to the extent state financial subsidies are provided under the provisions of AB 885. Load allocations and implementation schedules must reflect these limitations.

Response:

The Regional Board agrees that replacing existing septic systems may be very costly. The revised Rainbow Creek TMDL implementation plan provides a 16 year time period to attain the spetic tank nutrient load reductions.

Assembly Bill 885, now adopted as Chapter 4.5 of the Porter-Cologne Act, requires the State Water Resources Control Board to promulgate regulations and standards for the permitting and operation of prescribed onsite sewage treatment systems and for the Regional Boards to incorporate those regulations into their Basin Plans. The State Board is in the process of promulgating the regulations. The Regional Board will incorporate the regulations into Basin Plan as soon as practicable upon their adoption by the State Board. The regulations currently under development include mandated nitrogen reduction performance requirements for septic tank systems that are identified as contributing to the impairment of surface water bodies listed as impaired pursuant to Section 303(d) of the Clean Water Act. As currently drafted, the new regulations require

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the Regional Board to issue waste discharge requirements for all septic tanks systems beginning in January 1, 2009, unless the County of San Diego assumes responsibility for enforcement of the regulations through a Memorandum of Understanding (MOU) with the Regional Board.

The implementation of these new regulations on septic tank disposal systems in the Rainbow Creek watershed will be an important vehicle for attaining the required nutrient load reductions for septic tank disposal systems. At this time it is not known how new programs developed through AB 885 will impact the implementation of the TMDLs for septic tank systems.

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33. Comment Code: Septic Tank Disposal Systems

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

The scope of an initial TMDL should be limited because the State has just established and is in the process of implementing a new program, complete with financial incentives, that may allow some properly functioning conventional septic systems in this watershed to be replaced with advanced systems, that would discharge less nitrogen. TMDL implementation in this watershed should be tied to the phased implementation of AB 885, but those new programs will not be in place until 2004.

Response:

Assembly Bill 885, now adopted as Chapter 4.5, Sections 13290 et seq. of the Porter-Cologne Act requires that the State Board promulgate regulations and standards for the permitting and operation of prescribed onsite sewage treatment systems and for the Regional Boards to incorporate those regulations into their Basin Plans. Among other requirements, section 13291(b) requires that the regulations shall include new requirements for systems adjacent to impaired waters.

The State Board is in the process of promulgating regulations. It is not known how new programs developed through AB 885 will impact implementation of the TMDLs at this time.

The Regional Board has a legal obligation under the Clean Water Act to adopt a TMDL for all water bodies, such as Rainbow Creek, identified as not meeting water quality standards under Section 303(d). The revised Rainbow Creek TMDL implementation plan provides a 16 year time period to attain the spetic tank nutrient load reductions. It is inappropriate to delay TMDL development on the basis of future programs, whose specific content and timing are unknown at this time. The 16 year time period allowed

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for in the implementaion plan should provide a sufficent flexibility to deal with issues arising from the new regulations.

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34. Comment Code: Septic Tank Disposal Systems

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

The County and the Regional Board should also cooperate to implement AB 885 programs for onsite wastewater treatment systems.

Response:

The Regional Board concurs and appreciates the County's willingness to cooperate. Assembly Bill 885, adopted as Chapter 4.5, Sections 13290 et seq. of the Porter-Cologne Act, requires the State Board to promulgate regulations and standards for the permitting and operation of prescribed onsite sewage treatment systems and for the Regional Boards to incorporate those regulations into their Basin Plans. Following that the Regional Board will likely pursue negotiating a Memorandum of Understanding (MOU) with the County of San Diego to assume responsibility for enforcement of the regulations.

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35. Comment Code: Septic Tank Disposal Systems

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Achieving a 50% reduction in septic system-derived loadings of nitrogen to Rainbow Creek is almost certainly not feasible, and is probably physically impossible under the most ideal of soil conditions, unless significant numbers of properly functioning conventional septic tank disposal systems are replaced with very costly alternative systems.

Response:

The Regional Board agrees that replacing existing septic systems may be very costly. The schedule of the implementation plan is intentionally written to allow incremental reductions towards achieving the N and P water quality objectives. The revised Rainbow

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Creek TMDL implementation plan provides a 16 year time period to attain the septic tank nutrient load reductions.

Assembly Bill 885, now adopted as Chapter 4.5 of the Porter-Cologne Act requires the State Board to promulgate regulations and standards for the permitting and operation of prescribed onsite sewage treatment systems and for the Regional Boards to incorporate those regulations into their Basin Plans. The regulations currently under development include mandated nitrogen reduction performance requirements for septic tank systems that are identified as contributing to the impairment of surface water bodies listed as impaired pursuant to Section 303(d) of the Clean Water Act. As currently drafted, the new regulations require the Regional Board to issue waste discharge requirements for all septic tanks systems beginning in January 1, 2009, unless the County of San Diego assumes responsibility for enforcement of the regulations through a Memorandum of Understanding (MOU) with the Regional Board.

The implementation of these new regulations on septic tank disposal systems in the Rainbow Creek watershed will be an important vehicle for attaining the required nutrient load reductions for septic tank disposal systems. At this time it is not known how new programs developed through AB 885 will impact the implementation of the TMDLs for septic tank systems.

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36. Comment Code: Technical Issues

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

The proposed TMDL calculations are scientifically and mathematically flawed. In discussions with County staff and legal counsel at a meeting on April 16, 2002, the Regional Board was unable to explain how the allowable loadings proposed in this Technical Report are related to estimated natural loadings to Rainbow Creek, or to estimated loadings required to reach the numerical water quality targets.

Response:

The Regional Board has revised the TMDL and background load calculations. Both of these calculations now utilize Rainbow Creek flow data collected by the USGS gaging station (See Appendix E - Technical Support Document: Streamflow, Seasonal Variation, and Flow Tiers). In the case of the TMDL calculations, the total nitrogen and total phosphorus TMDLs are now calculated by multiplying the numeric targets (1.0 mg N/L and 0.1 mg P/L) with the annual flow volume of Rainbow Creek. Similarly, a background load is calculated by multiplying representative background concentrations

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with the annual flow volume. Nutrient water quality data collected from minimally impaired streams in San Diego County have been assessed to establish nutrient background concentrations for San Diego County. The approach and data used in the background assessment can be found in Appendix D - Technical Support Document: Background Concentrations. The remainder of the TMDLs, after background and a margin of safety are subtracted, are then allocated to point and nonpoint sources based on considerations of the various sources (See Appendix F - Load Allocation Analysis).

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37. Comment Code: Technical Issues

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

The daily load allocations specified in Table 4-Y of the draft Basin Plan Amendment (Attachment A to Resolution No. R9-2002-0108) should be enforced based on a running 30-day average. This would provide an allowance for irrigation system malfunctions or other problems while meeting the objectives of the TMDLs. Since the proposed biostimulatory criteria are so low and there is no actual nutrient impairment, this should more than protect beneficial uses.

Response:

The TMDLs' allocations are based on a total annual load, rather than a daily load, and this load is not to be exceeded. If load requirements are incorporated into a permit, the method of enforcement will be determined at that time.

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38. Comment Code: Technical Issues

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

The visual characterizations of algal growth may not be reliable even as to the locations called out by staff. Two of the Regional Board's three peer reviewers have questioned the use of visual observations alone to determine whether algae and plant growth is "excessive." Dr. Rhea Williamson notes that determining visually whether there is excessive algae growth "can be misleading." (Appendix J, page 2 of J-2, first comment

regarding page 5 of the staff report) Dr. David Jenkins asks, "where are the data on emergent plant and algal numbers to support your statement that both are 'excessive'." The Regional Board was unable to respond with data, as no data are available yet to make this showing. (Attachment J, J-3 at "Summary of asterisked comments" for page 8 of the staff report).

Response:

Regardless of the presence or absence of algae, nitrogen and phosphorus levels are exceeding the Biostimulatory Substances water quality objective. Water quality data collected in 2000 support the designation of Rainbow Creek as an impaired waterbody. The 2002 303(d) List of impaired waterbodies was updated to reflect that nitrogen and phosphorus are the cause of impairment and the TMDL must be developed to address these impairments.

The Regional Board noted abundant algal growth at monitoring locations in Rainbow Creek during regular site observations and sampling events conducted during 1999-2000. It was noted as a qualitative assessment/observation that lends support to the assumption that increased nutrient concentration promotes increased algal growth when other factors present favorable conditions. The discussion about excess algae within the revised Rainbow Creek TMDL document and the color photographs in Appendix C, are used as supporting information.

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39. Comment Code: Technical Issues

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

The Regional Board considers the algal and emergent plant growth they have visually observed in Rainbow Creek to be excessive. (See draft Staff Report, p. 7.) This observed condition is not creek-wide. Rainbow Creek is about five to six miles long. Much of it is shaded by a plant canopy, and no excess algae have been observed in shaded areas. The growth of algae was visually judged by staff to be excessive at only two locations in 1999, and at only four locations in 2000. All of these areas have shallow slow moving water and no overhanging canopy. (Draft Staff Report at p. 7-8, and attached photos.)

Response:

It was not the intent of Regional Board to imply that excessive emergent plant growth extends along the entire length of Rainbow Creek. The Regional Board noted algae growth at certain locations in Rainbow Creek during regular site observations and

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sampling events conducted during 1999-2000. It was noted as a qualitative assessment/observation that lends support to the assumption that increased nutrient concentration promotes increased algal growth. The mention of excess algae within the revised Rainbow Creek TMDL document, along with the color photographs in the appendix, are used as supporting information.

The 2002 Clean Water Act section 303(d) list describes Rainbow Creek as impaired for elevated levels of nitrogen and phophorus. Therefore, the focus of the Rainbow Creek TMDL is the nitrogen and phophorus concentrations in the Creek. Water quality data collected along the length of the Creek show strong indication that the nutrient water quality standards are being exceeded on a regular basis, and that the listing as an impaired water body and the development of a TMDL is warranted.

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40. Comment Code: Technical Issues

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Even though pre-human nitrogen loadings to Rainbow Creek were likely to have been about 2,400 kg/yr, this TMDL package proposes a nominal TMDL for nitrogen that would require total nitrogen loadings to be reduced to less than two-thirds that level. Under this scenario, undeveloped land could be left to nature and could continue to release nitrogen to the creek, but all nitrogen discharges from land touched by man (even if only touched by designation as a “preserve”) would eventually have to be eliminated. It would not be sufficient merely to reduce discharges back to natural levels.

Response:

New methods for determining background nutrient loads and nutrient loading to Rainbow Creek have been incorporated into the revised TMDL report. The revised Technical Report now uses the water quality data from several minimally-impacted streams within San Diego County and flow data to calculate the background loads (see Appendix D). Therefore, the method used to arrive at 2,400 kg/yr for nitrogen loading no longer applies.

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41. Comment Code: Technical Issues

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

None of these numbers are certain, of course. But it is nonetheless clear that the Regional Board should not launch a TMDL development process in San Diego by proposing to set TMDLs for Rainbow Creek at levels that are two-thirds to one-fifth of natural loadings, based on an impairment listing that staff concedes has no basis in fact. To do so would be scientifically unsupportable, inconsistent with the Water Code, and politically unwise. Any such proposal would be damaging to the successful implementation of TMDLs in San Diego and elsewhere.

Response:

The Regional Board has modified the approach for calculating nutrient background loads by utilizing actual background data for San Diego County. The new approach uses nitrogen and phosphorus data from relatively clean streams in San Diego County to estimate the nutrient background loads for Rainbow Creek (see Appendix D). This method replaces the use of export coefficients for estimating nutrient background loads. The revised background loads are less than the proposed TMDLs and no longer support the statement that the TMDLs "are two-thirds to one-fifth of natural loadings".

In regard to the impairment listing, the original listing for Rainbow Creek was based on excessive nitrate concentrations documented during the mid-1980s, but listed for the pollution condition of "eutrophic". As a result of further monitoring and evaluation during the development of this Technical Report, a recommendation was made that the impairment listing be clarified and revised from "eutrophic" to "nitrogen and phosphorus" for exceedance of the Biostimulatory Substances Objective. The 2002 303(d) List Update, which included this revision of the impairment listing for Rainbow Creek, was approved by the USEPA in July 2003.

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42. Comment Code: Technical Issues

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Efforts to reduce nitrogen to these levels would themselves have environmental consequences for the lands affected. Reducing loadings of nitrogen and phosphorus to Rainbow Creek to below the level of natural loadings could also have environmental impacts on Rainbow Creek—under the plan proposed by the Regional Board, Rainbow Creek would receive less nitrogen and phosphorus than it did in its natural condition.

The environmental effects of driving nutrient loadings down to these unnatural levels were not disclosed or addressed in the environmental checklists and analyses prepared for this project.

Response:

The Regional Board has modified the approach for calculating nutrient background loads by utilizing actual background data for San Diego County. The new approach uses nitrogen and phosphorus data from relatively clean streams in San Diego County to estimate the nutrient background loads for Rainbow Creek. This method replaces the use of export coefficients for estimating nutrient background loads. The revised background loads are less than the proposed TMDLs and no longer support the statement that the proposed TMDLs will reduce nitrogen and phosphorus loading below natural levels.

The approach and data used in the background calculations can be found in Appendix D - Technical Support Document: Background Concentrations and Appendix E - Technical Support Document: Streamflow, Seasonal Variation, and Flow Tiers.

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43. Comment Code: Technical Issues

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

Section 2.6 discusses how dissolved oxygen (DO) concentrations were not low enough to cause an adverse effect and that DO is not expected to be depressed below the water quality standard. Yet, it then states that there are no results to support that assumption. However, there are clearly no results to not support the assumption either. Since there is not reason to suspect DO problems, then DO monitoring is not necessary. The Staff Report is specific to nutrients and algal growth and should therefore stay focused on the problem statement and not go looking for other issues.

Response:

The Regional Board agrees that the focus of the TMDL should be on nutrient related issues. However, monitoring for dissolved oxygen, in conjunction with temperature, conductivity, and pH, is a standard measurement of water quality and will be used as one of several indicators of water quality conditions that may impact beneficial uses to Rainbow Creek. Dissolved oxygen data may also be useful if a site-specific water quality objective is proposed.

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44. Comment Code: Technical Issues

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

The Southern California Coastal Water Research Project (SCCWRP) study referenced in the Staff Report indicates that the coefficient for agriculture was based on one site located in Ventura County. For the subject TMDLs, coefficients should be developed for inland San Diego County commercial nurseries, field agriculture, and orchards. The coefficients used in the SCCWRP study may have been appropriate for a regional study of coastal waters, however, they are not appropriate for a regulatory document, such as a TMDL Staff Report. Additional research is required to develop appropriate coefficients.

Response:

The Regional Board agrees that site-specific land use coefficients would have been ideal for this TMDL. Unfortunately, to our knowledge, none exist for Rainbow Creek or San Diego County. A brief discussion has been added to Section 4.0 Source Assessment of the revised Technical Report that discusses the selection process for the nutrient export coefficients.

The Regional Board is willing to consider other export coefficients and load calculation methods. With the exception of USEPA, no comments were made by the stakeholders or the peer review panel with suggestions or modifications to the use of export coefficients. USEPA submitted information on load calculations and that information was incorporated into the revised TMDL Report.

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45. Comment Code: Technical Issues

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Don’t require reduced discharges of nitrogen or phosphorus from preserves. Discharges from preserves are natural, background discharges. They cannot be reduced without interfering with preservation of the land in its natural state. Yet, the proposed Staff Report would require the same proportional reductions in nitrogen and phosphorus loadings from these lands as from agriculture and septic tank disposal systems.

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Response:

The Technical Report has been modified and load reductions are no longer specified for preserve lands.

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46. Comment Code: Technical Issues

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

Page two of the executive summary indicates that there are no wasteload allocations made for these TMDLs; however, there are urban areas within the watershed. If the urban areas are served by publicly (or privately owned treatment facilities, such as Oak Crest Mobile Estates and Rainbow Conservation Camp) then there are point sources within the watershed that must be considered.

Response:

Oak Crest Mobile Estates uses concrete lined evaporation ponds at their facility. The Regional Board does not consider the Oak Crest Mobile Estates waste water treatment facility a point source dischagre within th e meaning of the Clean Water Act.

The California Department of Forestry and Fire Protection (CDFFP) is responsible for operating Rainbow Conservation Camp and is named as a responsible party in the revised TMDL Report. CDFFP will be directed to undertake an investigation on possible impacts from their septic tanks and percolation ponds on Rainbow Creek. See Section 9.7, CA Department of Forestry and Fire Protection, in the revised TMDL Report.

