City of San Clemente
Engineering Division

Tom Bonigut, Deputy Public Works Director
Phone: (949) 361-6187 Fax: (949) 361-8316
bonigutt@san-clemente.org

August 2, 2016

Transmitted via email to:
sandiego@waterboards.ca.gov

Xueyuan Yu
California Regional Water Quality Control Board
San Diego Region
2375 Northside Drive, Suite 100
San Diego, CA 92108

Subject: Comment – CWA Section 305(b)/303(d) Integrated Report

Dear Ms. Yu:

The City of San Clemente (City) appreciates the opportunity to provide comments on the Draft 2014 Clean Water Act Section 303(d)/305(b) Integrated Report and 303(d) List for San Diego Region. The 303(d) list affects the City's water quality programs and the City has several main comments and concerns with the 303(d) list as described in this letter.

It appears that the Regional Water Board did not include all the available data as required by the Listing Policy, which states, "In developing the list, the state shall evaluate all existing readily available water quality-related data and information." All available data should be considered to ensure the 303(d) list reflects the current condition of our receiving waters. As stated in the Draft Integrated Report, a "significant amount of (available) data collected between August 2010 and July 2016" was not included in the analysis since only the data submitted as part of the 2010 solicitation was evaluated as part of this listing cycle.

The City requests Board staff to provide more details on the Regional Water Board's process to trigger an off cycle review and hopes that the process will be scheduled in a timely manner. We also have concerns that the 2014 listings are not representative of current condition and that the receiving water changes observed between August 2010 and July 2016 could result in a different listing decision had the Board considered all of the available information.

Secondly, the State Water Board is in the process of developing guidelines for using biological information in the assessment of aquatic life uses, however these guidelines have not yet been reviewed and adopted by the State Board. As such, it is the City's position that it is premature and not appropriate to apply these potential biological guidelines to the current evaluation of possible impaired waters listings. The City requests that any listings which have relied upon guidance not yet adopted by the State Board be removed until the biological objectives are finalized and San Diego specific reference conditions can be better reflected in the assessment.

Lastly, we are concerned about several of the other listings as follows:

- The List decision for nickel in Cristianitos Creek and cadmium, nickel, and copper in Segunda Deshecha, and the number of exceedances determined, as presented in the Fact Sheets, needs to be re-evaluated. Our review of the calculated exceedances following the California Toxics Rule (CTR) provisions for the dissolved fraction, indicates that these four pollutant listings did not exceed the CTR water quality criteria.

  We request the listing decisions for Cristianitos Creek and Segunda Deshecha Creeks be removed based on the absence of dissolved metals exceedances meeting the listing policy requirements.

- We request the Board to clarify the decision to list Mercury in Prima Deshecha and Segunda Deshecha based on the number of exceedances shown in the Fact Sheet. The data files listed in the "Data Used to Assess Water Quality" only include one (1) dissolved mercury result for both streams, and both results are below the threshold used to establish the new List decision.

  We request the Mercury listings be removed for Prima Deshecha and Segunda Deshecha Creeks should the Board not be able to produce additional data to support the listing decision and based on the current administrative record not meeting the listing policy requirements.

- We are concerned with the Board's interpretation that an elevated level of nitrogen and phosphorus during an episodic wet weather event contributes to biostimulatory-based beneficial use impairment. We do not agree that a short-lived wet weather pulse of water can contribute to aquatic plant growth or the creation of a nuisance condition in Prima Deshecha and Segunda Deshecha Creeks during dry weather conditions.

  We believe that the appropriate integrate report category for the Phosphorus and Nitrogen listings should be to place the listing decisions in Category 3, since there is insufficient data to indicate impairments for these constituents.

- We disagree with the Board's interpretation that a pollutant's exceedance of a water quality objective and the presence of toxicity in ambient waters are directly associated. We believe that the appropriate process for considering toxicity within the context of a pollutant listing decision is through the use of permit mandated and statewide toxicity policy requirements for Toxicity Identification Evaluations (TIE). The TIE process is a scientifically documented and regulatory agency supported approach for identifying the pollutant(s) contributing to ambient water toxicity.

We request that the Lines of Evidence referencing toxicity and toxicity exceedances within the individual pollutant listing decisions be removed from the Integrated Report. We would support the Board's decision to list Toxicity on the Integrated Report and look forward to working the Board to resolve the issues contributing to toxicity in ambient waters.

- We do not agree with the Board's decision to use non-Basin Plan or California promulgated (e.g., CTR) based criteria to establish the listing decisions. Specifically, the application of scientific research journal based values for cadmium and nickel in sediment or national aquatic life benchmarks for malathion, is not appropriate since these are not adopted objectives for the San Diego Region and thus not reflective of limits that would appropriately protect water quality in the San Diego Region.

  More specifically, we believe that established approaches following the toxicity identification evaluation process and managing the pollutants contributing to toxicity is a more appropriate process for addressing water quality.

Thank you for providing an opportunity to comment on the 2014 Clean Water Act Section 305(b)/303(d) Integrated Report. I appreciate your consideration of the City's comments. Please contact me if you have any questions.

Sincerely,

Tom Bonigut

Tom Bonigut, P.E.
Deputy Public Works Director

August 10, 2016
0780-85-KY181

San Diego Regional Water Quality Control Board
2375 Northside Drive, Suite 100
San Diego, CA 92108
Attention: Ms. Xueyuan Yu
Submitted Via Email: sandiego@waterboards.ca.gov

SUBJECT: COMMENT LETTER – CWA SECTION 305(b)/303(d) INTEGRATED REPORT

Thank you for the opportunity to provide comments the proposed 2014 Clean Water Act Section 303(d) List for the San Diego Region. The City of Chula Vista has reviewed the following waterbody/ pollutant combinations and has the following comments for consideration, as well as one general comment.

1) DECISION ID 53457 – Sweetwater River, Lower (below Sweetwater Reservoir)/ Chlorpyrifos

FACT SHEET: Sweetwater River, Lower, Decision ID 53457; LOE ID 77930 states that three of 14 samples exceeded the chlorpyrifos criterion at Sweetwater River – Mass Loading Station (SR-MLS) over the time period 02/17/2002 – 10/05/2008, justifying the placement of this waterbody/pollutant on the 303(d) List under Section 3.1 of the Listing Policy.

COMMENTS: Section 4.10 of the Listing Policy provides for the evaluation of water quality trends over time. Given the age of the exceedances (data from 14 years ago), an assessment of all available data from 2001 through 2014 provides a more complete evaluation of water quality trends. Re-analysis of all available data (Transitional Monitoring and Assessment Program Report for the San Diego Bay Watershed Management Area (2014-2015)) shows that there have been no exceedances of the chlorpyrifos criterion at SR-MLS since end of February 2003. During this time period, three of 21 wet weather samples and zero of seven dry weather samples exceeded the criterion at SR-MLS; and zero out of four samples exceeded the criterion at SWAMP Site Sweetwater 8 (a total of zero exceedences out of 32 samples). The total number of exceedances between 2001 and 2014 was three out of 37 samples. This does not meet the criteria for listing presented in Table 3.1 of the Listing Policy. See Attachments 1 and 2 for tables of monitoring results.

RECOMMENDATION: Sweetwater River, Lower/ Chlorpyrifos should be removed from the draft 2014 303(d) List due to the comprehensive analysis of all data from 2001-2014, showing that chlorpyrifos does not meet listing criteria per Table 3.1 of the Listing Policy.

2) DECISION ID 53461 – Sweetwater River, Lower (below Sweetwater Reservoir)/ Diazinon

FACT SHEET: Sweetwater River, Lower, Decision ID 53461; LOE ID 77012 states that five of 27 samples exceeded the criterion for diazinon at SR-MLS over the time period 02/17/2002 – 10/05/2008, justifying the placement of this waterbody pollutant on the 303(d) list under Section 3.1 of the Listing Policy.

COMMENTS: The five samples that exceeded the diazinon criterion were taken in 2002 and 2003, at a time when diazinon was not yet banned. Section 6.1.5.3 of the Listing Policy states that "If the implementation of a management practice(s) has resulted in a change in the water body segment, only recently collected data [since the implementation of the management measure(s)] should be considered." In this case, the management practice was the EPA ban of diazinon in 2005. Re-analysis of all available data (Transitional Monitoring and Assessment Program Report for the San Diego Bay Watershed Management Area (2014-2015)) shows that starting in 2004, zero out of 19 wet weather samples and zero of seven dry weather samples have exceeded the criterion at SR-MLS; and zero out of four samples exceeded criterion at Sweetwater 8 (a total of zero exceedences out of 30 samples). Based on the age of the exceedances (pre-dating the ban on diazinon) and significantly decreasing trend results (Step 6 of Section 3.10 of the Listing Policy), this pollutant is not likely to exceed the criterion in the future. See Attachments 1 and 2 for tables of monitoring results.

RECOMMENDATION: Sweetwater River, Lower/ Diazinon should be removed from the draft 2014 303(d) List due to the ban on the sale of diazinon, the significantly decreasing trends in diazinon since 2005, and the likelihood that diazinon will not exceed the criterion in the future.

3) <u>GENERAL COMMENT – STATE LISTING POLICY</u>

COMMENT: The State Board's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (Listing Policy) that is used to evaluate waterbody/pollutant combinations needs to be updated.

RECOMMENDATION: The Listing Policy was adopted in 2004, and since then there have been numerous changes to the way regulated parties address pollutants, as well as improved science and methods. It would be beneficial for the State and Regional Boards to collaborate and seek comments from interested parties to update the Listing Policy to reflect current science and methods, and provide up to date guidance. Recommended updates include expanded definitions for toxicants and conventional pollutants, reassessment of the criteria tables for listing and delisting, and updates to the types of pollutants and/or conditions that are addressed by the Listing Policy. Section 5 of the Listing Policy states that "All waterbody/pollutant combinations on the Section 303(d) List shall be assigned a TMDL schedule date." The Water Quality Improvement Plan (WQIP) process that was adopted with the most recent Regional MS4 Permit seeks to address priority pollutants via goals, strategies, and schedules. It is possible that implementation of WQIPs or other management actions can circumvent the need for TMDLs, which require a great deal of stakeholder resources to plan and implement.

Thank you for your consideration of the above comments and recommendations. If you have any questions, please contact me at (619)397-6111 or bsalem@chulavistaca.gov.

BOUSHRA SALEM
SENIOR CIVIL ENGINEER

C: William S. Valle, Assistant Director of Public Works Engineering
Silvester Evetovich, Principal Civil Engineer
Marisa Soriano, Environmental Health Specialist

H:\NPDES\303(d)-TMDL\2014 303(d) List\Draft Comments Letter on Draft 2014 303(d) List.docx

ATTACHMENT 1 - Sweetwater River Mass Loading Station Data

Wet Weather Historical Monitoring Table for SR-MLS

Category Group	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	2001-2002			2002-2003			2003-2004			2004-2005			2005-2006		
					02/17/02	03/17/02	04/25/02	12/16/02	02/11/03	02/25/03	11/12/03	02/03/04	02/18/04	10/17/04	02/11/05	02/18/05	10/18/05	01/02/06	02/19/06
General/Physical/Organic																			
NA	Electrical Conductivity	µmhos/cm	NA		3,820	3,430	2,980	2,990	2,760	1,955	3,040	1,742	1,995	529	5,070	3,260	3,430	4,090	2,690
CHEM-Conventional	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2000	1	1	1	4.47	2	1	4.43	<1	1.05	<1	<1	<1	<1	<1	<1
CHEM-Conventional	pH	pH units	6.5-9.0	1. Basin Plan	7.5	7.4	7.3	7.56	6.87	6.94	7.20	7.83	7.58	7.24	7.52	7.49	7.66	8.14	8.09
NA	Water Temperature	Celcius	NA					14.30	17.00	14.40	14.90	12.20	15.40	19.30	14.60	14.00	16.50	15.20	12.20
Bacteriological																			
BACT-Enterococcus	Enterococcus	MPN/100 mL	NA		300	16,000	9,000	8,000	14,000	30,000	18,792	1,879	17,000	800	3,000	50,000	50,000	5,000	13,000
BACT-Fecal Coliform	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	130	500	**11,000**	**23,000**	**7,000**	1,700	4,000	2,200	2,300	300	1,300	1,300	3,000	**8,000**	2,300
BACT-Total Coliform	Total Coliform	MPN/100 mL	NA		23,000	5,000	230,000	30,000	30,000	170,000	300,000	130,000	130,000	30,000	13,000	28,000	130,000	30,000	80,000
Wet Chemistry																			
CHEM-Conventional	Ammonia as N	mg/L	(a)	6. USEPA Water Quality Criteria (Freshwater)	0.16	0.3	0.2	0.25	0.28	0.19	0.16	0.1	0.15	0.39	0.14	0.14	<0.1	<0.1	0.19
CHEM-Conventional	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2000, 8. McNeeley (1979)	2	14.2	4.7	<2.0	20.4	5.89	9.32	**46.7**	15.3	19.8	2.57	3.42	4.96	3.72	2.22
CHEM-Conventional	Chemical Oxygen Demand	mg/L	120	4. MSGP 2000	70	63	55	59	85	39	104	69	86	44	**123**	74	47	44	102
CHEM-Conventional	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
CHEM-Conventional	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
CHEM-Conventional	Total Suspended Solids	mg/L	100	4. MSGP 2000, 1. Basin Plan	21	47	23	74	14	51	<20	<20	<20	20	26	**102**	<20	<20	<20
CHEM-Conventional	Turbidity	NTU	20	1. Basin Plan	7.7	**20.2**	8.24	**62.9**	13	**46.5**	15.2	11.5	16.8	4.03	5.8	**48.8**	11.4	9.07	**21.7**
NA	Dissolved Organic Carbon	mg/L	NA					9.68	25.2	8.94	21.9	7.94	88.2	25.7	5.24	6.19	5.04	19	10.5
NA	Total Kjeldahl Nitrogen	mg/L	NA		1.5	3	1.2	1.0	1.0	0.8	2.8	<0.5	0.7	2.1	1.4	1.8	1	1.7	2.5
NA	Total Organic Carbon	mg/L	NA					40.7	12.9	6.72	20.8	12.5	96.4	30.1	10.9	11.7	12.1	14	13.2
NUTR-Nitrate as N	Nitrate as N	mg/L	10	1. Basin Plan	0.4	0.3	0.2	0.54	0.81	0.39	2.19	0.25	0.27	0.07	1.02	1.93	0.55	1.52	1.44
NUTR-Total/Dissolved Phosphorus	Dissolved Phosphorus	mg/L	2	4. MSGP 2000	<0.05	0.2	0.1	0.34	0.20	0.10	0.4	0.18	0.12	0.2	0.18	0.45	0.26	0.43	0.24
NUTR-Total/Dissolved Phosphorus	Total Phosphorus	mg/L	2	4. MSGP 2000	0.18	0.29	0.1	0.54	0.22	0.14	0.43	0.22	0.16	0.25	0.57	0.47	0.52	0.45	0.54
TDS-Total Dissolved Solids	Total Dissolved Solids	mg/L	1,500 (b)	1. Basin Plan	**2,000**	1,050	**2,870**	793	**1,660**	1,150	**1,880**	**1,780**	**2,230**	**2,860**	**2,370**	1,410	**2,640**	**2,140**	**2,070**
Pesticides																			
CHEM-Pesticides	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.03*	<0.03*	**0.03**	**0.053**	**0.059**	<0.03*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
CHEM-Pesticides	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	**0.10**	**0.27**	<0.03	**0.301**	**0.146**	**0.171**	**0.084**	<0.01	0.026	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
CHEM-Pesticides	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook				0.24	<0.10	<0.10	0.423	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
Hardness																			
NA	Total Hardness	mg $CaCO_3$/L	NA		932	499	1,010	344	758	549	817	728	816	1,210	991	556	1,130	1,020	966
Total Metals																			
NA	Antimony	mg/L	NA		<0.002	<0.002	<0.002	0.004	0.004	0.003	<0.005	<0.005	<0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
NA	Arsenic	mg/L	NA		0.002	0.002	0.003	0.004	0.002	0.003	0.005	0.007	0.005	0.004	0.005	<0.002	0.008	0.005	0.005
NA	Cadmium	mg/L	NA		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
NA	Chromium	mg/L	NA		<0.005	0.007	<0.005	0.009	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
NA	Copper	mg/L	NA		<0.005	0.010	0.006	0.010	0.018	0.007	0.009	0.013	0.012	<0.005	<0.005	0.005	<0.005	0.005	0.005
NA	Lead	mg/L	NA		0.002	0.006	0.003	0.010	0.003	<0.002	0.002	<0.002	0.003	<0.002	<0.002	0.002	<0.002	<0.002	<0.002
NA	Nickel	mg/L	NA		0.003	0.003	0.004	<0.002	0.002	<0.002	0.004	0.002	<0.002	0.002	0.003	0.002	0.007	0.004	0.003
CHEM-Metals	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.003	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.004	<0.005
NA	Zinc	mg/L	NA		<0.02	0.045	<0.020	0.042	0.029	0.025	0.036	<0.02	0.029	<0.02	<0.02	<0.02	0.044	<0.02	<0.02
Dissolved Metals																			
CHEM-Metals	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	<0.002	0.006	<0.002	0.004	<0.005	<0.005	<0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CHEM-Metals	Arsenic	mg/L	0.34 (c)	16. 40 CFR 131.38	<0.001	0.001	0.003	0.003	0.003	0.003	0.003	0.004	0.003	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
CHEM-Metals	Cadmium	mg/L	(d)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
CHEM-Metals	Chromium	mg/L	(d)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CHEM-Metals	Copper	mg/L	(d)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	0.007	0.025	0.008	0.005	0.006	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
CHEM-Metals	Lead	mg/L	(d)	16. 40 CFR 131.38	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
CHEM-Metals	Nickel	mg/L	(d)	16. 40 CFR 131.38	0.004	<0.002	0.003	<0.002	0.002	<0.002	0.003	0.002	<0.002	0.002	0.003	0.002	<0.002	0.004	0.003
NA	Selenium	mg/L	NA		<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.004	<0.005
CHEM-Metals	Zinc	mg/L	(d)	16. 40 CFR 131.38	<0.020	<0.020	<0.020	0.043	0.097	0.021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.04	<0.02	<0.02
Pyrethroid																			
NA	Allethrin	µg/L	NA																
CHEM-Pesticides	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006															
CHEM-Pesticides	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004															
CHEM-Pesticides	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004															
NA	Danitol	µg/L	NA																
NA	Deltamethrin	µg/L	NA																
CHEM-Pesticides	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004															
CHEM-Pesticides	L-Cyhalothrin	µg/L	0.2	17. Wheelock et al., 2004															
CHEM-Pesticides	Permethrin	µg/L	0.021	15. Anderson et al., 2006															
NA	Prallethrin	µg/L	NA																
Toxicity																			
Toxicity-*Ceriodaphnia*	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100	NPDES Order 2007-0001	>100	**70.71**	>100	**72.22**	>100	>100	>100	>100	>100	**80.53**	>100	>100	>100	>100	>100
Toxicity-*Ceriodaphnia*	*Ceriodaphnia* 7-day survival	NOEC (%)	100	NPDES Order 2007-0001	100	**25**	100	**50**	100	100	100	100	100	**25**	100	100	100	100	100
Toxicity-*Ceriodaphnia*	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100	NPDES Order 2007-0001	100	**50**	**50**	**50**	100	100	100	100	100	**12.5**	**50**	100	100	100	100
Toxicity-*Hyallella*	*Hyalella* 96-hr	LC_{50} (%)	>100	NPDES Order 2007-0001	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
Toxicity-*Selenastrum*	*Selenastrum* 96-hr	NOEC (%)	100	NPDES Order 2007-0001	**50**	**50**	**25**	**12.5**	100	100	100	100	**50**	**50**	100	100	**50**	100	100

See last page for footnotes and source references.

ATTACHMENT 1

Wet Weather Historical Monitoring Table for SR-MLS

Category Group	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	2006-2007			2007-2008	2008-2009	2009-2010		2010-2011	2011-2012		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					10/14/06	01/30/07	02/19/07	-	10/05/08	11/28/09	02/06/10	-	10/05/11-10/06/11	02/07/12		
General/Physical/Organic																
NA	Electrical Conductivity	µmhos/cm	NA		1,890	4,100	3,520		5,180	4,680	3,410		4,380	1,219		
CHEM-Conventional	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2000	<5	<5	<5		**14.3**	3.4J	<5		1.9J	3.1J	4%	0.23
CHEM-Conventional	pH	pH units	6.5-9.0	1. Basin Plan	7.80	7.79	7.60		7.49	7.32	7.05		7.55	7.71	0%	0.00
NA	Water Temperature	Celcius	NA		16.10	11.10	13.10		14.90	12.80	16.30		16.6	13.9		
Bacteriological																
BACT-Enterococcus	Enterococcus	MPN/100 mL	NA		110,000	3,000	1,300		80,000	340	8,000		50,000	5,000		
BACT-Fecal Coliform	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	**8,000**	170	**5,000**		**230,000**	170	**17,000**		**23,000**	2,200	39%	3.84
BACT-Total Coliform	Total Coliform	MPN/100 mL	NA		50,000	3,000	30,000		500,000	2,300	220,000		80,000	80,000		
Wet Chemistry																
CHEM-Conventional	Ammonia as N	mg/L	(a)	6. USEPA Water Quality Criteria (Freshwater)	0.79	0.67	1.24		0.11	0.1	0.07		0.22	<0.1	0%	0.02
CHEM-Conventional	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2000, 8. McNeeley (1979)	**115**	3.66	3.36		**45.7**	5.5	2.9		10	3.5[†]	13%	0.50
CHEM-Conventional	Chemical Oxygen Demand	mg/L	120	4. MSGP 2000	119	54	45		52	36.1	55		34	36	4%	0.54
CHEM-Conventional	Nitrite as N	mg/L	1	1. Basin Plan	0.06	<0.05	<0.05		<0.05	<0.05	<0.75		0.033J	0.021J	0%	0.05
CHEM-Conventional	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5		0.16	0.1H	0.031		0.1	0.14	0%	0.39
CHEM-Conventional	Total Suspended Solids	mg/L	100	4. MSGP 2000, 1. Basin Plan	45	<20	91		8.2	6.8	**106**		9	12	9%	0.32
CHEM-Conventional	Turbidity	NTU	20	1. Basin Plan	**32.2**	9.6	**65.8**		3.7	5.4	**89.7**		9.4	16	35%	1.16
NA	Dissolved Organic Carbon	mg/L	NA		86.9	13.6	12.8		9.7	8.6	9.9		7.6	7.9		
NA	Total Kjeldahl Nitrogen	mg/L	NA		2.2	1.4	2.4		2.4	1.12	0.644J		1	0.89		
NA	Total Organic Carbon	mg/L	NA		88.8	13.8	13		9.9	8.8	9.4		7.6	8.5		
NUTR-Nitrate as N	Nitrate as N	mg/L	10	1. Basin Plan	1.36	<0.05	0.74		0.22	0.36	0.67		0.39	0.64	0%	0.07
NUTR-Total/Dissolved Phosphorus	Dissolved Phosphorus	mg/L	2	4. MSGP 2000	0.28	0.21	0.32		0.133	0.163	0.263		0.2	0.11	0%	0.11
NUTR-Total/Dissolved Phosphorus	Total Phosphorus	mg/L	2	4. MSGP 2000	0.4	0.28	0.39		0.19	0.17	0.396		0.24	0.15	0%	0.16
TDS-Total Dissolved Solids	Total Dissolved Solids	mg/L	1,500 (b)	1. Basin Plan	**1,990**	**2,060**	1,290		**3,038**	**2,878**	952B		**2,900**	**1,800**	74%	1.33
Pesticides																
CHEM-Pesticides	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002		<0.01	<0.01	15%	0.53
CHEM-Pesticides	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004	<0.004		<0.004	<0.004	<0.004		<0.01	<0.01	26%	0.64
CHEM-Pesticides	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	0.097	0.063	<0.006		<0.006	<0.006	0.059		<0.01	<0.01	0%	0.12
Hardness																
NA	Total Hardness	mg $CaCO_3$/L	NA		807	999	626	No Sample Collected	1,010.8	1,086.9	336.8	No Sample Collected	1200	950		
Total Metals																
NA	Antimony	mg/L	NA		0.002	0.002	0.004		0.0009	0.0004J	0.0006		0.0006	0.00072		
NA	Arsenic	mg/L	NA		0.011	0.002	0.003		0.004	0.0084	0.0046		0.0017	0.002		
NA	Cadmium	mg/L	NA		0.003	<0.001	<0.001		<0.0004	<0.0004	<0.0004		0.00004J	0.000037J		
NA	Chromium	mg/L	NA		<0.005	<0.005	<0.005		0.0021	0.0006	0.0015		0.0019	0.0008		
NA	Copper	mg/L	NA		0.011	0.006	0.012		0.0053	0.0035	0.0059		0.005	0.005		
NA	Lead	mg/L	NA		0.003	<0.001	0.004		0.0005	0.00026	0.00338		0.00075	0.0013		
NA	Nickel	mg/L	NA		0.004	0.003	0.004		0.0017	0.003	0.0022		0.005	0.0037		
CHEM-Metals	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.004	<0.004	<0.004		0.0002J	<0.0005	0.0013		0.0004	0.00062	0%	0.36
NA	Zinc	mg/L	NA		0.047	0.022	0.047		0.021	0.011	0.0261		0.013	0.011		
Dissolved Metals																
CHEM-Metals	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	0.002		0.0004J	0.0002J	0.0006		0.00034J	0.00047J	0%	0.31
CHEM-Metals	Arsenic	mg/L	0.34 (c)	16. 40 CFR 131.38	0.002	<0.001	<0.001		0.0041	0.008	0.0039		0.0017	0.0017	0%	0.01
CHEM-Metals	Cadmium	mg/L	(d)	16. 40 CFR 131.38	<0.001	<0.001	<0.001		<0.0004	<0.0004	<0.0004		0.000034J	0.000029J	0%	0.02
CHEM-Metals	Chromium	mg/L	(d)	16. 40 CFR 131.38	<0.005	<0.005	<0.005		0.0018	0.0005	0.0003J		0.0014	0.00043	0%	0.00
CHEM-Metals	Copper	mg/L	(d)	16. 40 CFR 131.38	0.006	0.004	0.005		0.0026	0.0019	0.0029		0.0031	0.0029	0%	0.10
CHEM-Metals	Lead	mg/L	(d)	16. 40 CFR 131.38	<0.001	<0.001	<0.001		<0.0001	0.00009J	0.00007J		0.000039J	0.000071J	0%	0.00
CHEM-Metals	Nickel	mg/L	(d)	16. 40 CFR 131.38	0.004	<0.002	0.002		0.0017	0.0030	0.0014		0.0048	0.0031	0%	0.00
NA	Selenium	mg/L	NA		<0.004	<0.004	<0.004		0.0002J	0.0003J	0.0007		0.00029J	0.00061		
CHEM-Metals	Zinc	mg/L	(d)	16. 40 CFR 131.38	0.023	<0.02	<0.02		0.0135	0.0050	0.0021		0.01	0.0064	0%	0.05
Pyrethroid																
NA	Allethrin	µg/L	NA						<0.002	<0.0005	<0.0005		<0.002	<0.002		
CHEM-Pesticides	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006					<0.002	<0.0005	**0.0358B**		<0.002	0.009	20%	1.01
CHEM-Pesticides	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004					<0.002	<0.0005	0.0179		<0.002	0.0142	0%	0.02
CHEM-Pesticides	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004					<0.002	<0.0005	<0.0005		<0.002	<0.002	0%	0.00
NA	Danitol	µg/L	NA						<0.002	<0.0005	0.0009J		<0.002	<0.002		
NA	Deltamethrin	µg/L	NA						<0.002	<0.0005	<0.0005		<0.002	<0.002		
CHEM-Pesticides	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004					<0.002	<0.0005	0.0022		<0.002	<0.002	0%	0.00
CHEM-Pesticides	L-Cyhalothrin	µg/L	0.2	17. Wheelock et al., 2004					<0.002	<0.0005	0.0264		<0.002	<0.002	0%	0.06
CHEM-Pesticides	Permethrin	µg/L	0.021	15. Anderson et al., 2006					<0.025*	<0.005	<0.005		<0.025[††]	<0.025[††]	0%	0.21
NA	Prallethrin	µg/L	NA						<0.002	<0.0005	<0.0005		<0.002	<0.002		
Toxicity																
Toxicity-*Ceriodaphnia*	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100	NPDES Order 2007-0001	>100	>100	>100		>100	>100	>100		>100	>100	13%	1.05
Toxicity-*Ceriodaphnia*	*Ceriodaphnia* 7-day survival	NOEC (%)	100	NPDES Order 2007-0001	100	100	100		100	100	100		100	100	13%	1.30
Toxicity-*Ceriodaphnia*	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100	NPDES Order 2007-0001	**6.25**	100	100		**50**	**50**	100		**50**	100	39%	2.26
Toxicity-*Hyallella*	*Hyalella* 96-hr	LC_{50} (%)	>100	NPDES Order 2007-0001	>100	>100	>100		>100	>100	>100		>100	>100	0%	1.00
Toxicity-*Selenastrum*	*Selenastrum* 96-hr	NOEC (%)	100	NPDES Order 2007-0001	100	100	100		**50**	**50**	100		**50**	**50**	48%	1.83

See last page for footnotes and source references.

ATTACHMENT 1

Wet Weather Historical Monitoring Table for SR-MLS

Blank spaces have been verified and no data is available due to changes in the monitoring program.

(a) Water Quality Benchmark is based on CMC (salmonids absent) using pH described in the USEPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999.
(b) Water Quality Benchmark for total dissolved solids is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective prior to April 25, 2007).
(c) Water Quality Benchmark for dissolved metal fractions are based on a default water effects ratios (WER) value of 1 and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000.
(d) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
NA indicate no criteria or published value was available or applicable to the matrix or program.
* Indicates detection limit above water quality benchmark.
† Result was from composite sample. The grab sample was analyzed outside of the holding time.
†† Permethrin was non-detect at the method detection limit of 0.005 µg/L.
B-Anayte was detected in the associated method blank.
H-Sample received and or/analyzed past the recommended holding time.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Shaded text – exceeds water quality benchmark.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources for benchmark source citations.

ATTACHMENT 1 - Sweetwater River Mass Loading Station Data

Dry Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014			2014-2015		
					01/06/10	05/18/10	-	09/12/11-09/13/11	05/08/12-05/09/12	-	09/17/13-09/18/13	1/13/14-1/14/14	05/01/14-05/02/14	-		
Organophosphorus Pesticides																
2013	Azinphos methyl (Guthion)	µg/L	NA				No Samples Collected			No Samples Collected	<0.010	<0.010	<0.010	No Samples Collected		
2013	Bolstar	µg/L	NA								<0.010	<0.010	<0.010			
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010		0%	0.32
2013	Coumaphos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Demeton-o	µg/L	NA								<0.010	<0.010	<0.010			
2013	Demeton-s	µg/L	NA								<0.010	<0.010	<0.010			
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010		0%	0.09
2013	Dichlorvos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Dimethoate	µg/L	NA								<0.010	<0.010	<0.010			
2013	Disulfoton	µg/L	NA								<0.010	<0.010	<0.010			
2013	Ethoprop	µg/L	NA								<0.010	<0.010	<0.010			
2013	Ethyl parathion	µg/L	NA								<0.010	<0.010	<0.010			
2013	Fensulfothion	µg/L	NA								<0.010	<0.010	<0.010			
2013	Fenthion	µg/L	NA								<0.010	<0.010	<0.010			
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010		0%	0.47
2013	Merphos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Methyl parathion	µg/L	NA								<0.010	<0.010	<0.010			
2013	Mevinphos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Naled	µg/L	NA								<0.010	<0.010BS-L	<0.010			
2013	Phorate	µg/L	NA								<0.010	<0.010	<0.010BS-L			
2013	Ronnel	µg/L	NA								<0.010	<0.010	<0.010			
2013	Stirophos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Tokuthion (Prothiofos)	µg/L	NA								<0.010	<0.010	<0.010			
2013	Trichloronate	µg/L	NA								<0.010	<0.010	<0.010			
PCB Congeners																
2013	PCB-8	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-18	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-28	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-44	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-52	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-66	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-77	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-81	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-101	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-105	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-114	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-118	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-123	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-126	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-128	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-138	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
Polynuclear Aromatic Hydrocarbons																
2013	1-Methylnaphthalene	µg/L	NA								<0.10	<0.10	<0.10			
2013	1-Methylphenanthrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	2,6-Dimethylnaphthalene	µg/L	NA								<0.10	<0.10	<0.10			
2013	2-Methylnaphthalene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Acenaphthene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Acenaphthylene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Anthracene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (a) anthracene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (a) pyrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (b) fluoranthene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (e) pyrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (g,h,i) perylene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (k) fluoranthene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Biphenyl	µg/L	NA								<0.10	<0.10	<0.10			
2013	Chrysene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Dibenzo (a,h) anthracene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Fluoranthene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Fluorene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Indeno (1,2,3-cd) pyrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Naphthalene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Perylene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Phenanthrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Pyrene	µg/L	NA								<0.10	<0.10	<0.10			

ATTACHMENT 1

Dry Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014			2014-2015		
					01/06/10	05/18/10	-	09/12/11-09/13/11	05/08/12-05/09/12	-	09/17/13-09/18/13	1/13/14-1/14/14	05/01/14-05/02/14	-		
Pyrethroids																
2013	Allethrin	µg/L	NA								<0.002	<0.002	<0.002			
2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006							<0.002	<0.002	<0.002		0%	NA[1]
2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004							<0.002	<0.002	<0.002		0%	NA[1]
2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004							<0.002	<0.002	<0.002		0%	NA[1]
2013	Danitol (Fenpropathrin)	µg/L	NA								<0.002	<0.002	<0.002			
2013	Deltamethrin/Tralomethrin	µg/L	NA								<0.002	<0.002	<0.002			
2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004			No Samples Collected			No Samples Collected	<0.002	<0.002	<0.002	No Samples Collected	0%	NA[1]
2013	Fenvalerate	µg/L	NA								<0.002	<0.002	<0.002			
2013	Fluvalinate	µg/L	NA								<0.002	<0.002	<0.002			
2013	L-Cyhalothrin	µg/L	0.2	17. Wheelock et al., 2004							<0.002	<0.002	<0.002		0%	NA[1]
2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006							<0.01	<0.01	<0.01		0%	NA[1]
2013	Prallethrin	µg/L	NA								<0.002	<0.002	<0.002			
2013	Resmethrin	µg/L	NA								<0.01	<0.01	<0.01			
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	NR	>100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100		100	NR	**50**		17%	1.17
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**50**	**50**		**50**	**50**		**25**	NR	**25**		100%	2.67
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100		>100C	>100		>100	NR	>100		0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	**50**		**50**	**50**		**25**	NR	**25**		100%	2.67
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail								Pass	Pass	Pass		0%	

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(b) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(c) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
(f) Water Quality Benchmark for PCBs is the CCC (USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000).
B-Analyte was detected in the associated method blank.
BS-L-Blank Spike recovery of this analyte was below the control limits. Results may be biased low.
C - Control failed; however, sample showed no toxic response.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.
NR-Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

ATTACHMENT 2 - Sweetwater River, Lower - SWAMP Chlorpyrifos Data

ParentProject	Project	StationName	StationCode	SampleDate	CollectionTime	SampleTypeCode	LabBatch	LabSampleID	MatrixName	MethodName	Analyte	Unit	Result	MDL	RL	ResultQualCode	QACode	ComplianceCode	BatchComments	SampleAgency	CollectionMethod	TargetLatitude	TargetLongitude	CollectionDeviceDescription	DigestExtractI	huc10
SWAMP RWB9 Monitoring	RWB9 Rotational Monitoring 2005	Sweetwater River 8	909SSWR08	05/31/2005	17:30:00	Grab	WPCL_L-269-287-05_W_OP	L-269-05-4	samplewater	EPA 8141AM	Chlorpyrifos, Total	ug/L		0.02	0.05	ND	None	QualH	Analytes lw %R LCS & MS/D. QAO: no LCS or MS/MSD 6/6, no blank 6/7, no QC 6/9 and 6/10	MPSL-DFG	Water_Grab	32.65897	-117.0418091	Individual Collection by hand	EPA 3510C	Lower Sweetwater River
SWAMP RWB9 Monitoring	RWB9 Rotational Monitoring 2005	Sweetwater River 8	909SSWR08	09/06/2005	16:00:00	Grab	WPCL_L-472-500-05_W_OP	L-472-05-4	samplewater	EPA 8141AM	Chlorpyrifos, Total	ug/L		0.02	0.05	ND	None	QualH	Low %R LCS, MS and MSD. RPD analytes exceed lab cntrl lmt for MS and MSD. QAO: no blank 9/16, no QC 9/8 and 9/20	MPSL-DFG	Water_Grab	32.65897	-117.0418091	Individual Collection by hand	EPA 3510C	Lower Sweetwater River
SWAMP RWB9 Monitoring	RWB9 Rotational Monitoring 2006	Sweetwater River 8	909SSWR08	04/10/2006	18:00:00	Grab	WPCL_L-179-192-06_W_OP	L-192-06-14	samplewater	EPA 8141AM	Chlorpyrifos, Total	ug/L		0.02	0.05	ND	None	QualH	Analytes low %R LCS. MS/MSD RPD exceed lab cntrl lmt. QAO: no MS/MSD or LCS for 4/7, no QC for 4/10, 4/13, 4/14, no blank for 4/11	MPSL-DFG	Water_Grab	32.65897	-117.0418091	Individual Collection by hand	EPA 3510C	Lower Sweetwater River
SWAMP RWB9 Monitoring	RWB9 Rotational Monitoring 2006	Sweetwater River 8	909SSWR08	01/30/2006	17:30:00	Grab	WPCL_L-051-06_W_OP	L-051-06-6	samplewater	EPA 8141AM	Chlorpyrifos, Total	ug/L		0.02	0.05	ND	None	QualH	Analytes low %R LCS & MSD. RPD analytes exceed lab cntrl lmt for MS & MSD. QAO: no MS or LCS for 2/2, no blank for 2/3	MPSL-DFG	Water_Grab	32.65897	-117.0418091	Individual Collection by hand	EPA 3510C	Lower Sweetwater River

ATTACHMENT 2 - Sweetwater River, Lower - SWAMP Diazinon Data

ParentProject	Project	StationName	StationCode	SampleDate	CollectionTime	SampleTypeCode	LabBatch	LabSampleID	MatrixName	MethodName	Analyte	Unit	Result	MDL	RL	ResultQualCode	QACode	ComplianceCode	BatchComments	SampleAgency	CollectionMethodName	TargetLatitude	TargetLongitude	CollectionDeviceDescription	DigestExtractMethod	huc10
SWAMP RWB9 Monitoring	RWB9 Rotational Monitoring 2005	Sweetwater River 8	909SSWR08	05/31/2005	17:30:00	Grab	WPCL_L-269-287-05_W_OP	L-269-05-4	samplewater	EPA 8141AM	Diazinon, Total	ug/L		0.005	0.02	ND	None	QualH	Analytes lw %R LCS & MS/D. QAO: no LCS or MS/MSD 6/6, no blank 6/7, no QC 6/9 and 6/10	MPSL-DFG	Water_Grab	32.65897	-117.0418091	Individual Collection by hand	EPA 3510C	Lower Sweetwater River
SWAMP RWB9 Monitoring	RWB9 Rotational Monitoring 2005	Sweetwater River 8	909SSWR08	09/06/2005	16:00:00	Grab	WPCL_L-472-500-05_W_OP	L-472-05-4	samplewater	EPA 8141AM	Diazinon, Total	ug/L		0.005	0.02	ND	None	QualH	Low %R LCS, MS and MSD. RPD analytes exceed lab cntrl lmt for MS and MSD. QAO: no blank 9/16, no QC 9/8 and 9/20	MPSL-DFG	Water_Grab	32.65897	-117.0418091	Individual Collection by hand	EPA 3510C	Lower Sweetwater River
SWAMP RWB9 Monitoring	RWB9 Rotational Monitoring 2006	Sweetwater River 8	909SSWR08	01/30/2006	17:30:00	Grab	WPCL_L-051-06_W_OP	L-051-06-6	samplewater	EPA 8141AM	Diazinon, Total	ug/L	0.009	0.005	0.02	DNQ	None	QualH	Analytes low %R LCS & MSD. RPD analytes exceed lab cntrl lmt for MS & MSD. QAO: no MS or LCS for 2/2, no blank for 2/3	MPSL-DFG	Water_Grab	32.65897	-117.0418091	Individual Collection by hand	EPA 3510C	Lower Sweetwater River
SWAMP RWB9 Monitoring	RWB9 Rotational Monitoring 2006	Sweetwater River 8	909SSWR08	04/10/2006	18:00:00	Grab	WPCL_L-179-192-06_W_OP	L-192-06-14	samplewater	EPA 8141AM	Diazinon, Total	ug/L	0.015	0.005	0.02	DNQ	None	QualH	Analytes low %R LCS. MS/MSD RPD exceed lab cntrl lmt. QAO: no MS/MSD or LCS for 4/7, no QC for 4/10, 4/13, 4/14, no blank for 4/11	MPSL-DFG	Water_Grab	32.65897	-117.0418091	Individual Collection by hand	EPA 3510C	Lower Sweetwater River

ESCONDIDO
City of Choice

August 11, 2016

San Diego Regional Water Quality Control Board
2375 Northside Drive
San Diego, CA 92108
Attention: Ms. Xueyuan Yu
Submitted via email to sandiego@waterboards.ca.gov

Comments – CWA Section 305(b)/303(d) Integrated Report

The City of Escondido respectfully submits the following comments on the draft Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego Region (draft Integrated Report) and the San Diego Regional Water Quality Control Board's (RWQCB's) interpretation and application of the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (Listing Policy).

1. **The category assignment process should be transparent and updated with each new Integrated Report, and reflect the RWQCB's regulatory approach to restoring beneficial uses.** The RWQCB should establish a defined procedure for assigning and/or reassigning 303(d) listings of Category 4b or 4c (where no TMDL is required), instead of defaulting to Category 5 (TMDL required). Specifically, when pollutants are being addressed through regulatory measures aside from TMDLs, including Water Quality Improvement Plans (WQIPs) as appropriate, the Regional Board should ensure this is reflected in the assigned category, and the categories should be assessed and updated with each new Integrated Report. This will support the Water Quality Improvement Planning process.

2. **Total Maximum Daily Load (TMDL) scheduling should be transparent and updated with each new Integrated Report, and reflect the RWQCB's regulatory approach to restoring beneficial uses.** The results of assessment of criteria for TMDL scheduling (Section 5 of the Listing Policy) should be transparent in the draft Integrated Report, and updated with each new Integrated Report to reflect the true realities of state resources and priorities, including the availability of data; this will reduce uncertainty for municipalities like the City of Escondido and support the Water Quality Improvement Planning process.

3. **RWQCB staff should re-assess the decision to list Escondido Creek for Diazinon (Decision ID 47734; LOE ID 73584).** Diazinon was banned from sale in 2005, and since that time significant decreases in concentrations of this pesticide have been observed in receiving water bodies in San Diego County, including Escondido Creek. Due to the ban on

sales of Diazinon in the past 11 years, evaluation of the data should be limited to data collected since the time of the ban. It is not clear why the RWQCB is choosing to list Diazinon now, when the sample data was available during previous list updates.

In Escondido Creek, the data used for listing indicates that five of 35 samples exceeded the criterion for Diazinon at ESC-MLS and ESC-TWAS-1 between 2001 and 2008. Re-analysis of available data (Transitional Monitoring and Assessment Program Report for the Carlsbad Watershed Management Area (2014-2015)) shows that there have been zero exceedances of the criterion for Diazinon since 2003 at these two monitoring locations (zero of 35 samples during wet and dry weather). Based on the age of the exceedances (pre-dating the ban on Diazinon) and significantly decreasing trend results (step six of section 3.10 of the Listing Policy) this pollutant is not likely to exceed the criterion in the future.

If the RWQCB determines that this listing is still required at this point in time, the City of Escondido requests to work with RWQCB staff to re-assess this decision in between listing cycles. Furthermore, staff should consider listing this and similar listings as Category 4b ("another regulatory program is reasonably expected to result in attainment of the water quality standard within a reasonable, specified timeframe"). Since source control is the best approach for reducing pesticides in receiving waters, and regulation of pesticides if outside of the jurisdiction of the City of Escondido or the State or Regional Water Quality Control Boards, this is not an appropriate application of the 303(d) list/TMDL process.

4. **Remove Escondido Creek from the draft Integrated Report for surfactants (MBAS) (Decision ID 47747; LOE 78020)**; the total number of exceedances for Escondido Creek (ESC-MLS and ESC-TWAS-1) was zero of 29. The Integrated Report states that nine of 12 samples collected by the Copermittees between 2001 and 2008 exceeded the criteria for surfactants (MBAS) (0.5 mg/L) at ESC-MLS and ESC-TWAS-1. According to the latest Copermittee monitoring report (Transitional Monitoring and Assessment Program Report for the Carlsbad Watershed Management Area (2014-2015)), zero of two samples exceeded the criterion during dry weather and zero of two samples exceeded the criterion during wet weather at ESC-TWAS-1 between 2001 and October 2010. Additionally, between 2001 and October 2010, zero of three samples exceeded the criterion during dry weather and zero of 22 samples exceeded criteria during wet weather at ESC-MLS. A total of 29 samples were collected between 2001 and October 2010 in the Escondido subwatershed (904.6) and none of those samples exceeded the criteria for surfactants (MBAS). It is not clear how the RWQCB has concluded from the data that exceedances occurred. Table 3.2 of the Listing Policy states that a minimum of five exceedances are needed to list a waterbody for a

conventional or other pollutant. These data do not meet the listing criteria for listing Escondido Creek for surfactants (MBAS).

5. **The City of Escondido supports the County of San Diego's efforts to delist Escondido Creek and San Marcos Creek for selenium, as data collected in each creek support de-listing based on the Listing Policy.** In May 2014, the County of San Diego submitted five comment letters related to the 2010 §303d listings for selenium in five creeks; the letters and data are referenced and included in the County of San Diego's comment letter for this decision. Additional data were collected by the County of San Diego for use in the de-listing evaluation and compared to the California Toxics Rule (CTR) Freshwater Criterion of 0.005 mg/L. In Escondido Creek, 0 of 32 samples exceeded the criterion; in San Marcos Creek, 0 of 31 samples exceeded the criterion. Based on the age of the exceedances (each major Line of Evidence was based on samples collected in 2002) and significantly decreasing trend results (step six of section 3.10 of the Listing Policy) this pollutant is not likely to exceed the criterion in the future.

6. **Remove new §303(d) listings for Benthic Community Effects (Escondido Creek - Decision ID 46213, San Marcos Creek – Decision ID 43723) and clarify expectation for TMDLs for this "pollutant".** Although we appreciate the reasons for assessing biological criteria, listing waterbodies in the San Diego region for Benthic Community Effects before establishing Biological Objectives in the Basin Plan (a currently ongoing process) is premature. The Biological Objective would be the standard against which data would be assessed to establish whether there a listing required. Furthermore, based on information communicated in the RWQCB workshop on July 19, 2016, Benthic Community Effects listings are "co-listed" as Category 4C and therefore TMDLs are not required, but all appendices and related information of the new Benthic Community Effects listings state a TMDL date of 2025. It is unclear how a TMDL could even be established for Benthic Community Effects. These listings should be removed.

7. **The State Board's Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (Listing Policy) that is used to evaluate waterbody/pollutant combinations needs to be updated.** The Listing Policy was adopted in 2004, and since then there have been numerous changes to the way regulated parties address pollutants, as well as improved science and methods. It would be beneficial for the State and Regional Boards to collaborate and seek comments from interested parties to update the Listing Policy to reflect current science and methods, and provide up-to-date guidance. Recommended updates include re-assessed definitions for toxicants and conventional pollutants, changes to the criteria tables and policies for listing and delisting,

more transparent decisions for categories and TMDL development dates, and updates to the types of pollutants and/or conditions that are addressed by the Listing Policy.

The City of Escondido recognizes the significant effort required to process thousands of lines of evidence and data sets and is grateful for the opportunity to submit comments. Please contact Helen Davies at (760) 839-6315 or hdavies@escondido.org with any questions.

Sincerely,

Helen Davies, M.S., CPSWQ
Environmental Programs Manager, Utilities Department
City of Escondido

August 12, 2016

VIA EMAIL TO: sandiego@waterboards.ca.gov

Ms. Xueyuan (Helen) Yu
San Diego Regional Water Quality Control Board
2375 Northside Drive, Suite 100
San Diego, CA 92108
sandiego@waterboards.ca.gov

Subject: City of Laguna Beach Comments on CWA Section 305(b)/303(d) Integrated Report

To Ms. Xueyuan Yu:

The City of Laguna Beach (City) appreciates the opportunity to provide comments on the Draft 2014 Clean Water Act Section 303(d)/305(b) Integrated Report and 303(d) List for San Diego Region. The City supports comments submitted by the County of Orange and would like to take this opportunity to further elaborate on some specific concerns with the 2014 303(d) listing decisions.

It appears as if the Regional Water Board did not include all the available data as required by the Listing Policy, which states, "In developing the list, the State shall evaluate all existing readily available water quality-related data and information." All available data should be considered to ensure the 303(d) list reflects the current condition of our receiving waters. As stated in the Draft Integrated Report, a "significant amount of (available) data collected between August 2010 and July 2016" was not included in the analysis since only the data submitted as part of the 2010 solicitation was evaluated as part of this listing cycle.

The City requests that Board staff provide more details on the Regional Water Board's process to trigger an off cycle review and hopes that the process will be scheduled in a timely manner. The City has concerns that the 2014 listings are not representative of current conditions. Additionally, the inclusion of receiving water data collected between August 2010 and July 2016 could result in different listing decisions had the Board considered all available information.

In addition to the evaluation of data that is neither current nor relevant to existing conditions, the City would like to assert the position that it is premature and not appropriate to apply the State Board's biological guidelines to the current evaluation of possible impaired waters listings until these guidelines have been evaluated and adopted. The City has been advised that the State Water Board is in the process of developing guidelines for the use of biological information in the assessment of aquatic life uses, however these guidelines have neither been reviewed nor adopted by the State Board. The City disagrees with the inclusion of a generalized statement that pollutant exceedances of water quality objectives contribute to degraded benthic communities. Our review suggests the lines of evidence need to be reconsidered. We provide the following concerns:

- Mercury has not been established as a stressor to benthic communities in Laguna Canyon Channel. The administrative record only lists one (1) dissolved mercury result for Laguna Canyon Channel at a concentration below the evaluation threshold, whereas the Fact Sheets indicates 23 exceedances in 23 samples. The discrepancies in the Fact Sheet and data files in the administrative record need to be reevaluated.

- Neither the presence of toxicity in ambient waters, nor exceedances of toxicity thresholds have been linked through monitoring studies to degraded stream benthic communities. This relationship has been reiterated several times in southern California regional studies including the Southern California Stormwater Monitoring Coalitions' Regional Watershed Monitoring Program in which the Regional Board is a participating member.

The City requests that any listings which have relied upon guidance not yet adopted by the State Board be removed until the biological objectives are finalized and San Diego specific reference conditions are better reflected in the assessment.

In addition to the above concerns, below is a summary of specific objections to 303(d) listing decisions:

- The Board's decision to include ***Pacific Ocean Shoreline, Laguna Beach HSA, at Broadway Creek*** is creating unnecessary replication of existing regulatory requirements. The City's beach, locally referred to as Main Beach, has existing 303(d) listings for the following two beach segments:

    - Pacific Ocean Shoreline, Laguna Beach HSA, at Main Beach (Do Not Delist)
    - Pacific Ocean Shoreline, Laguna Beach HSA, at Laguna Hotel (Delisted)

    The beach segment ***Pacific Ocean Shoreline, Laguna Beach HSA, at Broadway Creek*** represents a section of beach geographically located between the above two 303d listed segments.

    Both of the Pacific Ocean Shoreline segments listed in the above bullet points are also currently included in the revised Beaches and Creek Indicator Bacteria Total Maximum Daily Load Program per Attachment E.6 of the MS4 Permit. The City is developing a coordinated implementation approach under the Water Quality Improvement Plan to manage the two listed beach segments.

- The Laguna Canyon Channel Indicator Bacteria listing includes Total Coliform exceedances based on application of draft California Department of Public Health (CDPH) monitoring guidance for freshwater beaches. Laguna Canyon Channel has not been posted for health advisory warnings by CDPH for elevated Total Coliforms. The fulfilled the listing policy requirements for the minimum exceedance count to place Laguna Canyon Channel on the 303(d) List.

It is the City's position that the Phosphorus and Nitrogen listings are premature and it is not appropriate to apply potential biological guidelines to the current evaluation of possible impaired waters. The City maintains that any listing decision should be deferred until such time that the State develops biological criteria using the nutrient numeric endpoint approach.

It is premature and not appropriate to apply these potential biological guidelines to the current evaluation of possible impaired waters listings. Thank you for providing an opportunity to comment on the 2014 Clean Water Act Section 305(b)/303(d) Integrated Report. If you have questions regarding these comments, please contact Mary Vondrak, City of Laguna Beach, Senior Water Quality Analyst at (949) 497-0781.

Respectfully,

David Shissler, P.E.
Director of Water Quality

August 11, 2016

VIA ELECTRONIC MAIL ONLY

Ms. Xueyuan (Helen) Yu
San Diego Regional Water Quality Control Board
2375 Northside Drive, Suite 100
San Diego, CA 92108
sandiego@waterboards.ca.gov

Subject: City of Dana Point's Comments – CWA Section 305(b)/303(d) Integrated Report, Attn: Xueyuan Yu

Dear Ms. Yu,

The City of Dana Point (City) appreciates the opportunity to comment on the draft 2014 Clean Water Act (CWA) Section 305(b)/303(d) Integrated Report and proposed 303(d) List for the San Diego Region. The 303(d) List significantly affects the City's water quality programs and priorities and the City has several comments and concerns with the 303(d) list, as proposed, which are described in this letter. The City thanks staff for their efforts on this expansive task.

At the public workshop, we heard Executive Officer Dave Gibson and staff acknowledge some of the following shortcomings and discuss their limitations to address them; however they also encouraged us to relay our concerns so that they can go back and relay them to the State Water Board and/or Legislature, as necessary and thus they are included herein. These are some of the global issues noted in #1-6 below.

1. ***Drafting a "new" "2014" Integrated Report in 2016 (which will be final in 2017 or 2018, we were told), which only includes data up to August 2010.***

As we voiced at the Public Workshop held on July 19, 2016, a very significant underlying concern is the timing of the "2014" Integrated Report with use of "old" data with nothing being evaluated past August of 2010, resulting in a report that is at least 6 years old before it is even adopted. Although, we were told that the new solicitation for data for next Integrated Report will be in the near future, the next Integrated Report won't be out until 2020. There has to be a better, more efficient way to evaluate data and represent current and accurate conditions of the region's waterbodies so we all can responsibly identify and address real priorities.

2. ***Reviewing Data against the Shellfish Beneficial Use which is recognized to have Significant Flaws***

Another very significant concern is the application of the Shellfish standard to the entire stretch of coastline in our region. The State recognized some serious flaws with the Shellfish standard and began to address them back in 2007 with a scoping meeting. However, the project has not been completed and the latest work effort, to our knowledge, is the Draft White Paper http://www.waterboards.ca.gov/water_issues/programs/ocean/index.shtml (attached) which notes “inherent difficulties in achieving the existing water quality standards at all locations where shellfish habitat exists”. The White Paper discusses several significant issues, including lack of a consistent definition of Shellfish, the need to define geographical extent of the recreational shellfish harvesting beneficial use areas to where it actually occurs instead of the entire coastline, etc. It is not a prudent use of any of our resources to evaluate data against standards which have known great flaws, especially when regulatory actions such as TMDLs can be required and applied to every beach location.

3. ***Postponing Issues to a Potential “Off-Cycle” Effort that may or may not occur***

While we sincerely appreciate the Board’s willingness to consider “off cycle” efforts that may help us address some of the significant limitations with this proposed 2014 list; we were also informed at the workshop that a process has not yet been developed and we understand that potential limitation of staff resources could delay or prevent these efforts. Please provide more details as to what will trigger an “off cycle” review and how the process can occur in a timely manner. We have concerns that many of the proposed 2014 listings are not representative of current conditions and that the receiving water data generated between August 2010 and July 2016 could result in a different listing decision had the Board considered all of the available information.

Notwithstanding an understanding of certain limitations affecting the San Diego Board and the potential value and application of “off cycle” efforts as a potential mechanism that can be incorporated into our Water Quality Management Plans to address *certain* pollutants and waterbodies; the City feels it is crucial to address the high priority specific issues presented herein (including the specific Decision comments in a)- h) below and in comments provided by the County of Orange) so they are reflected as accurately as possible in the Final 2014 Report at this time and not be postponed.

4. ***Applying the California Stream Condition Index (CSCI) without validating the approach in reference streams with naturally high Total Dissolved Solids (TDS)***

While the City supports the Board’s effort to set biological based water quality standards, we believe the standard used to establish Benthic Community Effects listing, and to suggest that Salt Creek is biologically impaired in the 2014 Integrated Report, needs to be re-evaluated. Specifically, our position is that the California Stream Condition Index (CSCI) needs to be validated in reference streams with naturally high total dissolved solids (TDS) concentrations (in this example, Salt Creek, the creek name itself is an indication of a history of naturally high TDS). Until such time that a CSCI optimization is performed that accounts for elevated TDS levels present in natural conditions, we do not believe that the application of the CSCI approach to list Benthic Community Effects in Salt Creek is technically appropriate at this time.

We also understand that the State Water Board is in the process of developing guidelines for using biological information in the assessment of aquatic life uses, however these guidelines have not yet been officially adopted. As such, it is the City’s position that it is premature and not appropriate to apply these biological guidelines to the current evaluation of possible impaired waters listings.

Furthermore, we disagree with the inclusion of a generalized statement that pollutant exceedances of water quality objectives contributes to degraded benthic communities. More to the point, the Board included several pollutants and calculated exceedances for these pollutants, and our review of these decisions suggests the lines of evidence need to be reconsidered. We provide the following concerns about the included Lines of Evidence:

- Neither the presence of toxicity in ambient waters nor exceedances of toxicity thresholds have been linked through monitoring studies to degraded stream benthic communities. This relationship has been reiterated several times in southern California regional studies including the Southern California Stormwater Monitoring Coalitions' Regional Watershed Monitoring Program in which the Regional Board is a participating member.

- Mercury has not been established as a stressor to benthic communities in Salt Creek. The administrative record has zero (0) dissolved mercury results in the water quality samples collected between September 2006 and April 2009, whereas the Fact Sheets indicates 6 exceedances in 6 samples. The discrepancies in the Fact Sheet and data files in the administrative record need to be reviewed.

- We do not agree with the Board's decision to use non-Basin Plan or non-statewide plan (e.g., CTR) based criteria to establish the listing decisions. Specifically, the aquatic life benchmarks for Malathion are not adopted objectives in the Basin Plan.

- The Index of Biotic Integrity (IBI) was not formalized into an approved Basin Plan objective and a determination that an IBI score of less than 40 indicates a biological impairment is not appropriate. The technical limitations of the Southern California IBI have been identified and the Board has decided to consider the California Stream Condition Index as a more representative and robust approach for evaluating benthic community data. The Board's decision to suggest an IBI score of 40 indicates a biological impairment should be removed as a supporting Line of Evidence.

We would also like to comment that the pollutants identified in the Lines of Evidence for Benthic Community Effects are not consistent with prioritized chemical stressors identified by the Southern California Stormwater Monitoring Coalitions' Regional Watershed Monitoring Program, in which the Regional Board is a participating member.

The City requests that any listings which have relied upon guidance not yet adopted by the State Board be removed until the biological objectives are finalized and San Diego specific reference conditions can be better reflected in the assessment.

5. *Holistic Approach is Needed*

For many pollutants impacting our waterways, source control will be imperative for water quality standards to be met. Source control of many pollutants begins far beyond the City's, County's (and State and Regional Board's) authorities under the Clean Water Act. More coordination with other State and regulatory agencies and efforts, such as the Department of Pesticide Regulation, Air Quality Management District, and the State Copper Initiative, to name a few, is needed in order to make demonstrable progress over the long-term. These sources/potential pollutant sources should also be acknowledged in this program.

6. *Review of trends and BMP implementation need to be considered*

Only data from 2006-2010 should be evaluated for listing decisions in the 2014 listing cycle. Many water bodies have shown improvement over time; however when using a large pool of data including water quality before and after improvements, the better, current conditions are not accurately reflected, as the previous poor results are averaged with the better, bringing down averages of the real current conditions. Waterbodies should be reviewed so that listings are not based on old or inaccurate current conditions. For example, if water quality started to improve in 2005 and there were minimal exceedance from 2006-2010, but there were many exceedances from 2000-2005 when this large body of data is pooled, the average conditions will be lower, in accurate and not reflective of current conditions. Please see comment (a) regarding Baby Beach below for an example of this.

In addition to the above concerns, specific, detailed, technical comments relating to specific decisions that we believe need to be addressed in this cycle for the Final 2014 Integrated Report are provided below.

Please note that the City also fully supports the comments put forth by the County of Orange and those comments are referenced herein.

a) *Decision ID 43763: Pacific Ocean Shoreline, Dana Point HAS, at Dana Point Harbor Baby Beach should be "Delist"*

This beach should be delisted based on the existing data, which is the goal of the TMDL. Baby Beach is a success story! During the previous cycle, the RWQCB indicated that "The reported storm drain data were not evaluated during this listing cycle, and will be included for the next listing cycle. Delisting of old Indicator Bacteria decision is an issue that needs to be addressed during the next listing cycle beginning in early 2010." A robust set of data has been collected under the TMDL and submitted consistently in Annual progress reports since Fiscal Year 2009 demonstrating the achievement of delisting criteria. Please also see comments submitted by County of Orange with further information and data analysis.

b) *Decision ID 49742: Pacific Ocean shoreline, Dana Point HAS, at Salt Creek outlet at Monarch Beach, Copper should be "Do Not List"*

The Listing decision was erroneously made combining non-ocean and ocean samples and listing based on an Ocean Plan Standard. Note that location SCM-1 is not an ocean sample and should not be included in this decision. The decision should be based only on ocean water samples, from SCM1-d taken on the five dates specified. Upon review the data does not exceed the 6-month median of 3.0 and are well below the the Instantaneous Max of 30 μg/L. Therefore zero of five samples exceed the Water Quality Criteria for Copper. Please re-evaluate with the appropriate sampling site and revise this listing to **Do Not List on 303(d) List.**

c) ***Decision ID 34003: Dana Point Harbor: Indicator Bacteria should be "Do Not List":***

This water body segment is an active Marina. Harbor rules dictate "No Fishing/Swimming. Fishing or swimming within Marina, including fishing from boats within the Marina shall not be permitted." - See more at: http://www.danapointmarina.com/rules.php#sthash.l1VBJOhJ.dpuf. The new listing for indicator bacteria is for the Shellfish Beneficial Use which is inappropriately applied to this waterbody.

d) ***Decision ID 49724: Pacific Ocean Shoreline, Dana Point HSA, at Niguel Marine Life Refuge: Mercury should be "Do Not List".***

Only 3 of the 5 samples referenced in LOE 74496 had actual/verified results for Mercury. No exceedances were observed for all samples.

e) ***Decision ID 49749: Pacific Ocean Shoreline, Dana Point HSA, at Salt Creek Outlet at Monarch Beach: Malathion should be "Do Not List":***

Only sample site SCM1d should be used. SCM1 is not an ocean sample. SCM1d did not exhibit any exceedances of the standard used (100 ng/L).

f) ***Decision ID 49753: Pacific Ocean Shoreline, Dana Point HSA, at Salt Creek Outlet at Monarch Beach: Nickel should be "Do Not List":***

Only sample site SCM1d should be used. SCM1 is not an ocean sample. Evaluating the correct site, SCM1d, Nickel should not be listed.

g) ***Decision ID 49751: Pacific Ocean Shoreline, Dana Point HSA, at Salt Creek Outlet at Monarch Beach: Mercury should be "Do Not List":***

In reviewing LOE 75134, there were no data provided for Mercury for the site referenced, so it appears that the Decision Fact Sheet is incorrect noting 9 exceedances in 9 samples. The RB staff decision concludes that the water body pollutant combination should not be placed on the section 303(d) list; however the final listing decision recommendation was "List on 303(d)"; but as noted above, no data was provided or referenced to support the Listing decision, so it appears that the final decision should be "Do Not List". Please revisit and correct.

Similar inconsistencies (i.e. no data exists for the sample sites referenced) were observed for the upstream sample in ***Salt Creek Decision ID 48631, LOE 75557***. Please review and re-evaluate.

h) ***Decision ID 49696: Dana Point Harbor at Guest dock: Indicator Bacteria should be "Do Not List":***

The LOE 77598 has incorrect number of samples and exceedances based on the data referenced. The site does not meet listing criteria and the decision should be "Do Not List".

The City also wanted to comment the Board and staff on the Public Workshop held on July 19. The City thought it was extremely beneficial and led to some good thoughts and dialogue. The staff was responsive, candid, cooperative and helpful. In addition to the staff present, we would like to thank Executive Officer Dave and Board members Eric and Tomas for taking the time out of their busy days to also attend.

We would also like to thank both staff and Board members in advance for considering our comments. If you have any questions, please contact me at (949) 248-3584 or lzawaski@danapoint.org.

Respectfully,

Lisa Zawaski, CPSWQ, CFM, QSD, QISP
Senior Water Quality Engineer
City of Dana Point

Cc; Brad Fowler, Dana Point

Enc: SWRCB Draft Shellfish White Paper, 12/10/12

Draft Shellfish Ocean Plan White Paper

Background

The State Water Resources Control Board (State Board) is currently developing beneficial use alternatives to address differences in the SHELL beneficial use definition across Regional Boards, as well as the inherent difficulties in achieving the existing bacterial water quality standards at all locations where shellfish habitat exists. The amendment is planned to address natural sources of bacteria and alignment of Ocean Plan and Basin Plan beneficial uses related to shellfish. Under consideration is the separation of commercial harvesting and recreational harvesting into separate SHELL uses with different water quality objectives, and utilizing a reference system or natural source exclusion approach for recreational shellfish use.

Chapter II of the 2009 California Ocean Plan contains bacterial water quality standards for areas where the designated beneficial uses of water include contact recreational water and shellfish harvesting. Currently there is no fecal coliform standard for areas where mariculture is a designated beneficial use and shellfish are harvested for human consumption.

In 1992, the Department of Health Services (now the Department of Public Health) (DPH) suggested that the California Ocean Plan be amended to add a fecal coliform standard of 14 organisms per 100 ml for waters in all areas where shellfish may be harvested for human consumption. The addition of a fecal coliform standard would make the California Ocean Plan consistent with the National Shellfish Sanitation Program (NSSP) guidelines for commercial shellfish growing areas. Although the NSSP allows the regulating agency to use either total coliform or fecal coliform to regulate commercial shellfish growing areas, adding fecal coliform would make the California Ocean Plan consistent with recreational and/or commercial shellfish growing water requirements of other coastal states, and consistent with California's regulations for commercial shellfish growing waters.

Scoping Meeting

Project Goals

The Shellfish project was initiated to accomplish two goals: 1) create consistency between Ocean Plan amendments and Basin Plan revisions related to shellfish, and 2) address the overlap in activities contained within Shellfish Harvesting (SHELL), Aquaculture/Mariculture (AQUA/MAR), and Commercial Fishing (COMM) beneficial use definitions that lead to confusion in the enforcement of water quality standards. To accomplish these goals, five major issues need to be addressed for amending the Ocean Plan and Basin Plans.

The Five Issues:

- **Issue 1**. Improve definition of what constitutes “shellfish”.
- **Issue 2**. Separate areas of recreational harvesting from commercial shellfish harvesting beneficial uses.
- **Issue 3.** Better define the geographic extent of the recreational shellfish harvesting beneficial use
- **Issue 4.** Add Fecal Coliform Shellfish standard to Ocean Plan
- **Issue 5.** Address the problem of natural sources of bacteria by allowing the implementation of the Fecal Coliform water quality objectives using either the **reference system with antidegradation** or the **natural sources exclusion approach.**

Issue Discussion

An initial review of coastal Regional Boards’ Basin Plans show that vast sections of the near coastal ocean waters are designated as shellfish growing areas. Areas are often listed both for shellfish harvesting and for water contact recreation. In these situations, the more stringent shellfish bacterial standard would supersede the water contact recreation standard and could potentially result in an increase in 303(d) listings. Commercial areas have an increased level of monitoring. Staff is also mindful of the recreational harvest of shellfish in state marine waters. Ocean waters must be fishable and therefore the recreational shellfish beneficial use must be protected.

Issue 1

Improve definition of what constitutes “shellfish”. This change was proposed for two reasons. First, because the various Regional Boards have an inconsistent definition of “shellfish” in their Basin Plans, which currently include bivalves (clams, oysters and mussels), crustaceans (lobster and crab), sea urchins, and abalone. The second reason was because there is no definition of shellfish in the commercial fishing beneficial use (COMM).

Issue 1 Analysis

- **Alternative 1**: No Action. Do not change the existing Ocean Plan definition of what constitutes “shellfish. This alternative would keep the Ocean Plan as it currently exists. This option does not clarify the overlap and among the Ocean Plan and Basin Plans with respect to Shellfish.
- **Alternative 2**: Amend the Ocean Plan and Basin Plans by adding improved definitions. To address these gaps, the proposed solutions are for Basin Plans to use the definition of shellfish specified in the Ocean Plan for SHELL (which restricts shellfish to bivalve mollusks), and for the definition of shellfish in COMM to specify that bivalves are not included in this beneficial use.

- **PRELIMINARY RECOMMENDATION**
  Alternative 2 Amend the Ocean Plan and Basin Plans by adding improved definitions.

Issue 2

Separate areas of recreational harvest from commercial shellfish harvesting beneficial uses. This change was proposed because of the overlap in definitions of the SHELL and AQUA/MAR beneficial uses. In addition, address the overlap in activities contained within shellfish harvesting (SHELL), mariculture/aquaculture (MAR/AQUA), and commercial fishing (COMM) beneficial use definitions, that lead to confusion in the enforcement of water quality standards

Issue 2 Analysis

- **Alternative 1**: No Action. Do not change the existing Ocean Plan beneficial use definitions. This alternative would keep the Ocean Plan as it currently exists. This option does not clarify the overlap and among the Ocean Plan and Basin Plans with respect to beneficial use definitions regarding shellfish harvesting.
- **Alternative 2**: Amend the Ocean Plan and Basin Plans by adding improved beneficial use definitions with regard to shellfish harvesting. The proposed change would be to remove commercial harvesting from SHELL, leaving this beneficial use to focus on recreational harvesting, but continue to include commercial shellfish harvesting operations in the AQUA/MAR beneficial use. Remove reference to shellfish harvesting from COMM as necessary.
- **PRELIMINARY RECOMMENDATION**
  Alternative 2 Amend the Ocean Plan and Basin Plans by adding improved Ocean Plan beneficial use definitions with regard to shellfish harvesting.

Issue 3

Better define the geographic extent of the recreational shellfish harvesting beneficial use. This change was proposed because the current designation of "Ocean Waters" for shellfish harvesting areas in the current definition is broad and applies in all of the State's near-coastal ocean waters out to three nautical miles from shore regardless of whether shellfish is actually harvested or not.

Issue 3 Analysis

- **Alternative 1**: No Action. Do not change the existing Ocean Plan definition of "Ocean Waters" for shellfish harvesting areas. This alternative would keep the Ocean Plan as it currently exists and continue to rely on each Regional Board determining their geographic extent separately. This option does not clarify the geographic disparity among the Ocean Plan and Basin Plans with respect to Shellfish harvesting areas along the California coast.
- **Alternative 2**: Change the Ocean Plan to define recreational shellfish harvesting areas to the nearshore zone, applied to all intertidal areas in the state and seaward restricted to 30 feet deep or 1000 feet from shore, whichever is furthest from the shoreline.
- **PRELIMINARY RECOMMENDATION**
Alternative 2 Amend the Ocean Plan by adding improved geographic definitions.

Issue 4

Add Fecal Coliform Shellfish standard to Ocean and Basin Plans.

- Add a fecal coliform standard for shellfish of 14 organisms per 100 ml of water with not more than 10% of samples exceeding 43 organisms per 100 ml.

This will create consistent statewide water quality standards for areas of shellfish harvesting. This change was proposed to address the gap between the water quality standards that appear in the Ocean Plan and those enforced by the California Department of Public Health. The proposed change was to add measures of fecal coliforms to the Ocean Plan to make the two programs comparable.

In addition, adding a fecal coliform of 14 organisms per 100 ml would make the California Ocean Plan consistent with recreational and/or commercial shellfish growing water requirements of other coastal states. The addition of a fecal coliform standard will make the California Ocean Plan consistent with the National Shellfish Sanitation Program (NSSP) guidelines for commercial shellfish growing areas

However, the existing Total Coliform standard and the proposed Fecal Coliform standard for protecting beneficial uses of shellfish are very stringent compared with normal bacteria standards applied to protect recreational uses. This is necessary to protect public consumption of filter feeding bivalves (mussels, clams, oysters and scallops) as they bioaccumulate bacteria and pathogens.

Issue 4 Analysis

- **Alternative 1**: No Action. Do not change the existing Ocean Plan standard for bacteria. This alternative would keep the Ocean Plan as it currently exists. This option provides inadequate protection to area where shellfish may be harvested for human consumption.
- **Alternative 2**: Amend the Ocean Plan by adding the fecal coliform standard of 14 organisms per 100 ml for waters where shellfish may be harvested for human consumption, and amend the Ocean Plan to address non-human sources of indicator bacteria for non-commercial areas**.** This change would make the Ocean Plan consistent with recreational and/or commercial shellfish growing water requirements of other coastal states, and consistent with California's regulations for commercial shellfish growing waters. The new fecal coliform standard would apply both in commercial shellfish growing waters and in those areas where recreational shellfish harvesting takes place. The standard would not be applicable where shellfish are not harvested for recreational or commercial purposes.

  However, this alternative would increase the need to address the natural background in areas recreational shellfish harvesting take place **(Issue 5)**. This would assist when the indicator bacteria is determined to be non-human and the indicator densities do not indicate a human health risk; therefore, the State would not consider those non-human sources of fecal contaminants in determining whether the standard is being attained.
- **Alternative 3**: Add the fecal coliform standard of 14 organisms per 100 ml in all areas. This alternative would use the fecal coliform standard of 14 organisms per 100 ml. However, this alternative would apply the new standard in all of the State's near-coastal ocean waters out to three nautical miles from shore regardless of whether shellfish is actually harvested or not. (Note Issue 2 can address this part of the problem) Furthermore non-human source of indicator bacteria (natural background) would not be considered in determining if standards are attained. The more stringent shellfish bacterial standard would effectively supersede the water contact recreation standard, and could potentially result in an increase in 303(d) listings without consideration of source of bacteria or the threat posed.
- **Alternative 4**: Add the fecal coliform standard of 14 organisms per 100 ml only in areas of commercial shellfish harvesting as designated by Aqua/Mar beneficial use as clarified in Issue 2. The addition of a fecal coliform standard to only commercial areas will make the California Ocean Plan consistent with the National Shellfish Sanitation Program (NSSP) guidelines for commercial shellfish growing areas.

- **PRELIMINARY RECOMMENDATION**

Alternative 2: Amend the Ocean Plan by adding the fecal coliform standard of 14 organisms per 100 ml for waters where shellfish may be harvested for human consumption, but only if we are able to amend the Ocean Plan to successfully address non-human sources of indicator bacteria for all recreational shellfish use.

Issue 5

Address the problem of natural sources of bacteria by allowing the implementation of indicator bacteria water quality objectives using either the **natural sources exclusion approach or reference system with anti-degradation approach.** Note that this should apply to contact recreational standards as well.

Natural Sources of Bacteria

Natural sources of bacteria may cause or contribute to exceedances of water quality objectives for indicator bacteria and will impact implementation of Fecal Coliform standard. It is not the intent of the State or Regional Board to require treatment or diversion of natural water bodies or to require treatment of natural sources of bacteria. Such requirements, if imposed by the State or Regional Board, could adversely affect valuable aquatic life and wildlife beneficial uses supported by water bodies in the state.

Furthermore, non-anthropogenic source of indicator bacteria (natural background) should not be considered in determining if standards are attained. The more stringent shellfish fecal coliform bacterial standard would effectively supersede the water contact recreation standard, and could potentially result in an increase in 303(d) listings without consideration of source of bacteria or the threat posed. Utilizing the latest approaches in source tracking and identification should help in identifying areas and amounts of natural background.

Under the **Natural Sources Exclusion Approach (NSEA)**, dischargers must demonstrate they have implemented all appropriate best management practices to control all anthropogenic sources of indicator bacteria to the target water body such that they do not cause or contribute to exceedances of the indicator bacteria water quality objectives. The requirement to control all sources of anthropogenic indicator bacteria does not mean the complete elimination of all anthropogenic sources of bacteria as this is both impractical as well as impossible. Dischargers must also demonstrate that the residual indicator bacteria densities are not indicative of a human health risk. After all anthropogenic sources of indicator bacteria have been controlled such that they do not cause exceedances of the indicator bacteria water quality objectives, and natural sources have been identified and quantified, exceedances of the indicator bacteria water quality objectives may be allowed based on the residual exceedances in the target water body. The residual exceedances shall define the background level of exceedance due to natural sources.

We may need additional flexibility in how the shellfish standards for recreational beneficial use are implemented. This change was proposed to address the difficulty in enforcing water quality standards due to natural sources of bacteria. The proposed solution was to investigate the use of a Reference System and Antidegradation Approach. This approach establishes an allowable exceedance frequency that is equal to or less than the frequency within a reference system, where a reference system is defined as an area minimally impacted by anthropogenic activity.

Implementation of indicator bacteria water quality objectives using the **Reference System and Antidegradation (RSA)** approach requires control of indicator bacteria from anthropogenic sources so that bacteriological water quality in the targeted waterbody is consistent with that of a reference system. The RSA approach also requires that no degradation of existing bacteriological water quality in the targeted water body occurs when the existing bacteriological water quality is better than that of a water body in a reference system. A reference system is a watershed and the beach to which the watershed discharges that is minimally impacted by anthropogenic activities that can affect bacterial densities in the water body.

Under the RSA approach, a certain frequency of exceedances of the indicator bacteria water quality objectives is allowed. The allowed frequencies of exceedances are either the observed frequency of exceedances in the selected reference system or the targeted water body, whichever is less.

Analysis of Reference System Approaches

The basic data used for the analysis of the impacts of the current total coliform standards and the addition of fecal coliform standards for shellfish was shoreline bacteria data collected at least weekly for beach recreational water quality monitoring program.

- Used California shoreline beach monitoring data from 2000 – 2009
    - 645 monitoring stations throughout California
    - 33,325 station/months of data
- Applied total and fecal coliforms Shell standards
    - Total coliforms median $\leq$ 70 MPN/ 100 ml (and 10% > 230)
    - Fecal coliforms median $\leq$ 14 MPN/ 100 ml (and 10% > 43)
- **Reference watershed defined as $\leq$7% developed**
- Determined how often the standards were exceeded under various scenarios

The data from the beach monitoring sites are an important part of the proposed reference system approach, which may be used to determine an allowable rate of exceedance to the shellfish standards due most likely to natural sources in these undeveloped watersheds. Data from the non-reference locations are also useful, as measurement of the existing frequencies of exceedance. In looking at all shoreline bacteria data it was determined that the median water quality standards would be exceeded about 40% of the time for each total and fecal coliforms and over 65% of the time when any of the four standards were exceeded.

Undeveloped Reference Watershed

This is based on previous work at SCCWRP and regional boards establishing what would be considered some of the most natural watershed condition with limited anthropogenic influence. The standard examined for this study was a statewide value for watershed that were equal to or less than 7% development. While this is a logical and normal approach in determining reference watersheds, when analyzing total and fecal shellfish standards that are often very close to the laboratory detections limits, we found this approach to be of surprisingly limited value.

Analysis found that there was no correlation between percent development and percent of time the coliform standards were exceeded. Both the fecal and total coliform standards exhibited similar lack of relationships. This can be seen the marginal difference in exceedance rates for all four standards in all areas and in what the reference areas show (62% Undeveloped vs 65% for all sites). (See figure 1 below).

We do not feel that percent development will make an appropriate choice for use as a reference area standard.

ASBS Reference Watersheds

Areas of Special Biological Significance are areas along the coast of California that have legally limited anthropogenic discharges to protect water quality. While ideally these should provide excellent reference watershed when combined with low development in their source watersheds, these are a very limited set of beach shoreline monitoring stations. While coliform exceedance levels were measurably lower than that of other statewide reference areas, the lack of samples meant this data was based on very low data robustness. (See figure 1 below)

The very limited distribution of sample locations (8 sites out of 645 total) and analyses that are both undeveloped (<7%) and in an ASBS makes this an impractical method for a statewide reference system approach to natural sources of bacteria.

Reference Based on distance from POTW/303d listed waters

A promising approach is to use for reference sites only for those stations that are some distance (>1000 feet or a mile) from any existing POTW outfall or a 303d listed waterbody (i.e. the bacteria impaired steams and beach areas in the state of California). This analysis 1) Only uses bacteria as the criteria for the 303(d) listing (sites in the total coliform beach monitoring dataset were assessed for proximity to both the total coliform and indicator bacteria 303d listings, while the fecal coliform sites were assessed relative to the fecal coliform and indicator bacteria 303d listings), and 2) excluding 21 sites (out of 645) that do not have lat/long information, and therefore could not be assessed to proximity to 303d/POTWs. This gives an exceedance frequency for all 4 standards of

52% for reference sites >1000' of a 303d/POTW, and 51% for reference sites >1 mile of a 303d/POTW.

It seems like there is a better case for using reference sites that are located at least 1000 feet away from any 303(d) listed waterbody or POTW outfall. There are almost four times as many station-months of data located in this category (n=803, 36 stations) as in the ASBS Reference (n=230, 8 stations).

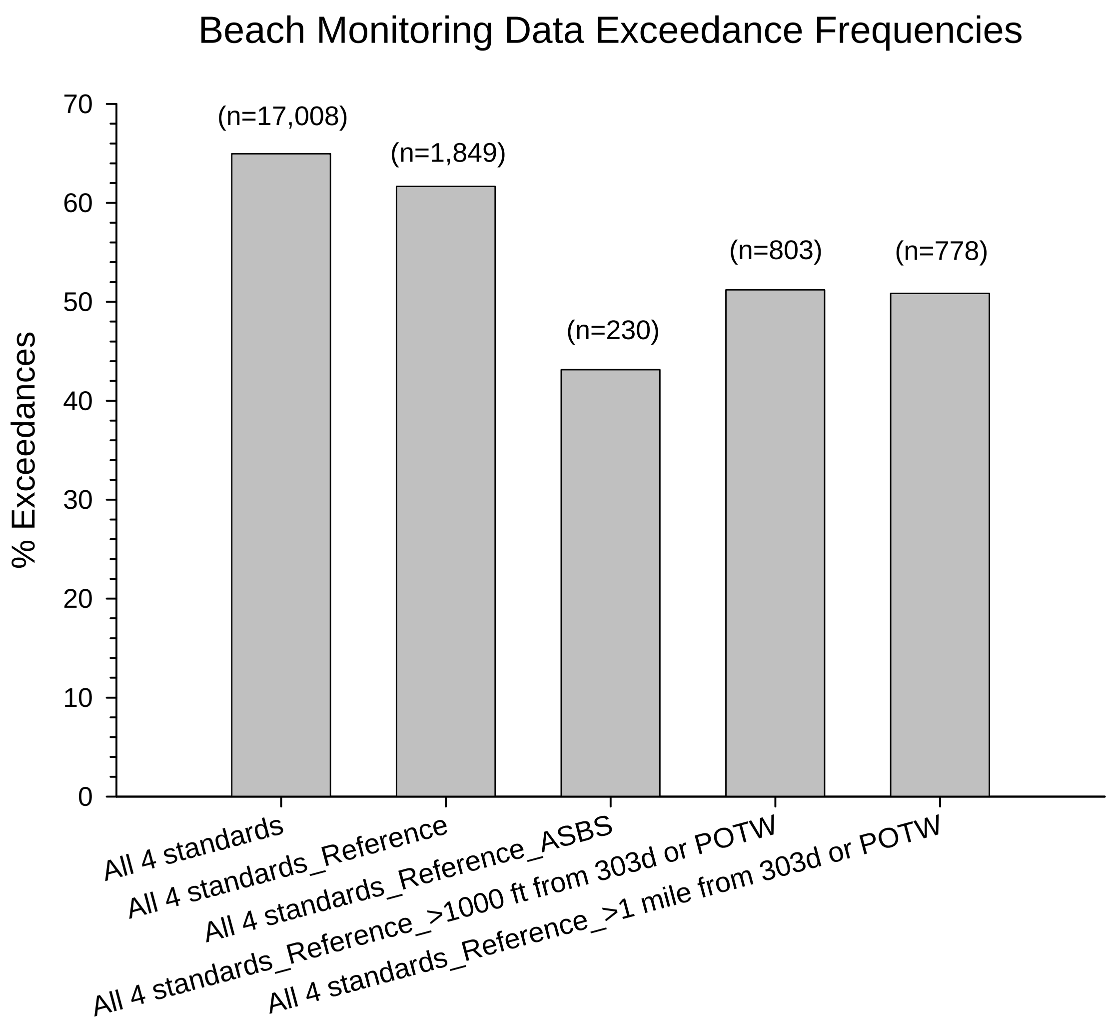


Figure 1. Beach monitoring data exceedance frequencies under different scenarios. Statewide station/month monitoring data from 1/2000 – 5/2009 were used for the analyses. The four standards included: total coliforms median >70 mpn/100 ml, total coliforms >10% >230 mpn/100 ml, fecal coliform median >14 mpn/100 ml, fecal coliform >10% >43 mpn/100 ml. "All 4 standards" indicates circumstances when any one standard was exceeded, and all four standards could be assessed. Reference sites are those within watersheds with ≤7% development. ASBS = Areas of Special Biological Significance. (n = number of station months with requisite data).

Inshore vs Offshore data (This is important for commercial offshore vs shoreline recreational shellfish)

Examination of bacteria data supplied by Los Angeles County Sanitation Districts (LACSD) indicates a much lower incidence of water quality exceedances in the offshore samples (surface samples = 1.1% exceedance, bottom samples = 0.4% exceedance, considering all 4 standards), compared with the shoreline samples (24% exceedance, considering all 4 standards). However, LACSD shoreline data had a lower exceedance frequency than the data from other Region 4 sites (76% exceedance frequency, shoreline data only, excluding LACSD, considering all 4 standards). Because of this difference, the exceedance frequency at inshore locations in other parts of Region 4 may be greater than what has been observed for LACSD.

Issue 5

Address the problem of natural sources of bacteria by allowing the implementation of the Fecal Coliform water quality objectives using either the **reference system with antidegradation** or the **natural sources exclusion approach**

Issue 5 Analysis

- **Alternative 1**: No Action. Do not change the existing Ocean Plan bacteria standard for shellfish. This alternative would keep the Ocean Plan as it currently exists. This option provides inadequate protection to area where shellfish may be harvested for human consumption.
- **Alternative 2:** Add a fecal coliform standard of 14 organisms per 100 ml in all areas without adding exclusion for natural sources or amending the existing language. This alternative will use the NSSP fecal coliform standard of 14 organisms per 100 ml. However, this alternative would apply the new standard in all of the State's ocean waters regardless of whether shellfish is actually harvested or not. The more stringent shellfish fecal coliform bacterial standard would effectively supersede the water contact recreation standard, and could potentially result in an increase in 303(d) listings without consideration of source of bacteria or the threat posed along major stretches of the California shoreline.
- **Alternative 3**: Add a fecal coliform standard of 14 organisms per 100 ml for shellfish. Add a definition for commercial and recreational shellfish. Separate areas of recreational from commercial shellfish harvesting beneficial uses. Add an allowance for using either the reference system or natural source exclusion approaches that will only apply to recreational shellfish harvesting and contact recreation.

  This approach would use for reference sites only those stations that are >1000 feet from any existing POTW outfall or a 303d listed waterbody. This gives an exceedance frequency for all 4 standards of 57% for reference sites >1000' of a 303d/POTW.

- **PLELIMINARY RECOMMENDATION**
  Alternative 3: Establish a fecal coliform standard of 14 organism per 100 ml for shellfish and add a natural source exclusion approach that will only apply to recreational shellfish and contact recreational areas. This would require amending the existing language of the Ocean Plan and separating the definition of recreational and commercial shellfish harvesting so that the RSA and NSEA could be applied only to recreational shellfish harvesting and contact recreation.

August 12, 2016

Ms. Xueyuan Yu
San Diego Water Board
2375 Northside Drive
San Diego, CA 92108
Phone: 619-521-5893
Email: heyu@waterboards.ca.gov

Re: Comment – CWA Section 305(b)/303(d) Integrated Report, Attn: Xueyuan Yu

On behalf of the Center for Biological Diversity (the Center), I submit this information to highlight that ocean-acidification threatened and impaired coastal and bay waters were omitted in the San Diego 2016 Water Quality Draft Integrated Report and 303(d) list.

