

Appendix D – Alternative Pollutant Load Expressions to Facilitate Implementation of the Concentration-based Allocations

The purpose of this appendix is to provide alternative, non-daily pollutant load expressions to facilitate implementation of the daily pollutant allocations. Daily allocations, as expressed in this TMDL, are on the basis of daily time-step concentrations (e.g., instantaneous receiving water concentrations represented in grab and field samples). Relevant guidance published by the U.S. Environmental Protection Agency (USEPA) pertaining to alternative load expressions is presented below:

Facilitating Implementation of Waste Load Allocations and Load Allocations

“TMDL submissions may include alternative, non-daily pollutant load expressions in order to facilitate implementation of the applicable water quality standards*. *To facilitate implementation of such a load in water bodies where the applicable water quality standard is expressed in non-daily terms, it may be appropriate for the TMDL documentation to include, in addition to wasteload allocations expressed in daily time increments, wasteload allocations expressed as weekly, monthly, seasonal, annual, or other appropriate time increments. The TMDL and its supporting documentation should clearly explain that the non-daily loads and allocations are implementation-related assumptions of the daily wasteload allocations and are included to facilitate implementation of the daily allocations as appropriate in NPDES permits and nonpoint source directed management measures.”*

From: U.S. Environmental Protection Agency, Memorandum, Nov. 15, 2006. Subject: Establishing TMDL "Daily" Loads in Light of the Decision by the U.S. Court of Appeals for the D.C. Circuit in *Friends of the Earth, Inc. v. EPA, et al.*, No. 05-5015, and Implications, for NPDES Permits

** emphasis added by Water Board staff*

In addition, non-daily and alternative load expressions of the concentration-based allocations may be needed to provide a meaningful connection with implementation efforts (such as nonpoint source best management practices) where averaging periods other than daily time steps, or expressions other than receiving water concentration allocations provide the basis for water quality-based control strategies. However, in accordance with USEPA guidance, all final TMDL submissions must contain a daily time-step load component; this requirement is satisfied by the proposed concentration-based TMDLs and allocations.

Table 1 and Table 2 present alternative, non-daily mass load expressions and estimated load reductions for nitrate to facilitate implementation of the TMDLs on an annual (Table 1) and seasonal (Table 2) basis. These alternative load expressions shall be considered implementation-related assumptions of the daily time-step concentration-based allocations.

It is important to recognize that there is uncertainty associated with these mass load expressions, as they are in many cases based on limited amounts of instantaneous flow data, or NHDplus modeled flow data and as such reflect coarser temporal load representations (annual and seasonal loads). In the absence of reliable continuous, or daily flow data (i.e., USGS gages or hydrologic modeling), there

could be a high degree of error associated with estimated daily flows from limited amounts of instantaneous flows¹. According to USEPA, the potential for error is particularly pronounced in arid areas, areas with few USGS gages, and areas where flows are highly modified by human activities (e.g., impoundments, regulated flows, and irrigation return flows)². Therefore, as noted previously, this TMDL and associated load allocation are based on instantaneous concentration-based loads – this satisfies the USEPA guidance to incorporate a daily time-step load. In addition, concentration is generally a more direct linkage to the protection of aquatic habitat, than annual or seasonal mass loads.

As more flow data, or better flow estimates become available in the future, these alternative, non-daily load expressions may be revised during reconsideration of the TMDL, scheduled for ten years after adoption.

Table 1. Alternative, non-daily load expressions and estimated load reductions to facilitate implementation of allocations.

Stream Reach and associated Monitoring Site	Estimated Mean Annual Flow (cfs) ^A	Mean Annual Conc. (mg/L)	Mean Annual Existing Load (lbs.)	Mean Annual Loading Capacity (lbs.)	Estimated Load Reduction Necessary (lbs.)	Percent Reduction Goal ^B	Nitrate as N Numeric Target Used for Calculating Loading Capacity (mg/L) and Reduction Goal
Carnadero Creek at private property access 305CAR	14.04	8.78	242,032	220,533	21,499	9%	Wet season biostimulation target = 8
Casserly Creek at Paulsen CA2	0.88	5.03	8,724	17,338	0	0%	MUN standard = 10 Anti-degradation requirements apply – maintain existing Water quality
Corralitos Creek at Freedom CORAA-21	16.9	5.31	167,280	252,033	0	0%	Wet season biostimulation target = 8 Anti-degradation requirements apply – maintain existing Water quality
Coward Creek at Carlton Rd CW	0.17	20.4	6,826	3,358	3,468	51%	MUN standard = 10

¹ U.S. Environmental Protection Agency, 2007. Options for Expression Daily Loads in TMDLs. June 22, 2007.