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47. Comment Code: Technical Issues

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

The Staff Report also establishes annual load allocations for commercial nurseries for both nitrogen and phosphorus (see Tables 6-1 and 6-2) that are both unrealistic and

unobtainable. The data and analysis in the Staff Report simply do not support the load allocations developed thereunder, specifically for commercial nurseries. For example, in Table 4-1, the Staff Report assumes an annual total nitrogen load of 611 kilograms per year for commercial nurseries. The reference to 611 kilograms per year is apparently based on a figure of 4.1 kilograms per hector per year as an export coefficient, which, according to the reference, was derived from a 2000 report from the Sourthern California Coastal Water Research Project (SCCWRP). Yet, a review of the SCCWRP 2000 report shows that it does not contain any coefficient for commercial nurseries. Rather, and to the contrary, it only contains co-efficients for general commercial facilities (e.g., shopping centers, restaurants and the like), and for agriculture.

Response:

The Technical Report has been revised to use the export coefficient for agriculture from the SCCWRP 2000 report.

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48. Comment Code: Technical Issues

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

The stated inability to reduce loads from parks, preserves, and urban areas places an additional burden on agricultural uses, among others. Any load generated by human activity can be reduced and should carry its fair share, even if its contribution is small.

Response:

The total nitrogen and total phosphorus allocations have been revised to include parks and urban areas in Rainbow Valley. Preserves, which are natural lands, are considered to contribute to the background load.

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49. Comment Code: Technical Issues

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

In developing a TMDL for any impaired water body, an assimilative capacity study should first be conducted in order to determine the pollutant load the water body can assimilate before becoming impaired. That is, the TMDL "load allocations" and "waste load allocations" which may be discharged into a water body without impairing the beneficial uses, can only be developed after the assimilative capacity of the water body has first been identified. There is thus no basis to determine a load allocation or a waste load allocation (i.e., there is no basis to develop a TMDL), where the assimilative capacity of the water body has not been established. Hines would thus recommend that additional monitoring and a study of the assimilative capacity of the various reaches of the creek be conducted before adopting the subject TMDL, as the assimilative capacity of the water body is the cornerstone of any properly developed TMDL.

Response:

The assimilative capacity or loading capacity is the maximum amount of nutrients that can enter into the water column without exceeding the water quality standards. In this case, the biostimulatory target concentration for total nitrogen and total phosphorus are the applicable water quality standard. For this TMDL, nitrogen and phosphorus loading capacities were calculated by multiplying the desired water quality concentrations, 1.0 mg N/L and 0.1 mg P/L, times the annual flow volume of Rainbow Creek. Using the Biostimulatory Substances water quality objectives for nitrogen and phosphorus in conjunction with site-specific flow data is an appropriate basis for establishing load capacity that incorporate the best available information. A detailed description of the annual load capacity calculations are included in Section 5.0 of the Technical Report.

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50. Comment Code: Technical Issues

Agency ID: US EPA- Region 9

Commenter: Peter Kozelka

Comment:

Table 5-1 of the Staff Report should be modified to remove information about current load and interim loading capacity or postpone this table until a later section of the document. Instead, Table 5-1 shall define the loading capacity for biostimulatory total nitrogen and total phosphorus.

Response:

Table 5-1 has been modified to only present the loading capacity for total nitrogen and total phosphorus.

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52. Comment Code: Technical Issues

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

The Regional Board's proposed approach to actually implementing these TMDLs would not treat the TMDLs themselves as stopping points. Instead, the draft Basin Plan Amendment proposes that incremental reductions in nitrogen loading must continue to be achieved somehow until the numerical objective of 1.0 mg N/L is met in the creek. (See draft Amendment at pp. 2-3.) If the Regional Board is correct that meeting these targets will require reducing loadings to 402 kg N/yr as stated in footnote 1 of the draft Basin Plan Amendment, then the effective TMDL for total nitrogen is 402 kg/yr, not 1,507 kg/yr. This would require total loadings of nitrogen to be reduced to 402 kg/yr—less than one fifth of estimated natural levels.

Response:

The draft Basin Plan Amendment has been revised to establish TMDLs for total nitrogen and total phosphorus for Rainbow Creek that are equal to the load that would bring attainment of the water quality objective (1.0 mg N/L and 0.1 mg P/L, respectively). The TMDLs are required by federal regualtions to be set at loads that attain water quality standards.

The Technical Report has been revised to incorporate Rainbow Creek flow data and water quality concentrations in calculating total nitrogen and total phosphorus loads to the Creek. Refer to Sections 4.0, 5.0, and 6.0 in the revised Technical Report for detailed load calculations and allocations.

Furthermore, reference concentrations for San Diego County for total nitrogen and total phosphorus have been established for these TMDLs by using data from several relatively clean streams within the region and calculating mean concentrations. The findings from the reference water quality information for these streams show that reference conditions for total nitrogen and total phosphorus below the above stated water quality objective do exist in San Diego County. Therefore the target loads are not below the estimated natural levels. Section 4.0 and Appendix D of the revised Technical Report have the methodology and descriptive statistics used in establishing reference conditions for similar streams in San Diego County.

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53. Comment Code: Technical Issues

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Set realistic TMDLs. TMDLs must not be set lower than estimated natural loadings for the basin, and should be set higher if that is consistent with protecting the beneficial uses of Rainbow Creek that are identified as being achievable after further study.

Response:

The Regional Board has a legal obligation under Section 303(d) of the Clean Water Act to adopt TMDLs that attain current water quality standards. It is not inconceivable that a water quality standard may be lower than natural loadings - a situation that would not allow for any additional assimilative capacity to be allocated to other sources.

In any event the Regional Board's revision of the background source estimate methodology renders the issue moot. Data collected from streams in San Diego County that are relatively free of anthropogenic sources were used to determine a background concentration and calculate a background load. This approach replaces the one referenced in the comment, which used a literature value (export coefficient) and undeveloped land area to make the estimate. Section 4.0 and Appendix D of the revised Technical Report have the methodology and descriptive statistics used in establishing reference conditions for similar streams in San Diego County.

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54. Comment Code: Technical Issues

Agency ID: US EPA- Region 9

Commenter: Peter Kozelka

Comment:

The Staff Report needs some written revisions. As presented, Section 5.0 does not clearly define the loading capacity for total nitrogen and total phosphorus and present these bottom line values in a table.

Response:

The recommended change has been incorporated into the revised Technical Report. Section 5.0 now only includes the bottom line values for the total nitrogen and total phosphorus loading capacities.

Administrative Record Page No. 026561

55. Comment Code: Technical Issues

Agency ID: US EPA- Region 9

Commenter: Peter Kozelka

Comment:

As a consequence to modifying the loading capacity, the allocations and margin of safety will also need to be modified. These values are dependent on the quantity defined as the assimilative or loading capacity.

USEPA Region IX would support interim allocation levels as part of implementation, as long as the Staff Report clearly documents quantitative performance levels associated with desired water quality conditions and potential responses to achieving these interim levels. The attainment of all applicable water quality objectives must be clearly presented in the document.

Response:

As recommended, the interim allocations have been removed from Section 6.0, Loading Capacity and Linkage Analysis, and the allocations and margin of safety have been modified accordingly. The interim step reductions are presented and discussed in the Implementation Action Plan (Section 9.3).

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56. Comment Code: Technical Issues

Agency ID: US EPA- Region 9

Commenter: Peter Kozelka

Comment:

The Draft TMDL, in section 5.1 of the Staff Report dated March 22, 2002, utilizes an indirect approach to calculating the loading capacity for total nitrogen. This indirect approach relies on interpretation of the current loading estimate and proportional reduction to define the biostimulatory loading capacity.

USEPA Region IX urges the Regional Board to directly determine the loading capacity by starting with the desired water quality objective(s) and using stream flow records to calculate the loading capacity and TMDLs for total nitrogen and total phosphorus.

Response:

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The recommended change has been incorporated into the revised Technical Report. Eight years of USGS streamflow-gage data is now used to directly determine the loading capacity.

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57. Comment Code: Technical Issues

Agency ID: US EPA- Region 9

Commenter: Peter Kozelka

Comment:

The Draft TMDL, in Section 5.1 of the Staff Report dated March 22, 2002, states that the biostimulatory TMDL for total nitrogen is set at 1,507 kg/yr, based on this current load from undeveloped [or background sources] land.

The Regional Board must change its approach to defining the loading capacity and TMDL for total nitrogen. As presented, USEPA cannot approve the Rainbow Creek Nutrient TMDL since it has not utilized water quality objectives to establish the loading capacity, which ultimately affects the allowable allocations. Therefore, the proposed TMDL will not result in attainment of all applicable water quality objectives.

Response:

As recommended, the approach has been changed so that the loading capacity is based on water quality objective and Rainbow Creek flow data. The TMDL load capacity is now defined as the nutrient water quality objective multiplied by the stream flow rate.

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58. Comment Code: Technical Issues

Agency ID: US EPA- Region 9

Commenter: Peter Kozelka

Comment:

The proposed TMDL implies that the quantity of nutrients from undeveloped land is sufficient to determine the loading capacity and to interpret applicable water quality objectives. This assumption conflicts with 40 CFR 130.2(f) which defines loading capacity as “the greatest amount of loading that a water can receive without violating water quality standards.” TMDLs are based on the existing water quality standards. We

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do not believe the Basin Plan provides an exemption from application of water quality objectives based on the idea that naturally occurring pollutant levels exceed other applicable objectives.

In the future, the Regional Board could address this issue via two options; both would require a Basin Plan amendment:
a) adopt a different water quality objective for Rainbow Creek, presumably a site-specific value based on credible data, or
b) define an exclusion for Rainbow Creek from meeting water quality objectives due to naturally occurring sources; again with sufficient rationale.

Response:

The approach used to calculate the TMDLs for total nitrogen and total phosphorus has been changed. The revised TMDL is now based on existing water quality standards for total nitrogen and total phosphorus and is now in compliance with 40 CFR 130.2(f).

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59. Comment Code: Technical Issues

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

The Staff Report states that nutrients are likely contributing to the excessive algal and emergent plant growth. The next sentence then recognizes that where the growth occurred there was no riparian canopy yet where there was riparian canopy there was no algal growth. The Regional Board must be able to make the easy assumption based on actual observation that sunlight has a direct effect on the algal growth. Perhaps the easier solution to the problem is to increase the riparian canopy throughout the watershed and should be addressed.

Response:

The observations recorded only apply to small areas where samples were collected for water quality analyses. No study has been conducted on Rainbow Creek that directly correlates riparian growth, sunlight exposure, and algal density. The field observations should only be used in the context of supporting data for Rainbow Creek TMDL.

Increasing riparian growth may reduce the presence of algae; however, it will not directly address the elevated nitrogen and phosphorus levels found in the creek.

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60. Comment Code: Technical Issues

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

The source identification incorrectly characterizes undeveloped land contributions as small when in fact Figure 4-1 identifies undeveloped land as the single biggest contributor at 33%.

Response:

Figure 4-1 graphically represents the land use contributions to surface water. It does not include groundwater or air deposition contributions. Note that "undeveloped land" is now referred to as "background" in the revised TMDL Report.

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61. Comment Code: Technical Issues

Agency ID: San Diego County Farm Bureau

Commenter: Eric Larson

Comment:

The Staff Report is relying on a Caltrans document to state that their contribution was not significant. Perhaps there should be further review on CalTrans' actual contribution. Individual farmers may have insignificant contributions but they will be subject to the TMDLs and provisions of the Implementation Plan. No one should be exempt in that cumulative impacts do add up.

Response:

Caltrans contribution to the nutrient problem in Rainbow Creek has been re-evaluated and a wasteload allocation has been established for Caltrans state highway nutrient discharges in the revised TMDL report.

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62. Comment Code: Technology-Based Controls

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

This basin has not yet reaped the full benefits that can be expected when appropriate technology-based controls have been in place at all commercial nurseries for a reasonable period of time. These nurseries are discrete and significant sources of contamination, and they are still in the process of developing and implementing nutrient control and irrigation control best management practices (BMPs) to limit nitrogen and phosphorus in their discharges. In addition, the draft Staff Report notes (at pp. 3-4) that one commercial nursery in the watershed has actually placed a dam in Rainbow Creek, and uses the creek to impound and recirculate irrigation water. Restoring the natural flow of the creek may have significant effects. Whether the controls put in place at these sources are "voluntary" or "mandatory" is not the key issue here.4 In either case, it is clear there are further reductions in pollutant discharges that can be attained using cost-effective technology-based measures. It will take some time to see what further effects these reductions in nitrogen and phosphorus loadings will have on Rainbow Creek. The interim reductions already achieved have had a significant beneficial effect on the creek.

4The Regional Board has asserted to County staff and legal counsel that discharges from these nurseries are "agricultural return flows" and therefore are not point source discharges subject to the federal Clean Water Act. If this were correct, then the Clean Water Act would not require that these nurseries be placed under permit before a TMDL was developed. Without commenting on the assertion that nurseries may be exempt from federal discharge permits, the County notes that state Water Code section 13260(a) allows the Regional Board to issue and enforce WDRs to "any person discharging waste," and that Water Code section 13050 defines "waste" to include discharges from "any producing operation." Commercial nurseries that discharge polluted water from a pipe into a creek could therefore be required under state law to obtain WDRs, whether or not the nurseries are required to have permits under the federal Clean Water Act.

Response:

The Regional Board agrees with the comment that implementation of appropriate management practices at all nurseries in the Rainbow Creek watershed may result in significant reductions in nitrogen and phosphorus concentrations in Rainbow Creek.

Discharges of irrigation return water from nurseries in the San Diego Region currently are regulated under the terms and conditions of the Regional Board's Basin Plan waiver policy. For the purposes of the waiver, a "nursery" is defined as a facility engaged in growing plants (shrubs, trees, vines, etc.) for sale. Under the terms of this policy the Regional Board waives the obligation of nursery owners and operators to obtain waste discharge requirements for discharges of irrigation return water from nurseries subject to the following conditions:

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- There is no discharge to waters of the United States;
- Management practices are implemented for the discharge as described in the NPS Program Plan (SWRCB, 1999);
- The discharge shall not create a nuisance as defined in the California Water Code;
- The discharge shall not cause a violation of any applicable water quality standard; and
- The discharge of any substance in concentrations toxic to animal or plant life is prohibited.

The direct discharge of irrigation return water from a commercial nursery to Rainbow Creek would be a violation of the waiver conditions. The Regional Board may terminate the applicability of waivers and issue waste discharge requirements or take other appropriate enforcement action against any commercial nursery failing to comply with the waiver conditions.

The implementation of technology based controls is one strategy that commercial nurseries can implement that will reduce a point and non point source discharges that may impact Rainbow Creek. Commercial nurseries account for 368 acres in Rainbow Valley and play a significant role in the nutrient problem found in the Creek. However, agricultural fields (502 acres) and orchards (811 acres) also have a significant presence in the valley and cannot be overlooked as sources of nutrients. A watershed management approach which takes into account all major sources is needed to control the nutrient surface water problem.

Under the revised TMDL implementation plan, the Regional Board will adopt, in conjunction with an MAA or MOU with the County of San Diego, individual or general waivers or waste discharge requirements (WDRs) for NPS discharges in the Rainbow Creek watershed. The waivers or WDRs shall require NPS dischargers to either participate in the third party NPS program or, alternatively, submit individual pollution prevention plans that detail how they will comply with the waivers and WDRs. Alternatively, the Regional Board may adopt a discharge prohibition, which includes exceptions for those discharges that adequately participate in the proposed County of San Diego Nutrient Resource Management Plan program.

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63. Comment Code: Technology-Based Controls

Agency ID: County of San Diego

Commenter: Gary Erbeck

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Comment:

Take reasonable technology-based reductions in loadings from nurseries into account. The Regional Board should secure reasonable further reductions in loadings from commercial nurseries (by voluntary means or through regulation) and should observe the effects of those reductions on Rainbow Creek, before promulgating a TMDL to address biostimulatory impairment of Rainbow Creek. When TMDLs are promulgated, loads allocated to these nurseries should begin from their discharges after reasonable technology-based controls are in place.

Response:

The Regional Board has a legal obligation under the Clean Water Act to adopt a TMDL for all water bodies, such as Rainbow Creek, identified as not meeting water quality standards under Section 303(d) of the Act. The Regional Board has identified both point sources and nonpoint sources to be contributing to excessive nutrient concentrations in Rainbow Creek. The revised TMDL requires nutrient wasteload and load reductions from these sources.