Coastal and bay water across the San Diego region may already be experiencing the harmful effects of ocean acidification. There is strong scientific evidence showing that growth, survival, and behavioral changes in marine species are linked to ocean acidification. These effects can extend throughout the food webs, threatening coastal and estuarine ecosystems, fisheries, and human communities. The San Diego water board must analyze and list the water bodies that are threatened or impaired by increasing acidity.

Increasing concentrations of atmospheric carbon dioxide and the contribution of coastal pollution, sedimentation, and inadequate watershed management can substantially amplify the fluctuating pH conditions in San Diego waters making them more corrosive and highly vulnerable to ocean acidification. Some coastal and bay waters of San Diego may already experience conditions that impair the survival and growth of calcifying organisms such as oysters. Here, we present the most current scientific information on ocean acidification that the San Diego water board must consider for its water quality assessment. The San Diego water board should address ocean acidification in its 2016 Integrated Report (IR) and designate those coastal and bay waters impaired due to ocean acidification. Additionally, the San Diego water board must obtain all readily available data on ocean acidification and analyze it for its water quality assessment.

1. San Diego's duty to assess ocean acidification

a. Clean Water Act Background related to ocean acidification

San Diego may not ignore its duties under the Clean Water Act to solicit and consider ocean acidification data and information during its biennial water quality assessments. Not only the Clean Water Act section 303(d) mandates that states and regions must list waters that are not meeting water quality standards as impaired, but also EPA has directed states and regions to do so (EPA 2010a).

San Diego water board can address ocean acidification in regional waters through the Clean Water Act. Under the Clean Water Act and EPA's mandate, the San Diego water board has the

Abel Valdivia, PhD, Ocean Scientist, Oceans Program . 1212 Broadway, Suite 800 . Oakland, CA 94612
Phone: 510-844-7100 x 303 . Fax: 919-932-0199 . Twitter@AbelValdivia . avaldivia@biologicaldiversity.org

authority and duty to identify waters impaired by ocean acidification. Impaired waters listing can help with local management, control local sources of pollution, and even address cross-border sources of pollution that contribute to acidification. It is not unique for water pollution to have sources that are not confined to one region or state, and the Clean Water Act has already grappled with downstream and cross-border pollution. See *e.g*., *Arkansas v. Oklahoma,* 503 U.S. 91 (1992) (EPA has clear authority to require a discharge permit to comply with a downstream state's water quality standards); *Milwaukee v. Illinois.*, 451 U.S. 304 (1981) (Milwaukee's battle with Illinois over sewage discharges into Lake Michigan); *Gulf Restoration Network v. Jackson*, 2013 U.S. Dist. LEXIS 134811 (E.D. La. 2013) (concerning EPA authority to set water quality standards for multiple states whose runoff contributes to the Gulf of Mexico dead zone). There is also a precedent and guidance for addressing atmospheric deposition as a source of water pollution under section 303(d). [1]

EPA's (2010a) memorandum instructs that states should list waters not meeting water quality standards, including marine pH water quality standards, and should solicit existing and readily available information on ocean acidification using the current 303(d) listing framework. EPA also recommended that states:

(1) request and gather existing data related to ocean acidification, including temperature, salinity, dissolved oxygen, nitrate, total alkalinity, and pH;
(2) develop assessment methods for evaluating impacts of ocean acidification on marine waters based on existing pH and biological water quality criteria;
(3) track the progress of federal efforts to develop assessment and monitoring methods;
(4) develop bioassessment methods and/or biocriteria to reflect ocean acidification impacts;
(5) and include in their Integrated Report methodology a description of how they consider available ocean acidification data and information for assessment decisions.

In this letter we show that ocean acidification is already impacting San Diego's coastal and bay waters and its negative effects will only grow more severe with business as usual greenhouse emission scenarios. The Center urges the San Diego water board to analyze readily available data and assess its coastal and bay waters to identify threatened and impaired waters due to ocean acidification under section 303(d) of the Clean Water Act.

b. California's water quality standards applicable to ocean acidification

San Diego must analyze its coastal and bay waters as required by section 303(d) of the Clean Water Act because existing pollution controls are insufficient for waters to meet the state marine water quality objectives regarding pH [2]. San Diego must include all water bodies that fail "*any water quality objectives*" including numerical, narrative, and antidegradation criteria. Below is a

---

[1] TMDLs Where Mercury Loadings Are Predominantly From Air Deposition September 2008 https://www.epa.gov/sites/production/files/2015-07/documents/document_mercury_tmdl_elements.pdf

[2] California Ocean Plan (2015). Water Quality Control Plan: Ocean Waters of California. State waters resources control board. California Environmental Protection Agency. 103 pp http://www.waterboards.ca.gov/water_issues/programs/ocean/docs/cop2015.pdf

summary of water quality objectives regarding pH for the state of California applicable to San Diego.

Numerical objectives

Based on the numerical water quality objectives for adequate aquatic life and seafood consumption, the pH of bay or estuary waters must fall between 6.5 and 8.5 units at all times. For ocean waters the pH must fall between 6.0 and 9.0 units[3]. The national recommended water quality criteria based on EPA standards requires that pH for saltwater aquatic life protection shall be between 6.5 to 8.5 units at any time. In addition, "the pH shall not be changed at any time more than 0.2 units from that which occurs naturally" (California Ocean Plan, Water Quality Objectives, Chemical Characteristics, Section II.D.2).

Antidegradation objectives

"Marine communities, including vertebrate, invertebrate, algae, and plant species, shall not be degraded (California Ocean Plan, Water Quality Objectives, Biological Characteristics, Section II.E.1). Based on the California Ocean Plan, degradation "shall be determined by comparison of the waste field and reference site(s) for characteristic species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and animal species. Degradation occurs if there are significant differences in any of three major biotic groups, namely, demersal fish, benthic invertebrates, or attached algae. Other groups may be evaluated where benthic species are not affected, or are not the only ones affected."

The Sand Diego water board must evaluate the attainment status of each of these standards with respect to ocean acidification. Moreover, if the water quality standards are not being attained, "*but the source-stressor is unknown (e.g., carbon deposition, nutrient enrichment, industrial discharge, natural background, etc), then EPA expects the segment to be listed*" (EPA 2010).

The San Diego water board must evaluate all readily available information about ocean acidification. There are increasingly important high-resolution data sets that contain information on ocean acidification (see below). San Diego must evaluate these data to determine baseline conditions and to assess its coastal, bay and estuarine waters for impairment by ocean acidification.

Increases of atmospheric carbon dioxide (CO_2), due to human activities, increases the uptake of CO_2 into the oceans making coastal and estuarine waters more acidic by decreasing the pH. There is strong scientific evidence that ocean acidification directly affect shellfish and other marine groups compromising growth, survival, reproduction, and metabolism. Ocean acidification can also amplify the toxicity of harmful algal blooms, impair fish behavior, and affect prey source and distribution of fish and marine mammals. San Diego must analyze coastal, bay and estuarine waters for changes in pH to determine whether they pose a risk to marine life.

[3] California Ocean Plan (2015). Water Quality Control Plan: Ocean Waters of California. State waters resources control board. California Envrionmental Protection Agency. 103 pp http://www.waterboards.ca.gov/water_issues/programs/ocean/docs/cop2015.pdf

Below we explain: how atmospheric CO_2 concentration drives ocean acidification; the scientific evidence supporting that ocean acidification is already harming marine life; how ocean acidification violates aquatic life standards even while attaining pH numeric standards; and we provide readily available data that must be considered in the 2016 Integral Report.

2. Relationship between CO_2 emissions and ocean acidification

Ocean acidification is directly related to the increase in atmospheric CO_2 emissions globally. Atmospheric CO_2 concentrations reached average levels of over 401 ppm globally on December of 2015 (NOAA National Climatic Data Center 2015) which is higher than at any point during the last 800,000 years (Lüthi et al. 2008). Over the past 200 years, the global oceans have absorbed approximately 25 % of the anthropogenic CO_2 released to the atmosphere from burning fossil fuels (Canadell et al. 2007, Feely et al. 2013, IPCC 2014). Anthropogenic CO_2 emissions from burning fossil fuels, cement production, and land used accounts for a total of 36 giga tones (Gt) of CO_2 per year in the past 10 years. Current emissions are about 40 $GtCO_2$ per year (Rogelj et al. 2016). Approximately 9 Gt of CO_2 per year (i.e., 26% of total emissions) entered the global oceans since 2004 (Le Quéré et al. 2015).

As the global oceans uptake the excess of CO_2, seawater chemistry profoundly changes and the oceans become more acidic (Orr et al. 2005, Fabry et al. 2008, Fabry 2009, Doney et al. 2009, Gattuso and Hansson 2011, Feely et al. 2013). The average pH of the global surface oceans has already decreased by 0.1 units (from 8.2 to 8.1 pH units) which represent a 30 % increase acidity and a 10% decrease in carbonate ion concentration in comparison with pre-industrial levels (Feely et al. 2004, Caldeira and Wickett 2005b, Orr et al. 2005, Cao and Caldeira 2008, Doney et al. 2009, Byrne et al. 2010). For some marine organisms this change already impairs their ability to grow shells. Long term monitoring and modeling studies of waters across the Pacific West Coast of the United States show a clear pH decline over the past decades (Beman et al. 2011, Friedrich et al. 2012). In fact, anthropogenic ocean acidification already exceeds the natural variability on regional scales and is detectable in several Pacific regions (Friedrich et al. 2012, McLaughlin et al. 2015, Takeshita et al. 2015).

Once anthropogenic CO_2 enters the oceans it is impossible to remove it, and the global oceans may require thousands of years to naturally return to a higher pH state (Solomon et al. 2009). Current CO_2 emission trajectories are tracking some of the worse emission scenarios (IPCC 2013) and rates of atmospheric CO_2 are forecast to reduce surface ocean pH by 0.3 to 0.5 units on average by 2100, and regional changes may be even more severe (Caldeira and Wickett 2005a, Orr et al. 2005, McNeil and Matear 2006, Steinacher et al. 2009, Doney et al. 2009). Changes in ocean chemistry due to increasing absorption of carbon dioxide concentration emitted by human activities is unprecedented in the geological record (Honisch et al. 2012). In fact, the oceans are becoming acidic at a rate faster than they have in the past ~300 millions year, a period that includes three major mass extinctions (Zeebe 2012, Hönisch et al. 2012). The current change in seawater chemistry is an order of magnitude faster than what occurred 55 million years ago during Paleocene-Eocene Thermal Maximum, which is considered to be the closest analogue to the present, when 96% of marine species went extinct (Zeebe 2012, Hönisch et al. 2012). While the atmospheric concentration of CO_2 is currently over 401 ppm, coastal and estuarine waters experience wide fluctuations of CO_2 concentrations that reach levels not expected until the end of the century (Feely et al. 2009).

3. Ocean acidification already affects marine life

a. Ocean acidification reduces calcium carbonate saturation

The uptake of anthropogenic CO_2 by the oceans not only reduces the pH of seawater, but also lowers the concentration of carbonate ion (CO_3^{-2}) and thus calcium carbonate ($CaCO_3$) saturation states - the amount of dissolved calcium carbonate available in seawater (Orr et al. 2005, Cao and Caldeira 2008, Doney et al. 2009). This relationship can be detected globally (Jiang et al. 2015) and regionally (Waldbusser et al. 2015a). Reduction of calcium carbonate saturation state due to decline in pH directly affects those species that produce shells and skeletons even when pH may be considered within normal ranges. This is because carbonate ions in seawater partially buffer the acidity created by decreasing pH. However, this neutralizing reaction depletes seawater of carbonate ions, making $CaCO_3$ less available for calcifying marine organisms to build shells and skeletons. Globally, the surface concentration of carbonate ions has decreased by more than 10% since the pre-industrial era (Caldeira and Wickett 2003, Orr et al. 2005, Feely et al. 2008).

Calcium carbonate saturation state is an important parameter that directly affects the ability of marine calcifying species of producing shells and skeletons (Ries 2010, Comeau et al. 2012, Feely et al. 2012, Jiang et al. 2015, Lebrato et al. 2016). In fact, calcium carbonate saturation states, instead of pH, is most commonly used to assess the effects of ocean acidification on marine organisms and determine the ability of organisms to produce shells and skeletons (Ries 2010, Albright and Langdon 2011, Bednaršek et al. 2012b, Waldbusser et al. 2015a). For example, decreasing carbonate saturation states is a better proxy to determine ocean acidification impairments in shelled mollusks (Fig. 1), which are directly linked with chronic and acute effects (Gazeau et al. 2013, Waldbusser et al. 2015a). Lower calcium carbonate saturation states is already affecting many marine organisms and altering ecosystem structure and function (Fabry et al. 2008, Nagelkerken and Connell 2015, Linares et al. 2015, Yang et al. 2016, Albright et al. 2016) and it is predicted to further decline in the near future (Cao and Caldeira 2008).

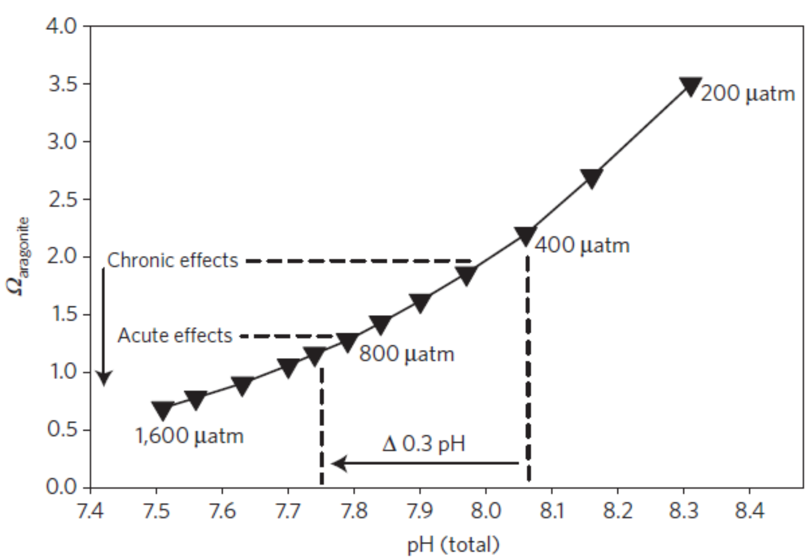


Figure 1 Calculated response of pH and aragonite saturation state to increasing *p*CO2 from 200 to 1,600 µatm (triangles) at typical upwelling conditions along the Oregon coast. Conditions calculated for total alkalinity = 2,300 µmol kg^{-1}, temperature = 13ºC, and salinity = 33. Symbols are values of pCO2 . Chronic and acute effects due to saturation state decreases from experiments have been noted for bivalve larvae. The Δ 0.3 pH was previously noted as

significant to many physiological processes in mollusks (Gazeau et al. 2013). *Figure and legend after (Waldbusser et al. 2015a).*

Calcifying organisms are particularly vulnerable to decreasing pH of seawater due to their dependence on carbonate ions concentrations and calcium carbonate saturation states. As the saturation state of $CaCO_3$ minerals reaches 1 (i.e., the equilibrium of a mineral to form or dissolve) calcification is depleted, stopped, and dissolution occurs (Gattuso and Hansson 2011). As such, the amount of the most common mineral forms of calcium carbonate in seawater (i.e., aragonite and calcite) determines the capacity of marine calcifiers to deposit (Ω>1) or dissolve (Ω<1) their calcium carbonate structures. This is because at lower pH, the amount of carbonate ions decreases making it less available for organisms to be used. Aragonite and calcite saturation states has already declined globally, although no uniformly (Jiang et al. 2015) and it is predicted to further decline by the end of the century (Cao and Caldeira 2008). Rates of change are one to two orders of magnitude larger than as estimated for the last glacial culmination (Friedrich et al. 2012).

b. San Diego 's coastal and bay waters are affected by ocean acidification

Ocean acidification is already affecting coastal and bay waters of the San Diego region by impairing the capacity of organisms to produce shells and skeletons, altering food webs, and affecting the dynamic of entire ecosystems such as kelp forests (Cooley and Doney 2009, Cheung et al. 2009, 2010, Brown et al. 2014, Ekstrom et al. 2015, Chan et al. 2016, Seijo et al. 2016). Small increases in acidity of coastal and estuarine waters can substantially reduce the ability of marine organisms to produce shells and skeletons. Microscopic algae and calcifying zooplankton are especially at risk and changes in their abundance and survivorship can result in cascading effects that ripple through the food web affecting other marine organisms from fishes to whales. But rising CO_2 in seawater can also directly affect marine fishes by affecting critical behavior such as orientation, predator avoidance, and the ability to locate food and suitable habitat.

San Diego's coastal waters are vulnerable to ocean acidification because two natural phenomena work in concert with anthropogenic CO_2 emissions: ocean currents and coastal upwelling. Acidification of California waters starts with surface oceanic currents carrying waters throughout the North Pacific from Asia to the West Coast. This water transport takes decades, absorbing atmospheric CO_2 produced through global human activity and accumulating CO_2 by natural respiration. Coastal upwelling along the state brings deep water rich in CO_2 and low in dissolved oxygen to the continental shelf driving chemical conditions that are harmful to marine life (Feely et al. 2004, 2008, 2009, Hauri et al. 2009, 2013, Gruber et al. 2012, Bednaršek et al. 2014). As these processes happen in a multi-decadal time frame, the effects of ocean acidification due the absorption of CO_2 across the North Pacific will become more severe overtime. That is, waters in transit to the West Coast will carry increasingly more anthropogenic CO_2 as they arrive to California and specifically to the San Diego region (Chan et al. 2016). Even if CO_2 emissions are totally halted today the West Coast states have already committed to increasing ocean acidification for the next three to four decades. Meanwhile, coastal upwelling is projected to intensify in response to stronger wings due to global warming, which will only increase the prevalence of waters of acidic and low oxygen conditions (Snyder et al. 2003, Sydeman et al. 2014).

Most importantly for local management, ocean acidification in coastal regions interacts with natural and anthropogenic processes that further reduce pH and carbonate saturation states (Feely et al. 2008, Wootton et al. 2008, Salisbury et al. 2008, Wootton and Pfister 2012, Takeshita et al. 2015). California coastal waters are relatively more acidic because oceanographic processes such as oceanic current and coastal upwelling (Feely et al. 2004, 2008, 2009, Hauri et al. 2009, 2013). However, surface waters already show undersaturation with respect to aragonite due to anthropogenic ocean acidification independently of upwelling pulses (Feely et al. 2008). In fact, without acidification, undersaturated waters would have been as much as 50 m deeper than they are today (Feely et al. 2008). In addition, recent declines in aragonite saturation states due to anthropogenic ocean acidification have been compounded by changes in the circulation of the California Current (Feely et al. 2012), likely connected to climate change (Bakun 1990, Snyder et al. 2003, Sydeman et al. 2014). Strong coastal upwelling occurs in the spring and summer bringing nutrients and even more CO_2 rich waters from the deep ocean due to ocean acidification (Feely et al. 2008). Upwelling in this region has been intensified in the past decades (Rykaczewski and Checkley 2008) and it is predicted to become stronger with more favorable winds due to climate change (Bakun 1990, Snyder et al. 2003, Sydeman et al. 2014). Models predict that by the mid-century, surface coastal waters in this region would remain undersaturated during the entire summer upwelling season and more than half of nearshore waters throughout the entire year (Gruber et al. 2012, Hauri et al. 2013).

Coastal and estuarine waters in California are influenced by local variability and ocean acidification can amplify these fluctuations. Daily and seasonal fluctuations in pH are due to changes in upwelling, respiration, salinity, temperature and several local factors such as river discharge, eutrophication, hypoxia, and chemical contamination that amplify the deleterious effects of anthropogenic ocean acidification in coastal and estuarine waters (Fabry et al. 2008, Kelly et al. 2011a, Cai et al. 2011, Waldbusser and Salisbury 2014). For example, ocean acidification combined with eutrophication can alter phytoplankton growth and succession affecting the entire base of food webs (Wu et al. 2014a, Flynn et al. 2015). Studies also show that under ocean acidification conditions heavy metal pollution can be more severe. In more acidic waters, sediments become more toxic as they easily bounds to heavy metals making them more available and thus more toxic for aquatic life (Roberts et al. 2013). For example, ocean acidification increases the toxicity effects of copper in some marine invertebrates (Campbell and Mangan 2014, Lewis et al. 2016).

Near and undersaturated coastal and bay waters in San Diego do not meet water quality objectives regardless of whether or not they attain current and inadequate pH numerical standards. The region and the state must act now to improve water quality in coastal, bay and estuarine areas because aragonite saturation state of some bodies of waters in San Diego are already suboptimal for oyster growth and reproduction (see below). The region and the states should also address factors that magnify the effects of acidification at local scale to increase the probability of calcifying species to deal with higher acidification in the near future.

c. Empirical and field studies show that marine calcifiers are highly vulnerable

Experiments have shown that ocean acidification has deleterious effects on many marine organisms (Feely et al. 2004, Cooley and Doney 2009, Hendriks et al. 2010, Kroeker et al. 2013, Waldbusser et al. 2015a, Yang et al. 2016) with long-term consequences for marine ecosystems (Hoegh-Guldberg 2007, Pandolfi et al. 2011, Couce et al. 2013, Nagelkerken and Connell 2015, Linares et al. 2015). Recent studies have confirmed this in the field, despite several confounding factors such as temperature and daily fluctuations (Albright et al. 2016). Calcifying organisms are clearly more vulnerable to the effects of ocean acidification than non-calcifying species (Kroeker et al. 2013) especially those that use aragonite as their calcium carbonate minerals (Ries 2010).

Most extant calcifying organisms use aragonite as the preferable crystal form of calcium carbonate to produce shells and skeletons and they are the most vulnerable to acidification (Ries 2010, Wittmann and Pörtner 2013). Since aragonite is more soluble than calcite, undersaturated conditions for aragonite will be reached before they are for calcite. Therefore, those organisms that use aragonite as the preferable form of calcium carbonate for calcification are the first to be affected as calcium carbonate plummets due to acidification. However, calcifying species have different thresholds for aragonite (i.e., the aragonite saturation state that prevents calcification and leads to dissolution is species specific), thus some marine calcifier species will be more vulnerable than others (Ries et al. 2009, Lebrato et al. 2016). Because marine calcifiers have different capacity to use the same concentration of calcium carbonate to secret shells and skeletons (Ries et al. 2009), certain species are highly sensitive to the same aragonite saturation conditions and suffer the effect of ocean acidification with greater intensity (Wittmann and Pörtner 2013). However, those species that are able to calcify and growth under acidic conditions may suffer physiological constrains that impairs fertilization, reproduction, settlement, and their capacity to resist diseases and other stressors (Pörtner 2008, Hofmann et al. 2010, Wittmann and Pörtner 2013, Bednaršek et al. 2016).

d. Shellfish in the San Diego region are vulnerable to ocean acidification

Among the marine species most vulnerable to ocean acidification in San Diego region are shelled mollusks. Studies have shown that most shelled mollusks are especially sensitive to small pH changes, in particular carbonate saturation states (Barton et al. 2012, Gazeau et al. 2013, Hettinger et al. 2013a) (Fig. 4). Shelled mollusks such as oysters are keystone species in coastal areas that provide great economic value and ecosystems services such as water filtration, coastal protection, and habitat (Newell 2004) and they are at risk due to corrosive waters.

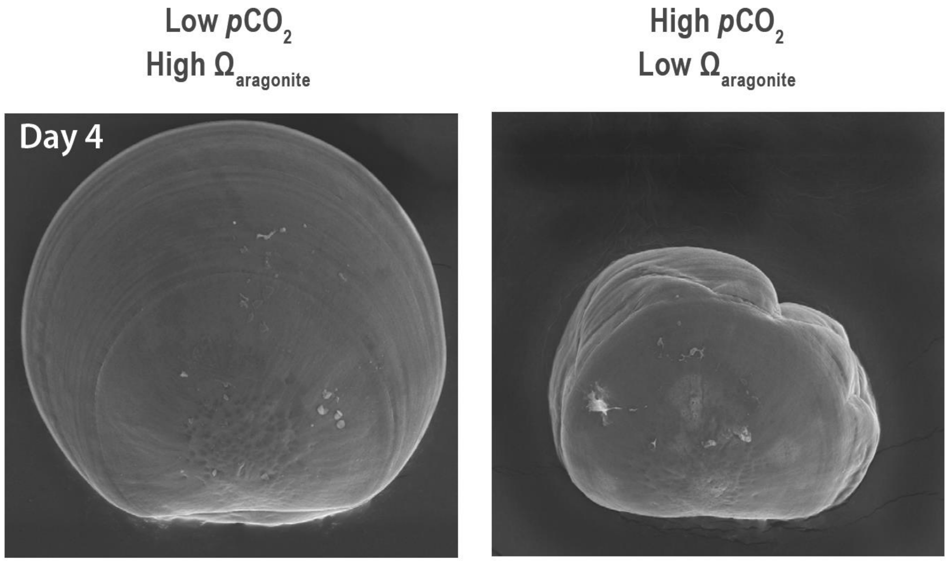


Figure 4. Pacific oyster larvae from the same spawn, raised by the Taylor Shellfish Hatchery in natural waters of Dabob Bay, WA, exhibiting favorable (left, $pCO_2 = 403$ ppm, $\Omega_{aragonite}= 1.64$, pH = 8.00) and unfavorable (right, $pCO_2 = 1418$ pp, $\Omega_{aragonite}= 0.47$, pH= 7.49) carbonate chemistry during the spawning period. Scanning Electron Microscopy images show representative larval shells from each condition at four days post–fertilization. *Figure and legend after Barton et al. 2015*

Ocean acidification has already affected oyster populations in estuarine waters of the U.S. Pacific Northwest (Barton et al. 2012, 2015, Timmins-Schiffman et al. 2012). Oyster production in the Pacific Northwest declined 22% between 2005 and 2009 because ocean acidification directly affected oyster seed production (Barton et al. 2012, 2015). In fact, Washington and Oregon alone experienced production declines of oyster seed hatcheries of up to 80% from 2006 to 2009 (Chan et al. 2016). In 2006, oyster larval production at the Whiskey Creek Hatchery (Netarts Bay, Oregon) substantially declined due to acidic water conditions leading to halted growth and oyster die offs (Barton et al. 2012).

Oysters and other marine bivalves show permanent negative effects due to ocean acidification when pH and aragonite saturation state declined below certain thresholds (Parker et al. 2009, 2012, Lannig et al. 2010, Barton et al. 2012, 2015, Hettinger et al. 2012, Gazeau et al. 2013, Waldbusser et al. 2015a, 2015b). Barton el al. (2012) first demonstrated that larval production and mid-stage growth of Pacific oyster (*Crassostrea gigas*) significantly declined as rearing water decreased **below 7.8 pH units** and below 1.7 in aragonite saturation state below. In waters with elevated CO_2 concentrations, oyster larvae showed difficulty with growth and development, drastically reducing oyster production (Barton et al. 2012). Even when larvae are able to develop under moderate aragonite saturation states, studies show they growth smaller (Waldbusser et al. 2015a) and very few develop to metamorphosis (Barton et al. 2012). Similarly, experimental studies with the Olympian oyster (*Ostrea lurida*), a foundation species of the Pacific Northwest, have shown that as pH declines to **7.8** units (well within the numerical standard pH criteria for the state of California), juvenile oysters exhibited a 41% decreased in shell growth rate, and negative effects persist even after oysters are returned to normal conditions (Hettinger et al. 2012, 2013b).

Ocean acidification can cost the shellfish industry million of dollars in economic losses and thousands of jobs. In fact, ocean acidification has already cost the oyster industry in the U.S. Pacific Northwest approximately $110 million dollars and compromised ~3,200 jobs (Washington State Blue Ribbon Panel on Ocean Acidification 2012, Barton et al. 2015). As the shellfish industry faces the increasing effects of ocean acidification, sales and job security will be drastically impacted affecting coastal communities, particularly in areas where fishing and coastal tourism provide the main economic support (Ekstrom et al. 2015, Chan et al. 2016). For example, a Canadian shellfish company reported losses of ~ $10 million during its scallop fisheries in 2014 because acidic waters (WCOAHP 2015a). The economic cost for the world could be over $100 billion USD with business as usual scenarios (Narita et al. 2012).

These findings in the Pacific Northwest are a wake-up call for action. Such negative effects of ocean acidification on shelled mollusk like oyster support the results from laboratory experiments. It is alarming that negative effects of ocean acidification are already seen under current and fluctuating pH conditions. As the ocean acidification trend continues, the shellfish industry that include oysters, mussels, scallops and crabs will be subject to substantial economic loses (Chan et al. 2016).

e. Ocean acidification affects crucial zooplankton groups such as pteropods

Ocean acidification in California waters affects crucial shelled organisms such as pelagic pteropods. Pteropods are small sea snails that use the aragonite form of calcium carbonate to secrete their spiral shells. Pteropods can be use as indicator for water impairment due to their striking vulnerability to ocean acidification. These mollusks are among the calcifier groups most sensitive to declines of aragonite saturation conditions because their delicate aragonite shells (Comeau et al. 2012, Lischka and Riebesell 2012, Bednaršek et al. 2016). In fact, in-life dissolution of pteropods-shells fossil can be used as an indicator of past ocean carbonate saturation conditions (Wall-Palmer et al. 2013). In the California Current Ecosystem, pteropods are already impacted by ocean acidification with reduction in abundance and signs of shell damages due to acidic waters (Bednaršek et al. 2014, Bednaršek and Ohman 2015). For example, sampling studies along the Washington-Oregon-California coast showed that on average, severe dissolution is found in 53 % of onshore pteropods and 24 % of offshore individuals due to undersaturated waters in the top 100 m with respect to aragonite (Bednaršek et al. 2014).

Field studies have demonstrated that pteropod's shell exhibit increasing dissolution as aragonite saturation declines below **1.3** (Bednaršek and Ohman 2015) and extensive dissolution (e.g., 30-50% shell surface area) in areas where aragonite saturation state is below 1.0 (Bednaršek et al. 2012a, Bednaršek and Ohman 2015). Values of **Ω** aragonite from 1.1 to 1.3 causes stress in pteropods and calcification is maintained at the expense of higher energy consumption (N. Bednaršek Per. Com.). At values below **Ω** aragonite = 1.1 extensive shell dissolution and irreparable damage is often observed (N. Bednaršek Per. Com.) (Fig 5). This highlights how aragonite saturation state is an important proxy to directly detect the impacts of ocean acidification on these organisms and how water quality standards must include this parameter.

Pteropods are so sensitive to acidic waters that their vertical distribution track changes in water chemistry in the southern California Current System (Bednaršek and Ohman 2015). As aragonite saturation horizon (Ω aragonite = 1.0) shoals (from >100 m to <75 m deep) pteropod abundance declines at depth below 100 m where waters are less saturated with respect to aragonite. In addition, severe shell dissolution is observed at depths where Ω aragonite equals 1.1 to 1.4 (Bednaršek and Ohman 2015). This dynamic in pteropod abundance due to change in sea water chemistry can directly affect those species that feed on them (Doubleday and Hopcroft 2015).

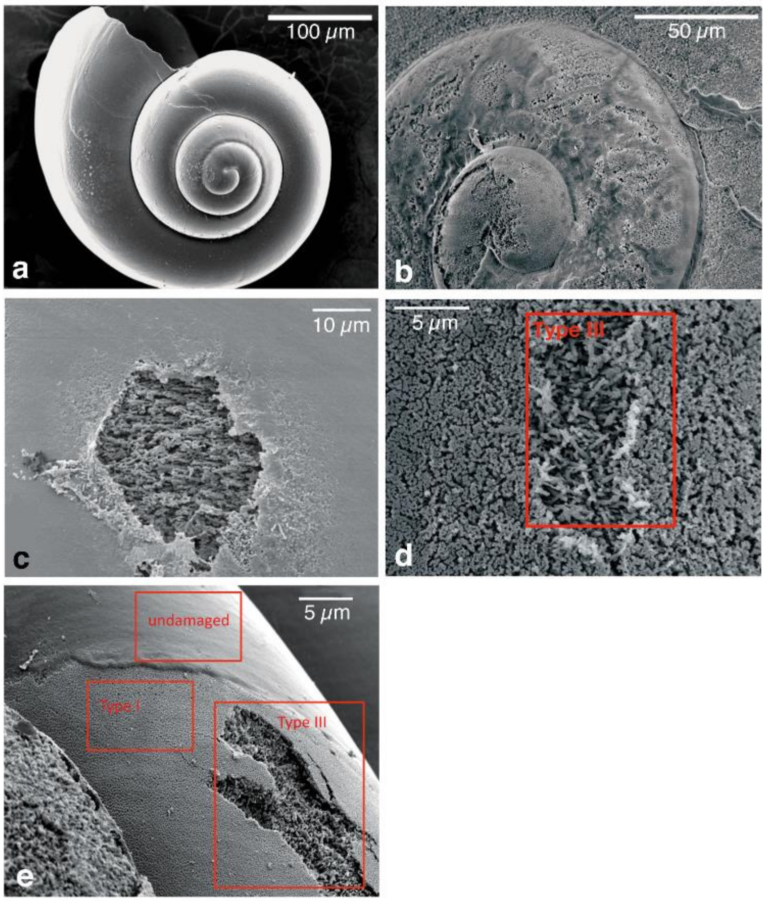


Figure 5 Scanning electornic micrographs illustrating types of shells dissolution in the thecosome pteropod Limacina helicina. (a) whole animal with no shell dissolution, (b) Type II dissolution; (c,d) Type III dissolution; (e) mixture of no dissolution, Type I and Type III on a single shell surface. As Ωarag decreases with ocean acidification, pteropods' biological condition deteriorates. Under low level of stress (Ω > 1.3) dissolution is insignificant and shell calcification is maintained. As Ω decreases, dissolution increases, calcification decreases and pteropod shells go through stress to damage to irreparable and ultimately leads to organism mortality. Below Ω < 1.1 moderate to extensive shell damage and decrease calcification occurs. Under undersaturated conditions (Ω <0.9) extensive severe dissolution and absence of calcification occurs. *Figure and legend modified after Bednaršek and Ohman (2015).*

Vertical distribution of pteropods is already affected by ocean acidification which may have important consequences for the species that feed on them. Pteropods are common prey for important commercial fishes such as anchovies, herring, jack mackerel, sablefish, and pink, chum, coho, and sockeye salmon (Brodeur et al. 1987, 2007, Armstrong et al. 2005, Aydin et al. 2005). In addition, zooplankton, squid, whales and even birds eat pteropods. Pteropods show vertical migrations to deeper waters during the day and feed in shallower waters at night to avoid predation. Ocean acidification can drastically constrain these vertical migrations by narrow the range of optimal carbonate saturation and thus calcification. For example, in the Pacific Northwest, diel migration for *L. helicina* is relatively shallow (100 m) because undersaturated waters with respect to aragonite (Mackas and Galbraith 2012). Thus, as pteropods are affected by ocean acidification through calcification and survivorship, ocean acidification indirectly affects species higher in the food web that depend on them as food source.

Pteropods are one of the most important species in oceanic marine food webs and their decline could threaten the functioning of entire coastal ecosystems and commercially important fisheries such as salmon (Doubleday and Hopcroft 2015). Pteropods are the main food sources for commercially and culturally important species such as Pacific salmon, herring, and squid (Doubleday and Hopcroft 2015). Therefore, temporal or spatial reduction in pteropod abundance will have drastic cascading effects on the species that rely on them as the main food source. For example, 30 % of the variability of pink salmon survival during spring-summer in Prince Williams Sound, southern Alaska, has been directly associated with changes in the abundance and distribution of the pteropod *Limacina helicina* (Doubleday and Hopcroft 2015).

f. Ocean acidification affects a variety of other marine organisms

Laboratory and mesocosm experiments shows that pH and calcium carbonate saturation state levels observed in coastal and estuarine waters of Sand Diego also impair calcification rates of other marine calcifiers such coccolithophorids, foraminifera, other mollusks, and sea urchins (Orr et al. 2005, Ries et al. 2009, Doney et al. 2009, Wittmann and Pörtner 2013, Haigh et al. 2015, Yang et al. 2016). Many calcifying species are directly affected by ocean acidification by decreasing calcification rates and compromising growth and survival. Overall calcifying organisms such as corals, echinoderms, and mollusks tend show higher sensitivity than crustaceans and fish species (Ries et al. 2009, Wittmann and Pörtner 2013) (Fig 6). For example, in experimental conditions, calcification rates in temperate corals, urchins, limpets, clams, scallops, and oysters decrease considerably as aragonite saturation state declines below 1.5 corresponding to very elevated pCO_2 (i.e., over 900 µatm) (see Ries et al. 2009). Studies also suggest that some species of juvenile fish of economical important coastal regions are highly sensitive to higher than normal pCO_2 concentrations and lower pH, exhibiting high mortality rates (Ishimatsu et al. 2004).

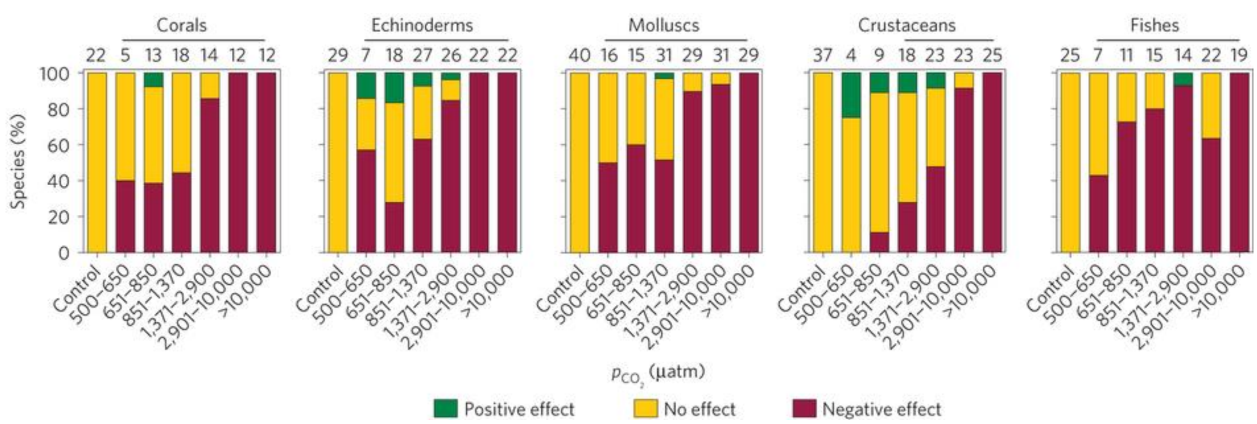


Figure 6 Fractions (%) of coral, echinoderm, mollusk, crustacean and fish species exhibiting negative, no or positive effects on performance indicators reflected as individual fitness in response to the respective p_{CO2} ranges (µatm). The numbers of species analyzed on each CO_2 range are on top of columns. Bars above columns denote count ratios significantly associated with p_{CO2} (according to Fisher's exact test, p<0.05, used to analyze species counts of pooled groups of negatively affected species versus not negatively affected species. *Figure and legend modified after Wittmann and Pörtner 2013.*

Ocean acidification will have negative impacts on calcification, survival, growth, reproduction and other physiological processes at the species level in the absence of evolutionary adaptation or acclimatization over the coming decades (Kroeker et al. 2013). These effects can accumulate through marine communities disrupting ecological process and energy fluxes (Nagelkerken and Connell 2015, Linares et al. 2015). Together, these studies forecast drastic changes in species composition with negative impacts through marine population and communities that ultimately affect ecosystem functionality and services.

g. Local stressors magnify anthropogenic ocean acidification

Local stressors can drastically magnify and contribute to acidification in Sand Diego coastal and estuarine waters. Local stressors such as eutrophication (Waldbusser et al. 2011, Cai et al. 2011), pollution (Biscéré et al. 2015, Flynn et al. 2015), sulfur dioxide deposition (Doney et al. 2007), hypoxia (Kemp et al. 2005, Melzner et al. 2012), river discharge (Salisbury et al. 2008), runoff from acidic fertilizers (Dentener et al. 2006), and harmful algal blooms (Wu et al. 2014b) can substantially contribute to ocean acidification in coastal waters (Duarte et al. 2013, Waldbusser and Salisbury 2014). Acidification can also be exacerbated by non-uniform changes in water circulation and biological processes, e.g., respiration (Feely et al. 2010) and precipitation runoff (Cooley and Doney 2009, Doney et al. 2009, Cheung et al. 2009). Non-atmospheric sources combined with anthropogenic ocean acidification can result in sudden negative ecosystem consequences when they coincide with physical processes such as upwelling that bring O_2 deprived, CO_2-enriched and low-pH waters to nearshore regions (Feely et al. 2009). For example, high mortality rate of oyster larvae from oyster hatcheries in the Pacific Northwest have been linked to the combination of multiple stressors in a lower pH environment (Barton et al. 2012, Timmins-Schiffman et al. 2012).

The US west coast Pacific had one of the worst harmful algal blooms recorded in 2015 with the highest concentrations of domoic acid yet observed[4] and ocean acidification may have increased their toxicity. These toxic algal blooms led managers to close down the entire West Coast recreational and crab fisheries from the southern Washington coast to Southern California[5]. The toxicity of harmful algal blooms increases with ocean acidification and eutrophication can alter phytoplankton growth and succession (Wu et al. 2014b, Flynn et al. 2015).This means that the water quality standard for toxic and other deleterious organic and inorganic substances for marine waters can be affected by both pH and pollution. For example, the toxicity of some harmful algal blooms can increase with ocean acidification (Sun et al. 2011) and with land-runoff and/or water column stratification (Hallegraeff 2010).

Harmful algal blooms can cause mass mortality of wildlife, shellfish harvesting closures, and tremendous risk to human health. Some species of *Pseudo-nitzschia*, a global distributed diatom genus, produce domoic acid, a neurotoxin that causes amnesic shellfish poisoning. Studies have shown that acidified conditions due to increasing pCO_2 can increase toxins concentration as much as five-fold in this harmful microalgae (Sun et al. 2011, Tatters et al. 2012). Toxicity levels

[4] NOAA Fisheries mobilizes to gauge unprecedented West Coast toxic algal bloom, June 2015. http://www.nwfsc.noaa.gov/news/features/west_coast_algal_bloom/index.cfm

[5] South coast of Washington closed to crab fishing, June 2015. http://wdfw.wa.gov/news/jun0515a/

are positively correlated with mortality of shellfish, fish, marine mammals, and can cause deleterious effects in the central nervous system in humans known as paralytic shellfish poisoning (Tatters et al. 2012, 2013, Fu et al. 2012). For example, results from laboratory experiments indicate that levels of the toxin domoic acid and growth rate in the diatom *Pseudo-nitzschia multiseries* increases as pCO_2 in water increases from 220 to 730 ppm (Sun et al. 2011).

h. Ocean acidification can be partially addressed locally

Currently, several approaches can be used to prevent locally intensified ocean acidification. Recently, the West Coast Ocean Acidification and Hypoxia Science Panel working in partnership with the California Ocean Science Trust published a report highlighting major findings, recommendations, and actions that West Coast states, including British Columbia in Canada, can take now to address ocean acidification locally (Chan et al. 2016). This report suggested that the effectiveness of local actions will be higher in semi-enclosed water bodies such as estuaries and bays where local physical-chemical processes dominated over oceanic forcing (Chan et al. 2016). As such local actions will be paramount in San Diego since semi-enclosed water bodies such as estuaries and bays represent a substantial portion of marine waters in the region. The state of California has already a legal framework to address not only local stressors that amplify the effects of ocean acidification, but also reduce local and state level carbon dioxide emissions that primarily contribute to the problem.

Ocean acidification can have a localized impact and often act synergistically with other stressors. Marine species have a limited capacity to deal simultaneously with several stressors, and often the negative combined effects of ocean acidification with other local stressors are stronger than the sum of their parts. This is because ocean acidification in coastal areas can be intensified by the negative effects of local stressors (e.g., pollution, hypoxia, warming) (WCOAHP 2015b). Additional declines of pH, aragonite saturation states and dissolved oxygen associated with local stressors can suddenly push marine species across a critical threshold that drastically impairs their physiology and can cascade up through the food web affecting entire ecosystems (Nagelkerken and Connell 2015, Haigh et al. 2015). As marine species fare better dealing with one stressor instead of multiple stressors, the most practical, fast, and direct approach to deal with ocean acidification is to eliminate other local stressors and therefore increase the resilience of marine species to corrosive waters.

Under the Clean Water Act 303(d) implementation, Sand Diego has ample authority to address local sources that contribute to ocean acidification, including storm water runoff, sewage contamination, and management actions to build resilience. First, state government agencies are directed by the Clean Water Act to ensure that runoff and pollution (that contribute to acidification) are monitored, managed, and do not affect the functioning of aquatic ecosystems. For example, stormwater surge prevention, coastal and riparian buffers, wetlands, and waste water treatments are among the most effective methods to control runoff and associated pollutants (Kelly et al. 2011b). Moreover, effluent limitations could assist in preparedness or adaption for ocean acidification by reducing point sources impacts (Craig 2009). Second, controlling and preventing coastal erosion by increasing vegetation benefit coastal and estuarine ecosystems by reducing organic carbon, nutrient concentration and sediment loading and prevent habitat modification. Coastal and river watershed erosion facilitates the movement of fertilized and enriched waters from cultivated lands and contaminated watersheds further increasing acidification, euthrophication and hypoxia in coastal waters. Third, adequate land-use can reduce direct and indirect CO_2 emissions (e.g., due to deforestation), runoff, and erosion (Julius et al. 2008). Cities, town and counties can adopt policies to protect their own waters even without the state government (Kelly et al. 2011b). Finally, regulating emissions for pollutants such as nitrogen oxides and sulfur oxides from cars and power plants can diminish local drivers of ocean acidification (Kemp et al. 2005) as these pollutants can enter waters from the air close where they are produce (Doney et al. 2007). The Clean Water Act is meant to be complemented by and partnered with several other federal laws (e.g., Clean Air Act and Coastal Zone Management Act), state laws, and local ordinances that also provide legal mechanisms to protect coastal waters by controlling emissions, runoff, and land-use patterns through zoning and permitting (Craig 2009, 2016, Kelly et al. 2011b, Weisberg et al. 2016).[6]

Anthropogenic ocean acidification combined with local stressors that lower pH greatly magnifies the global ocean acidification problem and have drastic effects in coastal and estuarine waters affecting entire shellfish fisheries (Chan et al. 2016). Ocean acidification can be especially problematic in estuarine and coastal waters adjacent to urban areas drastically reducing water quality that impairs the survival and growth of marine species. By addressing local pollution, eutrophication, river runoff and shore line erosion (among others), the Sand Diego region will not only prevent the magnification of the ocean acidification problem, but also provide marine organisms with better capacity and more time to resist ocean acidification while we work globally to reduce atmospheric CO_2.

Although the primary solution to eliminate ocean acidification is to drastically curb CO_2 emissions globally, local management actions that directly address water quality by eliminating pollution, hypoxia, excess of land-based nutrient runoff, and sedimentation from land erosion will substantially ameliorate the likely stronger and synergistic deleterious effects of ocean acidification on marine species (Chan et al. 2016). Addressing local stressors may alone improve the health of coastal waters and protect coastal economies that depend on shellfish fisheries. Moreover, under the Clean Water Act, California has the authority to reduce atmospheric CO_2 that contributes to ocean acidification water quality violations. The Clean Water Act has a long history of being used to address water pollution from atmospheric deposition. For example, section 303(d) has been used to address cross-border pollution from atmospheric mercury, PCBs, and acid rain. California can do its part, as well as hold other states accountable for their contributions to ocean acidification.

4. Sand Diego must evaluate data related to ocean acidification parameters from several readily available sources

[6] Coastal Zone Act Reauthorization Amendments (CZARA) Section 6217 https://www.epa.gov/polluted-runoff-nonpoint-source-pollution/coastal-zone-act-reauthorization-amendments-czara-section

San Diego has a duty to evaluate ocean acidification parameters during its water quality assessment (EPA 2010a). San Diego water board must "*evaluate all exiting and readily available water quality-related data and information to develop the list*" 40 C.F.R. § 130.7(b)(5). Beyond reviewing the information submitted by the Center, San Diego must also evaluate pH and other monitoring data that is readily available and seek out additional ocean acidification data from state, federal, and academic research institutions. EPA's 2010 memo and Integrated Report Guidance discussed several sources, including the NOAA data (EPA 2010: 7-9; EPA Guidance 30-31). There are several sources for high resolution ocean acidification data that will be available in the near future.

The state must obtain and consider data being collected from the University of California San Diego, the National Oceanic and Atmospheric Administration, and other research institutions. They are conducting research surveys as well as have permanently moored instruments that are gathering information about ocean acidification. Finally, the Center urges the state to improve its own monitoring program so that it can detect ocean acidification related water quality problems at a higher temporal resolution.

The following are sources from which San Diego can obtain and evaluate data from:

- Natural Estuarine Research Reserve System
- Southern California Coastal ocean Observing System
- California Current Ecosystem Interdisciplinary Biogeochemical Moorings
- Carlsbad Aquafarm
- California Environmental Data Exchange Network
- NOAA Pacific Marine Environmental Laboratory Carbon Program
- NOAA National Ocean Data Center
- National Data Buoy Center

San Diego should obtain and evaluate data on all relevant parameters of ocean acidification (e.g., pH, pCO_2, calcium carbonate saturation) that are available from these and other sources including it its own water quality database. Coastal and estuarine ocean acidification parameters are not considered in the draft Integral Report. Thus, Sand Diego should seek, analyze, and discuss data on water quality parameters relevant to ocean acidification.

5. Current water quality criteria for pH are inadequate to address ocean acidification

Based on the scientific available information on the deleterious effect of ocean acidification on marine life in estuarine waters, California's water quality objectives regarding pH standards are inadequate, because negative effects can be observed at pH levels well within the current range that is considered normal. As such, California can and should develop new water quality standards for ocean acidification (either numerical or narrative) that better reflect natural variability and potential negative effects of acidification on vulnerable coastal and estuarine species. Current water quality criteria for pH were developed over four decades ago and are scientifically inadequate to address the effects of ocean acidification. The numerical criteria are not based in the most current science and are not ecological relevant for marine and estuarine species (Chan et al. 2016). California's current water good quality pH numerical standards for marine water uses may not be less than 6.0 or greater than 8.5 (or even 9.0) with less than 0.2 deviation within that range due to anthropogenic causes (see water quality objectives above). These thresholds are flawed with respect to ocean acidification applications (Chan et al. 2016). Several studies (see above) have shown biological impacts at pH levels well above 7.5 units. Moreover, this pH range represents up to two order of magnitude difference in acidity since the pH is in logarithm scale. Finally, a deviation of no more than 0.2 units from natural conditions is almost impossible to apply. This is because natural conditions are site specific and are difficult to determine without historical data.

New ecologically meaningful water quality criteria for ocean acidification must be developed and recent studies recommend more appropriate approaches (Weisberg et al. 2016). In addition, ocean acidification water criteria should be expanded to include other acidification parameters (e.g., pCO_2, aragonite saturation state, carbonate ions concentration) that may be more relevant than pH and may affect many marine species (Chan et al. 2016). For example, aragonite saturation state is more biologically relevant than pH for shell formation in calcifying organisms such as pteropods and oysters, and recent studies have already established chronic and acute thresholds that can be used (see above). In contrast, parameters such as pCO_2 instead of pH are more relevant for fish which can drastically impair their ability to avoid predators, find food, and identify suitable habitat.

Since the current numerical water quality criteria to analyze ocean acidification are inadequate, California should rely on their narrative and antidegradation standards to determine whether waters are impaired by ocean acidification. Biological criteria that better describe the effects of ocean acidification on marine organisms (e.g., growth, survival, reproductive success, behavior) that cascade up to populations and ecosystem are more useful. For example, the response of pteropods to ocean acidification may be a relevant biological criterion since they are among the most sensitive species to acidification and their decline will affect marine species that depend on them for food (see above). Thus, effective biological criteria should provide an early warning system before significant negative alterations due to ocean acidification have taken place. Since ocean acidification is predicted to worsen overtime, biological criteria will be fundamental to detect early negative effects and trigger management actions before significant ecosystem alteration happen.

Although EPA mandated states to list waters impaired by pH where data are available (EPA 2010b), substantive reform of the National Water Quality Standards for marine pH is urgently needed (EPA 2010c) since the current criteria is obsolete. Data collection can help determining pH natural variability in coastal waters and thus facilitate future regulatory revisions to allow the state and local governments to restrict pollutants[7]. The state of California and regional water boards should use existing laws to develop biological water quality standards for ocean acidification. For example, the state of California recently introduced a bill (AB 2139)[8] to actively address ocean acidification in coastal waters:

[7] EPA Ocean Acidification and Marine pH Water Quality Criteria. Notice of data availability. 74 FR 17484, April 15, 2009

[8] Assembly Bill, No. 2129 AB 2139, as amended, Williams. *Ocean Protection Council: ocean acidification.* *http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB2139&utm_source=OAH+Subscri*

"This bill would require the [Ocean Protection] council to facilitate research and compile data on the causes and effects of ocean acidification and, no later than January 1, 2018, to adopt recommendations for further legislative and executive actions to address ocean acidification"

Water quality standards and impairment designations are only ecological meaningful compared to established baseline conditions, threshold for ecosystem change and ecosystems' vulnerability (Kelly et al. 2011b). Thus, the state and federal governments should support efforts to determine historical and current pH levels and natural fluctuations that because they are area-specific are often undefined. However, determining the baseline of naturally occurring pH range for a body of water does not necessarily requires long term monitoring programs. Natural temporal and spatial variability that occurs in a daily and seasonal basis due to variations in oceanic currents, water flow, river discharge, precipitation regime, temperature, remineralization and metabolic process such as respiration and photosynthesis can be calculated through several methods. For example, by reconstructing water chemistry conditions by analyzing sediment cores based on stable isotopes and by back-calculating pH and aragonite states for preindustrial pCO_2 levels with certain assumptions (see Evans et al. 2015 and Gray et al. 2012), natural baseline fluctuations for specific areas can be calculated. Specific water bodies can be listed as impaired based on biological indicators such as detrimental effects on oysters, pteropods or other calcifying organisms (Bradley et al. 2010).

More monitoring programs with high resolution and automatable equipment are needed to understand temporal and spatial fluctuation in the carbonate system parameter in waters cross San Diego and California. For example, more reliable, accurate, and self-calibrating pCO_2 and pH sensors such as MapCO2 used in the PMEL OA moorings network could be added in more sites throughout estuarine waters across the region and state to continuously monitor ocean acidification (as they do for temperature, and salinity). Therefore, based on the fact that current pH water quality standards are obsolete and inadequate for marine life, new quality standards should be immediately designed for coastal and estuarine/bay waters that take in consideration negative effects on sensitive species such as corals.

6. Conclusion

In conclusion, the Center urges the San Diego water board to thoroughly evaluate current studies on ocean acidification and data to identify waters that are currently harmful for marine life and that may not be meeting water quality standards including not only numeric but also narrative standards and designated uses, as threatened or impaired. The Center also requests that San Diego and California reevaluate obsolete and inadequate pH water quality standards that do not account for negative effects on marine life because they were designed for point source contaminated waters established more than four decades ago. Even though most pH values of coastal and estuarine/bay waters across San Diego may fall within the ranges attaining pH numeric standards for California, scientific evidence over the past decade clearly shows that these waters are becoming more acidic, directly compromising the growth and survival of

---

ber+Public+Newsletter&utm_campaign=7a5e908629-West_Coast_OAH_Product_Release6_12_2014&utm_medium=email&utm_term=0_e74af6963b-7a5e908629-102211085

important calcifying coastal and estuarine species such as oysters and pteropods, and indirectly fish species like salmon. It is imperative that San Diego takes concern and action now on ocean acidification to address this increasingly important water quality problem before it has devastating consequences on coastal, estuarine and bay ecosystems. Delaying action could make future management strategies substantially less effective and likely more costly. Minimizing or preventing additional local stressors on coastal ecosystems such as nutrient inputs associated with development and urbanization can ameliorate compounding threats of ocean acidification. In estuaries and bay waters natural factors including acidic freshwater inputs, restricted circulation, influence of coastal upwelling, and hypoxic conditions can amplify the effects of anthropogenic ocean acidification and nutrients inputs and predispose these ecologically and economically important habitat to corrosive waters. The actions that San Diego can take now based on the best available science would ameliorate the negative effects of ocean acidification. Inaction on ocean acidification will result in drastic biological, ecological and socioeconomic negative effects that will be more severe in coastal and estuarine environments compromising sensitive species, ecosystem services and the human populations that rely on them.

Please contact me if you require further information or have questions.

Sincerely,

Abel Valdivia PhD
Marine Scientist | Oceans Program
Center *for* Biological Diversity
1212 Broadway, Oakland, CA 94612
Office: 510-844-7103
Email: avaldivia@biologicaldiversity.org

7. **Literature cited***

*(All references are found here: https://www.dropbox.com/sh/xgmz19idj7tgqth/AABdoa9hFMeTovmWWtdiwZL6a?dl=0)

Albright, R., L. Caldeira, J. Hosfelt, L. Kwiatkowski, J. K. Maclaren, B. M. Mason, Y. Nebuchina, A. Ninokawa, J. Pongratz, K. L. Ricke, T. Rivlin, K. Schneider, M. Sesboüé, K. Shamberger, J. Silverman, K. Wolfe, K. Zhu, and K. Caldeira. 2016. Reversal of ocean acidification enhances net coral reef calcification. Nature.

Albright, R., and C. Langdon. 2011. Ocean acidification impacts multiple early life history processes of the Caribbean coral Porites astreoides. Global Change Biology 17:2478–2487.

Armstrong, J. L., J. L. Boldt, A. D. Cross, J. H. Moss, N. D. Davis, K. W. Myers, R. V. Walker, D. A. Beauchamp, and L. J. Haldorson. 2005. Distribution, size, and interannual, seasonal and diel food habits of northern Gulf of Alaska juvenile pink salmon, Oncorhynchus gorbuscha. Deep Sea Research Part II: Topical Studies in Oceanography 52:247–265.

Aydin, K. Y., G. A. McFarlane, J. R. King, B. A. Megrey, and K. W. Myers. 2005. Linking oceanic food webs to coastal production and growth rates of Pacific salmon (Oncorhynchus spp.), using models on three scales. Deep Sea Research Part II: Topical Studies in Oceanography 52:757–780.

Bakun, A. 1990. Global Climate Change and Intensification of Coastal Ocean Upwelling. Science 247:198–201.

Barton, A., B. Hales, G. G. Waldbusser, C. Langdon, and R. A. Feely. 2012. The Pacific oyster, Crassostrea gigas, shows negative correlation to naturally elevated carbon dioxide levels: Implications for near-term ocean acidification effects. Limnology and Oceanography 57:698–710.

Barton, A., G. Waldbusser, R. Feely, S. Weisberg, J. Newton, B. Hales, S. Cudd, B. Eudeline, C. Langdon, I. Jefferds, T. King, A. Suhrbier, and K. McLauglin. 2015. Impacts of Coastal Acidification on the Pacific Northwest Shellfish Industry and Adaptation Strategies Implemented in Response. Oceanography 25:146–159.

Bednaršek, N., R. A. Feely, J. C. P. Reum, B. Peterson, J. Menkel, S. R. Alin, and B. Hales. 2014. Limacina helicina shell dissolution as an indicator of declining habitat suitability owing to ocean acidification in the California Current Ecosystem. Proceedings of the Royal Society of London B: Biological Sciences 281:20140123.

Bednaršek, N., C. J. Harvey, I. C. Kaplan, R. A. Feely, and J. Možina. 2016. Pteropods on the Edge: Cumulative Effects of Ocean Acidification, Warming, and Deoxygenation. Progress in Oceanography.

Bednaršek, N., and M. Ohman. 2015. Changes in pteropod distributions and shell dissolution across a frontal system in the California Current System. Marine Ecology Progress Series 523:93–103.

Bednaršek, N., G. A. Tarling, D. C. E. Bakker, S. Fielding, E. M. Jones, H. J. Venables, P. Ward, A. Kuzirian, B. Lézé, R. A. Feely, and others. 2012a. Extensive dissolution of live pteropods in the Southern Ocean. Nature Geoscience 5:881–885.

Bednaršek, N., G. A. Tarling, D. C. Bakker, S. Fielding, A. Cohen, A. Kuzirian, D. McCorkle, B. Lézé, and R. Montagna. 2012b. Description and quantification of pteropod shell dissolution: a sensitive bioindicator of ocean acidification. Global Change Biology 18:2378–2388.

Beman, J. M., C.-E. Chow, A. L. King, Y. Feng, J. A. Fuhrman, A. Andersson, N. R. Bates, B. N. Popp, and D. A. Hutchins. 2011. Global declines in oceanic nitrification rates as a consequence of ocean acidification. Proceedings of the National Academy of Sciences 108:208–213.

Biscéré, T., R. Rodolfo-Metalpa, A. Lorrain, L. Chauvaud, J. Thébault, J. Clavier, and F. Houlbrèque. 2015. Responses of Two Scleractinian Corals to Cobalt Pollution and Ocean Acidification. PLoS ONE 10:e0122898.

Bradley, P., L. Fore, W. Fisher, and W. Davis. 2010. Coral reef biological criteria: using the Clean Water Act to protect a national treasure. US Environmental Protection Agency, Office of Research and Development. EPA/600/R-10/054, Washington DC.

Brodeur, R. A., E. A. Daly, M. V. Sturdevant, T. W. Miller, J. H. Moss, M. E. Thiess, M. Trudel, L. A. Weitkamp, J. Armstrong, and E. C. Norton. 2007. Regional comparisons of juvenile salmon feeding in coastal marine waters off the west coast of North America. Page 183American Fisheries Society Symposium. American Fisheries Society.

Brodeur, R. D., H. V. Lorz, and W. G. Pearcy. 1987. Food habits and dietary variability of pelagic nekton off Oregon and Washington, 1979-1984. US Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service.

Brown, M. B., M. S. Edwards, and K. Y. Kim. 2014. Effects of climate change on the physiology of giant kelp, Macrocystis pyrifera, and grazing by purple urchin, Strongylocentrotus purpuratus. Algae 29:203–215.

Busch, D. S., M. Maher, P. Thibodeau, and P. McElhany. 2014. Shell Condition and Survival of Puget Sound Pteropods Are Impaired by Ocean Acidification Conditions. PLOS ONE 9:e105884.

Byrne, R. H., S. Mecking, R. A. Feely, and X. Liu. 2010. Direct observations of basin-wide acidification of the North Pacific Ocean. Geophysical Research Letters 37:L02601.

Cai, W.-J., X. Hu, W.-J. Huang, M. C. Murrell, J. C. Lehrter, S. E. Lohrenz, W.-C. Chou, W. Zhai, J. T. Hollibaugh, Y. Wang, P. Zhao, X. Guo, K. Gundersen, M. Dai, and G.-C. Gong. 2011. Acidification of subsurface coastal waters enhanced by eutrophication. Nature Geoscience 4:766–770.

Caldeira, K., and M. E. Wickett. 2005a. Ocean model predictions of chemistry changes from carbon dioxide emissions to the atmosphere and ocean. J. Geophys. Res. 110:C09S04.

Caldeira, K., and M. E. Wickett. 2005b. Ocean model predictions of chemistry changes from carbon dioxide emissions to the atmosphere and ocean. Journal of Geophysical Research: Oceans 110:C09S04.

Campbell, A., and S. Mangan. 2014. Ocean Acidification Increases Copper Toxicity to the Early Life History Stages of the Polychaete Arenicola marina in Artificial Seawater. Environmental science & ….

Canadell, J. G., C. L. Quéré, M. R. Raupach, C. B. Field, E. T. Buitenhuis, P. Ciais, T. J. Conway, N. P. Gillett, R. A. Houghton, and G. Marland. 2007. Contributions to accelerating atmospheric CO2 growth from economic activity, carbon intensity, and efficiency of natural sinks. Proceedings of the National Academy of Sciences 104:18866–18870.

Cao, L., and K. Caldeira. 2008. Atmospheric CO_2 stabilization and ocean acidification. Geophysical Research Letters 35.

Chan, F., A. . Boehm, J. . Barth, E. A. Chronesky, A. G. Dickson, R. A. Feely, B. Hales, T. M. Hill, G. Hofmann, D. Ianson, T. Klinger, J. Newton, T. F. Pedersen, G. N. Somero, J. L. Largier, M. Sutula, W. W. Wakefield, G. G. Waldbusser, S. Weisberg, and E. Whiteman. 2016. The West Coast Ocean Acidification and Hypoxia Science Panel: Major Findings, Recommendations, and ctions. Page 40. California Ocean Science Trust, Oakland, California.

Cheung, W. W. L., V. W. Y. Lam, J. L. Sarmiento, K. Kearney, R. Watson, and D. Pauly. 2009. Projecting global marine biodiversity impacts under climate change scenarios. Fish and Fisheries 10:235–251.

Cheung, W. W. L., V. W. Y. Lam, J. L. Sarmiento, K. Kearney, R. Watson, D. Zeller, and D. Pauly. 2010. Large-scale redistribution of maximum fisheries catch potential in the global ocean under climate change. Global Change Biology 16:24–35.

Comeau, S., J.-P. Gattuso, A.-M. Nisumaa, and J. Orr. 2012. Impact of aragonite saturation state changes on migratory pteropods. Proceedings of the Royal Society of London B: Biological Sciences 279:732–738.

Cooley, S. R., and S. C. Doney. 2009. Anticipating ocean acidification's economic consequences for commercial fisheries. Environmental Research Letters 4:24007.

Couce, E., A. Ridgwell, and E. J. Hendy. 2013. Future habitat suitability for coral reef ecosystems under global warming and ocean acidification. Global Change Biology 19:3592–3606.

Craig, R. K. 2009. Clean Water Act on the Cutting Edge: Climate Change and Water-Quality Regulation, The. Natural Resources & Environment 24:14.

Craig, R. K. 2016. Dealing with Ocean Acidification: The Problem, the Clean Water Act, and State and Regional Approaches. SSRN Scholarly Paper, Social Science Research Network, Rochester, NY.

Dentener, F., J. Drevet, D. Stevenson, K. Ellingsen, T. Van Noije, M. Schultz, C. Atherton, N. Bell, T. Butler, B. Eickhout, and others. 2006. Nitrogen and Sulfur Deposition on Regional and Global Scales: a Multi-model Evaluation. Understanding and Quantifying the Atmospheric Nitrogen Cycle:161.

Doney, S. C., V. J. Fabry, R. A. Feely, and J. A. Kleypas. 2009. Ocean Acidification: The Other CO_2 Problem. Annual Review of Marine Science 1:169–192.

Doney, S. C., N. Mahowald, I. Lima, R. A. Feely, F. T. Mackenzie, J.-F. Lamarque, and P. J. Rasch. 2007. Impact of anthropogenic atmospheric nitrogen and sulfur deposition on ocean acidification and the inorganic carbon system. Proceedings of the National Academy of Sciences 104:14580–14585.

Doubleday, A. J., and R. R. Hopcroft. 2015. Interannual patterns during spring and late summer of larvaceans and pteropods in the coastal Gulf of Alaska, and their relationship to pink salmon survival. Journal of Plankton Research 37:134–150.

Duarte, C. M., I. E. Hendriks, T. S. Moore, Y. S. Olsen, A. Steckbauer, L. Ramajo, J. Carstensen, J. A. Trotter, and M. McCulloch. 2013. Is Ocean Acidification an Open-Ocean Syndrome? Understanding Anthropogenic Impacts on Seawater pH. Estuaries and Coasts 36:221–236.

Ekstrom, J. A., L. Suatoni, S. R. Cooley, L. H. Pendleton, G. G. Waldbusser, J. E. Cinner, J. Ritter, C. Langdon, R. van Hooidonk, D. Gledhill, K. Wellman, M. W. Beck, L. M. Brander, D. Rittschof, C. Doherty, P. E. T. Edwards, and R. Portela. 2015. Vulnerability and adaptation of US shellfisheries to ocean acidification. Nature Climate Change 5:207–214.

EPA. 2010a. Integrated reporting and listing decisions related to ocean acidification. Page 16. Memorandum, US Environmental Protection Agency, Washington DC.

EPA. 2010b. Integrated reporting and listing decisions related to ocean acidification. Page 16. Memorandum, US Environmental Protection Agency, Washington DC.

EPA. 2010c. Decision on Re-evaluation and/or Revision of the Water Quality Criterion for Marine p for the Protection of Aquatic Life, memorandum. 15 April 2010.

Fabry, V. J. 2009. Ocean acidification at high latitudes: the bellweather. Oceanography 22:160.

Fabry, V. J., B. A. Seibel, R. A. Feely, and J. C. Orr. 2008. Impacts of ocean acidification on marine fauna and ecosystem processes. ICES Journal of Marine Science: Journal du Conseil 65:414–432.

Feely, R. A., S. R. Alin, J. Newton, C. L. Sabine, M. Warner, A. Devol, C. Krembs, and C. Maloy. 2010. The combined effects of ocean acidification, mixing, and respiration on pH and carbonate saturation in an urbanized estuary. Estuarine, Coastal and Shelf Science 88:442–449.

Feely, R. A., C. L. Sabine, R. H. Byrne, F. J. Millero, A. G. Dickson, R. Wanninkhof, A. Murata, L. A. Miller, and D. Greeley. 2012. Decadal changes in the aragonite and calcite saturation state of the Pacific Ocean. Global Biogeochemical Cycles 26:GB3001.

Feely, R. A., C. L. Sabine, J. M. Hernandez-Ayon, D. Ianson, and B. Hales. 2008. Evidence for upwelling of corrosive “acidified” water onto the continental shelf. Science 320:1490–1492.

Feely, R. A., C. L. Sabine, K. Lee, W. Berelson, J. Kleypas, V. J. Fabry, and F. J. Millero. 2004. Impact of anthropogenic CO2 on the CaCO3 system in the oceans. Science 305:362–366.

Feely, R., S. Doney, and S. Cooley. 2009. Ocean Acidification: Present Conditions and Future Changes in a High-CO2 World. Oceanography 22:36–47.

Feely, R., R. Wanninkhof, C. Sabine, J. Mathis, T. Takahashi, S. Khatiwala, and G. Park. 2013. Global ocean carbon cycle, in “State of the Climate in 2012, Global Oceans.” Bull. Am. Meteorol. Soc 94:S72–S75.

Flynn, K. J., D. R. Clark, A. Mitra, H. Fabian, P. J. Hansen, P. M. Glibert, G. L. Wheeler, D. K. Stoecker, J. C. Blackford, and C. Brownlee. 2015. Ocean acidification with (de)eutrophication will alter future phytoplankton growth and succession. Proceedings of the Royal Society of London B: Biological Sciences 282:20142604.

Friedrich, T., A. Timmermann, A. Abe-Ouchi, N. R. Bates, M. O. Chikamoto, M. J. Church, J. E. Dore, D. K. Gledhill, M. González-Dávila, M. Heinemann, T. Ilyina, J. H. Jungclaus, E. McLeod, A. Mouchet, and J. M. Santana-Casiano. 2012. Detecting regional anthropogenic trends in ocean acidification against natural variability. Nature Climate Change 2:167–171.

Fu, F., A. Tatters, and D. Hutchins. 2012. Global change and the future of harmful algal blooms in the ocean. Marine Ecology Progress Series 470:207–233.

Gattuso, J.-P., and L. Hansson. 2011. Ocean Acidification. Oxford University Press, Oxford, UK.

Gazeau, F., L. M. Parker, S. Comeau, J.-P. Gattuso, W. A. O'Connor, S. Martin, H.-O. Pörtner, and P. M. Ross. 2013. Impacts of ocean acidification on marine shelled molluscs. Marine Biology 160:2207–2245.

Gruber, N., C. Hauri, Z. Lachkar, D. Loher, T. L. Frölicher, and G.-K. Plattner. 2012. Rapid Progression of Ocean Acidification in the California Current System. Science 337:220–223.

Haigh, R., D. Ianson, C. A. Holt, H. E. Neate, and A. M. Edwards. 2015. Effects of Ocean Acidification on Temperate Coastal Marine Ecosystems and Fisheries in the Northeast Pacific. PLoS ONE 10:e0117533.

Hallegraeff, G. M. 2010. Ocean Climate Change, Phytoplankton Community Responses, and Harmful Algal Blooms: A Formidable Predictive Challenge1. Journal of Phycology 46:220–235.

Hauri, C., N. Gruber, G.-K. Plattner, S. Alin, R. A. Feely, B. Hales, and P. A. Wheeler. 2009. Ocean Acidification in the California Current System. Oceanography.

Hauri, C., N. Gruber, M. Vogt, S. C. Doney, R. A. Feely, Z. Lachkar, A. Leinweber, A. M. P. McDonnell, M. Munnich, and G.-K. Plattner. 2013. Spatiotemporal variability and long-term trends of ocean acidification in the California Current System. Biogeosciences 10:193–216.

Hendriks, I. E., C. M. Duarte, and M. Álvarez. 2010. Vulnerability of marine biodiversity to ocean acidification: A meta-analysis. Estuarine, Coastal and Shelf Science 86:157–164.

Hettinger, A., E. Sanford, T. M. Hill, J. D. Hosfelt, A. D. Russell, and B. Gaylord. 2013a. The influence of food supply on the response of Olympia oyster larvae to ocean acidification. Biogeosciences 10:6629–6638.

Hettinger, A., E. Sanford, T. M. Hill, E. A. Lenz, A. D. Russell, and B. Gaylord. 2013b. Larval carry-over effects from ocean acidification persist in the natural environment. Global Change Biology 19:3317–3326.

Hettinger, A., E. Sanford, T. M. Hill, A. D. Russell, K. N. S. Sato, J. Hoey, M. Forsch, H. N. Page, and B. Gaylord. 2012. Persistent carry-over effects of planktonic exposure to ocean acidification in the Olympia oyster. Ecology 93:2758–2768.

Hoegh-Guldberg, O. 2007. Coral reefs under rapid climate change and ocean acidification. Science 318:1737–1742.

Hofmann, G. E., J. P. Barry, P. J. Edmunds, R. D. Gates, D. A. Hutchins, T. Klinger, and M. A. Sewell. 2010. The Effect of Ocean Acidification on Calcifying Organisms in Marine Ecosystems: An Organism-to-Ecosystem Perspective. Annual Review of Ecology, Evolution, and Systematics 41:127–147.

Honisch, B., A. Ridgwell, D. N. Schmidt, E. Thomas, S. J. Gibbs, A. Sluijs, R. Zeebe, L. Kump, R. C. Martindale, S. E. Greene, W. Kiessling, J. Ries, J. C. Zachos, D. L. Royer, S. Barker, T. M. Marchitto, R. Moyer, C. Pelejero, P. Ziveri, G. L. Foster, and B. Williams. 2012. The Geological Record of Ocean Acidification. Science 335:1058–1063.

Hönisch, B., A. Ridgwell, D. N. Schmidt, E. Thomas, S. J. Gibbs, A. Sluijs, R. Zeebe, L. Kump, R. C. Martindale, S. E. Greene, W. Kiessling, J. Ries, J. C. Zachos, D. L. Royer, S. Barker, T. M. Marchitto, R. Moyer, C. Pelejero, P. Ziveri, G. L. Foster, and B. Williams. 2012. The Geological Record of Ocean Acidification. Science 335:1058–1063.

IPCC. 2013. Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Stocker, T.F., D. Qin, G.-K. Plattner, M. Tignor, S.K. Allen, J. Boschung, A. Nauels, Y. Xia, V. Bex and P.M. Midgley. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

IPCC. 2014. Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Ishimatsu, A., T. Kikkawa, M. Hayashi, K.-S. Lee, and J. Kita. 2004. Effects of CO2 on marine fish: larvae and adults. Journal of oceanography 60:731–741.

Jiang, L.-Q., R. A. Feely, B. R. Carter, D. J. Greeley, D. K. Gledhill, and K. M. Arzayus. 2015. Climatological distribution of aragonite saturation state in the global oceans. Global Biogeochemical Cycles:2015GB005198.

Julius, S. H., J. M. West, L. A. Joyce, P. Kareiva, B. D. Keller, M. Palmer, and C. Peterson. 2008. Preliminary review of adaptation options for climate-sensitive ecosystems and resources. National Parks 1:6.

Kelly, R. P., M. M. Foley, W. S. Fisher, R. A. Feely, B. S. Halpern, G. G. Waldbusser, and M. R. Caldwell. 2011a. Mitigating local causes of ocean acidification with existing laws. Science 332:1036–1037.

Kelly, R. P., M. M. Foley, W. S. Fisher, R. A. Feely, B. S. Halpern, G. G. Waldbusser, and M. R. Caldwell. 2011b. Mitigating local causes of ocean acidification with existing laws. Science(Washington) 332:1036–1037.

Kemp, W. M., W. R. Boynton, J. E. Adolf, D. F. Boesch, W. C. Boicourt, G. Brush, J. C. Cornwell, T. R. Fisher, P. M. Glibert, J. D. Hagy, and others. 2005. Eutrophication of Chesapeake Bay: historical trends and ecological interactions. Marine Ecology Progress Series 303:1–29.

Kroeker, K. J., R. L. Kordas, R. Crim, I. E. Hendriks, L. Ramajo, G. S. Singh, C. M. Duarte, and J.-P. Gattuso. 2013. Impacts of ocean acidification on marine organisms: quantifying sensitivities and interaction with warming. Global Change Biology 19:1884–1896.

Lannig, G., S. Eilers, H. O. Pörtner, I. M. Sokolova, and C. Bock. 2010. Impact of Ocean Acidification on Energy Metabolism of Oyster, Crassostrea gigas—Changes in Metabolic Pathways and Thermal Response. Marine Drugs 8:2318–2339.

Le Quéré, C., R. Moriarty, R. M. Andrew, G. P. Peters, P. Ciais, P. Friedlingstein, S. D. Jones, S. Sitch, P. Tans, A. Arneth, T. A. Boden, L. Bopp, Y. Bozec, J. G. Canadell, L. P. Chini, F. Chevallier, C. E. Cosca, I. Harris, M. Hoppema, R. A. Houghton, J. I. House, A. K. Jain, T. Johannessen, E. Kato, R. F. Keeling, V. Kitidis, K. Klein Goldewijk, C. Koven, C. S. Landa, P. Landschützer, A. Lenton, I. D. Lima, G. Marland, J. T. Mathis, N. Metzl, Y. Nojiri, A. Olsen, T. Ono, S. Peng, W. Peters, B. Pfeil, B. Poulter, M. R. Raupach, P. Regnier, C. Rödenbeck, S. Saito, J. E. Salisbury, U. Schuster, J. Schwinger, R. Séférian, J. Segschneider, T. Steinhoff, B. D. Stocker, A. J. Sutton, T. Takahashi, B. Tilbrook, G. R. van der Werf, N. Viovy, Y.-P. Wang, R. Wanninkhof, A. Wiltshire, and N. Zeng. 2015. Global carbon budget 2014. Earth System Science Data 7:47–85.

Lebrato, M., A. J. Andersson, J. B. Ries, R. B. Aronson, M. D. Lamare, W. Koeve, A. Oschlies, M. D. Iglesias-Rodriguez, S. Thatje, M. Amsler, S. C. Vos, D. O. B. Jones, H. A. Ruhl, A. R. Gates, and J. B. McClintock. 2016. Benthic marine calcifiers coexist with $CaCO3_3$ -undersaturated seawater worldwide. Global Biogeochemical Cycles.

Lewis, C., R. P. Ellis, E. Vernon, K. Elliot, S. Newbatt, and R. W. Wilson. 2016. Ocean acidification increases copper toxicity differentially in two key marine invertebrates with distinct acid-base responses. Scientific Reports 6.

Linares, C., M. Vidal, M. Canals, D. K. Kersting, D. Amblas, E. Aspillaga, E. Cebrián, A. Delgado-Huertas, D. Díaz, J. Garrabou, B. Hereu, L. Navarro, N. Teixidó, and E. Ballesteros. 2015.

Persistent natural acidification drives major distribution shifts in marine benthic ecosystems. Proc. R. Soc. B 282:20150587.
Lischka, S., and U. Riebesell. 2012. Synergistic effects of ocean acidification and warming on overwintering pteropods in the Arctic. Global Change Biology 18:3517–3528.
Lüthi, D., M. Le Floch, B. Bereiter, T. Blunier, J.-M. Barnola, U. Siegenthaler, D. Raynaud, J. Jouzel, H. Fischer, K. Kawamura, and T. F. Stocker. 2008. High-resolution carbon dioxide concentration record 650,000–800,000 years before present. Nature 453:379–382.
Mackas, D. L., and M. D. Galbraith. 2012. Pteropod time-series from the NE Pacific. ICES Journal of Marine Science: Journal du Conseil 69:448–459.
McLaughlin, K., S. Weisberg, A. Dickson, G. Hofmann, J. Newton, D. Aseltine-Neilson, A. Barton, S. Cudd, R. Feely, I. Jefferds, E. Jewett, T. King, C. Langdon, S. McAfee, D. Pleschner-Steele, and B. Steele. 2015. Core Principles of the California Current Acidification Network: Linking Chemistry, Physics, and Ecological Effects. Oceanography 25:160–169.
McNeil, B. I., and R. J. Matear. 2006. Projected climate change impact on oceanic acidification. Carbon Balance and Management 1:1–6.
Melzner, F., J. Thomsen, W. Koeve, A. Oschlies, M. A. Gutowska, H. W. Bange, H. P. Hansen, and A. Körtzinger. 2012. Future ocean acidification will be amplified by hypoxia in coastal habitats. Marine Biology 160:1875–1888.
Nagelkerken, I., and S. D. Connell. 2015. Global alteration of ocean ecosystem functioning due to increasing human CO2 emissions. Proceedings of the National Academy of Sciences:201510856.
Narita, D., K. Rehdanz, and R. S. J. Tol. 2012. Economic costs of ocean acidification: a look into the impacts on global shellfish production. Climatic Change 113:1049–1063.
Newell, R. I. 2004. Ecosystem influences of natural and cultivated populations of suspension-feeding bivalve molluscs: a review. Journal of Shellfish Research 23:51–62.
NOAA National Climatic Data Center. 2015. State of the Climate: Global Analysis for March 2015.
Orr, J. C., V. J. Fabry, O. Aumont, L. Bopp, S. C. Doney, R. A. Feely, A. Gnanadesikan, N. Gruber, A. Ishida, F. Joos, R. M. Key, K. Lindsay, E. Maier-Reimer, R. Matear, P. Monfray, A. Mouchet, R. G. Najjar, G.-K. Plattner, K. B. Rodgers, C. L. Sabine, J. L. Sarmiento, R. Schlitzer, R. D. Slater, I. J. Totterdell, M.-F. Weirig, Y. Yamanaka, and A. Yool. 2005. Anthropogenic ocean acidification over the twenty-first century and its impact on calcifying organisms. Nature 437:681–686.
Pandolfi, J. M., S. R. Connolly, D. J. Marshall, and A. L. Cohen. 2011. Projecting coral reef futures under global warming and ocean acidification. Science 333:418–422.
Parker, L. M., P. M. Ross, and W. A. O'connor. 2009. The effect of ocean acidification and temperature on the fertilization and embryonic development of the Sydney rock oyster Saccostrea glomerata (Gould 1850). Global Change Biology 15:2123–2136.
Parker, L. M., P. M. Ross, W. A. O'Connor, L. Borysko, D. A. Raftos, and H.-O. Pörtner. 2012. Adult exposure influences offspring response to ocean acidification in oysters. Global Change Biology 18:82–92.
Pörtner, H.-O. 2008. Ecosystem effects of ocean acidification in times of ocean warming: a physiologist's view. Mar Ecol Prog Ser 373:203–217.
Ries, J. B. 2010. Review: geological and experimental evidence for secular variation in seawater Mg/Ca (calcite-aragonite seas) and its effects on marine biological calcification. Biogeosciences 7:2795–2849.
Ries, J. B., A. L. Cohen, and D. C. McCorkle. 2009. Marine calcifiers exhibit mixed responses to CO2-induced ocean acidification. Geology 37:1131–1134.
Rogelj, J., M. Schaeffer, P. Friedlingstein, N. P. Gillett, D. P. van Vuuren, K. Riahi, M. Allen, and R. Knutti. 2016. Differences between carbon budget estimates unravelled. Nature Climate Change 6:245–252.
Rykaczewski, R. R., and D. M. Checkley. 2008. Influence of ocean winds on the pelagic ecosystem in upwelling regions. Proceedings of the National Academy of Sciences 105:1965–1970.

Salisbury, J., M. Green, C. Hunt, and J. Campbell. 2008. Coastal Acidification by Rivers:A Threat to Shellfish? Eos, Transactions American Geophysical Union 89:513–513.
Seijo, J. C., R. Villanueva-Poot, and A. Charles. 2016. Bioeconomics of ocean acidification effects on fisheries targeting calcifier species: A decision theory approach. Fisheries Research 176:1–14.
Snyder, M. A., L. C. Sloan, N. S. Diffenbaugh, and J. L. Bell. 2003. Future climate change and upwelling in the California Current. Geophysical Research Letters 30:1823.
Solomon, S., G.-K. Plattner, R. Knutti, and P. Friedlingstein. 2009. Irreversible climate change due to carbon dioxide emissions. Proceedings of the national academy of sciences 106:1704–1709.
Steinacher, M., F. Joos, T. L. Frölicher, G.-K. Plattner, and S. C. Doney. 2009. Imminent ocean acidification in the Arctic projected with the NCAR global coupled carbon cycle-climate model. Biogeosciences 6:515–533.
Sun, J., D. A. Hutchins, Y. Feng, E. L. Seubert, D. A. Caron, and F.-X. Fu. 2011. Effects of changing *p* CO_2 and phosphate availability on domoic acid production and physiology of the marine harmful bloom diatom *Pseudo-nitzschia multiseries*. Limnology and Oceanography 56:829–840.
Sydeman, W. J., M. García-Reyes, D. S. Schoeman, R. R. Rykaczewski, S. A. Thompson, B. A. Black, and S. J. Bograd. 2014. Climate change and wind intensification in coastal upwelling ecosystems. Science 345:77–80.
Takeshita, Y., C. A. Frieder, T. R. Martz, J. R. Ballard, R. A. Feely, S. Kram, S. Nam, M. O. Navarro, N. N. Price, and J. E. Smith. 2015. Including high-frequency variability in coastal ocean acidification projections. Biogeosciences 12:5853–5870.
Tatters, A. O., L. J. Flewelling, F. Fu, A. A. Granholm, and D. A. Hutchins. 2013. High CO2 promotes the production of paralytic shellfish poisoning toxins by Alexandrium catenella from Southern California waters. Harmful Algae 30:37–43.
Tatters, A. O., F.-X. Fu, and D. A. Hutchins. 2012. High CO2 and Silicate Limitation Synergistically Increase the Toxicity of Pseudo-nitzschia fraudulenta. PLoS ONE 7:e32116.
Timmins-Schiffman, E., M. J. O'Donnell, C. S. Friedman, and S. B. Roberts. 2012. Elevated pCO2 causes developmental delay in early larval Pacific oysters, Crassostrea gigas. Marine Biology 160:1973–1982.
Trainer, V. L., W. P. Cochlan, A. Erickson, B. D. Bill, F. H. Cox, J. A. Borchert, and K. A. Lefebvre. 2007. Recent domoic acid closures of shellfish harvest areas in Washington State inland waterways. Harmful Algae 6:449–459.
Waldbusser, G. G., B. Hales, C. J. Langdon, B. A. Haley, P. Schrader, E. L. Brunner, M. W. Gray, C. A. Miller, and I. Gimenez. 2015a. Saturation-state sensitivity of marine bivalve larvae to ocean acidification. Nature Climate Change 5:273–280.
Waldbusser, G. G., B. Hales, C. J. Langdon, B. A. Haley, P. Schrader, E. L. Brunner, M. W. Gray, C. A. Miller, I. Gimenez, and G. Hutchinson. 2015b. Ocean Acidification Has Multiple Modes of Action on Bivalve Larvae. PLOS ONE 10:e0128376.
Waldbusser, G. G., and J. E. Salisbury. 2014. Ocean Acidification in the Coastal Zone from an Organism's Perspective: Multiple System Parameters, Frequency Domains, and Habitats. Annual Review of Marine Science 6:221–247.
Waldbusser, G. G., E. P. Voigt, H. Bergschneider, M. A. Green, and R. I. E. Newell. 2011. Biocalcification in the Eastern oyster (Crassostrea virginica) in relation to long-term trends in chesapeake bay ph. Estuaries and Coasts 34:221–231.
Wall-Palmer, D., C. W. Smart, and M. B. Hart. 2013. In-life pteropod shell dissolution as an indicator of past ocean carbonate saturation. Quaternary Science Reviews 81:29–34.
Washington State Blue Ribbon Panel on Ocean Acidification. 2012. Ocean Acidification: From Knowledge to Action. Washington State's Strategic Response. Washington Department of Ecology, Olympia, Washington.
WCOAHP. 2015a. Multiple stressor considerations: ocean acidification in a deoxygenating ocean and warming climate. Page 7. West Coast Ocean Acidification and Hypoxia Science Pane, Oakland, California.

WCOAHP. 2015b. Multiple stressor considerations: ocean acidification in a deoxygenating ocean and warming climate. Page 7. West Coast Ocean Acidification and Hypoxia Science Pane, Oakland, California.

Weisberg, S. B., N. Bednaršek, R. A. Feely, F. Chan, A. B. Boehm, M. Sutula, J. L. Ruesink, B. Hales, J. L. Largier, and J. A. Newton. 2016. Water quality criteria for an acidifying ocean: Challenges and opportunities for improvement. Ocean & Coastal Management 126:31–41.

Wittmann, A. C., and H.-O. Pörtner. 2013. Sensitivities of extant animal taxa to ocean acidification. Nature Climate Change 3:995–1001.