² *Ibid.*

Stream Reach and associated Monitoring Site	Estimated Mean Annual Flow (cfs) ^A	Mean Annual Conc. (mg/L)	Mean Annual Existing Load (lbs.)	Mean Annual Loading Capacity (lbs.)	Estimated Load Reduction Necessary (lbs.)	Percent Reduction Goal ^B	Nitrate as N Numeric Target Used for Calculating Loading Capacity (mg/L) and Reduction Goal
Furlong Creek at Fraiser Lake Rd 305FUF	0.43	34.13	28,908	6,789	22,119	77%	Wet season biostimulation Target = 8
Green Valley Creek at Green Valley Road GV	0.27	3.84	2,044	4,271	0	0%	MUN standard = 10 Anti-degradation requirements apply – maintain existing Water quality
Green Valley Creek Tributary at Casserly Road GVT	0.40	21.48	16,900	7,884	9,016	53%	MUN standard = 10
Harkins Slough at Harkins Slough Rd 305HAR	2.09	3.18	12,702	32,923	0	0%	Wet season biostimulation Target, total nitrogen as N = 8 Anti-degradation requirements apply – maintain existing Water quality
Hughes Creek at Casserly Road HC	0.07	0.95	146	1,387	0	0%	MUN standard = 10 Anti-degradation requirements apply – maintain existing Water quality
Llagas Creek at Bloomfield Avenue 305LLA	11.94	11.27	249,405	177,062	72,343	29%	Wet season biostimulation target = 8
Llagas Creek at Southside 305LUC	8.84	17.8	309,812	139,248	170,564	55%	Wet season biostimulation target = 8
Pacheco Creek at San Felipe Rd 305PAC	12.70	1.68	42,012	250,062	0	0%	MUN standard = 10 Anti-degradation requirements apply – maintain existing Water quality

Stream Reach and associated Monitoring Site	Estimated Mean Annual Flow (cfs) ^A	Mean Annual Conc. (mg/L)	Mean Annual Existing Load (lbs.)	Mean Annual Loading Capacity (lbs.)	Estimated Load Reduction Necessary (lbs.)	Percent Reduction Goal ^B	Nitrate as N Numeric Target Used for Calculating Loading Capacity (mg/L) and Reduction Goal
Pajaro River at Thurwatcher Rd. 305THU	109.59	5.01	1,081,057	1,726,268	0	0%	Wet season biostimulation target = 8 Anti-degradation requirements apply – maintain existing Water quality
Pajaro River at Chittenden 305CHI	173.1	8.27	2,818,686	2,726,661	92,025	3%	Wet season biostimulation target = 8
Salsipuedes Creek at Hwy 129 downstream of Corralitos Creek 305COR	8.54	3.54	59,532	134,539	0	0%	Wet season biostimulation target = 8 Anti-degradation requirements apply – maintain existing Water quality
San Benito at Y Rd 305SAN	38.60	1.46	110,960	760,040	0	0%	MUN standard = 10 Anti-degradation requirements apply – maintain existing Water quality
San Juan Creek at Anzar 305SJN	1.06	29.13	60,809	16,681	44,128	73%	Wet season biostimulation target = 8
Tequisquita Slough at Shore Rd 305TES	4.23	5.57	46,392	66,613	0	0%	Wet season biostimulation target = 8 Anti-degradation requirements apply – maintain existing Water quality
Tres Pinos Creek at Southside Rd. (305TRE)	18.2	0.42	15,038	358,357	0	0%	MUN standard = 10 Anti-degradation requirements apply – maintain existing Water quality
Watsonville Slough upstream Harkins Slough 305WSA	4.46	10.77	94,572	70,263	24,309	26%	Wet season biostimulation Target, total nitrogen as N = 8

^A See TMDL report Section 3.4 – Hydrology for source information on flow estimates.

^B Percent reduction goals are for informational purposes only, and should not be viewed as the TMDL

Table 2. Alternative, non-daily (dry season – May. 1 to Oct. 31) load expressions and estimated dry season load reductions to facilitate implementation of allocations.