The Regional Board agrees with the comment that implementation of appropriate management practices at all nurseries in the Rainbow Creek watershed may result in significant reductions in nitrogen and phosphorus concentrations in Rainbow Creek. The Regional Board has structured an adaptive implementation action plan in the revised Rainbow Creek TMDL that simultaneously makes progress towards achieving nutrient water quality objectives while relying on monitoring data to reduce uncertainty and fill data gaps as time progresses. This monitoring data can be used to revise and improve the TMDL wasteload and load allocations over time.

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64. Comment Code: Water Quality Standards

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

The draft Staff Report does not explicitly consider that the Basin Plan water quality objective is not violated merely by accelerated or “excessive” growth of algae or emergent plants. The Basin Plan's narrative objective is violated only if growth is so excessive it is a nuisance, or so excessive it adversely affects beneficial uses.

Response:

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Regardless of the presence or absence of algae, nitrogen and phosphorus levels in Rainbow Creek are exceeding the Biostimulatory Substances water quality objective. The 0.1 mg/l goal for phosphorus stated in the Biostimulatory Substances water quality objective is the phosphorus water quality objective applicable to Rainbow Creek. Simarly the N:P ratio of 10:1 stated in the Biostimulatory Substances water quality objective serves as the basis for determining allowable concentrations of nitrogen in Rainbow Creek. Applying the the N:P ratio of 10:1 to a phosphorus water quality objective of 0.1 mg/l yields 1.0 mg/l total nitrogen as the applicable nitrogen water quality objecitve for Rainbow Creek.

Rainbow Creek waters routinely exceed the 1.0 mg TN/L and 0.1 mg TP/L Biostimulatory Substances water quality objectives of the Basin Plan. Rainbow Creek is listed on the State of California's 2002 Clean Water Act section 303(d) list as an impaired water body due to excessive nitrogen and total phosphorus concentrations. The Clean Water Act provides that the Regional Board must establish TMDLs for nitrogen and phosphorus designed to attain the applicable Biostimulatory Substances water quality objectives of 1.0 mg TN/L and 0.1 mg TP/L.

The Biostimulatory Substances water quality objective requires the use of 0.1 mg/l phosphorus and 1.0 mg/l nitrogen as water quality objectives unless scientific studies show that altenrative site specifc water quality objectives (SSOs) for nitrogen and phosphorus are appropriate for Rainbow Creek. The SSOs would need to (1) be based on sound scientific rationale; (2) protect the designated beneficial uses of Rainbow Creek waters; and (3) be adopted by the Regional Board in a Basin Plan amendment.

Monitoring data collected in 2000 support that nutrient concentrations in the Creek are at levels that can promote nuisance algal growth, which was observed at monitoring stations that had optimal conditions (e.g., low flow, available substrate, and adequate water temperatures).

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65. Comment Code: Water Quality Standards

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Any TMDL for biostimulatory substances in inland surface waters in San Diego must be based on the Basin Plan narrative standard as the applicable Water Quality Objective. The Regional Board's targets of 0.1 and 1.0 mg/L for total phosphorus and total nitrogen, respectively, should be properly identified as interim numeric targets, rather than as Water Quality Objectives. Basic studies should be completed in the near future to allow

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replacement of these default values with numeric targets that reflect what is actually going on in Rainbow Creek.

Response:

The TMDL numeric targets are required by federal regulations to be based on the Basin Plan's existing water quality objective for Biostimulatory Substances [see 40 CFR 130.7(c)(1)].

The 0.1 mg/l goal for phosphorus stated in the Biostimulatory Substances water quality objective is the phosphorus water quality objective applicable to Rainbow Creek. Simarly the N:P ratio of 10:1 stated in the Biostimulatory Substances water quality objective serves as the basis for determining allowable concentrations of nitrogen in Rainbow Creek. Applying the the N:P ratio of 10:1 to a phosphorus water quality objective of 0.1 mg/l yields 1.0 mg/l total nitrogen as the applicable nitrogen water quality objecitve for Rainbow Creek.

The Biostimulatory Substances water quality objective requires the use of 0.1 mg/l phosphorus and 1.0 mg/l nitrogen as water quality objectives unless scientific studies show that altenrative site specifc water quality objectives (SSOs) for nitrogen and phosphorus are appropriate for Rainbow Creek. The SSOs would need to (1) be based on sound scientific rationale; (2) protect the designated beneficial uses of Rainbow Creek waters; and (3) be adopted by the Regional Board in a Basin Plan amendment. Dischargers or other interested parties would need to fund and initiate the scientific studies to develop the SSO. It is possible the studies could reveal the need for more stringent nutrient water quality objectives.

The Regional Board is currently participating in the development of new numeric nutrient water qua;ity objecitves in an effort underway in California by the USEPA Region IX Regional Technical Advisory Group (RTAG). USEPA’s recommended water quality criteria for the subecoregion that includes Rainbow Creek are 0.5 mg N/L for total nitrogen and 0.03 mg P/L for total phosphorus. The RTAG group is currently working on developing alternative regional nutrient water quality criteria for the Southern and Central California due to the number of nutrient TMDLs being completed in this region. Basin Plan resources are assigned to continue participation in the RTAG effort over the next three years. Information on the National Nutrient Strategy, the status of the RTAG effort, and technical guidance can be found at http://www.epa.gov/ost/standards/nutrient.html.

If the RTAG effort results in a new nutrient water quality objective applicable to the Southern California area, the Rainbow Creek TMDL will be revised in accordance with the procedures described in the draft Basin Plan amendment presented in Attachment A of the proposed Resolution 2004-0401.

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66. Comment Code: Water Quality Standards

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

In the Regional Board's response to this comment, “absolutely insupportable, bordering on the ridiculous” becomes merely “unfounded.” Staff’s more substantive response is essentially that the Basin Plan allows the use of a 0.1 mg/L target for P, and a ratio-based 1.0 mg/L target for N, when no data are available. (Response to Peer Review No. 1 Comments, page 1.) The Regional Board has chosen to respond to a stinging scientific objection by a designated peer reviewer by (1) softening the true force of that comment in their summary, and (2) by offering up a legal rather than a scientific response to the comment.

Response:

The Regional Board disagrees that paraphrasing the comment by using the word "unfounded" softens “the true force of that comment." The use of the word "unfounded" was intended to be consistent with the comment “absolutely insupportable.” The Regional Board did leave out the commentor’s phrase “bordering on the ridiculous” simply because it did not add any useful information beyond “absolutely insupportable” and “unfounded.”

The Regional Board is required by law to base the TMDLs on the Basin Plan's existing water quality objective for Biostimulatory Substances [40 CFR 130.7(c)(1)].

The Biostimulatory Substances water quality objective requires the use of 0.1 mg/l phosphorus and 1.0 mg/l nitrogen as water quality oibjectives unless scientific studies show that altenrative site specifc water quality objectives (SSOs) for nitrogen and phosphorus are appropriate for Rainbow Creek. The SSOs would need to (1) be based on sound scientific rationale; (2) protect the designated beneficial uses of Rainbow Creek waters; and (3) be adopted by the Regional Board in a Basin Plan amendment. Dischargers or other interested parties would need to fund and initiate the scientific studies to develop the SSO. It is possible the studies could reveal the need for more stringent nutrient water quality objectives.

The Regional Board has revised Section 2.4 to include supporting information regarding the use of the 10:1 nitrogen to phosphorus ratio as a translator and the appropriateness of the Basin Plan objectives for total nitrogen and total phosphorus based on comparisons with the USEPA's recommended nutrient criteria and published scientific studies.

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67. Comment Code: Water Quality Standards

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

The initial target should be the drinking water standard, for which there is a more solid scientific basis. At a specified review date, numeric biostimulatory cirteria could be added, if required.

Response:

TMDLs are required to be established at levels necessary to attain and maintain the applicable water quality standards for all pollutants preventing such attainment [40 CFR 130.7(c)(1)]. By law, the Rainbow Creek nutrient TMDLs must be based on the Basin Plan's existing water quality objective for Biostimulatory Substances.

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68. Comment Code: Water Quality Standards

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

If the stated or inferred desired goals taken from the explanation of the narrative water quality objective in the Basin plan for biostimulatory substances are to be used as numeric targets for the nutrient TMDLs, another part of the explanatory material should also be included. The TMDL should specify that the defined "values are not to be exceeded more than 10% of the time unless studies of [Rainbow Creek] clearly show that water quality objective changes are permissible and changes are approved by the Regional Board." This would be consistent with the Basin Plan and provide the needed flexibility in the proposed TMDLs.

Response:

The reference to "values are not to be exceeded more than 10 percent of the time…" refers to the water quality of Rainbow Creek. The success of this TMDL will be judged on the basis of Rainbow Creek meeting the Water Quality Objectives for Biostimulatory Substances 90 percent of the time in the receiving waters.

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69. Comment Code: Water Quality Standards

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

The Regional Board is incorrect on the application of the law. The "apparent" or "desired goal" for phosphorus that staff would rely on was not identified during the Basin Plan amendment process as a numerical Water Quality Objective, for informed public comment and Regional Board adoption. It is therefore not a Water Quality Objective, but is only what the Basin Plan says it is: a number that appears to be a desirable goal. Similarly, the limit of 1.0 mg/L total nitrogen that staff derive by applying a 10:1 ratio to this apparent desirable goal is also not legally a Water Quality Objective, or even an identified "desired goal." It is a default in the absence of any data. The Regional Board should be gathering the data to avoid a resort to such defaults, rather than proclaiming default values to be Water Quality Objectives that should drive the TMDL development process.

Response:

The Regional Board uses the 0.1 mg/l goal for phosphorus stated in the Biostimulatory Substances water quality objective as a phosphorus water quality objective unless site specific scientific studies demonstrate that a modified phosphorus objective is appropriate for a particular waterbody. (A modified water quality objective is referred to as a site-specific water quality objective (SSO).) Similarly the Regional Board uses the N:P ratio of 10:1 cited in the in the Biostimulatory Substances water quality objective as a basis for establishing a nitrogen water quality objective of 1.0 mg/l unless site specific scientific studies are conducted to establish a nitrogen site specific water quality objective based on different N:P ratios. SSOs must be approved by the Regional Board and incorporated into the Basin Plan. The Regional Board's use and interpretation of the Biostimulatory Substances water quality objective in this manner is well established and consistent with applicable laws and regulations.

The Biostimulatory Substances water quality objective requires the use of 0.1 mg/l phosphorus and 1.0 mg/l nitrogen as water quality objectives unless scientific studies show that altenrative site specifc water quality objectives (SSOs) for nitrogen and phosphorus are appropriate for Rainbow Creek. The SSOs would need to (1) be based on sound scientific rationale; (2) protect the designated beneficial uses of Rainbow Creek waters; and (3) be adopted by the Regional Board in a Basin Plan amendment. Dischargers or other interested parties would need to fund and initiate the scientific studies to develop the SSO. It is possible the studies could reveal the need for more stringent nutrient water quality objectives.

Further research into the appropriateness of the Basin Plan objectives for total nitrogen and total phosphorus shows that the numeric goals of 1.0 mg N/L and 0.1 mg P/L are consistent with published scientific studies. Dodds et al. (1998), using the cumulative frequency distributions of nutrient data from more than 1000 temperate streams primarily in North America and New Zealand, suggest total nitrogen and total phosphorus levels between 0.7 to 1.5 mg N/L and 0.02 to 0.07 mg P/L, respectively, to define streams that are mesotrophic. Eutrophic is a trophic state that has an abundance of nutrients and plant growth, and mesotrophic is a trophic state that has moderate concentrations of nutrients and plant growth.

In another paper, Dodds and Welch (2000) reviewed studies for the purpose of defining potential nutrient criteria that would address the concern of eutrophication. One study showed that total nitrogen should remain below 3 mg N/L and total phosphorus below 0.4 mg P/L for benthic chlorophyll to remain below a target level of 200 mg/m2 (below what is considered to be not aesthetically pleasing or have compromised recreational uses). Levels of 0.9 mg N/L and 0.04 mg P/L were recommend based on the above referenced study using cumulative frequency distributions of nutrients. Another study found that total nitrogen should be 0.47 mg N/L and total phosphorus be 0.06 mg P/L to ensure that chlorophyll is less than 100 mg/m2 most of the time.

The Regional Board is currently participating in the development of new numeric nutrient water qua;ity objecitves in an effort underway in California by the USEPA Region IX Regional Technical Advisory Group (RTAG). USEPA's recommended water quality criteria for the subecoregion that includes Rainbow Creek are 0.5 mg N/L for total nitrogen and 0.03 mg P/L for total phosphorus. The RTAG group is currently working on developing alternative regional nutrient water quality criteria for the Southern and Central California due to the number of nutrient TMDLs being completed in this region. Basin Plan resources are assigned to continue participation in the RTAG effort over the next three years. Information on the National Nutrient Strategy, the status of the RTAG effort, and technical guidance can be found at http://www.epa.gov/ost/standards/nutrient.html.

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70. Comment Code: Water Quality Standards

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

Respect the Basin Plan. The Regional Board's numeric targets for total nitrogen and total phosphorus should not be characterized anywhere in the Resolution, Basin Plan Amendment, or Staff Report as Water Quality Objectives. Only the narrative standard for biostimulatory substances actually established by the Basin Plan, after clear public notice and an opportunity to comment, has this status.

Response:

The Regional Board uses the 0.1 mg/l goal for phosphorus stated in the Biostimulatory Substances water quality objective as a phosphorus water quality objective unless site specific scientific studies demonstrate that a modified phosphorus objective is appropriate for a particular waterbody. (A modified water quality objective is referred to as a site-specific water quality objective (SSO).) Similarly the Regional Board uses the N:P ratio of 10:1 cited in the in the Biostimulatory Substances water quality objective as a basis for establishing a nitrogen water quality objective of 1.0 mg/l unless site specific scientific studies are conducted to establish a nitrogen site specific water quality objective based on different N:P ratios. SSOs must be approved by the Regional Board and incorporated into the Basin Plan. The Regional Board's use and interpretation of the Biostimulatory Substances water quality objective is well established and consistent with applicable laws and regulations.

The Biostimulatory Substances water quality objective requires the use of 0.1 mg/l phosphorus and 1.0 mg/l nitrogen as water quality objectives unless scientific studies show that altenrative site specifc water quality objectives (SSOs) for nitrogen and phosphorus are appropriate for Rainbow Creek. The SSOs would need to (1) be based on sound scientific rationale; (2) protect the designated beneficial uses of Rainbow Creek waters; and (3) be adopted by the Regional Board in a Basin Plan amendment. Dischargers or other interested parties would need to fund and initiate the scientific studies to develop the SSO. It is possible the studies could reveal the need for more stringent nutrient water quality objectives.

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71. Comment Code: Water Quality Standards

Agency ID: Hines Nurseries

Commenter: Bud Summers

Comment:

The Staff Report then proceeds to assert a numeric objective of 1.0 mgN/L for total nitrogen and 0.1 mg P/L for total phosphorus, in part based on the fact that "data are lacking," and that the objective allows for the use of a weight to weight ratio. Yet, no data or analysis is included in the Staff Report to support the translation of the narrative objective "to the numeric objectives," i.e., there has been no translator established to translate the narrative objective that inland surface waters shall not contain biostimulatory substances that promote aquatic growth which "cause nuisance or adversely affect beneficial uses," into the numeric objectives of 1.0 mg N/L and 0.1 mgP/L for total nitrogen and total phosphorus, respectively. In fact, at one point the Staff Report provides that: "currently, no site-specific data are available that correlates in-stream nutrient concentrations with abundance of algae." (TMDL, p. 12.). In effect, no

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"translator" has been developed for the TMDL to translate the narrative objective of not causing a nuisance or adversely affecting beneficial uses, into the 1.0 mg N/L and 0.1 mgP/L numeric objectives.

Response:

The TMDL targets are required by federal regulation to be based on the Basin Plan's existing water quality objective for Biostimulatory Substances.[see 40 CFR 130.7(c)(1)].

The 0.1 mg/l goal for phosphorus stated in the Biostimulatory Substances water quality objective is the phosphorus water quality objective applicable to Rainbow Creek. Simarly the N:P ratio of 10:1 stated in the Biostimulatory Substances water quality objective serves as the basis for determining allowable concentrations of nitrogen in Rainbow Creek. Applying the the N:P ratio of 10:1 to a phosphorus water quality objective of 0.1 mg/l yields 1.0 mg/l total nitrogen as the applicable nitrogen water quality objecitve for Rainbow Creek.