Wootton, J. T., and C. A. Pfister. 2012. Carbon System Measurements and Potential Climatic Drivers at a Site of Rapidly Declining Ocean pH. PLOS ONE 7:e53396.

Wootton, J. T., C. A. Pfister, and J. D. Forester. 2008. Dynamic patterns and ecological impacts of declining ocean pH in a high-resolution multi-year dataset. Proceedings of the National Academy of Sciences 105:18848–18853.

Wu, Y., D. A. Campbell, A. J. Irwin, D. J. Suggett, and Z. V. Finkel. 2014a. Ocean acidification enhances the growth rate of larger diatoms. Limnology and Oceanography 59:1027–1034.

Wu, Y., D. A. Campbell, A. J. Irwin, D. J. Suggett, and Z. V. Finkel. 2014b. Ocean acidification enhances the growth rate of larger diatoms. Limnology and Oceanography 59:1027–1034.

Yang, Y., L. Hansson, and J.-P. Gattuso. 2016. Data compilation on the biological response to ocean acidification: an update. Earth System Science Data 8:79–87.

Zeebe, R. E. 2012. History of Seawater Carbonate Chemistry, Atmospheric CO2, and Ocean Acidification. Annual Review of Earth and Planetary Sciences 40:141–65.

County of San Diego

RICHARD E. CROMPTON
DIRECTOR

DEPARTMENT OF PUBLIC WORKS
5510 OVERLAND AVE, SUITE 410
SAN DIEGO, CALIFORNIA 92123-1237
(858) 694-2212 FAX: (858) 694-3597
Web Site: www.sdcounty.ca.gov/dpw/

August 12, 2016

Ms. Xueyuan Yu
San Diego Regional Water Quality Control Board
2375 Northside Drive, #100
San Diego, CA 92108

Electronic submission: sandiego@waterboards.ca.gov

REVIEW AND COMMENT OF THE DRAFT 2014 CALIFORNIA SECTION (§) 303(D)/305(B) INTEGRATED REPORT

County of San Diego

RICHARD E. CROMPTON
DIRECTOR

DEPARTMENT OF PUBLIC WORKS
5510 OVERLAND AVE, SUITE 410
SAN DIEGO, CALIFORNIA 92123-1237
(858) 694-2212 FAX: (858) 694-3597
Web Site: www.sdcounty.ca.gov/dpw/

August 12, 2016

Ms. Xueyuan Yu
San Diego Regional Water Quality Control Board
2375 Northside Drive, #100
San Diego, CA 92108

Electronic submission: sandiego@waterboards.ca.gov

Dear Ms. Yu:

REVIEW AND COMMENT OF THE DRAFT 2014 CALIFORNIA SECTION (§) 303(D)/305(B) INTEGRATED REPORT

The County of San Diego (County) has reviewed the Draft 2014 California §303(d)/305(b) Integrated Report dated July 12, 2016. We appreciate the opportunity to provide comments to the San Diego Regional Water Quality Control Board (Regional Board) on this important document. We thank the Regional Board staff for their high level of interaction with stakeholders and their responsiveness to stakeholders' questions. This letter first provides an overview of our key comments and then provides specific comments organized by constituent or water body condition.

General Comments

1. Inconsistent Application of Listing Policy for Conventional and Other Pollutants
   Listings for conventional and other pollutants do not appear to follow the guidance presented in Table 3.2 of the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (Listing Policy). The exceedances of conventional and other pollutants needed to place a water body on the §303(d) list should be greater than or equal to five. However, numerous listings, including total nitrogen, total phosphorus, benthic community, and surfactants are included on the Draft 2014 §303(d) list based on exceedance counts of less than five. More detail is provided below regarding comments for specific decision IDs.

2. Water Quality Improvement Plans Address Beaches and Creek Bacteria TMDL
   A number of new listings for indicator bacteria have been added to the Draft 2014 §303d list. Water bodies located in the tributaries of the Beaches and Creek Bacteria TMDL should be classified as Category 4a.

3. Incorrect Application of the Listing Policy by Combining Sediment and Water Toxicity Sample Results
   In many of the proposed toxicity listings, sediment and water toxicity samples were combined to determine the final exceedance count and listing determination. The toxicants found in water and sediment are likely to be different. Additionally, the species used to test toxicity are different for water and sediment. The Listing Policy states: "A water segment shall be placed on the section 303(d) list if the water segment exhibits statistically significant water or sediment toxicity using the binomial distribution…" The Listing Policy does not state water and/or sediment toxicity.

4. Consider Recent Data Before Making A Listing Decision
   Although acknowledged by the Regional Board, the age of some of the data used in the listing analysis was greater than 10 years for numerous waterbodies and therefore not likely representative of current water quality conditions. Inclusion of data greater than 10 years old, and arguably greater than five years old, will likely not result in a §303d list that is representative of water quality conditions in San Diego County and therefore not useful in the development of water quality priorities. If the Regional Board is required to list a waterbody using available data, please review listings off-cycle with additional available information not included in the Draft 2014 §303(d) listing evaluation.

5. Inconsistent Use of Biological Indices in Listing Decisions
   The Listing Policy states that appropriate reference sites must be identified for each waterbody assessment of biological data (Section 6.1.5.8 of the Listing Policy). Per the Draft Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego Region (Integrated Report) the Regional Board states that the California Stream Condition Index (CSCI) incorporates reference stations by utilizing an expected value and that for this listing cycle, the CSCI was used to assess stream beneficial use attainment. In the Draft 2014 §303d list, recommendations were made to list both Santa Margarita River (Lower) and Sweetwater River (Upper) based on CSCI scores below the threshold of 0.79, but in both cases the number of samples is below the minimum of five required to list a waterbody for a conventional or other pollutant per Table 3.2 of the Listing Policy.

6. Incorrect use of Nutrient Concentrations as an LOE for Benthic Community Listings
   Secondary lines of evidence (LOEs) were presented for the benthic community listings that included nutrients. Note that total nitrogen and total phosphorus, while indicative of conditions that may cause eutrophication or harmful algal blooms, do not directly cause toxicity in the water. The Listing Policy, Section 3.9, states that the biological communities must be compared to reference sites and that the results be associated with "*water or sediment concentrations of pollutants including but not limited to chemical concentrations, temperature, dissolved oxygen, and trash."* Nutrients such as total nitrogen and total phosphorus are not included on this list of associated pollutants in the Listing Policy, and should not be included as secondary LOEs.

7. CSCI Impairment Threshold of 0.79 is Overly Conservative
   The CSCI is a relatively new indexing tool that has recently been published for use in California (Mazor, et al 2016) and includes a predictive approach to estimate expected reference conditions at a sampling location. While the tool is an improvement over

historic benthic community index tools (i.e., Index of Biotic Integrity (IBI) and the observed to expected ratio (O/E)) there are still specific details of the tool that are currently under revision (e.g., use of "distinct" or "non-distinct" Southwestern Association of Freshwater Invertebrate Taxonomists (SAFIT) Level 1 or 2 taxonomic data). The revisions are ongoing and do affect CSCI results. In addition, the Regional Board's selection of the threshold for impairment of a CSCI < 0.79 is overly conservative and the basis is unclear. Mazor et al 2016, Table 6 indicates that 52% of sites located in "high activity" areas of the South Coast received CSCI scores of <0.63. Combining "moderate" and "high activity," 32% of sites in the South Coast were <0.63. A CSCI ≥ 0.79 is considered "possibly altered," and only 40% of samples in Table 6 met this criterion in the South Coast. For the purposes of developing the §303(d) list the Regional Board should use the category "likely altered" (CSCI≥0.63), which would protect the biologic beneficial use and allow stakeholders to accurately prioritize impaired waterways. Further, the use of the CSCI is not consistent with the policy currently under development at the State Water Resources Control Board for biological objectives and is not explicitly included in the Listing Policy.

8. Selenium De-Listing Letters not Considered in Draft 2014 303(d) List
   In May 2014, the County of San Diego submitted five comment letters related to the 2010 §303d listings for selenium in five creeks. Additional data were collected by the County of San Diego for use in the de-listing evaluation and compared to the California Toxics Rule (CTR) Freshwater Criterion of 0.005 mg/L. The County requests that these data be considered as part of the 2014 §303(d) list development process.

Specific Comments by Constituent

1. Nitrogen
   Numerous pollutant-waterbody combinations were included on the Draft 2014 §303(d) list for total nitrogen based on sample sizes of four or less, with exceedance counts of four or less. Per Table 3.2 of the Listing Policy, the number of exceedances required to list a waterbody for a conventional or other pollutant is at least five. The 14 waterbodies listed below do not meet the listing criteria and should be removed from the 2014 §303(d) list.

Water Body	HSA	Decision ID	LOE Notes
Sandia Creek	902.22	43855	2 of 4 samples exceeded
Santa Margarita River (Upper)	902.22	43136	2 of 4 samples exceeded
Keys Creek	903.12	43330	4 of 4 samples exceeded
Buena Creek	904.32	44287	4 of 4 samples exceeded
Cloverdale Creek	905.32	44129	3 of 3 samples exceeded
Poway Creek	906.2	43500	4 of 4 samples exceeded
Alvarado Creek	907.11	42850	2 of 4 samples exceeded
Forester Creek	907.13	42728	4 of 4 samples exceeded
Los Coches Creek	907.14	43119	4 of 4 samples exceeded
Chocolate Creek	907.33	42678	3 of 3 samples exceeded
Telegraph Canyon Creek	909.11	32905	4 of 4 samples exceeded
Sweetwater River, Upper	909.21	43750	2 of 4 samples exceeded
Poggi Canyon Creek	910.2	43074	3 of 3 samples exceeded
Tecate Creek	911.23	43237	4 of 4 samples exceeded

LOE = Line of Evidence

Recommendation

Remove Sandia Creek, Santa Margarita River (Upper), Keys Creek, Buena Creek, Cloverdale Creek, Poway Creek, Alvarado Creek, Forester Creek, Los Coches Creek, Chocolate Creek, Telegraph Canyon Creek, Sweetwater River (Upper), Poggi Canyon Creek, and Tecate Creek from the Draft 2014 §303(d) List for Total Nitrogen because each waterbody segment has less than the minimum of five samples required by the Listing Policy for conventional and other pollutants.

2. Phosphorus

New pollutant-waterbody combinations were included on the Draft 2014 §303(d) list for total phosphorus based on exceedance counts of four or less. Per Table 3.2 of the Listing Policy, the number of exceedances required to list a waterbody for a conventional or other pollutant is at least five. The 12 waterbodies listed below do not meet the listing criteria and should not be included on the 2014 §303(d) list.

Water Body	HSA	Decision ID	LOE Notes
San Luis Rey River, Upper (East of I-15)	903.12	35149	4 of 4 samples exceeded
Buena Creek	904.32	33504	4 of 4 samples exceeded
Encinitas Creek	904.51	33095	4 of 4 samples exceeded
Reidy Canyon Creek	904.62	32634	2 of 2 samples exceeded
Sutherland Reservoir	905.53	43121	4 of 9 samples exceeded
Forester Creek	907.13	44281	3 of 10 samples exceeded
Los Coches Creek	907.14	44602	2 of 4 samples exceeded
San Vicente Creek	907.22	43874	2 of 5 samples exceeded
Chocolate Creek	907.33	43144	2 of 3 samples exceeded
Otay Reservoir, Lower	910.31	43242	3 of 28 samples exceeded
Tecate Creek	911.23	42788	4 of 4 samples exceeded
Barrett Lake	911.3	42328	4 of 9 s samples exceeded

LOE = Line of Evidence

Recommendation

Remove San Luis Rey River (Upper), Buena Creek, Encinitas Creek, Reidy Canyon Creek, Sutherland Reservoir, Forester Creek, Los Coches Creek, San Vicente Creek, Chocolate Creek, Otay Reservoir (Lower), Tecate Creek, and Barrett Lake from the Draft 2014 §303(d) List for Total Phosphorus because each waterbody segment has less than the minimum of five samples required by the Listing Policy for conventional and other pollutants.

3. Surfactants

Agua Hedionda Creek, Escondido Creek, and San Diego River (Lower) were listed for surfactants (MBAS) based on one LOE, and each listing referenced the Copermittee monitoring data from 2001 to 2008 as the basis of the listing. Further examination of the available data resulted in the following comments:

- Agua Hedionda Creek, Decision ID 47481; the single LOE states that eight of 11 samples collected by the San Diego County Municipal Copermittees (Copermittees) between 2001 and 2008 at AHC-MLS and AHC-TWAS-1 exceeded the criterion for surfactants (MBAS) (0.5 mg/L). According to the latest Copermittee monitoring report (Transitional Monitoring and Assessment Program Report for the Carlsbad Watershed Management Area (2014-2015)), zero of two dry weather and zero of two wet weather samples at AHC-TWAS-1 exceeded the criteria between 2001 and October 2010. Additionally, between 2001 and October 2010, zero of three dry weather and zero of 31 wet weather samples collected at AHC-MLS exceeded the criterion. A total of 38 samples were collected between 2001 and October 2010, with zero exceedances of the criterion for surfactants (MBAS). Table 3.2 of the Listing Policy states that a minimum of seven exceedances are needed to list a waterbody for a conventional or other pollutant with 38 samples. These data do not meet the listing criteria for listing Agua Hedionda Creek for surfactants (MBAS).

- Escondido Creek, Decision ID 47747; LOE 78020 states that nine of 12 samples collected by the Copermittees between 2001 and 2008 exceeded the criterion for surfactants (MBAS) (0.5 mg/L) at ESC-MLS and ESC-TWAS-1. According to the latest Copermittee monitoring report (Transitional Monitoring and Assessment Program Report for the Carlsbad Watershed Management Area (2014-2015)), zero of two samples exceeded the criterion during dry weather and zero of two samples exceeded the criterion during wet weather at ESC-TWAS-1 between 2001 and October 2010. Additionally, between 2001 and October 2010, zero of three samples exceeded the criterion during dry weather and zero of 22 samples exceeded the criterion during wet weather at ESC-MLS. A total of 29 samples were collected between 2001 and October 2010 in the Escondido subwatershed (904.6) and none of those samples exceeded the criterion for surfactants (MBAS). Table 3.2 of the Listing Policy states that a minimum of five exceedances are needed to list a waterbody for a conventional or other pollutant. These data do not meet the listing criteria for listing Escondido Creek for surfactants (MBAS).

- San Diego River (Lower), Decision ID 51367; According to LOE 78088, four wet weather samples were collected at SDR-MLS, and two of those four samples exceeded the criterion of 0.5 mg/L for surfactants (MBAS) between 2001 and 2008. Further examination of the Copermittee monitoring data collected between 2001-2008 and 2008-2010 shows that zero of two samples collected during dry weather (January 2010 and May 2010) and two of 21 samples collected during wet weather (between February 2002 and November 2009) at SDR-MLS exceeded the criterion. A total of two out of 23 samples exceeded the criterion between 2001 and October 2010 (Transitional Monitoring and Assessment Program Report for the San Diego River Watershed Management Area (2014-2015)). Table 3.2 of the Listing Policy states that a minimum of five exceedances are needed to list a waterbody for a conventional or other pollutant. These data do not meet the listing criteria for listing San Diego River (Lower) for surfactants (MBAS).

<u>Recommendations</u>

- Recommend removal of Agua Hedionda Creek for surfactants (MBAS) from the Draft 2014 §303(d) list; the total number of exceedances for Agua Hedionda Creek is zero of 38 (AHC-MLS and AHC-TWAS-1).
- Recommend removal of Escondido Creek for surfactants (MBAS) from the Draft 2014 §303(d) list; the total number of exceedances for Escondido Creek (ESC-MLS and ESC-TWAS-1) was zero of 29.
- Recommend removal of San Diego River (Lower) for surfactants (MBAS) from the Draft 2014 §303(d) list; the total number of exceedances for SDR-MLS was two of 23 samples, which does not meet the criteria for listing.

4. Chlorpyrifos

Los Peñasquitos Creek and Lower Sweetwater River were placed on the Draft 2014 §303d list for Chlorpyrifos. Both listings were based on the Copermittee data collected between 2001 and 2008. In addition to the Chlorpyrifos results included in the analysis, toxicity at Los Peñasquitos Creek was used as a secondary line of evidence. Re-evaluation of the data available up to October 2010 and to 2015 results in the following findings:

- Los Peñasquitos Creek, Decision ID 47517; LOE ID 77794 notes that two exceedances of the Chlorpyrifos criteria were observed from samples collected at LPC-MLS. The two exceedances occurred during wet weather in 2002, and since 2002 there have been no exceedances of the Chlorpyrifos standard (Transitional Monitoring and Assessment Program Report for the Los Peñasquitos Creek Watershed Management Area (2014-2015)) during either wet or dry weather. Re-analysis of wet weather monitoring data collected between 2001 and October 2010 results in two exceedances out of 16 samples, and inclusion of samples collected to 2015 results in two exceedances out of 22 samples. Two dry weather samples were collected in 2007-2008 and one sample in September 2010, and Chlorpyrifos was not detected in any sample. Note that six samples were not included in the analysis because the method reporting limit was greater than the criterion of 0.014 µg/L. Although the Listing Policy does not place a limit on the age of data used in assessments, data over 10 years old are likely not representative of current water quality conditions. Additionally, no exceedances (and no detections) of Chlorpyrifos have been observed since the two exceedances in 2002. See Attachment A for monitoring results.

  In addition to the LOE based on Chlorpyrifos results, toxicity was also included as a LOE (LOE ID 74173). Seven of 27 results were found to exhibit toxicity; however, no toxicity was observed for the two samples which exceeded the criteria for Chlorpyrifos (November and December 2002).

  Therefore, based on analysis of Chlorpyrifos and toxicity data, inclusion of Los Peñasquitos Creek on the Draft 2014 §303d list for Chlorpyrifos is not representative of current water quality conditions. Los Peñasquitos Creek should not be included on the 2014 §303d list for Chlorpyrifos.

- Sweetwater River (Lower), Decision ID 53457; LOE ID 77930 states that three of 14 samples exceeded the Chlorpyrifos criterion at SR-MLS and SR-TWAS-1 between 2001 and 2008. Re-analysis of available data (Transitional Monitoring and Assessment Program Report for the San Diego Bay Watershed Management Area (2014-2015)) shows that there have been no exceedances of the Chlorpyrifos criterion at SR-MLS or SR-TWAS-1 since 2003. Between 2001 and 2010, three of 16 wet weather samples and zero of two dry weather samples exceeded the criterion at SR-MLS, and zero of two samples for both wet and dry weather exceeded the criterion at SR-TWAS-1 for a total of three out of 22 samples exceeding the Chlorpyrifos criterion. Given the age of the exceedances, it is prudent to consider the available data from 2001 through 2014. During this time period, three of 21 wet weather samples and zero of seven dry weather samples exceeded the criterion at SR-MLS, and zero of six samples exceeded the criterion at SR-TWAS-1 during both wet and dry weather. The total number of exceedances between 2001 and 2014 was three out of 40 samples. This does not meet the criteria for listing presented in Table 3.1 of the Listing Policy. See Attachment A for monitoring results.

Recommendations

- Recommend Los Peñasquitos Creek should not be included on the 2014 §303(d) list for Chlorpyrifos, two of 19 samples exceeded the criterion between 2001 and October 2010; and two of 28 samples exceeded the criterion up to 2015. Additionally, no samples have exceeded or been detected since 2002. Per Section 3.10 item 6 of the Listing Policy, Chlorpyrifos is not expected to exceed the criterion by the next listing cycle and should be removed from the 2014 §303d list.
- Recommend Sweetwater River, Lower should not be included on the 2014 §303d list. Three of 22 samples exceed the criterion between 2001 and 2010, however only three of 40 samples exceeded the criterion between 2001 and 2014. Additionally, no exceedances of Chlorpyrifos have been observed in Sweetwater River at the two monitoring stations since 2003. Per Section 3.10 item 6 of the Listing Policy, Chlorpyrifos is not expected to exceed the criterion by the next listing cycle and should be removed from the 2014 §303d list.

5. Diazinon

Diazinon was banned from sale in 2005, and since that time significant decreases in concentrations of this pesticide have been observed in receiving water bodies in San Diego County. Due to the inclusion of data greater than 10 years old in the Draft 2014 §303d list evaluation, the number of exceedances for this pesticide meets listing criteria in some water bodies. However, due to the ban on sales of Diazinon in the past 11 years, evaluation of the data should be limited to data collected since the time of the ban. Additionally, sections 3.10 and 4.10 of the Listing Policy allow for the inclusion of trend evaluation during §303d list development. The following water bodies are currently proposed for listing on the Draft 2014 §303d list for Diazinon; however there have been no exceedances of the criteria for Diazinon since the early 2000's at any of the stations included in the analysis.

- Agua Hedionda Creek, Decision ID 47453; LOE ID 72872 states that nine of 28 samples exceeded the criterion for Diazinon at AHC-MLS and AHC-TWAS-1 between 2001 and 2008. Re-analysis of available data (Transitional Monitoring and Assessment Program Report for the Carlsbad Watershed Management Area (2014-2015)) shows that there have been zero exceedances of the criterion for Diazinon since 2006 at these two monitoring locations (zero of 18 samples during wet and dry weather). Based on the age of the exceedances and significantly decreasing trend results (step six of section 3.10 of the Listing Policy) this pollutant is not likely to exceed the criterion in the future. Therefore, Diazinon should not be included on the 2014 §303d list for Agua Hedionda Creek. See Attachment A for a table of monitoring results.

- Escondido Creek, Decision ID 47734; LOE ID 73584 states that five of 35 samples exceeded the criterion for Diazinon at ESC-MLS and ESC-TWAS-1 between 2001 and 2008. Re-analysis of available data (Transitional Monitoring and Assessment Program Report for the Carlsbad Watershed Management Area (2014-2015)) shows that there have been zero exceedances of the criterion for Diazinon since 2003 at these two monitoring locations (zero of 35 samples during wet and dry weather). Based on the age of the exceedances (pre-dating the ban on Diazinon) and significantly decreasing trend results (step six of section 3.10 of the Listing Policy) this pollutant is not likely to exceed the criterion in the future. Therefore, Diazinon should not be included on the 2014 §303d list for Escondido Creek. See Attachment A for a table of monitoring results.

- Los Peñasquitos Creek, Decision ID 47555; LOE ID 74219 states that three of 27 samples exceeded the criterion for Diazinon at LPC-MLS and LPC-TWAS-2 between 2001 and 2008. Re-analysis of available data (Transitional Monitoring and Assessment Program Report for the Los Peñasquitos Creek Watershed Management Area (2014-2015)) shows that there have been zero exceedances of the criterion for Diazinon since 2002 up to 2014 at LPC-MLS (zero of 33 samples during wet and dry weather). LPC-TWAS-2 is located in a separate waterbody and therefore was not included in this reanalysis. Based on the age of the exceedances (pre-dating the ban on Diazinon) and significantly decreasing trend results (step six of section 3.10 of the Listing Policy) this pollutant is not likely to exceed the criterion in the future. Therefore, Diazinon should not be included on the 2014 §303d list for Los Peñasquitos Creek. See Attachment A for a table of monitoring results.

- San Diego River (Lower), Decision ID 49392; LOE ID 75599 states that two of 19 samples exceeded the criterion for Diazinon at SDR-MLS between 2001 and 2008. Re-analysis of available data (Transitional Monitoring and Assessment Program Report for the San Diego River Watershed Management Area (2014-2015)) shows that there have been zero exceedances of the criteria for Diazinon since 2002 at this monitoring location (zero of 30 samples during wet and dry weather). Based on the age of the exceedances (pre-dating the ban on Diazinon) and significantly decreasing trend results (step six of section 3.10 of the Listing Policy) this pollutant is not likely to exceed the criterion in the future. Therefore, Diazinon should not be included on the 2014 §303d list for the Lower San Diego River. See Attachment A for a table of monitoring results.

- Sweetwater River (Lower), Decision ID 53461; LOE ID 77012 states that five of 27 samples exceeded the criterion for Diazinon at SR-MLS and SR-TWAS-1 between 2001 and 2008. Re-analysis of available data (Transitional Monitoring and Assessment Program Report for the San Diego Bay Watershed Management Area (2014-2015)) shows that there have been zero exceedances of the criterion for Diazinon since 2003 at these two monitoring locations (zero of 38 samples). Based on the age of the exceedances (pre-dating the ban on Diazinon) and significantly decreasing trend results (step six of section 3.10 of the Listing Policy) this pollutant is not likely to exceed the criterion in the future. Therefore, Diazinon should not be included on the 2014 §303d list for the Lower Sweetwater River. See Attachment A for a table of monitoring results.

Recommendations

- Recommend Agua Hedionda Creek be removed from the Draft 2014 §303d list due to the ban on the sale of Diazinon, the significantly decreasing trends in Diazinon since 2005, no observed exceedances of Diazinon since 2006 (zero of 18 samples), and the likelihood that Diazinon will not exceed the criterion in the future.
- Recommend Escondido Creek be removed from the Draft 2014 §303d list due to the ban on the sale of Diazinon, the significantly decreasing trends in Diazinon since 2005, no observed exceedances of Diazinon since 2003 (zero of 35 samples), and the likelihood that Diazinon will not exceed the criterion in the future.
- Recommend Los Peñasquitos Creek, be removed from the Draft 2014 §303d list due to the ban on the sale of Diazinon, the significantly decreasing trends in Diazinon since

2005, no observed exceedances of Diazinon since 2002 (zero of 33 samples) and the likelihood that Diazinon will not exceed the criterion in the future.

- Recommend San Diego River, Lower be removed from the Draft 2014 §303d list due to the ban on the sale of Diazinon, the significantly decreasing trends in Diazinon since 2005, no observed exceedances of Diazinon since 2002 (zero of 30 samples) and the likelihood that Diazinon will not exceed the criterion in the future.
- Recommend Sweetwater River, Lower be removed from the Draft 2014 §303d list due to the ban on the sale of Diazinon, the significantly decreasing trends in Diazinon since 2005, no exceedances of Diazinon since 2003 (zero of 38 samples) and the likelihood that Diazinon will not exceed the criterion in the future.

6. Malathion

Five lines of evidence were used as the basis to list Escondido Creek for Malathion (Decision ID 47742) on the Draft 2014 §303d list. One LOE was based on the data collected by the Copermittees from 2001-2008, and one LOE was based on data collected by the County of San Diego between 2003 and 2009. The remaining LOEs compare the same two datasets with a different criterion for Malathion (drinking water standard of 500 µg/L), and one LOE presents toxicity findings from the Copermittee dataset. Based on re-analysis of the Copermittee data ((Transitional Monitoring and Assessment Program Report for the Carlsbad Watershed Management Area (2014-2015)), additional data are available to complete the data analysis from 2001 through October 2010. Below are the findings from this re-analysis.

- LOE ID: 73609; the fact sheet states that three of 24 samples exceeded the Malathion criterion during wet and dry weather at ESC-MLS and ESC-TWAS-1 between 2001 and 2008. Inclusion of data up to October of 2010 results in three exceedances out of 26 samples. However, inclusion of data up to 2014 results in a finding of three of 38 samples exceeding the criterion for Malathion (not enough to list, per Table 3.1 of the Listing Policy). In addition, no samples have exceeded the Malathion criterion at the two stations since 2007, and due to the low levels observed since 2007 this pollutant is not likely to exceed the criterion in the future. See Attachment A for a table of monitoring results.

- LOE ID: 73610; Zero of seven samples exceeded the criterion for Malathion at two locations in Escondido Creek between 2006 and 2009 (Escondido Creek at El Camino Del Norte and Escondido Creek at East Country Club Drive).

- LOE ID: 73566; Toxicity was observed in seven of 27 samples collected as part of the County of San Diego Copermittee monitoring program between 2001 and 2008. Further examination of the data available up to October 2010 shows that although toxicity was observed in some samples, Malathion levels were below the detection limit when toxicity was observed during dry weather at ESC-MLS, and no toxicity was observed during wet weather when Malathion levels were above the criterion (i.e., Malathion levels were below the detection limit when toxicity was observed during wet weather). See Attachment A for a table of monitoring results.

Recommendation

Based on the findings above, it is recommended that the listing for Malathion at Escondido Creek be removed from the Draft 2014 §303d list because no exceedances have been observed since 2007. Although three of 26 samples exceeded the criterion between 2001 and 2010, the number of exceedances does not warrant a listing using the dataset available up to

2014 (three of 38 samples). In addition, the pollutant is not likely to exceed the criterion based on historical monitoring results and trend patterns, and no toxicity was associated with exceedances of Malathion in the sampling results.

7. Toxicity
   Santa Margarita River (Lower), Decision ID: 43103. Six LOEs are included as the basis for inclusion of the Lower Santa Margarita River on the 2014 §303d list for toxicity. Of the six LOEs, two reference data collected in the Santa Margarita Lagoon (LOE ID 76545 and 72834) which should not be included in the listing assessment for the Lower Santa Margarita River, as they are located in a downstream waterbody. Of the four remaining LOEs, two are for sediment and two are for water.

   LOEs 76546 and 30287 present sediment samples collected as part of the Surface Water Ambient Monitoring Program (SWAMP), and no toxicity is exhibited for either set of samples. Therefore, sediment toxicity should not be included on the 2014 §303d list for the Lower Santa Margarita River.

   LOEs 76544 and 7501 do indicate toxicity at a frequency that would cause the Lower Santa Margarita River to be listed for toxicity. Therefore, the Lower Santa Margarita River §303d listing should be revised to indicate impairment for water toxicity only, and the sediment toxicity listing should be removed.

   San Diego River (Lower), Decision ID 51375. Four LOEs were used as the basis of the listing for toxicity in the Lower San Diego River. Of the four LOEs, one (LOE ID 75571) is for sediment collected as part of Bight ’08 and should not be included in the evaluation (as the data were collected in the San Diego River Estuary, and not the freshwater lower San Diego River). The other three LOEs are based on toxicity in water. However, LOEs 25293 and 75570 are presenting the same data separately and counting the results twice. LOE 25293 is based on the Copermittee data presented in the San Diego County Municipal Copermittees Urban Runoff Monitoring Report, 2007. LOE 745570 is based on a longer time-range of the same dataset (2001-2008). The first LOE (25293) should be removed. The revised total exceedance count should be six of 23 water samples exhibiting toxicity, not eight of 38.

Recommendations

- Recommend that reference to sediment toxicity in the Lower Santa Margarita River be removed from Decision ID 43103 because the samples included in the analysis are downstream of the waterbody (LOE 76545 and 72834) and no sediment toxicity is observed for LOE 76546 and 30287.
- Recommend that the reference to sediment toxicity be removed from the San Diego River (Lower) Decision ID51375 because LOE 75571 was based on data collected from the San Diego River estuary (downstream of the waterbody in this Decision ID). No other LOEs were included in the Decision ID referencing sediment toxicity.
- Recommend revision of the assessment results for San Diego River (Lower); should be revised to six of 23 water samples exhibiting toxicity, not eight of 38.

8. Benthic Community Effects
   Numerous listings for benthic community were added to the Draft 2014 §303d list. The following two listings did not meet the threshold for listing based on Table 3.2 of the Listing Policy, which states that greater than or equal to five samples must be below the CSCI threshold of 0.79 to list the water bodies. All LOEs are assessed for the Santa Margarita River (Lower) Decision ID in this comment letter as a specific example of how toxicity and

Chlorpyrifos LOEs were used in the listing assessment without consideration of temporal and seasonal requirements necessary to conduct the data analysis. For example, Chlorpyrifos exceedances from 2003 during wet weather are not likely indicative of the potential for beneficial use impairments during dry weather in 2007 collection of BMI data. Additionally, as stated in the general comments, the use of total nitrogen and total phosphorus LOEs does not support benthic community listings in general.

- Santa Margarita River (Lower) Decision ID: 49149 is based on nine LOEs:
  - LOE ID: 79700 states that two of six CSCI scores were below a threshold of 0.79. The Listing Policy states, per Table 3.2, that a minimum of five exceedances are required to list a water body for a conventional or other pollutant. Further, the LOE states that "more recent data from the Stormwater Monitoring Condition was not included in this listing cycle but confirms this listing." Examination of SMC data collected after 2008 shows that no samples have been collected downstream of Deluz Creek. All samples have been collected upstream of Deluz Creek, which is considered Santa Margarita River, Upper. Of the samples collected for both the SMC program and National Pollutant Discharge Elimination System (NPDES) program upstream of Deluz Creek, all CSCI results are above the threshold of 0.79.
  - LOE ID: 76471 notes that seven of eight bioassessment samples collected at SMR-CP as part of the County of San Diego Copermittee program had IBI results of less than 40. The Integrated Report notes that the CSCI will be used to determine whether or not benthic community impairment is occurring, because the index more accurately compares observed benthic community results to "reference" conditions. The use of the IBI score should not be used as a LOE to assess benthic community impairment, as a better measure has been adopted (CSCI).
  - LOE ID: 77848 includes an assessment of Chlorpyrifos data collected at SMR-MLS. Note that the data used in the assessment, and the samples that exceeded the Chlorpyrifos criterion, were collected during wet weather sampling. Bioassessment occurs during dry weather. During dry weather sampling at SMR-MLS, no exceedances of the Chlorpyrifos criterion were observed. This LOE does not support a benthic community listing for Santa Margarita River, Lower.
  - LOE ID: 7497 states that 5 of 6 samples at SMR-MLS exceeded the criterion of 1 mg/L for total nitrogen. Note that total nitrogen, in and of itself, does not cause toxicity. Nitrate and nitrite do have the potential to cause toxicity, but were not observed at levels above Basin Plan objectives at SMR-MLS during either wet or dry weather. Total nitrogen is an indication of the potential for eutrophication, which could cause benthic impairments. However, total nitrogen does not directly impact the benthic community, and therefore does not support a benthic community listing for Santa Margarita River, Lower.
  - LOE ID 7498 states that three of five samples exceeded the criterion for total nitrogen at SMR-MLS. As noted in comments for LOE ID 7497, total nitrogen does not itself cause toxicity. This LOE does not support listing for benthic community at Santa Margarita River, Lower.
  - LOE ID: 7501 includes an assessment of toxicity results collected in 2003 at station Santa Margarita 10 as part of the SWAMP program. One of three results showed toxicity, but no toxicity identification evaluation (TIE) was conducted to determine the pollutant causing the toxicity. There is no direct

link between toxicity observed at this station and any benthic community results, as the data were not collected at the same time.
    - LOE ID: 76544 presents the toxicity results from SMR-MLS collected as part of the County of San Diego Copermittee program. Five of 11 samples exhibited toxicity, however the five samples with toxicity were collected during wet weather, and bioassessment is conducted during dry weather. There is no evidence that wet weather toxicity directly affects the bioassessment community during the dry season. Therefore, this LOE does not support a listing for benthic community at Santa Margarita River, Lower.
    - LOE ID: 7500 notes that five of five samples collected during 2003 as part of the County of San Diego Copermittees monitoring program at SMR-MLS exceeded the total phosphorus water quality criterion of 0.1 mg/L. Total phosphorus is not a toxicant, and does not directly cause toxicity to the benthic community. Note that total phosphorus can contribute to harmful algal blooms and other water quality issues that may indirectly affect benthic community health, but total phosphorus does not directly degrade the benthic community. Therefore, this LOE does not support a listing for benthic community at Santa Margarita River, Lower.
    - LOE ID: 7499 presents the same data as LOE ID 7500 (County of San Diego Copermittee dataset), with an additional year of monitoring. Recommend that LOE ID 7500 be dropped. See comments presented in LOE 7500, total phosphorous does not directly impact the benthic community, and therefore this LOE does not support a listing for benthic community at Santa Margarita River, Lower.

- Sweetwater River, Upper, Decision ID 51753
    - Numerous LOEs were included in the fact sheet for benthic community at Sweetwater River, Upper. Of note, the combined evaluation of LOEs 79676 and 79675 shows that four of nine samples were below the threshold of 0.79 for listing benthic community. Per Table 3.2 of the Listing Policy, this is not enough samples to justify listing Sweetwater River (Upper), for benthic community. A minimum of five samples below the threshold is required. The IBI was also used as in LOEs 76859 and 72768. It is not clear why the Regional Board is using the IBI and the CSCI for LOEs for benthic community listings, as the Staff Report clearly states that CSCI will be used as the basis of listing decisions. Recommend removal of Sweetwater River, Upper for benthic community as the number of samples below the threshold is not equal to or greater than five.

Recommendation

It is recommended that both Santa Margarita River (Lower) and Sweetwater River (Upper) be removed from the Draft 2014 §303d list for benthic community, as the number of samples below the threshold of 0.79 for the CSCI was not equal to or greater than five for either waterbody.

9. <u>Selenium</u>

   In May 2014, the County submitted five comment letters related to the 2010 §303d listings for selenium in five creeks. Additional data were collected by the County for use in the de-listing evaluation and compared to the California Toxics Rule (CTR) Freshwater Criterion of 0.005 mg/L.

The results are as follows:

- Keys Creek: 0 of 28 samples exceeded the criterion
- San Marcos Creek: 0 of 31 samples exceeded the criterion
- Escondido Creek: 0 of 32 samples exceeded the criterion
- Los Coches Creek: 0 of 31 samples exceeded the criterion
- Lower Sweetwater River: 0 of 31 samples exceeded the criterion

The original letters are included as Attachment B to this comment letter. The data used as the basis of the de-listing evaluations are included in each letter.

Recommendation

It is recommended that Keys Creek, San Marcos Creek, Escondido Creek, Los Coches Creek, and Lower Sweetwater River be removed from the Draft 2014 §303d list for selenium, as data collected in each creek support de-listing based on California's Listing Policy.

We thank you in advance for your consideration of our comments. If you have any questions or require additional information, please feel free to contact Jo Ann Weber at (858) 495-5317 or e-mail at JoAnn.Weber@sdcounty.ca.gov.

Sincerely,

TODD E. SNYDER, LUEG Program Manager
Watershed Protection Program

Attachments: Database to support delisting recommendations
County of San Diego Selenium Delisting letters

Dry Weather Historical Monitoring Table for AHC-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data 2007-2008 09/18/07-09/19/07	2007-2008 05/13/08-05/14/08	2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	Transitional Monitoring 2013-2014	2014-2015	Frequency Above Benchmarks	Mean Ratio to Benchmarks
							-	-	-	-	-	-	-		
Physical Chemistry							No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected		
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.93	8.01								0%	NA[1]
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,610	1,844									
2007, 2013	Water Temperature	Celsius	NA		19.60	17.00									
2007, 2013	Turbidity	NTU	20	1. Basin Plan	<2	1.2J								0%	NA[1]
Bacteriological															
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	40	**260**								50%	NA[1]
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	300	**2,300**								50%	NA[1]
2007, 2013	Total Coliform	MPN/100 mL	NA		3,000	2,300									
Nutrients															
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.02J	<0.03								0%	NA[1]
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.11	5.6								0%	NA[1]
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05								0%	NA[1]
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.56	0.98									
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	0.67	**6.62**								50%	NA[1]
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	**0.11**	**0.11**								100%	NA[1]
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.1	**0.11**								50%	NA[1]
General Chemistry															
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	<2								0%	NA[1]
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	13	14								0%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		4.9	5.8									
2007, 2013	Total Organic Carbon	mg/L	NA		6	5.7									
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	1.7J	<5								0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.049	0.055								0%	NA[1]
2007, 2013	Total Dissolved Solids	mg/L	500 (c)	1. Basin Plan	**1,460**	**1,438**								100%	NA[1]
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	3.2J	1.7J								0%	NA[1]
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		453.6	492.4									
Total Metals															
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0003J	0.0003J								0%	NA[1]
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0027	0.0032								0%	NA[1]
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0004								0%	NA[1]
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0001J	0.0001J								0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0015	0.0019								0%	NA[1]
2007, 2013	Lead	mg/L	NA		0.00006J	0.00006J									
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0025	0.0022								0%	NA[1]
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0002J	0.0007								0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0034	0.0038								0%	NA[1]
Dissolved Metals															
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0003J	0.0003J								0%	NA[1]
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0029	0.0031								0%	NA[1]
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0004								0%	NA[1]
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	0.0001J	<0.0005								0%	NA[1]
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0012	0.0017								0%	NA[1]
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001								0%	NA[1]
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0024	0.0021								0%	NA[1]
2007, 2013	Selenium	mg/L	NA		0.0002J	0.0007									
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0023	0.0031								0%	NA[1]
Organophosphorus Pesticides															
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002								0%	NA[1]
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	0.0031J								0%	NA[1]
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006								0%	NA[1]
Toxicity															
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100								0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100								0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100								0%	NA[1]
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100								0%	NA[1]
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	100								50%	NA[1]

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for AHC-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Water Quality Benchmark is based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for AHC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data: 2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		Transitional Monitoring: 2013-2014	2014-2015		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					09/18/07-09/19/07	05/13/08-05/14/08	- (No Samples Collected)	- (No Samples Collected)	09/14/10-09/15/10	05/09/11-05/10/11	- (No Samples Collected)	09/05/12-09/06/12	05/14/13 - 05/15/13	- (No Samples Collected)	09/10/14	05/13/15		
Physical Chemistry																		
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.73	8.49			8.08	8.13		7.63	7.82		8.06	8.06	0%	0.23
2007, 2013	Specific Conductivity	µmhos/cm	NA		3,480	3,390			3,530	3,140		3,990	3,040		4397	3487		
2007, 2013	Water Temperature	Celsius	NA		20.70	23.00			26.00	19.80		24.4	25.3		28.59	22.65		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	3.1	1.2J			1.3	0.61		0.91	1.8		2.2	2.2	0%	0.08
Bacteriological																		
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	**300**	**300**			**800**	**500**		**1,700**	**230**		≤78AE	**2200**	88%	5.06
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	**500**	**1,300**			**1,300**	230		300	**800**		**2200**	**500**	75%	2.23
2007, 2013	Total Coliform	MPN/100 mL	NA		3,000	2,800			11,000	3,000		3,000	1,700		4900	2400		
Nutrients																		
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.03J	<0.03			<0.1	<0.1		0.048J	0.064J		<0.10	<0.10	0%	0.05
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.21	0.8			0.44	0.97		0.091J	0.31		0.15	0.36	0%	0.04
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05			0.019J	0.017J		<0.1	0.014J		0.051J	0.019J	0%	0.03
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.7	0.7			0.34	0.41		0.42	0.12		0.41	0.24		
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	0.91	**1.5**			0.799	**1.397**		0.511	0.444		0.611	0.619	25%	0.85
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.02J	0.05			0.0061J	0.023		0.024	0.03		0.0071J	0.02	0%	0.23
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.02J	0.033J			0.0069J	0.028		0.028	0.038		0.046	0.023	0%	0.28
General Chemistry																		
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	<2			0.58J	1.3J		1.5J	0.84J		<2.0	<2.0	0%	0.10
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	12	19			9.4	29		17	3.7J		18	17	0%	0.13
2007, 2013	Dissolved Organic Carbon	mg/L	NA		4.2	5.2			2.4	3.6		3.2	2.1		3.3	3.2		
2007, 2013	Total Organic Carbon	mg/L	NA		5.1	9			2.6	3.5		2.5	2.3		3.6	3.1		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5			<5	<5		1.9J	<5		<5.0	<5.0	0%	0.24
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.044	0.041			0.033J			0.031J	0.048J		0.11	0.054	0%	0.10
2007, 2013	Total Dissolved Solids	mg/L	500 (c)	1. Basin Plan	**1,900**	**2,076**			**2,200**	**2,200**		**2,500**	**2,200**		**2800**	**2200**	100%	4.52
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	7.5	2J			1	2		2	3		3	2	0%	0.05
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		531.4	548.7			1,100	1,000		1,100	989		1320	1090		
Total Metals																		
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0002J	0.0002J			0.0001J	0.00019J		0.00008J	0.00018J		0.000095J	0.00020J	0%	0.03
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0041	0.0046			0.0028	0.0034		0.0032	0.0029		0.0025	0.0022	0%	0.32
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0004			0.000028J	0.000042J		0.00007J	0.00011		<0.00010	<0.00010	0%	0.02
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0002J	0.0005			0.00013J	0.00011J		<0.0002	0.00019J		0.000098J	0.00013J	0%	0.00
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.002	0.001			0.00072	0.0017		0.00029J	0.0018		0.00061	0.0021	0%	0.00
2007, 2013	Lead	mg/L	NA		<0.0001	<0.0001			0.000035J	0.00009J		0.00008J	0.000054J		0.000037J	<0.00020		
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0025	0.0031			0.0033	0.0049		0.002	0.0069		0.0022	0.0067	0%	0.04
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0008	0.0015			0.00075	0.00076		0.00055	0.0016		0.00033J	0.0024	0%	0.22
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.01	0.001			0.0014J	0.002J		0.0036J	0.0022J		0.0015J	0.0018J	0%	0.00
Dissolved Metals																		
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0002J	0.0002J			0.000098J	0.00018J		0.00008J	0.00017J		0.00011J	0.00021J	0%	0.03
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0039	0.0044			0.0028	0.0034		0.003	0.0025		0.0023	0.002	0%	0.02
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000029J	0.000043J		0.00007J	0.000084J		<0.00010	<0.00010	0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	0.0001J	0.0001J			0.000042J	0.000051J		<0.0002	0.000073J		0.000034J	0.000074J	0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0011	0.0012			0.00097	0.0018		0.00039J	0.0016		0.00059	0.0025	0%	0.04
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001			0.000034J	0.000023J		0.00006J	<0.0002		0.000045J	<0.00020	0%	0.01
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0023	0.003			0.0037	0.0048		0.002	0.0065		0.0022	0.0069	0%	0.02
2007, 2013	Selenium	mg/L	NA		0.0008	0.0015			0.00068	0.00074		0.00053	0.0014		0.00031J	0.0025		
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0034	0.0008			0.0017J	0.0025J		0.0035J	0.0025J		0.0014J	0.0022J	0%	0.01
Organophosphorus Pesticides																		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.29
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.09
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.05
Toxicity																		
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**50**	100			**50**	<6.25CF		**50**	100		**50**	**<25**	71%	2.00
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**6.25**	100			100	**50**		**50**	100		**50**	**50**	63%	3.38

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for AHC-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
AE - Analysis error.
CF-Control failed; results not used in assessment.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NR -Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for BVC-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data: 2007-2008 (09/18/07-09/19/07)	2007-2008 (05/13/08-05/14/08)	2008-2009 (-)	2009-2010 (-)	2010-2011 (09/14/10-09/15/10)	2010-2011 (05/09/11-05/10/11)	2011-2012 (-)	2012-2013 (09/05/12-09/06/12)	2012-2013 (05/01/13-05/02/13)	Transitional Monitoring: 2013-2014 (-)	2014-2015 (09/10/15)	2014-2015 (05/13/15)	Frequency Above Benchmarks	Mean Ratio to Benchmarks
Physical Chemistry							No Samples Collected	No Samples Collected			No Samples Collected			No Samples Collected				
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.97	8.65			8.35	8.23		7.62	8.04		7.95	8.18	0%	0.33
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,620	19			2,430	1,913		2,540	1,984		2,651	2,122		
2007, 2013	Water Temperature	Celsius	NA		20.80	20.20			19.10	20.80		22.3	18.8		23.07	17.51		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	3	4			0.85	3.2		1.2	2		2	2.4	0%	0.12
Bacteriological																		
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	1,100	80			130	80		900	300		≤330AE	3,400	63%	5.23
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	80	80			130	130		170	170		790	1,100	25%	0.83
2007, 2013	Total Coliform	MPN/100 mL	NA		8,000	13,000			5,000	2,300		3,000	30,000		13,000	2,200		
Nutrients																		
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.03J	0.1			<0.1	<0.1		<0.1	<0.1		<0.10	<0.10	0%	0.05
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.53	1.3			0.58	1.7		0.32	0.24		0.11	0.11	0%	0.06
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05			<0.1	<0.1		<0.1	<0.15		0.030J	<0.10	0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.98	1.1			0.28	0.41		0.54	0.75		0.26	0.51		
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	1.51	2.40			0.86	2.11		0.86	0.99		0.4	0.62	38%	1.22
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.1	0.07			0.029	0.065		0.032	0.058		0.054	0.081	0%	0.61
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.09	0.07			0.028	0.074		0.041	0.065		0.073	0.091	0%	0.67
General Chemistry																		
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	<2			1.6J	0.74J		1.4J	1.2J		<2.0	<2.0	0%	0.11
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	11	17			7.1	12		16	14		17	24	0%	0.12
2007, 2013	Dissolved Organic Carbon	mg/L	NA		4.1	5.3			2.8	4		3.2	3.5		4	7.4		
2007, 2013	Total Organic Carbon	mg/L	NA		5.1	5.2			3	3.7		2.7	2.1		4.1	7.5		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	1.1J	<5			<5	<5		<5	1.9J		<5.0	1.9J	0%	0.22
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.044	0.034			0.031J			0.06	0.043J		0.11	0.077	0%	0.11
2007, 2013	Total Dissolved Solids	mg/L	500 (c)	1. Basin Plan	1,357	1,394			1,400	1,400		1,500	1,500		1,700	1,300	100%	2.89
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	14.8	4.7J			6	8		12	7		10	4	0%	0.14
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		365	360.6			650	670		639	646		729	190		
Total Metals																		
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0004J	0.0003J			0.00023J	0.00025J		0.0002J	0.00028J		0.00025J	0.00046J	0%	0.05
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0078	0.0075			0.0066	0.006		0.0071	0.0064		0.0062	0.0047	0%	0.65
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0004			0.000032J	0.000037J		0.00009J	0.00005J		<0.00010	<0.00010	0%	0.02
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0002J	0.0001J			0.00036	0.00036		0.00009J	0.00029		0.00033	0.00029	0%	0.01
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0016	0.0022			0.0014	0.0023		0.00088	0.0018		0.0013	0.0025	0%	0.00
2007, 2013	Lead	mg/L	NA		0.0002	0.0002			0.00018J	0.00019J		0.00009J	0.00023		0.00025	0.000044J		
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0014	0.0014			0.0024	0.0031		0.0013	0.0014		0.0014	0.0039	0%	0.02
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0010	0.0018			0.00074	0.001		0.00072	0.00078		0.0006	0.0016	0%	0.21
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0043	0.0043			0.0024J	0.0033J		0.0015J	0.0033J		0.0031J	0.0043J	0%	0.00
Dissolved Metals																		
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0004J	0.0003J			0.00023J	0.00024J		0.0002J	0.00026J		0.00024J	0.00049J	0%	0.05
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0075	0.0074			0.0067	0.0058		0.0072	0.0061		0.0061	0.0046	0%	0.04
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000026J	0.000031J		0.00009J	0.00005J		<0.00010	<0.00010	0%	0.02
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	0.0001J	0.0001J			0.00011J	0.00016J		0.00009J	0.00012J		0.000059J	0.00013J	0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0012	0.0014			0.0012	0.0018		0.00096	0.0016		0.00077	0.0021	0%	0.06
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001			0.000049J	0.000047J		0.00008J	0.00004J		0.000043J	<0.00020	0%	0.01
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0013	0.0014			0.002	0.0028		0.0013	0.0012		0.0012	0.0038	0%	0.01
2007, 2013	Selenium	mg/L	NA		0.0009	0.0019			0.00073	0.001		0.00073	0.00075		0.00058	0.0017		
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0020	0.0020			0.0024J	0.0029J		0.0031J	0.0022J		0.0014J	0.0038J	0%	0.01
Organophosphorus Pesticides																		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.29
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.09
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.05
Toxicity																		
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100			100	<6.25CF		100	100		100	100	0%	1.00
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100			100	100		100	50		100	100	13%	1.13

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for BVC-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
AE - Analysis error.
CF - Control failed; results not used in assessment.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for ESC-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data							Transitional Monitoring		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015		
					09/18/07-09/19/07	05/13/08-05/14/08	-	-	-	-	-	-	-		
Physical Chemistry							No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected		
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	8.40	8.30								0%	NA[1]
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,552	1,619									
2007, 2013	Water Temperature	Celsius	NA		21.60	18.20									
2007, 2013	Turbidity	NTU	20	1. Basin Plan	1.1J	2								0%	NA[1]
Bacteriological															
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	80	140								0%	NA[1]
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	**500**	40								50%	NA[1]
2007, 2013	Total Coliform	MPN/100 mL	NA		2,200	1,100									
Nutrients															
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.04J	0.03								0%	NA[1]
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	5.63	6.37								0%	NA[1]
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.06	0.04J								0%	NA[1]
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.84	1.1									
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	**6.53**	**7.51**								100%	NA[1]
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.05	0.07								0%	NA[1]
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.05	0.057								0%	NA[1]
General Chemistry															
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	<2								0%	NA[1]
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	**150**	13								50%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		3.5	5									
2007, 2013	Total Organic Carbon	mg/L	NA		13	4.6									
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5								0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.036	0.049								0%	NA[1]
2007, 2013	Total Dissolved Solids	mg/L	500 (c)	1. Basin Plan	**1,204**	**1,242**								100%	NA[1]
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	1.5J	1J								0%	NA[1]
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		315.2	342.3									
Total Metals															
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0003J	0.0003J								0%	NA[1]
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0014	0.0014								0%	NA[1]
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0004								0%	NA[1]
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0003J	0.0003J								0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0018	0.0017								0%	NA[1]
2007, 2013	Lead	mg/L	NA		0.00007J	0.0001									
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0011	0.0009								0%	NA[1]
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0021	0.0030								0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0048	0.0069								0%	NA[1]
Dissolved Metals															
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0003J	0.0003J								0%	NA[1]
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0015	0.0015								0%	NA[1]
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0004								0%	NA[1]
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	0.0003J	0.0003J								0%	NA[1]
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0016	0.0014								0%	NA[1]
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001								0%	NA[1]
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0010	0.0008								0%	NA[1]
2007, 2013	Selenium	mg/L	NA		0.0022	0.0031									
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0035	0.0039								0%	NA[1]
Organophosphorus Pesticides															
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002								0%	NA[1]
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004								0%	NA[1]
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006								0%	NA[1]
Toxicity															
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100								0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100								0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100								0%	NA[1]
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100								0%	NA[1]
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100								0%	NA[1]

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for ESC-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

Values with **red bold font and shading** do not meet Water Quality Benchmarks

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for ESC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data									Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015				
					09/18/07-09/19/07	05/13/08-05/14/08	-	-	09/21/10-09/22/10	05/11/11-05/12/11	-	09/12/12-09/13/12	05/14/13-05/15/13	-	09/23/14-09/24/14	01/07/15-01/08/15	05/05/15-05/06/15		
Physical Chemistry																			
2013	Dissolved Oxygen	mg/L	<6.0 (a)	1. Basin Plan			No Samples Collected	No Samples Collected			No Samples Collected			No Samples Collected	6.92	9.96	7.88	0%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	8.14	7.89			8.02	7.69		7.9	7.99		7.76	7.91	8.01	0%	0.15
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,988	1,813			2,610	2,510		2,420	1,656		2,829	2,311	2,436		
2007, 2013	Water Temperature	Celsius	NA		20.7	16.70			19.20	17.20		23.7	20.9		22.97	9.88	15.38		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	4.3	7.8			1.2	3.2		5.9	2.4		3.2	0.7	3.9	0%	0.18
Bacteriological																			
2007, 2013	Enterococcus	MPN/100 mL	151 (b)	1. Basin Plan	**230**	**230**			130	**230**		**300**	**1,700**		**790**	70	90	67%	2.77
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	260	90			230	20		230	220		78	40	110	0%	0.36
2007, 2013	Total Coliform	MPN/100 mL	NA		7,000	2,200			1,400	700		11,000	1,700		700	5,000	700		
Nutrients																			
2007, 2013	Ammonia as N	mg/L	(c)	6. USEPA Water Quality Criteria (Freshwater)	0.03J	0.21			<0.1	0.1		0.56	0.077J		<0.10	<0.10	<0.10	0%	0.08
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	1.85	0.05			1.4	0.14		1.4	1.2		0.15	2.6	0.61	0%	0.10
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05			<0.1	0.026J		<0.1	0.012J		0.015J	0.020J	<0.10	0%	0.03
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.7	1.5			0.44	0.4		1.3	0.21		0.4	0.32	0.36		
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	**2.55**	**1.55**			**1.84**	0.566		**2.7**	**1.422**		0.565	**2.94**	0.97	67%	1.68
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.09	0.03J			**0.11**	0.042		**0.16**	**0.11**		**0.13**	NR	**0.11**	63%	0.98
2013	Orthophosphate	mg/L	NA												0.13	AE	0.12		
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.08	**0.11**			**0.13**	0.088		**0.15**	**0.13**		**0.18**	**0.12**	**0.16**	78%	1.27
General Chemistry																			
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	<2			2.5	1.1J		0.73J	0.8J		<2.0	NR	<2.0	0%	0.11
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	9	30			20	18		11	7.4		9.8	NR	16	0%	0.13
2007, 2013	Dissolved Organic Carbon	mg/L	NA		4.3	5			3.6	3.2		4.8	3.8		3.8	4.5	5.1		
2007, 2013	Total Organic Carbon	mg/L	NA		5.4	5.2			3.5	3.2		4.7	3.5		4.1	4.6	5.1		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5			<5	<5		<5	<5		<5.0	NR	<5.0	0%	0.25
2013	Sulfate	mg/L	250 (a)	1. Basin Plan											**560**	**390**	**460**	100%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.051	0.05			0.021J	0.066		0.033J	0.056J		0.12	0.08	0.040J	0%	0.11
2007, 2013	Total Dissolved Solids	mg/L	500 (a)	1. Basin Plan	**1,591**	**2,620**			**1,700**	**2,200**		**1,500**	**1,400**		**1,800**	**1,500**	**1,600**	100%	3.54
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	5.7	2.4J			4	3		11	11		13	3	12	0%	0.12
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		445.0	603.7			680	890		590	609		837	722	722		
Total Metals																			
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0003J	<0.0005			0.00019J	0.00005J		0.00019J	0.00036J		0.00014J	NR	0.00025J	0%	0.04
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0015	0.0026			0.00081	0.0019		0.00089	0.0012		0.0008	0.00084	0.00098	0%	0.13
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0004			0.000092J	0.00002J		0.00007J	0.00012		0.000025J	0.00023	0.00011	0%	0.02
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0003J	<0.0005			0.00036	0.00008J		0.00011J	0.00035		0.00041	0.00014J	0.00038	0%	0.01
2013	Chromium, Trivalent	mg/L	NA												<0.00050	<0.00020	0.00022		
2013	Chromium, Hexavalent	mg/L	0.010 (d)	1. Basin Plan											0.000043J	0.00012	0.00015	0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0029	<0.0008			0.0026	0.00031J		0.0015	0.0031		0.0033	0.0021	0.0029	0%	0.00
2013	Iron	mg/L	0.3 (a)	1. Basin Plan											**0.6**	0.13	**0.57**	67%	NA[1]
2007, 2013	Lead	mg/L	NA		0.0002	0.00005J			0.00028	0.00008J		0.00011J	0.00035		0.00036	0.00011J	0.00047		
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan											**0.27**	**0.21**	**0.3**	100%	NA[1]
2013	Mercury	mg/L	0.002 (d)	1. Basin Plan											<0.000050	0.0000040J	<0.000050	0%	NA[1]
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0017	0.0014			0.0029	0.0011		0.0012	0.0038		0.0013	0.0014	0.0015	0%	0.02
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0017	0.0002J			0.0012	0.00018J		0.0016	0.0019		0.0011	0.0014	0.0011	0%	0.23
2013	Silver	mg/L	0.1 (d)	1. Basin Plan											<0.00020	<0.00020	<0.00020	0%	NA[1]
2013	Thallium	mg/L	0.002 (d)	1. Basin Plan											<0.00020	<0.00020	<0.00020	0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0328	0.0032			0.0028J	0.0018J		0.0026J	0.0042J		0.0029J	0.0061	0.0048J	0%	0.00
Dissolved Metals																			
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0003J	<0.0005			0.00018J	0.00005J		0.00018J	0.00036J		0.00011J	NR	0.00029J	0%	0.04
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0015	0.0025			0.00076	0.0015		0.00085	0.0013		0.00069	0.00079	0.00091	0%	0.01
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000042J	0.00002J		0.00007J	0.000086J		<0.00010	0.00017	0.000051J	0%	0.02
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	0.0001J	<0.0005			0.000083J	0.00002J		0.00009J	0.000098J		0.000043J	0.00011J	<0.00020	0%	0.00
2013	Chromium, Trivalent	mg/L	(e)	16. 40 CFR 131.38											AE	<0.0002	<0.0002	0%	NA[1]
2013	Chromium, Hexavalent	mg/L	0.011	16. 40 CFR 131.38											AE	0.00013H	0.00014	0%	NA[1]
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0022	<0.0008			0.0021	0.00007J		0.0014	0.0026		0.00098	0.0018	0.0022	0%	0.05
2013	Iron	mg/L	NA												<0.010	<0.010	0.0032J		
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001			<0.0002	0.00003J		0.00002J	<0.0002		<0.00020	<0.00020	<0.00020	0%	0.01
2013	Manganese	mg/L	NA												0.11	0.18	0.15		
2013	Mercury	mg/L	NA												<0.000050	<0.000050	<0.000050		
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0014	0.0014			0.0026	0.001		0.0012	0.0037		0.0011	0.0013	0.0013	0%	0.01
2007, 2013	Selenium	mg/L	NA		0.0017	0.0002J			0.0011	0.00022J		0.0016	0.0017		0.0011	0.0013	0.001		
2013	Silver	mg/L	(e)	16. 40 CFR 131.38											<0.00020	<0.00020	<0.00020	0%	0.04
2013	Thallium	mg/L	NA												<0.00020	<0.00020	<0.00020		
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0256	0.0025			0.0021J	0.0032J		0.0032J	0.0025J		0.0012J	0.0039J	0.0019J	0%	0.01

Dry Weather Historical Monitoring Table for ESC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data									Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015				
					09/18/07-09/19/07	05/13/08-05/14/08	-	-	09/21/10-09/22/10	05/11/11-05/12/11	-	09/12/12-09/13/12	05/14/13-05/15/13	-	09/23/14-09/24/14	01/07/15-01/08/15	05/05/15-05/06/15		
Chlorinated Pesticides							No Samples Collected	No Samples Collected			No Samples Collected			No Samples Collected					
2013	2,4'-DDE	µg/L	NA												<0.0050	<0.0050	<0.0050		
2013	2,4'-DDT	µg/L	NA												<0.0050	<0.0050	<0.0050		
2013	4,4´-DDE	µg/L	NA												<0.0050	<0.0050	<0.0050		
2013	4,4´-DDT	µg/L	0.001	16. 40 CFR 131.38											<0.0050	<0.0050	<0.0050	0%	NA[1]
Organophosphorus Pesticides																			
2013	Azinphos methyl (Guthion)	µg/L	NA												<0.010	<0.010	<0.010		
2013	Bolstar	µg/L	NA												<0.010	<0.010	<0.010		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010	0%	0.29
2013	Coumaphos	µg/L	NA												<0.010	<0.010	<0.010		
2013	Demeton-o	µg/L	NA												<0.010	<0.010	<0.010		
2013	Demeton-s	µg/L	NA												<0.010	<0.010	<0.010		
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010	0%	0.09
2013	Dichlorvos	µg/L	NA												<0.010	<0.010	<0.010		
2013	Dimethoate	µg/L	NA												<0.010	<0.010	<0.010		
2013	Disulfoton	µg/L	NA												<0.010	<0.010	<0.010		
2013	Ethoprop	µg/L	NA												<0.010	<0.010	<0.010		
2013	Ethyl parathion	µg/L	NA												<0.010	<0.010	<0.010		
2013	Fensulfothion	µg/L	NA												<0.010	<0.010	<0.010		
2013	Fenthion	µg/L	NA												<0.010	<0.010	<0.010		
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010	0%	0.05
2013	Merphos	µg/L	NA												<0.010	<0.010	<0.010		
2013	Methyl parathion	µg/L	NA												<0.010	<0.010	<0.010		
2013	Mevinphos	µg/L	NA												<0.010	<0.010	<0.010		
2013	Naled	µg/L	NA												<0.010	<0.010	<0.010		
2013	Phorate	µg/L	NA												<0.010	<0.010	<0.010		
2013	Ronnel	µg/L	NA												<0.010	<0.010	<0.010		
2013	Stirophos	µg/L	NA												<0.010	<0.010	<0.010		
2013	Tokuthion (Prothiofos)	µg/L	NA												<0.010	<0.010	<0.010		
2013	Trichloronate	µg/L	NA												<0.010	<0.010	<0.010		
Pyrethroids																			
2013	Allethrin	µg/L	NA												<0.002	<0.002	<0.002		
2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006											<0.002	<0.002	<0.002	0%	NA[1]
2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004											<0.002	<0.002	<0.002	0%	NA[1]
2013	Cyhalothrin, Total Lambda	µg/L	0.2	17. Wheelock et al., 2004											<0.002	<0.002	<0.002	0%	NA[1]
2013	Cypermethrin	µg/L	0.344	17. Wheelock et al., 2004											<0.002	<0.002	<0.002	0%	NA[1]
2013	Danitol (Fenpropathrin)	µg/L	NA												<0.002	<0.002	<0.002		
2013	Deltamethrin/Tralomethrin	µg/L	NA												<0.002	<0.002	<0.002		
2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004											<0.002	<0.002	<0.002	0%	NA[1]
2013	Fenvalerate	µg/L	NA												<0.002	<0.002	<0.002		
2013	Fluvalinate	µg/L	NA												<0.002	<0.002	<0.002		
2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006											<0.01	<0.01	<0.01	0%	NA[1]
2013	Prallethrin	µg/L	NA												<0.002	<0.002	<0.002		
2013	Resmethrin	µg/L	NA												<0.01	<0.01	<0.01		
Toxicity																			
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	NR	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100		100	100		100	NR	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**50**	100			100	100		100	100		100	NR	100	13%	1.13
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	NR	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	**50**			100	**50**		100	100		100	NR	100	25%	1.25
2013	*Strongylocentrotus 96-hr*	TST	Pass/Fail												Pass	Pass	Pass		

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for ESC-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(b) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(c) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
AE - Analysis error.
H - Sample analyzed and/or extracted past the recommended holding time.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NR -Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for LPC-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data								Transitional Monitoring		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013	2013-2014	2014-2015		
					09/26/07-09/27/07	06/02/08-06/03/08	-	-	09/23/10	05/11/11-05/12/11	-	-	-	-		
Physical Chemistry							No Samples Collected	No Samples Collected			No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected		
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	8.00	8.28			7.75	8.28					0%	NA[1]
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,420	3,920			4,340	3,790						
2007, 2013	Water Temperature	Celsius	NA		19.80	27.40			14.90	28.50						
2007, 2013	Turbidity	NTU	20	1. Basin Plan	2.23	2.3			0.62	0.22					0%	NA[1]
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	**500**	**500**			40	<20					50%	NA[1]
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	220	230			20	172					0%	NA[1]
2007, 2013	Total Coliform	MPN/100 mL	NA		6,000	1,300			5,000	1,300						
Nutrients																
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.02J	<0.03			<0.1	<0.1					0%	NA[1]
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	<0.05	0.03J			<0.1	0.066J					0%	NA[1]
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	0.04J			<0.1	0.031J					0%	NA[1]
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.98	0.56			0.22	0.3						
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	0.98	0.63			0.22	0.397					0%	NA[1]
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	<0.05	0.09			0.0018J	0.0067J					0%	NA[1]
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	<0.05	0.034J			<0.01	0.0065J					0%	NA[1]
General Chemistry																
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	<2			0.48J	1.7J					0%	NA[1]
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	23	14			26	31					0%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		6.8	5.3			2.6	2.9						
2007, 2013	Total Organic Carbon	mg/L	NA		7.1	5.4			2.6	3.1						
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	1J	<5			<5	<5					0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.084	0.097			0.036J	0.056					0%	NA[1]
2007, 2013	Total Dissolved Solids	mg/L	500 (c)	1. Basin Plan	**2,446**	**2,638**			**3,200**	**2,700**					100%	NA[1]
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	1J	1.7J			<1	2					0%	NA[1]
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		699.5	746.8			1,400	1,400						
Total Metals																
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0008	0.0008			0.00047J	0.00037J					0%	NA[1]
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0024	0.0027			0.0011	0.0017					0%	NA[1]
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0004			<0.0001	<0.0001					0%	NA[1]
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0002J	0.0001J			0.00021	0.00008J					0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0026	0.0014			0.0011	0.0012					0%	NA[1]
2007, 2013	Lead	mg/L	NA		<0.0001	<0.0001			0.00002J	0.00003J						
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0019	0.0013			0.0044	0.0011					0%	NA[1]
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0012	0.0015			0.00083	0.0012					0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0051	0.0026			0.00074J	0.0014J					0%	NA[1]
Dissolved Metals																
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0008	0.0008			0.00047J	0.00038J					0%	NA[1]
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0025	0.0026			0.0011	0.0017					0%	NA[1]
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0004			<0.0001	0.00002J					0%	NA[1]
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	0.0001J	<0.0005			0.000044J	0.00007J					0%	NA[1]
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0029	0.0012			0.0013	0.0013					0%	NA[1]
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001			<0.0002	0.00002J					0%	NA[1]
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0020	0.0012			0.004	0.00099					0%	NA[1]
2007, 2013	Selenium	mg/L	NA		0.0012	0.0014			0.00086	0.0013						
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0061	0.0021			0.0016J	0.0025J					0%	NA[1]
Organophosphorus Pesticides																
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01					0%	NA[1]
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004			<0.01	<0.01					0%	NA[1]
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			<0.01	<0.01					0%	NA[1]
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100					0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100					0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**50**	**50**			100	<6.25CF					67%	NA[1]
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100					0%	NA[1]
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	**<6.25**			**50**	100					50%	NA[1]

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for LPC-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
CF- control failed; results not used in assessment.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for LPC-TWAS-2

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data									Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015			
					09/26/07-09/27/07	06/02/08-06/03/08	-	-	09/21/10-09/22/10	05/11/11-05/12/11	-	09/12/12-09/13/12	05/14/13-05/15/13	-	09/23/14	05/13/15		
Physical Chemistry							No Samples Collected	No Samples Collected			No Samples Collected			No Samples Collected				
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.60	7.68			7.51	7.79		7.55	7.53		7.32	7.96	0%	0.16
2007, 2013	Specific Conductivity	µmhos/cm	NA		3,430	3,070			3,890	3,050		3,510	2,680		3,886	2,362		
2007, 2013	Water Temperature	Celsius	NA		19.00	19.40			18.40	16.70		21.7	19.6		22.46	17.48		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	4.4	6			1.8	2.2		2.1	3.8		1.6	2	0%	0.15
Bacteriological																		
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	**700**	**800**			**700**	**300**		**170**	**500**		45	**2,200**	88%	4.48
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	300	170			170	220		110	80		78	**700**	13%	0.57
2007, 2013	Total Coliform	MPN/100 mL	NA		2,300	17,000			3,000	5,000		3,000	800		490	3,000		
Nutrients																		
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	<0.05	0.04			0.073J	0.058J		<0.1	0.091J		<0.10	<0.10	0%	0.03
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.255	0.2			0.045J	0.27		0.13	0.13		0.24	0.047J	0%	0.02
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.01J	0.05			<0.1	0.039J		<0.1	<0.1		0.014J	<0.10	0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1.4	0.98			0.48	0.48		0.64	0.19		0.39	0.54		
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	**1.67**	**1.23**			0.525	0.789		0.77	0.32		0.644	0.587	25%	0.82
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.062	0.09			0.056	0.061		0.082	**0.11**		0.093	0.1	13%	0.82
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	**0.101**	**0.130**			0.068	0.075		0.096	**0.14**		**0.12**	**0.12**	63%	1.06
General Chemistry																		
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	<2			1.7J	1.6J		1.3J	0.94J		<2.0	<2.0	0%	0.12
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	41	27			35	24		26	14		34	27	0%	0.24
2007, 2013	Dissolved Organic Carbon	mg/L	NA		11.8	8.5			4.9	6.5		7.6	6.9		5.9	9.2		
2007, 2013	Total Organic Carbon	mg/L	NA		12	8.1			4.6	6.5		6.8	7.9		6.1	9.6		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<2.2	1.5J			<5	<5		<5	<5		<5.0	2.1J	0%	0.22
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.11	0.083			0.048J	0.073		0.045J	0.086		0.11	0.083	0%	0.16
2007, 2013	Total Dissolved Solids	mg/L	500 (c)	1. Basin Plan	**1,942**	**1,802**			**2,600**	**2,000**		**2,200**	**1,700**		**2,200**	**1,200**	100%	3.91
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	1.3J	9.7			2	3		3	2		2	1	0%	0.05
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		506.4	475.7			930	770		790	684		1,040	521		
Total Metals																		
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0005	0.0004J			0.00023J	0.00021J		0.00017J	0.00029J		0.00016J	0.00044J	0%	0.05
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0053	0.0037			0.0024	0.0025		0.003	0.0025		0.0025	0.0022	0%	0.30
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0004			<0.0001	0.00002J		0.00002J	0.000028J		<0.00010	<0.00010	0%	0.02
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0002J	0.0001J			0.0014	0.00011J		<0.0002	0.00012J		0.000097J	0.00019J	0%	0.01
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0021	0.0019			0.0052	0.0011		0.00028J	0.0016		0.00075	0.0021	0%	0.00
2007, 2013	Lead	mg/L	NA		0.0001	0.0001			0.000062J	0.00012J		0.00005J	0.000031J		0.000075J	<0.00020		
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0029	0.0014			0.0086	0.00098		0.0012	0.004		0.001	0.0035	0%	0.03
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0007	0.0008			0.0037	0.00063		0.00041	0.00095		0.00028J	0.0013	0%	0.22
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0047	0.0031			0.0032J	0.0017J		<0.005	0.0016J		0.0014J	0.0036J	0%	0.00
Dissolved Metals																		
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0005	0.0003J			0.00025J	0.00021J		0.00016J	0.0003J		0.00015J	0.00044J	0%	0.05
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0045	0.0030			0.0021	0.0023		0.0028	0.0024		0.0023	0.0021	0%	0.02
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000021J	0.00002J		0.00003J	0.000024J		<0.00010	<0.00010	0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	0.0001J	<0.0005			0.000053J	0.00006J		<0.0002	0.00011J		0.000043J	0.00013J	0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0020	0.0012			0.0009	0.0011		0.00032J	0.0017		0.00049J	0.002	0%	0.04
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001			0.000021J	0.00006J		<0.0002	<0.0002		<0.00020	<0.00020	0%	0.01
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0029	0.0014			0.0036	0.001		0.0012	0.0041		0.00099	0.0035	0%	0.01
2007, 2013	Selenium	mg/L	NA		0.0006	0.0008			0.00047	0.00067		0.00044	0.0011		0.00022J	0.0014		
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0049	0.0020			0.0015J	0.003J		0.0022J	0.0027J		0.0012J	0.0029J	0%	0.01
Organophosphorus Pesticides																		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.29
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004			<0.01	<0.01		0.01	<0.01		<0.010	<0.010	0%	0.10
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.05
Toxicity																		
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**50**	100			100	100C		100	100		**50**	100	25%	1.25
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100			**50**	**50**		**50**	100		**50**	100	50%	1.50

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for LPC-TWAS-2

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
C-Control failed; however, sample showed no toxic response.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for LPC-TWAS-3

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data		Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2012-2013		2013-2014	2014-2015			
					09/12/12-09/13-12	05/14/13-05/15/13	-	09/23/14	05/13/15		
Physical Chemistry							No Samples Collected				
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.7	7.69		7.61	7.82	0%	NA[1]
2007, 2013	Specific Conductivity	µmhos/cm	NA		4,950	4,180		5,287	4,757		
2007, 2013	Water Temperature	Celsius	NA		24.2	19.5		22.35	18.14		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	6.9	2.8		0.9	1	0%	NA[1]
Bacteriological											
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	**230**	**300**		**230**	**17,000**	100%	NA[1]
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	300	300		20	1,300	25%	NA[1]
2007, 2013	Total Coliform	MPN/100 mL	NA		17,000	1,400		7,000	9,000		
Nutrients											
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	<0.1	0.064J		<0.10	<0.10	0%	NA[1]
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.081J	0.063J		0.1	<0.10	0%	NA[1]
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.011J	<0.1		0.015J	<0.10	0%	NA[1]
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.6	0.15		0.52	0.33		
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	0.692	0.213		0.635	0.33	0%	NA[1]
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.066	0.083		0.1	0.085	0%	NA[1]
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	**0.12**	**0.11**		**0.18**	**0.11**	100%	NA[1]
General Chemistry											
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	0.79J	**14**		<2.0	<2.0	25%	NA[1]
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	27	13		34	23	0%	NA[1]
2007	Dissolved Organic Carbon	mg/L	NA		5.7	2.7		3.4	4.8		
2007, 2013	Total Organic Carbon	mg/L	NA		5	2.9		3.6	5.2		
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5		<5.0	3.3J	0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.028J	0.056J		0.1	0.07	0%	NA[1]
2007, 2013	Total Dissolved Solids	mg/L	500 (c)	1. Basin Plan	**3,800**	**3,200**		**3,800**	**3,100**	100%	NA[1]
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	45	8		40	2	0%	NA[1]
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		1,400	1,370		1,750	1,490		
Total Metals											
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.00009J	0.00015J		0.000080J	0.00016J	0%	NA[1]
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0055	0.0052		0.0056	0.0046	0%	NA[1]
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0001	<0.0001		<0.00010	<0.00010	0%	NA[1]
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	<0.0002	0.0002		0.0012	0.000068J	0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	<0.0005	0.0012		0.00075	0.0015	0%	NA[1]
2007, 2013	Lead	mg/L	NA		0.00007J	0.000094J		0.00014J	<0.00020		
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0016	0.0077		0.0029	0.0078	0%	NA[1]
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.0004	0.0015		0.00015J	0.0027	0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0015J	0.0014J		0.0049J	0.00097J	0%	NA[1]
Dissolved Metals											
2007	Antimony	mg/L	0.006	1. Basin Plan	0.00009J	0.00016J		0.000073J	0.00018J	0%	NA[1]
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0054	0.0053		0.0044	0.0042	0%	NA[1]
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001		<0.00010	<0.00010	0%	NA[1]
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	<0.0002	0.000064J		0.000034J	0.000043J	0%	NA[1]
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	<0.0005	0.0014		0.00025J	0.002	0%	NA[1]
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	0.00009J	<0.0002		<0.00020	<0.00020	0%	NA[1]
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0016	0.0084		0.0017	0.0086	0%	NA[1]
2007, 2013	Selenium	mg/L	NA		<0.0004	0.0019		0.00012J	0.0034		
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0029J	0.002J		0.00096J	0.0016J	0%	NA[1]
Organophosphorus Pesticides											
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.01	<0.01		0.01	<0.010	0%	NA[1]
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.01	<0.01		<0.010	<0.010	0%	NA[1]
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.01	<0.01		<0.010	<0.010	0%	NA[1]
Toxicity											
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100	0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100	0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**25**	**50**		**50**	**25**	100%	NA[1]
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100	0%	NA[1]
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	**50**		**25**	**25**	100%	NA[1]

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for LPC-TWAS-3

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.

(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).