Stream Reach and associated Monitoring Site	Estimated Mean Dry Season Flow (cfs) ^A	Mean Dry Season Conc. (mg/L)	Mean Dry Season Existing Load (lbs.)	Mean Dry Season Loading Capacity (lbs.)	Estimated Load Reduction Necessary (lbs.)	Percent Reduction Goal ^B	Nitrate as N Biostimulation Numeric Target Used for Calculating the Loading Capacity (mg/L) and Reduction Goal
Carnadero Creek at private property access (305CAR)	1.79	13.59	23,949	3,176	20,773	97%	dry season nitrate as N biostimulation water quality target = 1.8
Carnadero Creek at Highway 25 (site 305CAN)	6.51	14.17	90,817	11,534	79,283	87%	dry season nitrate as N biostimulation water quality target = 1.8
Corralitos Creek at Brown Valley Road (CO-BVR)	6.81	0.13	876	12,063	0	0%	dry season nitrate as N biostimulation water quality target = 1.8
Furlong Creek at Fraiser Lake Rd (305FUF)	1.1	32.67	35,387	1,953	33,434	94%	dry season nitrate as N biostimulation water quality target = 1.8
Llagas Creek at Bloomfield Avenue (305LLA)	2.2	13.01	28,178	3,906	24,272	86%	dry season nitrate as N biostimulation water quality target = 1.8
Llagas Creek at Southside (305LUC)	5.08	17.27	86,377	8,997	77,380	90%	dry season nitrate as N biostimulation water quality target = 1.8
Llagas Creek at Monterey (305MON)	14.09	0.2	2,774	24,966	0	0%	dry season nitrate as N biostimulation water quality target = 1.8
Millers Canal at Frazier Lake Rd (305FRA)	6.72	1.5	9,928	7,282	2,646	27%	dry season total nitrogen as N biostimulation water quality target = 1.1
Pacheco Creek at San Felipe Road (305PAC)	5.83	–	–	Not applicable	0	0%	Biostimulation water quality targets do not apply. Anti-degradation requirements apply – maintain existing water quality.
Pajaro River at Porter (305PJP)	22.83	7.58	170,364	87,655	82,709	49%	dry season nitrate as N biostimulation water quality target = 3.9
Pajaro River at Chittenden Gap (305CHI)	24.2	9.90	235,863	92,911	142,952	61%	dry season nitrate as N biostimulation water quality target = 3.9
Pajaro River at Betabel Rd (305PAJ)	28.45	9.98	377,775	147,624	230,151	61%	dry season nitrate as N biostimulation water quality target = 3.9

Stream Reach and associated Monitoring Site	Estimated Mean Dry Season Flow (cfs) ^A	Mean Dry Season Conc. (mg/L)	Mean Dry Season Existing Load (lbs.)	Mean Dry Season Loading Capacity (lbs.)	Estimated Load Reduction Necessary (lbs.)	Percent Reduction Goal ^B	Nitrate as N Biostimulation Numeric Target Used for Calculating the Loading Capacity (mg/L) and Reduction Goal
Salsipuedes Creek at Hwy 129 (305COR)	5.28	5.28	27,448	9,362	18,086	66%	dry season nitrate as N biostimulation water quality target = 1.8
San Benito at Y Rd (305SAN)	0.4	–	–	Not applicable	0	0%	Biostimulation water quality targets do not apply. Anti-degradation requirements apply – maintain existing water quality.
San Juan Creek at Anzar Rd (305SJN)	1.98	37.57	73,237	6,424	66,813	91%	dry season nitrate as N biostimulation water quality target = 3.3
Tequisquita Slough at Shore Rd (305TES)	0.73	6.72	4,836	1,588	3,248	67%	dry season nitrate as N biostimulation water quality target = 2.2
Tres Pinos Creek at Southside Rd. (305TRE)	2.93	–	–	Not applicable	0	0%	Biostimulation water quality targets do not apply. Anti-degradation requirements apply – maintain existing water quality.
Watsonville Slough upstrm of Harkins Slough (305WSA)	0.5	14.8	7,282	1,040	6,278	86%	dry season total nitrogen as N biostimulation water quality target = 2.1

^A See TMDL report Section 3.4 – Hydrology for source information on flow estimates.

^B Percent reduction goals are for informational purposes only, and should not be viewed as the TMDL