The Biostimulatory Substances water quality objective requires the use of 0.1 mg/l phosphorus and 1.0 mg/l nitrogen as water quality objectives unless scientific studies show that alternative site specifc water quality objectives (SSOs) for nitrogen and phosphorus are appropriate for Rainbow Creek. The SSOs would need to (1) be based on sound scientific rationale; (2) protect the designated beneficial uses of Rainbow Creek waters; and (3) be adopted by the Regional Board in a Basin Plan amendment. Dischargers or other interested parties would need to fund and initiate the scientific studies to develop the SSO. It is possible the studies could reveal the need for more stringent nutrient water quality objectives.

Further research into the appropriateness of the Basin Plan objectives for total nitrogen and total phosphorus supported that the numeric goals of 1.0 mg N/L and 0.1 mg P/L are consistent with published scientific studies. Dodds et al. (1998), using the cumulative frequency distributions of nutrient data from more than 1000 temperate streams primarily in North America and New Zealand, suggest total nitrogen and total phosphorus levels between 0.7 to 1.5 mg N/L and 0.02 to 0.07 mg P/L, respectively, define streams that are mesotrophic. Eutrophic is a trophic state that has an abundance of nutrients and plant growth, and mesotrophic is a trophic state that has moderate concentrations of nutrients and plant growth.

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72. Comment Code: Water Quality Standards

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

The scientific basis for both of these targets is weak. Dr. David Jenkins of U.C. Berkeley, one of the Regional Board's peer reviewers for the draft staff report, addressed these targets as follows: "An arbitrary assumption that the P limit should be one-tenth of the N limit is absolutely insupportable, bordering on the ridiculous! Reductions in P and further reductions in NO3-N must be justified on the basis of determining which limits algal growth in the Creek." (Attachment F-3 of the Staff Report dated March 22, 2002, page 1 of transmittal letter.)

Response:

The Regional Board uses the 0.1 mg/l goal for phosphorus stated in the Biostimulatory Substances water quality objective as a phosphorus water quality objective unless site specific scientific studies demonstrate that a modified phosphorus objective is appropriate for a particular waterbody. (A modified water quality objective is referred to as a site-specific water quality objective (SSO).) Similarly the Regional Board uses the N:P ratio of 10:1 cited in the in the Biostimulatory Substances water quality objective as a basis for establishing a nitrogen water quality objective of 1.0 mg/l unless site specific scientific studies are conducted to establish a nitrogen site specific water quality objective based on different N:P ratios. SSOs must be approved by the Regional Board and incorporated into the Basin Plan. The Regional Board's use and interpretation of the Biostimulatory Substances water quality objective is well established and consistent with applicable laws and regulations.

The Biostimulatory Substances water quality objective requires the use of 0.1 mg/l phosphorus and 1.0 mg/l nitrogen as water quality objectives unless scientific studies show that alternative site specifc water quality objectives (SSOs) for nitrogen and phosphorus are appropriate for Rainbow Creek. The SSOs would need to (1) be based on sound scientific rationale; (2) protect the designated beneficial uses of Rainbow Creek waters; and (3) be adopted by the Regional Board in a Basin Plan amendment. Dischargers or other interested parties would need to fund and initiate the scientific studies to develop the SSO. It is possible the studies could reveal the need for more stringent nutrient water quality objectives.

Further research into the appropriateness of the Basin Plan objectives for total nitrogen and total phosphorus supported that the numeric goals of 1.0 mg TN/L and 0.1 mg TP/L are consistent with published scientific studies. Dodds et al. (1998), using the cumulative frequency distributions of nutrient data from more than 1000 temperate streams primarily in North America and New Zealand, suggest total nitrogen and total phosphorus levels between 0.7 to 1.5 mg TN/L and 0.02 to 0.07 mg TP/L, respectively, define streams that are mesotrophic. Where eutrophic is a trophic state that has an abundance of nutrients and plant growth, mesotrophic is a trophic state that has moderate concentrations of nutrients and plant growth.

In another paper, Dodds and Welch (2000) reviewed studies for the purpose of defining potential nutrient criteria that would address the concern of eutrophication. One study showed that total nitrogen should remain below 3 mg/L and total phosphorus below 0.4

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mg/L for benthic chlorophyll to remain below a target level of 200 mg/m2 (below what is considered to be not aesthetically pleasing or have compromised recreational uses). Levels of 0.9 mg TN/L and 0.04 mg TP/L were recommend based on the above referenced study using cumulative frequency distributions of nutrients. Another study found that total nitrogen should be 0.47 mg TN/L and total phosphorus 0.06 mg TP/L to ensure that chlorophyll is less than 100 mg/m2 most of the time.

The Regional Board is currently participating in the development of new numeric nutrient water qua;ity objecitves in an effort underway in California by the USEPA Region IX Regional Technical Advisory Group (RTAG). USEPA's recommended water quality criteria for the subecoregion that includes Rainbow Creek are 0.5 mg N/L for total nitrogen and 0.03 mg P/L for total phosphorus. The RTAG group is currently working on developing alternative regional nutrient water quality criteria for the Southern and Central California due to the number of nutrient TMDLs being completed in this region. Basin Plan resources are assigned to continue participation in the RTAG effort over the next three years. Information on the National Nutrient Strategy, the status of the RTAG effort, and technical guidance can be found at http://www.epa.gov/ost/standards/nutrient.html.

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73. Comment Code: Water Quality Standards

Agency ID: County of San Diego

Commenter: Gary Erbeck

Comment:

A principle reason that the Regional Board has not made a convincing scientific case for impairment by biostimulatory substances may be that it misconstrues the Basin Plan as also setting numerical Water Quality Objectives for N and P. The Basin Plan states that "a desired goal for total phosphorus appears to be 0.1 mg/L total phosphorus." The Regional Board would style this as creating a Water Quality Objective. While the Regional Board admits that no "analogous threshold value" for nitrogen is set in the Basin Plan (Staff Report at p.7), it nevertheless derives a limit of 1.0 mg/L for nitrogen from a discussion in the Basin Plan of natural ratios of nitrogen to phosphorus (N:P) that should be used as default values in the absence of any water-body-specific data. The Regional Board characterizes even this constructed number, which is derived from rather than called out in the Basin Plan, as a "Water Quality Objective." (Draft Staff Report p.6, and draft Resolution p.1, Finding No. 5).

Response:

The Regional Board uses the 0.1 mg/l goal for phosphorus stated in the Biostimulatory Substances water quality objective as a phosphorus water quality objective unless site

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specific scientific studies demonstrate that a modified phosphorus objective is appropriate for a particular waterbody. (A modified water quality objective is referred to as a site-specific water quality objective (SSO).) Similarly the Regional Board uses the N:P ratio of 10:1 cited in the in the Biostimulatory Substances water quality objective as a basis for establishing a nitrogen water quality objective of 1.0 mg/l unless site specific scientific studies are conducted to establish a nitrogen site specific water quality objective based on different N:P ratios. SSOs must be approved by the Regional Board and incorporated into the Basin Plan. The Regional Board's use and interpretation of the Biostimulatory Substances water quality objective is well established and consistent with applicable laws and regulations.

The Biostimulatory Substances water quality objective requires the use of 0.1 mg/l phosphorus and 1.0 mg/l nitrogen as water quality objectives unless scientific studies show that alternative site specifc water quality objectives (SSOs) for nitrogen and phosphorus are appropriate for Rainbow Creek. The SSOs would need to (1) be based on sound scientific rationale; (2) protect the designated beneficial uses of Rainbow Creek waters; and (3) be adopted by the Regional Board in a Basin Plan amendment. Dischargers or other interested parties would need to fund and initiate the scientific studies to develop the SSO. It is possible the studies could reveal the need for more stringent nutrient water quality objectives.

The Regional Board is currently participating in the development of new numeric nutrient water qua;ity objecitves in an effort underway in California by the USEPA Region IX Regional Technical Advisory Group (RTAG). USEPA's recommended water quality criteria for the subecoregion that includes Rainbow Creek are 0.5 mg N/L for total nitrogen and 0.03 mg P/L for total phosphorus. The RTAG group is currently working on developing alternative regional nutrient water quality criteria for the Southern and Central California due to the number of nutrient TMDLs being completed in this region. Basin Plan resources are assigned to continue participation in the RTAG effort over the next three years. Information on the National Nutrient Strategy, the status of the RTAG effort, and technical guidance can be found at http://www.epa.gov/ost/standards/nutrient.html.

Literature Cited

Dodds, W. K., J. R. Jones, and E. B. Welch, 1998. Suggested Classification of Stream Trophic State: Distributions of Temperate Stream Types by Chlorophyll, Total Nitrogen, and Phosphorus. Water Research, Journal of the International Water Association, Volume 32:5, pp. 1455-1462.

Dodds, W. K., and E. B. Welch, 2000. Establishing Nutrient Criteria in Streams. Journal of North American Benthological Society, Volume 19:1, pp. 186-196.

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

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

N-1 Dr. Jenkins' Peer Review Comment Letter

Lisa E.B. Honma
Environmental Scientist
San Diego Water Quality Control Board
9174 Sky Park Court
Suite 100
San Diego, CA 92123-4340

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	
p.2, ¶5	**Comment:** 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.
p.3, ¶2, l 2,3	**Comment:** Phosphate minerals do not break down, they dissolve. **Response:** The sentence in the third paragraph of Section 2.1 has been reworded.
p.3, ¶2, l 6	**Comment:** 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.
p.3, ¶3, l 2	**Comment:** "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)].
p.3, ¶3, l 7	**Comment:** 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	
	Comment:
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.
	Response:
	A sentence has been added to Section 2.5 to address this issue.
	Comment:
p.17, ¶1, l 2	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	
	Comment:
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!
	Response:
	The recommended change has been incorporated into the second paragraph of Section 3.0.
	Comment:
p.17, ¶3, l 10	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.

Appendix O - Response to Public Comments from Public Hearing on December 8, 2004 and Written Comments Submitted on/before December 29, 2004.

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California Regional Water Quality Control Board

San Diego Region

Total Nitrogen and Total Phosphorus TMDL for Rainbow Creek

Response to Public Comments from Public Hearing on December 8, 2004 and Written Comments Submitted on/before December 29, 2004.

January 27, 2005

1) ALGAE GROWTH

a) *Comment from the California Avocado Commission 12/01/04:*
It also appears that an alternative strategy of providing riparian cover in areas now affected by algal blooms may almost entirely solve the problem. These alternatives should be fully explored by the Board.

Regional Board Response:
This comment was addressed in the Technical Report, Appendix M, Response to Public Comments, Public Hearing on May 8, 2002. See response #39.

b) *Comment from the California Avocado Commission 12/01/04:*
In areas where Rainbow Creek is open to sunlight, re-vegetation efforts should be made. Development of a new, vegetative canopy would retard algal growth, the driving force behind the establishment of the numeric water quality objectives in the TMDL. As noted above, without the presence of an algal bloom the development of a numerical objective for nutrient levels is unjustified.

Regional Board Response:
This comment was addressed in Appendix M of the Technical Report, Response to Public Comments, Public Hearing on May 8, 2002. See response #64.

c) *Comment from the California Avocado Commission 12/01/04:*
The TMDL draws a clear link between existing levels of total nitrogen and total phosphorus (biostimulatory substances) in surface waters and algal growth. Without the latter, the Board lacks justification for the TMDL. Yet the evidence from recent water quality sampling, on which the TMDL is based, fails to make a convincing case that the numerical levels actually result in algal blooms that constitute a “nuisance" or "adversely affect beneficial uses" (see pages 21-23).

Regional Board Response:
The Regional Board disagrees with this comment. The justification for the Rainbow Creek TMDL is that the nitrogen and phosphorus concentrations are above the water quality objective for Municipal Water Supply and Biostimulatory Substances.

The Regional Board’s most recent water quality sampling (December 2004) from Rainbow Creek shows nitrogen concentrations nearly double of any sample collected in 2000. Water quality objectives are developed for the protection of beneficial uses. Therefore any exceedance of the water quality objectives is considered to be an adverse affect on the designated beneficial uses.

d) *Comment from the California Avocado Commission 12/01/04:*

If algae, at the peak of its growth, does not create a nuisance or affect beneficial uses (thereby calling into question the validity of the entire TMDL), then rejection of a seasonal nutrient differential is even more unfathomable.

Regional Board Response:
The water quality objectives, and hence the numeric targets, do not have seasonal differential. Seasonal variation was accounted for by the use of flow tiers in examining the Creek flow data in calculating the nutrient loading and background capacity. See Appendix F of the Technical Report.

2) ATMOSPHERIC DEPOSITION

a) *Comment from the California Avocado Commission 12/01/04:*
In the Source Assessment of the TMDL, the Board determined that atmospheric deposition of nutrients should be constrained to the creek surface area (see Section 4.0). By constraining the calculation to the creek area, the estimate of nutrient loading from atmospheric deposition is artificially low.

Regional Board Response:
Atmospheric deposition is accounted for in two ways: Section 4.1.3 calculates the portion that is deposited directly into the creek and Section 4.1.1 calculates the portion that is deposited to land. This is explained in Section 4.1.3 of the Technical Report as quoted below (underline added for emphasis):

> *"Air pollutants are deposited to the earth, in most cases directly to a water body or to a land area that drains into a water body. These pollutants are deposited by wet or dry deposition. In wet deposition, pollutants are removed from the air by a precipitation event such as rain. Dry deposition occurs when particles settle out of the air and onto surfaces. Total nitrogen loads from atmospheric deposition are most significant in large lakes or reservoirs when the waterbody is large compared to the total watershed area (USEPA 1999). In the Rainbow Creek watershed, nutrient loads from atmospheric deposition are not likely to be significant as compared to other sources, because the surface area of the creek is small compared to the area of the watershed. Atmospheric deposition is calculated using water surface area only, since total nitrogen depositions on land are included in the nutrient export coefficients. Atmospheric deposition loads to Rainbow Creek were estimated using established atmospheric deposition rates."*

b) *Comment from the California Avocado Commission 12/01/04:*
Remarkably, the draft TMDL omits any discussion of those reports in the scientific literature that speak to the significance of atmospheric deposition and whether land use export coefficients adequately address the calculation of loadings.

Regional Board Response:
The Rainbow Creek TMDL Technical Report has undergone 2 formal peer reviews and also been reviewed by the USEPA and at no time did any of the reviewers recommend export coefficients they deemed more accurate. Several comments were submitted by the public that was critical of the Regional Board's

selection of export coefficients but, again, no alternative export coefficients were specifically recommended.

Furthermore, the USEPA submitted the following statement in a letter dated December 3, 2004:

> "*The proposed TMDLs meet all federal regulatory requirements and will be approvable when they are submitted to EPA. The TMDLs are based on sound analytical methods that identify reasonable pollutant reductions necessary to attain the existing Basin Plan numeric water quality objectives.*"

c) *Comment from the California Avocado Commission 12/01/04:*
It is our concern that a potentially significant source—one beyond the control of any entity within the Rainbow Creek watershed—could possibly explain a significant portion of the nutrient loading in Rainbow Creek.

Regional Board Response:
See Regional Board Comment Response 2a of this document

d) *Comment from Hines Nurseries 12/01/04:*
Unfortunately, the source assessment for the proposed Total Nitrogen and Total Phosphorus TMDL for Rainbow Creek is incomplete and inadequate. It all but ignores indirect atmospheric deposition.

Regional Board Response:
See Regional Board Comment Response 2a of this document.

e) *Comment from Hines Nurseries 12/01/04:*
Hines recommends that the Regional Board invite researchers from SCCWRP and UCLA to conduct a workshop for Board members, Board staff, and the regulated community on the relationship of atmospheric deposition to water quality, with emphasis on atmospheric deposition of nutrients.

Regional Board Response:
Comment noted.

3) ECONOMICS

a) *Comment from Caltrans 12/07/04*:
In addition, since the necessary controls have not been identified, the TMDL cannot show how the benefits justify the cost.

Regional Board Response:
The Implementation Action Plan section is intentionally written to give the stakeholders the flexibility to develop what they feel as cost effective nutrient management measures to address the impairment of Rainbow Creek. Under Water

Code Section 13360, the Regional Board may not specify the design, location, type of construction, or particular manner of compliance with waste discharge requirements or other orders, and dischargers can comply "in any lawful manner." This restriction is a shield against unwarranted interference with the ingenuity of the party subject to waste discharge requirements, who can elect between available strategies to comply with the standard.