(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
CF- control failed; results not used in assessment.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for LPC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data									Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015				
					09/26/07-09/27/07	06/02/08-06/03/08	-	-	09/22/10	05/11/11-05/12/11	-	09/12/12-09/13/12	05/14/13-05/15/13	-	09/23/14	01/07/15	05/13/15		
Physical Chemistry																			
2013	Dissolved Oxygen	mg/L	<5.0 (a)	1. Basin Plan											**4.79**	10.29	8.33	33%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	8.07	8.10			8.10	7.96		7.92	7.75		7.57	7.19	8.08	0%	0.00
2007, 2013	Specific Conductivity	µmhos/cm	NA		3,500	3,200			3,520	3,290		3,200	1,966		3,858	2,541	2,147		
2007, 2013	Water Temperature	Celsius	NA		17.70	19.10			17.50	18.00		21.9	17.8		20.88	7.35	17.24		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	3.25	5			0.78	3.1		6.4	2.3		1.4	0.3	1.7	0%	0.13
Bacteriological																			
2007, 2013	Enterococcus	MPN/100 mL	151 (b)	1. Basin Plan	**300**	**170**			**700**	**170**		110	**500**		**1,700**	<20	**500**	78%	3.07
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	20	80			40	130		500	130		700	20	500	0%	0.13
2007, 2013	Total Coliform	MPN/100 mL	NA		2,200	1,879			800	700		7,000	300		13,000	220	1100		
Nutrients																			
2007, 2013	Ammonia as N	mg/L	(c)	6. USEPA Water Quality Criteria (Freshwater)	0.01J	0.03			<0.1	<0.1		0.06J	<0.1		<0.10	<0.10	<0.10	0%	0.03
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	<0.05	0.03J			<0.1	0.067J		<0.1	0.07J		0.079J	<0.10	<0.10	0%	0.01
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	0.05			<0.1	0.043J		<0.1	<0.1		0.015J	<0.10	0.014J	0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1.1	0.84			0.44	0.51		0.43	0.27		0.4	0.21	0.33		
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	**1.1**	0.92			0.44	0.62		0.43	0.34		0.494	0.21	0.344	11%	0.54
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.04J	0.03J			0.082	**0.12**		0.08	0.093		0.083	NR	0.067	13%	0.74
2013	Orthophosphate	mg/L	NA												0.075	AE	0.068		
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.07	0.09			0.1	**0.16**		**0.11**	**0.11**		0.1	0.041	0.085	33%	0.96
General Chemistry																			
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	<2			1.5J	1.5J		0.94J	0.95J		<2.0	NR	<2.0	0%	0.11
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	45	13			33	41		20	13		25	NR	23	0%	0.22
2007, 2013	Dissolved Organic Carbon	mg/L	NA		13.6	9.9			4.5	5.5		6.4	5.3		5.3	5	8.2		
2007, 2013	Total Organic Carbon	mg/L	NA		13.2	9.5			4	5.3		6.3	5.9		5.5	5.1	8.2		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<1.1	<5			<5	<5		<5	<5		<5.0	NR	<5.0	0%	0.23
2013	Sulfate	mg/L	250 (a)	1. Basin Plan											**570**	**310**	**260**	#DIV/0!	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.15	0.11			0.033J	0.051		0.033J	0.071		0.096	0.084	0.083	0%	0.16
2007, 2013	Total Dissolved Solids	mg/L	500 (a)	1. Basin Plan	**2,057**	**1,798**			**2,300**	**2,100**		**2,300**	**1,700**		**2,300**	**1,500**	**1,300**	100%	3.86
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	5.3	8			3	26		14	5		8	1	4	0%	0.14
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		547.5	511.3			890	910		840	688		1,160	707	571		
Total Metals							No Samples Collected	No Samples Collected			No Samples Collected			No Samples Collected					
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0004J	0.0004J			0.00015J	0.0002J		0.00017J	0.00032J		0.00027J	NR	0.00044J	0%	0.05
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0048	0.0037			0.0029	0.0038		0.0036	0.0027		0.0028	0.0017	0.0025	0%	0.32
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0004			<0.0001	0.00002J		0.00003J	0.000027J		<0.00010	<0.00010	<0.00010	0%	0.02
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0002J	0.0002J			0.00032	0.00049		<0.0002	0.00018J		0.00024	0.000056J	0.0002	0%	0.00
2013	Chromium, Trivalent	mg/L	NA												<0.00050	<0.00020	0.00016J		
2013	Chromium, Hexavalent	mg/L	0.010 (d)												0.00012J	0.00012	0.000041	0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0017	0.0009			0.00096	0.0012		<0.0005	0.0013		0.00083	0.001	0.0019	0%	0.00
2013	Iron	mg/L	0.3 (a)	1. Basin Plan											0.26	0.083	0.16	0%	NA[1]
2007, 2013	Lead	mg/L	NA		0.0002	0.00016			0.00024	0.00063		0.00011J	0.0001J		0.00035	0.000035J	<0.00020		
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan											**0.36**	0.041	**0.085**	67%	NA[1]
2013	Mercury	mg/L	0.002 (d)												<0.000050	0.0000050J	<0.000050		
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.002	0.0018			0.0032	0.0013		0.0011	0.0039		0.0011	0.00086	0.0033	0%	0.02
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0005	0.0005			0.00036J	0.00044		<0.0004	0.00089		0.00019J	0.00021J	0.0011	0%	0.10
2013	Silver	mg/L	0.1 (d)												0.000050J	<0.00020	0.000064J	0%	NA[1]
2013	Thallium	mg/L	0.002 (d)												<0.00020	<0.00020	<0.00020	0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.002	0.002			0.0015J	0.0045J		0.0018J	0.0014J		0.0039J	0.0015J	0.0017J	0%	0.00
Dissolved Metals																			
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0005	0.0004J			0.00015J	0.00018J		0.00016J	0.00032J		0.00026J	NR	0.00046J	0%	0.05
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0049	0.0036			0.0028	0.0033		0.0035	0.0024		0.0025	0.0015	0.0022	0%	0.02
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0004			<0.0001	<0.0001		0.00003J	0.000018J		<0.00010	<0.00010	<0.00010	0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	0.0001J	<0.0005			0.000043J	0.00005J		<0.0002	0.000086J		0.000030J	0.000043J	0.000054J	0%	0.01
2013	Chromium, Trivalent	mg/L	(e)	16. 40 CFR 131.38											AE	AE	0.00002J	0%	NA[1]
2013	Chromium, Hexavalent	mg/L	0.011	16. 40 CFR 131.38											AE	AE	0.000039	0%	NA[1]
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0018	0.0009			0.00079	0.00066		<0.0005	0.0012		0.00045J	0.00091	0.0021	0%	0.03
2013	Iron	mg/L	NA						0.000069J	0.00007J		0.00004J	<0.0002		<0.010	<0.010	0.0015J		
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001			0.000069J	0.00007J		0.00004J	<0.0002		<0.00020	<0.00020	<0.00020	0%	0.00
2013	Manganese	mg/L	NA												0.053	0.036	0.0055		
2013	Mercury	mg/L	NA												<0.000050	0.0000050J	<0.000050		
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0027	0.0016			0.0031	0.00094		0.0011	0.0035		0.00092	0.00083	0.0032	0%	0.01
2007, 2013	Selenium	mg/L	NA		0.0006	0.0005			0.00033J	0.00043		<0.0004	0.00083		0.00015J	0.00019J	0.0012		
2013	Silver	mg/L	(e)	16. 40 CFR 131.38											0.000062J	<0.00020	<0.00020	0%	NA[1]
2013	Thallium	mg/L	NA												<0.00020	<0.00020	<0.00020		
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0036	0.0006			0.0015J	0.0023J		0.0019J	0.0019J		0.0015J	0.0012J	0.0014J	0%	0.00

Dry Weather Historical Monitoring Table for LPC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data									Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015				
					09/26/07-09/27/07	06/02/08-06/03/08	-	-	09/22/10	05/11/11-05/12/11	-	09/12/12-09/13/12	05/14/13-05/15/13	-	09/23/14	01/07/15	05/13/15		
Organophosphorus Pesticides							No Samples Collected	No Samples Collected			No Samples Collected			No Samples Collected					
2013	Azinphos methyl (Guthion)	µg/L	NA												<0.010	<0.010	<0.010		
2013	Bolstar	µg/L	NA												<0.010	<0.010	<0.010		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010	0%	0.29
2013	Coumaphos	µg/L	NA												0.00015J	0.00019J	0.0012		
2013	Demeton-o	µg/L	NA												0.00015J	0.00019J	0.0012		
2013	Demeton-s	µg/L	NA												0.0015J	0.0012J	0.0014J		
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010	0%	0.09
2013	Dichlorvos	µg/L	NA												<0.010	<0.010	<0.010		
2013	Dimethoate	µg/L	NA												<0.010	<0.010	<0.010		
2013	Disulfoton	µg/L	NA												<0.010	<0.010	<0.010		
2013	Ethoprop	µg/L	NA												<0.010	<0.010	<0.010		
2013	Ethyl parathion	µg/L	NA												<0.010	<0.010	<0.010		
2013	Fensulfothion	µg/L	NA												<0.010	<0.010	0.0059J		
2013	Fenthion	µg/L	NA												<0.010	<0.010	<0.010		
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010	0%	0.05
2013	Merphos	µg/L	NA												<0.010	<0.010	<0.010		
2013	Methyl parathion	µg/L	NA												<0.010	<0.010	<0.010		
2013	Mevinphos	µg/L	NA												<0.010	<0.010	<0.010		
2013	Naled	µg/L	NA												<0.010	<0.010	<0.010		
2013	Phorate	µg/L	NA												<0.010	<0.010	<0.010		
2013	Ronnel	µg/L	NA												<0.010	<0.010	<0.010		
2013	Stirophos	µg/L	NA												<0.010	<0.010	<0.010		
2013	Tokuthion (Prothiofos)	µg/L	NA												<0.010	<0.010	<0.010		
2013	Trichloronate	µg/L	NA												<0.010	<0.010	<0.010		
Pyrethroids																			
2013	Allethrin	µg/L	NA												<0.002	<0.002	<0.002		
2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006											<0.002	<0.002	<0.002	0%	NA[1]
2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004											<0.002	<0.002	<0.002	0%	NA[1]
2013	Cyhalothrin, Total Lambda	µg/L	0.2	17. Wheelock et al., 2004											<0.002	<0.002	<0.002	0%	NA[1]
2013	Cypermethrin	µg/L	0.344	17. Wheelock et al., 2004											<0.002	<0.002	<0.002	0%	NA[1]
2013	Danitol (Fenpropathrin)	µg/L	NA												<0.002	<0.002	<0.002		
2013	Deltamethrin/Tralomethrin	µg/L	NA												<0.002	<0.002	<0.002		
2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004											<0.002	<0.002	<0.002	0%	NA[1]
2013	Fenvalerate	µg/L	NA												<0.002	<0.002	<0.002		
2013	Fluvalinate	µg/L	NA												<0.002	<0.002	<0.002		
2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006											<0.01	<0.01	<0.01	0%	NA[1]
2013	Prallethrin	µg/L	NA												<0.002	<0.002	<0.002		
2013	Resmethrin	µg/L	NA												<0.01	<0.01	<0.01		
Toxicity																			
2007, 2013	*Ceriodaphnia* 96-hr	LC$_{50}$ (%)	>100		>100	>100			>100	>100		>100	>100		>100	NR	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100		100	100		100	NR	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**50**	**50**			100	100		100	100		**50**	NR	100	38%	1.38
2007	*Hyalella* 96-hr	LC$_{50}$ (%)	>100		>100	>100			>100	>100		>100	>100		>100	NR	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100			**50**	100		**50**	100		**50**	NR	100	38%	1.38
2013	*Strongylocentrotus 96-hr*	TST	Pass/Fail												Pass	Pass	Pass	0%	

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for LPC-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(b) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(c) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
AE - Analysis error.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NR -Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for SDR-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014		2014-2015		
					01/06/10	05/18/10	-	09/12/11-09/13/11	05/16/12-05/17/12	-	09/17/13-09/18/13	05/07/14-05/08/14	-		
Physical Chemistry															
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	6.74	7.23	No Samples Collected	7.74	7.41	No Samples Collected	7.45	7.56	No Samples Collected	0%	0.32
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,250	2,160		3,280	1,765		4,058	2,466			
2007, 2013	Water Temperature	Celsius	NA		12.00	21.10		23.4	22.7		27.67	18.97			
2007, 2013	Turbidity	NTU	20	1. Basin Plan	5.7	3.3		6.5	10		13.9	5.1		0%	0.37
Bacteriological															
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	20	40		**230**	20		<18	45		17%	0.41
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	170	40		230	40		45	<18		0%	0.23
2007, 2013	Total Coliform	MPN/100 mL	NA		20	5,000		3,000	8,000		230	7,900			
Nutrients															
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	<0.03	0.11		0.062J	0.18		0.44	0.070J		0%	0.06
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	<0.05	0.051J		<0.1	<0.1		0.042J	<0.10		0%	0.00
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	0.033J		<0.1	<0.1		<0.1	<0.10		0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.712J	0.57		1.1	0.88		1.3	0.56			
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	0.712	0.654		**1.1**	0.88		**1.342**	0.56		33%	0.87
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	**0.129**	**0.15**		**0.36**	**0.16**		**0.23**	**0.18**		100%	2.02
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	**0.144**	**0.19**		**0.45**	**0.2**		**0.29**	**0.19**		100%	2.44
General Chemistry															
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	**12.1**	1.5J		4.4	1.7J		**11**	7.6		33%	0.64
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	24.8	21		40	25		52	34		0%	0.27
2007, 2013	Dissolved Organic Carbon	mg/L	NA		8.3B	6.9		9	5.8		8.4	7.8			
2007, 2013	Total Organic Carbon	mg/L	NA		7.8	6.8		8.8	5.4		8.1	8.1			
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5		<5	<5		2.5J	<5.0		0%	0.25
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.105	0.043J		0.07	0.027J		0.11	0.11		0%	0.16
2007, 2013	Total Dissolved Solids	mg/L	1,500 (c)	1. Basin Plan	1,352B	1,200		**2,600**	1,000		**2,500**	1,500		33%	1.13
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	5.5	6		10	20		27	7		0%	0.22
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		476.2	520		940	450		1,050	638			
Total Metals															
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0005	0.00028J		0.00051	0.00042J		0.00023J	0.00031J		0%	0.06
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0027	0.0033		0.0066	0.0034		0.0032	0.0027		0%	0.37
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	0.000017J		0.00002J	0.00003J		<0.00010	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	<0.0005	0.000076J		0.00011J	0.00048		0.000062J	0.00013J		0%	0.00
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0007J	0.00055		0.00045J	0.0014		0.0009	0.00058		0%	0.00
2007, 2013	Lead	mg/L	NA		0.0002	0.000099J		0.00018J	0.00082		0.000047J	0.00018J			
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0011	0.0028		0.0011	0.0013		0.0054	0.0011		0%	0.02
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0004J	0.0004		<0.0004	0.00032J		0.00087	0.00019J		0%	0.08
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0007	0.00079J		0.0012J	0.0049J		0.00065J	0.0021J		0%	0.00
Dissolved Metals															
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0005	0.00029J		0.0005	0.00037J		0.00024J	0.00026J		0%	0.06
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0025	0.0032		0.0064	0.0032		0.0033	0.0026		0%	0.02
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0001		<0.0001	0.00002J		<0.00010	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	<0.0005	0.000051J		<0.0002	0.0001J		<0.00020	0.000055J		0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0007J	0.00061		0.00039J	0.00062		0.00088	0.00023J		0%	0.02
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0002		<0.0002	0.00003J		<0.00020	<0.00020		0%	0.01
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0011	0.0026		0.0011	0.001		0.0052	0.0011		0%	0.01
2007, 2013	Selenium	mg/L	NA		0.0002J	0.00041		<0.0004	0.00031J		0.00078	0.00016J			
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0002J	0.0017J		0.0019J	0.0019J		0.0012J	0.0023J		0%	0.00
Organophosphorus Pesticides															
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.01		<0.01	<0.01		<0.010	<0.010		0%	0.31
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.01		<0.01	<0.01		<0.010	<0.010		0%	0.09
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.01		<0.01	<0.01		<0.010	<0.010		0%	0.05
Toxicity															
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100		100	100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100		100	100		**50**	100		17%	1.17
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100		0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100		**50**	100		**50**	100		33%	1.33

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for SDR-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area/subarea.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
B-Analyte was detected in the associated method blank.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for SDR-TWAS-2

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014		2014-2015		
					01/06/10	05/18/10	-	09/12/11-09/13/11	05/16/12-05/17/12	-	09/17/13-09/18/13	05/07/14-05/08/14	-		
							No Samples Collected			No Samples Collected			No Samples Collected		
Physical Chemistry															
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.32	7.73		7.67	7.55		7.71	7.69		0%	0.11
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,320	1,912		2,510	2,180		2,959	2,411			
2007, 2013	Water Temperature	Celsius	NA		12.2	20.8		20.6	19.0		23.09	17.08			
2007, 2013	Turbidity	NTU	20	1. Basin Plan	3.2	2.9		6.1	3.3		4.4	3.4		0%	0.19
Bacteriological															
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	110	500		500	300		310	700		83%	2.67
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	<20	230		7,000	500		230	330		33%	3.46
2007, 2013	Total Coliform	MPN/100 mL	NA		2,200	3,000		17,000	17,000		3,300	4,600			
Nutrients															
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.03J	0.09J		0.2	0.057J		<0.10	0.049J		0%	0.03
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.49	1.1		0.72	0.56		0.14	0.1		0%	0.05
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	0.037J		0.021J	<0.1		<0.1	0.013J		0%	0.03
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.734J	0.57		1	0.59		0.37	0.38			
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	1.224	1.707		1.741	1.15		0.51	0.493		67%	1.14
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.095	0.11		0.16	0.11		0.16	0.16		83%	1.33
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.104	0.13		0.26	0.13		0.16	0.21		100%	1.66
General Chemistry															
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	1.5J		1.2J	1.5J		0.88J	6.3		0%	0.21
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	26.8	22		28	14		26	23		0%	0.19
2007, 2013	Dissolved Organic Carbon	mg/L	NA		7.6B	6.4		8	4.1		6.2	5.8			
2007, 2013	Total Organic Carbon	mg/L	NA		7.5	6.3		8.4	4.2		6.1	6.1			
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5		<5	<5		<5.0	<5.0		0%	0.25
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.09	0.046J		0.11	0.023J		0.074	0.077		0%	0.14
2007, 2013	Total Dissolved Solids	mg/L	1,000 (c)	1. Basin Plan	1,338B	1,300		1,800	1,300		1,800	1,500		100%	2.79
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	2.8J	<5		8	3		3	2		0%	0.06
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		465.1	540		650	520		710	629			
Total Metals															
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0004J	0.0002J		0.00039J	0.00021J		0.00017J	0.00016J		0%	0.04
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0023	0.0017		0.0026	0.0019		0.002	0.0016		0%	0.20
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0001		0.00004J	0.00002J		0.000040J	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	<0.0005	0.000083J		0.00033	0.0002		0.00013J	0.00010J		0%	0.00
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0007J	0.00085		0.0012	0.00094		0.0011	0.0006		0%	0.00
2007, 2013	Lead	mg/L	NA		<0.0001	0.000093J		0.00068	0.00016J		0.00015J	0.00014J			
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0014	0.0025		0.0022	0.0013		0.0039	0.0011		0%	0.02
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0007	0.00069		0.00058	0.00052		0.00073	0.00030J		0%	0.12
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	<0.0005	0.0016J		0.0038J	0.0025J		0.0014J	0.0023J		0%	0.00
Dissolved Metals															
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0004J	0.00021J		0.00038J	0.0002J		0.00017J	0.00014J		0%	0.04
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0019	0.0016		0.0022	0.0018		0.0018	0.0015		0%	0.01
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0001		0.00003J	0.00002J		0.000037J	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	<0.0005	0.000066J		0.00012J	0.00011J		<0.00020	0.000057J		0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0007J	0.00083		0.0015	0.00079		0.00098	0.00036J		0%	0.03
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	0.000034J		0.00008J	0.00004J		<0.00020	0.000038J		0%	0.01
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0012	0.0027		0.002	0.0012		0.0041	0.001		0%	0.01
2007, 2013	Selenium	mg/L	NA		0.0004J	0.00058		0.00056	0.00053		0.0012	0.00025J			
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0006	0.003J		0.0031J	0.0025J		0.0014J	0.0020J		0%	0.01
Organophosphorus Pesticides															
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.01		<0.01	<0.01		<0.010	<0.010		0%	0.31
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.01		<0.01	<0.01		<0.010	<0.010		0%	0.09
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.01		<0.01	<0.01		<0.010	<0.010		0%	0.05
Toxicity															
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100		100	100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100		100	100		100	50		17%	1.17
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100		0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100		100	100		50	100		17%	1.17

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for SDR-TWAS-2

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area/subarea.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
B-Analyte was detected in the associated method blank.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for SDR-TWAS-3

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014		2014-2015		
					01/06/10	05/18/10	-	09/12/11-09/13/11	05/16/12-05/17/12	-	01/13/14-01/14/14	05/07/14-05/08/14	-		
Physical Chemistry															
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.39	7.70		7.83	7.61		7.84	7.81		0%	0.10
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,160	1,837		1,812	2,240		2,077	1,830			
2007, 2013	Water Temperature	Celsius	NA		10.60	21.20		23.50	21.20		10.27	19.32			
2007, 2013	Turbidity	NTU	20	1. Basin Plan	6	3.3		12	12		2.8	3.6		0%	0.33
Bacteriological															
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	<20	**230**		70	40		<18	20		17%	0.44
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	120	<20		20	110		<18	<18		0%	0.13
2007, 2013	Total Coliform	MPN/100 mL	NA		300	700		1,100	30,000		140	170			
Nutrients															
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.03J	0.21		0.091J	0.098J		<0.10	0.054J		0%	0.04
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	<0.05	0.13		<0.1	<0.1		<0.10	<0.10		0%	0.01
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	0.035J		<0.1	<0.1		0.029J	<0.10		0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		2.4	0.79		0.92	0.96		0.48	0.53			
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	**2.4**	0.955		0.92	0.96		0.509	0.53		17%	1.05
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.09	**0.14**		**0.11**	**0.14**		0.013	**0.12**		67%	1.02
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.081	**0.17**		**0.21**	**0.18**		0.05	**0.14**		67%	1.39
General Chemistry															
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	6.5	3		2.6	2.9		<2.0	6.6		0%	0.38
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	34.8	24		26	24		12	28		0%	0.21
2007, 2013	Dissolved Organic Carbon	mg/L	NA		5.9	6		6.4	4.9		4.6	6.9			
2007, 2013	Total Organic Carbon	mg/L	NA		7.2	5.7		5.9	3.6		4.6	7.2			
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5		<5	<5		<5.0	<5.0		0%	0.25
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.092	0.025J		0.039J	0.023J		0.056	0.079		0%	0.10
2007, 2013	Total Dissolved Solids	mg/L	1,000 (c)	1. Basin Plan	**1,232B**	**1,300**		**1,600**	**1,400**		**1,300**	**1,100**		100%	2.44
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	10.3	9		11	18		8	4		0%	0.17
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		486.8	600		650	610		610	527			
Total Metals							No Samples Collected			No Samples Collected			No Samples Collected		
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0002J	0.00023J		0.00019J	0.0002J		0.00018J	0.00020J		0%	0.03
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0013	0.0015		0.0012	0.0016		0.00062	0.00098		0%	0.12
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	0.000042J		0.00002J	0.00003J		0.000035J	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	<0.0005	0.000071J		0.00008J	0.00033		0.00013J	0.00013J		0%	0.00
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0005J	0.00062		0.00046J	0.00087		0.00084	0.00049J		0%	0.00
2007, 2013	Lead	mg/L	NA		0.00006J	0.0001J		0.00014J	0.00037		0.00012J	0.000061J			
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0012	0.0027		0.00088	0.001		0.0033	0.00069J		0%	0.02
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0008	0.00069		0.00048	0.00079		0.0016	0.00044		0%	0.16
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0021B	0.0015J		0.0025J	0.003J		0.0051	0.0027J		0%	0.00
Dissolved Metals															
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0002J	0.00021J		0.00018J	0.00015J		0.00019J	0.00018J		0%	0.03
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.001	0.0014		0.0011	0.0016		0.00058	0.00093		0%	0.01
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0001		<0.0001	0.00002J		0.000030J	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	<0.0005	0.000042J		<0.0002	0.0001J		0.000045J	0.000035J		0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0005J	0.00055		<0.0005	0.00046J		0.00075	0.00031J		0%	0.02
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0002		<0.0002	<0.0002		<0.00020	<0.00020		0%	0.01
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0011	0.0026		0.00081	0.00082		0.0033	0.00066J		0%	0.01
2007, 2013	Selenium	mg/L	NA		0.0011	0.00074		0.00047	0.00075		0.0016	0.00035J			
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0003J,B	0.0019J		0.002J	0.0015J		0.0037J	0.0013J		0%	0.00
Organophosphorus Pesticides															
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.01		<0.01	<0.01		<0.010	<0.010		0%	0.31
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.01		<0.01	<0.01		<0.010	<0.010		0%	0.09
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.01		<0.01	<0.01		<0.010	<0.010		0%	0.05
Toxicity															
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	**25**		100	100		17%	1.50
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100		100	100		100	100		0%	1.00
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100		0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	**50**		**50**	**50**		**50**	100		83%	1.83

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for SDR-TWAS-3

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area/subarea.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
B-Analyte was detected in the associated method blank.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for SDR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014			2014-2015		
					01/07/10	05/22/10	-	09/12/11-09/13/11	05/16/12-05/17/12	-	09/17/13-09/18/13	01/13/14-01/14/14	05/07/14-05/08/14	-		
Physical Chemistry																
2013	Dissolved Oxygen	mg/L	<5.0 (a)								7.18	6.53	**4.31**		33%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	6.58	7.58		7.41	7.34		7.72	7.55	7.39		0%	0.31
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,490	2,410		3,450	2,200		3,429	2,882	2,181			
2007, 2013	Water Temperature	Celsius	NA		12.90	21.20		23.9	23.1		24.33	13.31	19.12			
2013	Color	Color Units	20	1. Basin Plan							15	**30**	**30**		67%	NA[1]
2007, 2013	Turbidity	NTU	20	1. Basin Plan	4.8	2.7		4	6.4		3.9	8.4	6.6		0%	0.26
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	151 (b)	1. Basin Plan	110	40		<20	110		**330**	**330**	**220**		43%	1.10
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	20	90E		230	40		230	130	**2,300**		14%	1.09
2007, 2013	Total Coliform	MPN/100 mL	NA		80	5,000		3,000	3,000		7,000	790	2,300			
Nutrients																
2007, 2013	Ammonia as N	mg/L	(c)	6. USEPA Water Quality Criteria (Freshwater)	<0.03	0.1		0.11	0.092J		<0.10	0.58	0.084J		0%	0.04
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.02J	0.055J		0.089J	0.12		0.093J	<0.10	<0.10		0%	0.01
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.1		0.013J	<0.1		<0.1	0.013J	0.013J		0%	0.03
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		<1	0.59		0.68	0.56		0.34	0.95	0.68			
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	0.02	0.645		0.782	0.68		0.433	0.963	0.693		0%	0.60
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	**0.101**	**0.17**		**0.34**	**0.16**		0.062	NR	**0.16**		83%	1.66
2013	Orthophosphate	mg/L	NA								0.045	0.048	0.16			
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	**0.104**	0.0054J		**0.39**	**0.18**		0.064	0.06	**0.17**		57%	1.39
General Chemistry																
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	3.8	0.91J		0.92J	1.9J		1.3J	NR	**23**		17%	0.53
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	32.8	23		31	19		26	NR	32		0%	0.23
2013	Chloride	mg/L	400 (a)	1. Basin Plan							**870**	**630**	**470**		100%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		7.9B	6.7		8	4.3		6.6	6.4	9.1			
2007, 2013	Total Organic Carbon	mg/L	NA		7.7	7.2		7.6	4.7		6.6	6.3	8.8			
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5		<5	2.5J		<5.0	NR	3.9J		0%	0.27
2013	Sulfate	mg/L	500 (a)	1. Basin Plan							330	290	210		0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.115	0.14		0.092	0.048J		0.072	0.091	0.17		0%	0.21
2007, 2013	Total Dissolved Solids	mg/L	1,500 (a)	1. Basin Plan	1,454B	1,300	No Samples Collected	**2,400**	1,300	No Samples Collected	**2,100**	**1,700**	1,400	No Samples Collected	43%	1.11
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	5.3	4		4	9		5	2	9		0%	0.09
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		539.3	580		920	530		803	767	608			
Total Metals																
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0006	0.00047J		0.00065	0.00055		0.0006	NR	0.00045J		0%	0.09
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0036	0.0043		0.007	0.0044		0.0036	0.0023	0.0027		0%	0.40
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0001		0.00002J	0.00004J		0.000022J	0.000020J	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	<0.0005	0.00021		0.00008J	0.00041		0.000075J	0.00023	0.00034		0%	0.00
2013	Chromium, Trivalent	mg/L	NA								<0.0005	<0.0005	<0.0005			
2013	Chromium, Hexavalent	mg/L	0.010 (d)	1. Basin Plan							0.000030J	0.00014J	0.00021J		0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0008	0.0015		0.0008	0.0013		0.001	0.002	0.0022		0%	0.00
2013	Iron	mg/L	1.0 (a)	1. Basin Plan							0.035	0.082	0.16		0%	NA[1]
2007, 2013	Lead	mg/L	NA		0.00078	0.00034		0.00024	0.0007		0.000077J	0.00013J	0.00033			
2013	Manganese	mg/L	1.0 (a)	1. Basin Plan							0.07	0.088	0.95		0%	NA[1]
2013	Mercury	mg/L	0.002 (d)	1. Basin Plan							0.000040J	<0.000050	<0.000050		0%	NA[1]
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0014	0.0032		0.0013	0.0015		0.004	0.005	0.0012		0%	0.03
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0009	0.00088		0.0011	0.00086		0.0016	0.0023	0.00052		0%	0.23
2013	Silver	mg/L	0.1 (d)	1. Basin Plan							<0.00020	0.00011J	0.000069J		0%	NA[1]
2013	Thallium	mg/L	0.002 (d)	1. Basin Plan							<0.00020	<0.00020	<0.00020		0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0029	0.0026J		0.0022J	0.0048J		0.0026J	0.0046J	0.0051		0%	0.00
Dissolved Metals																
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0006	0.00046J		0.00062	0.00051		0.00059	NR	0.00044J		0%	0.09
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0032	0.0041		0.0066	0.0041		0.0033	0.0022	0.0028		0%	0.03
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0001		0.00002J	0.00002J		0.000022J	0.000029J	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	<0.0005	0.000069J		<0.0002	0.00018J		<0.00020	0.00015J	0.000069J		0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0009	0.0021		0.00067	0.0012		0.00099	0.0019	0.00064		0%	0.04
2013	Iron	mg/L	NA								<0.010	0.02	0.021			
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	0.000074J		0.00002J	0.00005J		<0.00020	0.000037J	<0.00020		0%	0.01
2013	Manganese	mg/L	NA								0.0067	0.069	0.88			
2013	Mercury	mg/L	NA								0.000042J	<0.000050	<0.000050			
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0014	0.0028		0.0013	0.0014		0.0038	0.0049	0.0011		0%	0.01
2007, 2013	Selenium	mg/L	NA		0.0011	0.00083		0.0011	0.0008		0.0015	0.0023	0.00045			
2013	Silver	mg/L	(e)	16. 40 CFR 131.38							<0.00020	0.00010J	0.00011J		0%	NA[1]
2013	Thallium	mg/L	NA								<0.00020	<0.00020	<0.00020			
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0002J	0.0023J		0.0025J	0.0032J		0.0022J	0.0057	0.0026J		0%	0.01

Dry Weather Historical Monitoring Table for SDR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014			2014-2015		
					01/07/10	05/22/10	-	09/12/11-09/13/11	05/16/12-05/17/12	-	09/17/13-09/18/13	01/13/14-01/14/14	05/07/14-05/08/14	-		
Organophosphorus Pesticides							No Samples Collected			No Samples Collected				No Samples Collected		
2013	Azinphos methyl (Guthion)	μg/L	NA								<0.010	<0.010	<0.010			
2013	Bolstar	μg/L	NA								<0.010	<0.010	<0.010			
2007, 2013	Chlorpyrifos	μg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010		0%	0.32
2013	Coumaphos	μg/L	NA								<0.010	<0.010	<0.010			
2013	Demeton-o	μg/L	NA								<0.010	<0.010	<0.010			
2013	Demeton-s	μg/L	NA								<0.010	<0.010	<0.010			
2007, 2013	Diazinon	μg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010		0%	0.09
2013	Dichlorvos	μg/L	NA								<0.010	<0.010	<0.010			
2013	Dimethoate	μg/L	NA								<0.010	<0.010	<0.010			
2013	Disulfoton	μg/L	NA								<0.010	<0.010	<0.010			
2013	Ethoprop	μg/L	NA								<0.010	<0.010	<0.010			
2013	Ethyl parathion	μg/L	NA								<0.010	<0.010	<0.010			
2013	Fensulfothion	μg/L	NA								<0.010	<0.010	<0.010BS-L			
2013	Fenthion	μg/L	NA								<0.010	<0.010	<0.010			
2007, 2013	Malathion	μg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010		0%	0.47
2013	Merphos	μg/L	NA								<0.010	<0.010	<0.010			
2013	Methyl parathion	μg/L	NA								<0.010	<0.010	<0.010			
2013	Mevinphos	μg/L	NA								<0.010	<0.010	<0.010			
2013	Naled	μg/L	NA								<0.010	<0.010BS-L	<0.010			
2013	Phorate	μg/L	NA								<0.010	<0.010	<0.010			
2013	Ronnel	μg/L	NA								<0.010	<0.010	<0.010			
2013	Stirophos	μg/L	NA								<0.010	<0.010	<0.010			
2013	Tokuthion (Prothiofos)	μg/L	NA								<0.010	<0.010	<0.010			
2013	Trichloronate	μg/L	NA								<0.010	<0.010	<0.010			
Pyrethroids																
2013	Allethrin	μg/L	NA								<0.002	<0.002	<0.002			
2013	Bifenthrin	μg/L	0.0093	15. Anderson et al., 2006							<0.002	<0.002	<0.002		0%	NA[1]
2013	Cyfluthrin	μg/L	0.344	17. Wheelock et al., 2004							<0.002	<0.002	<0.002		0%	NA[1]
2013	Cyhalothrin, Total Lambda	μg/L	0.20	17. Wheelock et al., 2004							<0.002	<0.002	<0.002		0%	NA[1]
2013	Cypermethrin	μg/L	0.683	17. Wheelock et al., 2004							<0.002	<0.002	0.0052		0%	NA[1]
2013	Danitol (Fenpropathrin)	μg/L	NA								<0.002	<0.002	<0.002			
2013	Deltamethrin/Tralomethrin	μg/L	NA								<0.002	<0.002	<0.002			
2013	Esfenvalerate	μg/L	0.25	17. Wheelock et al., 2004							<0.002	<0.002	0.0005J		0%	NA[1]
2013	Fenvalerate	μg/L	NA								<0.002	<0.002	0.0006J			
2013	Fluvalinate	μg/L	NA								<0.002	<0.002	<0.002			
2013	Permethrin	μg/L	0.021	15. Anderson et al., 2006							<0.01	<0.01	<0.01		0%	NA[1]
2013	Prallethrin	μg/L	NA								<0.002	<0.002	<0.002			
2013	Resmethrin	μg/L	NA								<0.01	<0.01	<0.01			
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC$_{50}$ (%)	>100		>100	>100		>100	>100		>100	NR	>100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100		100	NR	100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100		100	100		**50**	NR	100		17%	1.17
2007	*Hyalella* 96-hr	LC$_{50}$ (%)	>100		>100	>100		>100	>100		>100	NR	>100		0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100		100	100		100	NR	100		0%	1.00
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail								Pass	Pass	Pass		0%	

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for SDR-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area/subarea.
(b) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(c) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteri for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
B-Analyte was detected in the associated method blank.
BS-L-Blank Spike recovery of this analyte was below the control limits. Results may be biased low.
E-Result calculated using Tomas Equation.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.
R-Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Results for SDC-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data 2007-2008 03/04/08-03/05/08	2007-2008 06/02/08-06/03/08	2008-2009	2009-2010	2010-2011 09/22/10-09/23/10	2010-2011 05/11/11-05/12/11	2011-2012	2012-2013 09/12/12-09/13/12	2012-2013 05/14/13-05/15/13	Transitional Monitoring 2013-2014	2014-2015 01/07/15	2014-2015 05/05/15	Frequency Above Benchmarks	Mean Ratio to Benchmarks
							-	-			-			-				
Physical Chemistry							No Samples Collected	No Samples Collected			No Samples Collected			No Samples Collected				
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	8.31	7.91			7.85	7.81		6.94	7.68		6.62	8.02	0%	0.32
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,650	2,360			2,610	2,420		3,240	1,431		1,138	2,029		
2007, 2013	Water Temperature	Celsius	NA		14.00	21.30			19.20	20.50		21.5	19.3		11.24	14.04		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	3.2	9.2			2	1.9		1.6	3.2		1.2	2	0%	0.15
Bacteriological																		
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	**230**	130			**700**	80		40	**300**		130	<20	38%	1.35
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	20	80			40	70		<20	220		<20	80	0%	0.17
2007, 2013	Total Coliform	MPN/100 mL	NA		500	3,000			3,000	2,200		800	3,000		500	2,400		
Nutrients																		
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.03	0.06			<0.1	0.081J		<0.1	<0.1		<0.10	<0.10	0%	0.03
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.85	0.12			<0.1	0.19		0.18	0.23		0.18	0.059J	0%	0.02
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	0.05			<0.1	0.031J		<0.1	<0.1		0.016J	<0.10	0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1.3	1.3			0.33	0.57		0.49	0.25		0.38	0.26		
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	**2.15**	**1.47**			0.33	0.791		0.67	0.48		0.576	0.319	25%	0.85
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.09	**0.12**			**0.13**	0.1		0.06	0.091		0.046	0.016	25%	0.82
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	**0.118**	**0.162**			0.056	**0.12**		0.092	**0.16**		0.067	0.034	50%	1.01
General Chemistry																		
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	2.4			0.65J	1.9J		6.3	4.6		2.6	<2.0	0%	0.26
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	16	26			15	32		17	9.6		3.9J	19	0%	0.14
2007, 2013	Dissolved Organic Carbon	mg/L	NA		7.1	8.8			4.1	4.9		6.5	4		4.8	7.2		
2007, 2013	Total Organic Carbon	mg/L	NA		7.5	9.7			4	5.1		6.4	4.7		5.1	7		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5			<5	<5		<5	<5		<5.0	<5.0	0%	0.25
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.103	0.11			0.032J	0.062		0.035J	0.076		0.088	0.083	0%	0.15
2007, 2013	Total Dissolved Solids	mg/L	500 (c)	1. Basin Plan	**1,752**	**1,476**			**1,700**	**1,800**		**1,800**	**1,300**		**780**	**1,300**	100%	2.98
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	3.3J	19.3			2	11		7	6		2	1	0%	0.11
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		508.1	452.9			840	810		800	594		414	679		
Total Metals																		
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0003J	0.0004J			0.00011J	0.0002J		0.00011J	0.00019J		0.00034J	0.00011J	0%	0.04
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0024	0.0029			0.0013	0.0021		0.0013	0.0018		0.0012	0.0014	0%	0.18
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0004			0.000017J	0.00002J		0.00005J	0.000039J		<0.00010	<0.00010	0%	0.02
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0002J	0.0002J			0.0011	0.00036		<0.0002	0.00018J		0.00018J	0.00022	0%	0.01
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0020	0.0025			0.00044J	0.0012		<0.0005	0.001		0.0021	0.00063	0%	0.00
2007, 2013	Lead	mg/L	NA		0.0001	0.0002			0.000022J	0.00053		0.00004J	0.000054J		0.000078J	0.000040J		
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0013	0.0016			0.0042	0.0018		0.0013	0.0034		0.0013	0.0018	0%	0.02
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0014	0.0008			0.0003J	0.0007		<0.0004	0.00079		0.00059	0.00035J	0%	0.13
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0041	0.0054			0.0028J	0.003J		0.0076	0.0028J		0.0061	0.027	0%	0.00
Dissolved Metals																		
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0003J	0.0004J			0.000089J	0.00018J		0.00011J	0.00019J		0.00036J	0.00012J	0%	0.04
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0024	0.0025			0.0013	0.002		0.0014	0.0017		0.0009	0.0012	0%	0.00
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000015J	0.00002J		0.00006J	0.000039J		<0.00010	<0.00010	0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	0.0001J	0.0001J			0.00012J	0.00007J		0.00008J	0.0001J		0.000078J	0.00011J	0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0019	0.0016			0.00061	0.00092		<0.0005	0.0011		0.0017	0.00059	0%	0.04
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001			<0.0002	0.00005J		0.00003J	<0.0002		<0.00020	<0.00020	0%	0.01
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0013	0.0014			0.004	0.0015		0.0013	0.0034		0.0011	0.0018	0%	0.01
2007, 2013	Selenium	mg/L	NA		0.0015	0.0007			0.00021J	0.00071		<0.0004	0.00081		0.00053	0.0004		
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0023	0.0018			0.002J	0.002J		0.0055	0.0025J		0.0027J	0.022	0%	0.01
Organophosphorus Pesticides																		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.29
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.09
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.05
Toxicity																		
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	**<6.25**			100	50CF		100	100		100	100	14%	3.14
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100			**50**	**50**		100	100		100	**50**	38%	1.38

See last page for footnotes and source references.

Dry Weather Historical Monitoring Results for SDC-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary based on hydrologic area.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
CF-Control failed; results not used in assessment.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Results for SDC-TWAS-2

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data 2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013	Transitional Monitoring 2013-2014	2014-2015	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					03/04/08-03/05/08	06/02/08-06/03/08	-	-	01/11/11-01/12/11	05/09/11-05/10/11	-	-	-	-		
Physical Chemistry							No Samples Collected	No Samples Collected			No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected		
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	8.16	7.73			7.50	7.85					0%	NA[1]
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,902	3,000			1,617	2,380						
2007, 2013	Water Temperature	Celsius	NA		12.50	19.20			11.00	16.00						
2007, 2013	Turbidity	NTU	20	1. Basin Plan	102.8	105.2			6.2	14					50%	NA[1]
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	170	7,000			130	300					75%	NA[1]
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	80	170			80	170					0%	NA[1]
2007, 2013	Total Coliform	MPN/100 mL	NA		2,200	30,000			3000	80,000						
Nutrients																
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.09	0.59			0.2	<0.1					0%	NA[1]
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	2.25	0.05			2.9	0.8					0%	NA[1]
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	0.07			0.095J	0.01J					0%	NA[1]
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1.7	2.4			1.2	0.89						
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	3.95	2.52			4.195	1.7					100%	NA[1]
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.1	0.07			0.33	0.065					25%	NA[1]
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.452	0.279			0.35	0.17					100%	NA[1]
General Chemistry																
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	65.1	66.4			1.9J	1.1J					50%	NA[1]
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	22	33			29	33					0%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		16.5	15.2			11	10						
2007, 2013	Total Organic Carbon	mg/L	NA		13.7	15.1			11	8.9						
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	1.2J	2.6J			<5	<5					0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.72	0.088			0.06						33%	NA[1]
2007, 2013	Total Dissolved Solids	mg/L	500 (c)	1. Basin Plan	1,330	1,940			1,200	1,700					100%	NA[1]
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	264	102.7			10	17					50%	NA[1]
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		348.9	525.3			560	830						
Total Metals																
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0002J	0.0002J			0.00018J	0.00013J					0%	NA[1]
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0016	0.0021			0.0012	0.001					0%	NA[1]
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0004			0.000028J	0.000021J					0%	NA[1]
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0015	0.0013			0.0011	0.00062					0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0057	0.0034			0.0032	0.0017					0%	NA[1]
2007, 2013	Lead	mg/L	NA		0.0060	0.0039			0.00055	0.00046						
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0019	0.0021			0.0034	0.0035					0%	NA[1]
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0004J	0.0003J			0.00068	0.00032J					0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0145	0.0062			0.0041J	0.0034J					0%	NA[1]
Dissolved Metals																
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0002J	0.0002J			0.00018J	0.00012J					0%	NA[1]
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0010	0.0018			0.001	0.00064					0%	NA[1]
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000023J	0.000016J					0%	NA[1]
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	0.0001J	0.0001J			0.00014J	0.000074J					0%	NA[1]
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0009	0.0009			0.0026	0.0011					0%	NA[1]
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001			0.000046J	0.000018J					0%	NA[1]
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0009	0.0012			0.0032	0.003					0%	NA[1]
2007, 2013	Selenium	mg/L	NA		0.0003J	0.0003J			0.0005	0.00028J						
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0003J	0.0004J			0.0024J	0.0022J					0%	NA[1]
Organophosphorus Pesticides																
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01					0%	NA[1]
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004			<0.01	<0.01					0%	NA[1]
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			<0.01	<0.01					0%	NA[1]
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100					0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100					0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100			100	<6.25					25%	NA[1]
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100					0%	NA[1]
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100			100	<6.25					25%	NA[1]

See last page for footnotes and source references.

Dry Weather Historical Monitoring Results for SDC-TWAS-2

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary based on hydrologic area.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for SDC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data									Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015				
					03/04/08 03/05/08	06/02/08- 06/03/08	-	-	12/02/10	05/11/11- 05/12/11	-	02/25/13- 02/26/13	05/01/13- 05/02/13	-	01/07/15	02/11/15	05/13/15		
Physical Chemistry							No Samples Collected	No Samples Collected			No Samples Collected			No Samples Collected					
2013	Dissolved Oxygen	mg/L	<6.0 (a)	1. Basin Plan											7.18	**5.25**	7.27	33%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.77	7.96			6.98	6.97		7.04	7.43		7.47	7.06	7.66	0%	0.34
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,740	3,760			3,740	2,840		3,500	3,420		3,630	3,917	3,624		
2007, 2013	Water Temperature	Celsius	NA		15.30	23.40			11.30	19.10		13.7	20.8		11.32	16.55	21		
2013	Color	Color Units	20	1. Basin Plan											**30**	15	20	33%	NA[1]
2007, 2013	Turbidity	NTU	20	1. Basin Plan	8.1	3.5			1	3.9		2.1	2.5		1	5.3	5.8	0%	0.18
Bacteriological																			
2007, 2013	Enterococcus	MPN/100 mL	151 (b)	1. Basin Plan	110	**471**			**500**	**1,300**		**230**	**700**		20	130	**300**	67%	2.77
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	20	**500**			140	300		110	40		20	20	270	11%	0.39
2007, 2013	Total Coliform	MPN/100 mL	NA		500	1,700			800	11,000		1,300	23,000		800	500	1,700		
Nutrients																			
2007, 2013	Ammonia as N	mg/L	(c)	6. USEPA Water Quality Criteria (Freshwater)	0.13	0.05			0.074J	0.17		0.077J	0.087J		<0.10	0.079J	<0.10	0%	0.03
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	1.48	0.11			0.45	0.61		0.36	0.35		0.22	0.17	<0.10	0%	0.04
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	0.05			0.035J	0.043J		0.037J	<0.15		0.033J	0.016J	0.013J	0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		7	0.98			1.1	0.98		0.46	0.6		0.56	0.63	1.5		
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	**8.48**	**1.14**			**1.585**	**1.633**		0.857	0.95		0.813	0.816	**1.513**	56%	1.98
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.09	0.05			**0.12**	0.097		0.082	0.088		0.087	NR	**0.14**	25%	0.94
2013	Orthophosphate	mg/L	NA												0.074	0.057	0.071		
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	**0.13**	0.08			**0.13**	**0.21**		**0.11**	**0.11**		**0.12**	**0.13**	**0.23**	89%	1.39
General Chemistry																			
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	**10.2**			1.4J	1.1J		1.8J	2.3		2.2	NR	9.3	13%	0.37
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	19	28			38	<5		27	19		33	NR	62	0%	0.24
2013	Chloride	mg/L	250 (a)	1. Basin Plan											**920**	**980**	**870**	100%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		8.2	7.9			8.7	6.4		6.3	4.9		7.5	5.5	8.7		
2007, 2013	Total Organic Carbon	mg/L	NA		9.7	8.1			8.5	6.7		6.4	4.2		7.7	5.2	9.7		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5			<5.9	<5		<5	<5		<5.0	NR	<5.0	0%	0.26
2013	Sulfate	mg/L	250 (a)	1. Basin Plan											**460**	**490**	**450**	100%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.09	0.068			0.058	0.049J		0.036J	0.052J		0.079	0.12	0.08	0%	0.14
2007, 2013	Total Dissolved Solids	mg/L	500 (a)	1. Basin Plan	**2,266**	**2,160**			**2,300**	**1,600**		**2,000**	**2,200**		**2,200**	**2,400**	**2,200**	100%	4.29
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	7.6	5			5	27		5	6		7	12	29	0%	0.20
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		332.1	560.3			960	760		923	914		1,060	1,070	1,000		
Total Metals																			
2013	Aluminum	mg/L	1.0 (d)	1. Basin Plan											0.046	0.13	0.071	0%	NA[1]
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0003J	0.0002J			0.00018J	0.00016J		0.00014J	0.00018J		0.00015J	NR	0.00020J	0%	0.03
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0026	0.0027			0.0017	0.0024		0.002	0.0018		0.0021	0.0019	0.0028	0%	0.22
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0004			<0.0001	0.00004J		0.00002J	0.00003J		<0.00010	<0.00010	<0.00010	0%	0.02
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0002J	<0.0005			0.0014	0.0013		0.00039	0.00023		0.00011J	0.00023	0.00017J	0%	0.01
2013	Chromium, Trivalent	mg/L	NA												<0.00020	<0.00020	<0.00020		
2013	Chromium, Hexavalent	mg/L	0.010 (d)	1. Basin Plan											0.00006	0.000035	0.000028	0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0014	0.0005J			0.0012	0.0017		0.00092	0.00097		0.00072	0.00068	0.0017	0%	0.00
2013	Iron	mg/L	0.3 (a)	1. Basin Plan											**0.35**	**0.57**	0.3	67%	NA[1]
2007, 2013	Lead	mg/L	NA		0.0001	0.00013			0.000095J	0.00063		0.00024	0.00019J		0.000060J	0.00016J	<0.00020		
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan											**0.32**	**0.7**	**0.22**	100%	NA[1]
2013	Mercury	mg/L	0.002 (d)	1. Basin Plan											0.0000070J	<0.000050	<0.000050	0%	NA[1]
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0018	0.0021			0.0073	0.0027		0.0024	0.0022		0.0024	0.0025	0.0064	0%	0.03
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0008	0.0004J			0.00062	0.00044		0.0005	0.00037J		0.00029J	0.0004	0.002	0%	0.13
2013	Silver	mg/L	0.1 (d)	1. Basin Plan											<0.00020	<0.00020	<0.00020	0%	NA[1]
2013	Thallium	mg/L	0.002 (d)	1. Basin Plan											<0.00020	<0.00020	<0.00020	0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.003	0.001			0.0015J	0.0066		0.0046J	0.0016J		0.0031J	0.0030J	0.0023J	0%	0.00
Dissolved Metals																			
2013	Aluminum	mg/L	NA												0.0017J	0.0019J	<0.0050		
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0003J	0.0002J			0.00019J	0.00015J		0.00015J	0.00015J		0.00016J	NR	0.00020J	0%	0.03
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0022	0.0027			0.0015	0.0018		0.0018	0.0018		0.0018	0.0015	0.0023	0%	0.01
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000013J	<0.0001		<0.0001	0.00002J		<0.00010	<0.00010	<0.00010	0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	0.0001J	<0.0005			0.00036	0.00005J		0.00008J	0.00008J		0.000043J	<0.00020	0.000052J	0%	0.00
2013	Chromium, Trivalent	mg/L	(e)	16. 40 CFR 131.38											AE	<0.0002	<0.0002	0%	NA[1]
2013	Chromium, Hexavalent	mg/L	0.011	16. 40 CFR 131.38											AE	0.000045	0.000019J	0%	NA[1]
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0012	0.0006J			0.001	0.00077		0.00071	0.00082		0.00049J	0.00042J	0.0015	0%	0.03
2013	Iron	mg/L	NA												0.044	0.03	<0.010		
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001			0.000021J	0.00007J		0.00012J	0.00006J		<0.00020	<0.00020	<0.00020	0%	0.01
2013	Manganese	mg/L	NA												0.18	0.51	0.0019		
2013	Mercury	mg/L	NA												0.0000060J	<0.000050	<0.000050		
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0018	0.0021			0.0066	0.0021		0.0022	0.0021		0.0023	0.0023	0.0065	0%	0.02
2007, 2013	Selenium	mg/L	NA		0.0007	0.0004J			0.00058	0.00043		0.00044	0.00033J		0.00035J	0.00035J	0.0021		
2013	Silver	mg/L	(e)	16. 40 CFR 131.38											<0.00020	<0.00020	<0.00020	0%	0.00
2013	Thallium	mg/L	NA												<0.00020	<0.00020	<0.00020		
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0008	0.0005			0.002J	0.005		0.0026J	0.0016J		0.0024J	0.0013J	0.0012J	0%	0.01

Dry Weather Historical Monitoring Table for SDC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data									Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015				
					03/04/08-03/05/08	06/02/08-06/03/08	-	-	12/02/10	05/11/11-05/12/11	-	02/25/13-02/26/13	05/01/13-05/02/13	-	01/07/15	02/11/15	05/13/15		
Acid Extractable Compounds																			
2013	Pentachlorophenol	μg/L	(f)	16. 40 CFR 131.38											AE	<1.0	<1.0	0%	NA[1]
Organophosphorus Pesticides																			
2013	Azinphos methyl (Guthion)	μg/L	NA												<0.010	<0.010	<0.010		
2013	Bolstar	μg/L	NA												<0.010	<0.010	<0.010		
2007, 2013	Chlorpyrifos	μg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010	0%	0.29
2013	Coumaphos	μg/L	NA												<0.010	<0.010	<0.010		
2013	Demeton-o	μg/L	NA												<0.010	<0.010	<0.010		
2013	Demeton-s	μg/L	NA												<0.010	<0.010	<0.010		
2007, 2013	Diazinon	μg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010	0%	0.09
2013	Dichlorvos	μg/L	NA												<0.010	<0.010	<0.010		
2013	Dimethoate	μg/L	NA												<0.010	<0.010	<0.010		
2013	Disulfoton	μg/L	NA												<0.010	<0.010	<0.010		
2013	Ethoprop	μg/L	NA												<0.010	<0.010	<0.010		
2013	Ethyl parathion	μg/L	NA												<0.010	<0.010	<0.010		
2013	Fensulfothion	μg/L	NA												<0.010	0.0035J	0.0060J		
2013	Fenthion	μg/L	NA												<0.010	<0.010	<0.010		
2007, 2013	Malathion	μg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010	0%	0.05
2013	Merphos	μg/L	NA												<0.010	<0.010	<0.010		
2013	Methyl parathion	μg/L	NA												<0.010	<0.010	<0.010		
2013	Mevinphos	μg/L	NA				No Samples Collected	No Samples Collected			No Samples Collected			No Samples Collected	<0.010	<0.010	<0.010		
2013	Naled	μg/L	NA												<0.010	<0.010BS-L	<0.010		
2013	Phorate	μg/L	NA												<0.010	<0.010	<0.010		
2013	Ronnel	μg/L	NA												<0.010	<0.010	<0.010		
2013	Stirophos	μg/L	NA												<0.010	<0.010	<0.010		
2013	Tokuthion (Prothiofos)	μg/L	NA												<0.010	<0.010	<0.010		
2013	Trichloronate	μg/L	NA												<0.010	<0.010	<0.010		
Pyrethroids																			
2013	Allethrin	μg/L	NA												<0.002	<0.002	<0.002		
2013	Bifenthrin	μg/L	0.0093	15. Anderson et al., 2006											<0.002	<0.002	<0.002	0%	NA[1]
2013	Cyfluthrin	μg/L	0.344	17. Wheelock et al., 2004											<0.002	<0.002	<0.002	0%	NA[1]
2013	Cyhalothrin, Total Lambda	μg/L	0.20	17. Wheelock et al., 2004											<0.002	<0.002	<0.002	0%	NA[1]
2013	Cypermethrin	μg/L	0.344	17. Wheelock et al., 2004											<0.002	<0.002	<0.002	0%	NA[1]
2013	Danitol (Fenpropathrin)	μg/L	NA												<0.002	<0.002	<0.002		
2013	Deltamethrin/Tralomethrin	μg/L	NA												<0.002	<0.002	<0.002		
2013	Esfenvalerate	μg/L	0.25	17. Wheelock et al., 2004											<0.002	<0.002	<0.002	0%	NA[1]
2013	Fenvalerate	μg/L	NA												<0.002	<0.002	<0.002		
2013	Fluvalinate	μg/L	NA												<0.002	<0.002	<0.002		
2013	Permethrin	μg/L	0.021	15. Anderson et al., 2006											<0.01	<0.01	<0.01	0%	NA[1]
2013	Prallethrin	μg/L	NA												<0.002	<0.002	<0.002		
2013	Resmethrin	μg/L	NA												<0.01	<0.01	<0.01		
Toxicity																			
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	NR	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100		100	100		100	NR	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100			**50**	**<6.25**		100	**50**		**50**	NR	100	50%	3.25
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	NR	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	**50**			100	100		100	100*		**50**	NR	100	38%	1.25
2013	*Strongylocentrotus 96-hr*	TST	Pass/Fail												Pass	Pass	Pass	0%	

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for SDC-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(b) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(c) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
(f) Water Quality Benchmark for pentachlorophenol are based on pH and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
AE-Analysis error.
BS-L-Blank Spike recovery of this analyte was below the control limits. Results may be biased low.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.
NR-Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).
* Originally tested with first batch. Showed slight toxicity (TU=2) but was out of holding time. Re-run with second batch.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for SLR-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data									Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015			
					09/18/07-09/19/07	05/13/08-05/14/08	-	-	01/11/11-01/12/11	05/10/11	-	02/25/13-02/26/13	05/01/13-05/02/13	-	01/07/15	5/5/2015-5/6/2015		
Physical Chemistry																		
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.42	7.68			7.34	7.75		7.45	7.62		6.66	7.59	0%	0.25
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,320	1,878			1,773	1,811		2,670	2,580		2,283	2,955		
2007, 2013	Water Temperature	Celsius	NA		18.9	15.90			12.70	17.20		12.20	15.80		14.58	15.69		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	5.3	8.4			8.8	3.2		13	2.6		2.7	2.5	0%	0.29
Bacteriological																		
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	**500**	**800**			**1,300**	**500**		60	**500**		40	20	63%	3.08
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	170	140			300	230		40	230		<20	40	0%	0.37
2007, 2013	Total Coliform	MPN/100 mL	NA		800	5,000			5,000	1,700		3,000	3,000		300	230		
Nutrients																		
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.004	0.03			0.1	<0.1		0.15	<0.1		<0.10	<0.10	0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.01	0.48			4.6	1.6		0.99	0.24		0.092J	<0.10	0%	0.10
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05			0.038J	<0.1		0.029J	<0.15		0.017J	<0.10	0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.56	1.1			0.71	0.5		0.41	0.54		0.3	0.2		
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	0.57	**1.58**			**5.35**	**2.10**		**1.429**	0.78		0.409	0.2	50%	1.55
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.04J	0.08			0.099	0.1		**0.11**	0.093		0.017	0.022	13%	0.70
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.1	**0.147**			**0.15**	**0.15**		**0.20**	**0.17**		0.064	0.08	63%	1.33
General Chemistry																		
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	3.6			1.3J	0.68J		1.2J	0.91J		<2.0	<2.0	0%	0.13
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	**160**	16			12	17		17	21		15	17	13%	0.29
2007, 2013	Dissolved Organic Carbon	mg/L	NA		5	6.4			6.2	5.1		4.8	4.4		5.3	4.9		
2007, 2013	Total Organic Carbon	mg/L	NA		39.4	5.8			6.4	5.1		5.1	4.1		5.4	4.9		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	1J	<5			<5	<5		<5	2.1J		<5.0	1.7J	0%	0.22
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.04	0.029			0.037J			<0.05	0.033J		0.056	0.049J	0%	0.08
2007, 2013	Total Dissolved Solids	mg/L	500 (c)	1. Basin Plan	**1,740**	**1,552**			**1,400**	**1,500**		**1,700**	**1,800**		**1,800**	**2,000**	100%	3.37
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	2J	10			11	10		19	25		3	4	0%	0.18
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		499.8	447.7			710	750		887	880		978	1,100		
Total Metals																		
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	<0.0005	0.0001J			0.00011J	0.000064J		0.00006J	0.00008J		0.000081J	<0.00050	0%	0.02
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0012	0.0014			0.0013	0.0011		0.001	0.0011		0.00096	0.00065	0%	0.11
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0004			0.000036J	0.000023J		0.00003J	0.00004J		0.000057J	<0.00010	0%	0.02
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0001J	<0.0005	No Samples Collected	No Samples Collected	0.00095	0.00033	No Samples Collected	0.00072	0.00062	No Samples Collected	0.000077J	0.000050J	0%	0.01
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	<0.0008	0.0007J			0.0035	0.0022		0.0017	0.0018		0.00056	0.00026J	0%	0.00
2007, 2013	Lead	mg/L	NA		<0.0001	0.0001			0.00034	0.00014J		0.0004	0.00045		0.000068J	<0.00020		
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0007	0.0008			0.0042	0.003		0.0017	0.0014		0.0022	0.0015	0%	0.02
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.0005	0.0006			0.00071	0.00056		0.00038J	0.00027J		0.00017J	<0.00040	0%	0.08
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0011	0.0017			0.0039J	0.0019J		0.0039J	0.0042J		0.0026J	0.0011J	0%	0.00
Dissolved Metals																		
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.0005	0.0001J			0.000091J	0.000071J		0.00006J	0.00005J		0.000080J	<0.00050	0%	0.02
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0011	0.0013			0.0009	0.00081		0.00078	0.00083		0.00069	0.00053	0%	0.00
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000027J	0.000022J		0.00004J	0.00003J		<0.00010	<0.00010	0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	<0.0005	<0.0005			0.000079J	0.0001J		<0.0002	0.00007J		0.000039J	<0.00020	0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	<0.0008	<0.0008			0.0024	0.0012		0.00081	0.00067		0.00030J	0.00025J	0%	0.03
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001			0.000022J	<0.0002		0.00007J	0.00004J		<0.00020	<0.00020	0%	0.01
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0006	0.0007			0.0037	0.0025		0.0013	0.0011		0.0022	0.0015	0%	0.01
2007, 2013	Selenium	mg/L	NA		<0.0005	0.0006			0.00066	0.00062		0.00035J	0.00019J		0.00015J	<0.00040		
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	<0.0005	0.0004J			0.002J	0.0021J		0.0024J	0.0019J		0.0012J	0.0012J	0%	0.00
Organophosphorus Pesticides																		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.29
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004			<0.01	<0.01		<0.01	<0.01		0.0056J	<0.010	0%	0.09
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.05
Toxicity																		
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100			100	6.25Q		100	**50**		**50**	**50**	43%	1.43
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100			100	100		100	**50**		100	**25**	25%	1.50

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for SLR-TWAS-1

Blank spaces have been verified and no data is available due.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary based on hydrologic area.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
Q-Results did not meet quality control criteria; results not used in assessment.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for SLR-TWAS-2

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Long Term Monitoring					Transitional Monitoring		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2010-2011		2011-2012	2012-2013		2013-2014	2014-2015		
					01/11/11-01/12/11	05/09/11-05/10/11	-	02/25/13-02/26/13	05/01/13-05/02/13	-	-		
Physical Chemistry													
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.62	8.02	No Samples Collected	7.91	7.68	No Samples Collected	No Samples Collected	0%	NA[1]
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,758	1,931		2,740	2,780				
2007, 2013	Water Temperature	Celsius	NA		13.60	18.80		13.7	17.3				
2007, 2013	Turbidity	NTU	20	1. Basin Plan	12	2		9.6	**43**			25%	NA[1]
Bacteriological													
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	**300**	110		20	**700**			50%	NA[1]
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	170	110		40	300			0%	NA[1]
2007, 2013	Total Coliform	MPN/100 mL	NA		5,000	1,700		800	5000				
Nutrients													
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.1	<0.1		<0.1	0.069J			0%	NA[1]
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	5.8	4.1		4.1	7.6			0%	NA[1]
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.059J	0.04J		0.071J	<0.15			0%	NA[1]
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.53	0.35		0.32	0.87				
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	**6.39**	**4.49**		**4.491**	**8.47**			100%	NA[1]
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	**0.17**	**0.14**		**0.14**	**0.13**			100%	NA[1]
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	**0.21**	**0.15**		**0.18**	**0.24**			100%	NA[1]
General Chemistry													
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	1.6J	3.6		1.2J	1.5J			0%	NA[1]
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	31	24		12	23			0%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		6.7	5.2		4.9	4.7				
2007, 2013	Total Organic Carbon	mg/L	NA		6.9	5.1		5.4	4.4				
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5		<5	2J			0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.031J			<0.05	0.024J			0%	NA[1]
2007, 2013	Total Dissolved Solids	mg/L	500 (c)	1. Basin Plan	**1,400**	**1,500**		**1,800**	**1,900**			100%	NA[1]
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	18	4		24	**71**			25%	NA[1]
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		690	780		906	894				
Total Metals													
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.00013J	0.000079J		0.0001J	0.00018J			0%	NA[1]
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0014	0.0011		0.0012	0.0019			0%	NA[1]
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	0.00003J	0.000026J		0.00006J	0.00007J			0%	NA[1]
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0021	0.00022		0.00091	0.0047			0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0041	0.0017		0.0018	0.0066			0%	NA[1]
2007, 2013	Lead	mg/L	NA		0.00047	0.00028		0.00034	0.0018				
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0046	0.003		0.002	0.0034			0%	NA[1]
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.00088	0.0008		0.00061	0.00071			0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0062	0.0011J		0.0061	0.022			0%	NA[1]
Dissolved Metals													
2007	Antimony	mg/L	0.006	1. Basin Plan	0.00011J	0.000076J		0.00007J	0.00009J			0%	NA[1]
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.00096	0.0011		0.001	0.0013			0%	NA[1]
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	0.000027J	0.000027J		0.00003J	0.00003J			0%	NA[1]
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	0.00013J	0.000056J		<0.0002	0.00009J			0%	NA[1]
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0024	0.0016		0.00095	0.0014			0%	NA[1]
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	0.000041J	<0.0002		0.00009J	<0.0002			0%	NA[1]
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0038	0.0028		0.0015	0.0013			0%	NA[1]
2007, 2013	Selenium	mg/L	NA		0.0008	0.00069		0.0006	0.00059				
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0022J	0.0024J		0.0033J	0.0023J			0%	NA[1]
Organophosphorus Pesticides													
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.01	<0.01		<0.01	<0.01			0%	NA[1]
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.01	<0.01		<0.01	<0.01			0%	NA[1]
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.01	<0.01		<0.01	<0.01			0%	NA[1]
Toxicity													
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100			0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100			0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	**<6.25**		100	100			25%	NA[1]
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100		>100	**57.4***			25%	NA[1]
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100		**50**	100			25%	NA[1]

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for SLR-TWAS-2

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmarks are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hyrdologic area/subarea.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.
* Fungus observed on bodies of dead Hyalella. TIE not run.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for SLR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data									Long Term and Transitional Monitoring		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015		
					09/18/10-09/19/10	05/13/08-05/14/08	-	-	01/11/11-01/12/11	05/09/11-05/10/11	-	02/25/13-02/26/13	05/01/13-05/02/13	-	-		
Physical Chemistry																	
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.74	7.87			7.75	8.05		7.74	7.22			0%	0.13
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,360	1,983			1,661	2,410		2,790	3,310				
2007, 2013	Water Temperature	Celsius	NA		18.20	16.30			14.40	16.30		11.6	17.90				
2007, 2013	Turbidity	NTU	20	1. Basin Plan	3.9	**25.4**			12	19		1.6	5			17%	0.56
Bacteriological																	
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	**1,700**	70			**1,700**	**500**		130	80			50%	4.61
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	**800**	110			**1,100**	170		40	110			33%	0.97
2007, 2013	Total Coliform	MPN/100 mL	NA		2,300	1,879E			6,000	30,000		2,800	3,000				
Nutrients																	
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.04J	0.03			0.1	<0.1		0.082J	<0.1			0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.16	1.23			4.5	2		0.8	<0.11			0%	0.15
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05			0.03J	<0.1		0.05J	<0.15			0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.7	0.56			0.62	0.63		0.48	1.1				
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	0.86	**1.79**			**5.15**	**2.63**		**1.33**	**1.1**			83%	2.14
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	**0.14**	**0.16**			**0.17**	**0.14**		0.063	0.095			67%	1.28
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	**0.16**	**0.30**			**0.24**	**0.25**		0.082	**0.18**			83%	2.02
General Chemistry																	
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	<2			1.4J	0.96J		1.5J	3.1			0%	0.15
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	61	18			20	37		22	36			0%	0.27
2007, 2013	Dissolved Organic Carbon	mg/L	NA		4.02	6.8			7.7	5.8		7	7				
2007, 2013	Total Organic Carbon	mg/L	NA		4.2	6.5			7.4	5.6		7	6.6				
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5			<5	<5		2J	1.5J			0%	0.23
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.045	0.047			0.031J			0.029J	0.085			0%	0.09
2007, 2013	Total Dissolved Solids	mg/L	500 (c)	1. Basin Plan	**1,685**	**1,630**			**1,400**	**1,500**		**1,700**	**2,400**			100%	3.44
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	4.7J	36			14	32		3	17			0%	0.31
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		450	440			660	780		860	1090				
Total Metals																	
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0001J	0.0001J	No Samples Collected	No Samples Collected	0.00014J	0.00011J	No Samples Collected	0.00016J	0.00012J	No Samples Collected	No Samples Collected	0%	0.02
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0018	0.0018			0.0013	0.0015		0.0011	0.0014			0%	0.15
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0004			0.000031J	0.000035J		0.00005J	0.00005J			0%	0.02
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0001J	0.0001J			0.00084	0.00081		0.00035	0.00016J			0%	0.01
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0005J	0.0036			0.0029	0.0025		0.0013	0.00053			0%	0.00
2007, 2013	Lead	mg/L	NA		0.00006J	0.0004			0.0003	0.00037		0.00009J	0.00022				
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.001	0.0017			0.0038	0.0033		0.002	0.0014			0%	0.02
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0004J	0.0007			0.00073	0.00051		0.00043	0.00034J			0%	0.10
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.001	0.004			0.0035J	0.0035J		0.0028J	0.003J			0%	0.00
Dissolved Metals																	
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0001J	0.0001J			0.00013J	0.000094J		0.00016J	0.0001J			0%	0.02
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0016	0.0017			0.001	0.0012		0.00092	0.0012			0%	0.01
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000022J	0.000022J		0.00004J	0.00005J			0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	<0.0005	<0.0005			0.00011J	0.000059J		<0.0002	0.00008J			0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0007J	0.0009			0.0022	0.0012		0.0013	0.00044J			0%	0.04
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0001			0.000023J	<0.0002		0.00011J	<0.0002			0%	0.01
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0009	0.0013			0.0034	0.0027		0.0018	0.0013			0%	0.01
2007, 2013	Selenium	mg/L	NA		0.0004J	0.0007			0.00067	0.00053		0.00046	0.00034J				
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0001J	0.0007			0.0021J	0.002J		0.0035J	0.0026J			0%	0.00
Organophosphorus Pesticides																	
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01		<0.01	<0.01			0%	0.26
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004			<0.01	<0.01		<0.01	<0.01			0%	0.08
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			<0.01	<0.01		<0.01	<0.01			0%	0.04
Toxicity																	
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100			0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100		100	100			0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100			100	**25**		100	100			17%	1.50
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100			0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100			100	100		100	**25**			17%	1.50

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for SLR-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
E-Results calculated using Thomas Equation.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for SM-TWAS-1b

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data 2010-2011 09/14/10-09/15/10	2010-2011 05/11/11-05/12/11	2011-2012	2012-2013 09/05/12-09/06/12	2012-2013 05/14/13-05/15/13	Transitional Monitoring 2013-2014	2014-2015 1/7/2015-1/8/2015	2014-2015 5/5/2015-5/6/2015	Frequency Above Benchmarks	Mean Ratio to Benchmarks
							-			-				
Physical Chemistry														
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	8.24	7.89	No Samples Collected	7.86	7.91	No Samples Collected	6.96	8.15	0%	0.28
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,823	2,250		1,746	1,370		1,869	1,848		
2007, 2013	Water Temperature	Celsius	NA		17.70	15.90		20.2	16.9		13.83	16.44		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	4.4	**35**		8.4	14		2.7	3.4	17%	0.57
Bacteriological														
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	**1,300**	**300**		**4,000**	**5,000**		110	80	67%	11.91
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	170	**500**		**3,000**	**500**		40	140	50%	1.81
2007, 2013	Total Coliform	MPN/100 mL	NA		80,000	14,000		5,000	8,000		900	2,400		
Nutrients														
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	<0.1	<0.1		0.072J	0.17		<0.10	<0.10	0%	0.04
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	1.7	3.6		0.97	1		1	0.32	0%	0.14
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.08J	0.04J		<0.1	<0.1		0.013J	0.010J	0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.78	0.9		0.68	0.26		0.33	0.41		
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	**2.56**	**4.54**		**1.65**	**1.26**		**1.343**	0.74	83%	2.02
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.066	**0.11**		0.056	**0.15**		0.037	0.092	33%	0.85
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.08	**0.18**		0.076	**0.18**		0.051	**0.18**	50%	1.25
General Chemistry														
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	3.4	1.3J		1.6J	0.88J		<2.0	<2.0	0%	0.15
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2000	25	50		19	5.5		9.9	15	0%	0.17
2007, 2013	Dissolved Organic Carbon	mg/L	NA		3.8	4.4		4.9	3.2		5.3	7.4		
2007, 2013	Total Organic Carbon	mg/L	NA		4.1	4.4		5.5	3.8		5.4	7.4		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5		<5	<5		<5.0	<5.0	0%	0.25
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.028J	0.046J		0.037J	0.053J		0.091	0.076	0%	0.11
2007, 2013	Total Dissolved Solids	mg/L	500 (c)	1. Basin Plan	**1,300**	**1,400**		**1,200**	**1,200**		**1,300**	**1,100**	100%	2.50
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	55	**60**		31	16		2	8	17%	0.49
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		580	650		528	531		665	574		
Total Metals														
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.00028J	0.00027J		0.00028J	0.00038J		0.00029J	0.00029J	0%	0.05
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0015	0.0018		0.002	0.0015		0.00091	0.002	0%	0.16
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	0.000053J	0.00006J		0.00006J	0.000031J		0.000042J	<0.00010	0%	0.01
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	0.0021	0.0019		0.0002	0.00018J		0.00014J	0.00033	0%	0.02
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0054	0.0062		0.0012	0.0021		0.0016	0.0017	0%	0.00
2007, 2013	Lead	mg/L	NA		0.0014	0.0016		0.00017J	0.000088J		0.00010J	0.00031		
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0035	0.0027		0.0018	0.0035		0.002	0.002	0%	0.03
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0012	0.0012		0.0009	0.0011		0.00058	0.00054	0%	0.18
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.02	0.019		0.0026J	0.0035J		0.0071	0.0063		
Dissolved Metals														
2007	Antimony	mg/L	0.006	1. Basin Plan	0.00025J	0.00021J		0.00028J	0.00038J		0.00029J	0.00028J	0%	0.05
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0013	0.0016		0.0019	0.0015		0.00077	0.0015	0%	0.01
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	0.000016J	0.00002J		0.00006J	0.000031J		<0.00010	<0.00010	0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	0.00012J	0.00016J		0.00008J	0.00014J		0.000055J	0.000043J	0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0017	0.0021		0.00097	0.0019		0.0014	0.00096	0%	0.05
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	0.000045J	0.00005J		0.00009J	0.000024J		<0.00020	<0.00020	0%	0.01
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0023	0.0015		0.0015	0.0038		0.0021	0.0018	0%	0.01
2007, 2013	Selenium	mg/L	NA		0.00098	0.0011		0.00088	0.0011		0.00066	0.00043		
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0035J	0.0036J		0.0024J	0.0037J		0.0045J	0.0028J	0%	0.01
Organophosphorus Pesticides														
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.36
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.01	<0.01		0.0065J	<0.01		<0.010	<0.010	0%	0.11
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.05
Toxicity														
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100		100	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100C		100	100		100	100	0%	1.00
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	**50**		100	100		**50**	100	33%	1.33

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for SM-TWAS-1b

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary based on hydrologic area.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.
C-Control failed; however, sample showed no toxic response.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for SMR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data 2007-2008 03/06/08	05/08/08	Frequency Above Benchmarks	Mean Ratio to Benchmarks
Physical Chemistry								
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	8.02	8.21	0%	NA[1]
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,280	1,180		
2007, 2013	Water Temperature	Celsius	NA		12.72	18.61		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	8.76	1.18	0%	NA[1]
Bacteriological								
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	8	22	0%	NA[1]
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	17	50	0%	NA[1]
2007, 2013	Total Coliform	MPN/100 mL	NA		110	1,600		
Nutrients								
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	<0.02	<0.02	0%	NA[1]
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	1.82	0.26	0%	NA[1]
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.007	<0.007	0%	NA[1]
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		<0.3	1.2		
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	**1.82**	**1.46**	100%	NA[1]
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	<0.05	<0.05	0%	NA[1]
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan				
General Chemistry								
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2.00	<2.00	0%	NA[1]
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	<25	<25	0%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		4.83	3.71		
2007, 2013	Total Organic Carbon	mg/L	NA		6.32	6.61		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5	0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.1	<0.1	0%	NA[1]
2007, 2013	Total Dissolved Solids	mg/L	750 (c)	1. Basin Plan	**830**	**819**	100%	NA[1]
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	<1	<1	0%	NA[1]
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		494	521		
Total Metals								
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	<0.001	<0.001	0%	NA[1]
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	<0.001	<0.001	0%	NA[1]
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.001	<0.001	0%	NA[1]
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	<0.004	<0.004	0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	<0.002	<0.002	0%	NA[1]
2007, 2013	Lead	mg/L	NA		<0.004	<0.004		
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	<0.002	<0.002	0%	NA[1]
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.005	<0.005	0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	<0.010	<0.010	0%	NA[1]
Dissolved Metals								
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	0%	NA[1]
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	<0.001	<0.001	0%	NA[1]
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.001	<0.001	0%	NA[1]
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	<0.004	<0.004	0%	NA[1]
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	<0.001	<0.001	0%	NA[1]
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.001	<0.001	0%	NA[1]
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	<0.002	<0.002	0%	NA[1]
2007, 2013	Selenium	mg/L	NA		<0.005	<0.005		
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	<0.010	<0.010	0%	NA[1]
Organophosphorus Pesticides								
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.04*	<0.04*		
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.04	<0.04	0%	NA[1]
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.05	<0.05	0%	NA[1]
Toxicity								
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100					
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100	0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100	0%	NA[1]
2007	*Hyalella* 96-hr	LC_{50} (%)	>100					
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100	0%	NA[1]

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for SMR-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.

(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).

(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.

(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.

(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).

(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.

J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources

Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for SMR-MLS-2

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data							Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015				
					-	-	09/14//10-09/15/10	05/10/11	-	09/05/12-09/06/12	05/01/13-05/02/13	-	09/10/14	01/07/15	05/05/15		
Physical Chemistry					No samples collected	No samples collected			No samples collected			No samples collected					
2013	Dissolved Oxygen	mg/L	<6.0 (a)	1. Basin Plan									6.92	10.43	7.64	0%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan			7.03	8.19		7.39	7.4		7.56	7.3	7.55	0%	0.31
2007, 2013	Specific Conductivity	µmhos/cm	NA				1,288	1,256		1,153	1,057		1,293	1,412	1,416		
2007, 2013	Water Temperature	Celsius	NA				20.40	15.90		21.5	19.6		23.17	12.13	19.05		
2007, 2013	Turbidity	NTU	20	1. Basin Plan			1.4	1.4		0.52	1.4		1.2	0.9	0.6	0%	0.05
Bacteriological																	
2007, 2013	Enterococcus	MPN/100 mL	151 (b)	1. Basin Plan			40	40		130	**170**		≤110AE	40	70	14%	0.57
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2			20	70		20	80		20	40	110	0%	0.13
2007, 2013	Total Coliform	MPN/100 mL	NA				5,000	1,300		800	2,300		490	2,400	500		
Nutrients																	
2007, 2013	Ammonia as N	mg/L	(c)	6. USEPA Water Quality Criteria (Freshwater)			<0.1	<0.1		<0.1	<0.1		<0.10	<0.10	<0.10	0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan			0.37	2.7		0.32	0.48		0.063J	3.2	0.51	0%	0.11
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan			0.016J	<0.1		<0.1	<0.15		0.028J	0.017J	<0.10	0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA				0.23	0.17		0.23	0.23		0.16	0.18	0.14		
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan			0.616	**2.87**		0.55	0.71		0.251	**3.397**	0.65	29%	1.29
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan			0.037	0.018		0.012	0.011		0.015	NR	0.01	0%	0.17
2013	Orthophosphate	mg/L	NA										0.014	AE	0.012		
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan			0.038	0.021		0.015	0.022		0.026	0.036	0.019	0%	0.25
General Chemistry																	
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)			4.7	0.59J		1.5J	1.2J		<2.0	NR	<2.0	0%	0.17
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015			3.9J	7.2		11	6.2		12	NR	11	0%	0.07
2007, 2013	Dissolved Organic Carbon	mg/L	NA				2.2	3.2		3.8	3.2		3.2	4	3.7		
2007, 2013	Total Organic Carbon	mg/L	NA				2.3	3.2		2.9	2.9		3.3	4.2	3.1		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL			<5	<5		4.5J	1.5J		<5.0	NR	<5.0	0%	0.27
2013	Sulfate	mg/L	250 (a)	1. Basin Plan									**290**	**330**	**330**	100%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan			<0.05			0.034J	0.035J		0.038J	0.06	0.032J	0%	0.07
2007, 2013	Total Dissolved Solids	mg/L	750 (a)	1. Basin Plan			**870**	**840**		**850**	**810**		**860**	**1,000**	**950**	100%	1.18
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan			1	31		3	4		6	3	2	0%	0.12
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA				430	440		402	385		426	542	481		
Total Metals																	
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan			0.0002J	0.00013J		0.00008J	0.00017J		0.000088J	NR	0.000045J	0%	0.02
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan			0.001	0.0014		0.0017	0.0012		0.0014	0.0014	0.0012	0%	0.13
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan			0.000017J	<0.0001		0.00002J	<0.0001		<0.00010	<0.00010	<0.00010	0%	0.01
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan			0.0001J	0.00015J		<0.0002	0.00021		0.00031	0.00012J	0.00013J	0%	0.00
2013	Chromium, Trivalent	mg/L	NA										<0.00050	<0.00020	<0.00020		
2013	Chromium, Hexavalent	mg/L	0.010 (d)	1. Basin Plan									0.000053J	0.000095	0.000084	0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan			0.00067	0.0013		0.00045J	0.0013		0.00067	0.0013	0.00088	0%	0.00
2013	Iron	mg/L	0.3 (a)	1. Basin Plan									**0.39**	0.13	0.15	33%	NA[1]
2007, 2013	Lead	mg/L	NA				0.0001J	0.000062J		0.00002J	0.00019J		0.000085J	0.000067J	0.000058J		
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan									**0.063**	0.034	0.049	33%	NA[1]
2013	Mercury	mg/L	0.002 (d)	1. Basin Plan									0.000026J	0.0000040J	<0.000050	0%	NA[1]
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan			0.0014	0.0016		0.00075J	0.00079J		0.00075J	0.001	0.00068J	0%	0.01
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38			0.00056	0.0012		0.00065	0.00079		0.00043	0.0012	0.00053	0%	0.15
2013	Silver	mg/L	0.1 (d)	1. Basin Plan									<0.00020	<0.00020	<0.00020	0%	NA[1]
2013	Thallium	mg/L	0.002 (d)	1. Basin Plan									<0.00020	<0.00020	<0.00020	0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan			0.0011J	0.0013J		<0.005	0.0015J		0.0018J	0.0030J	<0.0050	0%	0.00
Dissolved Metals																	
2007	Antimony	mg/L	0.006	1. Basin Plan			0.00014J	0.00012J		0.0001J	0.00012J		0.000086J	NR	0.000095J	0%	0.02
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38			0.001	0.0013		0.0016	0.0012		0.0011	0.0013	0.0012	0%	0.00
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38			<0.0001	<0.0001		0.00002J	<0.0001		<0.00010	<0.00010	<0.00010	0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38			0.000056J	0.000074J		<0.0002	0.00016J		0.000086J	0.000047J	<0.00020	0%	0.00
2013	Chromium, Trivalent	mg/L	(e)	16. 40 CFR 131.38									AE	AE	<0.0002	0%	NA[1]
2013	Chromium, Hexavalent	mg/L	0.011	16. 40 CFR 131.38									AE	AE	0.000076	0%	NA[1]
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38			0.00061	0.0012		0.0005	0.00095		0.00048J	0.0012	0.00092	0%	0.03
2013	Iron	mg/L	NA										0.027	0.0077J	0.039		
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38			<0.0002	0.000039J		<0.0002	<0.0002		<0.00020	<0.00020	0.000045J	0%	0.01
2013	Manganese	mg/L	NA										0.012	0.018	0.04		
2013	Mercury	mg/L	NA										0.000015J	<0.000050	<0.000050		
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38			0.0014	0.0016		0.00071J	0.0008		0.00065J	0.00092	0.00067J	0%	0.01
2007, 2013	Selenium	mg/L	NA				0.00065	0.0012		0.00067	0.00071		0.00035J	0.0012	0.00058		
2013	Silver	mg/L	(e)	16. 40 CFR 131.38									<0.00020	<0.00020	<0.00020	0%	NA[1]
2013	Thallium	mg/L	NA										<0.00020	<0.00020	<0.00020		
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38			0.0017J	0.0024J		0.0016J	0.0046J		0.0011J	0.0013J	0.0012J	0%	0.01

Dry Weather Historical Monitoring Table for SMR-MLS-2

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data							Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015				
					-	-	09/14//10-09/15/10	05/10/11	-	09/05/12-09/06/12	05/01/13-05/02/13	-	09/10/14	01/07/15	05/05/15		
Organophosphorus Pesticides					No samples collected	No samples collected			No samples collected			No samples collected					
2013	Azinphos methyl (Guthion)	µg/L	NA										<0.010	<0.010	<0.010		
2013	Bolstar	µg/L	NA										<0.010	<0.010	<0.010		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010	0%	0.36
2013	Coumaphos	µg/L	NA										<0.010	<0.010	<0.010		
2013	Demeton-o	µg/L	NA										<0.010	<0.010	<0.010		
2013	Demeton-s	µg/L	NA										<0.010	<0.010	<0.010		
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010	0%	0.10
2013	Dichlorvos	µg/L	NA										<0.010	<0.010	<0.010		
2013	Dimethoate	µg/L	NA										<0.010	<0.010	<0.010		
2013	Disulfoton	µg/L	NA										<0.010	<0.010	<0.010		
2013	Ethoprop	µg/L	NA										<0.010	<0.010	<0.010		
2013	Ethyl parathion	µg/L	NA										<0.010	<0.010	<0.010		
2013	Fensulfothion	µg/L	NA										<0.010	<0.010	<0.010		
2013	Fenthion	µg/L	NA										<0.010	<0.010	<0.010		
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010	0%	0.05
2013	Merphos	µg/L	NA										<0.010	<0.010	<0.010		
2013	Methyl parathion	µg/L	NA										<0.010	<0.010	<0.010		
2013	Mevinphos	µg/L	NA										<0.010	<0.010	<0.010		
2013	Naled	µg/L	NA										<0.010	<0.010	<0.010		
2013	Phorate	µg/L	NA										<0.010	<0.010	<0.010		
2013	Ronnel	µg/L	NA										<0.010	<0.010	<0.010		
2013	Stirophos	µg/L	NA										<0.010	<0.010	<0.010		
2013	Tokuthion (Prothiofos)	µg/L	NA										<0.010	<0.010	<0.010		
2013	Trichloronate	µg/L	NA										<0.010	<0.010	<0.010		
Pyrethroids																	
2013	Allethrin	µg/L	NA										<0.002	<0.002	<0.002		
2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006									<0.002	<0.002	<0.002	0%	NA[1]
2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004									<0.002	<0.002	<0.002	0%	NA[1]
2013	Cyhalothrin, Total Lambda	µg/L	0.2	17. Wheelock et al., 2004									<0.002	<0.002	<0.002	0%	NA[1]
2013	Cypermethrin	µg/L	0.344	17. Wheelock et al., 2004									<0.002	<0.002	<0.002	0%	NA[1]
2013	Danitol (Fenpropathrin)	µg/L	NA										<0.002	<0.002	<0.002		
2013	Deltamethrin/Tralomethrin	µg/L	NA										<0.002	<0.002	<0.002		
2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004									<0.002	<0.002	<0.002	0%	NA[1]
2013	Fenvalerate	µg/L	NA										<0.002	<0.002	<0.002		
2013	Fluvalinate	µg/L	NA										<0.002	<0.002	<0.002		
2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006									<0.01	<0.01	<0.01	0%	NA[1]
2013	Prallethrin	µg/L	NA										<0.002	<0.002	<0.002		
2013	Resmethrin	µg/L	NA										<0.01	<0.01	<0.01		
Toxicity																	
2007, 2013	*Ceriodaphnia* 96-hr	LC$_{50}$ (%)	>100				>100	>100		>100	>100		>100	NR	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100				100	100		100	100		100	NR	100	0%	1.00
2013	*Ceriodaphnia 7-day survival*	TST	Pass/Fail										Pass	Pass	Pass	0%	
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100				100	<6.25CF		100	100		100	NR	100	0%	1.00
2013	*Ceriodaphnia 7-day reproduction*	TST	Pass/Fail										Pass	Pass	Pass	0%	
2007	*Hyalella* 96-hr	LC$_{50}$ (%)	>100				>100	>100		>100	>100		>100	NR	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100				100	100		100	100		100	NR	100	0%	1.00
2013	*Selenastrum 96-hr*	TST	Pass/Fail										Pass	Pass	Pass	0%	
2013	*Pimephales 7-day survival*	TST	Pass/Fail										Pass	Pass	Pass	0%	
2013	*Pimephales 7-day biomass*	TST	Pass/Fail										Pass	Pass	Pass	0%	

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for SMR-MLS-2

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.

(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.

(b) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011)

(c) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.

(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).

(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.

AE-Analysis error.

CF-Control failed; results not used in assessment.

J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

NR-Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources

Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for SR-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014		2014-2015		
					01/06/10	05/18/10	-	09/12/11-09/13/11	05/08/12-05/09/12	-	01/13/14-01/14/14	05/01/14-05/02/14	-		
Physical Chemistry															
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.15	7.51		7.09	7.39	No Samples Collected	7.3	7.25	No Samples Collected	0%	0.37
2007, 2013	Specific Conductivity	µmhos/cm	NA		3,110	2,970		2,470	2,680		2,652	2,743			
2007, 2013	Water Temperature	Celsius	NA		11.80	17.4		18.4	16.3		12.28	16.39			
2007, 2013	Turbidity	NTU	20	1. Basin Plan	10.9	9.4		11	10		16.7	**47.8**		17%	0.88
Bacteriological															
2007, 2013	Enterococcus	MPN/100 mL	151 (a)	1. Basin Plan	130	**170**		140	**300**		78	**790**		50%	1.77
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	<20	20		300	40		<18	170		0%	0.22
2007, 2013	Total Coliform	MPN/100 mL	NA		800	8,000		5,000	2,200		1,300	790			
Nutrients															
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.04	0.1		0.094J	0.058J		0.030J	<0.10		0%	0.01
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.17	0.13		0.27	0.23		0.062J	<0.10		0%	0.02
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.04J	<0.1		<0.1	<0.1		0.014J	0.011J		0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		<1	0.4		0.4	0.45		0.25	0.28			
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	0.21	0.53		0.67	0.68		0.326	0.291		0%	0.45
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	0.076	0.02		0.054	0.053		0.01	0.024		0%	0.40
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.086	0.086		**0.13**	**0.11**		0.062	0.068		33%	0.90
General Chemistry															
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	1.1J		1.3J	0.42J		<2.0	<2.0		0%	0.10
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	24.8	10		22	12		13	6.8		0%	0.12
2007, 2013	Dissolved Organic Carbon	mg/L	NA		5.1	5.7		4.7	5.6		4.5	4.4			
2007, 2013	Total Organic Carbon	mg/L	NA		5.7	5.3		4.7	5.3		4.4	4.5			
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5		<5	<5		<5.0	3.7J		0%	0.27
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.058	0.032J		0.065	0.039J		0.066	0.058		0%	0.11
2007, 2013	Total Dissolved Solids	mg/L	1,500 (c)	1. Basin Plan	**1,952B**	**1,900**		**1,800**	**1,800**		**1,700**	**1,800**		100%	1.22
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	8.2	6		10	9		5	12		0%	0.14
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		801.3	860		780	780		835	893			
Total Metals															
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	<0.0005	0.000085J		0.0001J	0.00009J		0.000060J	0.000044J		0%	0.02
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.001	0.00096		0.0013	0.0017		0.001	0.00076		0%	0.11
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	0.000016J		0.00002J	0.00002J		0.000032J	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	<0.0005	0.000072J		0.00022	0.00022		0.00012J	<0.00020		0%	0.00
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	<0.0008	0.00036J		0.00073	0.00034J		0.00065	0.00018J		0%	0.00
2007, 2013	Lead	mg/L	NA		<0.0001	0.000033J		0.00026	0.00014J		0.000065J	<0.00020			
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0012	0.0031		0.00093	0.001		0.0043	0.00066J		0%	0.02
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0003J	0.00044		<0.0004	0.00036J		0.0015	0.00011J		0%	0.10
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	<0.0005	0.00096J		0.0026J	0.0023J		0.0022J	0.00078J		0%	0.00
Dissolved Metals															
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0001J	0.000093J		0.00015J	0.00008J		0.000060J	0.000050J		0%	0.01
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0011	0.00076		0.00095	0.0013		0.00072	0.00075		0%	0.01
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	0.000017J		0.00002J	0.00003J		0.000040J	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	<0.0005	0.000069J		0.00019J	<0.0002		0.000057J	0.000058J		0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	<0.0008	0.00045J		0.00046J	<0.0005		0.00061	0.00012J		0%	0.01
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0002		<0.0002	<0.0002		<0.00020	<0.00020		0%	0.01
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.001	0.0034		0.00086	0.001		0.0043	0.00065J		0%	0.01
2007, 2013	Selenium	mg/L	NA		0.0004J	0.00034J		<0.0004	0.00037J		0.0015	0.00012J			
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	<0.0005	0.0024J		0.0022J	0.0016J		0.0026J	0.0011J		0%	0.00
Organophosphorus Pesticides															
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.01		<0.01	<0.01		<0.010	<0.010		0%	0.22
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.01		<0.01	<0.01		<0.010	<0.010		0%	0.06
2007^, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.01		<0.01	<0.01		<0.010	<0.010		0%	0.01
Toxicity															
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100		100	100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100		100	100		**50**	**50**		33%	1.33
2007, 2013	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100		>100C	>100		>100	>100		0%	1.00
2007	*Selenastrum* 96-hr	NOEC (%)	100		**25**	**25**		**50**	**50**		**50**	**50**		100%	2.67

See last page for footnotes and source references.