CEQA's provisions require that the Regional Board perform an environmental analysis of the reasonably foreseeable methods of compliance with the wasteload and load allocations. The Regional Board must consider the economic costs of the methods of compliance in this analysis; however, the Regional Board is not required to do a formal cost-benefit analysis. The Regional Board did perform an environmental analysis of the reasonably foreseeable methods of compliance in Section 11.4 of the Technical Report of typical BMPs to reduce nutrient discharges from state highways. Estimated costs for implementing these BMPs are provided in Section 12 of the Technical Report.

b) *Comment from Caltrans 12/07/04*:
Table 4-2 in the report shows the total annual nitrogen load for the watershed to be 3,868 kg N/yr. The total volume of flow in the creek is 58,539 $x10^6$ cf /yr. This is equivalent to an average annual concentration of 2.33 mg/L within the creek. The monitoring data in Appendix B shows average concentrations with the creek to be 9.6 mg/L, 14.5 mg/L and 14.7 mg/L for 2000 monitoring. This means that the sources for between 75% and 85% of the nitrogen load to the creek have not been identified. This discrepancy casts doubt on the load allocation as well as the likelihood that the proposed measures will result in significant improvement to water quality in Rainbow Creek.

Regional Board Response:
This comparison is inappropriate because the total load in Table 4-2 is based in part on export coefficients while the data in Appendix B is actual monitoring data. Therefore the difference between the two methods of calculation suggests that the additional data collection planned during implementation will be useful to refine the current loading estimates. In addition, the analysis in the comment, a comparison of averages, does not take into account the fact that the infrequent but significant high flow periods account for much of the total load.

c) *Comment from Caltrans 12/07/04*:
The costs presented in Appendix H uses a Caltrans drainage area of 214 acres rather than the 120 acres used in the TMDL report. The cost suggests the use of sediment basins for treatment at a cost as low as $700. The Caltrans BMP Retrofit Pilot Program Final Report (http://www.dot.ca.gov/hq/env/stormwater/special/newsetup/_pdfs/new_technology/CTSW-RT-01-050.pdf) found that the cost for sediment basins in a retrofit situation range from $303 to $1,307 per WQV m^3. This would be a cost of $602,000 to $2,586,000 to treat the 1,986 m^3 of WQV for the 4.1 miles of I-15 in this watershed. Cost for

sand filters range from $748 to $2,118 per WQV m^3. ($1,486,000 to $4,206,000 to treat 1,986 m^3 of WQV)

Regional Board Response:
The cost estimates submitted by Caltrans have been incorporated into Section 12 and Appendix H.

The acreage for the Interstate 15 corridor has been corrected in the revised Technical Report. The correct value is 120 acres.

d) *Comment from the California Avocado Commission 12/01/04:*
Compliance with the TMDL is estimated to cost from a low of $18,565,000 to a high estimate of $41,772,000 not including costs associated with individual agricultural operations. Assuming a high cost of $57,705 for each orchard, avocado production in the Rainbow Creek watershed could be rendered economically infeasible.

Regional Board Response:
The Implementation Action Plan section is intentionally written to give the stakeholders the flexibility to develop what they feel as cost effective nutrient management measures to address the impairment of Rainbow Creek. Under Water Code Section 13360, the Regional Board may not specify the design, location, type of construction, or particular manner of compliance with waste discharge requirements or other orders, and dischargers can comply "in any lawful manner." This restriction is a shield against unwarranted interference with the ingenuity of the party subject to waste discharge requirements, who can elect between available strategies to comply with the standard.

CEQA's provisions require that the Regional Board perform an environmental analysis of the reasonably foreseeable methods of compliance with the wasteload and load allocations. The Regional Board must consider the economic costs of the methods of compliance in this analysis; however, the Regional Board is not required to do a formal cost-benefit analysis.

The Regional Board can adopt TMDLs and other types of Basin Plan amendments despite significant economic consequences. In the Rainbow Creek Technical Report the Regional Board has clearly explained why the TMDL is necessary and provided extensive information on the sensitivity of the receiving waterbody, water quality problems caused by excessive nutrient loading and public health implications.

The estimated capital costs for orchards ranges from $10,105 to $57,705. The implementation actions are to be implemented over a period of 16 years. This should allow ample time to implement needed nutrient reduction measures in a phased approach, monitor effectiveness, and adjust the program as necessary to maximize efficiency and minimize costs.

Sources of potential funding for Rainbow Creek TMDL projects are listed in Section 12.3 of the Technical Report.

e) *Comment from Richard Watson 12/08/04:*
Tentative Finding 17 claims that the Regional Board has considered costs of implementing the amendment. However, the costs for commercial nurseries are understated, and the economics analysis does not comply with California Water Code Section 13241.

Regional Board Response:
Water Code Section 13241 establishes the requirements attendant to the Regional Boards' adoption of water quality objectives. A TMDL normally is, in essence, an interpretation or refinement of an existing water quality objective. TMDLs are designed to attain water quality objectives and are not intended to re-balance the policy interests defined by Water Code Section 13241 that underlie the water quality objective. A TMDL implements existing water quality objectives; it does not create new objectives. Therefore, section 13241 does not apply to development of a TMDL.

The Regional Board documented the estimated costs to commercial nurseries for implementation of the "reasonably foreseeable methods of compliance" as required by CEQA and provided the information in Section 12 of the Technical Report. The cost data was based primarily on information contained in "Calleguas Creek Watershed and Erosion Control Plan for Mugu Lagoon. USDA, May 1995." and is a reasonable estimate of the cost impacts of the Rainbow Creek TMDL on commercial nurseries.

f) *Comment from the County of San Diego 12/28/04:*
Consequently, waiting until after the TMDL is approved to develop the required costs/benefits analyses will only guarantee that such analyses amount to little more than post hoc rationalizations in support of orders that are, in fact, a fait accompli.

Regional Board Response:
This comment was in reference to the Regional Board's issuance of a CWC §13225(c) order for a Nutrient Reduction Management Plan.

CEQA's provisions require that the Regional Board perform an environmental analysis of the reasonably foreseeable methods of compliance with the wasteload and load allocations prior to adopting a TMDL Basin Plan amendment. The Regional Board must consider the economic costs of the reasonable foreseeable methods of compliance in this analysis; however, the Regional Board is not required to do a formal cost/benefit analysis for the adoption of a TMDL. The Regional Board has provided the results of this analysis, including an estimate of the costs that might be incurred by the County of San Diego in preparing reports

and overseeing nutrient reduction efforts described in the TMDL in Section 12 of the Technical Report.

The Regional Board is required under CWC §13225 to provide a written justification showing that the burden, including costs of preparing a report required under CWC §13225 bears a reasonable relationship to the need for the report. However the requirement to produce the written justification is not triggered until the CWC §13225 order requiring the report is issued to the County of San Diego at some time subsequent to the adoption of the TMDL.
The details of the MAA and NRMP are scheduled to be worked out after TMDL adoption. The Regional Board will provide a written justification addressing the issue of the burden of the reports bearing a reasonable relationship to the benefits attained at the time the CWC §13225(c) order is issued.

4) EXPORT COEFFICIENTS

a) *Comment from the California Avocado Commission 12/01/04:*
It is clear from Dr. Boynton's comments above that he has serious doubts about the applicability of the export coefficients identified in the study to local conditions in a completely different geographic area, here Rainbow Creek. There is no valid scientific basis, therefore, for the Board's use of 2.5 kg/ha/yr for Total Nitrogen and 0.2 kg/ha/yr for Total Phosphorus for the orchard land use category in the TMDL.

Regional Board Response:
This comment was addressed in Section 11.3 of Technical Report, Analysis of Public Comments on Technical Issues. See Section 11.3.3 and 11.3.7.

The USEPA submitted the following statement in a letter dated December 3, 2004:

> *"The proposed TMDLs meet all federal regulatory requirements and will be approvable when they are submitted to EPA. The TMDLs are based on sound analytical methods that identify reasonable pollutant reductions necessary to attain the existing Basin Plan numeric water quality objectives."*

Furthermore, in the development of this nutrient TMDL, local experts were a part of the Technical Advisory Committee and reviewed sections of the Technical Report as it was drafted. See Section 13.0, Public Participation, for a list of participants and Appendix I, List Events, for a list of meeting dates and topics. In addition to the TAC members, other local scientists, such as scientists from the Southern California Coastal Water Research Project (SCCWRP) and other Regional and State Water Board staff, were also consulted on specific nutrient issues, including the use of export coefficients and nutrient water quality objectives.

b) *Comment from the California Avocado Commission 12/01/04:*
There is no specific export coefficient value for avocados. Avocado nutrient load allocations should be based on specific information that takes into account grower practices and resulting contributions to the TMDL. Otherwise, avocado growers are unfairly burdened with an allocation that is excessive or beyond their ability to control.

Regional Board Response:
This comment was addressed in Appendix M of the Technical Report, Response to Public Comments, Public Hearing on May 8, 2002. See response #44. Also see Section 11.3.7 of the Technical Report. .

c) *Comment from the California Avocado Commission 12/01/04:*
Section 11.3.3 of the TMDL purports that the export coefficient selected for the orchard land use category (among others) is appropriate (see page 101). This claim is unsubstantiated, however, as evident from the following statement in the TMDL:

> "The Regional Board recognizes it is difficult to calculate nutrient loadings from non-point sources with precision and acknowledges that *the development of nutrient loads from NPS discharges is characterized by uncertainties*" (emphasis added).

Regional Board Response:
The Regional Board agrees with the above quote – that it is difficult to calculate non-point source nutrient loading and that there are uncertainties. However that does not preclude moving forward with development and adoption of a TMDL using the available data. Also see Response #44 in Appendix M and Section 11.3.7 of the Technical Report.

The USEPA submitted the following statement in a letter dated December 3, 2004:

> *"The proposed TMDLs meet all federal regulatory requirements and will be approvable when they are submitted to EPA. The TMDLs are based on sound analytical methods that identify reasonable pollutant reductions necessary to attain the existing Basin Plan numeric water quality objectives. The TMDLs are consistent with numerous nutrient TMDLs developed elsewhere in California, including the TMDLs for Los Angeles River, Laguna de Santa Rosa, and Malibu Creek. We are pleased that the TMDLs include waste load allocations to account for future growth in the watershed."*

d) *Comment from Richard Watson 12/08/04:*
Instead, staff attempted to use inappropriate export coefficients to estimate loads.

Regional Board Response:
See Regional Board Comment Responses 4a, 4b, and 4c of this document.

e) *Comment from Richard Watson 12/08/04:*

Furthermore, the allocations for commercial nurseries and other nonpoint sources were based on misapplication of export coefficients.

Regional Board Response:
See Regional Board Comment Responses 4a, 4b, and 4c of this document.

f) *Comment from Hines Nurseries 12/01/04:*
The export coefficients for agriculture were based on mass emissions monitoring of one field in Ventura County. The crude estimate is not an appropriate basis to estimate loads to be used in a regulatory document such as a TMDL.

Regional Board Response:
See Regional Board Comment Response 4a, 4b, and 4c of this document.

g) *Comment from Hines Nurseries 12/01/04:*
For the subject TMDL, coefficients should be developed for inland San Diego County commercial nurseries, field agriculture, and orchards. The coefficients used in the SCCWRP study may have been appropriate for a regional study or coastal waters. However, they are not appropriate for a regulatory document such as a TMDL. Additional research is required to develop appropriate coefficients.

Regional Board Response:
See Regional Board Comment Response 4a, 4b, and 4c of this document.

5) IMPLEMENTATION PLAN

a) *Comment from the County of San Diego 12/08/04:*
The County very much appreciates the fact that since May 2002 Regional Board staff has demonstrated a willingness to work with the County in moving this TMDL forward, but we are also extremely concerned that the proposed schedule of February 2005 adoption does not provide sufficient time to fully resolve many of the outstanding issues raised by the County and others. We are therefore requesting you not close the public testimony on this matter at the conclusion of your December 8, 2004 meeting, and that you direct staff to work within a more realistic schedule for final adoption.

Regional Board Response:
The Regional Board held a public hearing on December 8, 2004, to consider public comment and testimony on the proposed TMDL. At the conclusion of the hearing the Board left the record open for submission of additional written comments for three weeks until December 29, 2004. The Regional Board has provided an ample period for the County of San Diego to review and comment on the proposed TMDL and will be considering adoption of the TMDL at the February 9, 2005 Regional Board meeting.

b) *Comment from Hines Nurseries 12/01/04:*

We, and the other members of the regulated community, deserve to see any revised Implementation Plan and have a chance to comment on it before the public hearing on the proposed TMDLs is closed.

Regional Board Response:
The Regional Board held a public hearing on December 8, 2004 to consider public testimony and comment on the Rainbow Creek TMDL following a reasonable period for review of the tentative proposal. In the course of the public review period prior to the hearing the Regional Board also conducted a workshop on November 17, 2004 to stimulate public understanding and discussion of potential issues that might be considered in the TMDL public review process. At the conclusion of the December 8 hearing, the Regional Board left the record open for submission of additional written comments for three weeks until December 29, 2004. The Regional Board has clearly provided an ample period for the public to review and comment on the proposed TMDL. Based on these considerations it would not be unreasonable for the Regional Board to restrict additional public commentary on the proposed TMDL Basin Plan Amendment when the Board considers its adoption on February 9, 2005.

On February 9 the Regional Board will be considering 1) the written responses to public comments document developed by Board staff; 2) revisions to the proposed TMDL Basin Plan amendment made as a logical outgrowth of the record developed at the December 8 hearing and the subsequent December 29, 2004 public comment period and 3) adoption of the TMDL Basin Plan Amendment. On February 9 the Board will evaluate if any revisions to the Basin Plan Amendment might qualify as sufficiently significant to merit an additional opportunity for public review and comment. Based on this evaluation the Board may, at their discretion, allow interested persons to make oral comment on the proposed changes and proceed with adoption on February 9 or circulate the modified proposal and any additional documentation for an additional structured period of public review.

The revised Technical Report will be made available to the public by posting the edited version on the Regional Board's website.

c) *Comment from Hines Nurseries 12/01/04:*
As presented in the Public Review Draft, the Implementation Plan is extremely prescriptive and inflexible.

Regional Board Response:
This comment was addressed in Appendix M of the Technical Report, Response to Public Comments, Public Hearing on May 8, 2002. See response #17 and #22.

Flexibility is provided in the TMDL Implementation Plan, for dischargers to either participate in an acceptable third party Nonpoint Source control programs

or, alternatively, submit individual pollution prevention plans that detail how they will comply with the WDRs.

d) *Comment from Hines Nurseries 12/01/04:*
The Implementation Plan could either be delayed or revised to be an adaptive management plans to be reassessed periodically based on a monitoring program to assess progress in achieving the water quality objectives in the Basin Plan.

Regional Board Response:
This comment was addressed in both Responses #22 of Appendix M and Section 11.3.7 of the Technical Report, Response to Public Comments, Public Hearing on May 8, 2002

e) *Comment from the California Avocado Commission 12/27/04:*
In light of that reality, the Commission proposes that the Board allow for direct participation in the implementation process by a team consisting of representatives from the Commission, University of California Cooperative Extension (UCCE), the Mission Resource Conservation District (MRCD), the San Diego County Farm Bureau, the County, and RWQCB Staff.

Regional Board Response:
The UCCE, MRCD, Farm Bureau, and the County are already members of the Technical Advisory Committee for this TMDL and have been participants in the development process. See Section 13.0, Public Participation, from the Technical Report for a complete list of committee members. We look forward to those entities, along with the California Avocado Commission, participating in the implementation process.

Section 9.5, item 6 of the TMDL Implementation Action Plan provides for the Regional Board to consider entering into a Memorandum of Understanding (MOU) to document cooperative agreements with agencies or organizations, such as those cited by the commenter, that are able to provide information, technical assistance, or financial assistance to dischargers to support the Regional Board's goals of attaining the nutrient load reductions required under this TMDL. Formalizing these arrangements in a MOU with the Regional Board would also assist the various agencies and districts in targeting technical and financial resources for Rainbow Creek nutrient NPS problems.

f) *Comment from the California Avocado Commission 12/27/04:*
We would be extremely pleased if the RWQCB staff would conduct a field tour of the watershed with representatives of affected parities in the watershed so that we can share ideas before we undertake mitigation measures to address any adopted TMDL.

Regional Board Response:

Comment noted. The Regional Board conducted a site visit in 2002 with representatives from the County, Hines Nursery, SDSU, MRCD, and the Dept. of Agriculture. The Regional Board would be willing to participate in other such events as the TMDL moves into the implementation phase.

g) *Comment from the Farm Bureau 12/24/04:*
We see the County of San Diego, the University of California Cooperative Extension Service, the Mission Resource Conservation District, and trade groups such as the California Avocado Commission as important partners in this effort.

Regional Board Response:
The Regional Board agrees. See Regional Board Comment Response 5e above.

6) LEGAL ISSUES

a) *Comment from the County of San Diego 12/08/04:*
The County is also concerned about staff's proposed use of Water Code Section 13225(c) to require activities we consider to be beyond investigating or reporting on "technical factors involved in water quality control". In particular, the County maintains that Section 13225(c) cannot and should not be used to require submission by the County of a Nutrient Reduction Management Plan.

Regional Board Response:
The Nutrient Reduction Management Plan is clearly within the scope of reports that the Regional Board can require the County to submit under the authority of CWC §13225. CWC §13225 provides authority for the Regional Board to require local agencies such as the County of San Diego to submit draft technical reports on water quality control, even though those entities may not be waste dischargers. Local agencies can be required to investigate the scope, causes, and sources of nonpoint source pollution, and potential practices or control measures to prevent it. The only restriction is that the burden of preparing the reports bears a reasonable relationship to the need for and the benefits to be obtained from the reports.

Section 9.7, which describes the development of the NRMP, has been revised to clarify that the County will review its legal authority and evaluate its adequacy to mandate compliance with nutrient load reductions specified in this TMDL through ordinance, statute, permit, contract, or similar means. Section 9.7 was also revised to clarify that, for the various elements listed for the NRMP, the County will evaluate the necessity of modifying, and their willingness to modify, the activities listed therein.

The Regional Board understands its obligation under CWC §13225 to provide a written justification to the County of San Diego showing that the burden, including costs of preparing the NRMP report bears a reasonable relationship to the need for the report. The Regional Board will provide the written justification

when the CWC §13225 order requiring the NRMP report is issued to the County of San Diego following adoption of the TMDL.

Further discussion on CWC §13225(c) can be found in Appendix M of the Technical Report, Response to Public Comments, Public Hearing on May 8, 2002. See response #17.

b) *Comment from the County of San Diego 12/08/04:*
Regional Board staff must demonstrate that the burden, including costs, of required investigations or reports bears a reasonable relationship to the need for them and the benefits to be obtained. Staff has indicated that this burden will be met not in the TMDL, but instead in the 13225(c) letter requiring such activities. This is problematic to the extent that detailed water quality investigations or monitoring are currently required within the TMDL document.

Regional Board Response:
The Regional Board has described in some detail in the Implementation Action Plan, Sections 9.6 and 9.7, and the Implementation Monitoring Plan, Section 10.5, the various elements, or additional or alternative elements, and technical information that the Regional Board will require the County of San Diego to include in the NRMP, the Groundwater Investigation and Characterization Report and the Implementation Monitoring Plan. CEQA's provisions require that the Regional Board perform an environmental analysis of the reasonably foreseeable methods of compliance which would include the Regional Board's requirement for the County to submit an NRMP, a Groundwater Investigation and Characterization Report and an Implementation Monitoring Plan. The Regional Board has provided the results of this analysis, including an estimate of the costs that might be incurred by the County of San Diego in preparing the reports in Section 12, Economic Considerations, of the TMDL Technical Report.

The Regional Board is not required to provide the CWC §13225 justification (that the burden, including cost, of the reports requested bears a reasonable relationship to the need for the report) in the Basin Plan Amendment itself for CWC §13225 orders the Board plans to issue in the future. As described in previous responses the Regional Board will provide the written justification - that the burden, including cost, of the report requested bears a reasonable relationship to the need for the report – when the CWC §13225 order requiring the reports is issued to the County of San Diego following adoption of the TMDL.

c) *Comment from Hines Nurseries 12/01/04:*
In addition to the misstatement from the Basin Plan, the listing was based on erroneous interpretation of Section 303(d)(1)(A) of the CWA. Both the Regional Board and the State Board appear to have thought that all impaired waters must be included on the 303(d) list. Actually, only water "for which the effluent limitations required by Section 301(b)(1)(A) and Section 301(b)(1)(B) of this title

are not stringent enough to implement any water quality standards..." are required to be included on the 303(d) list.

Regional Board Response:
Rainbow Creek has been included on the State's current list of impaired water bodies that was promulgated following the requisite hearings and opportunities for public participation, and has been approved by U.S. EPA as the list required to be prepared by CWA 303(d). Whether or not Rainbow Creek falls within the requirements of CWA 303(d) does not alter the fact that the state has determined that the quality of the waters of Rainbow Creek have been impaired, and has elected to develop a TMDL in order mitigate or alleviate the impairment. The TMDL process is not the correct forum to challenge the listing criteria that has placed Rainbow Creek on the list of impaired water bodies.

Sections 303(d)(1)(C) and (d)(1)(D) require the states to establish TMDLs for listed waters. Section 303(d)(2) requires states to submit the 303(d) list and TMDLs for listed waters to EPA for approval. Even if Rainbow Creek were not on the 303(d) list, Section 303(d)(3) requires states, for information purposes, to establish TMDLs for all waters that are not listed on the 303(d) list. Thus, under the federal statute, all waters must have TMDLs for all pollutants being discharged into them.

d) *Comment from Hines Nurseries 12/01/04:*
USEPA's regulations clearly state that a water quality limited segment is one where water quality standards are not expected to be met "even after the application of technology-based effluent limitations required by section 301(b) and 306 of the Act." Technology-based solutions had already greatly reduced nitrogen and phosphorus loads by 2002 and continued application of best management practices could be expected to bring Rainbow Creek into compliance with the numeric nitrate water quality objective and the narrative biostimulatory substances water quality objective in the Basin Plan.

Regional Board Response:
This comment was addressed in Appendix M of the Technical Report, Response to Public Comments, Public Hearing on May 8, 2002. See response #62.

e) *Comment from the County of San Diego 12/28/04:*
First, as described further below (comment A.6), we believe that the RWQCB has exceeded the authority granted it under CWC §13225(c) by imposing a requirement for the County to submit and implement a NRMP.

Regional Board Response:
Section 9.6 County of San Diego Actions, has been revised to clarify that the County, pursuant to CWC §13225(c), will be required to submit a NRMP. However the County's commitment and level of effort to implement the NRMP will be voluntary and addressed within the proposed Management Agency

Agreement (MAA) described in Section 9.5, Item 3 of the Implementation Action Plan.

f) *Comment from the County of San Diego 12/28/04:*
As stated in its December 8 letter, the County has consistently maintained its willingness to voluntarily submit a NRMP. However, we respectfully disagree that CWC §13225(c) can reasonably be interpreted to authorize the RWQCB to compel the County to do so.

Regional Board Response:
See Regional Board Response 6a, b, and e of this document.

g) *Comment from the County of San Diego 12/28/04:*
The statute authorizes the RWQCB to require the County to investigate, report on and analyze water quality factors, but those terms do not describe the NRMP.

Regional Board Response:
See Regional Board Response 6a, b, and e of this document.

h) *Comment from the County of San Diego 12/28/04:*
As this language demonstrates, the NRMP does not consist of investigation and analysis; it consists almost entirely of policing, oversight and management. In short, the NRMP is precisely what its name implies - a plan for the reduction and management of nutrients. CWC §13225(c) does not authorize the imposition of such a plan.

Regional Board Response:
See Regional Board Response 6a, b, and e of this document.

i) *Comment from the County of San Diego 12/28/04:*
On a related note, even in those instances where §13225(c) authorizes the RWQCB to require certain investigations or analyses, e.g., for water quality investigations or monitoring, the statute requires that the burden, including costs, of those investigations or analyses bear a reasonable relationship to the benefits to be obtained. The County submits that such a costs/benefits analysis must be provided in writing, and must identify the evidence supporting the analysis, before the identified investigations or analyses may be required.

Regional Board Response:
The Regional Board will provide a written justification that the burden of the reports, including cost, of the report requested, bears a reasonable relationship to the to the need for the report when the CWC §13225(c) order requiring the reports is issued to the County of San Diego following adoption of the TMDL. CWC §13225(c) does not require a detailed cost/benefit analysis.

j) *Comment from the County of San Diego 12/28/04:*

The County believes the written, evidence-supported costs/benefits analysis for the §13225(c) orders referenced in the TMDL should be included in the text of the TMDL. While TMDL Section 12.2 does provide some very basic information on implementation costs, this analysis is clearly not sufficient to meet these § 13225(c) obligations.

Regional Board Response:
See Regional Board Responses 6a, b, e, and i of this document.

k) *Comment from the County of San Diego 12/28/04:*
Section 13225(c) orders should only be issued with a clear understanding of how the benefits of the required investigations justify their costs.

Regional Board Response:
Controlling and reducing nutrient discharges in the Rainbow Creek watershed to meet the TMDL nutrient load reductions for nonpoint sources will be a long term and complicated undertaking. There are multiple sources of nutrients in the watershed in seven different land use categories with an array of agencies and dischargers whose actions need to be coordinated. MMs and MPs need to be identified and implementation tracked and monitored. Water quality levels in Rainbow Creek need to be monitored and accessed to determine the effectiveness of the nutrient load reduction efforts, water quality trends, and success in attaining water quality objectives. See Sections 8.3.1, 8.4.1,10.1, and 10.2 of the TMDL Technical Report and Regional Board Responses 6a, b, e, and i of this document.

7) LOAD ALLOCATIONS

a) *Comment from the California Avocado Commission 12/01/04:*
Our analysis of the draft TMDL leads us to conclude that the allocation of nutrient loads to orchards (and avocado production in particular) is not founded on sound science.

Regional Board Response:
See Regional Board Response 4c of this document.

b) *Comment from the California Avocado Commission:*
Prior to the establishment of target nutrient levels for avocado growers, stream monitoring should occur to identify all sources contributing to the nutrient load.

Regional Board Response:
Source identification from all the potential nutrient sources is part of the NRMP. See Section 9.7, item 7 of the Technical Report.

c) *Comment from Caltrans 12/07/04*:

The TMDL has a schedule of 16 years to meet the load allocations, however the Department is expected to meet the waste load allocations in 8 years. The Department requests 20% waste load reduction every 4 years as is shown for load allocations due to the fact there is currently no BMP technology that will reduce nitrogen and phosphorus concentrations to the proposed levels.

Regional Board Response:
The schedule for Caltrans has been revised and extended to 16 years.

d) *Comment from Caltrans 12/07/04*:
Why is Caltrans assigned 74% (N) and 58% (P) reductions when "urban areas" with similar or possibly more heavily loaded runoff are assigned only 50% reductions.

Regional Board Response:
The current annual nutrient load from Urban Areas is small in comparison to the other land use categories therefore the potential of significant nutrient reductions is also small in comparison to the other land use categories.

The rationale for the load and wasteload allocations can be found in Appendix F of the Technical Report.

e) *Comment from Hines Nurseries 12/01/04:*
There is no basis to determine a load allocation or a waste load allocation (i.e., there is no basis to develop a TMDL) where the assimilative capacity of the water body has not been established. Hines would thus recommend that additional monitoring and a study of the assimilative capacity of the various reaches of the creek be conducted before adopting the subject TMDL, as the assimilative capacity of the water body is the cornerstone of any properly developed TMDL.

Regional Board Response:
This comment is addressed in Appendix M of the Technical Report, Response to Public Comments, Public Hearing on May 8, 2002. See response #49.

f) *Comment from Hines Nurseries 12/01/04:*
The TMDL continues to establish annual load allocations for commercial nurseries for both nitrogen and phosphorus (see Table 6-1 and 6-2) that are both unrealistic and unobtainable. The data and analysis in the TMDL simply do not support the load allocations developed for commercial nurseries.

Regional Board Response:
This comment was addressed in Section 11.3 of Technical Report, Analysis of Public Comments on Technical Issues. See Issue 11.3.2.

g) *Comment from the County of San Diego:*

The County has no specific objection to the assignment of a WLA for those portions of the Rainbow Creek Watershed tributary to its MS4. However, as is evidenced in the attached maps, the presence of an MS4 in this Watershed is limited and often not continuous.

Regional Board Response:
Comment noted.

8) MANAGEMENT AGENCY AGREEMENTS

a) *Comment from the County of San Diego 12/08/04:*
While the County agrees in principle that a negotiated agreement such as a MAA may be a useful means of achieving this objective, we have not had sufficient time to fully consider the implications of such an agreement, or to discuss the specifics of what both agencies envision the document containing.

Regional Board Response:
Sections 8, 9, and 10 of the TMDL Technical Report provide specifics on the actions and tasks the Regional Board believes will address nutrient control and reduction in Rainbow Creek. The overall purpose of the Management Agency Agreement (MAA) is to document commitments and clarify roles and responsibilities of the Regional Board and the County of San Diego over the next 20 years in overseeing implementation of the TMDL until compliance with the nutrient water quality objectives is attained. The MAA will enhance the effectiveness of the proposed partnership of the County of San Diego and the Regional Board; however the TMDL Basin Plan Amendment does not require the County to enter into a MAA with the Regional Board. The proposed MAA would be a voluntary agreement between the Regional Board and the County.

b) *Comment from the County of San Diego 12/08/04:*
We appreciate the willingness of your staff to work with the County in developing a draft, but must insist that we be given sufficient time to complete this process or the County may decline to enter in to the MAA.

Regional Board Response:
The proposed MAA between the Regional Board and the County for nutrient reduction in Rainbow Creek will be voluntary. The Regional Board recognizes that the County may ultimately decline to enter into a MAA. In that event the Regional Board will need to move forward with overseeing implementation of the TMDL using its own regulatory authority.

c) *Comment from the County of San Diego 12/08/04:*
We also believe that the TMDL must be amended to clarify that the County's compliance obligations will be defined in the MAA as agreed by both parties. As such, except for those obligations relating solely to the County's role as a

municipal stormwater discharger, detailed descriptions of required County actions should be removed from the TMDL.

Regional Board Response:
The proposed MAA between the Regional Board and the County for nutrient reduction in Rainbow Creek will be voluntary. The Regional Board recognizes that the County may decline to enter into a MAA if they do not agree with the various oversight responsibilities for the nonpoint source nutrient load reduction component of this TMDL defined in the MAA once it is developed.

Section 9.6, County of San Diego Actions, of the Technical Report has been revised to clarify that the County, pursuant to CWC §13225(c), will be required to submit a NRMP. However, the County's commitment and level of effort to implement the NRMP will be voluntary and addressed within the proposed Management Agency Agreement (MAA) described in Section 9.5, Item 3 of the Implementation Action Plan.

d) *Comment from the County of San Diego 12/08/04:*
It is important to recognize that, should the County and the Regional Board fail to come to agreement in the execution of a MAA, the Board's ability to properly exercise its legal authority in requiring specific County actions at a later date would not be affected.

Regional Board Response:
Comment noted.

e) *Comment from the County of San Diego 12/28/04:*
While this may be technically correct, it fails to recognize the central role of this agreement in ensuring successful implementation of the TMDL, or to consider how this and other key milestones in this process might best be sequenced (i.e., MMA drafting, TMDL adoption, MAA adoption, Nutrient Reduction and Management Plan [NRMP] submittal and implementation, etc.).

Regional Board Response:
The Regional Board envisions the following sequencing: TMDL adoption then TMDL implementation. During implementation, the sequence will likely be MAA development then MAA adoption, during which NRMP development and submittal may occur concurrently. It is anticipated that NRMP implementation will occur after MAA adoption.

f) *Comment from the County of San Diego 12/28/04:*
The County considers the MAA the primary vehicle for defining the roles, responsibilities, and specific commitments of both parties in implementing this TMDL. Until such a document exists, at least in draft form, we cannot be sure that either party understands the expectations or likely commitments of the other.

Regional Board Response:
See Regional Board Response 8a of this document.

g) *Comment from the County of San Diego 12/28/04:*
With respect to MAA content and purpose, it is worth noting that the apparent position of RWQCB staff is that the MAA should define additional commitments by the County over and above the prescriptive compliance assurances already written into Section 9.7 (County of San Diego Nutrient Reduction and Management Plan). The County maintains that such an approach would be unsupported by statute (see specific comments on the limitations of the RWQCB's California Water Code [CWC] §13225(c) authority below), and would negate the stated purpose of the MAA.