Dry Weather Historical Monitoring Table for SR-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(d) Water Quality Benchmark for total metals is based on the MUN beneficial use as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).
(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, may 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria concentration (CCC) were used.
B-Analyte was detected in the associated method blank.
C - Control failed; however, sample showed no toxic response.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Dry Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014			2014-2015		
					01/06/10	05/18/10	-	09/12/11-09/13/11	05/08/12-05/09/12	-	09/17/13-09/18/13	1/13/14-1/14/14	05/01/14-05/02/14	-		
Physical Chemistry																
2013	Dissolved Oxygen	mg/L	<5.0 (a)	1. Basin Plan							**3**	6.44	5.68		33%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.38	7.39		7.26	7.29		7.36	7.38	7.46		0%	0.31
2007, 2013	Specific Conductivity	µmhos/cm	NA		4,810	4,630		5,010	4,640		5,229	5,167	5,109			
2007, 2013	Water Temperature	Celsius	NA		12.70	18.10		19.3	16.8		21.24	16.28	19.91			
2013	Color	Color units	20	1. Basin Plan							20	20	**25**		33%	NA[1]
2007, 2013	Turbidity	NTU	20	1. Basin Plan	1.4J	2.5		0.98	4		3.2	0.1	**63.4**		14%	0.54
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	151 (b)	1. Basin Plan	80	**170**		130	**300**		78	140	**310**		43%	1.14
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	120	90		20	<20		130	45	20		0%	0.02
2007, 2013	Total Coliform	MPN/100 mL	NA		800	13,000		1,300	500		1,400	490	1,100			
Nutrients																
2007, 2013	Ammonia as N	mg/L	(c)	6. USEPA Water Quality Criteria (Freshwater)	0.03J	0.14		0.18	0.06J		0.11	<0.10	0.044J		0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.17	0.33		0.063J	0.24		0.085J	0.098J	0.065J		0%	0.02
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	0.045J		<0.1	<0.1		<0.1	0.012J	0.022J		0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.554J	0.51		0.62	0.46		0.4	0.3	0.42			
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	0.724	0.885		0.683	0.7		0.485	0.41	0.507		0%	0.63
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	**0.132**	0.077		**0.18**	0.097		**0.15**	NR	0.1		50%	1.23
2013	Orthophosphate	mg/L	NA								0.15	0.097	0.11			
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.098	**0.14**		**0.21**	**0.12**		**0.16**	0.096	**0.11**		71%	1.33
General Chemistry																
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	1.5J		2.7	0.54J		1.5J	NR	<2.0		0%	0.14
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	40.9	22		29	22		24	NR	28		0%	0.23
2007, 2013	Dissolved Organic Carbon	mg/L	NA		7.8	6.7		5.3	6		6.1	3.9	4.9			
2007, 2013	Total Organic Carbon	mg/L	NA		7.7	6.1		4.3	6.2		5.9	3.8	4.9			
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5		<5	2J		<5.0	NR	1.4J		0%	0.22
2013	Sulfate	mg/l	500 (a)	1. Basin Plan							410	420	470		0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.074	0.06		0.063	0.057		0.071	0.059	0.072		0%	0.13
2007, 2013	Total Dissolved Solids	mg/L	1,500 (a)	1. Basin Plan	**2,642B**	**2,700**		**3,400**	**2,700**		**3,200**	**2,900**	**3,000**		100%	1.96
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	1.8J	5		2	4		4	6	4		0%	0.07
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		978.7	1,100	No Samples Collected	1,200	1,100	No Samples Collected	1,290	1,270	1,260	No Samples Collected		
Total Metals																
2013	Aluminum	mg/L	0.2 (d)	1. Basin Plan							0.0049J	0.0085	0.021		0%	0.06
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0002J	0.00016J		0.00011J	0.00017J		0.000083J	0.000070J	0.00013J		0%	0.02
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0031	0.0016		0.0014	0.0024		0.0014	0.00092	0.0013		0%	0.17
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0001		0.00002J	0.00002J		0.000025J	0.000022J	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	<0.0005	0.000077J		<0.0002	0.00011J		0.00015J	0.000065J	0.000046J		0%	0.00
2013	Chromium, Trivalent	mg/L	NA								<0.0005	<0.0005	<0.0005			
2013	Chromium, Hexavalent	mg/L	0.010 (d)	1. Basin Plan							0.000036J	0.000025J	0.00016J		0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0005J	0.00063		<0.0005	<0.0005		0.0011	0.001	0.00040J		0%	0.00
2013	Iron	mg/L	0.3 (a)	1. Basin Plan							0.024	0.024	0.06		0%	NA[1]
2007, 2013	Lead	mg/L	NA		0.00007J,B	0.000062J		0.00004J	0.00011J		0.000028J	0.000030J	0.000061J			
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan							**0.39**	**0.14**	**0.31**		100%	NA[1]
2013	Mercury	mg/L	0.002 (d)	1. Basin Plan							0.000039J	<0.000050	<0.000050		0%	NA[1]
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0015	0.0051		0.0011	0.0015		0.0069	0.0073	0.00093		0%	0.03
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0003J	0.00045		<0.0004	0.00043		0.001	0.0026	0.00022J		0%	0.15
2013	Silver	mg/L	0.1 (d)	1. Basin Plan							0.000013J	0.000056J	<0.00020		0%	NA[1]
2013	Thallium	mg/L	0.002 (d)	1. Basin Plan							<0.00020	<0.00020	<0.00020		0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0023B	0.0017J		0.0011J	0.003J		0.0024J	0.0016J	0.0014J		0%	0.00
Dissolved Metals																
2013	Aluminum										<0.0050	<0.0050	<0.0050			
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0002J	0.00019J		0.0001J	0.00016J		0.000085J	0.000078J	0.00014J		0%	0.02
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0033	0.0015		0.0014	0.002		0.0014	0.0009	0.0012		0%	0.01
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0001		0.00002J	0.00002J		0.000022J	0.000017J	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	<0.0005	0.000083J		<0.0002	<0.0002		<0.00020	0.000052J	0.000039J		0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0005J	0.0007		<0.0005	<0.0005		0.0011	0.0011	0.00030J		0%	0.02
2013	Iron	mg/L	NA								<0.010	0.0017J	<0.010			
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0002		0.00002J	<0.0002		<0.00020	<0.00020	<0.00020		0%	0.01
2013	Manganese	mg/L	NA								0.38	0.1	0.27			
2013	Mercury	mg/L	NA								0.000048J	0.0000040J	<0.000050			
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0014	0.0054		0.001	0.0014		0.007	0.0071	0.00084		0%	0.02
2007, 2013	Selenium	mg/L	NA		0.0005	0.00047		<0.0004	0.0004		0.00089	0.0025	0.00022J			
2013	Silver	mg/L	(e)	16. 40 CFR 131.38							0.000029J	0.000058J	<0.00020		0%	NA[1]
2013	Thallium	mg/L	NA								<0.00020	<0.00020	<0.00020			
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0021B	0.0029J		0.0019J	0.0027J		0.0011J	0.0024J	0.0016J		0%	0.01

Dry Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014			2014-2015		
					01/06/10	05/18/10	-	09/12/11-09/13/11	05/08/12-05/09/12	-	09/17/13-09/18/13	1/13/14-1/14/14	05/01/14-05/02/14	-		
Organophosphorus Pesticides																
2013	Azinphos methyl (Guthion)	µg/L	NA				No Samples Collected			No Samples Collected	<0.010	<0.010	<0.010	No Samples Collected		
2013	Bolstar	µg/L	NA								<0.010	<0.010	<0.010			
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010		0%	0.32
2013	Coumaphos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Demeton-o	µg/L	NA								<0.010	<0.010	<0.010			
2013	Demeton-s	µg/L	NA								<0.010	<0.010	<0.010			
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010		0%	0.09
2013	Dichlorvos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Dimethoate	µg/L	NA								<0.010	<0.010	<0.010			
2013	Disulfoton	µg/L	NA								<0.010	<0.010	<0.010			
2013	Ethoprop	µg/L	NA								<0.010	<0.010	<0.010			
2013	Ethyl parathion	µg/L	NA								<0.010	<0.010	<0.010			
2013	Fensulfothion	µg/L	NA								<0.010	<0.010	<0.010			
2013	Fenthion	µg/L	NA								<0.010	<0.010	<0.010			
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010		0%	0.47
2013	Merphos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Methyl parathion	µg/L	NA								<0.010	<0.010	<0.010			
2013	Mevinphos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Naled	µg/L	NA								<0.010	<0.010BS-L	<0.010			
2013	Phorate	µg/L	NA								<0.010	<0.010	<0.010BS-L			
2013	Ronnel	µg/L	NA								<0.010	<0.010	<0.010			
2013	Stirophos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Tokuthion (Prothiofos)	µg/L	NA								<0.010	<0.010	<0.010			
2013	Trichloronate	µg/L	NA								<0.010	<0.010	<0.010			
PCB Congeners																
2013	PCB-8	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-18	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-28	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-44	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-52	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-66	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-77	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-81	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-101	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-105	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-114	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-118	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-123	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-126	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-128	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-138	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
Polynuclear Aromatic Hydrocarbons																
2013	1-Methylnaphthalene	µg/L	NA								<0.10	<0.10	<0.10			
2013	1-Methylphenanthrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	2,6-Dimethylnaphthalene	µg/L	NA								<0.10	<0.10	<0.10			
2013	2-Methylnaphthalene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Acenaphthene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Acenaphthylene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Anthracene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (a) anthracene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (a) pyrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (b) fluoranthene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (e) pyrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (g,h,i) perylene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (k) fluoranthene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Biphenyl	µg/L	NA								<0.10	<0.10	<0.10			
2013	Chrysene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Dibenzo (a,h) anthracene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Fluoranthene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Fluorene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Indeno (1,2,3-cd) pyrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Naphthalene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Perylene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Phenanthrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Pyrene	µg/L	NA								<0.10	<0.10	<0.10			

Dry Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014			2014-2015		
					01/06/10	05/18/10	-	09/12/11-09/13/11	05/08/12-05/09/12	-	09/17/13-09/18/13	1/13/14-1/14/14	05/01/14-05/02/14	-		
Pyrethroids																
2013	Allethrin	µg/L	NA								<0.002	<0.002	<0.002			
2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006							<0.002	<0.002	<0.002		0%	NA[1]
2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004							<0.002	<0.002	<0.002		0%	NA[1]
2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004							<0.002	<0.002	<0.002		0%	NA[1]
2013	Danitol (Fenpropathrin)	µg/L	NA								<0.002	<0.002	<0.002			
2013	Deltamethrin/Tralomethrin	µg/L	NA								<0.002	<0.002	<0.002			
2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004			No Samples Collected			No Samples Collected	<0.002	<0.002	<0.002	No Samples Collected	0%	NA[1]
2013	Fenvalerate	µg/L	NA								<0.002	<0.002	<0.002			
2013	Fluvalinate	µg/L	NA								<0.002	<0.002	<0.002			
2013	L-Cyhalothrin	µg/L	0.2	17. Wheelock et al., 2004							<0.002	<0.002	<0.002		0%	NA[1]
2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006							<0.01	<0.01	<0.01		0%	NA[1]
2013	Prallethrin	µg/L	NA								<0.002	<0.002	<0.002			
2013	Resmethrin	µg/L	NA								<0.01	<0.01	<0.01			
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	NR	>100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100		100	NR	**50**		17%	1.17
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**50**	**50**		**50**	**50**		**25**	NR	**25**		100%	2.67
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100		>100C	>100		>100	NR	>100		0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	**50**		**50**	**50**		**25**	NR	**25**		100%	2.67
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail								Pass	Pass	Pass		0%	

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.

(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.

(b) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).

(c) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.

(d) Water Quality Benchmark for total metals is based on the MUN beneficial as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).

(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.

(f) Water Quality Benchmark for PCBs is the CCC (USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000).

B-Analyte was detected in the associated method blank.

BS-L-Blank Spike recovery of this analyte was below the control limits. Results may be biased low.

C - Control failed; however, sample showed no toxic response.

J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

NR-Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources

Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for AHC-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data							Transitional Monitoring		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015		
					11/30/07	02/03/08	-	-	-	-	-	-	-		
Physical Chemistry															
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	8.34	8.02	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	0%	NA[1]
2007, 2013	Specific Conductivity	umhos/cm	NA		254	423									
2007, 2013	Water Temperature	Celsius	NA		16.60	13.20									
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**304**	**108**								100%	NA[1]
Bacteriological															
2007, 2013	Enterococcus	MPN/100 mL	NA		80,000	22,000									
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan REC-1/REC-2	**110,000**	**2,200**								100%	NA[1]
2007, 2013	Total Coliform	MPN/100 mL	NA		170,000	70,000									
Nutrients															
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	0.74	0.09								0%	NA[1]
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	2.5	1.9								0%	NA[1]
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.1	<0.03								0%	NA[1]
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		3.9	1.1									
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.74	0.26								0%	NA[1]
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	1.3	0.4								0%	NA[1]
General Chemistry															
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	11	2.7								0%	NA[1]
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	62	23								0%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		14.7	5.4									
2007, 2013	Total Organic Carbon	mg/L	NA		15.9	5.6									
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	3.3J	2.2J								0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.03	0.1								0%	NA[1]
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	**504**	406								50%	NA[1]
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**440**	**122**								100%	NA[1]
2007, 2013	Hardness	mg $CaCO_3$/L	NA		88.5	86.6									
Total Metals															
2007	Antimony	mg/L	NA		0.0006	0.0006									
2007, 2013	Arsenic	mg/L	NA		0.0035	0.0023									
2007, 2013	Cadmium	mg/L	NA		0.0003J	<0.0004									
2007, 2013	Chromium	mg/L	NA		0.0065	0.0016									
2007, 2013	Copper	mg/L	NA		0.0379	0.0115									
2007, 2013	Lead	mg/L	NA		0.0099	0.0032									
2007, 2013	Nickel	mg/L	NA		0.0084	0.0025									
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0006	0.0003J								0%	NA[1]
2007, 2013	Zinc	mg/L	NA		0.1632	0.0509									
Dissolved Metals															
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0009	0.0007								0%	NA[1]
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0025	0.0020								0%	NA[1]
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004	<0.0004								0%	NA[1]
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0005	0.0005								0%	NA[1]
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0051	0.0042								0%	NA[1]
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.00009J	<0.0001								0%	NA[1]
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0021	0.0012								0%	NA[1]
2007, 2013	Selenium	mg/L	NA		0.0005	0.0004J									
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0125	0.0089								0%	NA[1]
Organophosphorus Pesticides															
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	**0.25**	**0.07**								100%	NA[1]
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	0.037	0.015								0%	NA[1]
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	0.058	0.048								0%	NA[1]
Pyrethroids															
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002									
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	**0.0329**	**0.0693**								100%	NA[1]
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	0.007	<0.002								0%	NA[1]
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	<0.002	<0.002								0%	NA[1]
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	0.01	<0.002								0%	NA[1]
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.002	0.001J									
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.002	<0.002									
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	<0.002								0%	NA[1]
2007, 2013	Fenvalerate	µg/L	NA		<0.002	<0.002									
2007, 2013	Fluvalinate	µg/L	NA		<0.002	0.0007J									
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.025*	<0.025*								0%	NA[1]
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002									
2007, 2013	Resmethrin	µg/L	NA												
Toxicity															
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100								0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100								0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100								0%	NA[1]
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		**90.93**	>100								50%	NA[1]
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100								0%	NA[1]

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for AHC-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
*Indicates detection limit above water quality benchmark
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for AHC-MLS

Permit Requirements	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data																	
					1998-1999			1999-2000			2000-2001			2001-2002			2002-2003			2003-2004		
					11/08/98	01/31/99	03/15/99	01/25/00	02/20/00	03/05/00	10/27/00	01/08/01	02/23/01	02/17/02	03/08/02	03/17/02	11/08/02	02/11/03	02/25/03	11/12/03	01/19/04	02/18/04
Physical Chemistry																						
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan										7.6	7.8	7.5	7.76	7.5	7.67	7.70	8.00	7.61
2007, 2013	Specific Conductivity	µmhos/cm	NA		652	1,560	2,270	2,160	1,172	1,194	2,220	3,180	645	1,320	2,000	1,520	955	588	548	1,203	2,610	647
2007, 2013	Water Temperature	Celsius	NA														17.40	13.90	13.70	16.00	14.20	14.10
2007, 2013	Turbidity	NTU	20	1. Basin Plan		8	14	**22**	**52**	**58**	6.4	**66**	**302**	9.5	16	**55.1**	**264**	**184**	**290**	**295**	**135**	**27.7**
Bacteriological																						
2007, 2013	Enterococcus	MPN/100 mL	NA								3,000	9,000	13,000	13,000	11,000	30,000	50,000	13,000	110,000	11,000	5,000	3,000
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	**>1600**	240	**>1600**	**>1600**	**>1600**	<2	**500**	**11,000**	**13,000**	**13,000**	**500**	**24,000**	**23,000**	**7,000**	**5,000**	**5,000**	**2,300**	**2,300**
2007, 2013	Total Coliform	MPN/100 mL	NA		>241,900	8,130	197,000	>1,600	>1,600	300	13,000	50,000	23,000	23,000	1,700	24,000	80,000	50,000	50,000	17,000	5,000	3,000
Nutrients																						
2007, 2013	Ammonia as N	mg/L	(a)	6. USEPA Water Quality Criteria (Freshwater)	0.3	0.15	0.21	0.4	<0.1	0.11	0.84	0.6	0.3	<0.1	0.1	0.1	0.25	0.25	0.62	0.43	<0.1	0.3
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	2.1	0.86	1.1	1.6	1.42	1.58	0.4	1.3	1.1	1.1	0.7	1.2	1.27	1.15	0.55	3.1	1.7	3.2
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	<0.05	0.057	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	0.06	<0.05	<0.05
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA			0.44	2.8	0.85	4.02	2.11	2.45	3	4.06	1.5	2.3	2.6	1.8	0.9	2.4	11	7.6	3.5
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.57	0.12	0.1	0.12	0.22	<0.1	0.06	0.22	0.42	<0.05	0.08	0.16	0.13	0.20	0.14	0.53	0.88	0.16
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.72	0.13	0.12	0.16	1.04	0.74	0.11	0.24	0.62	0.5	0.25	0.53	0.87	0.83	1.14	0.63	**2.28**	0.56
General Chemistry																						
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	20	<3	5.25	6	2.98	6.6	2	8.9	5	8	2.1	7.6	4.32	20.4	5.6	**45.3**	3.52	16
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	34	<5	21	70	66	41	62	69	56	50	44	61	88	46	60	**260**	**124**	106
2007, 2013	Dissolved Organic Carbon	mg/L	NA														11.0	9.75	11.9	19.6	8.28	32.9
2007, 2013	Total Organic Carbon	mg/L	NA														20.3	13.8	5.21	18.1	14.5	47.2
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	0.67	<0.5	<0.5	3.24	3.54	2.28	<1	<1	1	2	<1	2	<1.00	1.54	<1.00	<1	<1	<1
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.25	0.07	<0.05	0.33	0.21	0.08	<0.5*	<0.5*	<0.5*	<0.5*	<0.5*	<0.5*	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan		**892**	**1,611**	**1,356**	335	362	**1,300**	**1,290**	487	**1,050**	**1,250**	389	**851**	**641**	310	**951**	<20	**851**
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan		35	5	65	**134**	**286**	<20	**131**	**442**	39	**152**	**335**	**508**	**380**	**674**	**842**	<20	**403**
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		137	365	568	52.2	155	35.3	680	532	201	592	669	290	418	370	205	680	576	403
Total Metals																						
2007	Antimony	mg/L	NA			<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.003	0.003	<0.005	<0.006	<0.006
2007, 2013	Arsenic	mg/L	NA			<0.001	<0.001	<0.001	0.018	0.007	0.005	0.005	0.007	0.004	0.004	0.003	0.008	0.005	0.010	0.015	0.008	0.008
2007, 2013	Cadmium	mg/L	NA			<0.0003	<0.0003	<0.0003	0.001	0.00025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001
2007, 2013	Chromium	mg/L	NA			<0.005	0.12	<0.005	<0.005	<0.005	<0.005	<0.005	0.015	0.042	<0.005	<0.005	0.006	0.009	0.017	0.021	<0.005	0.009
2007, 2013	Copper	mg/L	NA			<0.005	<0.005	<0.005	0.054	0.020	<0.005	0.010	0.031	0.006	0.010	0.008	0.021	0.02	0.042	0.055	0.02	0.031
2007, 2013	Lead	mg/L	NA			<0.001	0.0017	<0.001	<0.001	<0.005	<0.002	0.002	0.010	<0.002	<0.002	0.003	0.008	0.006	0.008	0.012	0.002	0.007
2007, 2013	Nickel	mg/L	NA			<0.005	0.010	<0.005	0.050	<0.005	0.007	0.007	0.010	0.007	0.006	0.003	0.009	0.007	0.014	0.026	0.006	0.008
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38		<0.001	<0.001	<0.001	0.002	<0.001	0.002	0.003	<0.002	**0.006**	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005
2007, 2013	Zinc	mg/L	NA			0.194	0.035	0.010	0.110	0.050	<0.020	0.030	0.070	<0.020	0.027	<0.020	0.047	0.053	0.089	0.148	0.036	0.083
Dissolved Metals																						
2007	Antimony	mg/L	0.006	1. Basin Plan				<0.0015	<0.0015	<0.0015	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	0.002	<0.005	<0.006	<0.006
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38				<0.001	0.011	<0.001	0.005	0.003	0.003	<0.001	0.002	0.002	0.004	0.003	0.003	0.002	0.002	0.003
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38				<0.00025	<0.00025	<0.00025	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38				<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38				<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	0.005	0.041	0.010	<0.005	0.008	0.005
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38				<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38				<0.005	<0.005	<0.005	0.007	0.005	0.002	0.004	0.005	<0.002	0.005	0.003	0.002	0.004	0.002	0.002
2007, 2013	Selenium	mg/L	NA					<0.001	<0.001	<0.001	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.02	<0.005
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38				0.01	<0.001	0.005	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020	0.009	0.291	0.030	<0.02	<0.02	<0.02
Organophosphorus Pesticides																						
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000			<0.5*	<0.5*	<0.5*	<0.5*	<0.05*	<0.5*	<0.05*	<0.03*	<0.03*	<0.03*	**0.047**	<0.03*	<0.03*	<0.01	<0.01	**0.121**
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon		<0.5*	**0.38**	<0.5*	<0.5*	<0.5*	**0.41**	<0.5*	**0.1**	**0.18**	**0.13**	**0.28**	**0.464**	**0.194**	**0.320**	**0.165**	0.051	0.068
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook													0.10	0.36	0.11	<0.01	0.331	0.076
Pyrethroids																						
2007, 2013	Allethrin	µg/L	NA																			
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006																		
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004																		
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004																		
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004																		
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA																			
2007, 2013	Deltamethrin/Tralomethrin	µg/L	NA																			
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004																		
2007, 2013	Fenvalerate	µg/L	NA																			
2007, 2013	Fluvalinate	µg/L	NA																			
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006																		
2007, 2013	Prallethrin	µg/L	NA																			
2007, 2013	Resmethrin	µg/L	NA																			
Toxicity																						
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100											>100	>100	>100	**81.25**	>100	>100	>100	>100	>100
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100											100	100	100	**50**	**50**	**50**	100	100	100
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100											100	100	100	**50**	100	**50**	100	100	100
2007	*Hyalella* 96-hr	LC_{50} (%)	>100											>100	>100	>100	>100	>100	>100	>100	>100	>100
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100											100	100	100	100	100	100	100	100	100

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for AHC-MLS

Permit Requirements	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data																	
					2004-2005			2005-2006			2006-2007			2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013	
					10/17/04	02/11/05	02/18/05	10/17/05	12/31/05	02/19/06	10/14/06	01/30/07	02/19/07	11/30/07	02/03/08	11/04/08	-	10/06/10	02/16/11	-	10/11/12-10/12/12	02/08/13
Physical Chemistry																	No Samples Collected			No Samples Collected		
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.50		7.76	7.38	8.22	6.70	7.30	7.86	7.39	7.31	8.10	7.84		8.09	7.63		7.65	7.99
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,760	502	700	1,248	2,760	1,268	587	2,440	951	345	749	3,260		1,181	1,208		3,350	1,430
2007, 2013	Water Temperature	Celsius	NA		17.60	15.10	13.50	18.00	14.30	9.50	15.70	13.30	13.40	16.30	13.30	17.10		16.66	13.50		22.1	11.6
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**383**	**27.5**	**214**	**67.1**	**194**	**825**	**321**	**181**	**68.3**	**406**	**121**	15.4		11	6		**41**	18
Bacteriological																						
2007, 2013	Enterococcus	MPN/100 mL	NA		280,000	7,000	50,000	22,000	17,000	23,000	500,000	3,000	8,000	110,000	3,000	50,000		50,000	11000		170,000	17,000
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	**30,000**	**5,000**	**50,000**	**14,000**	**5,000**	**11,000**	**22,000**	**11,000**	**3,000**	**130,000**	**5,000**	**30,000**		**23,000**	**5,000**		**70,000**	**5,000**
2007, 2013	Total Coliform	MPN/100 mL	NA		300,000	17,000	80,000	110,000	70,000	80,000	50,000	50,000	30,000	130,000	30,000	80,000		70,000	30000		300,000	22,000
Nutrients																						
2007, 2013	Ammonia as N	mg/L	(a)	6. USEPA Water Quality Criteria (Freshwater)	0.82	0.23	0.18	0.64	0.43	0.24	0.81	0.88	0.91	0.68	0.07	0.22		0.17	0.13		0.65	0.09J
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	1.93	2.41	0.88	2.23	1.66	2.58	1.77	<0.05	0.95	1.3	0.89	1.64		0.55	1.8		1.2	1.2
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	0.09	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.07	<0.05	0.05		0.065J	0.073J		0.038J	0.043J
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		14.1	1.3	3.6	5.1	4.2	2.7	2.5	3.5	2.7	2.7	1.1	1.6		0.94	0.71		4.6	1.3
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	1.1	0.44	0.51	0.31	0.23	0.32	0.31	0.39	0.1	0.53	0.15	0.094		0.1	0.1		0.09	0.085
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	**2.15**	0.47	1.12	0.32	0.47	0.47	0.98	0.43	0.28	1.3	0.34	0.2		0.12	0.16		0.93	0.2
General Chemistry																						
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	**32.2**	4.67	3.64	7.76	8.59	<2	15.3	**49.4**	9.84	17	2.5	10.8		4.6	2.7		23	4.4
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	**279**	75	39	**157**	81	85	**552**	115	33	42	25	83		40	35		**130**	42
2007, 2013	Dissolved Organic Carbon	mg/L	NA		28.9	7.3	7.2	10.8	7.78	15.2	32.5	16.6	8.91	12.1	5.4	21.6		10	8.7		17	6.2
2007, 2013	Total Organic Carbon	mg/L	NA		44.7	7.31	14.2	34.3	18.7	17.5	47.5	17.9	9.49	13.4	5.3	22.4		12	9.2		18	6.8
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<1	<1	<1	<1	<1	<1	<5	<5	<5	2.2J	2.1J	<5		<5	<5		<5	<5
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.01	0.037	0.365		0.11	0.12		0.037J	0.063
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	**852**	**752**	416	**617**	**1,010**	**800**	**518**	**806**	**573**	406	**580**	**1,870**		**1,200**	**1,200**		**920**	**990**
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**962**	**246**	**859**	**597**	**344**	**2,210**	**1,160**	**346**	**120**	**840**	**215**	44.5		29	34		**560**	74
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		422	387	225	442	606	532	419	413	300	80	126.4	672.2		550	570		420	496
Total Metals																						
2007	Antimony	mg/L	NA		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.003	0.002	0.003	0.0005	0.0005	0.0008		0.0011	0.00071		0.0016	0.00067
2007, 2013	Arsenic	mg/L	NA		0.008	0.007	<0.002	0.009	0.009	0.004	0.016	0.003	0.003	0.0054	0.0038	0.0045		0.0037	0.0032		0.0069	0.0033
2007, 2013	Cadmium	mg/L	NA		0.002	<0.001	<0.001	<0.001	<0.001	<0.001	0.003	<0.001	<0.001	0.0004	0.0002J	<0.0004		0.000091J	0.00014		0.00086	0.00014
2007, 2013	Chromium	mg/L	NA		<0.005	<0.005	<0.005	<0.005	0.013	<0.005	0.013	<0.005	0.007	0.0055	0.0021	0.0008		0.00074	0.0016		0.0064	0.0024
2007, 2013	Copper	mg/L	NA		0.032	0.012	0.018	0.03	0.028	0.021	0.036	0.015	0.025	0.037	0.016	0.007		0.0045	0.0085		0.03	0.0093
2007, 2013	Lead	mg/L	NA		0.007	0.004	0.006	0.008	0.006	0.004	0.015	0.006	0.004	0.0099	0.0039	0.00052		0.00056	0.00089		0.0054	0.0014
2007, 2013	Nickel	mg/L	NA		0.028	0.007	0.007	0.015	0.013	0.014	0.026	0.008	0.008	0.0115	0.0065	0.0086		0.0065	0.0083		0.013	0.0076
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.005	<0.005	<0.005	<0.005	<0.004	<0.005	<0.004	<0.004	<0.004	0.0005	0.0005	0.0009		0.0006	0.00098		0.00077	0.00087
2007, 2013	Zinc	mg/L	NA		0.270	0.042	0.060	0.116	0.077	0.102	0.199	0.093	0.075	0.12	0.058	0.02		0.011	0.021		0.1	0.027
Dissolved Metals																						
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	0.003	0.0006	0.0006	0.0009		0.0011	0.00066		0.0018	0.00053
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	<0.002	<0.002	<0.002	0.001	<0.001	<0.001	0.001	<0.001	<0.001	0.0027	0.0022	0.0038		0.003	0.0021		0.0032	0.0019
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0004	<0.0004	<0.0004		0.000036J	0.000059J		0.00013	0.000047J
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0003J	0.0003J	0.0002J		0.00022	0.00031		0.00027	0.00023
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.006	0.005	<0.005	<0.005	0.005	0.006	0.003	0.006	0.004	0.0042	0.0033	0.0035		0.0027	0.0046		0.0031	0.0028
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	0.00005J	<0.0001	<0.0001		0.000041J	0.000019J		<0.0002	0.000031J
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.007	0.003	0.002	0.007	0.003	0.003	0.003	0.003	0.003	0.0022	0.0002	0.0072		0.0052	0.0065		0.0048	0.0049
2007, 2013	Selenium	mg/L	NA		<0.005	<0.005	<0.005	<0.005	<0.004	<0.005	<0.004	<0.004	<0.004	0.0005	0.0006	0.0009		0.00066	0.00076		0.00033J	0.00069
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	<0.02	<0.02	<0.02	0.041	<0.02	<0.02	<0.02	<0.02	<0.02	0.0054	0.0038	0.0049		0.0044J	0.0041J		0.0095	0.006
Organophosphorus Pesticides																						
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.002	<0.002	<0.002	**0.0938**	**0.0354**	<0.002		<0.01	<0.01		<0.01	<0.01
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	**0.267**	0.044	<0.01	0.024	<0.02	<0.02	**0.451**	<0.004	<0.004	0.035	0.007	<0.004		0.016	0.01		0.0063J	<0.01
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	0.330	0.083	<0.01	0.247	**0.622**	0.035	**0.436**	0.064	0.062	0.398	0.034	0.078		0.094	0.012		0.13	<0.01
Pyrethroids																						
2007, 2013	Allethrin	µg/L	NA								<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006							**0.4869**	**0.1925**	**0.1374**	**0.0816**	**0.0386**	**0.0233**		<0.002	**0.0156**		**0.931**	**0.151**
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004							0.1013	<0.002	0.0101	0.02	0.004	<0.002		<0.002	<0.002		0.0575	<0.002
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004							0.0205	<0.002	<0.002	0.002J	0.0007J	<0.002		<0.002	<0.002		0.0081	0.029
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004							0.0682	<0.002	0.0047	<0.002	0.001J	<0.002		<0.002	<0.002		0.0244	<0.002
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA								<0.002	<0.002	<0.002	<0.002	<0.002	<0.002			<0.002		<0.002	<0.002
2007, 2013	Deltamethrin/Tralomethrin	µg/L	NA								<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		0.0154	<0.002
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004							<0.002	<0.002	<0.002	0.004	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002
2007, 2013	Fenvalerate	µg/L	NA								<0.002	<0.002	<0.002	0.003	0.0007J	<0.002		<0.002	<0.002		<0.002	<0.002
2007, 2013	Fluvalinate	µg/L	NA											<0.002	<0.002	<0.002			<0.002		0.006	<0.002
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006							<0.002	<0.002	<0.002	<0.025*	<0.025*	<0.025*		<0.005	<0.025*		<0.025††	<0.01
2007, 2013	Prallethrin	µg/L	NA								<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002
2007, 2013	Resmethrin	µg/L	NA												<0.025	<0.025					<0.0025	<0.01
Toxicity																						
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100	**77.11**	>100	>100	>100	>100	>100		>100	>100		>100	>100
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		**50**	100	100	100	100	100	**25**	100	100	100	100	100		100	100		100	100
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100	100	100	100	100	**25**	100	100	100	100	100		100	100		100	100
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		**72.17**	>100	>100	>100	**73.61**	>100	**6.53**	**46.97**	>100	**77.3**	>100	>100		>100	>100		**13.2**	>100
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100	100	100	100	100	100	100	100	100	100	100		100	100		100	100

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for AHC-MLS

Permit Requirements	Analyte	Units	Water Quality Benchmarks	Benchmark References	Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2013-2014	2014-2015			
					-	11/01/14	03/01/15		
Physical Chemistry					No Samples Collected				
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan		7.46	7.59	0%	0.20
2007, 2013	Specific Conductivity	µmhos/cm	NA			2546	343		
2007, 2013	Water Temperature	Celsius	NA			15.01	13.37		
2007, 2013	Turbidity	NTU	20	1. Basin Plan		**49.7**	**68.1**	72%	6.70
Bacteriological									
2007, 2013	Enterococcus	MPN/100 mL	NA			2,800H	30,000		
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2		240,000H^	**50,000**	97%	40.32
2007, 2013	Total Coliform	MPN/100 mL	NA			300,000H	70,000		
Nutrients									
2007, 2013	Ammonia as N	mg/L	(a)	6. USEPA Water Quality Criteria (Freshwater)		0.14	<0.10	0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan		1.5	0.46	0%	0.14
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan		0.053J	0.027J	0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA			3.3	2.6		
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015		0.32	0.08	0%	0.13
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015		0.51	0.78	6%	0.31
General Chemistry									
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)		14	5.5	8%	0.36
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015		120	110	17%	0.76
2007, 2013	Dissolved Organic Carbon	mg/L	NA			22	6		
2007, 2013	Total Organic Carbon	mg/L	NA			22	6.9		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015		<5.0	3.0J	0%	0.15
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan		0.13	0.032J	0%	0.33
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan		**1,600**	460	72%	1.64
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan		**230**	**350**	69%	3.80
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA			775	234		
Total Metals									
2007	Antimony	mg/L	NA			0.0013	0.00078		
2007, 2013	Arsenic	mg/L	NA			0.009	0.0058		
2007, 2013	Cadmium	mg/L	NA			0.00043	0.00031		
2007, 2013	Chromium	mg/L	NA			0.0053	0.0099		
2007, 2013	Copper	mg/L	NA			0.02	0.03		
2007, 2013	Lead	mg/L	NA			0.0034	0.0056		
2007, 2013	Nickel	mg/L	NA			0.011	0.011		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38		0.0011	0.0011	3%	0.34
2007, 2013	Zinc	mg/L	NA			0.061	0.079		
Dissolved Metals									
2007	Antimony	mg/L	0.006	1. Basin Plan		0.001	0.00058	0%	0.25
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38		0.002	0.0014	0%	0.01
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38		0.000040J	<0.00010	0%	0.03
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38		0.00016J	0.00018J	0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38		0.0036	0.0021	0%	0.15
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38		0.000025J	0.000031J	0%	0.00
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38		0.0045	0.002	0%	0.00
2007, 2013	Selenium	mg/L	NA			0.00071	0.0004		
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38		0.0057	0.0028J	0%	0.06
Organophosphorus Pesticides									
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000		<0.010	<0.010	18%	0.87
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon		<0.010	<0.010	40%	1.52
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook		0.022	0.013	8%	0.35
Pyrethroids									
2007, 2013	Allethrin	µg/L	NA			<0.002	<0.002		
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006		**0.1173**	**0.0759**	92%	20.18
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004		0.0125	0.0194	0%	0.06
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004		<0.002	0.0069	0%	0.05
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004		<0.002	<0.002	0%	0.01
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA			<0.002	<0.002		
2007, 2013	Deltamethrin/Tralomethrin	µg/L	NA			0.0231	0.0349		
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004		<0.002	<0.002	0%	0.01
2007, 2013	Fenvalerate	µg/L	NA			<0.002	<0.002		
2007, 2013	Fluvalinate	µg/L	NA			<0.002	0.0051		
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006		<0.01	<0.01	0%	0.27
2007, 2013	Prallethrin	µg/L	NA			<0.002	<0.002		
2007, 2013	Resmethrin	µg/L	NA			<0.01	<0.01		
Toxicity									
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100			>100	>100	7%	1.02
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100			100	100	19%	1.26
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100			100	100	11%	1.19
2007	*Hyalella* 96-hr	LC_{50} (%)	>100			>100	>100	22%	1.85
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100			100	100	0%	1.00

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for AHC-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
†† Permethrin was non-detect at the method detection limit of 0.005 µg/L.
^Results were not compared to the water quality benchmark for fecal coliform due to the sample being received and/or analyzed past the recommended holding time.
H-Sample analyzed and/or extracted past the recommended holding time.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for BVC-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data									Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015			
					11/30/07	02/03/08	-	-	10/6/10	02/16/11	-	10/11/12	02/08/13-02/09/13	-	11/01/14	03/01/15		
Physical Chemistry							No Samples Collected	No Samples Collected			No Samples Collected			No Samples Collected				
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.75	8.02			7.59	7.78		7.26	8.28		7.58	7.77	0%	0.17
2007, 2013	Specific Conductivity	µmhos/cm	NA		286	361			1,108	1,160		562	1,961		1,576	644		
2007, 2013	Water Temperature	Celsius	NA		15.90	13.60			17.30	16.40		17.1	14		15.55	14.5		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**231**	**112**			11	6.9		**33**	6		**102.2**	**99.9**	63%	3.76
Bacteriological																		
2007, 2013	Enterococcus	MPN/100 mL	NA		70,000	17,000			110,000	8,000		140,000	11,000		3,300	30,000		
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan REC-1/REC-2	**28,000**	**5,000**			**17,000**	**9,000**		**80,000**	**1,300**		**30,000**	**17,000**	100%	58.53
2007, 2013	Total Coliform	MPN/100 mL	NA		70,000	80,000			170,000	50,000		600,000	30,000		50,000	50,000		
Nutrients																		
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	0.68	0.13			0.15	0.1		0.69	0.13		0.33	0.077J	0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	1.6	1.06			1.3	2.3		1.4	1.9		2.2	0.77	0%	0.16
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.07	0.03J			0.064J	0.07J		0.045J	0.026J		0.071J	0.031J	0%	0.05
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		5.9	1.1			1.6	0.92		4	0.89		4.9	1.7		
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.95	0.18			0.23	0.16		0.39	0.08		0.39	0.22	0%	0.16
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	1.19	0.434			0.24	0.26		0.9	0.12		0.66	0.46	0%	0.27
General Chemistry																		
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	20	5.3			4.9	6.1		22	4		25	10	0%	0.41
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	60	26			47	45		**150**	25		**160**	70	25%	0.61
2007, 2013	Dissolved Organic Carbon	mg/L	NA		15.2	5.4			11	11		15	5.7		28	8.2		
2007, 2013	Total Organic Carbon	mg/L	NA		16.6	5.9			13	12		16	6		30	8.8		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	6.3	3.7J			2J	<5		<5	<5		<5.0	1.6J	0%	0.30
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.045	0.064			0.22	0.15		0.046J	0.08		0.16	0.042J	0%	0.20
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	434	402			**860**	**750**		**660**	**1,200**		**1,100**	**590**	75%	1.50
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**520**	**290**			42	66		**310**	15		**290**	**230**	63%	2.20
2007, 2013	Hardness	mg $CaCO_3$/L	NA		68.2	83.1			360	360		295	559		455	277		
Total Metals																		
2007	Antimony	mg/L	NA		0.0011	0.0008			0.0019	0.0014		0.0015	0.00067		0.002	0.00096		
2007, 2013	Arsenic	mg/L	NA		0.0081	0.0044			0.0059	0.0047		0.0063	0.0055		0.0087	0.0046		
2007, 2013	Cadmium	mg/L	NA		0.0005	0.0002J			0.000079J	0.000094J		0.00032	0.000087J		0.0003	0.00014		
2007, 2013	Chromium	mg/L	NA		0.0056	0.0019			0.0019	0.0033		0.0072	0.00079		0.009	0.0061		
2007, 2013	Copper	mg/L	NA		0.0479	0.0178			0.011	0.015		0.036	0.0045		0.039	0.019		
2007, 2013	Lead	mg/L	NA		0.0193	0.0072			0.0017	0.0029		0.0098	0.00049		0.0092	0.0056		
2007, 2013	Nickel	mg/L	NA		0.0092	0.0044			0.0039	0.0056		0.0074	0.005		0.0094	0.0057		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0005	0.0003J			0.00052	0.00067		0.00076	0.0012		0.0013	0.001	0%	0.16
2007, 2013	Zinc	mg/L	NA		0.2828	0.1068			0.031	0.044		0.19	0.013		0.16	0.071		
Dissolved Metals																		
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0011	0.0009			0.0018	0.0013		0.00093	0.00059		0.0017	0.00069	0%	0.19
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0040	0.0030			0.0053	0.0038		0.0042	0.0052		0.005	0.0028	0%	0.01
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000037J	0.000038J		0.00006J	0.000075J		0.000029J	<0.00010	0%	0.02
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0004J	0.0005			0.00047	0.00064		0.00074	0.00023		0.00033	0.00028	0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0044	0.0036			0.0061	0.0074		0.0057	0.0029		0.0078	0.0032	0%	0.19
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.0002	<0.0001			0.00009J	0.000033J		0.00026	0.000034J		0.000062J	0.000084J	0%	0.00
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0020	0.0012			0.003	0.0039		0.0026	0.0041		0.0038	0.0019	0%	0.00
2007, 2013	Selenium	mg/L	NA		0.0004J	0.0003J			0.0006	0.0008		0.00051	0.0012		0.00073	0.00059		
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0109	0.0075			0.012	0.011		0.031	0.0071		0.03	0.0076	0%	0.06
Organophosphorus Pesticides																		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.20
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	0.042	<0.004			<0.01	0.0092J		<0.01	<0.01		<0.010	<0.010	0%	0.12
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	0.106	0.020			<0.01	0.12		0.061	<0.01		0.14	0.025	0%	0.14
Pyrethroids																		
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002			<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	**0.1024**	**0.0583**			<0.002	**0.0459**		**0.194**	**0.012**		**0.1098**	0.0084	75%	7.15
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	0.02	0.02			<0.002	0.0039		0.0398	<0.002		0.0425	<0.002	0%	0.05
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	0.005	<0.002			<0.002	0.0015J		0.0044	<0.002		0.0075	<0.002	0%	0.04
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.002	<0.002			<0.002	<0.002		0.0117	<0.002		0.0132	<0.002	0%	0.01
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		0.002	<0.002				<0.002		0.0009J	<0.002		<0.002	<0.002		
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.002	<0.002			<0.002	<0.002		<0.002	<0.002		0.0405	<0.002		
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	0.0009J			<0.002	<0.002		0.0011J	<0.002		0.0036	<0.002	0%	0.01
2007, 2013	Fenvalerate	µg/L	NA		<0.002	0.0009J			<0.002	<0.002		0.0008J	<0.002		0.0006J	<0.002		
2007, 2013	Fluvalinate	µg/L	NA		<0.002	<0.002				<0.002		<0.002	<0.002		0.0029	<0.002		
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	**0.235**	<0.025*			<0.005	<0.025*		**0.2759**	<0.01		**0.094**	<0.01	38%	3.81
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002			<0.002	0.0016J		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Resmethrin	µg/L	NA			<0.025						<0.025	<0.01		<0.01	<0.01		
Toxicity																		
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		100	>100		>100	>100	13%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for BVC-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for ESC-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data							Transitional Monitoring		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015		
					11/30/07	02/03/08	-	-	-	-	-	-	-		
Physical Chemistry							No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected		
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.41	8.32								0%	NA[1]
2007, 2013	Specific Conductivity	µmhos/cm	NA		252	165									
2007, 2013	Water Temperature	Celsius	NA		16.00	12.40									
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**114**	**82.2**								100%	NA[1]
Bacteriological															
2007, 2013	Enterococcus	MPN/100 mL	NA		80,000	23,000									
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan REC-1/REC-2	**17,000**	**5,000**								100%	NA[1]
2007, 2013	Total Coliform	MPN/100 mL	NA		50,000	170,000									
Nutrients															
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	0.48	0.13								0%	NA[1]
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	1.7	0.8								0%	NA[1]
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.1	0.03J								0%	NA[1]
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		3.2	0.84									
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.3	0.12								0%	NA[1]
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.60	0.33								0%	NA[1]
General Chemistry															
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	15	2.8								0%	NA[1]
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2000	62	19								0%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		13	4									
2007, 2013	Total Organic Carbon	mg/L	NA		15.2	4.5									
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	4J	1.9J								0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.34	0.12								0%	NA[1]
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	**546**	116								50%	NA[1]
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**180**	96								50%	NA[1]
2007, 2013	Hardness	mg $CaCO_3$/L	NA		48.7	42.7									
Total Metals															
2007	Antimony	mg/L	NA		0.0012	0.0008									
2007, 2013	Arsenic	mg/L	NA		0.0018	0.0013									
2007, 2013	Cadmium	mg/L	NA		0.0002J	<0.0004									
2007, 2013	Chromium	mg/L	NA		0.0028	0.0017									
2007, 2013	Copper	mg/L	NA		0.0180	0.0125									
2007, 2013	Lead	mg/L	NA		0.0091	0.0062									
2007, 2013	Nickel	mg/L	NA		0.0035	0.0019									
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0004J	0.0002J									
2007, 2013	Zinc	mg/L	NA		0.1277	0.0926									
Dissolved Metals															
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0012	0.0008								0%	NA[1]
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0015	0.0010								0%	NA[1]
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004	<0.0004								0%	NA[1]
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0007	0.0006								0%	NA[1]
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0053	0.0034								0%	NA[1]
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.0003	<0.00007								0%	NA[1]
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0015	0.0007								0%	NA[1]
2007, 2013	Selenium	mg/L	NA		0.0004J	0.0002J									
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0262	0.0186								0%	NA[1]
Organophosphorus Pesticides															
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002								0%	NA[1]
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	0.067	0.042								0%	NA[1]
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	0.175	0.048								0%	NA[1]
Pyrethroids															
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002									
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	**0.0428**	**0.0532**								100%	NA[1]
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	0.02	0.02								0%	NA[1]
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	0.006	0.003								0%	NA[1]
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	0.02	<0.002									
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.002	<0.002									
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.002	<0.002									
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	0.0007J								0%	NA[1]
2007, 2013	Fenvalerate	µg/L	NA		<0.002	<0.002									
2007, 2013	Fluvalinate	µg/L	NA		<0.002	<0.002									
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.025*	<0.025*								0%	NA[1]
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002									
2007, 2013	Resmethrin	µg/L	NA			<0.025									
Toxicity															
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100								0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100								0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100								0%	NA[1]
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100								0%	NA[1]
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100								0%	NA[1]

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for ESC-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

Values with **red bold font and shading** do not meet Water Quality Benchmarks

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for ESC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data														
					2001-2002			2002-2003			2003-2004			2004-2005			2005-2006		
					11/29/01	02/17/02	03/08/02	11/08/02	02/11/03	02/25/03	11/12/03	02/03/04	03/02/04	10/17/04	02/11/05	02/18/05	10/17/05	02/19/06	03/11/06
Physical Chemistry																			
2013	Dissolved Oxygen	mg/L	<6.0 (a)	1. Basin Plan															
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.7	7.7	7.7	7.55	7.46	7.41	7.78	8.02	7.83	7.91	8.16	8.10	7.80	6.70	7.69
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,810	2,540	1,620	1,826	1,192	1,675	1,736	1,452	1,595	2,860	2,530	1,390	2,550	1,618	778
2007, 2013	Water Temperature	Celsius	NA					15.30	14.60	16.80	16.00	12.10	12.50	17.80	13.60	14.20	17.00	9.70	12.10
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**31.3**	4.33	**24.5**	**38.3**	**111**	**192**	**40.1**	**116**	**26**	15.4	13.4	**117**	**30.9**	**39.3**	**137**
Bacteriological																			
2007, 2013	Enterococcus	MPN/100 mL	NA		8,000	1,400	17,000	50,000	80,000	80,000	22,000	170,000	80,000	8,000	1,700	50,000	80,000	5,000	90,000
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	**3,000**	**8,000**	**1,700**	**13,000**	**23,000**	**22,000**	**17,000**	**23,000**	**17,000**	**1,300**	**1,100**	**50,000**	**80,000**	**17,000**	**17,000**
2007, 2013	Total Coliform	MPN/100 mL	NA		50,000	30,000	8,000	30,000	50,000	80,000	70,000	30,000	80,000	17,000	13,000	230,000	130,000	300,000	170,000
Nutrients																			
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.4	0.19	0.18	0.29	0.32	0.41	<0.1	0.18	1.2	0.33	0.26	0.32	0.95	0.23	<0.1
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	2.6	3.2	2.2	2.32	0.95	2.25	1.72	1.66	3.8	2.71	7.2	6.32	4.63	3.77	4.15
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	0.05	0.06
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		2.1	1.2	1.6	1.6	2.0	1.7	3.2	4.2	1.7	2	0.7	3	3	6.5	1.3
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.29	<0.05	0.14	0.32	0.32	0.13	0.36	0.25	0.22	0.26	<0.05	<0.05	0.42	0.36	0.26
2013	Orthophosphate	mg/L	NA																
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	1.75	0.8	0.29	0.49	0.62	0.72	0.46	0.52	0.3	0.28	0.26	0.62	0.44	0.39	0.5
General Chemistry																			
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	5.2	4.4	5.3	4.07	9.93	5.00	4.4	**43.1**	21.7	6.26	3.32	5.2	7.62	4.54	7.29
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	<25	25	40	73	51	69	45	**126**	59	68	37	42	75	64	69
2007, 2013	Dissolved Organic Carbon	mg/L	NA					4.1	11.1	9.86	10.9	6.31	13.4	29	3.86	6.47	5.66	18.2	5.56
2007, 2013	Total Organic Carbon	mg/L	NA					14.5	14.0	8.04	11.1	13.1	12.7	34	6.9	13.8	32.2	18.2	14.1
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<1	<1	1	<1.00	1.16	<1.00	<1	<1	<1	<1	<1	<1	<1	<1	<1
2013	Sulfate	mg/L	250 (a)	1. Basin Plan															
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2007, 2013	Total Dissolved Solids	mg/L	500 (a)	1. Basin Plan	**1,150**	**1,460**	**1,160**	**1,360**	**681**	**717**	**1,300**	**665**	**1,310**	**1,460**	**1,410**	**965**	**1,220**	**844**	**929**
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	53	<20	60	54	**150**	**221**	75	<20	55	60	72	**264**	**102**	36	**155**
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		564	681	532	530	365	388	610	284	547	700	663	514	668	447	502
Total Metals																			
2007	Antimony	mg/L	NA		<0.002	<0.002	<0.002	<0.002	0.003	0.004	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Arsenic	mg/L	NA		<0.001	<0.001	0.002	0.003	0.003	0.004	0.003	0.004	0.003	0.003	0.004	<0.002	0.004	0.002	0.005
2007, 2013	Cadmium	mg/L	NA		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	0.009
2007, 2013	Chromium	mg/L	NA		0.006	<0.005	<0.005	<0.005	0.008	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	NA		<0.006	<0.005	0.009	0.009	0.015	0.019	0.009	0.018	0.006	0.008	0.022	0.02	0.012	0.009	0.01
2013	Iron	mg/L	0.3 (a)	1. Basin Plan															
2007, 2013	Lead	mg/L	NA		<0.002	<0.002	<0.002	0.005	0.005	0.005	0.002	0.006	<0.002	<0.002	0.002	0.005	0.004	<0.002	0.005
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan															
2013	Mercury	mg/L	NA																
2007, 2013	Nickel	mg/L	NA		0.002	0.002	0.004	0.004	0.004	0.006	0.004	0.003	<0.002	0.004	0.002	0.003	0.004	0.003	0.004
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2013	Thallium	mg/L	NA																
2007, 2013	Zinc	mg/L	NA		<0.020	<0.020	0.028	0.022	0.046	0.066	0.033	0.065	<0.02	0.020	0.022	0.052	0.030	0.038	0.079
Dissolved Metals																			
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	<0.002	<0.002	0.002	0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	<0.001	<0.001	0.002	0.002	0.002	0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	<0.005	0.012	0.005	<0.005	**0.049**	0.008	<0.005	0.005	<0.005	<0.005	0.007	<0.005	0.005	0.007	<0.005
2013	Iron	mg/L	NA																
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
2013	Manganese	mg/L	NA																
2013	Mercury	mg/L	NA																
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.002	0.005	0.002	0.003	0.002	<0.002	0.002	0.002	0.002	0.003	0.002	<0.002	0.003	0.003	0.002
2007, 2013	Selenium	mg/L	NA		<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2013	Thallium	mg/L	NA																
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	<0.020	<0.020	<0.020	<0.020	0.230	0.022	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.03	0.023	0.03

Wet Weather Historical Monitoring Table for ESC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data														
					2001-2002			2002-2003			2003-2004			2004-2005			2005-2006		
					11/29/01	02/17/02	03/08/02	11/08/02	02/11/03	02/25/03	11/12/03	02/03/04	03/02/04	10/17/04	02/11/05	02/18/05	10/17/05	02/19/06	03/11/06
Chlorinated Pesticides																			
2013	2,4'-DDE	µg/L	NA																
2013	2,4'-DDT	µg/L	NA	16. 40 CFR 131.38															
2013	4,4´-DDE	µg/L	NA																
2013	4,4´-DDT	µg/L	1.1	16. 40 CFR 131.38															
Organophosphorus Pesticides																			
2013	Azinphos methyl (Guthion)	µg/L	NA																
2013	Bolstar	µg/L	NA																
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.03*	<0.03*	<0.03*	<0.03*	<0.03*	**0.030**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
2013	Coumaphos	µg/L	NA																
2013	Demeton-o	µg/L	NA																
2013	Demeton-s	µg/L	NA																
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	**0.94**	**0.27**	**0.27**	**0.122**	**0.163**	0.063	0.061	0.067	0.037	<0.01	<0.01	<0.01	<0.01	0.045	<0.02
2013	Dichlorvos	µg/L	NA																
2013	Dimethoate	µg/L	NA																
2013	Disulfoton	µg/L	NA																
2013	Ethoprop	µg/L	NA																
2013	Ethyl parathion	µg/L	NA																
2013	Fensulfothion	µg/L	NA																
2013	Fenthion	µg/L	NA																
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook				<0.10	<0.10	<0.10	0.205	0.037	0.047	<0.01	<0.01	<0.01	0.052	<0.02	<0.02
2013	Merphos	µg/L	NA																
2013	Methyl parathion	µg/L	NA																
2013	Mevinphos	µg/L	NA																
2013	Naled	µg/L	NA																
2013	Phorate	µg/L	NA																
2013	Ronnel	µg/L	NA																
2013	Stirophos	µg/L	NA																
2013	Tokuthion (Prothiofos)	µg/L	NA																
2013	Trichloronate	µg/L	NA																
Pyrethroids																			
2007, 2013	Allethrin	µg/L	NA																
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006															
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004															
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004															
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004															
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA																
2007, 2013	Deltamethrin/Tralomethrin	µg/L	NA																
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004															
2007, 2013	Fenvalerate	µg/L	NA																
2007, 2013	Fluvalinate	µg/L	NA																
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006															
2007, 2013	Prallethrin	µg/L	NA																
2007, 2013	Resmethrin	µg/L	NA																
Toxicity																			
2007, 2013	*Ceriodaphnia* 96-hr	LC$_{50}$ (%)	>100		**35.36**	>100	>100	>100	>100	>100	>100	>100	> 100	>100	>100	>100	>100	>100	>100
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		**25**	**50**	100	100	100	100	100	100	100	100	100	100	100	100	100
2013	*Ceriodaphnia* 7-day survival	TST	Pass/Fail																
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**25**	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2013	*Ceriodaphnia* 7-day reproduction	TST	Pass/Fail																
2007	*Hyalella* 96-hr	LC$_{50}$ (%)	>100		>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2013	*Selenastrum* 96-hr	TST	Pass/Fail																
2013	*Pimephale*s 7-day survival	TST	Pass/Fail																
2013	*Pimephales* 7-day biomass	TST	Pass/Fail																
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail																

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for ESC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data											
					2006-2007			2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013	
					10/14/06	01/31/07	02/19/07	11/30/07	02/03/08-02/04/08	11/04/08	-	10/06/10-10/07/10	02/16/11	-	10/12/12	02/08/13-02/09/13
Physical Chemistry																
2013	Dissolved Oxygen	mg/L	<6.0 (a)	1. Basin Plan							No Samples Collected			No Samples Collected		
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.50	8.01	6.97	7.57	8.38	7.78		8.09	7.95		8.04	8.22
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,400	1,654	1,086	496	1,759	2,770		2,410	1,620		2,510	1,572
2007, 2013	Water Temperature	Celsius	NA		15.40	13.70	14.30	16.10	12.10	14.80		18.10	15.00		18.6	11.8
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**57.5**	**52**	**62.3**	**126**	**75.3**	14.6		6.7	4.8		5.2	5.5
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	NA		80,000	5,000	110,000	130,000	3,000	30,000		13,000	3000		5,000	5,000
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	**23,000**	**2,800**	**4,000**	**110,000**	**1,100**	**30,000**		**17,000**	**3,000**		**3,000**	**5,000**
2007, 2013	Total Coliform	MPN/100 mL	NA		130,000	14,000	170,000	800,000	22,000	80,000		170,000	30000		70,000	50,000
Nutrients																
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.44	1.41	1.24	0.38	0.1	0.08		0.099J	0.18		0.26	0.1
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	5.3	<0.05	2.38	1.6	1.6	3.57		2.2	5.1		3.8	3.6
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	0.1	0.05	0.08	0.03J	0.04J		0.062J	0.15		0.13	0.031J
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1.8	3	2.4	2.9	1.1	1.4		1	1.2		1.3	0.61
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.35	0.35	0.28	0.51	0.33	0.148		0.19	0.16		0.16	0.094
2013	Orthophosphate	mg/L	NA													
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.4	0.52	0.4	0.63	0.46	0.22		0.21	0.24		0.26	0.13
General Chemistry																
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	14.5	**33.1**	8.8	9.1	5.5	5.5		1.9J	4.5		7.6	1.6J
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	58	116	37	47	24	39		33	29		33	22
2007, 2013	Dissolved Organic Carbon	mg/L	NA		76.9	27.3	10.7	13.1	6.9	8.8		10	8.4		8.6	5.1
2007, 2013	Total Organic Carbon	mg/L	NA		77.1	31.9	11	14.6	6.6	8.8		11	9.3		8.8	5.2
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<5	<5	<5	3.1J	1.5J	1J		<5	2.3J		<5	<5
2013	Sulfate	mg/L	250 (a)	1. Basin Plan												
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	0.28	0.107	0.138		0.11	0.2		0.044J	0.053
2007, 2013	Total Dissolved Solids	mg/L	500 (a)	1. Basin Plan	**1,590**	**715**	**748**	448	364	**1,686**		**1,600**	**1,200**		**1,700**	**1,300**
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	97	**103**	65	**160**	46	22		23	54		76	26
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		772	331	329	95.7	87.6	671.6		670	560		724	578
Total Metals																
2007	Antimony	mg/L	NA		0.002	0.002	0.003	0.001	0.0007	0.0004J		0.00057	0.00058		0.0004J	0.00037J
2007, 2013	Arsenic	mg/L	NA		0.01	<0.001	0.002	0.0023	0.0015	0.0023		0.0018	0.0013		0.0018	0.0011
2007, 2013	Cadmium	mg/L	NA		0.003	<0.001	0.001	0.0003J	<0.0004	0.0003J		0.00057	0.00015		0.00033	0.0002
2007, 2013	Chromium	mg/L	NA		<0.005	<0.005	<0.005	0.0023	0.0011	0.0004J		0.00059	0.00099		0.00068	0.00067
2007, 2013	Copper	mg/L	NA		0.008	0.014	0.026	0.015	0.0068	0.005		0.0047	0.006		0.004	0.004
2013	Iron	mg/L	0.3 (a)	1. Basin Plan												
2007, 2013	Lead	mg/L	NA		0.002	0.005	0.005	0.0067	0.0025	0.0006		0.00067	0.00094		0.0013	0.00052
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan												
2013	Mercury	mg/L	NA													
2007, 2013	Nickel	mg/L	NA		0.004	0.004	0.005	0.0036	0.0014	0.0022		0.0034	0.0041		0.0024	0.0043
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.004	<0.004	<0.004	0.0006	0.0004J	0.0015		0.0011	0.0013		0.002	0.0021
2013	Thallium	mg/L	NA													
2007, 2013	Zinc	mg/L	NA		0.026	0.061	0.08	0.083	0.033	0.017		0.01	0.013		0.015	0.0089
Dissolved Metals																
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	0.002	0.0009	0.0008	0.0004J		0.00057	0.00057		0.0004J	0.00035J
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	<0.001	<0.001	<0.001	0.0017	0.0013	0.0019		0.0016	0.0011		0.0018	0.00092
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.0004	<0.0004	0.0002J		0.00035	0.000053J		0.00012	0.00012
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	0.0005	0.0006	0.0001J		0.00014J	0.00039		0.00008J	0.0002
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.004	0.007	0.005	0.0048	0.0037	0.0032		0.003	0.0041		0.002	0.0027
2013	Iron	mg/L	NA													
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	0.00027	<0.0001	<0.0001		0.000045J	<0.0002		<0.0002	0.000021J
2013	Manganese	mg/L	NA													
2013	Mercury	mg/L	NA													
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.002	<0.002	<0.002	0.0014	0.0009	0.0019		0.0027	0.0037		0.0017	0.0036
2007, 2013	Selenium	mg/L	NA		<0.004	<0.004	<0.004	0.0007	0.0004J	0.0014		0.0011	0.0013		0.0017	0.0018
2013	Thallium	mg/L	NA													
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	<0.02	<0.02	0.07	0.0134	0.0068	0.0075		0.0053	0.0036J		0.0047J	0.0044J

Wet Weather Historical Monitoring Table for ESC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data											
					2006-2007			2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013	
					10/14/06	01/31/07	02/19/07	11/30/07	02/03/08-02/04/08	11/04/08	-	10/06/10-10/07/10	02/16/11	-	10/12/12	02/08/13-02/09/13
Chlorinated Pesticides											No Samples Collected			No Samples Collected		
2013	2,4'-DDE	µg/L	NA													
2013	2,4'-DDT	µg/L	NA	16. 40 CFR 131.38												
2013	4,4´-DDE	µg/L	NA													
2013	4,4´-DDT	µg/L	1.1	16. 40 CFR 131.38												
Organophosphorus Pesticides																
2013	Azinphos methyl (Guthion)	µg/L	NA													
2013	Bolstar	µg/L	NA													
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.01	<0.01		<0.01	<0.01
2013	Coumaphos	µg/L	NA													
2013	Demeton-o	µg/L	NA													
2013	Demeton-s	µg/L	NA													
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004	<0.004	0.015	0.007	<0.004		<0.01	<0.01		<0.01	<0.01
2013	Dichlorvos	µg/L	NA													
2013	Dimethoate	µg/L	NA													
2013	Disulfoton	µg/L	NA													
2013	Ethoprop	µg/L	NA													
2013	Ethyl parathion	µg/L	NA													
2013	Fensulfothion	µg/L	NA													
2013	Fenthion	µg/L	NA													
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	0.032	<0.006	<0.006	0.136	0.038	<0.006		<0.01	0.026		<0.01	<0.01
2013	Merphos	µg/L	NA													
2013	Methyl parathion	µg/L	NA													
2013	Mevinphos	µg/L	NA													
2013	Naled	µg/L	NA													
2013	Phorate	µg/L	NA													
2013	Ronnel	µg/L	NA													
2013	Stirophos	µg/L	NA													
2013	Tokuthion (Prothiofos)	µg/L	NA													
2013	Trichloronate	µg/L	NA													
Pyrethroids																
2007, 2013	Allethrin	µg/L	NA					<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006				**0.0907**	**0.0108**	<0.002		<0.002	0.0081		0.0018J	**0.0107**
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004				0.01	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004				0.002J	0.0005J	<0.002		<0.002	<0.002		<0.002	<0.002
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004				<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA					0.003	<0.002	<0.002			<0.002		<0.002	<0.002
2007, 2013	Deltamethrin/Tralomethrin	µg/L	NA					<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004				0.0006J	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002
2007, 2013	Fenvalerate	µg/L	NA					0.0008J	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002
2007, 2013	Fluvalinate	µg/L	NA					0.0011J	<0.002	<0.002			<0.002		<0.002	<0.002
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006				<0.025*	<0.025*	<0.025*		<0.005	<0.025*		<0.025††	<0.01
2007, 2013	Prallethrin	µg/L	NA					<0.002	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002
2007, 2013	Resmethrin	µg/L	NA						<0.025	<0.025						<0.01
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100		>100	>100		>100	>100
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100	100	100	100	100		100	100		100	100
2013	*Ceriodaphnia* 7-day survival	TST	Pass/Fail													
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100	100	100	100	100		100	100		100	100
2013	*Ceriodaphnia* 7-day reproduction	TST	Pass/Fail													
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100		>100	>100		>100	>100
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100	100	100	100	100		100	100		100	100
2013	*Selenastrum* 96-hr	TST	Pass/Fail													
2013	*Pimephale* s 7-day survival	TST	Pass/Fail													
2013	*Pimephales* 7-day biomass	TST	Pass/Fail													
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail													

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for ESC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2013-2014	2014-2015				
					-	11/1/14	11/21/14-11/22/14	03/01/15-03/02/15		
Physical Chemistry					No Samples Collected					
2013	Dissolved Oxygen	mg/L	<6.0 (a)	1. Basin Plan		7.31	8.26	9.07	0%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan		7.66	7.71	7.76	0%	0.20
2007, 2013	Specific Conductivity	µmhos/cm	NA			2,548	2,397	696		
2007, 2013	Water Temperature	Celsius	NA			14.76	15.72	13.58		
2007, 2013	Turbidity	NTU	20	1. Basin Plan		4.3	19.6	12.4	61%	2.47
Bacteriological										
2007, 2013	Enterococcus	MPN/100 mL	NA			170	300	50,000		
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2		**30,000**	80	**35,000**	96%	49.83
2007, 2013	Total Coliform	MPN/100 mL	NA			30,000	110	160,000		
Nutrients										
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)		0.16	0.12	0.057J	0%	0.03
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan		1.4	3.1	1.5	0%	0.30
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan		0.036J	0.063J	0.032J	0%	0.05
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA			2.1	1.6	1		
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015		0.44	NR	0.24	0%	0.12
2013	Orthophosphate	mg/L	NA			0.36	0.27	0.22		
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015		0.44	0.44	0.39	0%	0.24
General Chemistry										
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)		3.2	NR	2.7	7%	0.29
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015		63	NR	41	4%	0.43
2007, 2013	Dissolved Organic Carbon	mg/L	NA			13	16	9.1		
2007, 2013	Total Organic Carbon	mg/L	NA			14	16	9.7		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015		<5.0	NR	<5.0	0%	0.14
2013	Sulfate	mg/L	250 (a)	1. Basin Plan		**410**	**290**	150	67%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan		0.081	0.15	0.094	0%	0.37
2007, 2013	Total Dissolved Solids	mg/L	500 (a)	1. Basin Plan		**1,400**	**990**	**590**	93%	2.21
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan		**110**	25	44	29%	0.80
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA			662	424	281		
Total Metals										
2007	Antimony	mg/L	NA			0.00059	NR	0.00087		
2007, 2013	Arsenic	mg/L	NA			0.002	0.0016	0.0012		
2007, 2013	Cadmium	mg/L	NA			0.00023	0.00065	0.00023		
2007, 2013	Chromium	mg/L	NA			0.0026	0.0009	0.0013		
2007, 2013	Copper	mg/L	NA			0.013	0.009	0.0083		
2013	Iron	mg/L	0.3 (a)	1. Basin Plan		**3.5**	**0.87**	**1.4**	100%	NA[1]
2007, 2013	Lead	mg/L	NA			0.0023	0.001	0.0015		
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan		**0.59**	**0.22**	**0.24**	100%	NA[1]
2013	Mercury	mg/L	NA			0.000017J	<0.000050	0.000011J		
2007, 2013	Nickel	mg/L	NA			0.0037	0.0041	0.0028		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38		0.003	0.0021	0.0012	0%	0.38
2013	Thallium	mg/L	NA			0.000034J	<0.00020	0.000014J		
2007, 2013	Zinc	mg/L	NA			0.035	0.018	0.019		
Dissolved Metals										
2007	Antimony	mg/L	0.006	1. Basin Plan		0.00036J	NR	0.00073	0%	0.24
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38		0.0012	0.0015	0.00091	0%	0.00
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38		0.000038J	0.00041	0.000085J	0%	0.03
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38		0.00016J	0.00031	0.00037	0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38		0.0038	0.0065	0.0039	4%	0.15
2013	Iron	mg/L	NA			0.047	0.068	0.056		
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38		0.000040J	0.000099J	0.000082J	0%	0.00
2013	Manganese	mg/L	NA			0.017	0.029	0.033		
2013	Mercury	mg/L	NA			0.000012J	<0.000050	0.0000080J		
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38		0.0018	0.0035	0.0017	0%	0.00
2007, 2013	Selenium	mg/L	NA			0.0023	0.0021	0.00082		
2013	Thallium	mg/L	NA			<0.00020	<0.00020	<0.00020		
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38		0.0063	0.0085	0.0054	0%	0.06

Wet Weather Historical Monitoring Table for ESC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2013-2014	2014-2015				
					-	11/1/14	11/21/14-11/22/14	03/01/15-03/02/15		
Chlorinated Pesticides					No Samples Collected					
2013	2,4'-DDE	µg/L	NA			<0.0050	<0.0050	<0.0050		
2013	2,4'-DDT	µg/L	NA	16. 40 CFR 131.38		<0.0050	<0.0050	<0.0050		
2013	4,4´-DDE	µg/L	NA			<0.0050	<0.0050	<0.0050		
2013	4,4´-DDT	µg/L	1.1	16. 40 CFR 131.38		<0.0050	<0.0050	<0.0050	0%	NA[1]
Organophosphorus Pesticides										
2013	Azinphos methyl (Guthion)	µg/L	NA			<0.010	<0.010	<0.010		
2013	Bolstar	µg/L	NA			<0.010	<0.010	<0.010		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000		<0.010	<0.010	<0.010	4%	0.27
2013	Coumaphos	µg/L	NA			<0.010	<0.010	<0.010		
2013	Demeton-o	µg/L	NA			<0.010	<0.010	<0.010BS-L		
2013	Demeton-s	µg/L	NA			<0.010	<0.010	<0.010		
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon		<0.010BS-L	<0.010	<0.010	18%	0.95
2013	Dichlorvos	µg/L	NA			<0.010	<0.010	0.048		
2013	Dimethoate	µg/L	NA			<0.010	<0.010	<0.010		
2013	Disulfoton	µg/L	NA			<0.010	<0.010	<0.010		
2013	Ethoprop	µg/L	NA			<0.010	<0.010	<0.010		
2013	Ethyl parathion	µg/L	NA			<0.010	<0.010	<0.010		
2013	Fensulfothion	µg/L	NA			<0.010	<0.010	<0.010		
2013	Fenthion	µg/L	NA			<0.010	<0.010	<0.010		
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook		0.073	0.017	<0.010	0%	0.08
2013	Merphos	µg/L	NA			<0.010	<0.010	<0.010		
2013	Methyl parathion	µg/L	NA			<0.010	<0.010	<0.010		
2013	Mevinphos	µg/L	NA			<0.010	<0.010	<0.010		
2013	Naled	µg/L	NA			<0.010	<0.010	<0.010		
2013	Phorate	µg/L	NA			<0.010	<0.010	<0.010		
2013	Ronnel	µg/L	NA			<0.010	<0.010	<0.010		
2013	Stirophos	µg/L	NA			<0.010	<0.010	<0.010		
2013	Tokuthion (Prothiofos)	µg/L	NA			<0.010	<0.010	<0.010		
2013	Trichloronate	µg/L	NA			<0.010	<0.010	<0.010		
Pyrethroids										
2007, 2013	Allethrin	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006		**0.0783**	0.0076	<0.002	40%	2.27
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004		0.0273	<0.002	<0.002	0%	0.01
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004		0.0021	<0.002	<0.002	0%	0.04
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004		0.0048	<0.002	<0.002	0%	0.00
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Deltamethrin/Tralomethrin	µg/L	NA			0.0246	<0.002	<0.002		
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004		0.0054	<0.002	<0.002	0%	0.01
2007, 2013	Fenvalerate	µg/L	NA			0.0012J	<0.002	<0.002		
2007, 2013	Fluvalinate	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006		**0.123**	<0.01	<0.01	10%	0.90
2007, 2013	Prallethrin	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Resmethrin	µg/L	NA			<0.01	<0.01	<0.01		
Toxicity										
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100			>100	NR	>100	4%	1.07
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100			100	NR	**50**	11%	1.19
2013	*Ceriodaphnia* 7-day survival	TST	Pass/Fail			NR	Pass	**Fail**	50%	
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100			100	NR	**50**	7%	1.15
2013	*Ceriodaphnia* 7-day reproduction	TST	Pass/Fail			NR	Pass	**Fail**	50%	
2007	*Hyalella* 96-hr	LC_{50} (%)	>100			**89**	NR	>100	4%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100			100	NR	100	0%	1.00
2013	*Selenastrum* 96-hr	TST	Pass/Fail			NR	Pass	Pass	0%	
2013	*Pimephales* 7-day survival	TST	Pass/Fail			NR	Pass	Pass	0%	
2013	*Pimephales* 7-day biomass	TST	Pass/Fail			NR	Pass	Pass	0%	
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail			Pass	NR	NR	0%	

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for ESC-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
†† Permethrin was non-detect at the method detection limit of 0.005 µg/L.
BS-L-Blank Spike recovery of this analyte was below the control limits. Results may be biased low.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.
NR-Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks. Values that are underlined are above the CMC Water Quality Benchmark.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for LPC-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data								Transitional Monitoring		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013	2013-2014	2014-2015		
					11/30/07	02/03/08	-	-	10/6/10	02/16/11**	-	-	-	-		
							No Samples Collected	No Samples Collected			No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected		
Physical Chemistry																
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.04	7.43			7.37	**6.40**					25%	NA[1]
2007, 2013	Specific Conductivity	µmhos/cm	NA		196	208			380	720						
2007, 2013	Water Temperature	Celsius	NA		17.20	13.20			17.60	16.20						
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**164**	**65**			**32**	**28**					100%	NA[1]
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	NA		14,000	5,000			130,000	17,000						
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1. Basin Plan REC-1/REC-2	**17,000**	1,700			**50,000**	3,000					50%	NA[1]
2007, 2013	Total Coliform	MPN/100 mL	NA		110,000	23,000			300,000	30,000						
Nutrients																
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	0.78	0.1			0.35	0.48					0%	NA[1]
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	1.3	0.2			0.45	0.45					0%	NA[1]
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.1	<0.05			0.3	0.054J					0%	NA[1]
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		3.9	0.84			3.5	1.9						
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.69	0.2			0.51	0.053					0%	NA[1]
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.606	0.33			0.83	0.53					0%	NA[1]
General Chemistry																
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	12	3.4			7	6.8					0%	NA[1]
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	49	22			110	83					0%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		12.7	6.5			7.9	9.5						
2007, 2013	Total Organic Carbon	mg/L	NA		14.3	5.7			12	9.6						
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	4.4J	3.3J			<5	2.1J					0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.158	0.062			0.17	0.095					0%	NA[1]
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	**524**	496			**600**	340					50%	NA[1]
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**260**	40			**330**	**220**					75%	NA[1]
2007, 2013	Hardness	mg $CaCO_3$/L	NA		49.2	45.2			360	180						
Total Metals																
2007	Antimony	mg/L	NA		0.0014	0.0011			0.0024	0.0026						
2007, 2013	Arsenic	mg/L	NA		0.0074	0.0032			0.013	0.012						
2007, 2013	Cadmium	mg/L	NA		0.0004	<0.0004			0.00051	0.00038						
2007, 2013	Chromium	mg/L	NA		0.0047	0.0015			0.0088	0.0094						
2007, 2013	Copper	mg/L	NA		0.0417	0.0128			0.062	0.05						
2007, 2013	Lead	mg/L	NA		0.0152	0.0037			0.019	0.015						
2007, 2013	Nickel	mg/L	NA		0.0087	0.0028			0.01	0.0097						
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0004J	0.0002J			0.00087	0.00056					0%	NA[1]
2007, 2013	Zinc	mg/L	NA		0.2228	0.0708			0.23	0.22						
Dissolved Metals																
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0014	0.0012			0.0014	0.0019					0%	NA[1]
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0025	0.0020			0.0017	0.0012					0%	NA[1]
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000027J	0.000014J					0%	NA[1]
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0006	0.0006			0.00026	0.00073					0%	NA[1]
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0056	0.0053			0.0049	0.0096					0%	NA[1]
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.0002	<0.0001			0.00023	0.000079J					0%	NA[1]
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0020	0.0012			0.0025	0.0023					0%	NA[1]
2007, 2013	Selenium	mg/L	NA		0.0004J	0.0002J			0.00048	0.00041						
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0125	0.0120			0.014	0.01					0%	NA[1]
Organophosphorus Pesticides																
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01					0%	NA[1]
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004			<0.01	<0.01					0%	NA[1]
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			<0.01	<0.01					0%	NA[1]
Pyrethroids																
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002			<0.002	<0.002						NA[1]
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	**0.0323**	<0.002			<0.002	**0.0288**					50%	NA[1]
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	0.02	0.01			<0.002	0.0125					0%	NA[1]
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	0.001J	<0.002			<0.002	0.0018J					0%	NA[1]
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.002	<0.002			<0.002	<0.002					0%	NA[1]
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		0.001J	<0.002				<0.002						
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.002	<0.002			<0.002	<0.002						
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	<0.002			<0.002	<0.002					0%	NA[1]
2007, 2013	Fenvalerate	µg/L	NA		<0.002	<0.002			<0.002	<0.002						
2007, 2013	Fluvalinate	µg/L	NA		0.0006J	<0.002				0.006						
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.025*	<0.025*			<0.005	<0.025*					0%	NA[1]
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002			<0.002	<0.002						
2007, 2013	Resmethrin	µg/L	NA			<0.025										
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100					0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100					0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100			100	100					0%	NA[1]
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100					0%	NA[1]
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100			100	100					0%	NA[1]

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for LPC-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
**Sample was taken upstream of LPC-TWAS-1.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations

Wet Weather Historical Monitoring Table for LPC-TWAS-2

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data									Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015			
					11/30/07	02/03/08	-	-	10/19/10-10/20/10	02/16/11	-	10/11/12	02/20/13	-	11/01/14	03/01/15-03/02/15		
							No Samples Collected	No Samples Collected			No Samples Collected			No Samples Collected				
Physical Chemistry																		
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.28	7.62			7.30	7.65		7.54	7.62		7.23	7.62	0%	0.21
2007, 2013	Specific Conductivity	µmhos/cm	NA		567	373			548	1,334		1,735	641		1,089	451		
2007, 2013	Water Temperature	Celsius	NA		16.80	12.50			17.50	15.10		20	10.8		17.64	13.27		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**84**	**147**			**77**	4.9		18	11		**75.7**	**26.6**	63%	2.78
Bacteriological																		
2007, 2013	Enterococcus	MPN/100 mL	NA		80,000	5,000			280,000	17,000		50,000	50,000		2,200	50,000		
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan REC-1/REC-2	**70,000**	**1,700**			**50,000**	**17,000**		**80,000**	**11,000**		**110,000**	**7,000**	100%	108.34
2007, 2013	Total Coliform	MPN/100 mL	NA		110,000	17,000			300,000	30,000		300,000	60,000		170,000	9,000		
Nutrients																		
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	0.62	0.08			0.33	0.16		0.87	0.14		0.28	<0.10	0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	1.3	0.44			0.67	1		2.1	0.45		1.4	0.28	0%	0.10
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.09	0.02J			0.13	0.078J		0.13	0.047J		0.075J	0.020J	0%	0.07
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		2.2	0.98			2.3	1.2		6.2	1.3		3.1	0.71		
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.1	0.16			0.29	0.098		0.18	0.13		0.47	0.13	0%	0.10
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	1.01	0.41			0.42	0.15		0.87	0.27		0.66	0.25	0%	0.25
General Chemistry																		
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	15	2.2			6.6	4.9		**82**	6.4		15	6.3	13%	0.58
2007	Chemical Oxygen Demand	mg/L	120	.	60	23			82	40		**230**	54		**130**	35	25%	0.68
2007, 2013	Dissolved Organic Carbon	mg/L	NA		16.4	5.3			8.6	11		41	6.1		28	8.1		
2007, 2013	Total Organic Carbon	mg/L	NA		16.9	5.5			8.7	12		42	5.8		32	8.6		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	2.8J	2.2J			2.6J	<5		<5	<5		<5.0	<5.0	0%	0.25
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.268	0.096			<0.05	0.2		0.095	0.065		0.15	0.096	0%	0.25
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	322	298			330	**1,000**		**1,200**	430		**1,300**	390	38%	1.32
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**113**	**200**			**130**	27		**380**	**150**		**120**	45	75%	1.46
2007, 2013	Hardness	mg $CaCO_3$/L	NA		93.9	66.5			150	430		505	198		553	174		
Total Metals																		
2007	Antimony	mg/L	NA		0.0014	0.0007			0.0012	0.0011		0.0023	0.001		0.0015	0.00095		
2007, 2013	Arsenic	mg/L	NA		0.0046	0.0033			0.004	0.0022		0.0066	0.0025		0.0048	0.0021		
2007, 2013	Cadmium	mg/L	NA		<0.0004	<0.0004			0.00014	0.000029J		0.00029	0.0001		0.00015	0.000046J		
2007, 2013	Chromium	mg/L	NA		0.0016	0.0014			0.0043	0.00069		0.004	0.0025		0.0033	0.0015		
2007, 2013	Copper	mg/L	NA		0.0183	0.0093			0.019	0.0071		0.034	0.015		0.016	0.0076		
2007, 2013	Lead	mg/L	NA		0.0047	0.0046			0.0062	0.00053		0.0071	0.0037		0.0036	0.0014		
2007, 2013	Nickel	mg/L	NA		0.0032	0.0020			0.0045	0.0037		0.009	0.0027		0.0046	0.0022		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0006	0.0002J			0.00064	0.00072		0.0012	0.00041		0.00079	0.00064	0%	0.13
2007, 2013	Zinc	mg/L	NA		0.0635	0.0465			0.076	0.011		0.15	0.068		0.066	0.026		
Dissolved Metals																		
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0012	0.0007			0.00087	0.0011		0.0019	0.00058		0.0012	0.00072	0%	0.17
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0028	0.0024			0.0022	0.0019		0.0035	0.0012		0.0025	0.0014	0%	0.01
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004	<0.0004			<0.0001	0.000014J		0.00007J	0.00002J		0.000054J	<0.00010	0%	0.02
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0003J	0.0005			0.00032	0.00045		0.00067	0.00028		0.00036	0.00034	0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0042	0.0035			0.0051	0.0059		0.0074	0.003		0.0048	0.0031	0%	0.20
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.0001	<0.0001			0.00013J	0.000026J		0.00024	<0.0002		0.00022	0.000062J	0%	0.00
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0017	0.0009			0.0016	0.0034		0.0059	0.00085		0.0028	0.0012	0%	0.00
2007, 2013	Selenium	mg/L	NA		0.0006	0.0003J			0.00036J	0.00085		0.00084	<0.0004		0.00049	0.00047		
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0090	0.0043			0.009	0.0059		0.034	0.0082		0.019	0.0051	0%	0.05
Organophosphorus Pesticides																		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.20
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	0.057	0.006			<0.01	0.0063J		<0.01	<0.01		<0.010BS-L	<0.010	0%	0.15
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	0.121	0.014			<0.01	0.023		0.069	0.081		0.017	<0.010	0%	0.10
Pyrethroids																		
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002			<0.005	<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	**0.0549**	**0.0534**			0.0023J	**0.0437**		**0.1197**	**0.2351**		**0.0507**	0.0051	75%	7.59
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	0.01	0.009			<0.005	<0.002		0.0175	0.071		0.0154	<0.002	0%	0.05
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	0.02	0.0007J			<0.005	<0.002		0.0024	<0.002		0.0016J	<0.002	0%	0.05
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	0.05	<0.002			<0.005	<0.002		0.0072	<0.002		0.0064	<0.002	0%	0.01
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.002	<0.002				<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.002	<0.002			<0.005	<0.002		<0.002	<0.002		0.0215	<0.002		
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	<0.002			<0.005	<0.002		<0.002	<0.002		<0.002	<0.002	0%	0.00
2007, 2013	Fenvalerate	µg/L	NA		<0.002	<0.002			<0.005	<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Fluvalinate	µg/L	NA		<0.002	<0.002				<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.025*	<0.025*			<0.005	<0.025*		**0.1607**	<0.01		**0.082**	<0.01	25%	1.71
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002			<0.005	<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Resmethrin	µg/L	NA			<0.025						<0.025	<0.01		<0.01	<0.01		
Toxicity																		
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	**94.2**			>100	**58**		>100	>100		>100	>100	25%	1.10
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for LPC-TWAS-2

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.

(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.

(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.

(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.

* Indicates detection limit above water quality benchmark.

£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.

BS-L Blank Spike recovery of this analyte was below the control limits. Results may be biased low.