Regional Board Response:
See Regional Board Response 6a and e of this document.

h) *Comment from the County of San Diego 12/28/04:*
The County is willing to consider drafting the MAA after TMDL adoption, but will have no reason to consider entering into a MAA or any other agreement should the prescriptive language currently contained in Section 9.7 remain as is.

Regional Board Response:
See Regional Board Response 6a and e of this document.

i) *Comment from the County of San Diego 12/28/04:*
Our second concern relates to the intended purpose and specific content of the MAA. Although RWQCB Counsel correctly indicated in his response to Dr. Wright that voluntary actions would be included in the MAA, and that these would be negotiated after the TMDL is adopted, Mr. Richards failed to note that this would occur only after prescriptive requirements are imposed in the TMDL document pursuant to §13225(c). In the County's view, any commitments in excess of our strict legal obligations must be negotiated during the development of the MAA.

Regional Board Response:
See Regional Board Response 6a and e of this document.

9) MANAGEMENT PRACTICES

a) *Comment from Caltrans 12/07/04*:
Our main concern is this TMDL would require the construction of treatment controls, not yet developed, so that the basic feasibility is unknown.

Regional Board Response:

The Implementation Action Plan section is intentionally written to give the stakeholders the flexibility to develop cost effective nutrient management measures to address the impairment of Rainbow Creek. The 16-year nutrient reduction schedule allows for implementation of needed controls, monitoring of effectiveness of implementation measures, and implementing stronger and more effective controls if necessary.

Delaying the development and implementation of this TMDL until a time when technological treatments are developed is unreasonable when other control measures, such controlling irrigation water discharge to the creek, consultation with agriculture advisors, and public education, are certainly measures are available and can be implemented in a relatively short time period.

b) *Comment from Caltrans 12/07/04*:
TMDL proposes uses of sand filters to be used in existing rights-of-ways, medians or interchange loops to provide treatment. Sand filters are not an appropriate BMP for treatment of nitrogen. Sand filters convert TKN into Nitrate, so they provide a reduction in TKN and an increase in nitrate.

Regional Board Response:
Although the commenter cites no specific section of the Technical Report, the Regional Board is assuming the comment is based on the contents of Economic Consideration Tables in Appendix H.

The narrative on Appendix H of the Technical Reports states:

> "While the table implies that Nutrient Management MPs / BMPs will be Implemented before Irrigation and Runoff/Erosion Control Management MPs / BMPs, this is done solely for developing a range of costs. The most appropriate and cost effective MPs / BMPs will vary for each land user/owner based on their operations and existing improvements. MPs / BMPs are typically most effective when a combination of Nutrient, Irrigation, and Runoff/Erosion Control Management MPs / BMPs are considered. Moreover, it is also possible that MPs / BMPs not presented herein would be identified and implemented."

The purpose of the tables in Appendix H is to show potential actions and associated costs that may be incurred by a property owner. It is not meant to be a prescriptive list of MPs or BMPs that must be a part of the implementation action plan or NRMP.

10) NUMERIC STANDARDS

a) *Comment from the California Avocado Commission 12/01/04:*
Prior to 2002, the Board did not have specific numerical standards that defined conditions in a stream that promoted algal impairments.

Regional Board Response:

The Regional Board disagrees with this statement. This comment was addressed in Section 11.3 of Technical Report and again in Appendix M. In Section 11.3, Analysis of Public Comments on Technical Issues, see Issue 11.3.6. In Appendix M, Response to Public Comments, Public Hearing on May 8, 2002, see Response #6.

b) *Comment from the California Avocado Commission 12/01/04:*
A recent revision to the Basin Plan, however, added numerical reference points against which total phosphorus and (based on the application of a ratio) total nitrogen levels would be gauged, to determine if water quality objectives were exceeded for purposes of enforcement.

Regional Board Response:
The Regional Board disagrees with this statement. This comment was addressed in Section 11.3 of Technical Report and again in Appendix M. In Section 11.3, Analysis of Public Comments on Technical Issues, see Issue 11.3.6. In Appendix M, Response to Public Comments, Public Hearing on May 8, 2002, see Response #6.

c) *Comment from the California Avocado Commission 12/01/04:*
In other words, in the absence of a verified condition of nuisance or a demonstrable adverse effect on beneficial uses, the numerical values should not drive a listing for purposes of a finding of impairment.

Regional Board Response:
The total nitrogen and total phosphorus numeric targets are the biostimulatory water quality objectives. Any exceedance of the water quality objective is considered an impairment to beneficial uses. Water quality monitoring in Rainbow Creek in 2000 showed regular exceedances of the water quality objectives for TN and TP. Moreover, water quality sampling conducted in December 2004 in the creek re-affirm the need for nutrient reduction measures in Rainbow Creek.

d) *Comment from the California Avocado Commission 12/01/04:*
The Rainbow Creek TMDL provides very little evidence of actual documented impairments other than the presence of excessive algae in some limited areas. Of course, the modification of the Basin Plan to include numerical objectives for total phosphorus and a calculated ratio for N:P provides the principal basis for the TMDL. These values must be interpreted in the context of how they result in nuisance conditions or affect beneficial uses. As noted above, the evidence of impact provided in the TMDL is profoundly weak.

Regional Board Response:
See Regional Board Comment Response in 10a and 10c of this document.

e) *Comment from Richard Watson 12/08/04:*

Tentative Finding 1 claims that the proposed amendment to the Basin Plan was developed in accordance with California Water Code Section 13240 et seq. However, the proposed amendment adds new numeric water quality objectives for biostimulatory substances without complying with all elements of Section 13241 which are applicable when the Regional Board establishes new water quality objectives.

Regional Board Response:
The Regional Board disagrees with this comment. The Rainbow Creek Nutrients TMDL does not establish a new nutrient water quality objective. The biostimulatory water quality objectives are already part of the existing Basin Plan.

See Regional Board Comment Response 3e of this document.

f) *Comment from Richard Watson 12/08/04:*
Tentative Finding 5 claims that the Basin Plan established two numeric objectives for biostimulatory substances when, in fact, it establishes a narrative water quality objective for biostimulatory substances.

Regional Board Response:
See Regional Board Comment Responses 10a and 10c of this document.

g) *Comment from Richard Watson 12/08/04:*
Tentative Finding 6 claims that concentrations for nutrients in Rainbow Creek routinely exceed applicable water quality objectives for nutrients and nitrate. However, as explained above, there are no numeric water quality objectives for biostimulatory substances in the Basin Plan.

Regional Board Response:
See Regional Board Comment Responses 10a and 10c of this document.

h) *Comment from Richard Watson 12/08/04:*
Furthermore, there is no definitive evidence that the narrative water quality objectives have been routinely exceeded.

Regional Board Response:
The TMDL is based on the numeric nitrate and biostimulatory substances water quality objectives which are being exceeded. Excessive nutrient concentrations in Rainbow Creek have persisted since the 1980s, when agricultural practices used in Rainbow Valley resulted in significant increases of nitrate concentrations in Rainbow Creek. Although voluntary implementation of MP in the watershed resulted in significant reductions of nutrient concentrations in Rainbow Creek since 1996, nutrient concentrations in the creek still exceed the applicable nutrient water quality objectives.

i) *Comment from Richard Watson 12/08/04:*
Tentative Finding 8 claims that numeric targets in the proposed TMDL have been set equal to the numeric water quality objectives cited in Finding 5. However, as explained above, the Basin Plan does not actually establish numeric water quality objectives for water quality objectives.

Regional Board Response:
See Regional Board Comment Responses in 10a and 10c of this document.

j) *Comment from Hines Nurseries 12/01/04:*
These numbers are excessively conservative, especially when there was no evidence of actual impairments to beneficial uses in 1998-1999 when the average nitrate concentrations was 7.7 mg NO_3/l or 1.7 mg NO_3-N/l and the average organophosphate as phosphorus concentration was 0.6 mg PO_4-P/l.

Regional Board Response:
The water quality objectives are meant to be conservative in order to protect all beneficial uses of a waterbody, including those of waterbodies downstream. In the case of Rainbow Creek, not only is the protection of the Creek important but also the Santa Margarita River, which is a source of drinking water supply for Camp Pendleton, and the Santa Margarita Lagoon, which is on the 303(d) list of impaired waterbodies for eutrophication.

k) *Comment from Hines Nurseries 12/01/04:*
If the Regional Board concludes that it must adopt a TMDL to meet its obligations to EPA Region 9, it should adopt a TMDL based on adaptive management as recommended by the National Research Council. To do this, the Board could adopt a TMDL with the initial numeric target equal to the numeric nitrate water quality objective in the Basin Plan, define interim numeric targets for biostimulatory substances equal to the average water quality conditions in 1998-1999 as specified on page 12 of the Technical Report, and provide for a reopener to adopt final numeric targets for biostimulatory substances after USEPA Region 9 and the State Water Resources Control Board have completed the Development of Nutrient Criteria in California.

Regional Board Response:
This comment was addressed in Appendix M, Response to Public Comments, Public Hearing on May 8, 2002. See Response #65. Also see the Basin Plan Amendment, Attachment A, Section C which provides a method of recalculation of the TMDL if a new biostimularoy substances water quality objective is designated in the future.

11) NUTRIENT REDUCTION

a) *Comment from the California Avocado Commission 12/01/04:*
By any measure, this level of pollutant reduction should be considered a major victory and highlights the direction that the Regional Board should pursue in seeking further reductions by embracing the pre-eminent principle of the State's Non-Point Source Plan which emphasizes the value and priority of voluntary efforts.

Regional Board Response:
This comment was addressed in Appendix M, Response to Public Comments, Public Hearing on May 8, 2002. See Response #3.

12) PUBLIC NOTIFICATION

a) *Comment from the California Avocado Commission 12/01/04:*
With regard to the Rainbow Creek TMDL, while it appears that the minimal legal and technical notice requirements were met by the San Diego Regional Water Quality Control Board (Board), few growers in the watershed have received actual notice of the Board's pending action.

Regional Board Response:
This comment was addressed in Appendix M of the Technical Report, Response to Public Comment, Public Hearing on May 8, 2002. See response #24.

The Regional Board extended the public comment period 3 weeks from the December 8, 2004 Board Hearing to allow additional time for submittal of written comments. During this extension period, the Regional Board mailed out an additional 370 notifications to property owners in the Rainbow Valley watershed, notified interested parties, published an article and public notification in a North county community paper (Village News, Fallbrook, CA), and made a copy of the Draft Technical Report available at the San Diego County Public Library in Fallbrook, CA.

The extended public comment period closed December 29, 2004 and produced a total of 5 additional comment letters from concerned citizens and stakeholders. The following parties submitted comments:

1. Bert Hayden (12/22/04)
2. Farm Bureau San Diego County (12/24/04)
3. California Avocado Commission (12/27/04)
4. Hines Nursery (12/29/04)
5. County of San Diego (12/29/04)

From the above list of letters submitted, only one letter is from a party that had not previously participated in this TMDL project.

b) *Comment from the California Avocado Commission 12/01/04:*
The lack of effective notice has caused the Rainbow Creek TMDL to be considered in a vacuum devoid of stakeholder participation. This situation must be rectified prior to the Board's formal adoption of the TMDL.

Regional Board Response:

See Regional Board Comment Response 12a above describing the Regional Board's additional public notification activities.

c) *Comment from the Farm Bureau 11/24/04:*
Throughout the Rainbow Creek TMDL process it has been our concern that the directly affected parties – particularly farmers and property owners – be given ample notice and opportunity to be fully aware of the ramifications of your pending action.

Regional Board Response:
See Regional Board Comment Response 12a above.

d) *Comment from the Farm Bureau 11/24/04:*
Do not close public testimony at the conclusion of your December 8, 2004 public hearing.

Regional Board Response:
The Regional Board closed public testimony at the December 8, 2004 Board Hearing but left the record open for submission of additional written comments for three weeks until December 29, 2004. On February 9, 2005 the Regional Board will be considering 1) the written responses to public comments document developed by Board staff; 2) revisions to the proposed TMDL Basin Plan Amendment made as a logical outgrowth of the record developed at the December 8 hearing and the subsequent December 29 public comment period and 3) adoption of the TMDL Basin Plan amendment. On February 9 the Board will evaluate if any revisions to the Basin Plan Amendment might qualify as sufficiently significant to merit an additional opportunity for public review and comment. Based on this evaluation the Board may, at their discretion, allow interested persons to make oral comment on the proposed changes and proceed with adoption on February 9 or circulate the modified proposal and any additional documentation for an additional structured period of public review.

e) *Comment from the Farm Bureau 11/24/04:*
Notify directly every affected property owner and farmer in the Rainbow Creek area of the pending action.

Regional Board Response:
See Regional Board Comment Response 12a above.

f) *Comment from the Farm Bureau 11/24/04:*
Conduct at lease one well-noticed public workshop in a location convenient to the Rainbow Creek area.

Regional Board Response:

Additional workshops will not take place before the February 2005 Board Meeting. However see Regional Board Response 12a above for the additional public notification activities.

g) *Comment from the Farm Bureau 11/24/04:*
Conclude public testimony and take action on the Rainbow Creek TMDL only after you are secure in the knowledge that the public has had adequate notice and opportunity to participate.

Regional Board Response:
See Regional Board Comment Response from 12a and 12d above.

13) RESPONSIBLE PARTIES

a) *Comment from Caltrans 12/07/04*:
Our second major concern is that much of the focus of the TMDL, including responsibility for developing and implementing the monitoring program, is placed on the Department even though the Department's contributes to less than 2% of the tributary drainage area.

Regional Board Response:
Caltrans is responsible, under the terms and conditions of their MS4 Storm Water Permit, for ensuring that their operations do not contribute to violations of water quality objectives in Rainbow Creek. Under the terms of the TMDL Implementation Monitoring Plan the Regional Board will direct the County of San Diego and Caltrans to provide a single monitoring plan for Rainbow Creek containing the elements described in Section 10.5 Implementation Monitoring Plan Elements. The Regional Board agrees that the level of Caltrans participation in the monitoring program should be related to the volume and significance of its discharge. The number of monitoring stations in Rainbow Creek assigned to Caltrans should be based on the number of stations needed by Caltrans to demonstrate compliance with the nutrient wasteload allocation and the success of the TMDL in attaining the nutrient water quality objective in the portion of Rainbow Creek affected by its discharge. The Regional Board will provide some guidance to both the County of San Diego and Caltrans on the level of effort each should contribute to the monitoring program in the CWC § 13225 and 13383 investigative orders. The Regional Board may amend these orders at any time to require other nutrient dischargers in the Rainbow Creek watershed to participate in the monitoring program as they are identified on a case-by-case basis.

b) *Comment from Caltrans 12/07/04*:
In view of this, we do not understand why this TMDL appears to be directed at Caltrans as the only named source rather than at the major contributors of nutrients in the watershed.

Regional Board Response:

The Technical Report is not directed exclusively at Caltrans but is directed at all known point source and nonpoint source dischargers of nutrients in the Rainbow Creek watershed. Construction, maintenance, and operation of State-owned highways are activities classified as point sources of nutrient discharges to Rainbow Creek. Caltrans is the only primary point source discharger in the Rainbow Creek watershed and is assigned a specific nutrient waste load allocation.

The major nonpoint source (NPS) nutrient discharges in the Rainbow Creek watershed result from (1) commercial nurseries, (2) agricultural fields, (3) orchards, (4) parks, (5) residential areas, (6) urban areas, and (7) septic tank disposal system land use activities. These nonpoint sources are assigned a nutrient load allocation.

c) *Comment from Caltrans 12/07/04*:
Why is Caltrans specifically identified as a source when "urban areas" and "residential areas" which also have discrete discharge points are not identified? If these areas are contributing to water quality problems, the Board certainly can address these areas via the County of San Diego MS4 permit and Phase II permit program. Similarly, the nurseries and other major sources can be identified and assigned specific reductions and allocations.

Regional Board Response:
Caltrans is identified as a point source of nutrients in the Rainbow Valley watershed with nutrient load reductions. Urban and Residential areas are not subject to a NPDES permit and therefore considered a non-point source of nutrients.

The seven land use categories, which include Urban, Residential, and Commercial Nurseries, have been assigned nutrient load reductions and allocations. See Table 6-1 and 6-2 and Appendix F from the Technical Report.

14) TECHNICAL BASIS

a) *Comment from Caltrans 12/07/04*:
It is premature to issue the TMDL before control technologies are identified. Otherwise, there can be no assurance that the allocations will be attained.