J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources

Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for LPC-TWAS-3

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data		Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2012-2013		2013-2014	2014-2015			
					12/13/12	02/08/13-02/09/13	-	11/01/14	03/01/15		
Physical Chemistry							No Samples Collected				
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.33	7.62		7.23	7.9	0%	NA[1]
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,247	3,600		2,096	1,783		
2007, 2013	Water Temperature	Celsius	NA		13.5	10.5		16.99	14.32		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**42**	4.9		**29.5**	**31**	75%	NA[1]
Bacteriological											
2007, 2013	Enterococcus	MPN/100 mL	NA		110,000	2,200		17,000H	50,000		
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1. Basin Plan REC-1/REC-2	**50,000**	2,200		240,000H^	**110,000**	67%	NA[1]
2007, 2013	Total Coliform	MPN/100 mL	NA		140,000	17,000		500,000H	170,000		
Nutrients											
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	0.22	0.061J		<0.10	<0.10	0%	NA[1]
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.76	0.087J		0.99	0.18	0%	NA[1]
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.038J	0.018J		0.066J	0.024J	0%	NA[1]
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1.2	0.42		2.8	0.63		
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.33	0.094		0.72	0.14	0%	NA[1]
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.71	0.26		0.94	0.24	0%	NA[1]
General Chemistry											
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	8	3.4		9.6	5.8	0%	NA[1]
2007	Chemical Oxygen Demand	mg/L	120		47	25		110	39	0%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		11	6.2		29	8.8		
2007, 2013	Total Organic Carbon	mg/L	NA		11	5.7		32	9.2		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<5	1.5J		<5.0	<5.0	0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.05	0.068		0.12	0.053	0%	NA[1]
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	**590**	**2,600**		**1,900**	**1,300**	100%	NA[1]
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**150**	7		**110**	35	50%	NA[1]
2007, 2013	Hardness	mg $CaCO_3$/L	NA		247	1,210		825	571		
Total Metals											
2007	Antimony	mg/L	NA		0.00043J	0.00028J		0.00062	0.00042J		
2007, 2013	Arsenic	mg/L	NA		0.0068	0.004		0.012	0.0041		
2007, 2013	Cadmium	mg/L	NA		0.000071J	<0.0001		0.000098J	<0.00010		
2007, 2013	Chromium	mg/L	NA		0.0021	0.00025		0.0016	0.0013		
2007, 2013	Copper	mg/L	NA		0.0063	0.0023		0.0071	0.0034		
2007, 2013	Lead	mg/L	NA		0.0021	0.00012J		0.0013	0.00052		
2007, 2013	Nickel	mg/L	NA		0.003	0.0079		0.0027	0.004		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.00099	0.0012		0.0013	0.0014	0%	NA[1]
2007, 2013	Zinc	mg/L	NA		0.022	0.0046J		0.018	0.0075		
Dissolved Metals											
2007	Antimony	mg/L	0.006	1. Basin Plan	0.00035J	0.00026J		0.00042J	0.00034J	0%	NA[1]
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0033	0.0031		0.0062	0.0024	0%	NA[1]
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0001	<0.0001		<0.00010	<0.00010	0%	NA[1]
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.00022	0.00011J		0.00017J	0.0003	0%	NA[1]
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0024	0.0018		0.0036	0.0024	0%	NA[1]
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.000059J	0.000016J		0.000026J	<0.00020	0%	NA[1]
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0018	0.0076		0.0018	0.0026	0%	NA[1]
2007, 2013	Selenium	mg/L	NA		0.00076	0.00091		0.00098	0.0013		
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.005	0.0038J		0.0046J	0.0025J	0%	NA[1]
Organophosphorus Pesticides											
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.01	<0.01		<0.010	<0.010	0%	NA[1]
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.01	<0.01		<0.010	<0.010	0%	NA[1]
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.01	<0.01		0.087	<0.010	0%	NA[1]
Pyrethroids											
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	**0.1048**	**0.1463**		**0.0219**	<0.002	75%	NA[1]
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	<0.002	<0.002		0.0642	<0.002	0%	NA[1]
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	<0.002	0.0156		<0.002	<0.002	0%	NA[1]
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.002	<0.002		<0.002	<0.002	0%	NA[1]
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	<0.002		<0.002	<0.002	0%	NA[1]
2007, 2013	Fenvalerate	µg/L	NA		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Fluvalinate	µg/L	NA		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.025††	<0.01		<0.01	<0.01	0%	NA[1]
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Resmethrin	µg/L	NA		<0.025	<0.01		<0.01	<0.01		
Toxicity											
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100	0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100	0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	**50**		100	100	25%	NA[1]
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		**35.8**	**68.6**		>100	>100	50%	NA[1]
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100		100	100	0%	NA[1]

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for LPC-TWAS-3

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
†† Permethrin was non-detect at the method detection limit of 0.005 µg/L.
^Results were not compared to the water quality benchmark for fecal coliform due to the sample being received and/or analyzed past the recommended holding time.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for LPC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data														
					2001-2002			2002-2003			2003-2004			2004-2005			2005-2006		
					11/29/01	02/17/02	03/17/02	11/08/02	12/16/02	02/11/03	11/12/03	02/03/04	02/18/04	10/17/04	02/11/05	02/18/05	10/17/05	02/20/06	02/28/06
Physical Chemistry																			
2013	Dissolved Oxygen	mg/L	<5.0 (a)	1. Basin Plan															
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.70	7.80	7.50	7.46	7.63	7.78	6.91	7.83	8.29	7.76	7.48	6.85	7.32	6.66	6.79
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,640	2,700	1,590	1,827	1,939	2,600	2,470	3,060	3,540	3,270	2,690	1,213	2,980	2,440	113
2007, 2013	Water Temperature	Celsius	NA					16.30	15.00	12.80	15.60	12.40	12.20	18.00	12.30	13.90	17.40	11.50	13.70
2007, 2013	Turbidity	NTU	20	1. Basin Plan	3.8	3.33	5.05	17.1	**45.4**	**29.9**	7.53	8.98	2.74	7.89	9.05	**56.4**	16.4	17.1	**30.3**
Bacteriological																			
2007, 2013	Enterococcus	MPN/100 mL	NA		500	1,700	3,000	230,000	500	22,000	700	1,700	500	1,112	3,000	8,000	1,300,000	2,300	30,000
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	130	500	300	**30,000**	500	1,700	1,300	130	130	500	500	2,200	**170,000**	1,112	**5,000**
2007, 2013	Total Coliform	MPN/100 mL	NA		1,700	3,000	500	500,000	1,400	50,000	5,000	13,000	230	17,000	13,000	50,000	1,300,000	30,000	30,000
Nutrients																			
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.14	<0.1	<0.1	0.3	0.11
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.2	0.3	0.3	1.32	0.98	0.60	0.28	0.11	<0.05	0.09	0.6	1.06	1.24	0.94	0.9
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	<0.05	0.11	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1.7	1	1.2	1.9	0.8	1.2	1.2	2.5	2.1	1.6	1.9	0.8	1	2.5	1.1
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.9	<0.05	0.15	0.52	0.40	0.28	0.21	0.13	0.11	0.14	0.1	0.51	0.29	0.45	0.37
2013	Orthophosphate	mg/L	NA																
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.1	0.15	0.23	0.73	0.60	0.39	0.23	0.2	0.17	0.14	0.28	0.69	0.48	0.47	0.38
General Chemistry																			
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2000, 8. McNeeley (1979)	3.1	5.6	21.3	5.55	<2.0	8.31	3.28	28.6	5.28	23.7	3.75	2.31	6.16	<2	5.24
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2000	<25	50	54	73	53	115	47	108	56	**143**	62	36	63	42	76
2007, 2013	Dissolved Organic Carbon	mg/L	NA					16.8	11.0	11.2	14	6.41	77.2	27.2	4.44	4.66	10.6	14.4	12.2
2007, 2013	Total Organic Carbon	mg/L	NA					22.7	57.4	13.6	10.5	8.86	95.6	29.9	9.51	10.8	22.1	14.5	14.9
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<1	1	<1	3.24	<1.00	1.39	<1	<1	<1	<1	<1	<1	<1	1.05	<1
2013	Sulfate	mg/L	250 (a)	1. Basin Plan															
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	0.2	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2007, 2013	Total Dissolved Solids	mg/L	500 (a)	1. Basin Plan	**1,580**	**1,590**	**1,010**	**955**	**1,280**	**997**	**1,380**	**1,890**	**2,040**	**2,120**	**1,500**	**804**	**1,940**	**1,030**	52
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015 , 1. Basin Plan	<20	<20	<20	35	58	38	27	<20	<20	<20	<20	**108**	20	30	**182**
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		808	815	551	428	602	602	692	805	880	1,000	707	379	932	563	373
Total Metals																			
2007	Antimony	mg/L	NA		<0.002	<0.002	<0.002	<0.002	0.005	0.009	<0.005	<0.005	<0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Arsenic	mg/L	NA		0.002	0.002	0.003	0.012	0.005	0.003	<0.002	0.006	0.005	0.005	0.004	<0.002	0.006	0.004	0.007
2007, 2013	Cadmium	mg/L	NA		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
2007, 2013	Chromium	mg/L	NA		<0.005	<0.005	<0.005	0.008	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	NA		<0.005	<0.005	0.008	0.021	0.004	0.010	<0.005	0.008	0.006	<0.005	<0.005	<0.005	0.005	0.005	0.006
2013	Iron	mg/L	0.3 (a)	1. Basin Plan															
2007, 2013	Lead	mg/L	NA		<0.002	<0.002	0.003	0.011	0.004	0.003	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	0.003
2013	Mercury	mg/L	NA																
2007, 2013	Nickel	mg/L	NA		<0.002	<0.002	<0.002	0.026	<0.002	0.002	0.003	<0.002	<0.002	0.003	0.002	0.002	0.005	0.004	0.003
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2013	Thallium	mg/L	NA																
2007, 2013	Zinc	mg/L	NA		<0.020	<0.020	0.020	0.058	0.006	<0.020	0.028	<0.02	<0.02	<0.02	<0.02	<0.02	0.039	<0.02	<0.02
Dissolved Metals																			
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.005	<0.005	<0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.002	<0.001	0.003	0.004	0.003	0.003	0.002	0.004	0.004	<0.002	<0.002	<0.002	0.002	<0.001	<0.001
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.001	<0.001
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	0.007	<0.005	0.027	<0.005	0.005	0.005	<0.005	<0.005	<0.005	<0.005	0.005	<0.005
2013	Iron	mg/L	NA																
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
2013	Mercury	mg/L	NA																
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	<0.002	0.003	<0.002	0.003	<0.002	0.002	0.002	0.002	<0.002	0.003	0.002	0.002	0.003	0.003	0.002
2007, 2013	Selenium	mg/L	NA		<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2013	Thallium	mg/L	NA																
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	<0.020	<0.020	<0.020	<0.020	0.020	0.106	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.036	<0.02	<0.02

Wet Weather Historical Monitoring Table for LPC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data 2001-2002			2002-2003			2003-2004			2004-2005			2005-2006		
					11/29/01	02/17/02	03/17/02	11/08/02	12/16/02	02/11/03	11/12/03	02/03/04	02/18/04	10/17/04	02/11/05	02/18/05	10/17/05	02/20/06	02/28/06
Organophosphorus Pesticides																			
2013	Azinphos methyl (Guthion)	μg/L	NA																
2013	Bolstar	μg/L	NA																
2007, 2013	Chlorpyrifos	μg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.03*	<0.03*	<0.03*	**0.055**	**0.067**	<0.03*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
2013	Coumaphos	μg/L	NA																
2013	Demeton-o	μg/L	NA																
2013	Demeton-s	μg/L	NA																
2007, 2013	Diazinon	μg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	**0.12**	0.06	**0.13**	**0.231**	0.040	0.077	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
2013	Dichlorvos	μg/L	NA																
2013	Dimethoate	μg/L	NA																
2013	Disulfoton	μg/L	NA																
2013	Ethoprop	μg/L	NA																
2013	Ethyl parathion	μg/L	NA																
2013	Fensulfothion	μg/L	NA																
2013	Fenthion	μg/L	NA																
2007, 2013	Malathion	μg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook				<0.10	<0.10	<0.10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.045	0.028	0.039
2013	Merphos	μg/L	NA																
2013	Methyl parathion	μg/L	NA																
2013	Mevinphos	μg/L	NA																
2013	Naled	μg/L	NA																
2013	Phorate	μg/L	NA																
2013	Ronnel	μg/L	NA																
2013	Stirophos	μg/L	NA																
2013	Tokuthion (Prothiofos)	μg/L	NA																
2013	Trichloronate	μg/L	NA																
Pyrethroids																			
2007, 2013	Allethrin	μg/L	NA																
2007, 2013	Bifenthrin	μg/L	0.0093	15. Anderson et al., 2006															
2007, 2013	Cyfluthrin	μg/L	0.344	17. Wheelock et al., 2004															
2007, 2013	Cyhalothrin, Total Lambda	μg/L	0.20	17. Wheelock et al., 2004															
2007, 2013	Cypermethrin	μg/L	0.683	17. Wheelock et al., 2004															
2007, 2013	Danitol (Fenpropathrin)	μg/L	NA																
2007, 2013	Deltamethrin/Tralomethrin	μg/L	NA																
2007, 2013	Esfenvalerate	μg/L	0.25	17. Wheelock et al., 2004															
2007, 2013	Fenvalerate	μg/L	NA																
2007, 2013	Fluvalinate	μg/L	NA																
2007, 2013	Permethrin	μg/L	0.021	15. Anderson et al., 2006															
2007, 2013	Prallethrin	μg/L	NA																
2007, 2013	Resmethrin	μg/L	NA																
Toxicity																			
2007	*Ceriodaphnia* 96-hr	LC$_{50}$ (%)	>100		>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
2007	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2013	Ceriodaphnia 7-day survival	TST	Pass/Fail																
2007	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2013	Ceriodaphnia 7-day reproduction	TST	Pass/Fail																
2007	*Hyalella* 96-hr	LC$_{50}$ (%)	>100		>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
2007	*Selenastrum* 96-hr	NOEC (%)	100		100	100	100	100	100	100	100	100	100	100	100	100	100^	100	100
2013	Selenastrum 96-hr	TST	Pass/Fail																
2013	Pimephales 7-day survival	TST	Pass/Fail																
2013	Pimephales 7-day biomass	TST	Pass/Fail																
2013	Strongylocentrotus 96-hr	TST	Pass/Fail																

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for LPC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data											
					2006-2007			2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013	
					12/10/06	01/30/07	02/19/07	11/30/07	02/03/08-02/04/08	11/11/08	-	10/20/10	02/17/11-02/18/11	-	10/12/12	02/09/13
Physical Chemistry											No Samples Collected			No Samples Collected		
2013	Dissolved Oxygen	mg/L	<5.0 (a)	1. Basin Plan												
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.73	8.08	7.21	7.11	8.33	7.82		7.28	7.96		7.63	7.99
2007, 2013	Specific Conductivity	µmhos/cm	NA		3,300	3,270	974	1,253	1,336	4,760		687	2,960		4,440	3,000
2007, 2013	Water Temperature	Celsius	NA		13.50	10.50	14.60	16.40	12.30	15.00		16.80	10.40		16.3	10.1
2007, 2013	Turbidity	NTU	20	1. Basin Plan	6.86	3.6	70.8	73	14.9	4.1		16	2.6		8.2	1.5
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	NA		230	300	13,000	22,000	3,000	11,000		170,000	1,700		5,000	500
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	800	500	2,300	22,000	300	5,000		50,000	1,112		30,000	500
2007, 2013	Total Coliform	MPN/100 mL	NA		1,300	800	30,000	22,000	5,000	50,000		230,000	35,000		500,000	13,000
Nutrients																
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.37	<0.1	0.94	0.44	<0.03	0.08		0.14	0.15		0.3	0.07J
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	<0.05	<0.05	0.47	1.7	0.38	0.55		0.93	0.21		0.84	<0.1
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	<0.05	0.07	<0.05	0.06		0.15	0.024J		0.19	<0.1
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.5	0.6	2.1	2.7	0.84	1.7		0.88	0.56		1.9	0.45
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.09	0.1	0.26	0.63	0.17	0.301		0.35	0.12		0.4	0.11
2013	Orthophosphate	mg/L	NA													
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.22	0.24	0.35	0.91	0.21	0.35		0.37	0.14		0.53	0.12
General Chemistry																
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2000, 8. McNeeley (1979)	<2	3.87	6.01	15	<2	4.7		5.2	2.3		15	1.6J
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2000	58	45	37	75	28	99		45	27		73	26
2007, 2013	Dissolved Organic Carbon	mg/L	NA		11.6	10.4	11	20	7	19		12	7.9		24	6.3
2007, 2013	Total Organic Carbon	mg/L	NA		11.6	11.2	11.9	21.7	6.5	18.7		11	8		24	6.6
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<5	<5	<5	2.3J	<5	<5		<5	<5		<5	<5
2013	Sulfate	mg/L	250 (a)	1. Basin Plan												
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	0.25	0.10	0.24		<0.05	0.099		0.18	0.054
2007, 2013	Total Dissolved Solids	mg/L	500 (a)	1. Basin Plan	1,890	1,760	1,080	906	822	2,360		630	1,400		2,400	1,600
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015 , 1. Basin Plan	22	<20	81	130	26	6.8		34	8		43	3
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		1,080	908	572	219.6	178.4	809.5		250	700		1,020	728
Total Metals																
2007	Antimony	mg/L	NA		<0.002	<0.002	0.002	0.001	0.0007	0.0007		0.00093	0.00038J		0.00067	0.00031J
2007, 2013	Arsenic	mg/L	NA		<0.001	<0.001	0.003	0.0048	0.0028	0.0048		0.0033	0.0024		0.0051	0.0024
2007, 2013	Cadmium	mg/L	NA		0.007	<0.001	<0.001	<0.0004	<0.0004	<0.0004		0.000048J	0.000024J		0.00009J	0.00002J
2007, 2013	Chromium	mg/L	NA		<0.005	<0.005	<0.005	0.0013	0.0008	0.0003J		0.0012	0.00042		0.00049	0.00022
2007, 2013	Copper	mg/L	NA		0.006	0.006	0.011	0.0077	0.0033	0.0023		0.0055	0.0023		0.004	0.0016
2013	Iron	mg/L	0.3 (a)	1. Basin Plan												
2007, 2013	Lead	mg/L	NA		0.001	<0.001	0.003	0.0023	0.00039	0.0002		0.0012	0.00015J		0.00049	0.00006J
2013	Mercury	mg/L	NA													
2007, 2013	Nickel	mg/L	NA		0.004	0.004	0.005	0.0025	0.0012	0.0023		0.0023	0.0037		0.0027	0.0011
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.004	<0.004	<0.004	0.0006	0.0005	0.0007		0.00046	0.00082		0.00077	0.0005
2013	Thallium	mg/L	NA													
2007, 2013	Zinc	mg/L	NA		<0.02	0.024	0.064	0.025	0.006	0.004		0.012	0.002J		0.013	0.0018J
Dissolved Metals																
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	0.002	0.0009	0.0007	0.0007		0.00089	0.00037J		0.0006	0.00031J
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	<0.001	<0.001	<0.001	0.0038	0.0029	0.0053		0.0028	0.0022		0.0046	0.0023
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.0004	<0.0004	<0.0004		0.000017J	0.000021J		0.00006J	0.00002J
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	0.0003J	0.0004J	0.0001J		0.00023	0.00021		0.00014J	0.00028
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.002	0.003	0.003	0.0037	0.0028	0.0023		0.0039	0.0021		0.0032	0.0015
2013	Iron	mg/L	NA													
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	0.00006J	<0.0001	<0.0001		0.000071J	<0.0002		0.00006J	<0.0002
2013	Mercury	mg/L	NA													
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.003	0.002	0.002	0.0015	0.0012	0.0021		0.0019	0.0034		0.0024	0.0011
2007, 2013	Selenium	mg/L	NA		<0.004	<0.004	<0.004	0.0005	0.0005	0.0008		0.00046	0.00065		0.00064	0.00049
2013	Thallium	mg/L	NA													
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	<0.02	<0.02	<0.02	0.0055	0.0023	0.0029		0.0053	0.0019J		0.0094	0.0048J

Wet Weather Historical Monitoring Table for LPC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data											
					2006-2007			2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013	
					12/10/06	01/30/07	02/19/07	11/30/07	02/03/08-02/04/08	11/11/08	-	10/20/10	02/17/11-02/18/11	-	10/12/12	02/09/13
Organophosphorus Pesticides											No Samples Collected			No Samples Collected		
2013	Azinphos methyl (Guthion)	µg/L	NA													
2013	Bolstar	µg/L	NA													
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.01	<0.01		<0.01	<0.01
2013	Coumaphos	µg/L	NA													
2013	Demeton-o	µg/L	NA													
2013	Demeton-s	µg/L	NA													
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	0.020	<0.004	<0.004	<0.004	<0.004	<0.004		<0.01	<0.01		<0.01	<0.01
2013	Dichlorvos	µg/L	NA													
2013	Dimethoate	µg/L	NA													
2013	Disulfoton	µg/L	NA													
2013	Ethoprop	µg/L	NA													
2013	Ethyl parathion	µg/L	NA													
2013	Fensulfothion	µg/L	NA													
2013	Fenthion	µg/L	NA													
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006	<0.006	0.068	<0.006	<0.006		<0.01	<0.01		<0.01	<0.01
2013	Merphos	µg/L	NA													
2013	Methyl parathion	µg/L	NA													
2013	Mevinphos	µg/L	NA													
2013	Naled	µg/L	NA													
2013	Phorate	µg/L	NA													
2013	Ronnel	µg/L	NA													
2013	Stirophos	µg/L	NA													
2013	Tokuthion (Prothiofos)	µg/L	NA													
2013	Trichloronate	µg/L	NA													
Pyrethroids																
2007, 2013	Allethrin	µg/L	NA					<0.002	<0.002	<0.002		<0.005	<0.002		<0.002	<0.002
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006				**0.0181**	0.0063	<0.002		<0.005	<0.002		0.0027	<0.002
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004				<0.002	<0.002	<0.002		<0.005	<0.002		<0.002	<0.002
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004				0.001J	<0.002	<0.002		<0.005	<0.002		<0.002	<0.002
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004				<0.002	<0.002	<0.002		<0.005	<0.002		<0.002	<0.002
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA					<0.002	<0.002	<0.002			<0.002		<0.002	<0.002
2007, 2013	Deltamethrin/Tralomethrin	µg/L	NA					<0.002	<0.002	<0.002		<0.005	<0.002		<0.002	<0.002
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004				0.0008J	<0.002	<0.002		<0.005	<0.002		<0.002	<0.002
2007, 2013	Fenvalerate	µg/L	NA					<0.002	<0.002	<0.002		<0.005	<0.002		0.0007J	<0.002
2007, 2013	Fluvalinate	µg/L	NA					<0.002	<0.002	<0.002			<0.002		<0.002	<0.002
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006				<0.025*	<0.025*	<0.025*		<0.005	<0.025*		<0.025††	<0.01
2007, 2013	Prallethrin	µg/L	NA					<0.002	<0.002	<0.002		<0.005	<0.002		<0.002	<0.002
2007, 2013	Resmethrin	µg/L	NA						<0.025	<0.025					<0.025	<0.01
Toxicity																
2007	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100		>100	>100		>100	>100
2007	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100	100	100	100	100		100	100		100	100
2013	Ceriodaphnia 7-day survival	TST	Pass/Fail													
2007	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	**6.25**	100	100	100	100		100	100		100	100
2013	Ceriodaphnia 7-day reproduction	TST	Pass/Fail													
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100		>100	>100		>100	>100
2007	*Selenastrum* 96-hr	NOEC (%)	100		100	100	100	100	100	100		100	100		**50**	100
2013	Selenastrum 96-hr	TST	Pass/Fail													
2013	Pimephales 7-day survival	TST	Pass/Fail													
2013	Pimephales 7-day biomass	TST	Pass/Fail													
2013	Strongylocentrotus 96-hr	TST	Pass/Fail													

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for LPC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2013-2014	2014-2015				
					-	11/01/14	11/21/14-11/22/14	03/01/15-03/02/15		
Physical Chemistry					No Samples Collected					
2013	Dissolved Oxygen	mg/L	<5.0 (a)	1. Basin Plan		7.48	8.12	8.42	0%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan		7.63	7.29	7.64	0%	0.28
2007, 2013	Specific Conductivity	µmhos/cm	NA			2,677	3,433	2,117		
2007, 2013	Water Temperature	Celsius	NA			15.21	16.02	13.3		
2007, 2013	Turbidity	NTU	20	1. Basin Plan		1.7	11.4	0.2	21%	0.85
Bacteriological										
2007, 2013	Enterococcus	MPN/100 mL	NA			500	<2.0	22,000		
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2		**9,000**	13	**110,000**	32%	3.98
2007, 2013	Total Coliform	MPN/100 mL	NA			24,000	30	170,000		
Nutrients										
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)		0.059J	0.050J	<0.10	0%	0.01
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan		0.51	0.45	0.28	0%	0.05
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan		0.014J	0.020J	0.013J	0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA			0.96	0.76	0.44		
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015		0.24	NR	0.17	0%	0.14
2013	Orthophosphate	mg/L	NA			0.21	0.19	0.16		
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015		0.29	0.30	0.20	0%	0.17
General Chemistry										
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2000, 8. McNeeley (1979)		4.6	NR	2	0%	0.23
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2000		49	NR	28	4%	0.49
2007, 2013	Dissolved Organic Carbon	mg/L	NA			16	15	9.2		
2007, 2013	Total Organic Carbon	mg/L	NA			15	14	9		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015		<5.0	NR	<5.0	0%	0.16
2013	Sulfate	mg/L	250 (a)	1. Basin Plan		**320**	**350**	140	67%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan		0.1	0.15	0.094	0%	0.38
2007, 2013	Total Dissolved Solids	mg/L	500 (a)	1. Basin Plan		**1,400**	**1,900**	**810**	96%	2.79
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015 , 1. Basin Plan		34	7	6	11%	0.35
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA			651	800	349		
Total Metals										
2007	Antimony	mg/L	NA			0.00042J	NR	0.0007		
2007, 2013	Arsenic	mg/L	NA			0.0029	0.0033	0.0024		
2007, 2013	Cadmium	mg/L	NA			0.000049J	0.000065J	0.000061J		
2007, 2013	Chromium	mg/L	NA			0.001	0.00027	0.00043		
2007, 2013	Copper	mg/L	NA			0.005	0.0035	0.0034		
2013	Iron	mg/L	0.3 (a)	1. Basin Plan		**1.2**	0.27	0.23	33%	NA[1]
2007, 2013	Lead	mg/L	NA			0.00098	0.00019J	0.00018J		
2013	Mercury	mg/L	NA			0.0000040J	<0.000050	0.000012J		
2007, 2013	Nickel	mg/L	NA			0.0017	0.0048	0.0024		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38		0.00025J	0.0026	0.00078	0%	NA[1]
2013	Thallium	mg/L	NA			<0.00020	<0.00020	<0.00020		
2007, 2013	Zinc	mg/L	NA			0.021	0.0034J	0.0046J		
Dissolved Metals										
2007	Antimony	mg/L	0.006	1. Basin Plan		0.00031J	NR	0.00062	0%	0.24
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38		0.0023	0.003	0.0021	0%	0.01
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38		<0.00010	0.000044J	<0.00010	0%	0.02
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38		0.00013J	0.00015J	0.00026	0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38		0.003	0.0032	0.0026	0%	0.09
2013	Iron	mg/L	NA			0.031	0.038	0.038		
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38		<0.00020	<0.00020	<0.00020	0%	0.00
2013	Mercury	mg/L	NA			<0.000050	<0.000050	0.000013J		
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38		0.0011	0.0048	0.0018	0%	0.00
2007, 2013	Selenium	mg/L	NA			0.00022J	0.0024	0.00067		
2013	Thallium	mg/L	NA			<0.00020	<0.00020	<0.00020		
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38		0.0062	0.0022J	0.0027J	0%	0.03

Wet Weather Historical Monitoring Table for LPC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Long Term and Transitional Monitoring 2013-2014	Long Term and Transitional Monitoring 2014-2015	Long Term Monitoring Only 2014-2015	Long Term and Transitional Monitoring 2014-2015	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					-	11/01/14	11/21/14-11/22/14	03/01/15-03/02/15		
Organophosphorus Pesticides					No Samples Collected					
2013	Azinphos methyl (Guthion)	µg/L	NA			<0.010	<0.010	<0.010		
2013	Bolstar	µg/L	NA			<0.010	<0.010	<0.010		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000		<0.010	<0.010	<0.010	8%	0.45
2013	Coumaphos	µg/L	NA			<0.010	<0.010	<0.010		
2013	Demeton-o	µg/L	NA			<0.010	<0.010	<0.010BS-L		
2013	Demeton-s	µg/L	NA			<0.010	<0.010	<0.010		
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon		<0.010BS-L	<0.010	<0.010	11%	0.35
2013	Dichlorvos	µg/L	NA			<0.010	<0.010	<0.010		
2013	Dimethoate	µg/L	NA			<0.010	<0.010	<0.010		
2013	Disulfoton	µg/L	NA			<0.010	<0.010	<0.010		
2013	Ethoprop	µg/L	NA			<0.010	<0.010	<0.010		
2013	Ethyl parathion	µg/L	NA			<0.010	<0.010	<0.010		
2013	Fensulfothion	µg/L	NA			<0.010	0.0036J	0.0031J		
2013	Fenthion	µg/L	NA			<0.010	<0.010	<0.010		
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook		<0.010	<0.010	<0.010	0%	0.04
2013	Merphos	µg/L	NA			<0.010	<0.010	<0.010		
2013	Methyl parathion	µg/L	NA			<0.010	<0.010	<0.010		
2013	Mevinphos	µg/L	NA			<0.010	<0.010	<0.010		
2013	Naled	µg/L	NA			<0.010	<0.010	<0.010		
2013	Phorate	µg/L	NA			<0.010	<0.010	<0.010		
2013	Ronnel	µg/L	NA			<0.010	<0.010	<0.010		
2013	Stirophos	µg/L	NA			<0.010	<0.010	<0.010		
2013	Tokuthion (Prothiofos)	µg/L	NA			<0.010	<0.010	<0.010		
2013	Trichloronate	µg/L	NA			<0.010	<0.010	<0.010		
Pyrethroids										
2007, 2013	Allethrin	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006		0.0029	<0.002	<0.002	10%	0.40
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004		<0.002	<0.002	<0.002	0%	0.00
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004		0.0063	<0.002	<0.002	0%	0.05
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004		<0.002	<0.002	<0.002	0%	0.00
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Deltamethrin/Tralomethrin	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004		<0.002	<0.002	<0.002	0%	0.00
2007, 2013	Fenvalerate	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Fluvalinate	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006		<0.01	<0.01	<0.01	0%	0.33
2007, 2013	Prallethrin	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Resmethrin	µg/L	NA			<0.01	<0.01	<0.01		
Toxicity										
2007	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100			>100	NR	>100	0%	1.00
2007	*Ceriodaphnia* 7-day survival	NOEC (%)	100			100	NR	100	0%	1.00
2013	Ceriodaphnia 7-day survival	TST	Pass/Fail			NR	NR	Pass	0%	
2007	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100			100	NR	100	4%	1.56
2013	Ceriodaphnia 7-day reproduction	TST	Pass/Fail			NR	NR	Pass	0%	
2007	*Hyalella* 96-hr	LC_{50} (%)	>100			>100	NR	>100	0%	1.00
2007	*Selenastrum* 96-hr	NOEC (%)	100			100	NR	100	4%	1.04
2013	Selenastrum 96-hr	TST	Pass/Fail			NR	NR	Pass	0%	
2013	Pimephales 7-day survival	TST	Pass/Fail			NR	NR	Pass	0%	
2013	Pimephales 7-day biomass	TST	Pass/Fail			NR	NR	Pass	0%	
2013	Strongylocentrotus 96-hr	TST	Pass/Fail			Pass	Pass	NR	0%	

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for LPC-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.

* Indicates detection limit above water quality benchmark.
^ Indicates results should be interpreted with care due to method protocol discrepancy.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
†† Permethrin was non-detect at the method detection limit of 0.005 µg/L.
BS-L - Blank Spike recovery of this analyte was below the control limits. Results may be biased low.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.
NR - Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SDR-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data: 2009-2010** 11/28/09	2009-2010** 11/30/09	2009-2010** 02/06/10	2010-2011 -	2011-2012 10/05/11-10/06/11	2011-2012 02/07/12	2012-2013 -	Transitional Monitoring: 2013-2014 10/10/13	2013-2014 02/28/14-03/01/14	2014-2015 -	Frequency Above Benchmarks	Mean Ratio to Benchmarks
Physical Chemistry																
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.51	7.61	7.24	No Samples Collected	7.34	7.58	No Samples Collected	6.7	7.38	No Samples Collected	0%	0.33
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,750	4,580	1,431		1,388	1,523		1,832	737			
2007, 2013	Water Temperature	Celsius	NA		13.90	13.30	14.80		19.0	14.2		15.4	17.7			
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**31.2**	6.1	**25.2**		**36**	7.4		AE	AE		75%	1.25
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	NA		170,000	2,300	2,300		500,000	1,700		46,000	110,000			
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan REC-1/REC-2	**140,000**	**5,000**	**3,000**		**80,000**	**700**		**33,000**	**7,000**		100%	109.88
2007, 2013	Total Coliform	MPN/100 mL	NA		280,000	70,000	30,000		300,000	13,000		170,000	49,000			
Nutrients																
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	0.95	<0.03	0.09		0.6	<0.1		1.2	0.14		0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	1.64	0.07	0.62		1.2	<0.1		1.7	0.33		0%	0.09
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.06	0.06	<0.15		0.035J	<0.1		0.096J	0.025J		0%	0.07
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		3.58	1.282	0.922J		2.9	0.85		3.3	0.78			
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.281	0.312	0.129		0.25	0.084		0.24	0.22		0%	0.10
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.441	0.394	0.214		0.49	0.11		0.28	0.19		0%	0.14
General Chemistry																
2007, 2013	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	<2	4.5	<2		18	3.9†		17	7.5		0%	0.29
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	98.9	50.3	53		89	32		120	32		0%	0.59
2007, 2013	Dissolved Organic Carbon	mg/L	NA		29.9	12.9	9.4		14	6.6		35	8.1			
2007, 2013	Total Organic Carbon	mg/L	NA		31.8	12.7	17.1		17	7.1		39	8.3			
2007, 2013	Oil & Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	1.4J	<5	1.7J		<5	<5		2.6J	1.6J		0%	0.21
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	**0.79H**	0.129	0.107		0.36	0.094		**1.1**	0.17		33%	0.87
2007, 2013	Total Dissolved Solids	mg/L	1,500 (b)	1. Basin Plan	**1,712**	**2,646**	804B		1,100	850		1,400	1,000		17%	0.87
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	26.8	<5	30.5		44	9		34	16		0%	0.27
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		643	1,040.7	301.7		500	510		564	411			
Total Metals																
2007	Antimony	mg/L	NA		0.0017	0.0003J	0.0007		0.0022	0.00055		0.0031	0.00097			
2007, 2013	Arsenic	mg/L	NA		0.0097	0.0088	0.0038		0.0075	0.0021		0.0068	0.0023			
2007, 2013	Cadmium	mg/L	NA		<0.0004	<0.0004	<0.0004		0.00015	0.000036J		0.00016	0.000049J			
2007, 2013	Chromium	mg/L	NA		0.0009	0.0001J	0.0006		0.0023	0.00048		0.002	0.00076			
2007, 2013	Copper	mg/L	NA		0.0093	0.0013	0.1004		0.019	0.002		0.017	0.0049			
2007, 2013	Lead	mg/L	NA		0.0027	0.0003	0.0023		0.0064	0.00051		0.0045	0.0013			
2007, 2013	Nickel	mg/L	NA		0.0038	0.0028	0.0017		0.0056	0.0022		0.0061	0.0013			
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.0005	0.0005	0.0007		0.00053	0.00034J		0.00097	0.00034J		0%	0.11
2007, 2013	Zinc	mg/L	NA		0.0328	<0.0005	0.0217		0.074	0.0041J		0.076	0.017			
Dissolved Metals																
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0013	0.0003J	0.0006		0.0014	0.0005		0.0025	0.0008		0%	0.20
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0082	0.0090	0.0031		0.0053	0.0019		0.0046	0.0019		0%	0.01
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004	<0.0004	<0.0004		0.000043J	0.000023J		0.000060J	0.000025J		0%	0.01
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0004J	0.0001J	0.0002J		0.00048	0.00025		0.00082	0.00044		0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0029	0.0009	0.0026		0.0053	0.0014		0.0069	0.0028		0%	0.08
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.0004	<0.0001	0.00008J		0.00031	0.00003J		0.00043	0.00014J		0%	0.00
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0035	0.0028	0.0014		0.0043	0.002		0.0052	0.0013		0%	0.00
2007, 2013	Selenium	mg/L	NA		0.0006	0.0005	0.0006		0.00041	0.00031J		0.00083	0.00027J			
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0099	0.0017	0.0046		0.023	0.0029J		0.045	0.01		0%	0.04
Organophosphorus Pesticides																
2007, 2013	Chlorpyrifos	µg/L	0.2 (acute) / 0.014 (chronic)	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002	<0.002		<0.01	<0.01		<0.010	<0.010		0%	0.18
2007, 2013	Diazinon	µg/L	0.08 (acute) / 0.05 (chronic)	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004	<0.004		<0.01	<0.01		<0.010	<0.010		0%	0.05
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006	<0.006		0.05	<0.01		<0.010	<0.010		0%	0.03
Pyrethroids																
2007, 2013	Allethrin	µg/L	NA		<0.0005	<0.0005	0.0468B		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	**0.0133**	<0.0005	**0.0338B**		**0.0412**	0.0023		**0.016**	<0.002		67%	1.93
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	<0.0005	<0.0005	0.0151		0.0119	<0.002		0.0109	<0.002		0%	0.02
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	<0.0005	<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002		0%	0.00
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.0005	<0.0005	0.0399		<0.002	<0.002		<0.002	<0.002		0%	0.01
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.0005	<0.0005	0.0357B		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.0005	<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.0005	<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002		0%	0.00
2007, 2013	Fenvalerate	µg/L	NA		<0.0005	<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Fluvalinate	µg/L	NA		<0.0005	<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.005	<0.005	<0.005		<0.025††	**0.0529**		<0.01	<0.01		17%	0.54
2007, 2013	Prallethrin	µg/L	NA		<0.0005	<0.0005	0.0529B		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Resmethrin	µg/L	NA		<0.005	<0.005			<0.025	<0.025		<0.01	<0.01			
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100	>100		>100	>100		>100	>100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100	100		100	100		100	100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	**50**	100		100	100		100	100		14%	1.14
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100	>100		>100	>100		>100	>100		0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100	100		100	100		100	100		0%	1.00

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SDR-TWAS-1

Blank spaces have been verified and no data is available due to changes in the monitoring program.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area/subarea.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
**Because of the unique drainage characteristics of the sample location, 2 peaks were monitored for this event. For conservative purposes, an exceedance of either sample was used to calculate exceedance frequencies.
† Result was from composite sample. The grab sample was analyzed outside of the holding time.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
†† Permethrin was non-detect at the method detection limit of 0.005 µg/L.
AE-Analysis error.
B-Analyte was detected in the associated method blank.
H-Sample received and/or analyzed past the recommended holding time.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SDR-TWAS-2

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014		2014-2015		
					11/28/09	02/06/10	-	10/05/11-10/06/11	02/07/12	-	10/10/13	02/28/14-03/01/14	-		
Physical Chemistry							No Samples Collected			No Samples Collected			No Samples Collected		
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	**5.91**	7.80		6.95	7.81		7.65	7.62		17%	0.33
2007, 2013	Specific Conductivity	µmhos/cm	NA		292	122		336	1,097		920	290			
2007, 2013	Water Temperature	Celsius	NA		13.20	15.30		18.4	13.3		17	17.78			
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**145.2**	**142.8**		**67**	**31**		AE	**59.3**		100%	4.45
Bacteriological															
2007, 2013	Enterococcus	MPN/100 mL	NA		70,000	110,000		220,000	80,000		110,000	110,000			
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan REC-1/REC-2	**130,000**	**5,000**		**110,000**	**80,000**		**70,000**	**49,000**		100%	185.00
2007, 2013	Total Coliform	MPN/100 mL	NA		240,000	170,000		170,000	220,000		460,000	490,000			
Nutrients															
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	1.11	0.12		0.8	0.2		1.2	0.15		0%	0.03
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	1.55	0.74		1.9	2.1		2.1	0.58		0%	0.15
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.08	<0.15		0.049J	0.1		0.12	0.046J		0%	0.08
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		4.58	1.162		4.5	2.2		4.3	1.2			
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.337	0.12		0.15	0.095		0.25	0.16		0%	0.09
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.709	0.254		0.73	0.23		0.89	0.27		0%	0.26
General Chemistry															
2007, 2013	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	**39.4**	5.3		28	15†		**50**	6.9		33%	0.74
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	64.4	51.1		**140**	71		**140**	46		33%	0.71
2007, 2013	Dissolved Organic Carbon	mg/L	NA		22.6	7.3		14	11		32	6.8			
2007, 2013	Total Organic Carbon	mg/L	NA		25.4	8		19	14		38	7.9			
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	4.6J	2.8J		<5	<5		4.7J	2.1J		0%	0.32
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.48H	0.054		0.38	0.23		**0.85**	0.11		17%	0.70
2007, 2013	Total Dissolved Solids	mg/L	1,000 (b)	1. Basin Plan	342	304B		450	620		390	270		0%	0.40
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**233**	**209**		**250**	37		**230**	66		67%	1.71
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		131	110.9		220	290		163	109			
Total Metals															
2007	Antimony	mg/L	NA		0.0016	0.0010		0.0019	0.0016		0.0033	0.0015			
2007, 2013	Arsenic	mg/L	NA		0.0043	0.0029		0.012	0.0029		0.0059	0.0032			
2007, 2013	Cadmium	mg/L	NA		0.0003J	0.0002J		0.0005	0.00011		0.00047	0.00018			
2007, 2013	Chromium	mg/L	NA		0.0032	0.0020		0.0084	0.0019		0.0062	0.0033			
2007, 2013	Copper	mg/L	NA		0.0264	0.0158		0.042	0.013		0.038	0.015			
2007, 2013	Lead	mg/L	NA		0.0149	0.0133		0.023	0.0037		0.017	0.0074			
2007, 2013	Nickel	mg/L	NA		0.0053	0.0030		0.01	0.0039		0.01	0.0029			
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.0005	0.0009		0.00088	0.00052		0.00083	0.00028J		0%	0.12
2007, 2013	Zinc	mg/L	NA		0.1822	0.1080		0.21	0.039		0.21	0.068			
Dissolved Metals															
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0015	0.0009		0.0016	0.0013		0.0024	0.0012		0%	0.25
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0024	0.0017		0.0028	0.0022		0.0024	0.0016		0%	0.01
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004	<0.0004		0.000061J	0.000049J		0.00012	0.000026J		0%	0.02
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0009	0.0006		0.00078	0.00072		0.001	0.0007		0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0050	0.0034		0.0067	0.0078		0.0084	0.0045		0%	0.28
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.0015	0.0003		0.0006	0.00025		0.0012	0.00028		0%	0.01
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0030	0.0012		0.0042	0.0028		0.0062	0.0012		0%	0.00
2007, 2013	Selenium	mg/L	NA		0.0008	<0.0005		0.00035J	0.00056		0.00059	0.00024J			
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0322	0.0124		0.022	0.016		0.062	0.012		0%	0.15
Organophosphorus Pesticides															
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002		<0.01	<0.01		<0.010	<0.010		0%	0.18
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004		<0.01	<0.01		<0.010	<0.010		0%	0.05
2007^, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	0.0998		0.069	<0.01		<0.010	0.011		0%	0.07
Pyrethroids															
2007, 2013	Allethrin	µg/L	NA		<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	**0.084**	**0.0824B**		**0.0596**	**0.0648**		**0.0406**	**0.0151**		100%	6.21
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	0.1225	0.0876		0.0159	0.0389		0.0095	<0.002		0%	0.13
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	<0.0005	0.01		<0.002	0.0042		<0.002	<0.002		0%	0.04
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	0.0564	0.054		<0.002	0.0125		0.0082	<0.002		0%	0.03
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.0005	0.0402B		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002		0%	0.00
2007, 2013	Fenvalerate	µg/L	NA		<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Fluvalinate	µg/L	NA		<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	**0.0493**	**0.1064**		<0.025††	**0.2326**		<0.01	<0.01		50%	3.16
2007, 2013	Prallethrin	µg/L	NA		<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Resmethrin	µg/L	NA		<0.005			<0.025	<0.025		<0.01	<0.01			
Toxicity															
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100		100	100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100		100	100		100	100		0%	1.00
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		**32.2**	>100		>100	>100		**97**	>100		33%	1.36
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100		100	100		100	100		0%	1.00

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SDR-TWAS-2

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area/subarea.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
*Indicates detection limit above water quality benchmark
[†] Result was from composite sample. The grab sample was analyzed outside of the holding time.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
[††] Permethrin was non-detect at the method detection limit of 0.005 µg/L.
AE-Analysis error.
B-Analyte was detected in the associated method blank.
H-Sample received and/or analyzed past the recommended holding time.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SDR-TWAS-3

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data					Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014		2014-2015		
					11/28/09	02/06/10	- (No Samples Collected)	10/05/11-10/06/11	02/07/12-02/08/12	- (No Samples Collected)	10/10/13	02/28/14-03/01/14	- (No Samples Collected)		
Physical Chemistry															
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.81	7.40		7.25	7.81		7.83	7.73		0%	0.14
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,403	1,744		2,330	1,986		2,206	1,566			
2007, 2013	Water Temperature	Celsius	NA		11.80	15.30		19.5	12.0		17.28	15.9			
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**68.7**	**78.8**		7.1	6.2		6.7	AE		40%	1.68
Bacteriological															
2007, 2013	Enterococcus	MPN/100 mL	NA		70,000	50,000		500	230		270	7,900			
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan REC-1/REC-2	**110,000**	**17,000**		130	80		<18	**790**		50%	53.34
2007, 2013	Total Coliform	MPN/100 mL	NA		300,000	50,000		1,700	500		7,000	2,800			
Nutrients															
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	0.64	0.06		0.11	<0.1		0.34	0.1		0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	1.02	1.8		0.13	0.37		0.42	0.49		0%	0.07
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.05	<0.75		<0.1	0.015J		0.043J	0.029J		0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		2.88	0.794J		0.72	0.66		1.3	0.93			
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.332	0.129		0.057	0.052		0.23	0.2		0%	0.08
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.497	0.231		0.096	0.075		0.26	0.29		0%	0.12
General Chemistry															
2007, 2013	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	<2	3.8		2.5	3†		4.4	4		0%	0.10
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	58.4	31.5		22	18		27	32		0%	0.26
2007, 2013	Dissolved Organic Carbon	mg/L	NA		18.8	7.5		3.7	4.2		11	7			
2007, 2013	Total Organic Carbon	mg/L	NA		20.5	7.3		3.5	4.5		12	7.6			
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<5	<5		<5	1.7J		<5.0	1.6J		0%	0.22
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.059H	0.071		0.04J	0.062		**1.1**	0.074		17%	0.57
2007, 2013	Total Dissolved Solids	mg/L	1,000 (b)	1. Basin Plan	928	938B		**1,200**	1,000		**1,200**	860		33%	1.02
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	69	72.7		7	7		24	59		0%	0.40
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		410.1	459.4		700	680		568	379			
Total Metals															
2007	Antimony	mg/L	NA		0.0006	0.0005		0.00018J	0.00016J		0.00037J	0.00045J			
2007, 2013	Arsenic	mg/L	NA		0.0028	0.0018		0.0013	0.00072		0.0012	0.0014			
2007, 2013	Cadmium	mg/L	NA		<0.0004	<0.0004		0.000024J	<0.0001		0.000030J	0.000059J			
2007, 2013	Chromium	mg/L	NA		0.0012	0.0013		0.00035	0.00019J		0.00053	0.0022			
2007, 2013	Copper	mg/L	NA		0.0070	0.0055		0.001	0.00064		0.0034	0.0063			
2007, 2013	Lead	mg/L	NA		0.0036	0.0029		0.00029	0.00021		0.00068	0.0031			
2007, 2013	Nickel	mg/L	NA		0.0023	0.0019		0.0024	0.0018		0.0013	0.0017			
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0005	0.0007		0.00068	0.001		0.00046	0.00052		0%	0.13
2007, 2013	Zinc	mg/L	NA		0.0269	0.0196		0.0025J	0.0036J		0.014	0.022			
Dissolved Metals															
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0004J	0.0004J		0.00017J	0.00015J		0.00032J	0.00034J		0%	0.05
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0030	0.0011		0.0012	0.00067		0.001	0.00093		0%	0.00
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004	<0.0004		<0.0001	<0.0001		<0.00010	0.000018J		0%	0.00
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0002J	0.0003J		<0.0002	<0.0002		0.00016J	0.00033		0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0025	0.0022		0.00058	0.00043J		0.0025	0.002		0%	0.03
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.0003	<0.0001		0.000028J	0.000011J		<0.00020	0.000067J		0%	0.00
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0020	0.0013		0.0024	0.002		0.0011	0.00068J		0%	0.00
2007, 2013	Selenium	mg/L	NA		0.0013	0.0005		0.00061	0.001		0.0004	0.00047			
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0060	0.0023		0.0024J	0.0016J		0.01	0.0047J		0%	0.01
Organophosphorus Pesticides															
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002		<0.01	<0.01		<0.010	<0.010		0%	0.18
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004		<0.01	<0.01		<0.010	<0.010		0%	0.05
2007^, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006		<0.01	<0.01		<0.010	0.018		0%	0.02
Pyrethroids															
2007, 2013	Allethrin	µg/L	NA		<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	**0.0228**	**0.0395B**		<0.002	0.0011J		0.0051	<0.002		33%	1.26
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	0.0155	0.0161		<0.002	<0.002		0.0021	<0.002		0%	0.02
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002		0%	0.04
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.0005	0.0397		<0.002	<0.002		<0.002	<0.002		0%	0.01
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.0005	0.0366B		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002		0%	0.00
2007, 2013	Fenvalerate	µg/L	NA		<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Fluvalinate	µg/L	NA		<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	0.0208J	0.0155J		<0.025††	<0.025††		<0.01	<0.01		0%	0.37
2007, 2013	Prallethrin	µg/L	NA		<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002			
2007, 2013	Resmethrin	µg/L	NA		<0.005			<0.025	<0.025		<0.01	<0.01			
Toxicity															
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100		100	100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100		100	100		100	100		0%	1.00
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100		0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100		**50**	**25**		100	100		33%	1.67

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SDR-TWAS-3

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area/subarea.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
*Indicates detection limit above water quality benchmark
† Result was from composite sample. The grab sample was analyzed outside of the holding time.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
†† Permethrin was non-detect at the method detection limit of 0.005 µg/L.
AE-Analysis error.
B-Analyte was detected in the associated method blank.
H-Sample received and/or analyzed past the recommended holding time.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SDR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data											
					2001-2002			2002-2003			2003-2004			2004-2005		
					11/29/01	02/17/02	03/17/02	11/08/02	12/16/02	02/11/03	11/12/03	02/03/04	03/02/04	10/27/04	02/11/05	02/18/05
Physical Chemistry																
2013	Dissolved Oxygen	mg/L	<5.0 (a)	1. Basin Plan												
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.30	7.60	7.50	7.68	7.64	7.61	7.48	7.70	7.26	7.16	7.63	7.20
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,680	2,230	2,270	1,568	811	1,550	2,470	1,546	995	560	1,260	747
2007, 2013	Water Temperature	Celsius	NA					17.40	15.00	15.00	17.40	14.20	13.70	15.40	14.40	16.00
2013	Color	Color Units	20	1. Basin Plan												
2007, 2013	Turbidity	NTU	20	1. Basin Plan	8.6	15.3	13.1	**40.7**	**104**	**34.5**	19.9	**31.2**	**22.4**	**234**	14.5	**30.9**
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	NA		80	2,200	170	17,000	13,000	7,000	11,000	23,000	358	22,000	2,300	22,000
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	130	**30,000**	170	**110,000**	**17,000**	**5,000**	**13,000**	**2,300**	**500**	**5,000**	**800**	**1,300**
2007, 2013	Total Coliform	MPN/100 mL	NA		2,300	80,000	3,000	220,000	50,000	23,000	50,000	28,000	11,000	300,000	30,000	50,000
Nutrients																
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.9	0.7	0.2	0.34	0.13	0.19	<0.1	<0.1	1.8	0.38	0.28	0.95
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.9	0.8	0.3	0.67	0.56	0.57	0.5	0.2	0.63	0.37	0.66	1.01
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.12	0.07	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		2.7	2.9	1.7	1.6	1.2	1.5	1.4	2.8	2	2.3	<0.5	23.3
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.3	0.03	0.12	0.19	0.24	0.19	0.41	0.13	0.15	0.44	<0.05	0.32
2013	Orthophosphate	mg/L	NA													
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	1.21	0.4	0.28	0.57	1.01	0.33	0.34	0.23	0.35	0.85	0.28	0.44
General Chemistry																
2007, 2013	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	12	**58.8**	3.4	4.73	<2.0	20.7	8.44	**45.2**	2.94	4.22	3.68	3.39
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	28	**154**	54	71	48	63	83	67	52	98	**283**	56
2013	Chloride	mg/L	400 (a)	1. Basin Plan												
2007, 2013	Dissolved Organic Carbon	mg/L	NA					6.80	8.68	10.70	16.6	4.26	5.57	33.2	2.94	5.62
2007, 2013	Total Organic Carbon	mg/L	NA					18.3	39.8	12.4	16.7	11.7	11.5	62	9.61	9.6
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<1	4	<1	**10.70**	<1.00	2.39	4.83	<1	<1	<1	<1	<1
2013	Sulfate	mg/L	500 (a)	1. Basin Plan												
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	**0.6**	<0.5	<0.1	<0.1	0.2	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2007, 2013	Total Dissolved Solids	mg/L	1,500 (a)	1. Basin Plan	869	691	796	1,260	676	896	**1,540**	1,120	491	594	756	490
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	<20	24	20	43	**212**	66	34	<20	21	**477**	50	61
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		429	399	490	545	331	483	759	476	206	201	364	251
Total Metals																
2007	Antimony	mg/L	NA		<0.002	0.003	<0.002	<0.002	0.006	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Arsenic	mg/L	NA		0.003	0.002	0.005	0.005	0.008	0.004	0.005	0.006	0.003	0.006	0.006	<0.002
2007, 2013	Cadmium	mg/L	NA		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2007, 2013	Chromium	mg/L	NA		0.005	<0.005	0.007	<0.005	0.02	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	NA		0.007	0.028	0.011	0.009	0.021	0.017	0.008	0.013	0.006	0.025	0.006	0.006
2013	Iron	mg/L	1.0 (a)	1. Basin Plan												
2007, 2013	Lead	mg/L	NA		0.003	0.004	0.009	0.007	0.035	0.011	0.004	0.006	0.005	0.060	0.005	0.004
2013	Manganese	mg/L	1.0 (a)	1. Basin Plan												
2013	Mercury	mg/L	NA													
2007, 2013	Nickel	mg/L	NA		0.004	0.005	0.004	0.007	0.005	0.005	0.005	0.003	<0.002	0.006	0.003	0.002
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.002	0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2013	Thallium	mg/L	NA													
2007, 2013	Zinc	mg/L	NA		0.029	0.112	0.067	0.031	0.118	0.077	0.046	0.053	0.026	0.213	0.033	0.032
Dissolved Metals																
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	<0.002	0.002	**0.007**	0.002	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.002	<0.001	0.002	0.004	0.003	0.003	0.004	0.003	0.002	<0.002	<0.002	<0.002
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.006	0.015	<0.005	0.005	0.006	0.015	<0.005	0.005	<0.005	<0.005	<0.005	0.005
2013	Iron	mg/L	NA													
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.002	<0.002	<0.002	0.006	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
2013	Manganese	mg/L	NA													
2013	Mercury	mg/L	NA													
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.003	0.005	0.002	0.006	<0.002	0.003	0.003	0.003	<0.002	0.003	0.002	0.002
2007, 2013	Selenium	mg/L	NA		<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2013	Thallium	mg/L	NA													
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.022	0.084	<0.020	0.026	0.037	0.070	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Wet Weather Historical Monitoring Table for SDR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data 2001-2002			2002-2003			2003-2004			2004-2005		
					11/29/01	02/17/02	03/17/02	11/08/02	12/16/02	02/11/03	11/12/03	02/03/04	03/02/04	10/27/04	02/11/05	02/18/05
Organophosphorus Pesticides																
2013	Azinphos methyl (Guthion)	µg/L	NA													
2013	Bolstar	µg/L	NA													
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.03*	<0.03*	**0.03**	0.0133	**0.0264**	**0.0227**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2013	Coumaphos	µg/L	NA													
2013	Demeton-o	µg/L	NA													
2013	Demeton-s	µg/L	NA													
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	**0.21**	**0.10**	0.08	0.051	0.051	0.038	<0.01	<0.01	<0.01	<0.01	0.038	<0.01
2013	Dichlorvos	µg/L	NA													
2013	Dimethoate	µg/L	NA													
2013	Disulfoton	µg/L	NA													
2013	Ethoprop	µg/L	NA													
2013	Ethyl parathion	µg/L	NA													
2013	Fensulfothion	µg/L	NA													
2013	Fenthion	µg/L	NA													
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook				<0.10	<0.10	<0.10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2013	Merphos	µg/L	NA													
2013	Methyl parathion	µg/L	NA													
2013	Mevinphos	µg/L	NA													
2013	Naled	µg/L	NA													
2013	Phorate	µg/L	NA													
2013	Ronnel	µg/L	NA													
2013	Stirophos	µg/L	NA													
2013	Tokuthion (Prothiofos)	µg/L	NA													
2013	Trichloronate	µg/L	NA													
Pyrethroids																
2007, 2013	Allethrin	µg/L	NA													
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006												
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004												
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004												
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004												
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA													
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA													
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004												
2007, 2013	Fenvalerate	µg/L	NA													
2007, 2013	Fluvalinate	µg/L	NA													
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006												
2007, 2013	Prallethrin	µg/L	NA													
2007, 2013	Resmethrin	µg/L	NA													
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100	100	100	100	100	100	100	100	100	100	100
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100	100	100	100	100	100	100	100	100	100	100
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	**25**	100	100	100	100	100	100	100	100	100	100
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail													

See last page for | See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SDR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data													
					2005-2006			2006-2007			2007-2008	2008-2009	2009-2010		2010-2011	2011-2012		2012-2013
					10/18/05	02/19/06	03/11/06	10/14/06	01/30/07	02/19/07	-	11/04/08	11/28/09	02/06/10	-	10/05/11-10/06/11	02/07/12-02/08/12	-
Physical Chemistry																		
2013	Dissolved Oxygen	mg/L	<5.0 (a)	1. Basin Plan							No Sampled Collected				No Sampled Collected			No Sampled Collected
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.79	8.07	7.74	8.32	7.67	6.95		7.80	8.07	7.30		7.56	7.24	
2007, 2013	Specific Conductivity	µmhos/cm	NA		2,870	2,490	1,262	1,499	2,830	994		2,860	3,160	1,512		1,735	1,633	
2007, 2013	Water Temperature	Celsius	NA		19.00	14.60	13.40	18.80	11.20	14.10		20.40	13.70	15.00		19.6	15.0	
2013	Color	Color Units	20	1. Basin Plan														
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**27.3**	**34.8**	**32.3**	**58.1**	**24.5**	**59.6**		16.8	19.5	**28.7**		**27**	13	
Bacteriological																		
2007, 2013	Enterococcus	MPN/100 mL	NA		50,000	3,000	5,000	17,000	2,300	9,000		30,000	30,000	8,000		110,000	2,300	
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	**70,000**	**3,000**	**800**	**5,000**	**8,000**	**5,000**		**50,000**	**8,000**	**800**		**11,000**	**8,000**	
2007, 2013	Total Coliform	MPN/100 mL	NA		1,100,000	50,000	30,000	30,000	14,000	23,000		110,000	300,000	17,000		230,000	80,000	
Nutrients																		
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.19	0.31	<0.1	0.54	0.51	1.04		0.17	0.28	0.06		0.18	<0.1	
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.63	0.25	0.29	0.9	<0.05	0.1		0.46	0.65	0.54		0.36	0.16	
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05		0.04J	0.05	0.03J		0.014J	0.025J	
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1.6	4.3	1.5	2.2	1.7	3.1		2.2	2.3	0.714J		1.6	0.92	
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.24	0.37	0.11	0.29	0.07	0.1		0.14	0.097	0.146		0.24	0.076	
2013	Orthophosphate	mg/L	NA															
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.5	0.45	0.52	0.51	0.09	0.33		0.25	0.234	0.225		0.44	0.12	
General Chemistry																		
2007, 2013	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	8.24	2.21	5.17	15.6	14.8	5.51		10	**75.2**	2.4		9.4	4.3[†]	
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	62	65	74	112	59	52		60	58.4	53		56	39	
2013	Chloride	mg/L	400 (a)	1. Basin Plan														
2007, 2013	Dissolved Organic Carbon	mg/L	NA		9.41	12.8	5.59	66	13	9.03		12.4	17.9	9.1		9.7	7	
2007, 2013	Total Organic Carbon	mg/L	NA		22.4	14.1	8.57	69.4	16	9.85		14	19.8	8.5		10	8.1	
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<1	<1	<1	<5	<5	<5		<5	4.1J	2.6J		<5	<5	
2013	Sulfate	mg/L	500 (a)	1. Basin Plan														
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		0.29	**0.68H**	0.127		0.089	0.14	
2007, 2013	Total Dissolved Solids	mg/L	1,500 (a)	1. Basin Plan	1,490	1,370	655	1,200	1,350	642		**1,800**	**1,880**	628B		**1,600**	920	
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	31	42	48	**111**	34	**124**		19.3	23.8	31.1		58	12	
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		706	751	366	657	713	305		645.1	797.6	273.9		670	550	
Total Metals																		
2007	Antimony	mg/L	NA		<0.005	<0.005	<0.005	0.003	0.003	0.004		0.0019	0.0019	0.0012		0.002	0.001	
2007, 2013	Arsenic	mg/L	NA		0.008	0.005	0.006	0.015	<0.001	0.004		0.0071	0.0109	0.0044		0.0076	0.0024	
2007, 2013	Cadmium	mg/L	NA		<0.001	<0.001	0.012	0.003	<0.001	<0.001		<0.0004	<0.0004	<0.0004		0.00013	0.000048J	
2007, 2013	Chromium	mg/L	NA		<0.005	<0.005	<0.005	<0.005	<0.005	0.006		0.0008	0.0008	0.0008		0.0027	0.00078	
2007, 2013	Copper	mg/L	NA		0.01	0.008	0.008	0.02	0.009	0.029		0.0082	0.0082	0.006		0.015	0.0054	
2013	Iron	mg/L	1.0 (a)	1. Basin Plan														
2007, 2013	Lead	mg/L	NA		0.004	0.006	0.007	0.016	0.004	0.024		0.0026	0.00246	0.00482		0.0087	0.0016	
2013	Manganese	mg/L	1.0 (a)	1. Basin Plan														
2013	Mercury	mg/L	NA															
2007, 2013	Nickel	mg/L	NA		0.007	0.005	0.003	0.006	0.003	0.007		0.0035	0.0058	0.002		0.0058	0.0029	
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.005	<0.005	<0.005	<0.004	0.004	<0.004		0.0018	0.002	0.0015		0.0012	0.0011	
2013	Thallium	mg/L	NA															
2007, 2013	Zinc	mg/L	NA		0.075	0.045	0.068	0.113	0.045	0.149		0.036	0.0311	0.0247		0.062	0.015	
Dissolved Metals																		
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.005	<0.005	<0.005	<0.002	<0.002	0.002		0.0017	0.0016	0.0011		0.0012	0.00077	
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.003	<0.001	<0.001	0.003	<0.001	<0.001		0.0058	0.0089	0.0039		0.0048	0.0019	
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.0004	<0.0004	<0.0004		0.000029J	0.000027J	
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		0.0003J	0.0003J	0.0004J		0.00037	0.00039	
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.005	<0.005	<0.005	0.003	0.005	0.003		0.0032	0.0034	0.0036		0.0032	0.0035	
2013	Iron	mg/L	NA															
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001		0.0001J	0.00017	0.00014		0.00017J	0.000065J	
2013	Manganese	mg/L	NA															
2013	Mercury	mg/L	NA															
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.003	0.004	0.002	0.004	<0.002	0.002		0.003	0.0051	0.0019		0.0041	0.0025	
2007, 2013	Selenium	mg/L	NA		<0.005	<0.005	<0.005	<0.004	<0.004	<0.004		0.0018	0.002	0.0014		0.0011	0.00087	
2013	Thallium	mg/L	NA															
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.053	0.026	0.035	<0.02	<0.02	<0.02		0.0161	0.0128	0.0099		0.013	0.0083	

Wet Weather Historical Monitoring Table for SDR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data													
					2005-2006			2006-2007			2007-2008	2008-2009	2009-2010		2010-2011	2011-2012		2012-2013
					10/18/05	02/19/06	03/11/06	10/14/06	01/30/07	02/19/07	-	11/04/08	11/28/09	02/06/10	-	10/05/11-10/06/11	02/07/12-02/08/12	-
Organophosphorus Pesticides																		
2013	Azinphos methyl (Guthion)	µg/L	NA															
2013	Bolstar	µg/L	NA															
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.01	<0.02	<0.02	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002		<0.01	<0.01	
2013	Coumaphos	µg/L	NA															
2013	Demeton-o	µg/L	NA															
2013	Demeton-s	µg/L	NA															
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.01	<0.02	<0.02	<0.004	<0.004	<0.004		<0.004	<0.004	<0.004		<0.01	<0.01	
2013	Dichlorvos	µg/L	NA															
2013	Dimethoate	µg/L	NA															
2013	Disulfoton	µg/L	NA															
2013	Ethoprop	µg/L	NA															
2013	Ethyl parathion	µg/L	NA															
2013	Fensulfothion	µg/L	NA															
2013	Fenthion	µg/L	NA															
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.01	<0.02	<0.02	0.095	<0.006	<0.006		0.048	<0.006	<0.006		<0.01	<0.01	
2013	Merphos	µg/L	NA															
2013	Methyl parathion	µg/L	NA															
2013	Mevinphos	µg/L	NA															
2013	Naled	µg/L	NA															
2013	Phorate	µg/L	NA															
2013	Ronnel	µg/L	NA															
2013	Stirophos	µg/L	NA									No Sampled Collected				No Sampled Collected			No Sampled Collected
2013	Tokuthion (Prothiofos)	µg/L	NA															
2013	Trichloronate	µg/L	NA															
Pyrethroids																		
2007, 2013	Allethrin	µg/L	NA									<0.002	<0.0005	<0.0005B		<0.002	<0.002	
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006								<0.002	<0.0005	**0.0321B**		**0.0222**	0.0089	
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004								0.0146	<0.0005	<0.0005		0.0093	0.0074	
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004								<0.002	<0.0005	0.0255		<0.002	<0.002	
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004								<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA									<0.002	<0.0005	0.001J		<0.002	<0.002	
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA									<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004								<0.002	<0.0005	0.0008J		<0.002	<0.002	
2007, 2013	Fenvalerate	µg/L	NA									<0.002	<0.0005	0.0066B		<0.002	<0.002	
2007, 2013	Fluvalinate	µg/L	NA									<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006								<0.025*	<0.005	<0.005		<0.025[††]	**0.1116**	
2007, 2013	Prallethrin	µg/L	NA									<0.002	<0.0005	<0.0005B		<0.002	<0.002	
2007, 2013	Resmethrin	µg/L	NA									<0.025	<0.005			<0.025	<0.025	
Toxicity																		
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100		>100	>100	>100		>100	>100	
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100	100	100	100	100		100	100	100		100	100	
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**50**	100	100	100	100	100		100	100	100		100	100	
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100		>100	>100	>100		>100	>100	
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100	100	100	100	100		100	**50**	100		100	100	
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail															

See last page for f See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SDR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2013-2014			2014-2015		
					10/10/13	11/22/13	02/28/14-03/01/14	-		
Physical Chemistry										
2013	Dissolved Oxygen	mg/L	<5.0 (a)	1. Basin Plan	9.49	**2.86**	**2.7**	No Sampled Collected	67%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.82	7.19	7.12		10%	0.39
2007, 2013	Specific Conductivity	µmhos/cm	NA		3,167	1,923	2,255			
2007, 2013	Water Temperature	Celsius	NA		19.29	16.1	17.12			
2013	Color	Color Units	20	1. Basin Plan	†	**40**	**30**			
2007, 2013	Turbidity	NTU	20	1. Basin Plan	8.5	13	12.1		58%	1.82
Bacteriological										
2007, 2013	Enterococcus	MPN/100 mL	NA		4,900	70,000	14,000			
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	**2,200**	**22,000**	**3,300**		92%	36.76
2007, 2013	Total Coliform	MPN/100 mL	NA		33,000	330,000	330,000			
Nutrients										
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.22	<0.10	0.11		0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.38	0.34	0.34		0%	0.05
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.1	0.027J	0.025J		0%	0.03
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.93	1.1	0.74			
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.11	NR	0.11		0%	0.09
2013	Orthophosphate	mg/L	NA		0.045	0.069	0.099			
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.11	0.15	0.21		0%	0.20
General Chemistry										
2007, 2013	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	2.7	NR	4.5		12%	0.44
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	42	NR	45		8%	0.61
2013	Chloride	mg/L	400 (a)	1. Basin Plan	**780**	**520**	**420**		100%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		14	11	7.7			
2007, 2013	Total Organic Carbon	mg/L	NA		15	12	8.1			
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<5.0	NR	<5.0		4%	0.22
2013	Sulfate	mg/L	500 (a)	1. Basin Plan	300	200	210		0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.19	0.16	0.17		8%	0.48
2007, 2013	Total Dissolved Solids	mg/L	1,500 (a)	1. Basin Plan	**1,800**	1,400	1,200		19%	0.72
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	8	20	40		15%	0.63
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		745	594	472			
Total Metals										
2007	Antimony	mg/L	NA		0.0014	NR	0.0013			
2007, 2013	Arsenic	mg/L	NA		0.0037	0.0029	0.003			
2007, 2013	Cadmium	mg/L	NA		0.000070J	0.000050J	0.000059J			
2007, 2013	Chromium	mg/L	NA		0.00081	0.0012	0.0012			
2007, 2013	Copper	mg/L	NA		0.0063	0.01	0.0077			
2013	Iron	mg/L	1.0 (a)	1. Basin Plan	0.34	0.72	0.76		0%	NA[1]
2007, 2013	Lead	mg/L	NA		0.0011	0.0021	0.0031			
2013	Manganese	mg/L	1.0 (a)	1. Basin Plan	0.18	0.48	0.32		0%	NA[1]
2013	Mercury	mg/L	NA		<0.000050	NR	0.000023J			
2007, 2013	Nickel	mg/L	NA		0.0031	0.002	0.0019			
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0015	0.0009	0.00079		0%	0.39
2013	Thallium	mg/L	NA		<0.00020	<0.00020	<0.00020			
2007, 2013	Zinc	mg/L	NA		0.036	0.038	0.029			
Dissolved Metals										
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0012	NR	0.0011		4%	0.33
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0032	0.0023	0.0022		0%	0.01
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	0.000050J	0.000020J	0.000021J		0%	0.02
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.00028	0.00032	0.00024		0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0049	0.0051	0.003		0%	0.10
2013	Iron	mg/L	NA		0.0055J	0.0090J	0.046			
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.00020	<0.00020	0.00023		0%	0.00
2013	Manganese	mg/L	NA		0.002	0.00099	0.1			
2013	Mercury	mg/L	NA		<0.000050	NR	0.000020J			
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0029	0.0016	0.0013		0%	0.00
2007, 2013	Selenium	mg/L	NA		0.0014	0.00085	0.0006			
2013	Thallium	mg/L	NA		<0.00020	0.000040J	<0.00020			
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.025	0.0096	0.012		0%	0.06

Wet Weather Historical Monitoring Table for SDR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2013-2014			2014-2015		
					10/10/13	11/22/13	02/28/14-03/01/14	-		
Organophosphorus Pesticides								No Sampled Collected		
2013	Azinphos methyl (Guthion)	µg/L	NA		<0.010BS-L	AE	<0.010			
2013	Bolstar	µg/L	NA		<0.010	AE	<0.010			
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.010	AE	<0.010		13%	0.38
2013	Coumaphos	µg/L	NA		<0.010	AE	<0.010			
2013	Demeton-o	µg/L	NA		<0.010	AE	<0.010			
2013	Demeton-s	µg/L	NA		<0.010	AE	<0.010			
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.010	AE	<0.010		8%	0.33
2013	Dichlorvos	µg/L	NA		<0.010	AE	<0.010			
2013	Dimethoate	µg/L	NA		<0.010	AE	<0.010			
2013	Disulfoton	µg/L	NA		<0.010	AE	<0.010			
2013	Ethoprop	µg/L	NA		<0.010	AE	<0.010			
2013	Ethyl parathion	µg/L	NA		<0.010	AE	<0.010			
2013	Fensulfothion	µg/L	NA		<0.010	AE	<0.010			
2013	Fenthion	µg/L	NA		<0.010	AE	<0.010			
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.010	AE	<0.010		0%	0.04
2013	Merphos	µg/L	NA		<0.010	AE	<0.010			
2013	Methyl parathion	µg/L	NA		<0.010	AE	<0.010			
2013	Mevinphos	µg/L	NA		<0.010	AE	<0.010			
2013	Naled	µg/L	NA		<0.010	AE	<0.010			
2013	Phorate	µg/L	NA		<0.010	AE	<0.010			
2013	Ronnel	µg/L	NA		<0.010	AE	<0.010			
2013	Stirophos	µg/L	NA		<0.010BS-L	AE	<0.010			
2013	Tokuthion (Prothiofos)	µg/L	NA		<0.010	AE	<0.010			
2013	Trichloronate	µg/L	NA		<0.010	AE	<0.010			
Pyrethroids										
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	0.0028	0.0088	0.0045		25%	1.08
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	<0.002	<0.002	<0.002		0%	0.01
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	<0.002	<0.002	<0.002		0%	0.06
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.002	<0.002	<0.002		0%	0.00
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	<0.002	<0.002		0%	0.00
2007, 2013	Fenvalerate	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Fluvalinate	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.01	<0.01	<0.01		13%	0.86
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Resmethrin	µg/L	NA		<0.01	<0.01	<0.01			
Toxicity										
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	NR	>100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	NR	100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	NR	100		4%	1.04
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	NR	>100		0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	NR	100		8%	1.16
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail		**Fail**	**Fail**	Pass		67%	

See last page for | See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SDR-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area/subarea.
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
† Result was from composite sample. The grab sample was analyzed outside of the holding time.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
†† Permethrin was non-detect at the method detection limit of 0.005 µg/L.
AE-Analysis error.
B-Analyte was detected in the associated method blank.
BS-L-Blank Spike recovery of this analyte was below the control limits. Results may be biased low.
H-Sample received and or/analyzed past the recommended holding time.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.
NR-Not required.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SDC-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data									Transitional Monitoring			Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015			
					11/30/07	02/03/08	-	-	10/6/10	02/16/11	-	10/11/12-10/12/12	02/08/13-02/09/13	-	11/01/14	03/01/15		
Physical Chemistry							No Samples Collected	No Samples Collected			No Samples Collected			No Samples Collected				
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.77	7.88			7.78	8.07		7.72	8		8.02	7.76	0%	0.11
2007, 2013	Specific Conductivity	µmhos/cm	NA		387	199.9			2,630	1,991		1,582	1,761		818	1,162		
2007, 2013	Water Temperature	Celsius	NA		17.90	11.90			20.90	14.50		20.1	13.6		17.3	16.15		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**292**	**43**			5.3	3		13	6.3		**33.4**	8.6	38%	2.53
Bacteriological																		
2007, 2013	Enterococcus	MPN/100 mL	NA		3,000	230			11,000	1,700		300,000	800		900	7,000		
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan REC-1/REC-2	**3,000**	20			**28,000**	**8,000**		**130,000**	230		**50,000**	**14,000**	75%	72.89
2007, 2013	Total Coliform	MPN/100 mL	NA		17,000	500			300,000	30,000		500,000	17,000		160,000	14,000		
Nutrients																		
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	0.68	0.12			0.14	0.29		0.29	0.12		0.27	0.12	0%	0.03
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.9	0.57			0.15	1.1		0.65	0.38		1.5	0.26	0%	0.07
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.08	0.03J			0.045J	0.068J		0.2	0.035J		0.041J	0.028J	0%	0.07
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		3.4	0.98			1.1	1.2		2.8	0.91		3	0.65		
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.44	0.28			0.14	0.12		0.17	0.14		0.35	0.12	0%	0.11
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	1.1	0.36			0.15	0.14		0.38	0.16		0.49	0.18	0%	0.18
General Chemistry																		
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	14	2.6			2.1	5.2		**36**	6		12	6.8	13%	0.35
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	49	24			40	29		88	29		93	25	0%	0.39
2007, 2013	Dissolved Organic Carbon	mg/L	NA		12.9	6.3			12	9.1		20	6.5		21	6.8		
2007, 2013	Total Organic Carbon	mg/L	NA		13.6	6.3			12	10		21	7.3		23	6.7		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	2.8J	1.7J			<5	<5		<5	<5		<5.0	2.7J	0%	0.25
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.14	0.075			0.16	0.18		0.13	0.12		0.13	0.11	0%	0.26
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	378	**704**			**1,700**	**1,400**		**1,200**	**960**		500	**580**	75%	1.86
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**730**	80			16	11		86	7		72	15	13%	1.27
2007, 2013	Hardness	mg $CaCO_3$/L	NA		121	183.3			740	680		581	444		232	292		
Total Metals																		
2007	Antimony	mg/L	NA		0.0011	0.0006			0.00044J	0.00072		0.00083	0.00071		0.0013	0.00065		
2007, 2013	Arsenic	mg/L	NA		0.0035	0.0023			0.0022	0.0019		0.0028	0.0016		0.0019	0.0015		
2007, 2013	Cadmium	mg/L	NA		<0.0004	<0.0004			0.000025J	0.000037J		0.0001	0.000053J		0.00012	<0.00010		
2007, 2013	Chromium	mg/L	NA		0.0048	0.0010			0.00052	0.0011		0.0016	0.00049		0.005	0.00068		
2007, 2013	Copper	mg/L	NA		0.0230	0.0066			0.0022	0.0074		0.0092	0.0043		0.019	0.0038		
2007, 2013	Lead	mg/L	NA		0.0102	0.0015			0.00035	0.0005		0.0015	0.00035		0.0034	0.00042		
2007, 2013	Nickel	mg/L	NA		0.0063	0.0015			0.0034	0.0052		0.0042	0.0034		0.0058	0.0024		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0005	0.0008			0.00077	0.0011		0.00069	0.0012		0.00088	0.00081	0%	0.17
2007, 2013	Zinc	mg/L	NA	1. Basin Plan	0.1252	0.0241			0.0078	0.012		0.047	0.01		0.17	0.012		
Dissolved Metals																		
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0011	0.0005			0.00045J	0.00065		0.00067	0.0006		0.00064	0.00051	0%	0.11
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0023	0.0023			0.0019	0.0018		0.0024	0.0014		0.0014	0.0012	0%	0.01
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000019J	0.000022J		0.00005J	0.000033J		0.000036J	<0.00010	0%	0.01
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0005	0.0005			0.00016J	0.00036		0.0003	0.00024		0.00047	0.00027	0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0042	0.0035			0.0014	0.0056		0.004	0.0029		0.0055	0.0023	0%	0.12
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.0003	<0.0001			0.000031J	0.000018J		0.00008J	0.000047J		0.00029	<0.00020	0%	0.00
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0015	0.0010			0.003	0.0046		0.0031	0.0032		0.0027	0.0016	0%	0.00
2007, 2013	Selenium	mg/L	NA		0.0005	0.0008			0.00078	0.0012		0.00081	0.0011		0.00073	0.00057		
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0118	0.0056			0.0037J	0.006		0.017	0.0063		0.075	0.0053	0%	0.07
Organophosphorus Pesticides																		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	**0.25**	**0.025**			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	25%	1.91
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	0.025	0.006			<0.01	0.0084J		<0.01	<0.01		<0.010BS-L	<0.010	0%	0.10
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	0.244	0.002			<0.01	0.019		0.023	<0.01		0.058	<0.010	0%	0.10
Pyrethroids																		
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002			<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	**0.0329**	**0.026**			<0.002	<0.002		**0.0343**	**0.0208**		**0.0474**	<0.002	63%	2.21
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	0.006	0.003			<0.002	<0.002		0.0088	0.0093		0.0327	<0.002	0%	0.02
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	0.007	<0.002			<0.002	<0.002		0.0011J	<0.002		0.0017J	<0.002	0%	0.04
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.002	<0.002			<0.002	<0.002		<0.002	<0.002		0.0068	<0.002	0%	0.00
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.002	<0.002				<0.002		0.0007J	<0.002		<0.002	<0.002		
2007, 2013	Deltamethrin/Tralomethrin	µg/L	NA		<0.002	<0.002			<0.002	<0.002		<0.002	<0.002		0.014	<0.002		
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	0.001J	<0.002			<0.002	<0.002		0.0006J	<0.002		<0.002	<0.002	0%	0.00
2007, 2013	Fenvalerate	µg/L			0.0016J	<0.002			<0.002	<0.002		0.0006J	<0.002		<0.002	<0.002		
2007, 2013	Fluvalinate	µg/L			0.0006J	<0.002				<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.025*	<0.025*			<0.005	<0.025*		<0.025††	<0.01		<0.01	<0.01	0%	0.31
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002			<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Resmethrin	µg/L				<0.025						<0.025	<0.01		<0.01	<0.01		
Toxicity																		
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		**70.37**	>100			>100	>100		>100	>100		>100	>100	13%	1.05
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SDC-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
[††] Permethrin was non-detect at the method detection limit of 0.005 µg/L.
BS-L Blank Spike recovery of this analyte was below the control limits. Results may be biased low.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SDC-TWAS-2

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data								Transitional Monitoring		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013	2013-2014	2014-2015		
					11/30/07-12/01/07	02/03/08	-	-	02/01/11	02/17/11-02/18/11	-	-	-	-		
Physical Chemistry																
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	**9.64**	8.80	No Samples Collected	No Samples Collected	7.93	7.69	No Samples Collected	No Samples Collected	No Samples Collected	No Samples Collected	25%	NA[1]
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,382	811			1936	2440						
2007, 2013	Water Temperature	Celsius	NA		14.50	11.10			12.00	11.40						
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**8,338**	**164**			5.6	4.9					50%	NA[1]
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	NA		170,000	17,000			1,400	500						
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1. Basin Plan REC-1/REC-2	**220,000**	**13,000**			300	80					50%	NA[1]
2007, 2013	Total Coliform	MPN/100 mL	NA		9,000,000	17,000			7,000	8,000						
Nutrients																
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	**8.3**	0.71			0.077J	0.15					25%	NA[1]
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	3.6	0.93			1.2	0.5					0%	NA[1]
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	**1.1**	0.03J			0.013J	0.033J					25%	NA[1]
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		23	17			1.2	0.84						
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.83	0.67			0.17	0.1					0%	NA[1]
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	**13**	**4**			0.17	0.14					50%	NA[1]
General Chemistry																
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	**110**	**64.4**			3.1	1.3J					50%	NA[1]
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	70	**140**			40	32					25%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		58	11.8			11	10						
2007, 2013	Total Organic Carbon	mg/L	NA		90.7	18.4			11	10						
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	1.8J	5.4			<5	<5					0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	**8.25**	0.28			0.062	0.048J					25%	NA[1]
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	**1,304**	394			**1,400**	**1,500**					75%	NA[1]
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**7,100**	**2,030**			14	9					50%	NA[1]
2007, 2013	Hardness	mg $CaCO_3$/L	NA		255.8	106.9			620	740						
Total Metals																
2007	Antimony	mg/L	NA		0.0004J	0.0002J			0.00014J	0.00013J						
2007, 2013	Arsenic	mg/L	NA		0.0112	0.0042			0.00088	0.00092						
2007, 2013	Cadmium	mg/L	NA		0.0046	0.0007			0.000037J	0.000038J						
2007, 2013	Chromium	mg/L	NA		0.0377	0.0046			0.0004	0.00084						
2007, 2013	Copper	mg/L	NA		0.1289	0.0304			0.0019	0.0022						
2007, 2013	Lead	mg/L	NA		0.3442	0.0744			0.00025	0.00061						
2007, 2013	Nickel	mg/L	NA		0.0669	0.0104			0.0025	0.0038						
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0030	0.0004J			0.00032J	0.00046					0%	NA[1]
2007, 2013	Zinc	mg/L	NA		0.5719	0.1323			0.0025J	0.0034J						
Dissolved Metals																
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0019	0.0003J			0.00013J	0.00012J					0%	NA[1]
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0023	0.0013			0.00074	0.00073					0%	NA[1]
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000032J	0.00003J					0%	NA[1]
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0002J	0.0001J			0.00011J	0.00011J					0%	NA[1]
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0050	0.0021			0.0015	0.0019					0%	NA[1]
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.0001	<0.0001			<0.0002	0.000045J					0%	NA[1]
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0028	0.0005			0.0024	0.0036					0%	NA[1]
2007, 2013	Selenium	mg/L	NA		0.0014	0.0003J			0.00039J	0.0003J						
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0028	0.0007			0.0022J	0.0019J					0%	NA[1]
Organophosphorus Pesticides																
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002			<0.01	<0.01					0%	NA[1]
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004			<0.01	<0.01					0%	NA[1]
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			<0.01	<0.01					0%	NA[1]
Pyrethroids																
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002			<0.002	<0.002						NA[1]
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	<0.002	<0.002			<0.002	<0.002					0%	NA[1]
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	<0.002	<0.002			<0.002	<0.002					0%	NA[1]
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	<0.002	0.005			<0.002	<0.002					0%	NA[1]
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.002	<0.002			<0.002	<0.002					0%	NA[1]
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.002	<0.002			<0.002	<0.002						
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.002	<0.002			<0.002	<0.002						
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	<0.002			<0.002	<0.002					0%	NA[1]
2007, 2013	Fenvalerate	µg/L	NA		<0.002	<0.002			<0.002	<0.002						
2007, 2013	Fluvalinate	µg/L	NA		<0.002	<0.002			<0.002	<0.002						
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.025*	<0.025*			<0.025*	<0.025*					0%	NA[1]
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002			<0.002	<0.002						
2007, 2013	Resmethrin	µg/L	NA			<0.025										
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100					0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			>100	100					0%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		12.5**	100			>100	100					0%	NA[1]
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100					0%	NA[1]
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100			100	100					0%	NA[1]

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SDC-TWAS-2

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
**For SDC-TWAS-2 on 11/30/07-12/1/07, the *C. dubia* 7-day reproduction endpoint test was inconclusive due to the high particulate content from fire related impacts to this portion of the watershed.
The sample required dilution to a 12.5% solution to run the test and no toxicity was observed in this diluted sample. No inference can be made to the 100% solution.
* Indicates detection limit above water quality benchmark.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Tables for SDC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data														
					2001-2002			2002-2003			2003-2004			2004-2005			2005-2006		
					11/29/01	01/29/02	02/17/02	02/11/03	02/25/03	03/15/03	02/03/04	02/18/04	03/02/04	10/17/04	02/11/05	02/18/05	10/18/05	01/02/06	02/20/06
Physical Chemistry																			
2013	Dissolved Oxygen	mg/L	<6.0 (a)	1. Basin Plan															
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.6	7.5	7.5	7.83	7.56	7.64	8.00	**5.22**	7.21	7.82	7.70	6.84	7.17	8.45	6.60
2007, 2013	Specific Conductivity	µmhos/cm	NA		3,090	3,340	3,480	277	2,700	257	3,700	3,660	1,990	3,210	3,380	1,744	3,790	4,250	3,710
2007, 2013	Water Temperature	Celsius	NA					15.00	14.30	13.70	13.40	12.80	13.50	19.90	13.10	14.40	17.90	15.30	11.90
2013	Color	Color Units	20	1. Basin Plan															
2007, 2013	Turbidity	NTU	20	1. Basin Plan	17.6	3.69	3.12	4.72	17.5	17.7	**30.6**	19.3	**29.7**	6.77	6.01	18.3	3.02	7.89	**39.2**
Bacteriological																			
2007, 2013	Enterococcus	MPN/100 mL	NA		3,000	300	500	17,000	5,000	1,700	7,000	1,300	30,000	140,000	130	1,300	8,000	5,000	230
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	230	80	22	**5,000**	300	**700**	230	**1300**	**8,000**	**14,000**	230	**500**	**1,300**	**1,300**	230
2007, 2013	Total Coliform	MPN/100 mL	NA		230	1,300	170	50,000	3,000	13,000	500	3,000	130,000	300,000	800	3,000	2,300	3,000	500
Nutrients																			
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.2	0.13	<0.1	0.52	0.20	0.13	<0.1	0.17	1.7	<0.1	0.17	0.16	0.12	<0.1	0.39
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.1	0.2	0.2	0.06	0.40	0.27	0.05	0.13	1.01	0.16	1.67	1.81	0.18	0.07	0.45
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		2.4	1.35	1.4	0.8	1.4	0.9	0.8	2.8	1.8	1.4	1.6	2	2.9	1.9	4.1
2007, 2013	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.1	0.05	<0.05	0.11	0.08	<0.05	<0.05	0.2	0.19	0.16	0.13	0.12	0.4	0.09	0.2
2013	Orthophosphate	mg/L	NA																
2007	Total Phosphorus	mg/L	2	4. MSGP 2015	0.1	0.07	0.08	0.14	0.08	0.12	0.12	0.2	0.3	0.19	0.14	0.45	0.52	0.16	0.3
General Chemistry																			
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	14	3	2.1	15.9	2.51	3.89	**44.7**	7.46	4.37	21.8	3.33	<2	4.39	4.16	<2
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	34	61	60	51	41	82	**138**	57	81	<25	**123**	41	38	41	104
2013	Chloride	mg/L	250 (a)	1. Basin Plan															
2007, 2013	Dissolved Organic Carbon	mg/L	NA					7.98	10.4	7.67	5.74	61	9.19	35.9	5.42	5.21	5.53	14	9.66
2007, 2013	Total Organic Carbon	mg/L	NA					9.68	8.59	11.0	9.85	83.8	11.2	36.3	9.54	10.9	13.7	3.83	13.6
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<1	<1	<1	<1	<1	1.38	<1	<1	<1	<1	<1	<1	<1	<1	<1
2013	Sulfate	mg/L	250 (a)	1. Basin Plan															
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	<0.1	0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2007, 2013	Total Dissolved Solids	mg/L	500 (a)	1. Basin Plan	**1,750**	**1,940**	**2,080**	**1,900**	**1,440**	**1,490**	**2,220**	**2,580**	**1,350**	**2,100**	**1,630**	**982**	**2,020**	**2,090**	**1,950**
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	31	<20	<20	10	23	34	<20	44	**101**	28	24	28	<20	26	**174**
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		840	970	1,080	1,030	726	767	935	999	564	967	767	487	1,030	1,090	1,080
Total Metals																			
2013	Aluminum	mg/L	NA																
2007	Antimony	mg/L	NA		<0.002	<0.002	<0.002	0.002	0.003	<0.002	<0.005	<0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Arsenic	mg/L	NA		0.001	0.002	0.003	0.002	0.003	0.003	0.007	0.006	0.004	0.006	0.007	<0.002	0.009	0.005	0.005
2007, 2013	Cadmium	mg/L	NA		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.003
2007, 2013	Chromium	mg/L	NA		0.005	0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	NA		<0.005	<0.005	<0.005	0.014	0.004	<0.005	0.012	0.006	0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2013	Iron	mg/L	0.3 (a)	1. Basin Plan															
2007, 2013	Lead	mg/L	NA		<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan															
2013	Mercury	mg/L	NA																
2007, 2013	Nickel	mg/L	NA		0.002	0.002	0.003	0.002	<0.002	0.003	0.003	<0.002	<0.002	0.003	0.003	0.002	0.003	0.003	0.003
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.002	<0.002	**0.007**	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.004	<0.005
2013	Thallium	mg/L	NA																
2007, 2013	Zinc	mg/L	NA		<0.020	<0.020	<0.020	<0.020	0.008	0.005	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.034	<0.02	0.026
Dissolved Metals																			
2013	Aluminum	mg/L	NA																
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	<0.002	<0.002	0.002	0.003	<0.005	<0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.001	0.002	0.001	0.002	0.002	0.002	0.003	0.004	<0.002	<0.002	<0.002	<0.002	0.003	<0.001	<0.001
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	0.016	0.005	0.005	0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2013	Iron	mg/L	NA																
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.002	<0.002	<0.002	<0.002	<0.002	0.0007	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
2013	Manganese	mg/L	NA																
2013	Mercury	mg/L	NA																
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	<0.002	0.003	0.005	0.002	<0.002	0.009	0.003	0.002	0.007	0.003	0.003	0.002	<0.002	0.003	0.003
2007, 2013	Selenium	mg/L	NA		<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.004	<0.005
2013	Thallium	mg/L	NA																
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	<0.020	<0.020	<0.020	0.086	0.033	<0.020	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Wet Weather Historical Monitoring Tables for SDC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data 2001-2002			2002-2003			2003-2004			2004-2005			2005-2006		
					11/29/01	01/29/02	02/17/02	02/11/03	02/25/03	03/15/03	02/03/04	02/18/04	03/02/04	10/17/04	02/11/05	02/18/05	10/18/05	01/02/06	02/20/06
Acid Extractable Compounds																			
2013	Pentachlorophenol	µg/L	(d)	16. 40 CFR 131.38															
Organophosphorus Pesticides																			
2013	Azinphos methyl (Guthion)	µg/L	NA																
2013	Bolstar	µg/L	NA																
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.03*	<0.03*	<0.03*	<0.03*	<0.03*	<0.03*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
2013	Coumaphos	µg/L	NA																
2013	Demeton-o	µg/L	NA																
2013	Demeton-s	µg/L	NA																
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.01	<0.01	0.032	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
2013	Dichlorvos	µg/L	NA																
2013	Dimethoate	µg/L	NA																
2013	Disulfoton	µg/L	NA																
2013	Ethoprop	µg/L	NA																
2013	Ethyl parathion	µg/L	NA																
2013	Fensulfothion	µg/L	NA																
2013	Fenthion	µg/L	NA																
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook				<0.10	<0.10	<0.10	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02
2013	Merphos	µg/L	NA																
2013	Methyl parathion	µg/L	NA																
2013	Mevinphos	µg/L	NA																
2013	Naled	µg/L	NA																
2013	Phorate	µg/L	NA																
2013	Ronnel	µg/L	NA																
2013	Stirophos	µg/L	NA																
2013	Tokuthion (Prothiofos)	µg/L	NA																
2013	Trichloronate	µg/L	NA																
Pyrethroids																			
2007, 2013	Allethrin	µg/L	NA																
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006															
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004															
2007, 2013	L-Cyhalothrin	µg/L	0.20	17. Wheelock et al., 2004															
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004															
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA																
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA																
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004															
2007, 2013	Fenvalerate	µg/L	NA																
2007, 2013	Fluvalinate	µg/L	NA																
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006															
2007, 2013	Prallethrin	µg/L	NA																
2007, 2013	Resmethrin	µg/L	NA																
Toxicity																			
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100	>100	>100	> 100	>100	>100	>100	>100	>100	>100
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100	100	100	100	100	100	100	100	100	100	100	100	**50**	100
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**6.25**	100	**50**	**12.5**	100	**50**	100	100	100	**25**	100	100	100	**50**	100
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	**50**	**50**	100	100	100	100	**50**	100	100	100	100	100	**50**	**<6.25**
2013	Strongylocentrotus 96-hr	TST	Pass/Fail																

See last page for footnotes and source references.

Wet Weather Historical Monitoring Tables for SDC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data											
					2006-2007			2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013	
					12/10/06	01/31/07	02/20/07	11/30/07	02/03/08-02/04/08	11/12/08	-	10/20/10	02/17/11-02/18/11	-	12/13/12-12/14/12	02/10/13
Physical Chemistry											No Samples Collected			No Samples Collected		
2013	Dissolved Oxygen	mg/L	<6.0 (a)	1. Basin Plan												
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.46	8.04	7.53	7.90	7.75	7.56		7.39	7.55		7.63	7.06
2007, 2013	Specific Conductivity	µmhos/cm	NA		3,650	3,470	3,080	3,720	2,740	4,170		406	3,310		3,680	3,520
2007, 2013	Water Temperature	Celsius	NA		16.40	11.90	16.20		13.00	18.70		20.00	12.70		14.6	11.2
2013	Color	Color Units	20	1. Basin Plan												
2007, 2013	Turbidity	NTU	20	1. Basin Plan	10.2	18.7	**36.1**	**28**	8	4.4		3.1	1.5		4	2.2
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	NA		1,300	110	13,000	8,000	2,300	500		11,000	700		8,000	1,300
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	130	20	**800**	**2,200**	80	**800**		**2,300**	170		**5,000**	230
2007, 2013	Total Coliform	MPN/100 mL	NA		1,300	500	3,000	17,000	5,000	2,200		13,000	5,000		30,000	1,400
Nutrients																
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.45	0.12	0.92	0.26	0.07	0.07		0.67	0.2		0.37	0.13
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	<0.05	<0.05	0.11	0.7	0.33	0.17		0.17	0.61		0.33	0.36
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	<0.05	0.08	<0.05	0.06		0.12	0.047J		0.043J	0.015J
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		2.5	2.9	4.5	1.8	1.3	1.7		1.2	1		0.91	1.1
2007, 2013	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	<0.05	0.05	<0.05	0.28	0.08	0.072		0.32	0.078		0.24	0.094
2013	Orthophosphate	mg/L	NA													
2007	Total Phosphorus	mg/L	2	4. MSGP 2015	0.43	0.16	0.18	0.35	0.15	0.12		0.34	0.19		0.3	0.11
General Chemistry																
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	2.18	3.89	7.07	11	2.7	<2		3.9	1.7J		2.5	1.2J
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	99	76	46	70	29	38		40	24		24	23
2013	Chloride	mg/L	250 (a)	1. Basin Plan												
2007, 2013	Dissolved Organic Carbon	mg/L	NA		10.5	9.56	10.3	11.6	8.4	6		5.9	6.3		9.1	6.6
2007, 2013	Total Organic Carbon	mg/L	NA		13.8	10.9	10.8	12.8	7.4	6.4		5.8	5.8		9.9	6.6
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<5	<5	<5	1.9J	2.3J	<5		<5	<5		<5	<5
2013	Sulfate	mg/L	250 (a)	1. Basin Plan												
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	0.14	0.072	0.05		0.059	0.038J		0.057	0.042J
2007, 2013	Total Dissolved Solids	mg/L	500 (a)	1. Basin Plan	**2,180**	**2,340**	**1,840**	**2,034**	**1,528**	**2,374**		**2,600**	**1,900**		**2,100**	**2,000**
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**156**	**141**	39	28	7.3	5		14	17		11	3
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		1,190	1,210	985	510.1	358.9	842.7		1,000	970		921	912
Total Metals																
2013	Aluminum	mg/L	NA													
2007	Antimony	mg/L	NA		<0.002	<0.002	0.002	0.0003J	0.0004J	0.0001J		0.00016J	0.00016J		0.00017J	0.00017J
2007, 2013	Arsenic	mg/L	NA		<0.001	<0.001	0.003	0.0048	0.0029	0.0037		0.0027	0.0017		0.0027	0.0019
2007, 2013	Cadmium	mg/L	NA		0.007	<0.001	<0.001	<0.0004	<0.0004	<0.0004		0.000014J	0.00003J		0.000028J	0.00002J
2007, 2013	Chromium	mg/L	NA		<0.005	<0.005	<0.005	0.0006	<0.0002	0.0001J		0.00044	0.00056		0.00018J	0.00032
2007, 2013	Copper	mg/L	NA		0.006	0.007	0.012	0.0059	0.0018	<0.0008		0.00071	0.0014		0.0015	0.001
2013	Iron	mg/L	0.3 (a)	1. Basin Plan												
2007, 2013	Lead	mg/L	NA		0.002	0.002	0.002	0.00062	0.00025	0.0001J		0.000048J	0.00016J		0.000082J	0.00013J
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan												
2013	Mercury	mg/L	NA													
2007, 2013	Nickel	mg/L	NA		0.005	0.005	0.006	0.0026	0.002	0.0026		0.0048	0.0063		0.0056	0.002
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.004	0.005	<0.004	0.0003J	0.0007	0.0003J		0.0004	0.00081		0.00082	0.00047
2013	Thallium	mg/L	NA													
2007, 2013	Zinc	mg/L	NA		0.028	<0.02	0.101	0.018	0.0031	0.002		0.0017J	0.0015J		0.0017J	0.0014J
Dissolved Metals																
2013	Aluminum	mg/L	NA													
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	0.002	0.0002J	0.0004J	0.0001J		0.00015J	0.00016J		0.00016J	0.00017J
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	<0.001	<0.001	<0.001	0.0038	0.0028	0.0037		0.0026	0.0015		0.0028	0.0017
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.0004	<0.0004	<0.0004		0.00002J	0.000022J		0.000021J	<0.0001
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	0.0001J	0.0001J	<0.0005		0.00017J	0.00015J		0.00008J	0.00012J
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	<0.002	0.003	0.003	0.0023	0.0016	<0.0008		0.0006	0.0012		0.0014	0.00084
2013	Iron	mg/L	NA													
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	0.00008J	<0.0001	<0.0001		<0.0002	0.000017J		0.000012J	0.00003J
2013	Manganese	mg/L	NA													
2013	Mercury	mg/L	NA													
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.003	0.003	0.002	0.0022	0.0021	0.0024		0.0045	0.0062		0.0054	0.002
2007, 2013	Selenium	mg/L	NA		<0.004	<0.004	<0.004	0.0003J	0.0008	0.0002J		0.00037J	0.0008		0.00078	0.00047
2013	Thallium	mg/L	NA													
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	<0.02	<0.02	<0.02	0.0046	0.0008	0.0005		0.0018J	0.0011J		0.002J	0.0022J

Wet Weather Historical Monitoring Tables for SDC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data											
					2006-2007			2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013	
					12/10/06	01/31/07	02/20/07	11/30/07	02/03/08-02/04/08	11/12/08	-	10/20/10	02/17/11-02/18/11	-	12/13/12-12/14/12	02/10/13
Acid Extractable Compounds											No Samples Collected			No Samples Collected		
2013	Pentachlorophenol	µg/L	(d)	16. 40 CFR 131.38												
Organophosphorus Pesticides																
2013	Azinphos methyl (Guthion)	µg/L	NA													
2013	Bolstar	µg/L	NA													
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002		<0.01	<0.01		<0.01	<0.01
2013	Coumaphos	µg/L	NA													
2013	Demeton-o	µg/L	NA													
2013	Demeton-s	µg/L	NA													
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004		<0.01	<0.01		<0.01	<0.01
2013	Dichlorvos	µg/L	NA													
2013	Dimethoate	µg/L	NA													
2013	Disulfoton	µg/L	NA													
2013	Ethoprop	µg/L	NA													
2013	Ethyl parathion	µg/L	NA													
2013	Fensulfothion	µg/L	NA													
2013	Fenthion	µg/L	NA													
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006	<0.006	0.029	<0.006	<0.006		<0.01	<0.01		<0.01	<0.01
2013	Merphos	µg/L	NA													
2013	Methyl parathion	µg/L	NA													
2013	Mevinphos	µg/L	NA													
2013	Naled	µg/L	NA													
2013	Phorate	µg/L	NA													
2013	Ronnel	µg/L	NA													
2013	Stirophos	µg/L	NA													
2013	Tokuthion (Prothiofos)	µg/L	NA													
2013	Trichloronate	µg/L	NA													
Pyrethroids																
2007, 2013	Allethrin	µg/L	NA					<0.002	<0.002	<0.002		<0.005	<0.002		<0.002	<0.002
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006				**0.0258**	<0.002	<0.002		<0.005	<0.002		0.0068	<0.002
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004				<0.002	<0.002	<0.002		0.0044J	<0.002		<0.002	<0.002
2007, 2013	L-Cyhalothrin	µg/L	0.20	17. Wheelock et al., 2004				0.0006J	<0.002	<0.002		0.0027J	<0.002		<0.002	<0.002
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004				<0.002	<0.002	<0.002		0.0042J	<0.002		<0.002	<0.002
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA					<0.002	<0.002	<0.002			<0.002		<0.002	<0.002
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA					<0.002	<0.002	<0.002		0.0047J	<0.002		<0.002	<0.002
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004				<0.002	<0.002	<0.002		0.0035J	<0.002		<0.002	<0.002
2007, 2013	Fenvalerate	µg/L	NA					<0.002	<0.002	<0.002		0.0035	<0.002		<0.002	<0.002
2007, 2013	Fluvalinate	µg/L	NA					<0.002	<0.002	<0.002			<0.002		<0.002	<0.002
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006				<0.025*	<0.025*	<0.025*		<0.005	<0.025*		<0.025††	<0.01
2007, 2013	Prallethrin	µg/L	NA					<0.002	<0.002	<0.002		<0.005	<0.002		<0.002	<0.002
2007, 2013	Resmethrin	µg/L	NA						<0.025	<0.025					<0.025	<0.01
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	**18.95**	>100	>100	>100	>100		>100	>100		>100	>100
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	**12.5**	100	100	100	100		100	100		100	100
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**50**	**12.5**	100	**50**	100	100		100	**6.25**		100	100
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100		>100	>100		>100	>100
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	100	100	100	100	100		100	100		100	100
2013	Strongylocentrotus 96-hr	TST	Pass/Fail													

See last page for footnotes and source references.

Wet Weather Historical Monitoring Tables for SDC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Long Term and Transitional Monitoring 2013-2014	Long Term and Transitional Monitoring 2014-2015	Long Term Monitoring Only 2014-2015	Long Term and Transitional Monitoring 2014-2015	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					-	11/22/14	12/02/14-12/04/14	03/01/15-03/02/15		
Physical Chemistry					No Samples Collected					
2013	Dissolved Oxygen	mg/L	<6.0 (a)	1. Basin Plan		6.03	**4.8**	7.02	33%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan		7.34	7.54	7.44	4%	0.29
2007, 2013	Specific Conductivity	µmhos/cm	NA			4,194	3,705	3,638		
2007, 2013	Water Temperature	Celsius	NA			13.87	16.92	14.7		
2013	Color	Color Units	20	1. Basin Plan		20	**30**	**25**	67%	NA[1]
2007, 2013	Turbidity	NTU	20	1. Basin Plan		8.5	1.4	0.5	18%	0.63
Bacteriological										
2007, 2013	Enterococcus	MPN/100 mL	NA			170	220	140,000		
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2		130	**500**	**50,000**	54%	8.55
2007, 2013	Total Coliform	MPN/100 mL	NA			3,000	1,400	50,000		
Nutrients										
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)		0.15	0.53	<0.10	0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan		0.054J	0.11	0.090J	0%	0.04
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan		0.15	0.12	0.013J	0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA			0.87	1.6	0.6		
2007, 2013	Dissolved Phosphorus	mg/L	2	4. MSGP 2015		0.11	NR	0.13	0%	0.06
2013	Orthophosphate	mg/L	NA			0.064	0.12	0.12		
2007	Total Phosphorus	mg/L	2	4. MSGP 2015		0.14	0.27	0.16	0%	0.10
General Chemistry										
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)		8.5	NR	<2.0	4%	0.22
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015		36	NR	27	7%	0.46
2013	Chloride	mg/L	250 (a)	1. Basin Plan		**1,200**	**1,100**	**880**	100%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA			8.5	12	5.9		
2007, 2013	Total Organic Carbon	mg/L	NA			9.1	11	6.1		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015		1.7J	NR	<5.0	0%	0.14
2013	Sulfate	mg/L	250 (a)	1. Basin Plan		**610**	**570**	**450**	100%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan		0.098	0.18J	0.082	0%	0.34
2007, 2013	Total Dissolved Solids	mg/L	500 (a)	1. Basin Plan		**2,800**	**2,700**	**2,200**	100%	4.01
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan		4	8	9	14%	0.36
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA			1200	1230	1050		
Total Metals										
2013	Aluminum	mg/L	NA			<0.0050	0.0089	0.077		
2007	Antimony	mg/L	NA			0.00014J	NR	0.00019J		
2007, 2013	Arsenic	mg/L	NA			0.0022	0.0027	0.0023		
2007, 2013	Cadmium	mg/L	NA			0.000018J	0.000021J	<0.00010		
2007, 2013	Chromium	mg/L	NA			0.000067J	0.000082J	0.00021		
2007, 2013	Copper	mg/L	NA			0.0015	0.0017	0.0016		
2013	Iron	mg/L	0.3 (a)	1. Basin Plan		0.16	0.3	0.25	0%	NA[1]
2007, 2013	Lead	mg/L	NA			<0.00020	0.000030J	0.000079J		
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan		**0.38**	**0.56**	**0.19**	100%	NA[1]
2013	Mercury	mg/L	NA			<0.000050	<0.000050	0.000013J		
2007, 2013	Nickel	mg/L	NA			0.0085	0.0076	0.0065		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38		0.0034	0.0029	0.0018	4%	0.41
2013	Thallium	mg/L	NA			<0.00020	<0.00020	<0.00020		
2007, 2013	Zinc	mg/L	NA			0.023	0.0074	0.0023J		
Dissolved Metals										
2013	Aluminum	mg/L	NA			<0.0050	<0.0050	0.0018J		
2007	Antimony	mg/L	0.006	1. Basin Plan		0.00015J	NR	0.00017J	0%	0.23
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38		0.0021	0.0023	0.0019	0%	0.01
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38		0.000033J	0.000019J	<0.00010	0%	0.02
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38		0.000039J	0.000039J	0.000066J	0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38		0.0014	0.00099	0.0013	0%	0.06
2013	Iron	mg/L	NA			0.0099J	0.039	0.0080J		
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38		<0.00020	<0.00020	<0.00020	0%	0.00
2013	Manganese	mg/L	NA			0.15	0.37	0.08		
2013	Mercury	mg/L	NA			<0.000050	<0.000050	0.0000080J		
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38		0.0084	0.0069	0.0055	0%	0.00
2007, 2013	Selenium	mg/L	NA			0.0033	0.0021	0.0013		
2013	Thallium	mg/L	NA			<0.00020	<0.00020	<0.00020		
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38		0.02	0.0068	0.0011J	0%	0.03

Wet Weather Historical Monitoring Tables for SDC-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2013-2014	2014-2015				
					-	11/22/14	12/02/14-12/04/14	03/01/15-03/02/15		
Acid Extractable Compounds					No Samples Collected					
2013	Pentachlorophenol	µg/L	(d)	16. 40 CFR 131.38		<1.0	<1.0	AE	0%	NA[1]
Organophosphorus Pesticides										
2013	Azinphos methyl (Guthion)	µg/L	NA			<0.010	<0.010	<0.010		
2013	Bolstar	µg/L	NA			<0.010	<0.010	<0.010		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000		<0.010	<0.010	<0.010	0%	0.22
2013	Coumaphos	µg/L	NA			<0.010	<0.010	<0.010		
2013	Demeton-o	µg/L	NA			<0.010	<0.010	<0.010BS-L		
2013	Demeton-s	µg/L	NA			<0.010	<0.010	<0.010		
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon		<0.010	<0.010	<0.010	0%	0.10
2013	Dichlorvos	µg/L	NA			<0.010	<0.010	<0.010		
2013	Dimethoate	µg/L	NA			<0.010	<0.010	<0.010		
2013	Disulfoton	µg/L	NA			<0.010	<0.010	<0.010		
2013	Ethoprop	µg/L	NA			<0.010	<0.010	<0.010		
2013	Ethyl parathion	µg/L	NA			<0.010	<0.010	<0.010		
2013	Fensulfothion	µg/L	NA			<0.010	<0.010	<0.010		
2013	Fenthion	µg/L	NA			<0.010	<0.010	<0.010		
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook		<0.010	<0.010	0.0085J	0%	0.03
2013	Merphos	µg/L	NA			<0.010	<0.010	<0.010		
2013	Methyl parathion	µg/L	NA			<0.010	<0.010	<0.010		
2013	Mevinphos	µg/L	NA			<0.010	<0.010	<0.010		
2013	Naled	µg/L	NA			<0.010	<0.010	<0.010		
2013	Phorate	µg/L	NA			<0.010	<0.010	<0.010		
2013	Ronnel	µg/L	NA			<0.010	<0.010	<0.010		
2013	Stirophos	µg/L	NA			<0.010	<0.010	0.0032J		
2013	Tokuthion (Prothiofos)	µg/L	NA			<0.010	<0.010	<0.010		
2013	Trichloronate	µg/L	NA			<0.010	<0.010	<0.010		
Pyrethroids										
2007, 2013	Allethrin	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006		<0.002	<0.002	<0.002	10%	0.45
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004		<0.002	<0.002	<0.002	0%	0.00
2007, 2013	L-Cyhalothrin	µg/L	0.20	17. Wheelock et al., 2004		<0.002	<0.002	<0.002	0%	0.04
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004		<0.002	<0.002	<0.002	0%	0.00
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004		<0.002	<0.002	<0.002	0%	0.01
2007, 2013	Fenvalerate	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Fluvalinate	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006		<0.01	<0.01	<0.01	0%	0.30
2007, 2013	Prallethrin	µg/L	NA			<0.002	<0.002	<0.002		
2007, 2013	Resmethrin	µg/L	NA			<0.01	<0.01	<0.01		
Toxicity										
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100			>100	NR	>100	4%	1.16
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100			100	NR	100	7%	1.30
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100			**50**	NR	100	41%	2.96
2007	*Hyalella* 96-hr	LC_{50} (%)	>100			>100	NR	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100			**50**	NR	100	26%	1.78
2013	Strongylocentrotus 96-hr	TST	Pass/Fail			**Fail**	Pass	Pass	33%	

See last page for footnotes and source references.

Wet Weather Historical Monitoring Tables for SDC-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
(d) Water Quality Benchmark is based on pH and is calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000.
* Indicates detection limit above water quality benchmark.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
[††] Permethrin was non-detect at the method detection limit of 0.005 µg/L.
AE-Analysis error.
BS-L - Blank Spike recovery of this analyte was below the control limits. Results may be biased low.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.
NR-Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SLR-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data 2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		Transitional Monitoring 2013-2014	2014-2015		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					11/30/07	02/03/08-02/04/08	-	-	10/19/10-10/20/10	02/16/11-02/17/11	-	10/11/12-10/12/12	02/08/13-02/09/13	-	11/21/14	03/01/15-03/02/15		
Physical Chemistry																		
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.72	8.05			7.07	7.77		7.45	7.67		6.95	7.79	0%	0.23
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,945	1,467			1,553	2,140		1,911	2,417		3,022	1,825		
2007, 2013	Water Temperature	Celsius	NA		14.20	12.10			18.10	13.90		17.7	11.87		15.52	13.56		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**239**	**492**			**28**	3.6		15	4.5		16.5	4.6	38%	5.02
Bacteriological																		
2007, 2013	Enterococcus	MPN/100 mL	NA		11,000	3,000			80,000	3,000		130,000	300		17	50,000		
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan REC-1/REC-2	**30,000**	**1,700**			**50,000**	**500**		**500,000**	**500**		23	**240,000**	88%	257.10
2007, 2013	Total Coliform	MPN/100 mL	NA		220,000	50,000			220,000	8,000		1,100,000	2,200		23	900,000		
Nutrients																		
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	0.56	0.22			0.16	0.13		0.17	0.14		<0.10	<0.10	0%	0.01
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	3	3.6			1.7	3.4		2.5	1.5		<0.10	1.2	0%	0.21
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.07	0.09			0.14	0.04J		0.19	0.013J		<0.10	0.023J	0%	0.08
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		4.2	2			1.8	0.74		1.4	0.73		0.34	0.55		
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	1.1	0.24			0.44	0.12		0.41	0.14		0.024	0.16	0%	0.16
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	1.3	0.97			1.1	0.17		0.68	0.21		0.091	0.29	0%	0.30
General Chemistry																		
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2000, 8. McNeeley (1979)	13	<2			7.5	1.5J		13	1.1J		<2.0	<2.0	0%	0.16
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	57	34			54	17		39	16		17	17	0%	0.26
2007, 2013	Dissolved Organic Carbon	mg/L	NA		17.9	8.2			9.1	5.2		12	5		5.7	6.1		
2007, 2013	Total Organic Carbon	mg/L	NA		18.2	8			8.7	5.1		12	4.9		5.9	6.5		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	1.5J	<5			<5	4.9J		<5	<5		<5.0	6.2	0%	0.31
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.039	0.048			<0.05	0.036J		0.066	0.03J		0.038J	0.054	0%	0.08
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	**1,330**	**884**			**1,400**	**1,400**		**1,400**	**1,700**		**2,200**	**1,400**	100%	2.93
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**235**	**456**			**200**	16		49	16		5	8	38%	1.23
2007, 2013	Hardness	mg $CaCO_3$/L	NA		295.1	223			680	730		745	836		1160	766		
Total Metals																		
2007	Antimony	mg/L	NA		0.0003J	0.0002J			0.00036J	0.00012J		0.00044J	0.00012J		0.000075J	0.00023J		
2007, 2013	Arsenic	mg/L	NA		0.0021	0.0029			0.0023	0.0011		0.0018	0.00097		0.0013	0.0012		
2007, 2013	Cadmium	mg/L	NA		<0.0004	0.0003J			0.00011	0.000048J		0.00006J	0.000046J		0.000083J	0.000062J		
2007, 2013	Chromium	mg/L	NA		0.0027	0.0027			0.0086	0.0003		0.00086	0.00041		0.000093J	0.00031		
2007, 2013	Copper	mg/L	NA		0.0117	0.0176			0.021	0.0024		0.0048	0.0021		0.002	0.0021		
2007, 2013	Lead	mg/L	NA		0.0045	0.0090			0.0041	0.0002		0.00073	0.00019J		0.000045J	0.00012J		
2007, 2013	Nickel	mg/L	NA		0.0029	0.0039			0.0069	0.0035		0.0023	0.0053		0.0072	0.0056		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0005	0.0006	No Samples Collected	No Samples Collected	0.00062	0.00085	No Samples Collected	0.00047	0.0009	No Samples Collected	0.003	0.0012	0%	0.20
2007, 2013	Zinc	mg/L	NA		0.0581	0.0435			0.043	0.0022J		0.011	0.003J		0.01	0.0046J		
Dissolved Metals																		
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0003J	0.0002J			0.00034J	0.00012J		0.00041J	0.00012J		0.000074J	0.00019J	0%	0.04
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0015	0.0015			0.0013	0.00088		0.0014	0.00078		0.0011	0.001	0%	0.00
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004	<0.0004			0.000037J	0.000039J		0.00004J	0.000048J		0.000076J	0.000047J	0%	0.01
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0002J	0.0001J			0.00011J	0.000092J		0.00009J	0.00008J		0.000054J	0.000071J	0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0040	0.0024			0.0038	0.0017		0.0031	0.0013		0.0015	0.0016	0%	0.06
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.00005J	<0.0001			<0.0002	<0.0002		0.00008J	0.000016J		0.000030J	<0.00020	0%	0.00
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0014	0.0008			0.0029	0.0032		0.0019	0.0052		0.007	0.0046	0%	0.00
2007, 2013	Selenium	mg/L	NA		0.0005	0.0006			0.00039J	0.00086		0.00038J	0.00081		0.0031	0.001		
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0075	0.0013			0.0043J	0.002J		0.0067	0.0028J		0.0069	0.0034J	0%	0.01
Organophosphorus Pesticides																		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	**0.0623**	<0.002			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	13%	0.58
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	0.013	<0.004			<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.07
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006			0.013	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.01
Pyrethroids																		
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002			<0.005	<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	**0.0197**	**0.0153**			<0.005	<0.002		<0.002	<0.002		<0.002	<0.002	25%	0.57
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	0.009	<0.002			<0.005	<0.002		<0.002	<0.002		<0.002	<0.002	0%	0.01
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	<0.002	<0.002			<0.005	<0.002		<0.002	<0.002		<0.002	<0.002	0%	0.06
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.002	<0.002			<0.005	<0.002		<0.002	<0.002		<0.002	<0.002	0%	0.00
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		0.002J	<0.002				<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.002	<0.002			<0.005	<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	<0.002			<0.005	<0.002		<0.002	<0.002		<0.002	<0.002	0%	0.00
2007, 2013	Fluvalinate	µg/L	NA		<0.002	<0.002			<0.005	<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.002	<0.002				<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.03*	<0.03*			<0.005	<0.025*		<0.025††	<0.01		<0.01	<0.01	0%	0.37
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002			<0.005	<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Resmethrin	µg/L	NA			<0.025						<0.025	<0.01		<0.01	<0.01		
Toxicity																		
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100			100	100		100	100		100	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	**25**			100	**50**		100	100		**50**	100	38%	1.63
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100			>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100			100	100		100	100		**50**	**50**	25%	1.25

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SLR-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
†† Permethrin was non-detect at the method detection limit of 0.005 µg/L.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SLR-TWAS-2

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data					Transitional Monitoring		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2010-2011		2011-2012	2012-2013		2013-2014	2014-2015		
					10/19/10-10/20/10	02/17/11-02/18/11	- (No Samples Collected)	01/26/13	02/09/13	- (No Samples Collected)	- (No Samples Collected)		
Physical Chemistry													
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.78	7.85		7.68	8.02			0%	NA[1]
2007, 2013	Specific Conductivity	µmhos/cm	NA		730	2,171		1,670	1,962				
2007, 2013	Water Temperature	Celsius	NA		16.10	12.36		16.8	12.9				
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**1,800**	3.8		4.6	5.4			25%	NA[1]
Bacteriological													
2007, 2013	Enterococcus	MPN/100 mL	NA		300,000	800		22,000	230				
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan REC-1/REC-2	**80,000**	300		**9,000**	130			50%	NA[1]
2007, 2013	Total Coliform	MPN/100 mL	NA		500,000	2,200		110,000	2,300				
Nutrients													
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	0.54	0.12		0.063J	0.17			0%	NA[1]
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	6.7	4.7		5.4	4.7			0%	NA[1]
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.27	0.052J		<0.15	0.051J			0%	NA[1]
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		6.3	0.55		0.57	0.54				
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	1.3	0.15		0.14	0.12			0%	NA[1]
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	**4**	0.16		0.18	0.12			25%	NA[1]
General Chemistry													
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	7.7	0.7J		1.9J	1.7J			0%	NA[1]
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	120	16		17	19			0%	NA[1]
2007, 2013	Dissolved Organic Carbon	mg/L	NA		13	5.1		5.5	5.3				
2007, 2013	Total Organic Carbon	mg/L	NA		13	4.8		5.9	5.2				
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<5	<5		1.6J	<5			0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.05	0.042J		0.04J	0.024J			0%	NA[1]
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	**660**	**1,400**		**1,700**	**1,800**			100%	NA[1]
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**1,500**	9		20	5			25%	NA[1]
2007, 2013	Hardness	mg $CaCO_3$/L	NA		310	760		863	896				
Total Metals													
2007	Antimony	mg/L	NA		0.00027J	0.00011J		0.00011J	0.00007J				
2007, 2013	Arsenic	mg/L	NA		0.0046	0.0011		0.001	0.00094				
2007, 2013	Cadmium	mg/L	NA		0.00015	0.000037J		0.00005J	0.00004J				
2007, 2013	Chromium	mg/L	NA		0.018	0.00032		0.00044	0.00028				
2007, 2013	Copper	mg/L	NA		0.025	0.002		0.0018	0.0017				
2007, 2013	Lead	mg/L	NA		0.0049	0.00012J		0.00014J	0.00011J				
2007, 2013	Nickel	mg/L	NA		0.011	0.0037		0.0016	0.0014				
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0017	0.00074		0.00066	0.00066			0%	NA[1]
2007, 2013	Zinc	mg/L	NA		0.052	0.0018J		0.012	0.0066				
Dissolved Metals													
2007	Antimony	mg/L	0.006	1. Basin Plan	0.00036J	0.00011J		0.00011J	0.00007J			0%	NA[1]
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0031	0.00099		0.00092	0.00091			0%	NA[1]
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	0.000058J	0.000036J		0.00004J	0.00003J			0%	NA[1]
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.00038	0.0001J		<0.0002	0.00014J			0%	NA[1]
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.007	0.0017		0.0014	0.0011			0%	NA[1]
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.000025J	<0.0002		0.00004J	0.00005J			0%	NA[1]
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0032	0.0037		0.0014	0.0013			0%	NA[1]
2007, 2013	Selenium	mg/L	NA		0.0016	0.00072		0.00065	0.00066				
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0058	0.0017J		0.01	0.0048J			0%	NA[1]
Organophosphorus Pesticides													
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.01	<0.01		<0.01	<0.01			0%	NA[1]
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	**0.14**	<0.01		<0.01	<0.01			25%	NA[1]
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	**0.56**	<0.01		<0.01	<0.01			25%	NA[1]
Pyrethroids													
2007, 2013	Allethrin	µg/L	NA		<0.005	<0.002		<0.002	<0.002				
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	<0.005	<0.002		**0.0142**	<0.002			25%	NA[1]
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	<0.005	<0.002		<0.002	<0.002			0%	NA[1]
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	<0.005	<0.002		<0.002	<0.002			0%	NA[1]
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.005	<0.002		<0.002	<0.002			0%	NA[1]
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA			<0.002		0.0114	<0.002				
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.005	<0.002		<0.002	<0.002				
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.005	<0.002		<0.002	<0.002			0%	NA[1]
2007, 2013	Fenvalerate	µg/L	NA		<0.005	<0.002		<0.002	<0.002				
2007, 2013	Fluvalinate	µg/L	NA			<0.002		<0.002	<0.002				
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.005	<0.025*		<0.01	<0.01			0%	NA[1]
2007, 2013	Prallethrin	µg/L	NA		<0.005	<0.002		<0.002	<0.002				
2007, 2013	Resmethrin	µg/L	NA					<0.01	<0.01				
Toxicity													
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		**32.99**	>100		>100	>100			25%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		**12.50**	100		100	100			25%	NA[1]
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**<6.25**	100		100	100			25%	NA[1]
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		**6.83**	>100		>100	>100			25%	NA[1]
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100		100	100			0%	NA[1]

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SLR-TWAS-2

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SLR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data																	
					2001-2002			2002-2003			2003-2004			2004-2005			2005-2006			2006-2007		
					11/29/01	02/17/02	03/17/02	11/08/02	02/11/03	02/25/03	11/12/03	02/02/04	02/18/04	10/27/04	02/11/05	02/18/05	10/17/05	12/31/05	02/19/06	10/14/06	01/31/07	02/19/07
Physical Chemistry																						
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.50	7.50	7.60	**6.40**	7.32	7.67	7.44	7.94	8.20	7.20		8.06	7.30	8.42	6.97	7.35	8.02	7.35
2007, 2013	Specific Conductivity	μmhos/cm	NA		2,370	2,310	2,450	4,190	1,965	2,680	2,860	2,780	2,810	927	2,790	1,865	2,580	2,990	2,300	2,650	2,530	2,450
2007, 2013	Water Temperature	Celsius						19.70	11.70	13.30	15.80	10.70	13.50	14.30	15.10	14.50	17.00	13.00	11.00	15.50	12.50	14.30
2007, 2013	Turbidity	NTU	20	1. Basin Plan	5.7	2.14	2.1	6.96	3.3	**185**	2.98	4.49	1.23	**136**	11.9	**31.3**	11.4	15.6	13.1	**21.4**	4.8	4.78
Bacteriological																						
2007, 2013	Enterococcus	MPN/100 mL	NA		800	80	900	500	800	16,000	1,300	700	130	80,000	5,000	13,000	800	3,000	1,300	35,000	6,000	2,200
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	300	50	300	230	130	**500**	230	**500**	130	**50,000**	**1,700**	**8,000**	**8,000**	**3,000**	**1,300**	**3,000**	**500**	**900**
2007, 2013	Total Coliform	MPN/100 mL	NA		2,300	130	300	300	300	1,700	2,800	1,300	230	170,000	11,000	11,000	17,000	3,000	11,000	170,000	5,000	2,200
General Chemistry																						
2007, 2013	Ammonia as N	mg/L	(a)	6. USEPA Water Quality Criteria (Freshwater)	0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.33	0.19	0.16	0.64	0.31	0.22
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.9	0.6	0.5	0.72	1.10	0.65	0.8	0.94	1.64	0.58	5.99	5.18	3.7	3.78	4.36	1.72	<0.05	2.5
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05	<0.05	<0.05
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		2.2	1.3	1.2	<0.5	0.8	0.7	3.2	<0.5	0.8	2.4	1.7	2	1.5	0.8	2.2	3.8	1.9	1.2
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.16	<0.05	0.16	0.22	0.19	0.10	0.33	0.08	0.11	0.46	0.36	<0.05	0.81	0.31	0.36	<0.05	0.21	0.11
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	1.12	0.4	0.2	0.29	0.23	0.22	0.29	0.13	0.13	0.58	0.84	0.57	0.87	0.32	0.58	0.68	0.37	0.22
Nutrients																						
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	2.3	2	2.9	<2.0	3.34	2.02	<2	**33**	2.05	4.09	2.61	<2	3.49	<2	<2	5.56	**35.7**	7.78
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	<25	61	48	38	49	25	33	<25	<25	32	58	40	45	<25	30	67	44	28
2007, 2013	Dissolved Organic Carbon	mg/L	NA					1.49	6.86	9.36	9.3	2.8	80.1	37.9	5.81	4.27	5.96	3.59	7.44	78.2	13.3	8.08
2007, 2013	Total Organic Carbon	mg/L	NA					5.61	11.10	4.93	7.24	6.56	76.2	51.3	7.8	10.2	20	5.62	8.43	78.2	13.8	8.29
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<5	<5	5
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	**1,480**	**1,340**	**1,420**	**1,730**	**1,500**	**818**	**1,840**	**1,530**	**2,410**	**652**	**1,280**	**1,100**	**1,240**	**1,500**	**1,450**	**1,380**	**1,280**	**1,460**
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	<20	<20	<20	14	8	**152**	<20	<20	<20	**165**	30	78	47	27	<20	29	<20	<20
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		737	821	818	779	832	463	891	749	867	353	650	581	627	872	827	724	760	802
Total Metals																						
2007	Antimony	mg/L	NA		<0.002	<0.002	<0.002	<0.002	0.002	0.003	<0.005	<0.005	<0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.002	<0.002	0.003
2007, 2013	Arsenic	mg/L	NA		<0.001	0.002	0.001	0.001	0.001	0.003	0.003	0.004	0.003	0.002	0.003	<0.002	0.003	0.003	0.001	0.01	<0.001	0.001
2007, 2013	Cadmium	mg/L	NA		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001
2007, 2013	Chromium	mg/L	NA		<0.005	<0.005	<0.005	<0.005	0.001	0.007	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	NA		<0.005	<0.005	<0.005	0.002	0.014	0.009	<0.005	0.006	<0.005	0.011	0.005	0.005	0.009	<0.005	<0.005	0.006	0.006	0.003
2007, 2013	Lead	mg/L	NA		<0.002	<0.002	<0.002	0.004	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.002	0.001	<0.001
2007, 2013	Nickel	mg/L	NA		<0.002	<0.002	<0.002	0.00175	0.002	0.006	0.002	0.002	<0.002	0.011	0.002	0.002	0.003	0.002	0.002	0.003	<0.002	0.002
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.002	0.005	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.004	<0.005	<0.004	<0.004	<0.004
2007, 2013	Zinc	mg/L	NA		<0.020	<0.020	<0.020	0.0102	0.006	0.022	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.022	<0.02
Dissolved Metals																						
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	<0.002	<0.002	0.002	0.004	<0.005	<0.005	<0.006	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.002	<0.002	0.003
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	<0.001	<0.001	<0.001	0.001	0.002	0.001	<0.002	0.002	0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.001	0.0002	0.0002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	<0.005	0.018	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.006	<0.005	<0.005	0.005	0.005	0.002
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	<0.002	0.002	<0.002	0.002	0.003	<0.002	<0.002	0.003	<0.002	<0.002	0.002	0.002	0.003	0.002	<0.002	0.003	<0.002	0.002
2007, 2013	Selenium	mg/L	NA		<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.004	<0.005	<0.004	<0.004	<0.004
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	<0.020	<0.020	<0.020	0.001	0.070	0.024	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Organophosphorus Pesticides																						
2007, 2013	Chlorpyrifos	μg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.03*	<0.03*	<0.03*	<0.03*	<0.03*	<0.03*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.002	<0.002	<0.002
2007, 2013	Diazinon	μg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	**0.12**	<0.03	<0.03	<0.03	<0.03	0.053	<0.01	<0.01	<0.01	<0.01	0.030	<0.01	<0.01	<0.02	<0.02	<0.004	<0.004	<0.004
2007, 2013	Malathion	μg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook				<0.10	<0.10	<0.10	<0.01	0.021	<0.01	<0.01	<0.01	<0.01	0.117	<0.02	<0.02	0.183	0.042	<0.006
Pyrethroids																						
2007, 2013	Allethrin	μg/L	NA																			
2007, 2013	Bifenthrin	μg/L	0.0093	15. Anderson et al., 2006																		
2007, 2013	Cyfluthrin	μg/L	0.344	17. Wheelock et al., 2004																		
2007, 2013	Cyhalothrin, Total Lambda	μg/L	0.20	17. Wheelock et al., 2004																		
2007, 2013	Cypermethrin	μg/L	0.683	17. Wheelock et al., 2004																		
2007, 2013	Danitol (Fenpropathrin)	μg/L	NA																			
2007, 2013	Deltamethrin/Tralomethrin[£]	μg/L	NA																			
2007, 2013	Esfenvalerate	μg/L	0.25	17. Wheelock et al., 2004																		
2007, 2013	Fenvalerate	μg/L	NA																			
2007, 2013	Fluvalinate	μg/L	NA																			
2007, 2013	Permethrin	μg/L	0.021	15. Anderson et al., 2006																		
2007, 2013	Prallethrin	μg/L	NA																			
2007, 2013	Resmethrin	μg/L	NA																			
Toxicity																						
2007, 2013	*Ceriodaphnia* 96-hr survival	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100	**50**	100	100	100	**50**	100	100	100	100	100	100	100	100	100	100	100
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100	100	100	100	100	100	100	**50**	100	100	100	100	100	100	100	100	100

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SLR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data									Long Term and Transitional Monitoring		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2007-2008		2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015		
					11/30/07	02/03/08-02/05/08	12/16/08	-	10/19/10-10/20/10	02/17/11-02/18/11	-	02/09/13	02/20/13-02/21/13	-	-		
								No Samples Collected			No Samples Collected			No Samples Collected	No Samples Collected		
Physical Chemistry																	
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.57	8.38	7.55		9.20	7.63		7.66	7.51			8%	0.09
2007, 2013	Specific Conductivity	µmhos/cm	NA		496	1,759	755		1,050	2,342		265	2,710				
2007, 2013	Water Temperature	Celsius			14.80	11.80	12.10		14.10	11.97		11.4	12.4				
2007, 2013	Turbidity	NTU	20	1. Basin Plan	27	136	17.5		7.6	3.3		1.5	1.7			24%	1.32
Bacteriological																	
2007, 2013	Enterococcus	MPN/100 mL	NA		30,000	3,000	50,000		500,000	800		500	1,300				
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	17,000	1,700	13,000		500,000	3,000		70	5,000			68%	61.85
2007, 2013	Total Coliform	MPN/100 mL	NA		28,000	50,000	110,000		500,000	5,000		22,000	23,000				
General Chemistry																	
2007, 2013	Ammonia as N	mg/L	(a)	6. USEPA Water Quality Criteria (Freshwater)	0.16	0.18	0.05		0.14	0.12		0.068J	<0.1			0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.7	3.27	1.17		0.64	3.1		0.94	0.93			0%	0.19
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.06	0.03J	0.04J		0.12	0.039J		0.026J	<0.15			0%	0.03
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1.4	1.8	1.4		1	0.78		0.72	0.53				
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.76	0.35	0.5		0.7	0.14		0.13	0.061			0%	0.13
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.77	0.40	0.51		0.69	0.17		0.15	0.084			0%	0.22
Nutrients																	
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	8.5	<2	8		4.2	0.6J		2.4	2.3			8%	0.19
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	55	27	71		36	26		24	24			0%	0.30
2007, 2013	Dissolved Organic Carbon	mg/L	NA		14.6	9.5	13.3		9.9	5.5		8.2	7.9				
2007, 2013	Total Organic Carbon	mg/L	NA		17.9	8.7	13.8		9.6	5.2		7.9	7.2				
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	1.8J	1.9J	<5		<5	<5		<5	<5			0%	0.13
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.21	0.057	0.138		0.049J	0.048J		0.042J	0.053			0%	0.36
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	964	878	756		700	1,500		1,800	1,700			100%	2.70
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	24	129	19.5		17	14		2	3			12%	0.34
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		151	242	251		290	760		884	820				
Total Metals																	
2007	Antimony	mg/L	NA		0.0005	0.0002J	0.0006		0.00051	0.00012J		0.00022J	0.00017J				
2007, 2013	Arsenic	mg/L	NA		0.0017	0.0024	0.002		0.0018	0.0012		0.0011	0.00096				
2007, 2013	Cadmium	mg/L	NA		<0.0004	<0.0004	<0.0004		0.000051J	0.000036J		0.00006J	0.00007J				
2007, 2013	Chromium	mg/L	NA		0.001	0.0016	0.0007		0.00092	0.0005		0.00028	0.00022				
2007, 2013	Copper	mg/L	NA		0.0043	0.0065	0.042		0.0041	0.0021		0.0017	0.0012				
2007, 2013	Lead	mg/L	NA		0.00078	0.0023	0.00049		0.00037	0.00016J		0.00008J	0.00006J				
2007, 2013	Nickel	mg/L	NA		0.0013	0.0025	0.0011		0.0019	0.0039		0.0019	0.0016				
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0003J	0.0006	0.0002J		0.00038J	0.00071		0.00093	0.00051			0%	0.36
2007, 2013	Zinc	mg/L	NA		0.012	0.015	0.009		0.007	0.0025J		0.0046J	0.0031J				
Dissolved Metals																	
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0004J	0.0002J	0.0005		0.00047J	0.00012J		0.00021J	0.00016J			0%	0.27
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0014	0.0019	0.0018		0.0017	0.001		0.00096	0.00084			0%	0.00
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004	<0.0004	<0.0004		0.000022J	0.000032J		0.00005J	0.00006J			0%	0.02
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0006	0.0002J	0.0003J		0.00038	0.000095J		0.00014J	0.00009J			0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0032	0.0029	0.0018		0.0033	0.0015		0.0017	0.0012			0%	0.08
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.00007J	<0.0001	<0.0001		0.000022J	<0.0002		0.00003J	0.00003J			0%	0.00
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0011	0.0014	0.0009		0.0017	0.0037		0.0017	0.0017			0%	0.00
2007, 2013	Selenium	mg/L	NA		0.0002J	0.0005	<0.0005		0.00043	0.00073		0.00098	0.0005				
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.005	0.0025	0.0018		0.0039J	0.0014J		0.0059	0.004J			0%	0.03
Organophosphorus Pesticides																	
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002	<0.002		<0.01	<0.01		<0.01	<0.01			0%	0.21
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	0.010	0.016	<0.004		<0.01	<0.01		<0.01	<0.01			4%	0.18
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	0.083	<0.006	0.022		0.031	<0.01		<0.01	<0.01			0%	0.08
Pyrethroids																	
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002	<0.002		<0.005	<0.002		<0.002	<0.002				
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	0.0089	<0.002	0.0124		<0.005	<0.002		<0.002	<0.002			14%	0.43
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	<0.002	<0.002	<0.002		0.014	<0.002		<0.002	<0.002			0%	0.01
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	<0.002	<0.002	<0.002		0.0063	<0.002		<0.002	<0.002			0%	0.09
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.002	<0.002	<0.002		0.012	<0.002		<0.002	<0.002			0%	0.00
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.002	0.005	<0.002			<0.002		<0.002	<0.002				
2007, 2013	Deltamethrin/Tralomethrin[ε]	µg/L	NA		<0.002	<0.002	<0.002		0.01	<0.002		<0.002	<0.002				
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	0.001 J	0.0008J		0.01	<0.002		<0.002	<0.002			0%	0.01
2007, 2013	Fenvalerate	µg/L	NA		<0.002	<0.002	0.0016		0.01	<0.002		<0.002	<0.002				
2007, 2013	Fluvalinate	µg/L	NA		<0.002	<0.002	<0.002			<0.002		<0.002	<0.002				
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.025*	<0.025*	<0.025*		<0.005	<0.025*		<0.01	<0.01			0%	0.39
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002	<0.002		<0.005	<0.002		<0.002	<0.002				
2007, 2013	Resmethrin	µg/L	NA			<0.025	<0.025					<0.01	<0.01				
Toxicity																	
2007, 2013	*Ceriodaphnia* 96-hr survival	LC$_{50}$ (%)	>100		>100	>100	>100		>100	>100		>100	>100			0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100	100		100	100		100	100			0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100	100		100	50		100	100			12%	1.12
2007	*Hyalella* 96-hr	LC$_{50}$ (%)	>100		>100	>100	>100		>100	>100		>100	>100			0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100	50		100	100		100	100			8%	1.08

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SLR-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SM-TWAS-1a

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data 2010-2011		2011-2012	2012-2013		Transitional Monitoring 2013-2014	2014-2015		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					10/06/10	02/16/11-02/17/11	- (No Samples Collected)	10/11/12	02/08/13-02/09/13	- (No Samples Collected)	11/1/14	03/01/15-03/02/15		
Physical Chemistry														
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	8.20	7.06		7.39	7.75		7.31	7.4	0%	0.31
2007, 2013	Specific Conductivity	µmhos/cm	NA		873	1,036		1,447	1,230		489	268		
2007, 2013	Water Temperature	Celsius	NA		17.73	15.10		19.6	12		16.86	13.26		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	12	7.8		25	15		47	22.7	50%	1.08
Bacteriological														
2007, 2013	Enterococcus	MPN/100 mL	NA		230,000	80,000		110,000	30,000		2,700	22,000		
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan REC-1/REC-2	70,000	11,000		8,000	13,000		22,000	11,000	100%	56.25
2007, 2013	Total Coliform	MPN/100 mL	NA		170,000	22,000		80,000	230,000		140,000	50,000		
Nutrients														
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	0.3	0.082J		0.73	0.15		0.37	<0.10	0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	1.1	2.5		1.9	2.5		1.3	0.62	0%	0.17
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.088J	0.073J		0.092J	0.033J		0.051J	0.038J	0%	0.06
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1.7	1		4.6	1.1		2.8	0.59		
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.28	0.17		0.3	0.12		0.38	0.23	0%	0.12
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.29	0.21		0.52	0.18		0.52	0.31	0%	0.17
General Chemistry														
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	11	6.4		33	3		14	4.4	17%	0.40
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	63	33		160	47		110	33	17%	0.62
2007, 2013	Dissolved Organic Carbon	mg/L	NA		18	9.8		39	7.4		30	8.9		
2007, 2013	Total Organic Carbon	mg/L	NA		20	11		39	8.1		34	9.5		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	2.1J	<5		<5	<5		<5.0	1.6J	0%	0.23
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.3	0.056		0.2	0.12		0.17	0.11	0%	0.32
2007, 2013	Total Dissolved Solids	mg/L	500 (b)	1. Basin Plan	910	800		1,100	860		540	280	83%	1.50
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	20	26		100	66		77	21	0%	0.52
2007, 2013	Hardness	mg $CaCO_3$/L	NA		360	340		411	387		206	146		
Total Metals														
2007	Antimony	mg/L	NA		0.002	0.0012		0.0042	0.0011		0.0021	0.00096		
2007, 2013	Arsenic	mg/L	NA		0.002	0.0018		0.0029	0.0017		0.0021	0.0013		
2007, 2013	Cadmium	mg/L	NA		0.00012	0.000052J		0.00037	0.0001		0.00038	0.000061J		
2007, 2013	Chromium	mg/L	NA		0.0016	0.0014		0.0035	0.002		0.0042	0.0015		
2007, 2013	Copper	mg/L	NA		0.012	0.0083		0.028	0.0092		0.027	0.007		
2007, 2013	Lead	mg/L	NA		0.0011	0.00075		0.0063	0.0016		0.0042	0.0011		
2007, 2013	Nickel	mg/L	NA		0.0047	0.0039		0.0095	0.0046		0.0074	0.0021		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0018	0.0014		0.0012	0.0012		0.0014	0.00048	0%	0.25
2007, 2013	Zinc	mg/L	NA		0.069	0.03		0.25	0.044		0.21	0.03		
Dissolved Metals														
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0019	0.0012		0.0019	0.00085		0.0013	0.00077	0%	0.22
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0019	0.0018		0.0023	0.0013		0.0014	0.0011	0%	0.00
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	0.000074J	0.000034J		0.00019	0.000044J		0.00014	<0.00010	0%	0.01
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.00063	0.00072		0.0011	0.0004		0.00086	0.00048	0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0078	0.0064		0.011	0.0052		0.0095	0.0035	0%	0.20
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	0.0002	0.000041J		0.00093	0.00009J		0.00055	0.00011J	0%	0.00
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0045	0.0035		0.0078	0.0034		0.0051	0.0013	0%	0.00
2007, 2013	Selenium	mg/L	NA		0.0018	0.0015		0.00099	0.00096		0.0012	0.00047		
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.044	0.019		0.14	0.016		0.088	0.011	0%	0.18
Organophosphorus Pesticides														
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	0%	0.25
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	0.013	0.0066J		<0.01	<0.01		<0.010BS-L	<0.010	0%	0.08
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	0.05	0.025		0.026	<0.01		0.05	0.0079J	0%	0.06
Pyrethroids														
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	<0.002	0.0398		0.0674	0.0679		0.0481	0.0034	67%	4.08
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	<0.002	<0.002		0.0156	<0.002		0.0206	<0.002	0%	0.02
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	<0.002	<0.002		0.0054	<0.002		0.0041	<0.002	0%	0.04
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.002	<0.002		<0.002	<0.002		0.0063	<0.002	0%	0.00
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA			<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	<0.002		<0.002	<0.002		<0.002	<0.002	0%	0.00
2007, 2013	Fenvalerate	µg/L	NA		<0.002	<0.002		<0.002	<0.002		0.0006J	<0.002		
2007, 2013	Fluvalinate	µg/L	NA			0.0036		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.005	<0.025*		0.2575	<0.01		<0.01	<0.01	17%	2.28
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Resmethrin	µg/L	NA					<0.01	<0.01		<0.01	<0.01		
Toxicity														
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100		100	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100		100	100		100	100	0%	1.00
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100		<25	100		100	100	17%	1.50

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SM-TWAS-1a

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
BS-L-Blank Spike recovery of this analyte was below the control limits. Results may be biased low.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SMR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data 2001-2002	2002-2003		2003-2004		2004-2005	2005-2006	2006-2007	2007-2008		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					11/29/01	02/12/03	02/25/03	02/03/04	02/24/04	-	02/28/06	-	11/30/07	02/03/08		
Physical Chemistry																
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.90	7.50	7.40	7.80	7.75		7.73		7.99	7.96	0%	0.00
2007, 2013	Specific Conductivity	µmhos/cm	NA		1,410	1,050	492	1,170	643		717		1,080	1,310		
2007, 2013	Water Temperature	Celsius	NA			13.00	13.00				12.00		12.00	13.67		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	2.5	**193**	**1,160**	**147**	0.095		**362**		10.9	6.72	50%	11.76
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	NA			130	300	4,106	5,172		11,000		1,600	23		
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2		**>1,600**	**>1,600**	**500**	**1,300**		**500**		170	23	71%	2.03
2007, 2013	Total Coliform	MPN/100 mL	NA	1. Basin Plan		>1,600	>1,600	2,800	17,000		16,000		>1,600	>1,600		
Nutrients																
2007, 2013	Ammonia as N	mg/L	(a)	6. USEPA Water Quality Criteria (Freshwater)	<0.1	<4	0.1	0.228	0.237		0.286		<0.02	<0.02	0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.5	1.2	1.5	0.985	1.21		1.62		0.08	0.98	0%	0.10
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.1	<0.1	<0.1	<0.5	<0.5		<0.1		<0.007	<0.007	0%	0.09
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		<0.5	0.6	0.7	1.92	1.46		0.677		0.6	2.1		
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.12	0.26	0.34	0.227	0.279				0.26	0.14	0%	0.10
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	<0.2	0.3	0.85	0.437	0.309		<0.05				0%	0.13
General Chemistry																
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	<5	16	22	14.1	6.72		10		2.09	<2.00	0%	0.31
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	<30	**185**	**447**	28	18		72.6		<25	<25	25%	0.82
2007, 2013	Dissolved Organic Carbon	mg/L	NA										8.24	5.52		
2007, 2013	Total Organic Carbon	mg/L	NA										11.7	6.99		
2007	Oil And Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<10	<5	<5	<1	<1		<1		<5	<5	0%	0.21
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.05	0.18	<0.04	0.154	0.095		<0.5		<0.1	<0.1	0%	0.21
2007, 2013	Total Dissolved Solids	mg/L	750 (b)	1. Basin Plan	**814**	616	374	**830**	446		490		716	719	25%	0.83
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	<5	**405**	**3,090**	**220**	69		**512**		<1	<1	50%	5.37
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		423	341	242	320	225		249		363	371		
Total Metals																
2007	Antimony	mg/L	NA		<0.002	<0.002	<0.002	<0.005	<0.005		0.001		<0.001	<0.001		
2007, 2013	Arsenic	mg/L	NA		<0.002	0.005	0.006	0.002	0.002		0.006		<0.001	<0.001		
2007, 2013	Cadmium	mg/L	NA		<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001	<0.001		
2007, 2013	Chromium	mg/L	NA		0.004	0.018	0.053	<0.005	<0.005		0.024		<0.004	<0.004		
2007, 2013	Copper	mg/L	NA		0.01	0.017	0.064	0.008	0.009		0.032		<0.002	<0.002		
2007, 2013	Lead	mg/L	NA		<0.005	0.008	0.039	0.010	0.007		0.008		<0.004	<0.004		
2007, 2013	Nickel	mg/L	NA		<0.005	0.013	0.024	0.003	0.003		0.013		<0.002	<0.002		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.005	**0.009**	<0.005	<0.005	<0.005	No Samples Collected	0.001	No Samples Collected	<0.005	<0.005	13%	0.64
2007, 2013	Zinc	mg/L	NA		0.04	0.05	0.2	0.035	0.027		0.093		<0.010	<0.010		
Dissolved Metals																
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	<0.002	<0.005	<0.005		0.001		<0.002	<0.002	0%	0.23
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	<0.002	0.005	<0.002	<0.002	0.002		0.006		<0.001	<0.001	0%	0.01
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.001	<0.001		<0.001		<0.001	<0.001	0%	0.04
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.003	0.002	0.004	<0.005	<0.005		0.024		<0.004	<0.004	0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.005	0.009	0.012	<0.005	0.007		0.030		<0.001	<0.001	0%	0.25
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.005	0.005	<0.005	<0.002	0.005		0.008		<0.001	<0.001	0%	0.02
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	<0.005	0.007	<0.005	<0.002	0.003		0.011		<0.002	<0.002	0%	0.00
2007, 2013	Selenium	mg/L	NA		<0.005	0.007	<0.005	<0.005	<0.005		0.001		<0.005	<0.005		
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	<0.010	0.05	0.01	<0.02	0.029		0.086		<0.010	<0.010	0%	0.09
Organophosphorus Pesticides																
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.01	<3.0*	<3.0*	0.015	**0.040**		<0.01			<0.04*	25%	0.81
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	0.08	<6.0*	<6.0*	0.011	0.031		<0.01			<0.04	0%	0.37
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook										<0.05	0%	NA[1]
Pyrethroids																
2007, 2013	Allethrin	µg/L	NA													
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006												
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004												
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004												
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004												
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA													
2007, 2013	Deltamethrin/Tralomethrin	µg/L	NA													
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004												
2007, 2013	Fenvalerate	µg/L	NA													
2007, 2013	Fluvalinate	µg/L	NA													
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006												
2007, 2013	Prallethrin	µg/L	NA													
2007, 2013	Resmethrin	µg/L	NA													
Toxicity	**Toxicity**															
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100	>100	**100**	**100**		**100**		>100	>100	38%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100	100	100	100		100		100	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	**50**	**<25**	>100	100		100		100	100	25%	1.50
2007	*Hyalella* 96-hr	LC_{50} (%)	>100										>100	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100	100	100		100		100		100	100	0%	1.00

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SMR-MLS

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area/ subarea.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SMR-MLS-2

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data							Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015				
					12/16/08	-	10/19/10	02/17/11	-	10/11/12-10/12/12	02/20/13	-	11/01/14	12/02/14-12/04/14	03/01/15-03/02/15		
Physical Chemistry																	
2013	Dissolved Oxygen	mg/L	<6.0 (a)	1. Basin Plan		No Samples Collected			No Samples Collected			No Samples Collected	8.38	9.12	9.45	0%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	8.16		7.43	8.27		7.9	7.4		7.68	7.76	8.46	0%	0.25
2007, 2013	Specific Conductivity	µmhos/cm	NA		239		1,155	1,173		1,013	986		1363	1259	1378		
2007, 2013	Water Temperature	Celsius	NA		10.40		18.20	14.10		20.4	10.7		17.42	15.05	13.59		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	**855**		**180**	4.5		2.4	**31**		1.1	14.8	2.4	38%	6.82
Bacteriological																	
2007, 2013	Enterococcus	MPN/100 mL	NA		50,000		30,000	230		500	7,000		90	270	90,000		
2007, 2013	Fecal Coliform	MPN/100 mL	400	1.Basin Plan REC-1/REC-2	**23,000**		**80,000**	**700**		**500**	**3,000**		170	**5,000**	**30,000**	88%	44.49
2007, 2013	Total Coliform	MPN/100 mL	NA		90,000		110,000	7,000		7,000	30,000		1,400	5,000	70,000		
Nutrients																	
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.23		0.15	0.15		0.093J	0.54		<0.10	<0.10	<0.10	0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	3.01		2.1	5.9		0.99	4.4		0.74	4.1	2.9	0%	0.30
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.05		0.098J	0.14		<0.1	<0.15		0.015J	0.045J	0.026J	0%	0.06
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		4.8		2.3	0.71		0.26	1.6		0.25	3.2	0.25		
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.295		0.088	0.04		0.02	0.058		0.016	NR	0.025	0%	0.04
2013	Orthophosphate	mg/L	NA										0.015	0.065	0.026		
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	1.115		0.31	0.084		0.039	0.19		0.026	0.51	0.056	0%	0.15
General Chemistry																	
2007	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	19.4		8.6	2.4		5.8	7		2.3	NR	<2.0	0%	0.22
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	68		54	19		10	31		7.5	NR	22	0%	0.25
2007, 2013	Dissolved Organic Carbon	mg/L	NA		10.3		5.6	4.4		3.9	4.1		3.6	10	3.5		
2007, 2013	Total Organic Carbon	mg/L	NA		8		5.9	4.4		5	4.7		3.7	11	3.7		
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	1.7J		<5	6		<5	1.9J		<5.0	NR	<5.0	0%	0.28
2013	Sulfate	mg/L	250	1. Basin Plan									AE	**290**	250	50%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.005J		<0.05	0.03J		<0.05	0.033J		0.044J	0.040J	0.035J	0%	0.06
2007, 2013	Total Dissolved Solids	mg/L	750 (a)	1. Basin Plan	564		**870**	**830**		**880**	570		**900**	**830**	**810**	75%	1.04
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	**1,220**		**220**	44		10	63		3	**340**	15	38%	2.39
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		135.5		450	410		422	318		467	476	398		
Total Metals																	
2007	Antimony	mg/L	NA		0.0003J		0.00023J	0.00017J		0.00009J	0.00021J		0.00011J	NR	0.00028J		
2007, 2013	Arsenic	mg/L	NA		0.003		0.0043	0.0015		0.0015	0.002		0.0011	0.0065	0.0022		
2007, 2013	Cadmium	mg/L	NA		0.0004		0.00016	0.000063J		0.00003J	0.00005J		<0.00010	0.00021	<0.00010		
2007, 2013	Chromium	mg/L	NA		0.0072		0.013	0.0011		0.0002	0.0022		0.00011J	0.016	0.00084		
2007, 2013	Copper	mg/L	NA		0.0236		0.014	0.0025		0.00081	0.0043		0.00068	0.021	0.0024		
2013	Iron	mg/L	0.3 (a)	1. Basin Plan									0.16	**16**	**0.69**	67%	NA[1]
2007, 2013	Lead	mg/L	NA		0.01811		0.0046	0.00039		0.00006J	0.0009		0.000077J	0.0049	0.00021		
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan									0.031	**0.43**	0.039	33%	NA[1]
2013	Mercury	mg/L	NA										<0.000050H	<0.000050	0.0000050J		
2007, 2013	Nickel	mg/L	NA		0.0094		0.0082	0.0027		0.00074J	0.0017		0.00061J	0.01	0.0028		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0004J		0.0015	0.0013		0.00091	0.0009		0.00068	0.0031	0.0017	0%	0.26
2013	Thallium	mg/L	NA										<0.00020	0.00019J	0.000023J		
2007, 2013	Zinc	mg/L	NA		0.0971		0.04	0.0068		0.0014J	0.011		0.0016J	0.05	0.0030J		
Dissolved Metals																	
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0006		0.00021J	0.00016J		0.0001J	0.00018J		0.00013J	NR	0.00022J	0%	0.04
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0027		0.0016	0.0012		0.0015	0.0012		0.0011	0.0015	0.0017	0%	0.00
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004		0.000018J	0.000038J		0.00002J	0.00002J		0.000034J	0.000020J	<0.00010	0%	0.01
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0002J		0.000086J	0.00011J		<0.0002	0.00008J		0.000053J	0.00011J	0.00013J	0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0017		0.0017	0.0015		0.00094	0.0015		0.00092	0.0019	0.0014	0%	0.04
2013	Iron	mg/L	NA										0.043	0.058	0.018		
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.0001		0.00016J	<0.0002		<0.0002	<0.0002		<0.00020	0.000024J	<0.00020	0%	0.00
2013	Manganese	mg/L	NA										0.0027	0.0035	0.0044		
2013	Mercury	mg/L	NA										<0.000050H	<0.000050	0.0000080J		
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.001		0.0027	0.0023		0.00083	0.00089		0.002	0.0028	0.0019	0%	0.00
2007, 2013	Selenium	mg/L	NA		0.0005		0.0011	0.0012		0.00089	0.00075		0.0013	0.0015	0.0014		
2013	Thallium	mg/L	NA										<0.00020	<0.00020	<0.00020		
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0006		0.0026J	0.0023J		0.0022J	0.0024J		0.0013J	0.0025J	0.0014J	0%	0.01

Wet Weather Historical Monitoring Table for SMR-MLS-2

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data							Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2008-2009	2009-2010	2010-2011		2011-2012	2012-2013		2013-2014	2014-2015				
					12/16/08	-	10/19/10	02/17/11	-	10/11/12-10/12/12	02/20/13	-	11/01/14	12/02/14-12/04/14	03/01/15-03/02/15		
Organophosphorus Pesticides						No Samples Collected			No Samples Collected			No Samples Collected					
2013	Azinphos methyl (Guthion)	µg/L	NA										<0.010	<0.010	<0.010		
2013	Bolstar	µg/L	NA										<0.010	<0.010	<0.010		
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002		<0.01	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010	0%	0.23
2013	Coumaphos	µg/L	NA										<0.010	<0.010	<0.010		
2013	Demeton-o	µg/L	NA										<0.010	<0.010	<0.010BS-L		
2013	Demeton-s	µg/L	NA										<0.010	<0.010	<0.010		
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004		<0.01	<0.01		<0.01	<0.01		<0.010BS-L	<0.010	<0.010	0%	0.06
2013	Dichlorvos	µg/L	NA										<0.010	<0.010	<0.010		
2013	Dimethoate	µg/L	NA										<0.010	<0.010	<0.010		
2013	Disulfoton	µg/L	NA										<0.010	<0.010	<0.010		
2013	Ethoprop	µg/L	NA										<0.010	<0.010	<0.010		
2013	Ethyl parathion	µg/L	NA										<0.010	<0.010	<0.010		
2013	Fensulfothion	µg/L	NA										<0.010	<0.010	<0.010		
2013	Fenthion	µg/L	NA										<0.010	<0.010	<0.010		
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	0.0976		<0.01	0.02		<0.01	0.0092J		<0.010	0.014	<0.010	0%	0.05
2013	Merphos	µg/L	NA										<0.010	<0.010	<0.010		
2013	Methyl parathion	µg/L	NA										<0.010	<0.010	<0.010		
2013	Mevinphos	µg/L	NA										<0.010	<0.010	<0.010		
2013	Naled	µg/L	NA										<0.010	<0.010	<0.010		
2013	Phorate	µg/L	NA										<0.010	<0.010	<0.010		
2013	Ronnel	µg/L	NA										<0.010	<0.010	<0.010		
2013	Stirophos	µg/L	NA										<0.010	<0.010	<0.010		
2013	Tokuthion (Prothiofos)	µg/L	NA										<0.010	<0.010	<0.010		
2013	Trichloronate	µg/L	NA										<0.010	<0.010	<0.010		
Pyrethroids																	
2007, 2013	Allethrin	µg/L	NA		<0.002		<0.005	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002		
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	**0.1376**		<0.005	<0.002		<0.002	0.0076		<0.002	**0.0185**	<0.002	25%	2.29
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	0.0347		<0.005	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	0%	0.02
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	0.0065		<0.005	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	0%	0.06
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	0.0483		<0.005	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	0%	0.01
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.002			<0.002		<0.002	<0.002		<0.002	0.005	<0.002		
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.002		<0.005	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002		
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	0.0025		<0.005	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002	0%	0.01
2007, 2013	Fenvalerate	µg/L	NA										<0.002	<0.002	<0.002		
2007, 2013	Fluvalinate	µg/L	NA										<0.002	0.0032	<0.002		
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.025*		<0.005	<0.025*		<0.025††	<0.01		<0.01	<0.01	<0.01	0%	0.30
2007, 2013	Prallethrin	µg/L	NA		<0.002		<0.005	<0.002		<0.002	<0.002		<0.002	<0.002	<0.002		
2007, 2013	Resmethrin	µg/L	NA										<0.01	<0.01	<0.01		
Toxicity																	
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100		>100	>100		>100	>100		>100	NR	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100		100	100		100	100		100	NR	100	0%	1.00
2013	*Ceriodaphnia* 7-day survival	TST	Pass/Fail										Pass	Pass	Pass	0%	
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**50**		100	100		100	100		100	NR	100	14%	1.14
2013	*Ceriodaphnia* 7-day reproduction	TST	Pass/Fail										Pass	Pass	Pass	0%	
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		**65.8**		>100	>100		>100	>100		>100	NR	>100	14%	1.07
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		100		100	100		100	100		100	NR	100	0%	1.00
2013	*Selenastrum* 96-hr	TST	Pass/Fail										Pass	**Fail**	Pass	33%	
2013	*Pimephales* 7-day survival	TST	Pass/Fail										Pass	Pass	Pass	0%	
2013	*Pimephales* 7-day biomass	TST	Pass/Fail										Pass	Pass	Pass	0%	

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SMR-MLS-2

Blank spaces have been verified and no data is available due to changes in the monitoring program.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area/subarea.
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
* Indicates detection limit above water quality benchmark.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
†† Permethrin was non-detect at the method detection limit of 0.005 µg/L.
AE-Analysis error.
BS-L-Blank Spike recovery of this analyte was below the control limits. Results may be biased low.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
H-Sample analyzed and/or extracted past the recommended holding time.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.
NR-Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SR-TWAS-1

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Transitional Monitoring		Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014			
					11/28/09	02/06/10	-	10/06/11	02/07/12-02/08/12	-	10/09/13-10/10/13	02/06/14-02/07/14		
Physical Chemistry														
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.36	7.38		7.49	8.24		8.02	7.29	0%	0.30
2007, 2013	Specific Conductivity	µmhos/cm	NA		3,120	623		1,256	533		225	2,781		
2007, 2013	Water Temperature	Celsius	NA		13.20	14.00		16.5	12.0		15.48	15.22		
2007, 2013	Turbidity	NTU	20	1. Basin Plan	7.1	**61**		**40**	7.1		**106.8**	**23.7**	67%	2.05
Bacteriological														
2007, 2013	Enterococcus	MPN/100 mL	NA		3,000	5,000		800,000	230		49,000	130		
2007, 2013	Fecal Coliform	MPN/100 mL	400	1. Basin Plan REC-1/REC-2	**23,000**	**2,200**		**50,000**	20		**79,000**	45	67%	64.28
2007, 2013	Total Coliform	MPN/100 mL	NA		30,000	23,000		110,000	1,700		170,000	3,300		
Nutrients														
2007, 2013	Ammonia as N	mg/L	(a)	6. U.S. EPA Water Quality Criteria (Freshwater)	0.04	0.03J		0.22	<0.1		<0.10	<0.10	0%	0.01
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.18	0.34		1.8	0.15		1.9	0.49	0%	0.08
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.05	<0.15		0.084J	<0.1		0.12	0.029J	0%	0.07
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.762J	0.492J		2.5	0.5		2.7	0.43		
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.041J	0.125		0.25	0.046		0.46	0.028	0%	0.08
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.074	0.159		0.6	0.063		0.77	0.15	0%	0.15
General Chemistry														
2007, 2013	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	3	2.5		16	2.7†		20	2.1	0%	0.26
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	17.8	51.1		91	19		110	14	0%	0.42
2007, 2013	Dissolved Organic Carbon	mg/L	NA		5	8.1		6.8	5.4		26	6.4		
2007, 2013	Total Organic Carbon	mg/L	NA		7	7.7		19	5.9		32	7.1		
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<5	<5		<5	1.3J		<5.0	<5.0	0%	0.23
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.1H	0.056		0.08	0.066		0.06	0.12	0%	0.16
2007, 2013	Total Dissolved Solids	mg/L	1500 (b)	1. Basin Plan	**1,862**	322B		1,000	290		1,100	1,500	17%	0.67
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	5.5	40		**110**	5		**160**	18	33%	0.56
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		798.7	163.6		500	180		516	803		
Total Metals														
2007	Antimony	mg/L	NA		0.0002J	0.0004J		0.001	0.00011J		0.0016	0.00042J		
2007, 2013	Arsenic	mg/L	NA		0.0018	0.0010		0.0025	0.00078		0.0026	0.0012		
2007, 2013	Cadmium	mg/L	NA		<0.0004	<0.0004		0.00011	<0.0001		0.00011	0.000044J		
2007, 2013	Chromium	mg/L	NA		0.0002J	0.0009		0.0059	0.0003		0.0056	0.00033		
2007, 2013	Copper	mg/L	NA		0.0016	0.0047		0.015	0.001		0.018	0.0017		
2007, 2013	Lead	mg/L	NA		0.00005J	0.0012		0.0043	0.00016J		0.0044	0.0002		
2007, 2013	Nickel	mg/L	NA		0.0019	0.0012		0.0071	0.00085		0.0059	0.0037		
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.0005	0.0007		0.00059	<0.0004		0.00082	0.0014	0%	0.13
2007, 2013	Zinc	mg/L	NA		0.0042	0.0128		0.043	0.0022J		0.07	0.0055		
Dissolved Metals							No Samples Collected			No Samples Collected				
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0001J	0.0003J		0.00085	0.000098J		0.0012	0.00039J	0%	0.08
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0024	0.0010		0.0015	0.00072		0.0018	0.0007	0%	0.00
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.0004	<0.0004		0.000035J	<0.0001		0.000030J	0.000047J	0%	0.01
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.0001J	0.0002J		0.00042	0.0001J		0.00064	0.00010J	0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0012	0.0020		0.0059	0.00071		0.007	0.0012	0%	0.07
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.0001	0.00008J		0.00011J	0.000015J		0.00014J	<0.00020	0%	0.00
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0021	0.0007		0.0033	0.0009		0.0031	0.0041	0%	0.00
2007, 2013	Selenium	mg/L	NA		<0.0005	0.0002J		0.00038J	0.00035J		0.00073	0.0012		
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.0015	0.0018		0.011	0.015		0.033	0.0046J	0%	0.04
Organophosphorus Pesticides														
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.002		<0.01	<0.01		<0.010	<0.010	0%	0.18
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.004		<0.01	<0.01		<0.010	<0.010	0%	0.05
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.006		0.03	<0.01		0.015	<0.010	0%	0.02
Pyrethroids														
2007, 2013	Allethrin	µg/L	NA		<0.0005	0.0064B		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	<0.0005	**0.0293B**		<0.002	<0.002		**0.0121**	0.0013J	33%	0.81
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	<0.0005	0.0056		<0.002	<0.002		0.0047	<0.002	0%	0.01
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	<0.0005	0.0256		<0.002	<0.002		<0.002	<0.002	0%	0.06
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.0005	0.006		<0.002	<0.002		<0.002	<0.002	0%	0.00
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.0005	0.004B		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Deltamethrin/Tralomethrin£	µg/L	NA		<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.0005	0.0026		<0.002	<0.002		<0.002	<0.002	0%	0.00
2007, 2013	Fenvalerate	µg/L	NA		<0.0005	0.0077		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Fluvalinate	µg/L	NA		<0.0005	<0.0005		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.005	<0.005		<0.025††	<0.025††		<0.01	<0.01	0%	0.08
2007, 2013	Prallethrin	µg/L	NA		<0.0005	0.0098B		<0.002	<0.002		<0.002	<0.002		
2007, 2013	Resmethrin	µg/L	NA		<0.005			<0.025	<0.025		<0.01	<0.01		
Toxicity														
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100		100	100	0%	1.00
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100		100	100		100	100	0%	1.00
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	>100	0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	100		100	100		100	**50**	33%	1.33

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SR-TWAS-1

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.
(a) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(b) Water Quality Benchmark is based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
*Indicates detection limit above water quality benchmark
† Result was from composite sample. The grab sample was analyzed outside of the holding time.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
†† Permethrin was non-detect at the method detection limit of 0.005 µg/L.
B-Analyte was detected in the associated method blank.
H-Sample received and/or analyzed past the recommended holding time.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Historical Monitoring Data											
					2001-2002			2002-2003			2003-2004			2004-2005		
					02/17/02	03/17/02	04/25/02	12/16/02	02/11/03	02/25/03	11/12/03	02/03/04	02/18/04	10/17/04	02/11/05	02/18/05
Physical Chemistry																
2013	Dissolved Oxygen	mg/L	<5.0 (a)													
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.5	7.4	7.3	7.56	6.87	6.94	7.20	7.83	7.58	7.24	7.52	7.49
2007, 2013	Specific Conductivity	µmhos/cm	NA		3,820	3,430	2,980	2,990	2,760	1,955	3,040	1,742	1,995	529	5,070	3,260
2007, 2013	Water Temperature	Celsius	NA					14.30	17.00	14.40	14.90	12.20	15.40	19.30	14.60	14.00
2013	Color	Color units														
2007, 2013	Turbidity	NTU	20	1. Basin Plan	7.7	**20.2**	8.24	**62.9**	13	**46.5**	15.2	11.5	16.8	4.03	5.8	**48.8**
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	NA		300	16,000	9,000	8,000	14,000	30,000	18,792	1,879	17,000	800	3,000	50,000
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	130	500	**11,000**	**23,000**	**7,000**	1,700	4,000	2,200	2,300	300	1,300	1,300
2007, 2013	Total Coliform	MPN/100 mL	NA		23,000	5,000	230,000	30,000	30,000	170,000	300,000	130,000	130,000	30,000	13,000	28,000
Nutrients																
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.16	0.3	0.2	0.25	0.28	0.19	0.16	0.1	0.15	0.39	0.14	0.14
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.4	0.3	0.2	0.54	0.81	0.39	2.19	0.25	0.27	0.07	1.02	1.93
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1.5	3	1.2	1.0	1.0	0.8	2.8	<0.5	0.7	2.1	1.4	1.8
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	<0.05	0.2	0.1	0.34	0.20	0.10	0.4	0.18	0.12	0.2	0.18	0.45
2013	Orthophosphate	mg/L	NA													
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.18	0.29	0.1	0.54	0.22	0.14	0.43	0.22	0.16	0.25	0.57	0.47
General Chemistry																
2007, 2013	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	2	14.2	4.7	<2.0	20.4	5.89	9.32	**46.7**	15.3	19.8	2.57	3.42
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	70	63	55	59	85	39	104	69	86	44	**123**	74
2007, 2013	Dissolved Organic Carbon	mg/L	NA					9.68	25.2	8.94	21.9	7.94	88.2	25.7	5.24	6.19
2007, 2013	Total Organic Carbon	mg/L	NA					40.7	12.9	6.72	20.8	12.5	96.4	30.1	10.9	11.7
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	1	1	1	4.47	2	1	4.43	<1	1.05	<1	<1	<1
2013	Sulfate	mg/L	500 (a)	1. Basin Plan												
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2007, 2013	Total Dissolved Solids	mg/L	1,500 (a)	1. Basin Plan	**2,000**	1,050	**2,870**	793	**1,660**	1,150	**1,880**	**1,780**	**2,230**	**2,860**	**2,370**	1,410
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	21	47	23	74	14	51	<20	<20	<20	20	26	**102**
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		932	499	1,010	344	758	549	817	728	816	1,210	991	556
Total Metals																
2013	Aluminum	mg/L	NA													
2007	Antimony	mg/L	NA		<0.002	<0.002	<0.002	0.004	0.004	0.003	<0.005	<0.005	<0.006	<0.005	<0.005	<0.005
2007, 2013	Arsenic	mg/L	NA		0.002	0.002	0.003	0.004	0.002	0.003	0.005	0.007	0.005	0.004	0.005	<0.002
2007, 2013	Cadmium	mg/L	NA		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2007, 2013	Chromium	mg/L	NA		<0.005	0.007	<0.005	0.009	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	NA		<0.005	0.010	0.006	0.010	0.018	0.007	0.009	0.013	0.012	<0.005	<0.005	0.005
2013	Iron	mg/L	0.3 (a)	1. Basin Plan												
2007, 2013	Lead	mg/L	NA		0.002	0.006	0.003	0.010	0.003	<0.002	0.002	<0.002	0.003	<0.002	<0.002	0.002
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan												
2013	Mercury	mg/L	NA													
2007, 2013	Nickel	mg/L	NA		0.003	0.003	0.004	<0.002	0.002	<0.002	0.004	0.002	<0.002	0.002	0.003	0.002
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.003	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2013	Thallium	mg/L	NA													
2007, 2013	Zinc	mg/L	NA		<0.02	0.045	<0.020	0.042	0.029	0.025	0.036	<0.02	0.029	<0.02	<0.02	<0.02
Dissolved Metals																
2013	Aluminum	mg/L	NA													
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	<0.002	0.006	<0.002	0.004	<0.005	<0.005	<0.006	<0.005	<0.005	<0.005
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	<0.001	0.001	0.003	0.003	0.003	0.003	0.003	0.004	0.003	<0.002	<0.002	<0.002
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	0.007	0.025	0.008	0.005	0.006	0.008	<0.005	<0.005	<0.005
2013	Iron	mg/L	NA													
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
2013	Manganese	mg/L	NA													
2013	Mercury	mg/L	NA													
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.004	<0.002	0.003	<0.002	0.002	<0.002	0.003	0.002	<0.002	0.002	0.003	0.002
2007, 2013	Selenium	mg/L	NA		<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2013	Thallium	mg/L	NA													
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	<0.020	<0.020	<0.020	0.043	0.097	0.021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Historical Monitoring Data											
					2001-2002			2002-2003			2003-2004			2004-2005		
					02/17/02	03/17/02	04/25/02	12/16/02	02/11/03	02/25/03	11/12/03	02/03/04	02/18/04	10/17/04	02/11/05	02/18/05
Chlorinated Pesticides																
2013	Chlordane (tech)	ug/L	2.4	16. 40 CFR 131.38												
Organophosphorus Pesticides																
2013	Azinphos methyl (Guthion)	µg/L	NA													
2013	Bolstar	µg/L	NA													
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.03*	<0.03*	**0.03**	**0.053**	**0.059**	<0.03*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2013	Coumaphos	µg/L	NA													
2013	Demeton-o	µg/L	NA													
2013	Demeton-s	µg/L	NA													
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	**0.10**	**0.27**	<0.03	**0.301**	**0.146**	**0.171**	**0.084**	<0.01	0.026	<0.01	<0.01	<0.01
2013	Dichlorvos	µg/L	NA													
2013	Dimethoate	µg/L	NA													
2013	Disulfoton	µg/L	NA													
2013	Ethoprop	µg/L	NA													
2013	Ethyl parathion	µg/L	NA													
2013	Fensulfothion	µg/L	NA													
2013	Fenthion	µg/L	NA													
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook				0.24	<0.10	<0.10	0.423	<0.01	<0.01	<0.01	<0.01	<0.01
2013	Merphos	µg/L	NA													
2013	Methyl parathion	µg/L	NA													
2013	Mevinphos	µg/L	NA													
2013	Naled	µg/L	NA													
2013	Phorate	µg/L	NA													
2013	Ronnel	µg/L	NA													
2013	Stirophos	µg/L	NA													
2013	Tokuthion (Prothiofos)	µg/L	NA													
2013	Trichloronate	µg/L	NA													
PCB Congeners																
2013	PCB-8	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-18	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-28	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-44	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-52	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-66	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-77	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-81	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-101	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-105	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-114	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-118	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-123	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-126	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-128	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-138	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-153	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-156	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-157	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-167	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-169	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-170	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-180	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-187	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-189	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-195	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-206	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-209	µg/L	0.014 (d)	16. 40 CFR 131.38												

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Historical Monitoring Data											
					2001-2002			2002-2003			2003-2004			2004-2005		
					02/17/02	03/17/02	04/25/02	12/16/02	02/11/03	02/25/03	11/12/03	02/03/04	02/18/04	10/17/04	02/11/05	02/18/05
Polynuclear Aromatic Hydrocarbons																
2013	1-Methylnaphthalene	µg/L	NA													
2013	1-Methylphenanthrene	µg/L	NA													
2013	2,6-Dimethylnaphthalene	µg/L	NA													
2013	2-Methylnaphthalene	µg/L	NA													
2013	Acenaphthene	µg/L	NA													
2013	Acenaphthylene	µg/L	NA													
2013	Anthracene	µg/L	NA													
2013	Benzo (a) anthracene	µg/L	NA													
2013	Benzo (a) pyrene	µg/L	NA													
2013	Benzo (b) fluoranthene	µg/L	NA													
2013	Benzo (e) pyrene	µg/L	NA													
2013	Benzo (g,h,i) perylene	µg/L	NA													
2013	Benzo (k) fluoranthene	µg/L	NA													
2013	Biphenyl	µg/L	NA													
2013	Chrysene	µg/L	NA													
2013	Dibenzo (a,h) anthracene	µg/L	NA													
2013	Fluoranthene	µg/L	NA													
2013	Fluorene	µg/L	NA													
2013	Indeno (1,2,3-cd) pyrene	µg/L	NA													
2013	Naphthalene	µg/L	NA													
2013	Perylene	µg/L	NA													
2013	Phenanthrene	µg/L	NA													
2013	Pyrene	µg/L	NA													
Pyrethroids																
2007, 2013	Allethrin	µg/L	NA													
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006												
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004												
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004												
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004												
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA													
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA													
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004												
2007, 2013	Fenvalerate	µg/L	NA													
2007, 2013	Fluvalinate	µg/L	NA													
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006												
2007, 2013	Prallethrin	µg/L	NA													
2007, 2013	Resmethrin	µg/L	NA													
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	**70.71**	>100	**72.22**	>100	>100	>100	>100	>100	**80.53**	>100	>100
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	**25**	100	**50**	100	100	100	100	100	**25**	100	100
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	**50**	**50**	**50**	100	100	100	100	100	**12.5**	**50**	100
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	**50**	**25**	**12.5**	100	100	100	100	**50**	**50**	100	100
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail													

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Historical Monitoring Data													
					2005-2006			2006-2007			2007-2008	2008-2009	2009-2010		2010-2011	2011-2012		2012-2013
					10/18/05	01/02/06	02/19/06	10/14/06	01/30/07	02/19/07	-	10/05/08	11/28/09	02/06/10	-	10/05/11-10/06/11	02/07/12	-
Physical Chemistry											No Sample Collected				No Sample Collected			No Sample Collected
2013	Dissolved Oxygen	mg/L	<5.0 (a)															
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.66	8.14	8.09	7.80	7.79	7.60		7.49	7.32	7.05		7.55	7.71	
2007, 2013	Specific Conductivity	µmhos/cm	NA		3,430	4,090	2,690	1,890	4,100	3,520		5,180	4,680	3,410		4,380	1,219	
2007, 2013	Water Temperature	Celsius	NA		16.50	15.20	12.20	16.10	11.10	13.10		14.90	12.80	16.30		16.6	13.9	
2013	Color	Color units																
2007, 2013	Turbidity	NTU	20	1. Basin Plan	11.4	9.07	**21.7**	**32.2**	9.6	**65.8**		3.7	5.4	**89.7**		9.4	16	
Bacteriological																		
2007, 2013	Enterococcus	MPN/100 mL	NA		50,000	5,000	13,000	110,000	3,000	1,300		80,000	340	8,000		50,000	5,000	
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	3,000	**8,000**	2,300	**8,000**	170	**5,000**		**230,000**	170	**17,000**		**23,000**	2,200	
2007, 2013	Total Coliform	MPN/100 mL	NA		130,000	30,000	80,000	50,000	3,000	30,000		500,000	2,300	220,000		80,000	80,000	
Nutrients																		
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	<0.1	<0.1	0.19	0.79	0.67	1.24		0.11	0.1	0.07		0.22	<0.1	
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.55	1.52	1.44	1.36	<0.05	0.74		0.22	0.36	0.67		0.39	0.64	
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	<0.05	0.06	<0.05	<0.05		<0.05	<0.05	<0.75		0.033J	0.021J	
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1	1.7	2.5	2.2	1.4	2.4		2.4	1.12	0.644J		1	0.89	
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.26	0.43	0.24	0.28	0.21	0.32		0.133	0.163	0.263		0.2	0.11	
2013	Orthophosphate	mg/L	NA															
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.52	0.45	0.54	0.4	0.28	0.39		0.19	0.17	0.396		0.24	0.15	
General Chemistry																		
2007, 2013	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	4.96	3.72	2.22	**115**	3.66	3.36		**45.7**	5.5	2.9		10	3.5[†]	
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	47	44	102	119	54	45		52	36.1	55		34	36	
2007, 2013	Dissolved Organic Carbon	mg/L	NA		5.04	19	10.5	86.9	13.6	12.8		9.7	8.6	9.9		7.6	7.9	
2007, 2013	Total Organic Carbon	mg/L	NA		12.1	14	13.2	88.8	13.8	13		9.9	8.8	9.4		7.6	8.5	
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<1	<1	<1	<5	<5	<5		**14.3**	3.4J	<5		1.9J	3.1J	
2013	Sulfate	mg/L	500 (a)	1. Basin Plan														
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		0.16	0.1H	0.031		0.1	0.14	
2007, 2013	Total Dissolved Solids	mg/L	1,500 (a)	1. Basin Plan	**2,640**	**2,140**	**2,070**	**1,990**	**2,060**	1,290		**3,038**	**2,878**	952B		**2,900**	**1,800**	
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	<20	<20	<20	45	<20	91		8.2	6.8	**106**		9	12	
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		1,130	1,020	966	807	999	626		1,010.8	1,086.9	336.8		1200	950	
Total Metals																		
2013	Aluminum	mg/L	NA															
2007	Antimony	mg/L	NA		<0.005	<0.005	<0.005	0.002	0.002	0.004		0.0009	0.0004J	0.0006		0.0006	0.00072	
2007, 2013	Arsenic	mg/L	NA		0.008	0.005	0.005	0.011	0.002	0.003		0.004	0.0084	0.0046		0.0017	0.002	
2007, 2013	Cadmium	mg/L	NA		<0.001	<0.001	<0.001	0.003	<0.001	<0.001		<0.0004	<0.0004	<0.0004		0.00004J	0.000037J	
2007, 2013	Chromium	mg/L	NA		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		0.0021	0.0006	0.0015		0.0019	0.0008	
2007, 2013	Copper	mg/L	NA		<0.005	0.005	0.005	0.011	0.006	0.012		0.0053	0.0035	0.0059		0.005	0.005	
2013	Iron	mg/L	0.3 (a)	1. Basin Plan														
2007, 2013	Lead	mg/L	NA		<0.002	<0.002	<0.002	0.003	<0.001	0.004		0.0005	0.00026	0.00338		0.00075	0.0013	
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan														
2013	Mercury	mg/L	NA															
2007, 2013	Nickel	mg/L	NA		0.007	0.004	0.003	0.004	0.003	0.004		0.0017	0.003	0.0022		0.005	0.0037	
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.005	<0.004	<0.005	<0.004	<0.004	<0.004		0.0002J	<0.0005	0.0013		0.0004	0.00062	
2013	Thallium	mg/L	NA															
2007, 2013	Zinc	mg/L	NA		0.044	<0.02	<0.02	0.047	0.022	0.047		0.021	0.011	0.0261		0.013	0.011	
Dissolved Metals																		
2013	Aluminum	mg/L	NA															
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.005	<0.005	<0.005	<0.002	<0.002	0.002		0.0004J	0.0002J	0.0006		0.00034J	0.00047J	
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	<0.001	<0.001	<0.001	0.002	<0.001	<0.001		0.0041	0.008	0.0039		0.0017	0.0017	
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.0004	<0.0004	<0.0004		0.000034J	0.000029J	
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		0.0018	0.0005	0.0003J		0.0014	0.00043	
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	0.006	0.004	0.005		0.0026	0.0019	0.0029		0.0031	0.0029	
2013	Iron	mg/L	NA															
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001		<0.0001	0.00009J	0.00007J		0.000039J	0.000071J	
2013	Manganese	mg/L	NA															
2013	Mercury	mg/L	NA															
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	<0.002	0.004	0.003	0.004	<0.002	0.002		0.0017	0.0030	0.0014		0.0048	0.0031	
2007, 2013	Selenium	mg/L	NA		<0.005	<0.004	<0.005	<0.004	<0.004	<0.004		0.0002J	0.0003J	0.0007		0.00029J	0.00061	
2013	Thallium	mg/L	NA															
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.04	<0.02	<0.02	0.023	<0.02	<0.02		0.0135	0.0050	0.0021		0.01	0.0064	