Regional Board Response:
See Regional Board Comment Response 9a of this document.

b) *Comment from Caltrans 12/07/04*:
The letter indicated District 11 owns 120.3 acres. This value was used for wasteload allocations however the map in Appendix A shows I-15 right of way as 214 acres and 3% of watershed, greater than the 120 acres used for TMDL load allocations.

Regional Board Response:
The correct acreage is 120 acres. The Technical Report has been revised.

c) *Comment from Caltrans 12/07/04*:
The Departments report CTSW-RT-03-065 has the latest monitoring data for Caltrans highway runoff. These numbers are different than the 1997-1998 data used in the WQPT that was used to determine Caltrans loads. The more appropriate total Nitrogen concentration is 3.13 mg/L and total phosphorus concentration is 0.29 mg/L

Regional Board Response:
The Technical Report has been revised to incorporate the latest monitoring data.

d) *Comment from the California Avocado Commission 12/01/04:*
The Commission also believes that the Board has chosen the wrong way to address a problem that falls short of constituting a serious nuisance.

Regional Board Response:
The Regional Board disagrees with this statement. This comment was addressed in Section 11.3 of Technical Report. In Section 11.3, Analysis of Public Comments on Technical Issues, see Issue 11.3.4.

e) *Comment from the California Avocado Commission:*
It is also known that nutrients released during wet weather conditions have a dramatically different biostimulatory effect than during other periods. The nutrient loading at certain periods of the year is not clearly defined in the TMDL. It may be that the nutrient load during wet weather is relatively greater than during dry weather, but has a far less significant effect.

Regional Board Response:
The Regional Board used stream flow data divided into flow tiers to account for the seasonal changes of nutrients carried down the stream. A discussion of the steam flow, seasonal variations, and flow tiers is in Appendix E of the Technical Report.

f) *Comment from Richard Watson 12/08/04:*
Understanding whether or not Rainbow Creek is over-enriched with nitrogen and/or phosphorus is very complex; a TMDL is not yet suitable for calculation as required by federal regulations.

Regional Board Response:
The Regional Board disagrees with this statement. This comment was addressed in Appendix M, Response to Public Comments, Public Hearing on May 8, 2002. See Response #25.

Also see Regional Board Comment Response 4c of this document.

g) *Comment from Richard Watson 12/08/04:*
The current draft TMDL has introduced flow data as we requested in 2002, but the sampling used to support the need for the TMDL was not flow weighted. In

fact, sampling was not used to estimate total loadings of nitrogen and phosphorus to the creek.

Regional Board Response:
The purpose of the water quality sampling conducted by the Regional Board was to assess the water quality of the creek. It was not initially designed to estimate the nutrient contribution from the various land use categories. Export coefficients were used to estimate the nutrient contribution from the land use categories.

Background and loading capacity nutrient calculations of the creek did use flow data in estimating nutrient loads.

h) *Comment from Richard Watson 12/08/04:*
Tentative Finding 9 cites TMDLs for total nitrogen and phosphorus that are incorrectly calculated in the Draft Technical Report.

Regional Board Response:
See Regional Board Comment Responses 4a of this document

i) *Comment from Richard Watson 12/08/04:*
This finding also claims that the TMDLs are equal to the assimilative or loading capacity of Rainbow Creek. However, a scientific assimilative capacity study was not actually conducted.

Regional Board Response:
This comment was addressed in Appendix M of the Technical Report, Response to Public Comment, Public Hearing on May 8, 2002. See response #49.

j) *Comment from Hines Nurseries 12/01/04:*
Review of the October 15 Public Review Draft indicates that the proposed TMDLs still do not meet the requirements within the Clean Water Act that only those TMDLs that are "suitable for such calculation" are to be developed.

Regional Board Response:
The Regional Board disagrees with this statement. This comment was addressed in Appendix M, Response to Public Comments, Public Hearing on May 8, 2002. See Response #25.

Furthermore, the USEPA submitted the following statement in a letter dated December 3, 2004:

> "*The proposed TMDLs meet all federal regulatory requirements and will be approvable when they are submitted to EPA. The TMDLs are based on sound analytical methods that identify reasonable pollutant reductions necessary to attain the existing Basin Plan numeric water quality objectives. The TMDLs are consistent with numerous nutrient TMDLs developed elsewhere in California, including the TMDLs for Los Angeles River, Laguna de Santa Rosa, and Malibu Creek. We are pleased that the TMDLs include waste load allocations to account for future growth in the watershed.*"

k) *Comment from Hines Nurseries 12/01/04:*
As noted in our April 23, 2002 letter, in developing a TMDL for any impaired water body, an assimilative capacity study should first be conduced in order to determine the pollutant load the water body can assimilate before becoming impaired.

Regional Board Response:
This comment was addressed in Appendix M of the Technical Report, Response to Public Comments, Public Hearing on May 8, 2002. See response #49.

15) TECHNICAL REPORT

a) *Comment from the County of San Diego 12/08/04:*
However, during this period only the County was involved in discussions with your staff, and that interaction ended in October 2003. Between October 2003 and November 2004, significant changes were made to this TMDL; it's only appropriate the County and other parties have adequate time to ensure review of this document is sufficient to adequately consider those changes.

Regional Board Response:
From the period of May 2002 through October 2004, the Regional Board was considering comments submitted by the stakeholders, including input from the County, and incorporating the suggested changes as necessary into the revised draft technical TMDL report. The revised draft report was not ready for public review until October 2004.

As a courtesy to the County, the Regional Board sent revised sections of the draft Rainbow Creek TMDL Technical Report (Chapters 8, 9, and 10) for their review prior to the October 2004 public release.

b) *Comment from the California Avocado Commission 12/01/04:*
It is inappropriate to suggest that nutrients have caused the "impairment" when no evidence is provided in support of the assertion and when other causes are likely.

Regional Board Response:
The Regional Board already recognized and acknowledged other potential factors in the Technical Report concerning aquatic insects. Section 2.6 of the Technical Report reads:

> *"Rainbow Creek has an impaired aquatic insect population, which may be related to its elevated nutrient concentrations. The creek's benthic macroinvertebrate community may be sensitive, in varying degrees, to temperature, DO, sedimentation, scouring, nutrient enrichment and chemical and organic pollution (Giller and Malmqvist 1998, Johnson et al. 1993). Elevated concentrations of nutrients and other pollutants, such as herbicides and pesticides, may cause changes in the aquatic insect community. These changes can include loss of species diversity, loss of pollutant sensitive species, and an increase in pollutant tolerant species (Waters 1995)."*

Referring to Rainbow Creek as impaired for nutrients is appropriate since there exists both historical and recent water quality data from certified analytical laboratories which demonstrates the water quality objectives for both nitrogen and phosphorus are frequently exceeded.

c) *Comment from the California Avocado Commission 12/01/04:*
Also, the use of the term "impairment" to describe the insect community suggests that there is a formal listing for impairment of insects, which is inaccurate and misleading.

Regional Board Response:
Comment noted.

d) *Comment from the California Avocado Commission 12/01/04:*
The TMDL also cites a condition of low species diversity as supportive of a degraded ecosystem. There is not mention of a causative factor for this condition, however. Additionally, recent information cited in the TMDL suggests a mixed picture and improvement:

> "The creek was "average" in both the September 1998 and November 1998 monitoring events, showing improved species diversity and a more well-distributed community structure with four of five functional feeding groups represented, although it continued to show an absence of sensitive species."

This suggests that the reductions in nutrients resulting from the Mission Resource Conservation District's voluntary program are yielding ecological dividends.

Regional Board Response:
The complete paragraph from Section 2.6 of the revised Technical Report reads as follows:

> *"Benthic macroinvertebrate surveys conducted in 1991-92 (Hunsaker II 1992) and in 1998-99 (CDFG 2000a) found an abundance of pollutant tolerant insects and a lack of pollutant sensitive insects. Hunsaker II (1992) found that benthic community indicators in Rainbow Creek were poor compared to other tributaries and the Santa Margarita River. The 1998-99 California Department of Fish and Game surveys indicate that Rainbow Creek was "below average" compared to other tributaries in the watershed in both the May 1998 and May 1999 surveys. Low species diversity, an absence of sensitive species, and a skewed benthic community, with one or two functional feeding groups dominating were observed during these two sampling periods. The creek was "average" in both the September 1998 and November 1998 monitoring events, showing improved species diversity and a more well-distributed community structure with four of five functional feeding groups represented, although it continued to show an absence of sensitive species. Shredding insects, which feed mostly on decomposing coarse particulate organic matter, were completely absent from all four sampling events. Their absence is notable because shedders are usually associated with streams that have an intact riparian canopy, such as exists along most of Rainbow Creek".*

The dominance of pollutant tolerant aquatic insect species in conjunction with the lack of pollution sensitive aquatic insects is an indication that the water quality of

the stream is having adverse affects on the benthic communities. The Regional Board agrees that the nutrient water quality in Rainbow Creek has improved since the 1980s; however, recent samples collected by the Regional Board in December 2004 raise questions on the trend of the TN and TP concentrations.

e) *Comment from Richard Watson 12/08/04:*
Tentative Finding 10 presents allocations and reductions that were erroneously calculated in the Technical Report. Waste load allocations were not assigned to two point sources, a load allocation was not assigned to the largest contribution of nitrogen and phosphorus atmospheric deposition.

Regional Board Response:
For the calculation comment, see Regional Board Comment Response 4a above.

Caltrans is the only identified point source with nutrient waste load allocations. For nutrient discharges in the Rainbow Creek watershed subject to the County of San Diego's MS4 NPDES Storm Water Permit, the County will be directed to require increasingly stringent best management practices, pursuant to the iterative process described in Receiving Water Limitation C.2.a. of the permit, to reduce nutrients discharges in the Rainbow Creek watershed to the maximum extent practicable and restore compliance with the nutrient water quality objective.

The California Department of Forestry and Fire Protection (CDFFP) – Rainbow Conservation Camp does not have an NPDES permit and is not authorized to discharge waste to Rainbow Creek. Accordingly no wasteload allocation is assigned to this discharge. As discussed in Section 8.2.3 of the Technical Report, the percolation ponds at the Camp are suspected of not having the proper separation from groundwater and/or bedrock and the percolated effluent appears to be surfacing down gradient of the ponds and flowing into Rainbow Creek. The Regional Board has previously directed CDDF, to conduct an investigation of the possible impacts from the Camp's wastewater discharge to the Creek and the results of the investigation are currently under review by the Regional Board for additional follow-up action.

The comment on atmospheric deposition issue is addressed in Regional Board Comment Responses 2a of this document.

f) *Comment from Richard Watson 12/08/04:*
Tentative Finding 11 does not clearly distinguish between point and nonpoint discharges. Furthermore, two point sources that were identified at the November 17, 2004 staff workshop are not listed.

Regional Board Response:
Section 8.2 and 8.3 of the Technical Report describe in detail the point and non point source dischargers. See Regional Board Comment Response 15e above.

g) *Comment from Hines Nurseries 12/01/04:*

Section 5.0 of the October 15, 2004 Public Review Draft does not describe a true assimilative capacity analysis, which should include a detailed analysis of chlorophyll and dissolved oxygen in relation to nitrogen and phosphorus content of the water.

Regional Board Response:
Chlorophyll and dissolved oxygen measurement are part of the Implementation Monitoring Plan Elements, Section 10.5 of the Technical Report. See Element #5, Surface Water Quality Parameters and #8, Algal Biomass.

h) *Comment from Hines Nurseries 12/01/04:*
At the 17 November 2004 workshop, staff made a Powerpoint presentation that indicated that two major changes will be made to the October 15, 2004 Public Review Draft. The first major change was a slide that indicated that staff now recognizes that there are three point sources in the watershed; the Public Review Draft only recognized one.

Regional Board Response:
The Technical Report recognizes all three point source dischargers. Section 8.2, Point Source Dischargers, from the October 15, 2004 Technical Report, lists Caltrans, California Department of Forestry and Fire Protection, and the County of San Diego as point sources. Of the three point sources, only Caltrans has a specified waste load allocation. Regarding the California Department of Forestry and Fire Protection (CDFFP), the Regional Board will issue a CWC § 13267 investigative order to CDFFP requiring them to evaluate if their discharge is contributing to the impairment of Rainbow Creek. Regarding the County as a point source discharger, they will be required to reduce nutrient discharges in accordance with Receiving Water Limitation C.2.a of their MS4 NPDES Storm Water Permit.

i) *Comment from Hines Nurseries 12/01/04:*
The second major change was a slide that acknowledged that the Basin Plan contain only a narrative water quality objective for biostimulatory substances. The Public Review Draft in one or two places does recognize that the only water quality objective for biostimulatory substances is narrative. However, in other locations the draft asserts that there are numeric water quality objectives for biostimulatory substances. This confusion in the current draft must be eliminated.

Regional Board Response:
The Technical Report has been revised to clarify that there are numeric water quality objectives for biostimulatory substances.

j) *Comment from the County of San Diego 12/28/04:*
The County has focused its comments on the three draft TMDL sections it believes to be most crucial for addressing its concerns: Sections 8, 9, and 10. Because these suggested changes are extensive, we have not attempted to make

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parallel edits in earlier sections of the TMDL. To maintain consistency with changes that are made to TMDL Sections 8, 9, and 10, the RWQCB will therefore need to make corresponding edits to Resolution No. R9-2004-0401 and other TMDL sections as applicable.

Regional Board Response:
Corresponding edits and revisions were made to the draft Resolution R9-2005-0036 (formerly R9-2004-0401), Basin Plan Amendment, and sections of the Technical Report, based on edits to Sections 8, 9, and 10. However the Regional Board did not accept all edits suggested by the County.

The revisions to the October 15, 2004 version of the Basin Plan Amendment, Resolution, and Technical Report will be made in strikeout mode so that the edits to the document will be apparent. Once revisions are complete, the edited documents will be posted on the Regional Board website for public review.

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Comment Letters Submitted on or Before December 8, 2004 Board Hearing.

Bellamore, Tom. 2004. Letter to John Robertus regarding "Comments of the California Avocado Commission on Draft Basin Plan Amendment and Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads for Rainbow Creek." California Avocado Commission, Irvine, CA. December 1, 2004.

Larson, Eric. 2004. Letter to John Minan. Farm Bureau San Diego County, Escondido, CA. November 24, 2004.

Strauss, Alexis. 2004. Letter to John Robertus from US EPA on the Rainbow Creek TMDL. USEPA 9, San Francisco, CA. December 3, 2004.

Van Rhyn, Jon. 2004. Letter to John Minan. County of San Diego Department of Public Works, San Diego, CA. December 8, 2004.

Vargas, Jesus. 2004. Letter to Ben Tobler regarding "Total Maximum Daily Loads (TMDLs) for Total Nitrogen and Total Phosphorus for Rainbow Creek (Technical Report dated 10/15/04). Department of Transportation, District 11. San Diego, CA. December 7, 2004.

Watson, Richard. 2004. Letter to Ben Tobler regarding "Public Review Draft Basin Plan Amendment and Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads for Rainbow Creek." Richard Watson and Associates, Mission Viejo, CA. December 8, 2004.

Westrup, Jesse. 2004. Letter to Ben Tobler regarding "October 15, 2004 Rainbow Creek Nutrients TMDL." Hines Horticulture, Fallbrook, CA. December 1, 2004

Comment Letters Submitted Before the Written Comment Period Closed on December 29, 2004.

Bellamore, Tom. 2004. Letter to John Robertus regarding "Supplemental Comments of the California Avocado Commission on Draft Basin Plan Amendment and Technical Report for Total Nitrogen and Total Phosphorus Total Maximum Daily Loads for Rainbow Creek." California Avocado Commission, Irvine, CA. December 27, 2004.

Hayden, Bert[1]. 2004. Electronic mail sent to Ben Tobler regarding "Rainbow Creek." Fallbrook, CA. December 22, 2004.

Larson, Eric. 2004. Letter to John Minan regarding "Rainbow Creek Total Maximum Daily Load Plan." Farm Bureau San Diego County, Escondido, CA. December 24, 2004.

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Van Rhyn, Jon. 2004. Letter to John Minan. County of San Diego Department of Public Works, San Diego, CA. December 28, 2004.

Westrup, Jesse. 2004. Letter to John Minan regarding "Additional Comments on October 15, 2004 Rainbow Creek Nutrients TMDL." Hines Horticulture, Fallbrook, CA. December 29, 2004

[1]The letter from Mr. Hayden did not directly comment on Rainbow Creek TMDL issues. The letter was forwarded to the Watershed Protection Unit to investigate his complaint.