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Historical Monitoring Data													
					2005-2006			2006-2007			2007-2008	2008-2009	2009-2010		2010-2011	2011-2012		2012-2013
					10/18/05	01/02/06	02/19/06	10/14/06	01/30/07	02/19/07	-	10/05/08	11/28/09	02/06/10	-	10/05/11-10/06/11	02/07/12	-
Chlorinated Pesticides											No Sample Collected				No Sample Collected			No Sample Collected
2013	Chlordane (tech)	ug/L	2.4	16. 40 CFR 131.38														
Organophosphorus Pesticides																		
2013	Azinphos methyl (Guthion)	µg/L	NA															
2013	Bolstar	µg/L	NA															
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.01	<0.02	<0.02	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002		<0.01	<0.01	
2013	Coumaphos	µg/L	NA															
2013	Demeton-o	µg/L	NA															
2013	Demeton-s	µg/L	NA															
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.01	<0.02	<0.02	<0.004	<0.004	<0.004		<0.004	<0.004	<0.004		<0.01	<0.01	
2013	Dichlorvos	µg/L	NA															
2013	Dimethoate	µg/L	NA															
2013	Disulfoton	µg/L	NA															
2013	Ethoprop	µg/L	NA															
2013	Ethyl parathion	µg/L	NA															
2013	Fensulfothion	µg/L	NA															
2013	Fenthion	µg/L	NA															
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.01	<0.02	<0.02	0.097	0.063	<0.006		<0.006	<0.006	0.059		<0.01	<0.01	
2013	Merphos	µg/L	NA															
2013	Methyl parathion	µg/L	NA															
2013	Mevinphos	µg/L	NA															
2013	Naled	µg/L	NA															
2013	Phorate	µg/L	NA															
2013	Ronnel	µg/L	NA															
2013	Stirophos	µg/L	NA															
2013	Tokuthion (Prothiofos)	µg/L	NA															
2013	Trichloronate	µg/L	NA															
PCB Congeners																		
2013	PCB-8	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-18	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-28	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-44	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-52	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-66	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-77	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-81	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-101	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-105	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-114	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-118	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-123	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-126	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-128	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-138	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-153	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-156	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-157	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-167	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-169	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-170	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-180	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-187	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-189	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-195	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-206	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-209	µg/L	0.014 (d)	16. 40 CFR 131.38														

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Historical Monitoring Data													
					2005-2006			2006-2007			2007-2008	2008-2009	2009-2010		2010-2011	2011-2012		2012-2013
					10/18/05	01/02/06	02/19/06	10/14/06	01/30/07	02/19/07	-	10/05/08	11/28/09	02/06/10	-	10/05/11-10/06/11	02/07/12	-
Polynuclear Aromatic Hydrocarbons											No Sample Collected				No Sample Collected			No Sample Collected
2013	1-Methylnaphthalene	µg/L	NA															
2013	1-Methylphenanthrene	µg/L	NA															
2013	2,6-Dimethylnaphthalene	µg/L	NA															
2013	2-Methylnaphthalene	µg/L	NA															
2013	Acenaphthene	µg/L	NA															
2013	Acenaphthylene	µg/L	NA															
2013	Anthracene	µg/L	NA															
2013	Benzo (a) anthracene	µg/L	NA															
2013	Benzo (a) pyrene	µg/L	NA															
2013	Benzo (b) fluoranthene	µg/L	NA															
2013	Benzo (e) pyrene	µg/L	NA															
2013	Benzo (g,h,i) perylene	µg/L	NA															
2013	Benzo (k) fluoranthene	µg/L	NA															
2013	Biphenyl	µg/L	NA															
2013	Chrysene	µg/L	NA															
2013	Dibenzo (a,h) anthracene	µg/L	NA															
2013	Fluoranthene	µg/L	NA															
2013	Fluorene	µg/L	NA															
2013	Indeno (1,2,3-cd) pyrene	µg/L	NA															
2013	Naphthalene	µg/L	NA															
2013	Perylene	µg/L	NA															
2013	Phenanthrene	µg/L	NA															
2013	Pyrene	µg/L	NA															
Pyrethroids																		
2007, 2013	Allethrin	µg/L	NA									<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006								<0.002	<0.0005	**0.0358B**		<0.002	0.009	
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004								<0.002	<0.0005	0.0179		<0.002	0.0142	
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004								<0.002	<0.0005	0.0264		<0.002	<0.002	
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004								<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA									<0.002	<0.0005	0.0009J		<0.002	<0.002	
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA									<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004								<0.002	<0.0005	0.0022		<0.002	<0.002	
2007, 2013	Fenvalerate	µg/L	NA									<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Fluvalinate	µg/L	NA									<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006								<0.025*	<0.005	<0.005		<0.025[††]	<0.025[††]	
2007, 2013	Prallethrin	µg/L	NA									<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Resmethrin	µg/L	NA									<0.025	<0.005			<0.025	<0.025	
Toxicity																		
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100		>100	>100	>100		>100	>100	
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100	100	100	100	100		100	100	100		100	100	
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100	100	**6.25**	100	100		**50**	**50**	100		**50**	100	
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100		>100	>100	>100		>100	>100	
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	100	100	100	100	100		**50**	**50**	100		**50**	**50**	
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail															

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2013-2014			2014-2015		
					10/10/13	12/07/13-12/08/13	02/07/14	-		
Physical Chemistry										
2013	Dissolved Oxygen	mg/L	<5.0 (a)		5.58	8.89	5.47		0%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.64	7.63	7.48		0%	0.24
2007, 2013	Specific Conductivity	µmhos/cm	NA		4,854	2,450	5,107			
2007, 2013	Water Temperature	Celsius	NA		15.7	12.65	13.77			
2013	Color	Color units			**50**	**25**	**30**		100%	NA[1]
2007, 2013	Turbidity	NTU	20	1. Basin Plan	2.1	**52.5**	**26.8**		38%	1.18
Bacteriological										
2007, 2013	Enterococcus	MPN/100 mL	NA		330	28,000	490			
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	330	**17,000**	<18		38%	3.57
2007, 2013	Total Coliform	MPN/100 mL	NA		7,900	110,000	13,000			
Nutrients										
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.18	<0.10	<0.10		0%	0.01
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.25	0.44	0.22		0%	0.07
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.032J	<0.10	0.026J		0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.7	0.54	0.67			
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.22	NR	0.11		0%	0.11
2013	Orthophosphate	mg/L	NA		0.18	0.13	0.11			
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.23	0.16	0.13		0%	0.15
General Chemistry										
2007, 2013	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	<2.0	NR	6.2		12%	0.47
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	36	NR	29		4%	0.52
2007, 2013	Dissolved Organic Carbon	mg/L	NA		9.8	8.6	6.6			
2007, 2013	Total Organic Carbon	mg/L	NA		9.8	8.2	6.4			
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	2.4J	NR	1.8J		4%	0.23
2013	Sulfate	mg/L	500 (a)	1. Basin Plan	430	210	420		0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.096	0.1	0.084		0%	0.36
2007, 2013	Total Dissolved Solids	mg/L	1,500 (a)	1. Basin Plan	**3,000**	**2,800**	**2,900**		77%	1.40
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	28	13	4	No Sample Collected	8%	0.30
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		1,240	1,150	1,260			
Total Metals										
2013	Aluminum	mg/L	NA		0.88	0.39	0.033			
2007	Antimony	mg/L	NA		0.0006	NR	0.00021J			
2007, 2013	Arsenic	mg/L	NA		0.0016	0.0016	0.0014			
2007, 2013	Cadmium	mg/L	NA		0.000070J	0.000040J	0.000028J			
2007, 2013	Chromium	mg/L	NA		0.0016	0.0029	0.00015J			
2007, 2013	Copper	mg/L	NA		0.007	0.0052	0.0012			
2013	Iron	mg/L	0.3 (a)	1. Basin Plan	**1.3**	**0.63**	0.1		67%	NA[1]
2007, 2013	Lead	mg/L	NA		0.0022	0.0011	0.000089J			
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan	**0.16**	**0.12**	**0.14**		100%	NA[1]
2013	Mercury	mg/L	NA		<0.000050	0.000032J	<0.000050			
2007, 2013	Nickel	mg/L	NA		0.002	0.0079	0.006			
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.00022J	0.00082	0.0023		0%	0.35
2013	Thallium	mg/L	NA		<0.00020	<0.00020	<0.00020			
2007, 2013	Zinc	mg/L	NA		0.029	0.014	0.0033J			
Dissolved Metals										
2013	Aluminum	mg/L	NA		0.0025J	<0.0050	<0.0050			
2007	Antimony	mg/L	0.006	1. Basin Plan	0.00026J	NR	0.00022J		0%	0.29
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0013	0.0015	0.0013		0%	0.01
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	0.000050J	0.000027J	0.000028J		0%	0.02
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.00063	0.0022	0.00014J		0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0038	0.0036	0.0017		0%	0.09
2013	Iron	mg/L	NA		<0.010	<0.010	0.01			
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.00020	<0.00020	<0.00020		0%	0.00
2013	Manganese	mg/L	NA		0.0018	0.001	0.11			
2013	Mercury	mg/L	NA		<0.000050	0.000030J	<0.000050			
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0015	0.0071	0.0074		0%	0.00
2007, 2013	Selenium	mg/L	NA		0.00021J	0.00076	0.0018			
2013	Thallium	mg/L	NA		<0.00020	<0.00020	<0.00020			
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.013	0.005	0.0042J		0%	0.04

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2013-2014			2014-2015		
					10/10/13	12/07/13-12/08/13	02/07/14	-		
Chlorinated Pesticides								No Sample Collected		
2013	Chlordane (tech)	ug/L	2.4	16. 40 CFR 131.38	<0.10	<0.10	<0.10		0%	NA[1]
Organophosphorus Pesticides										
2013	Azinphos methyl (Guthion)	µg/L	NA		<0.010	<0.010	<0.010			
2013	Bolstar	µg/L	NA		<0.010	<0.010	<0.010			
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.010	<0.010	<0.010		13%	0.50
2013	Coumaphos	µg/L	NA		<0.010	<0.010	<0.010			
2013	Demeton-o	µg/L	NA		<0.010	<0.010BS-L	<0.010			
2013	Demeton-s	µg/L	NA		<0.010	<0.010BS-L	<0.010			
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.010	<0.010	<0.010		23%	0.57
2013	Dichlorvos	µg/L	NA		<0.010	<0.010	<0.010			
2013	Dimethoate	µg/L	NA		<0.010	<0.010	<0.010			
2013	Disulfoton	µg/L	NA		<0.010	<0.010BS-L	<0.010			
2013	Ethoprop	µg/L	NA		<0.010	<0.010	<0.010			
2013	Ethyl parathion	µg/L	NA		<0.010	<0.010	<0.010			
2013	Fensulfothion	µg/L	NA		<0.010	<0.010	<0.010			
2013	Fenthion	µg/L	NA		<0.010	<0.010	<0.010			
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.010	<0.010	<0.010		0%	0.11
2013	Merphos	µg/L	NA		<0.010	<0.010	<0.010			
2013	Methyl parathion	µg/L	NA		<0.010	<0.010	<0.010			
2013	Mevinphos	µg/L	NA		<0.010	<0.010	<0.010			
2013	Naled	µg/L	NA		<0.010BS-L	<0.010BS-L	<0.010			
2013	Phorate	µg/L	NA		<0.010	<0.010	<0.010			
2013	Ronnel	µg/L	NA		<0.010	<0.010	<0.010			
2013	Stirophos	µg/L	NA		<0.010	<0.010	<0.010			
2013	Tokuthion (Prothiofos)	µg/L	NA		<0.010	<0.010	<0.010			
2013	Trichloronate	µg/L	NA		<0.010	<0.010	<0.010			
PCB Congeners										
2013	PCB-8	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-18	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-28	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-44	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-52	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-66	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-77	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-81	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-101	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-105	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-114	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-118	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-123	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-126	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-128	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-138	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-153	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-156	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-157	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-167	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-169	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-170	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-180	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-187	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-189	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-195	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-206	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-209	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2013-2014			2014-2015		
					10/10/13	12/07/13-12/08/13	02/07/14	-		
Polynuclear Aromatic Hydrocarbons										
2013	1-Methylnaphthalene	µg/L	NA		<0.10	<0.10	<0.10	No Sample Collected		
2013	1-Methylphenanthrene	µg/L	NA		<0.10	<0.10	<0.10			
2013	2,6-Dimethylnaphthalene	µg/L	NA		<0.10	<0.10	<0.10			
2013	2-Methylnaphthalene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Acenaphthene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Acenaphthylene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Anthracene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Benzo (a) anthracene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Benzo (a) pyrene	µg/L	NA		<0.10BS-L	<0.10	<0.10			
2013	Benzo (b) fluoranthene	µg/L	NA		<0.10BS-L	<0.10	<0.10			
2013	Benzo (e) pyrene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Benzo (g,h,i) perylene	µg/L	NA		<0.10BS-L	<0.10	<0.10			
2013	Benzo (k) fluoranthene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Biphenyl	µg/L	NA		<0.10	<0.10	<0.10			
2013	Chrysene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Dibenzo (a,h) anthracene	µg/L	NA		<0.10BS-L	<0.10	<0.10			
2013	Fluoranthene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Fluorene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Indeno (1,2,3-cd) pyrene	µg/L	NA		<0.10BS-L	<0.10BS-L	<0.10			
2013	Naphthalene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Perylene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Phenanthrene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Pyrene	µg/L	NA		<0.10	<0.10	<0.10			
Pyrethroids										
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	0.0021	0.0013J	<0.002		20%	1.01
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	<0.002	<0.002	<0.002		0%	0.02
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	0.001J	<0.002	<0.002		0%	0.06
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.002	<0.002	<0.002		0%	0.00
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	<0.002	<0.002		0%	0.00
2007, 2013	Fenvalerate	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Fluvalinate	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.01	<0.01	<0.01		0%	0.21
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Resmethrin	µg/L	NA		<0.01	<0.01	<0.01			
Toxicity										
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	NR	>100		13%	1.05
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	NR	100		13%	1.30
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**50**	NR	**50**		39%	2.26
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	NR	>100		0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	NR	**25**		48%	1.83
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail		Pass	Pass	Pass		0%	

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SR-MLS

Blank spaces have been verified and no data is available.

(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
(d) Water Quality Benchmark for PCBs is the Criteria Continuous Concentration (CCC) was used (USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000). There is no Criteria Maximum Concentration (CMC) for PCBS.
NA indicate no criteria or published value was available or applicable to the matrix or program.
* Indicates detection limit above water quality benchmark.
† Result was from composite sample. The grab sample was analyzed outside of the holding time.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
†† Permethrin was non-detect at the method detection limit of 0.005 µg/L.
B-Analyte was detected in the associated method blank.
BS-L-Blank Spike recovery of this analyte was below the control limits. Results may be biased low.
H-Sample received and or/analyzed past the recommended holding time.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.
NR-Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

County of San Diego

RICHARD E. CROMPTON
DIRECTOR

DEPARTMENT OF PUBLIC WORKS
5510 OVERLAND AVE, SUITE 410
SAN DIEGO, CALIFORNIA 92123-1237
(858) 694-2212 FAX: (858) 694-3597
Web Site: www.sdcounty.ca.gov/dpw/

May 22, 2014

Mr. Jeremy Haas
California Regional Water Quality Control Board
San Diego Region
2375 Northside Drive, Suite 100
San Diego, CA 92108

SUBJECT: REASSESSMENT AND DELISTING OF SELENIUM IN KEYS CREEK

Dear Mr. Haas:

The County of San Diego appreciates the opportunity to provide the following information to support the reassessment and delisting of Keys Creek for selenium. Based on the memorandum dated November 12, 2013 related to the California Integrated Report Update, the next integrated report for the San Diego Region (9) will be forthcoming in 2014. The selenium listing discussed herein is a high priority for the San Luis Rey Watershed and should be included in the analysis for the 2014 Integrated Report. As specified in the memorandum, the data will be uploaded to the California Environmental Data Exchange Network (CEDEN).

In 2010, Keys Creek was placed on the California Clean Water Act Section 303(d) List of Impaired Waters (303(d) List) for exceeding the water quality objective for total selenium. The listing was supported by results reported in the 2007 California's Surface Water Ambient Monitoring Program Report. According to the lines of evidence presented for Decision ID 16498, two of three samples exceeded the California Toxic Rule's (CTR) Criterion Continuous Concentration (CCC) of 0.005 mg/L for total selenium and resulted in a listing of the waterbody. It should be noted that dissolved (not total) selenium concentrations were used in the listing while the CTR chronic CCC of 0.005 mg/L applies to total selenium concentrations only.

Data collected since the 2010 listing has indicated a decrease in concentrations of selenium. Available monitoring data has been reviewed to determine if the creek continues to exceed applicable water quality objectives or qualifies for delisting under the 2004 Water Quality Control Policy for Developing California Clean Water Act

Section 303(d) List (Listing Policy). This letter provides a summary of that review and Attachment 1 provides the data to support the conclusions presented.

Data Used in the Analysis

Water quality data from April 2011 to February 2013 were collected from Monitoring Stations SLR17 at Dublin Road and SLR29 at Lilac Road. Samples were analyzed for total selenium according to EPA 200.8 analytical method, as specified in the 2011 Quality Assurance Project Plan for the County of San Diego's Inland Surface Water Monitoring Program. Monitoring station SLR17 is located on Keys Creek just upstream of the confluence with the San Luis Rey River. Monitoring Station SLR 29 is located on Keys Creek approximately 5.5 miles upstream of the San Luis Rey River. Twenty eight samples were collected across all seasons under dry and wet conditions between the two monitoring stations and analyzed for total selenium.

Comparison of Data to Water Quality Criteria

Selenium results were compared to the CTR criteria as show in **Table 1**.

Table 1. Selenium Water Quality Criteria

Constituent	Units	Freshwater Criterion Continuous Concentration (CCC)
Total Selenium	mg/L	0.005[1]

[1] 40 CFR Part 131.38(b).1. *California Toxics Rule.*

The Water Quality Control Plan for the San Diego Basin (Basin Plan) also lists a maximum contaminant level for selenium; however the listing only applies to water bodies with domestic or municipal supply (MUN) beneficial use designations. Table 2-2 of the Basin Plan indicates that the MUN beneficial use does not apply to Keys Creek, therefore the Basin Plan water quality objective was not used in the analysis. It should be noted that the Basin Plan water quality objective is a less stringent objective, set at 0.05 mg/L.

The more stringent CTR CCC (chronic) objective is used for comparison in the analysis. A sample was determined to exceed the water quality objective if the total selenium concentration in the sample was greater than or equal to the CTR CCC value of 0.005 mg/L.

Comparison of Exceedances to Listing Policy

The number of exceedances shown in **Table 2** was then compared to the requirements for delisting presented in Section 4 of the Listing Policy. Table 4.1 of the Listing Policy indicates that for toxicants where the sample size is between twenty eight and thirty six samples, the number of exceedances must be less than or equal to two for the constituent to be considered for delisting.

As shown in **Table 2** and in the data included in Attachment 1, there were no exceedances of the CTR CCC criteria for the twenty eight samples analyzed. As a result, the available data collected since April 20 shows that Keys Creek should be delisted per the 2004 Listing Policy.

Table 2. Summary of Objective Exceedances

	Exceedances of CTR Freshwater CCC Criteria (0.005 mg/L)
Total Selenium (n = 28)	0
Allowable Exceedances for Delisting[1]	2

[1] Allowable Exceedances for delisting are outlined in Table 4.1 of the Listing Policy

Attachment 1 to this letter includes the data used to determine the number of exceedances of the applicable water quality objective.

Thank you for your consideration of these comments. If you have any questions, please contact me at (858) 495-5317.

Yours truly,

JO ANN WEBER, Watershed Program Manager
County of San Diego Department of Public Works

JW:js

Attachments: Attachment 1. Data to Support Delisting of San Marcos Creek for Selenium

Attachment 1. Data to Support Delisting of San Marcos Creek for Selenium

Site Name:	Keys Creek
Site ID	SLR17
Site Description:	Keys Creek at Dunlin Road
Latitude:	33.32384
Longitude:	-117.15723
CTR Freshwater CCC Criteria:	0.005 mg/L
Number of Samples (n):	8
Number of Exceedances:	0
Number of Allowable Exceedances:	2

Sample Date	Analyte	Method Name	Results	MDL	RL	Unit	Exceedance
4/19/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
5/6/2011	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
6/3/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
2/23/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
3/7/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
3/21/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
3/28/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
4/4/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No

Site Name:	Keys Creek
Site ID	SLR29
Site Description:	Keys Creek at Lilac Road
Latitude:	33.28808
Longitude:	-117.08333
CTR Freshwater CCC Criteria:	0.005 mg/L
Number of Samples (n):	20
Number of Exceedances:	0
Number of Allowable Exceedances:	2

Sample Date	Analyte	Method Name	Results	MDL	RL	Unit	Exceedance
4/19/2011	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
5/6/2011	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
6/3/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
6/15/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
7/5/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
7/13/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
2/23/2012	Selenium, Total	EPA 200.8	0.003	0.0005	0.001	mg/L	No
3/7/2012	Selenium, Total	EPA 200.8	0.003	0.0005	0.001	mg/L	No
3/21/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
3/28/2012	Selenium, Total	EPA 200.8	0.003	0.0005	0.001	mg/L	No
4/4/2012	Selenium, Total	EPA 200.8	0.003	0.0005	0.001	mg/L	No
5/23/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
6/1/2012	Selenium, Total	EPA 200.8	0.004	0.0005	0.001	mg/L	No
6/4/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
9/7/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
10/16/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
10/23/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
10/30/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
11/7/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
2/8/2013	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No

County of San Diego

RICHARD E. CROMPTON
DIRECTOR

DEPARTMENT OF PUBLIC WORKS
5510 OVERLAND AVE, SUITE 410
SAN DIEGO, CALIFORNIA 92123-1237
(858) 694-2212 FAX: (858) 694-3597
Web Site: www.sdcounty.ca.gov/dpw/

May 22, 2014

Mr. Jeremy Haas
California Regional Water Quality Control Board
San Diego Region
2375 Northside Drive, Suite 100
San Diego, CA 92108

SUBJECT: REASSESSMENT AND DELISTING OF SELENIUM IN SAN MARCOS CREEK

Dear Mr. Haas:

The County of San Diego appreciates the opportunity to provide the following information to support the reassessment and delisting of San Marcos Creek for selenium. Based on the memorandum dated November 12, 2013 related to the California Integrated Report Update, the next integrated report for the San Diego Region (9) will be forthcoming in 2014. The selenium listing discussed herein is a high priority for the Carlsbad Watershed and should be included in the analysis for the 2014 Integrated Report. As specified in the memorandum, the data will be uploaded to the California Environmental Data Exchange Network (CEDEN).

In 2010, San Marcos Creek was placed on the California Clean Water Act Section 303(d) List of Impaired Waters for exceedances the water quality objective for total selenium. The listing was supported by results reported in the 2007 California's Surface Water Ambient Monitoring Program Report. According to the lines of evidence presented for Decision ID 17066, seven of eight samples exceeded the California Toxic Rule's (CTR) Criterion Continuous Concentration (CCC) of 0.005 mg/L for total selenium and resulted in the listing of the waterbody. It should be noted that dissolved (not total) selenium concentrations were used in the listing while the CTR chronic CCC of 0.005 mg/L applies to total selenium concentrations only.

Data collected since the 2010 listing has indicated a decrease in concentrations of selenium. Available monitoring data has been reviewed to determine if the creek continues to exceed applicable water quality objectives or qualifies for delisting under the 2004 Water Quality Control Policy for Developing California Clean Water Act Section 303(d) List (Listing Policy). This letter provides a summary of that review and Attachment 1 provides the data to support the conclusions presented.

Data Used in the Analysis

Water quality data from April 2011 to April 2013 were collected from Monitoring Station CAR04 at the Discovery Street Bridge and were analyzed for total selenium according to the EPA 200.8 analytical method, as specified in the 2011 Quality Assurance Project Plan for the County of San Diego's Inland Surface Water Monitoring Program. Monitoring station CAR04 is located approximately 0.25 miles upstream of Lake San Marcos. Thirty one samples were collected across all seasons under dry and wet conditions and analyzed for total selenium.

Comparison of Data to Water Quality Criteria

Selenium results were compared to the CTR criteria as shown in **Table 1.**

Table 1 Selenium Water Quality Criteria

Constituent	Units	Freshwater Criterion Continuous Concentration (CCC)[1]
Total Selenium	mg/L	0.005

[1] 40 CFR Part 131.38(b).1. *California Toxics Rule.*

The Water Quality Control Plan for the San Diego Basin (Basin Plan) also lists a maximum contaminant level for selenium; however the listing only applies to water bodies with domestic or municipal supply (MUN) beneficial use designations. Table 2-2 of the Basin Plan indicates that the MUN beneficial use does not apply to San Marcos Creek; therefore the Basin Plan water quality objective was not used in the analysis. It should be noted that the Basin Plan water quality objective is a less stringent objective, set at 0.05 mg/L.

The more stringent CTR CCC (chronic) objective is used for comparison in the analysis. A sample was determined to exceed the water quality objective if the total selenium concentration in the sample was greater than or equal to the CTR CCC value of 0.005 mg/L.

Comparison of Exceedances to Listing Policy

The number of exceedances shown in **Table 2** was then compared to the requirements for delisting presented in Section 4 of the Listing Policy. Table 4.1 of the Listing Policy indicates that for toxicants where the sample size is between twenty eight and thirty six samples, the number of exceedances must be less than or equal to two for the constituent to be considered for delisting.

As shown in **Table 2** and in the data included as Attachment 1, there were no exceedances of the CTR CCC criteria for the thirty one samples analyzed. As a result, the available data collected since April 2011 shows that San Marcos Creek should be delisted per the 2004 Listing Policy.

Table 2. Summary of Objective Exceedances

	Exceedances of CTR Freshwater CCC Criteria (0.005 mg/L)
Total Selenium (n=31)	0
Allowable Exceedances for Delisting[1]	2

[1] Allowable Exceedances for delisting are outlined in Table 4.1 of the Listing Policy

Attachment 1 to this letter includes the data used to determine the number of exceedances of the applicable water quality objective.

Thank you for your consideration of these comments. If you have any questions, please contact me at (858) 495-5317.

Yours truly,

JO ANN WEBER, Watershed Program Manager
County of San Diego Department of Public Works

JW:js

Attachments: Attachment 1. Data to Support Delisting of San Marcos Creek for Selenium

Attachment 1. Data to Support Delisting of San Marcos Creek for Selenium

Site Name:	San Marcos Creek
Site ID:	CAR04
Site Description:	San Marcos Creek at Discovery Street
Latitude:	33.13046
Longitude:	-117.20045
CTR Freshwater CCC Criteria:	0.005 mg/L
Number of Samples (n):	31
Number of Exceedances:	0
Number of Allowable Exceedances:	2

SampleDate	Analyte	MethodName	Result	MDL	RL	Unit	Exceedance
4/25/2011	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
5/10/2011	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
6/2/2011	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
6/7/2011	Selenium, Total	EPA 200.8	0.0009	0.0005	0.001	mg/L	NO
7/11/2011	Selenium, Total	EPA 200.8	0.0009	0.0005	0.001	mg/L	NO
2/16/2012	Selenium, Total	EPA 200.8	0.0008	0.0005	0.001	mg/L	NO
2/29/2012	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	NO
3/8/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
3/23/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
3/29/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
4/6/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
5/3/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
5/22/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
5/29/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
10/16/2012	Selenium, Total	EPA 200.8	0.0008	0.0005	0.001	mg/L	NO
10/23/2012	Selenium, Total	EPA 200.8	0.0009	0.0005	0.001	mg/L	NO
10/30/2012	Selenium, Total	EPA 200.8	0.0008	0.0005	0.001	mg/L	NO
11/7/2012	Selenium, Total	EPA 200.8	0.0009	0.0005	0.001	mg/L	NO
11/19/2012	Selenium, Total	EPA 200.8	0.0009	0.0005	0.001	mg/L	NO
11/27/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
11/29/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
12/3/2012	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	NO
1/10/2013	Selenium, Total	EPA 200.8	0.0008	0.0005	0.001	mg/L	NO
1/29/2013	Selenium, Total	EPA 200.8	0.0008	0.0005	0.001	mg/L	NO
2/11/2013	Selenium, Total	EPA 200.8	0.0008	0.0005	0.001	mg/L	NO
2/22/2013	Selenium, Total	EPA 200.8	0.0008	0.0005	0.001	mg/L	NO
2/28/2013	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
3/19/2013	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
3/26/2013	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
4/3/2013	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO
4/17/2013	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	NO

County of San Diego

RICHARD E. CROMPTON
DIRECTOR

DEPARTMENT OF PUBLIC WORKS
5510 OVERLAND AVE, SUITE 410
SAN DIEGO, CALIFORNIA 92123-1237
(858) 694-2212 FAX: (858) 694-3597
Web Site: www.sdcounty.ca.gov/dpw/

May 22, 2014

Mr. Jeremy Haas
California Regional Water Quality Control Board
San Diego Region
2375 Northside Drive, Suite 100
San Diego, CA 92108

SUBJECT: REASSESSMENT AND DELISTING OF SELENIUM IN ESCONDIDO CREEK

Dear Mr. Haas:

The County of San Diego appreciates the opportunity to provide the following information to support the reassessment and delisting of Escondido Creek for selenium. Based on the memorandum dated November 12, 2013 related to the California Integrated Report Update, the next integrated report for the San Diego Region (9) will be forthcoming in 2014. The selenium listing discussed herein is a high priority for the Carlsbad Watershed and should be included in the analysis for the 2014 Integrated Report. As specified in the memorandum, the data will be uploaded to the California Environmental Data Exchange Network (CEDEN).

In 2006, Escondido Creek was placed on the California Clean Water Act Section 303(d) List of Impaired Waters (303(d) List) for exceeding the water quality objective for total selenium. Data used in the listing determination included data from the 2004 California's Surface Water Ambient Monitoring Program Report and City of Escondido Baseline Water Quality Monitoring Program. According to the lines of evidence presented for Decision ID 5711, eight of thirty one samples exceeded the California Toxic Rule's (CTR) Criterion Continuous Concentration (CCC) of 0.005 mg/L for total selenium and resulted in a listing of the waterbody.

Data collected since the 2006 listing has indicated a decrease in concentrations of selenium. Available monitoring data has been reviewed to determine if the creek continues to exceed applicable water quality objectives or qualifies for delisting under the 2004 Water Quality Control Policy for Developing California Clean Water Act Section 303(d) List (Listing Policy). This letter provides a summary of that review and Attachment 1 provides the data to support the conclusions presented.

Data Used in the Analysis

Water quality data from May 2009 to March 2013 were collected from Monitoring Stations CAR02 at East County Club Dr. and CAR03 at El Camino Del Norte. Samples were analyzed for total selenium according to EPA analytical methods (200.7 and 200.8), as specified in the 2011 Quality Assurance Project Plan for the County of San Diego's Inland Surface Water Monitoring Program. Monitoring station CAR02 is located on Escondido Creek approximately two miles downstream of Interstate 15. Monitoring Station CAR03 is located on Escondido Creek approximately four and one half miles upstream of where the creek reaches the Pacific Ocean. Thirty two samples were collected between the two monitoring stations and analyzed for total selenium.

Comparison of Data to Water Quality Criteria

Selenium results were compared to the CTR and Basin Plan criteria as show in

Table 1.

Table 1. Selenium Water Quality Criteria

Constituent	Units	Water Quality Objective	Source
Total Selenium	mg/L	0.005[1]	CTR CCC
Total Selenium	mg/L	0.05	Basin Plan

[1] 40 CFR Part 131.38(b).1. *California Toxics Rule.*

Table 2-2 of the Water Quality Control Plan for the San Diego Basin (Basin Plan) lists Escondido Creek as having an existing domestic or municipal supply (MUN) beneficial use designation. It should be noted that the Basin Plan water quality objective is a less stringent objective, set at 0.05 mg/L.

The more stringent CTR CCC (chronic) objective is used for comparison in the analysis. A sample was determined to exceed the water quality objective if the total selenium concentration in the sample was greater than or equal to the CTR CCC value of 0.005 mg/L.

Comparison of Exceedances to Listing Policy

The number of exceedances shown in **Table 2** was then compared to the requirements for delisting presented in Section 4 of the Listing Policy. Table 4.1 of the Listing Policy indicates that for toxicants where the sample size is between twenty eight and thirty six samples, the number of exceedances must be less than or equal to two for the constituent to be considered for delisting.

As shown in **Table 2** and in the data included in Attachment 1, there were no exceedances of the CTR CCC criteria for the thirty two samples analyzed. As a result, the available data collected since May 20, 2009 shows that Escondido Creek should be delisted per the 2004 Listing Policy.

Table 2. Summary of Objective Exceedances

	Exceedances of CTR Freshwater CCC Criteria (0.005 mg/L)
Total Selenium (n = 32)	0
Allowable Exceedances for Delisting[1]	2

[1] Allowable Exceedances for delisting are outlined in Table 4.1 of the Listing Policy

Attachment 1 to this letter includes the data used to determine the number of exceedances of the applicable water quality objective.

Thank you for your consideration of these comments. If you have any questions, please contact me at (858) 495-5317.

Yours truly,

JO ANN WEBER, Watershed Program Manager
County of San Diego Department of Public Works

JW:js

Attachments: Attachment 1. Data to Support Delisting of Escondido Creek for Selenium

Attachment 1. Data to Support Delisting of Escondido Creek for Selenium

Site Name:	Escondido Creek
Site ID	CAR02
Site Description:	Escondido Creek @ East County Club Drive
Latitude:	33.09901
Longitude:	-117.13047

Site ID	CAR03
Site Description:	Escondido Creek @ El Camino Del Norte
Latitude:	33.04839
Longitude:	-117.22716
CTR Freshwater CCC Criteria:	0.005 mg/L
Number of Samples (n):	32
Number of Exceedances:	0
Number of Allowable Exceedances:	2

Site ID	Sample Date	Analyte	Method Name	Result	MDL	RL	Unit	Exceedance
CAR02	5/20/2009	Selenium, Total	EPA 200.8	0.00168	1.61E-05	0.00222	mg/L	No
CAR02	6/14/2010	Selenium, Total	EPA 200.7	ND	0.005	0.01	mg/L	No
CAR02	4/25/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR02	5/12/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR02	6/2/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR02	6/22/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR02	7/11/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR02	2/16/2012	Selenium, Total	EPA 200.8	0.0007	0.0005	0.001	mg/L	No
CAR02	2/29/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
CAR02	3/8/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR02	3/23/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR02	3/29/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
CAR02	4/6/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR02	5/3/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR02	5/22/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR02	5/29/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR02	10/16/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR02	10/23/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
CAR02	10/30/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR03	2/16/2012	Selenium, Total	EPA 200.8	0.0005	0.0005	0.001	mg/L	No
CAR03	2/29/2012	Selenium, Total	EPA 200.8	0.0008	0.0005	0.001	mg/L	No
CAR03	3/8/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR03	3/23/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR03	3/29/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR03	4/6/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR03	5/3/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR03	5/22/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
CAR03	5/29/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR03	10/16/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR03	10/23/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
CAR03	10/30/2012	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
CAR03	3/19/2013	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No

County of San Diego

RICHARD E. CROMPTON
DIRECTOR

DEPARTMENT OF PUBLIC WORKS
5510 OVERLAND AVE, SUITE 410
SAN DIEGO, CALIFORNIA 92123-1237
(858) 694-2212 FAX: (858) 694-3597
Web Site: www.sdcounty.ca.gov/dpw/

May 22, 2014

Mr. Jeremy Haas
California Regional Water Quality Control Board
San Diego Region
2375 Northside Drive, Suite 100
San Diego, CA 92108

SUBJECT: REASSESSMENT AND DELISTING OF SELENIUM IN LOS COCHES CREEK

Dear Mr. Haas:

The County of San Diego appreciates the opportunity to provide the following information to support the reassessment and delisting of Los Coches Creek for selenium. Based on the memorandum dated November 12, 2013 related to the California Integrated Report Update, the next integrated report for the San Diego Region (9) will be forthcoming in 2014. The selenium listing discussed herein is a high priority for the San Diego River Watershed and should be included in the analysis for the 2014 Integrated Report. As specified in the memorandum, the data will be uploaded to the California Environmental Data Exchange Network (CEDEN).

In 2010, Los Coches Creek was placed on the California Clean Water Act Section 303(d) List of Impaired Waters (303(d) List) for exceeding the water quality objective for total selenium. The listing was supported by results reported in the 2007 California's Surface Water Ambient Monitoring Program Report. According to the lines of evidence presented for Decision ID 16566, three of four samples exceeded the California Toxic Rule's (CTR) Criterion Continuous Concentration (CCC) of 0.005 mg/L for total selenium and resulted in a listing of the waterbody. It should be noted that dissolved (not total) selenium concentrations were used in the listing while the CTR chronic CCC of 0.005 mg/L applies to total selenium concentrations only.

Data collected since the 2010 listing has indicated a decrease in concentrations of selenium. Available monitoring data has been reviewed to determine if the creek continues to exceed applicable water quality objectives or qualifies for delisting under the 2004 Water Quality Control Policy for Developing California Clean Water Act Section 303(d) List (Listing Policy).

This letter provides a summary of that review and Attachment 1 provides the data to support the conclusions presented.

Data Used in the Analysis

Water quality data from April 2011 to March 2013 were collected from Monitoring Station SDR08 at I-8 Business Route. Samples were analyzed for total selenium according to EPA 200.8 analytical method, as specified in the 2011 Quality Assurance Project Plan for the County of San Diego's Inland Surface Water Monitoring Program. Monitoring station SDR08 is located on Los Coches Creek approximately three miles upstream of the confluence with the San Diego River. Thirty one samples were collected at the monitoring station and analyzed for total selenium.

Additional water quality samples were collected at Monitoring Station SDR10 on the San Diego River at the Riverford Bridge. The SDR10 site is located approximately three quarters of a mile downstream of the confluence of Los Coches Creek and San Diego River. Twenty nine samples were collected between February 2012 and August 2013 to provide better spatial representation of selenium concentrations in the watershed.

Comparison of Data to Water Quality Criteria

Selenium results were compared to the CTR criteria as show in **Table 1**.

Table 1. Selenium Water Quality Criteria

Constituent	Units	Water Quality Objective	Source
Total Selenium	mg/L	0.005[1]	CTR CCC
Total Selenium	mg/L	0.05	Basin Plan

[1] 40 CFR Part 131.38(b).1. *California Toxics Rule*.

Table 2-2 of the Water Quality Control Plan for the San Diego Basin (Basin Plan) lists Los Coches Creek as having a potential domestic or municipal supply (MUN) beneficial use designation. It should be noted that the Basin Plan water quality objective is a less stringent objective, set at 0.05 mg/L.

The more stringent CTR CCC (chronic) objective is used for comparison in the analysis. A sample was determined to exceed the water quality objective if the total selenium concentration in the sample was greater than or equal to the CTR CCC value of 0.005 mg/L.

Comparison of Exceedances to Listing Policy

The number of exceedances shown in **Table 2** was then compared to the requirements for delisting presented in Section 4 of the Listing Policy. Table 4.1 of the Listing Policy indicates that for toxicants where the sample size is between twenty eight and thirty six samples, the number of exceedances must be less than or equal to two for the constituent to be considered for delisting.

As shown in **Table 2** and in the data included in Attachment 1, there were no exceedances of the CTR CCC criteria for the thirty one samples analyzed for Los Coches Creek or the twenty nine samples analyzed downstream in the San Diego River. As a result, the available data collected since April 21, 2011 shows that Los Coches Creek should be delisted per the 2004 Listing Policy.

Table 2. Summary of Objective Exceedances

	Exceedances of CTR Freshwater CCC Criteria (0.005 mg/L)
SDR08 – Total Selenium (n = 31)	0
SDR10 – Total Selenium (n = 29)	0
Allowable Exceedances for Delisting[1]	2

[1] Allowable Exceedances for delisting are outlined in Table 4.1 of the Listing Policy

Attachment 1 to this letter includes the data used to determine the number of exceedances of the applicable water quality objective.

Thank you for your consideration of these comments. If you have any questions, please contact me at (858) 495-5317.

Yours truly,

JO ANN WEBER, Watershed Program Manager
County of San Diego Dept. of Public Works

JW:js

Attachment: Attachment 1. Data to Support Delisting of Los Coches for Selenium

Attachment 1. Data to Support Delisting of Los Coches Creek for Selenium

Site Name:	Los Coches Creek
Site ID	SDR08
Site Description:	Los Coches Creek @ I-8 Business Route
Latitude:	32.83599
Longitude:	-116.9004
CTR Freshwater CCC Criteria:	0.005 mg/L
Number of Samples (n):	31
Number of Exceedances:	0
Number of Allowable Exceedances:	2

Sample Date	Analyte	Method Name	Result	MDL	RL	Unit	Exceedance
4/21/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
5/13/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
5/25/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
7/6/2011	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
7/13/2011	Selenium, Total	EPA 200.8	0.002	0.0005	0.001	mg/L	No
7/14/2011	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
2/14/2012	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
2/24/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
3/20/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
3/22/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
3/26/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
4/2/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
4/12/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
4/23/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
5/24/2012	Selenium, Total	EPA 200.8	0.0009	0.0005	0.001	mg/L	No
6/6/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
10/18/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
10/26/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
11/1/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
11/19/2012	Selenium, Total	EPA 200.8	0.0009	0.0005	0.001	mg/L	No
11/27/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
11/29/2012	Selenium, Total	EPA 200.8	ND	0.002	0.005	mg/L	No
12/3/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
1/10/2013	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No
1/29/2013	Selenium, Total	EPA 200.8	0.0008	0.0005	0.001	mg/L	No
2/11/2013	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
2/22/2013	Selenium, Total	EPA 200.8	0.0009	0.0005	0.001	mg/L	No
2/28/2013	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
3/19/2013	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
3/26/2013	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
4/3/2013	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No

Attachment 1. Data to Support Delisting of Los Coches Creek for Selenium

Site Name:	San Diego River
Site ID	SDR10
Site Description:	San Diego River @ Riverford Road
Latitude:	32.85653
Longitude:	-116.9473
CTR Freshwater CCC Criteria:	0.005 mg/L
Number of Samples (n):	29
Number of Exceedances:	0
Number of Allowable Exceedances:	2

Sample Date	Analyte	Method Name	Result	MDL	RL	Unit	Exceedance
2/14/2012	Selenium, Total	EPA 200.8	0.0005	0.0005	0.001	mg/L	No
2/24/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
3/20/2012	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
3/22/2012	Selenium, Total	EPA 200.8	0.0008	0.0005	0.001	mg/L	No
3/26/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
4/2/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
4/12/2012	Selenium, Total	EPA 200.8	0.001	0.0005	0.001	mg/L	No
4/23/2012	Selenium, Total	EPA 200.8	0.0009	0.0005	0.001	mg/L	No
5/24/2012	Selenium, Total	EPA 200.8	0.0007	0.0005	0.001	mg/L	No
6/6/2012	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
10/18/2012	Selenium, Total	EPA 200.8	0.0005	0.0005	0.001	mg/L	No
10/26/2012	Selenium, Total	EPA 200.8	0.0005	0.0005	0.001	mg/L	No
11/1/2012	Selenium, Total	EPA 200.8	ND	0.002	0.005	mg/L	No
11/19/2012	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
11/27/2012	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
11/29/2012	Selenium, Total	EPA 200.8	ND	0.002	0.005	mg/L	No
1/29/2013	Selenium, Total	EPA 200.8	0.0005	0.0005	0.001	mg/L	No
2/11/2013	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
2/22/2013	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
2/28/2013	Selenium, Total	EPA 200.8	0.0007	0.0005	0.001	mg/L	No
3/19/2013	Selenium, Total	EPA 200.8	0.0008	0.0005	0.001	mg/L	No
3/26/2013	Selenium, Total	EPA 200.8	0.0008	0.0005	0.001	mg/L	No
4/3/2013	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
4/17/2013	Selenium, Total	EPA 200.8	0.0007	0.0005	0.001	mg/L	No
5/9/2013	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
5/10/2013	Selenium, Total	EPA 200.8	0.0007	0.0005	0.001	mg/L	No
5/16/2013	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
7/30/2013	Selenium, Total	EPA 200.8	0.0007	0.0005	0.001	mg/L	No
8/8/2013	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No

County of San Diego

RICHARD E. CROMPTON
DIRECTOR

DEPARTMENT OF PUBLIC WORKS
5510 OVERLAND AVE, SUITE 410
SAN DIEGO, CALIFORNIA 92123-1237
(858) 694-2212 FAX: (858) 694-3597
Web Site: www.sdcounty.ca.gov/dpw/

May 22, 2014

Mr. Jeremy Haas
California Regional Water Quality Control Board
San Diego Region
2375 Northside Drive, Suite 100
San Diego, CA 92108

SUBJECT: REASSESSMENT AND DELISTING OF SELENIUM IN THE LOWER SWEETWATER RIVER

Dear Mr. Haas:

The County of San Diego appreciates the opportunity to provide the following information to support the reassessment and delisting of the Lower Sweetwater River for selenium. Based on the memorandum dated November 12, 2013 related to the California Integrated Report Update, the next integrated report for the San Diego Region (9) will be forthcoming in 2014. The selenium listing discussed herein is a high priority for the San Diego Bay Watershed Management Area and should be included in the analysis for the 2014 Integrated Report. As specified in the memorandum, the data will be uploaded to the California Environmental Data Exchange Network (CEDEN).

In 2008, the Lower Sweetwater River was placed on the California Clean Water Act Section 303(d) List of Impaired Waters (303(d) List) for exceeding the water quality objective for total selenium. Data used in the listing determination included data from the 2007 California's Surface Water Ambient Monitoring Program Report and the Copermittee Regional Stormwater Monitoring Program. According to the lines of evidence presented for Decision ID 17871, four of nineteen samples exceeded the California Toxic Rule's (CTR) Criterion Continuous Concentration (CCC) of 0.005 mg/L for total selenium and resulted in a listing of the waterbody. It should be noted that dissolved (not total) selenium concentrations were used in the listing while the CTR chronic CCC of 0.005 mg/L applies to total selenium concentrations only.

Data collected since the 2008 listing has indicated a decrease in concentrations of selenium. Available monitoring data has been reviewed to determine if the creek continues to exceed applicable water quality objectives or qualifies for delisting under the 2004 Water Quality Control Policy for Developing California Clean Water Act Section 303(d) List (Listing Policy). This letter provides a summary of that review and Attachment 1 provides the data to support the conclusions presented.

Data Used in the Analysis
Water quality data from February 2011 to April 2013 were collected from Monitoring Station SWT03 at Plaza Bonita Road. Samples were analyzed for total selenium according to EPA 200.8 analytical method, as specified in the 2011 Quality Assurance Project Plan for the County of San Diego's Inland Surface Water Monitoring Program. Monitoring station SWT03 is located on

Sweetwater River just upstream of the confluence with Rice Canyon and approximately three miles upstream of San Diego Bay. Thirty one samples were collected at the monitoring station and analyzed for total selenium.

Comparison of Data to Water Quality Criteria
Selenium results were compared to the CTR and Basin Plan criteria as show in **Table 1**.

Table 1. Selenium Water Quality Criteria

Constituent	Units	Water Quality Objective	Source
Total Selenium	mg/L	0.005[1]	CTR CCC
Total Selenium	mg/L	0.05	Basin Plan

[1] 40 CFR Part 131.38(b).1. *California Toxics Rule.*

Table 2-2 of the Water Quality Control Plan for the San Diego Basin (Basin Plan) lists the Sweetwater River as having an existing domestic or municipal supply (MUN) beneficial use designation. It should be noted that the Basin Plan water quality objective is a less stringent objective, set at 0.05 mg/L.

The more stringent CTR CCC (chronic) objective is used for comparison in the analysis. A sample was determined to exceed the water quality objective if the total selenium concentration in the sample was greater than or equal to the CTR CCC value of 0.005 mg/L.

Comparison of Exceedances to Listing Policy
The number of exceedances shown in **Table 2** was then compared to the requirements for delisting presented in Section 4 of the Listing Policy. Table 4.1 of the Listing Policy indicates that for toxicants where the sample size is between twenty eight and thirty six samples, the number of exceedances must be less than or equal to two for the constituent to be considered for delisting.

As shown in **Table 2** and in the data included in Attachment 1, there were no exceedances of the CTR CCC criteria for the thirty one samples analyzed. As a result, the available data collected since February 15, 2011 shows that Sweetwater River should be delisted per the 2004 Listing Policy.

Table 2. Summary of Objective Exceedances

	Exceedances of CTR Freshwater CCC Criteria (0.005 mg/L)
Total Selenium (n = 31)	0
Allowable Exceedances for Delisting[1]	2

[1] Allowable Exceedances for delisting are outlined in Table 4.1 of the Listing Policy

Attachment 1 to this letter includes the data used to determine the number of exceedances of the applicable water quality objective.

Thank you for your consideration of these comments. If you have any questions, please contact me at (858) 495-5317.

Yours truly,

JO ANN WEBER, Watershed Program Manager
County of San Diego Department of Public Works

JW:js

Attachments: Attachment 1. Data to Support Delisting of Sweetwater River for Selenium

Attachment 1. Data to Support Delisting of Sweetwater River for Selenium

Site Name:	Sweetwater River
Site ID	SWT03
Site Description:	Sweetwater River @ Plaza Bonita Road
Latitude:	32.65069
Longitude:	-117.06374
CTR Freshwater CCC Criteria:	0.005 mg/L
Number of Samples (n):	31
Number of Exceedances:	0
Number of Allowable Exceedances:	2

Sample Date	Analyte	Method Name	Result	MDL	RL	Unit	Exceedance
2/15/2011	Selenium, Total	EPA 200.8	0.0007	0.0005	0.001	mg/L	No
4/14/2011	Selenium, Total	EPA 200.8	0.0008	0.0005	0.001	mg/L	No
5/13/2011	Selenium, Total	EPA 200.8	ND	0.004	0.005	mg/L	No
5/25/2011	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
7/14/2011	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No
2/14/2012	Selenium, Total	EPA 200.8	0.0009	0.0005	0.001	mg/L	No
2/24/2012	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
3/20/2012	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No
3/22/2012	Selenium, Total	EPA 200.8	0.0005	0.0005	0.001	mg/L	No
3/26/2012	Selenium, Total	EPA 200.8	0.0009	0.0005	0.001	mg/L	No
4/2/2012	Selenium, Total	EPA 200.8	0.0007	0.0005	0.001	mg/L	No
4/12/2012	Selenium, Total	EPA 200.8	0.0005	0.0005	0.001	mg/L	No
4/23/2012	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No
5/24/2012	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No
6/6/2012	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No
10/18/2012	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No
10/26/2012	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No
11/1/2012	Selenium, Total	EPA 200.8	ND	0.002	0.005	mg/L	No
11/19/2012	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No
11/27/2012	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No
11/29/2012	Selenium, Total	EPA 200.8	ND	0.002	0.005	mg/L	No
12/3/2012	Selenium, Total	EPA 200.8	ND	0.002	0.005	mg/L	No
1/10/2013	Selenium, Total	EPA 200.8	0.0005	0.0005	0.001	mg/L	No
1/29/2013	Selenium, Total	EPA 200.8	0.0005	0.0005	0.001	mg/L	No
2/11/2013	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No
2/22/2013	Selenium, Total	EPA 200.8	0.0005	0.0005	0.001	mg/L	No
2/28/2013	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No
3/19/2013	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
3/26/2013	Selenium, Total	EPA 200.8	0.0006	0.0005	0.001	mg/L	No
4/3/2013	Selenium, Total	EPA 200.8	ND	0.001	0.002	mg/L	No
4/17/2013	Selenium, Total	EPA 200.8	ND	0.0005	0.001	mg/L	No

earth LAW CENTER
FIGHTING FOR NATURE'S RIGHTS

P.O. Box 610044, Redwood City, CA 94061
tel (650) 877-2710
www.earthlawcenter.org

August 8, 2016

Henry Abarbanel, Chair and Board Members
San Diego Regional Water Quality Control Board
2375 Northside Drive, Suite 100
San Diego, California 92108

VIA ELECTRONIC SUBMITTAL: sandiego@waterboards.ca.gov

Re: Comment – CWA Section 305(b)/303(d) Integrated Report, Attn: Xueyuan Yu

Dear Chair Abarbanel and Board Members:

On behalf of Earth Law Center (ELC), I welcome the opportunity to submit these comments on the above-referenced CWA Section 305(b)/303(d) Integrated Report (Report). ELC has been working at the state and national levels for a number of years to ensure that waterbodies impaired by "pollution," particularly altered flow and hydrology, are represented in either Category 5 or Category 4C of the 305(b)/303(d) Integrated Report. Our recent comment letter to U.S. EPA and USGS in support of such listings is attached.

We write today in support of your proposal to list waterways as impaired due to hydromodification and habitat alteration in Category 4C, as discussed in the July 2016 Draft Staff Report[1] at pages 12-17. As noted in the Staff Report, on August 13, 2015 U.S. EPA released guidance on Integrated Reporting and Listing Decisions that reaffirmed the duty to list in Category 4C those waters impaired by "pollution."[2] In this guidance, U.S. EPA notes that "[w]hile TMDLs are not required for waterbody impairments assigned to Category 4C, States can employ a variety of watershed restoration tools and approaches to address the source(s) of the impairment," raising the importance of full and complete listing identification for these impaired waterways. The Staff Report echoes EPA's finding, stating that Category 4C listed waters "may be a priority for restoration by a Regional Water Board."

We further support your staff's work, consistent with U.S. EPA guidance and regulations, to identify flow-impaired stream segments where in-stream data was lacking, using such tools as

---

[1] At: http://www.waterboards.ca.gov/sandiego/water_issues/programs/303d_list/docs/IR_RB_StaffReport_R9_07-11-16_Clean.pdf.

[2] Memorandum from U.S. EPA, Office of Wetlands, Oceans, and Watersheds Information to Water Division Directors, Regions 1 – 10, Concerning 2016 Clean Water Act Sections 303(d), 305(b), and 314 Integrated Reporting and Listing Decisions (August 13, 2015), at: https://www.epa.gov/sites/production/files/2015-10/documents/2016-ir-memo-and-cover-memo-8_13_2015.pdf. *See also* U.S. EPA, "Guidance for 2006 Assessment, Listing and Reporting Requirements Pursuant to Sections 303(d), 305(b) and 314 of the Clean Water Act," p. 56 (July 29, 2005), at: http://bit.ly/2aIVP8h.

"desktop aerial reconnaissance for potential in-stream habitat and hydrologic alteration associated with channel modifications, stream diversion or augmentation."

Finally, we support staff's assertion that it is "important to note that USEPA recommended in its 2015 guidance that 'States assign all of their surface water segments to *one or more* of five reporting categories'." (Emphasis added.) In other words, a stream segment can be listed for *both* impaired hydrology and pollutant contamination, rather than one or the other.

Specific listing of all waters impaired by "pollution" gives a far more accurate picture of the challenges facing state agencies and Californians than ignoring pollution impairments. For example, the Staff Report states that "over 96 percent of streams that exhibited biological degradation had both an associated pollutant(s) and supporting information showing pollution from in-stream habitat/hydrologic alteration and/or watershed hydrologic alteration (hydromodification, Table 3)." If pollution impairments were ignored, then virtually all of the impaired streams in the San Diego Region would be under-assessed, likely resulting in misallocation of limited resources and attention.

The Clean Water Act calls on the nation to protect the chemical, biological *and physical* integrity of our waters. The full and proper identification of all impaired waterways, including for altered flow and hydrology, is an important step in meeting this mandate. We urge the San Diego Regional Water Quality Control Board to adopt the proposed listings for habitat alteration/hydromodification, as described in Table 3 of the Draft Staff Report and elsewhere. Thank you for the opportunity to submit these comments.

Sincerely,

Linda Sheehan
Executive Director
lsheehan@earthlaw.org

attachments

earth
LAW CENTER
FIGHTING FOR NATURE'S RIGHTS

P.O. Box 610044, Redwood City, CA 94061
tel (650) 877-2710
www.earthlawcenter.org

June 14, 2016

Diana Eignor
Health and Ecological Criteria Division
Office of Water (Mail Code 4304T)
Environmental Protection Agency
1200 Pennsylvania Avenue NW
Washington, DC 20460

VIA ELECTRONIC SUBMITTAL: Federal eRulemaking Portal: http://www.regulations.gov

Re: Draft EPA-USGS Technical Report: Protecting Aquatic Life from Effects of Hydrologic Alteration; 81 FR 21863; Docket ID No. EPA-HQ-OW-2015-0335

Dear Ms. Eignor:

On behalf of Earth Law Center (ELC), I welcome the opportunity to submit these comments on the above-referenced Report. We thank U.S. EPA and USGS for taking up the critical task of protecting aquatic life from the increasing pressures of over-extraction of our waterways. In California, several aquatic species, including the Delta smelt and winter-run Chinook salmon, are at risk of imminent extinction due to unwise water use and planning. Reports such as this one are essential to better prepare for the challenges we face now and those to be expected in the future, particularly due to climate change.

We agree with the comments of the Natural Resources Defense Council that: (a) the Report is scientifically sound and provides a clear framework by which decisionmakers can effectively employ flow regime management strategies to protect aquatic ecosystems and species, and (b) U.S. EPA and USGS should finalize the Report this year and conduct immediate outreach to ensure swift implementation.

Further, we particularly support the discussion in Chapter 5 with regard to state and federal actions in law and policy to protect instream flows. We agree with the finding by U.S. EPA Region 4 (see attached letter, pages 9-13) that instream flow criteria adopted into water quality standards "would be in use for all purposes under the CWA…such as Section 401, Section 404, etc." Accordingly, we support the following areas of discussion and recommendation in Chapter 5 the Report, as well as the associated Appendix B:

- Section 5.1, calling for adoption of flow criteria in Water Quality Standards. The attached U.S. EPA Region 4 letter describes the numerous benefits of such CWA-compliant "instream flow water quality standards" in more detail. We request that U.S. EPA take a leadership role in engaging states to adopt and implement such standards.

- Section 5.2, concluding that water bodies impaired by altered flow must be identified as impaired under Category 4C of the 303(d)/305(b) Integrated Report. Earth Law Center has done extensive analysis into the fact that such flow listings are requirement rather than a suggestion, and are essential for both state and local planning purposes. We are happy to provide these analyses on request. We strongly urge U.S. EPA to reject any 303(d)/305(b) reporting that does not include appropriate Category 4C listings for impairments associated with altered flow.
- Section 5.4, requiring consideration of flow in Section 401 certifications. For example, California is facing a Section 401 certification process with regard to the development of its "Twin Tunnels" project, which would reduce the amount of flow to the already-struggling Delta. It is unclear at this point whether the state will appropriately consider flow in this process. Clear instruction from U.S. EPA with regard to the applicability of flow to Section 401 certifications is essential if we are to invest in infrastructure that will serve people and environment well in the long term.
- Other applications of the CWA and related processes to flow, as discussed elsewhere in Chapter 5. These applications include, but are not limited to, Section 402 and 404 permits. Such recommendations are echoed and expanded upon in a letter by U.S. EPA Region 1 (attached), which was issued shortly after the landmark U.S. Supreme Court decision *PUD v. Washington Dep't of Ecology*. This decision, of course, found the distinction between water quality and flows to be an "artificial" one.

The Clean Water Act calls on the nation to protect the chemical, biological and physical integrity of our waters. The Report is an essential step in fulfilling all three elements of this mandate. We urge U.S. EPA to swiftly adopt the Report and begin work with the states to implement its recommendations, particularly those in Chapter 5.

Thank you for the opportunity to submit these comments.

Sincerely,

Linda Sheehan
Executive Director
lsheehan@earthlaw.org

attachments

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

NOV 19 2012

Lance LeFleur
Director
Alabama Department of Environmental Management
Post Office Box 301463
Montgomery, Alabama 36130-1463

Dear Mr. LeFleur:

Thank you for the opportunity to provide input into the State of Alabama's development of a comprehensive statewide water management plan. The Environmental Protection Agency strongly supports Governor Bentley's directive to develop a plan that is based on sound science and that will "benefit Alabamians now and for generations to come." As we have discussed at the most recent State Directors meetings, our stewardship of water resources in the Southeast is facing new challenges from increased demands on limited freshwater supplies. Your effort acknowledges that competing uses of ground water and surface water for industrial, municipal and agricultural uses, power generation, new reservoirs, inter-basin transfers and water diversions are all bringing this issue into sharp focus. Planning is further complicated by droughts, floods, climate change and existing hydrologic modifications.

Fortunately, our understanding of the science of water management has evolved significantly over the past decade. We applaud your efforts to bring this science to bear in assisting Alabama's efforts to balance multiple water needs. Long-term planning for the stewardship of Alabama's waters will serve to protect the significant ecological resources of the state, as well as ensure future delivery of drinking water, power generation and sustainable economic development.

The EPA has been working to better understand the complex issues of addressing water quantity and water quality effectively under the existing authorities of the Clean Water Act (CWA). The EPA Region 4 has had the benefit of working with other state and federal partners that have long been involved in this issue. For instance, population pressures and water disputes compelled many states in New England to begin development of water plans more than twenty years ago. All six of the New England states have developed hydrologic protection of state waters either through their state water quality standards program under the CWA and/or through state water allocation and permitting programs. The eight states surrounding the Great Lakes, facing challenges of competing water uses, spurred development of water plans under the Great Lakes and St. Lawrence Seaway Compact, including innovative tools such as Michigan's Water Withdrawal Assessment Process and Internet Screening Tool. Alabama can draw on such tools, expertise, innovation and success both here in the Region and nationally. We have provided several examples in our comments and would welcome the opportunity to share with you any of these resources and contacts in the coming year as you develop and refine your plan.

As requested, the EPA has completed a review of the *Water Management Issues in Alabama* report. Our comments include recommendations about how Alabama could utilize tools that are already available under the CWA to address many of the State's water resource issues, with a focus on efficiency, conservation and reuse, and development of instream flow water quality standards under the CWA. We support Alabama's water conservation and efficiency efforts, which can be a key component in water resource management. In addition, the EPA recommends that the State consider using its CWA authority under the water quality standards program to develop "instream flows which can serve as a cornerstone of a statewide water management plan" (*Water Management Issues in Alabama*, Alabama Water Agencies Working Group, pg. 6). We further support the proposal to examine and recommend "appropriate flow dynamics for rivers and streams to support biological, recreational, and industrial/transportation needs and requirements" (Id., pg. 4), and have included examples of successful flow standards from throughout the country. We share with you the expectation, as you move forward, that all newly developed water plans and policies will of course be consistent with your state water quality standards under the CWA.

Our enclosed comments follow the format of the Water Issues Area Summaries while also addressing the 2009 recommendations from the Permanent Joint Legislative Committee on Water Policy and Management and the areas of stated importance from the Governor in his charge to the Alabama Water Agencies Working Group in April 2012.

With the benefit of evolving research in this area, we believe it is possible to develop the tools needed to protect, and where possible restore, the hydrologic condition and ecological integrity of state waters, while efficiently carrying out necessary and important water supply planning and economic development. We stand ready to assist your group in any way possible, and please do not hesitate to contact me at (404) 562-9470 or Ms. Lisa Perras Gordon at (404) 562-9317 if you have any questions.

Sincerely,

James D. Giattina
Director
Water Protection Division

Enclosure

cc: Glenda Dean

Alabama Water Agencies Working Group
EPA Region 4 Stakeholder Comments
November 2012

The Region 4 office of the Environmental Protection Agency (EPA) has reviewed the report entitled *Water Management Issues in Alabama* (the WMI Report) by the Alabama Water Agencies Working Group (AWAWG) and offers the following stakeholder input.

General Stakeholder Input

The EPA supports the development of a statewide water management plan as detailed in the WMI Report. The EPA's two primary issues for stakeholder input are conservation and reuse, and the recommendation to develop instream flow water quality standards. The EPA is also providing comments below in seven other areas. In addition to those comments, the EPA is providing information regarding the significance of Alabama's aquatic ecology that was not included in the WMI Report.

<u>Alabama's globally significant aquatic biodiversity</u>

The United States is often cited as one of the top countries in the world for aquatic biodiversity, ranking 1st for crayfishes, freshwater mussels, freshwater snails and many aquatic insects and 7th for fish diversity. In fact, whereas the U.S. has over 300 species of freshwater mussels, all the rivers of Europe have only 10 and the entire continent of Africa just 56. There is no question that Alabama is at the heart of the U.S. freshwater diversity, with more species of mollusks (180 species of both snails and mussels) and fish (>300 species) than any other state (ADCNR 2012). *Rivers of Life*, a NatureServe report on aquatic biodiversity, highlights the state of Alabama in general and the Mobile River basin in particular as having "extraordinarily diverse assemblages of freshwater animal species..." and also references the Cahaba River which it describes as a "treasure trove of botanical life" (Master et al. 1998). However, the report notes that many of Alabama's species are vulnerable. In fact, Tennessee and Alabama came in 1st and 2nd for the greatest number of imperiled freshwater species nationally. The report finds that just two regions of the U.S., one of which is the Mobile River Basin, are home to 35% of all vulnerable species in the U.S. Seventy percent of those species occur nowhere else in the world. Conservation practices and development of instream flow protections may provide the safeguards needed for many of these species that make Alabama a unique ecological treasure.

Freshwater ecosystems, as a whole, have suffered more decline than terrestrial ecosystems in recent decades (Master et al. 1998). Nationally, aquatic systems are under significant stress, and particularly in the Southeast, with the largest number of imperiled species. More than two centuries of alterations to aquatic habitat, such as dams, surface water and ground water withdrawals, impervious cover, introduction of non-native species and channelization have significantly altered the aquatic environment. Only recently have scientists begun to quantify the extent of that alteration. In a national assessment, the U.S. Geological Survey found that alteration of waterways has impacted the magnitude of minimum and maximum streamflows in more than 86% of monitored streams nationally and may be the primary cause of ecological impairment in river and stream ecosystems (Carlisle et al. 2011). Every aspect of the lives of aquatic plants and animals is cued by and inextricably linked to the natural variability of our rivers and streams (Southern Instream Flow Network 2010). Alterations and reductions in stream flow and fragmentation of our waterways concentrate toxic and conventional pollutants, reduce fish passage, increase stream temperatures, increase predation, reduce access to stream bank habitat, eliminate the connectivity to feeding and breeding locations in the flood plain and in some instances even eliminate stream flow altogether.

The EPA supports Governor Bentley's efforts to create a statewide comprehensive water plan that includes instream flow protection which may provide protection for Alabama's significant aquatic biodiversity. The EPA applauds this movement towards greater stewardship of these resources and hopes that with public outreach citizens can take even greater pride in their state's ecological riches.

Little was mentioned of Alabama's global significance in this area in the WMI Report. EPA encourages the AWAWG to acknowledge and support the exceptional aquatic biodiversity of Alabama as it works toward the completion of the statewide water management plan.

Water Issue Area Specific Comments

Water Resources Management

As a means of managing and planning for water supply while minimizing impacts to public resources such as streams and wetlands, we encourage the state to place up-front emphasis on conservation and management principles.

Fixing leaking infrastructure and incentivizing efficient use can free up significant supply already in the treatment and distribution system, often closing demand-supply gaps at a fraction of the cost of developing new supply. Whereas many distribution systems have unaccounted-for water (UAW) volumes upwards of 20-30%, states that have UAW goals generally target losses of no more than 10-15% (EPA 2010a). With its *Water Conservation Standards* of 2006, for example, Massachusetts established that water suppliers should conduct annual audits and semi-annual system-wide leak detection surveys with a goal of reducing UAW volumes to below 10%. Suppliers must then work towards fixing system leaks and reducing unaccounted-for water, with regular reporting requirements. Fixing leaks and managing system losses can increase financial benefits because water treated and transported through the distribution system, but lost before reaching an end user, is unbilled and thus represents revenue loss that could be recovered. In the mid-1990s, for example, Gallitzin, Pennsylvania's small distribution system was experiencing high water losses exceeding 70% (EPA 2002). After a thorough leak detection and mapping effort, the authority initiated a leak repair program and a corrosion control program at the water treatment plant. Just four years after implementation, delivery had decreased by 68%, with UAW down to 9%. Chemical treatment and energy cost decreases were 47% and 61%, respectively, which allowed the authority to keep water rates down.

Projects that impact hydrology, such as new or expanded water supply, development, and recreational or amenity impoundments, often require Clean Water Act (CWA) Section 404 permits, making them subject to review for compliance with the 404(b)(1) Guidelines. In reviewing such projects EPA considers whether the applicant has demonstrated adherence to the mitigation sequence, with avoidance and minimization of impacts to aquatic resources as the first two steps. EPA also reviews proposed projects for full consideration of alternatives in selection of the Least Environmentally Damaging Practicable Alternative. For water supply project proposals, full implementation of conservation and efficiency measures, including water reuse options, is a primary alternative that could have a fraction of the impacts to aquatic resources of developing new supply infrastructure. A study that surveyed multi-family residential units across several cities found that the introduction of sub-metering reduced water consumption by 10-26% (Mayer et al. 2004). EPA looks for such measures to minimize or altogether avoid aquatic resource impacts. A state water management plan can serve as the policy basis for prioritizing projects that use and improve upon existing infrastructure, and make use of existing investments so that they have less impact to aquatic resources. A state plan can facilitate such measures being considered together as a comprehensive approach rather than in isolation.

When water supply projects are determined to be necessary, demonstrated maximization of conservation and efficiency measures can facilitate federal permit review. Any new supply development (such as a reservoir) should be sized appropriately for the documented purpose and need, and designed to mimic the natural conditions as closely as feasible in the downstream waters. Dewatering of the downstream segments should not be allowed during the filling stages of impoundments. Many of these projects require long-term financial and maintenance obligations, which should be outlined and accounted for in all applications to ensure protection of the water quality necessary to protect designated and existing uses throughout the life of the project. The maintenance of impoundments, including the costs for activities such as dredging of sediments, is often not adequately considered, and can lead to degradation of resources. Whereas free-flowing streams can be economic boons by bringing recreational users and tourism, with associated hospitality and recreational gear business, reservoirs can be an economic liability. One such example is that of the Hickory Log Reservoir in Canton, Georgia. Costs for that reservoir have increased to more than five times the original estimate, creating an economic burden threatening other fundamental needs of the city. *The Atlanta Journal-Constitution* reported in June 2012 that water bills for city of Canton customers have increased 30% to pay for expenses for the reservoir, which is full but not yet delivering water (Scott 2012).

Incorporating protection for aquatic species is a critical element of a good water resource management plan. Impoundments, for example, represent a significant threat to connectivity of Alabama's exceptional aquatic resources, including the many threatened and endangered species of freshwater mussels found in the state.

Therefore, the EPA would like to encourage the State to give priority to maximizing efficiency measures and the possible expansion of existing facilities versus building new reservoirs in order to avoid impacts to aquatic resources such as streams and wetlands, and to protect overall ecological/environmental integrity. My staff would be happy to work with the AWAWG and member agencies to provide technical support of the state's efforts.

As the WMI Report recognizes, water resource management "needs to be holistic across an entire watershed or drainage basin due to the interrelationship of the natural and human processes and activities that can impact each other, in some cases from a great distance. This includes both land and water resources, since land use can have significant impacts on water resources and related ecosystems." A water management plan that incorporates all uses should give equal consideration to instream uses, e.g., aquatic life, aesthetic values, physical stability, and ecological viability (habitat, water quality) as it does to anthropogenic off-stream uses (supply, impoundment), as recognized for some time by western states and more recently by eastern states and the Instream Flow Council (Breckenridge 2004). The CWA provides that each state must specify appropriate water uses to be achieved and protected for each waterbody (40 CFR 131.10(a)). The state must take into consideration the use and value of water for public water supply, protection and propagation of fish, shellfish and wildlife, recreation in and on the water, agriculture, industrial uses and other purposes including navigation. For the past 30 years, North Carolina has successfully utilized the designated use provisions under its water quality standards (WQS) program to work with local jurisdictions to directly address issues where land use affects water use. For instance, a use designation for Class WS-II Waters provides additional protections for drinking water supplies by requiring local jurisdictions to adopt "nonpoint source and stormwater pollution control criteria for the entire watershed" (NCDWQ 2007). Once the use designation is adopted, those provisions are placed into ordinances of local jurisdictions, which are then responsible for their implementation. These provisions also include best practices such as buffers, housing density options or advanced storm water management. The state is careful to point out that these practices do not limit economic development, but rather ensure sustainable development in sensitive areas. *Alabama could review North Carolina's use designations and consider more fully developing its designated uses under the CWA to provide protection for an entire watershed rather than just the waterbody, and require those provisions be adopted by local jurisdictions.*

Expanded Certificates of Use/Permitting:

The EPA strongly supports a comprehensive program for permitting and accounting for both ground water and surface water use in Alabama. Understanding water availability and use is essential to managing the resource (USGS 2012). Understandably, Alabama also would like to keep 'the regulatory burden to a minimum' (WMI Report p.12).

The EPA has three recommendations in this section:

- As other states have faced this challenge, new innovative tools have evolved that Alabama may want to explore. Michigan has developed an innovative and national award winning ground water withdrawal permitting system that provides detailed information on ground water use while keeping the regulatory burden to a minimum. Michigan's Water Withdrawal Assessment Process and Internet Screening Tool was developed collaboratively over six years by the Groundwater Conservation Advisory Council representing water users, state officials, technical experts and conservationists. This tool allows citizens to go on-line, type in information on proposed ground water use, and get instantaneous feedback to determine if the water withdrawal will affect local streams. If it does not, they need only complete forms to get permitted. If it does, they may try to change the location or withdrawal rate to get the "go-ahead." No direct government review is needed for the majority of the permits. Only those few wells that may cause biological effects on streams need to proceed to the more detailed site-specific permit review (Ruswick et al. 2010; Hamilton et al. 2011).

- As Alabama considers how to move ahead with issuing a Certificate of Use (COU) that 'will not interfere with an existing legal use of the water' we ask that you also consider a requirement that the permitted use not cause or contribute to a violation of water quality standards, including any existing implicit protections for instream flow, such as support for aquatic life.

- In other states, authorities have found it important not to set the threshold too high for capturing withdrawals and impacts via a permitting system. In Massachusetts, for example (Breckenridge 2004), higher permit thresholds led to not capturing data on many withdrawals, compromising understanding of the total anthropogenic uses and impacts on systems, and increasing uncertainty in planning. An effective plan would incorporate estimates of unpermitted uses (e.g., those below the threshold and illegal withdrawals) to more accurately gauge impacts. A plan and permitting system that allows for periodic review and adaptive management will provide for more effective protection as lessons are learned, systems adjust to alterations and impacts, and new monitoring and scientific information becomes available, especially given the variability of hydrographs that is essential to maintenance of the physical/chemical system and aquatic life.

Economic Development

As indicated in Alabama's proposal, protecting the health of freshwater ecosystems is not only critical to biodiversity and ecology but also to the support of a thriving economy. Maintaining the integrity of natural biological and physical systems provides significant economic benefits to state and local economies. In July 2012, EPA Headquarters published a document entitled, *The Economic Benefits of Protecting Healthy Watersheds* (EPA 2012b). This fact sheet, based in part on a study that included data from Alabama entitled, *Forests for Water: Exploring Payments for Watershed Services in the U.S. South* (Hanson 2011) states that healthy intact watersheds provide many ecosystem services that are necessary for our social and economic well-being. These services include water filtration and storage, nutrient cycling, soil formation, flood prevention, food production and timber.

Protection of natural and aquatic resources can also be directly tied to the creation of jobs and a strong economy. For example:

- A 2012 report found that outdoor recreation contributed $646 billion in direct sales and services to the U.S. economy annually, supporting an estimated 6.1 million jobs, generating $39.9 billion in federal tax revenue and $39.7 billion in state/local tax revenue, and providing sustainable growth in rural communities (Outdoor Industry Foundation 2012). Outdoor recreation jobs numbering 215,126 were found in the East South Central states (AL, KY, MS and TN) (Outdoor Recreation Industry 2006).
- Twenty-four million Americans participate in paddling sports (kayaking, canoeing, rafting). Despite the national recession, the outdoor recreation economy grew approximately 5 percent annually between 2005 and 2011 (Outdoor Industry Association 2012).
- Local hydrologic restoration projects are bringing economic development to smaller communities in our region. A project to remove aging dams and restore naturalized white water flow to the Chattahoochee River on the Georgia/Alabama border is projected to bring 144,000 new visitors annually, create 700 jobs and add $42 million additional yearly revenue from recreational tourism (Adams 2011).

- Healthy estuaries, such as the Mobile Bay and coastal communities dependent on the natural timing and delivery of freshwater flows, contribute billions of dollars to state economies.

Protection of adequate instream flow also provides economic certainty to municipal and industrial dischargers. In recent years, there has been a trending downward of freshwater flows in many freshwater rivers and streams – much of which is anthropogenic in origin, such as over-pumping of ground water or surface water withdrawals. Some of these reductions may persist long enough to cause revisions to the calculated 7Q10 (the lowest recorded 7 days of flow in a ten year period). In addition, prolonged droughts have prompted those who control regulated rivers to consider dropping the low flow minimums or revise drought control manuals to allow for further reductions of the low flow values. National Pollutant Discharge Elimination System (NPDES) permits issued under Section 402 of the CWA use critical low flow values such as 7Q10s or negotiated low flows on regulated rivers to calculate a permittee's discharge limits. In areas where those low flow values are causing long-term changes, permits will have to be recalculated to protect for the new critical low flow. Where possible, protection of instream flows from anthropogenic alteration may prevent unnecessary and often costly additional treatment for those permittees.

Whereas resource management can often be portrayed as protection of ecology vs. protection for economic development, new data and studies indicate that they are quite often linked. Therefore, *the EPA encourages the AWAWG to acknowledge as they develop their plan that there may be significant economic benefits, in both ecosystem services, jobs and revenue, to protecting and maintaining intact aquatic ecosystems.*

Surface Water and Ground Water Availability

The EPA supports Alabama's approach of developing comprehensive scientific knowledge of surface water and ground water availability. The EPA recommends that as Alabama explores ground water development policy, it ensure that it addresses the linkages between ground water and surface water. Alabama notes surface water and ground water concerns in this section separately, but they should be treated in most areas as a single resource. Nearly all surface water bodies interact in some manner with ground water (Winter 1998). Withdrawal of surface water can deplete ground water and there are numerous areas in the Southeast where pumping of ground water has been known to directly affect surface water. Ground water depletion may cause significant reductions of surface water flow which may impair or remove designated uses without going through the provisions of the CWA (40 CFR 131.10 (g)). It should be noted that under the CWA, existing uses generally cannot be removed (40 CFR 131.10(h)).

The EPA recommends that newly developed ground water withdrawal policy directly link to Alabama's water quality standards so that any withdrawals will not cause or contribute to a loss of the water quantity needed to support the water quality, including support for meeting aquatic life uses, drinking water, recreation, etc.

The EPA will work with the State to explore any potential assistance that we can provide on funding options for maintenance of gaging stations, water quality and biological assessments and ground water and surface water assessments.

<u>Water Conservation and Reuse</u>

When it comes to protecting our limited fresh water supply, development and expansion of efficiency and conservation programs and efforts is an essential first step as we noted above, and we applaud the recognition in the *WMI Report* of the major impacts of water usage, and benefits of water conservation and reuse. Conservation not only reduces volumes requiring treatment (for consumption and as waste), but also reduces energy required to distribute and treat water. Conservation also preserves in-stream values such as water quality, habitat, physical stability, and aquatic life.

Water reuse, as recognized in the *Water Conservation and Water Reuse* section of the report, can be implemented in many settings. It can benefit municipal, agricultural, environmental, industrial, and private entities through uses such as those identified as well as through protection of environmental values. It can also represent an economic development advantage by reducing infrastructure and energy costs and resource demands in both public and private capacities. In September, EPA released its 2012 update of its manual *Guidelines for Water Reuse ("2012 Guidelines")*. This update includes new information on efforts by states across the country to develop water reuse, including regulations adopted by 30 states and one territory, and an inventory of diverse case studies (EPA 2012a). It can serve as a valuable resource and addresses two issue areas identified as considerations in the WMI Report. The first consideration given is:

- A tension exists within public water systems between the need to conserve water and a financial model predominantly based on water sales.

When water is reused as one measure for avoiding new withdrawals, this conflict is reduced; Chapter 7 of the *2012 Guidelines* addresses financial aspects of water reuse, including rate and fee structures. Other considerations describe success of these approaches as tied to public understanding and acceptance, for example:

- The public's perception of water reuse may be less receptive if they believe the recycled water is from a common public waste source.

This is a challenge that has played out nationally and in many communities as water reuse has been implemented, and Chapter 8 of the *2012 Guidelines* provides an excellent discussion of the issue and various approaches to public outreach and engagement. Much of this discussion, including the importance of proactively providing information to the public, is also translatable to conservation and efficiency programs.

An excellent example of a successful water reuse initiative is the Mobile Area Water and Sewer Systems (MAWSS) demonstration project funded by EPA through a $1.1 million National Community Decentralized Wastewater Demonstration Project grant. To deal with municipal treatment capacity overloads, the utility diverted wastewater to four satellite cluster facilities. Some of that diverted water is then treated and used in a state-of-the-art underground drip irrigation system for a municipal park, decreasing the burden on the central treatment facility and reducing wastewater discharges to Mobile Bay (MAWSS 2005).

We have provided each of the southeastern states with a copy of EPA Region 4's 2010 *Guidelines on Water Efficiency Measures for Water Supply Projects in the Southeast* ("*WEGs*"). The *WEGs* emphasize many of the same goals expressed in the Alabama WMI report, and provide recommendations for effective implementation of conservation and efficiency measures (EPA 2010b). EPA is continually working to update these guidelines to incorporate more refined and quantifiable approaches and will continue to provide those as revised. The WMI Report issue area on conservation mentions measures such as fixing leaks, turning off water when not in use, rain barrel use, and non-potable water reuse in agricultural and industrial settings. We would highly recommend implementation of much more comprehensive measures (such as those identified in the *WEGs) and incentivizing them via funding programs and permitting requirements*. We especially endorse fixing leaking infrastructure, using an integrated resource management approach across residential, industrial, agricultural, and commercial settings, full-cost pricing, conservation pricing, metering of all water users, low-impact development and green infrastructure, retrofitting all buildings, water reuse, landscaping to minimize demand and waste, and efficient irrigation practices. Many state approaches can provide good examples of conservation and efficiency programs, such as the standards and recommendations in ten key areas in Massachusetts' *Water Conservation Standards* of 2006.

These approaches can conserve resources, reduce treatment costs, and reduce releases of pollutants into streams and rivers, as well as reduce unbilled losses. Conservation and efficiency measures can be promoted directly with residential, industrial, agriculture, commercial, municipal and local users, as well, not just public utilities, through establishment of codes, policies, and incentive programs, as demonstrated by many successful programs across the country. As recognized in the WMI report, developing a new water supply can be costly and time consuming, whereas demand can often be met for a fraction of the cost via conservation and efficiency measure implementation. Ashland, Oregon, for example, was facing a demand-supply gap and initially considered an $11 million reservoir or $7.7 million for 13 miles of new pipeline to withdraw from the Rogue River (EPA 2002). Instead they implemented an efficiency program comprised of system leak detection and repair, conservation-based water rates, a high-efficiency showerhead replacement program, and toilet retrofits and replacement. The cost of the program was just $825,875—less than 10% of the estimated cost of a reservoir—and less than a decade later demand was down considerably (16% of winter use), wastewater flow was reduced by 58 million gallons annually, and the town had realized considerable energy savings primarily associated with efficient showerhead replacement. Savings to utilities from avoiding additional infrastructure development can also be considerable. The WMI Report refers to the potential use of the Water Supply Assistance Fund; this presents an opportunity whereby efficiency-first guidelines could be established as part of this program. Additionally, the Regulated Riparian Model Water Code bolsters this emphasis by specifying a water authority's ability to "promulgate and establish guidelines and procedures relating to loans or grants" (ASCE 2004).

Again, EPA recommends that the state place up-front emphasis on conservation and efficiency as integral to water resource management. We highly recommend that the measures implemented be a far more comprehensive approach than that identified in the WMI Report, and that they be incentivized through funding programs and permitting requirements. States such as Florida, Kansas, Colorado, Pennsylvania, Vermont, and Nebraska have used State Revolving Fund (SRF) programs to provide audit and leak detection programs, metering, and to improve efficiency in irrigation (EPA 2003). Kansas and Texas require implementation of approved water efficiency plans in order to receive SRF funding.

EPA welcomes the opportunity to work with Alabama to explore potential funding options to support Alabama's efforts to implement water efficiency measures and conservation and reuse programs. Nationally, the EPA already provides funding for efficiency, including reuse, through mechanisms such as the State Revolving Fund.

Interbasin Transfers

The EPA recommends that Alabama consider the procedures set out in Massachusetts' Interbasin Transfer Act (MGL Ch 21 Section 8B-8D), which governs water and wastewater transfers between river basins of the Commonwealth. This Act has been in effect for over 25 years and is considered part of an overall plan which has led Massachusetts to be considered a model for water supply efficiency. (See http://www.mass.gov/dcr/watersupply/intbasin/index.htm.) This well–established program includes many features that Alabama is considering, including defined basin units for evaluating and accounting for interbasin transfers and a "regulatory mechanism that provides for existing transfers and establishes criteria for new or expanded transfers." The Act also requires that efficiency measures be in place prior to approval of a transfer, such as conservation, leak detection, more accurate metering, etc. These efficiency measures correlate well with Alabama's stated goals regarding conservation.

Instream Flows

Under the WMI Report's Findings and Policy Options (pp.4-7) it recommends that the state:

- *Develop a policy concerning instream flows which can serve as a cornerstone of a statewide water management plan, and*
- *Develop an acceptable legal and regulatory framework for implementation of an instream flow policy.*

Under the issues identified by the Permanent Joint Legislative Committee on Water Policy and Management (2009) it recommended:

- *Examining and recommending appropriate flow dynamics [instream flows] for rivers and streams to support biological, recreational, and industrial/transportation needs and requirements.*

EPA concurs with these statements and recommends that Alabama utilize the well understood and well established tools under the CWA to develop instream flow water quality standards (WQS) for the protection of all designated uses and for application in all other purposes under the CWA. Under the CWA, WQS include the designated use of a waterbody, narrative and/or numeric criteria to protect those designated uses and the state's antidegradation requirements. All three of these WQS components can be used by Alabama as relevant and vital tools to protect and restore healthy hydrology in the state.

The WMI Report to the Governor states that "environmental legislation such as the Clean Water Act...often play[s] a major role in protecting instream flows in rivers and stream reaches but in a very indirect manner..." (WMI Report, p. 26). However, the EPA notes that the tools available under the CWA are increasingly being used to protect and restore the hydrology of waterbodies.

Many states have considered that the CWA is only concerned with water *quality* and does not regulate water *quantity*. However, the U.S. Supreme Court specifically addressed this under the CWA in PUD No. 1 of Jefferson County v. Washington Department of Ecology ("PUD"), 511 U.S. 700 (1994). In that case, the Court found that the distinction between water quality and quantity was "an artificial distinction" and that "[i]n many cases, water quantity is closely related to water quality..." (*PUD* at 1912-13). The linkage between water quality and water quantity has been well documented by the scientific community. Bunn and Arthington (2002) concluded that flow is a major determinant of physical habitat in streams and rivers and directly affects biological composition. Modifying flow regimes alters habitat and influences species diversity, distribution and abundance (Bunn and Arthington, 2002). Aquatic plant and animal species have evolved life cycle patterns directly tied to the frequency, magnitude, duration, timing and rate of change of natural flows. Ecologists now understand that flows following the range of the natural hydrograph are important for maintaining structure and function of aquatic ecosystems (Freeman and Marcinek, 2006). The *Regulated Riparian Model Water Code* recognizes the critical interconnectedness of water quantity and water quality at Section 1R-1-09, stating:

> Water allocation is inseparable from the regulation of water quality. Regardless of whether both functions are vested in a single agency, water allocation must be coordinated with water quality for effective management of a water source and to comply with federal laws and regulations. ... Two programs...will particularly affect State water allocation: 1. ambient water quality standards; and 2. effluent discharge standards for "point sources."

At this time, eight states and three tribes have adopted explicit narrative water quality criteria for protection of instream flows into their state WQSs under the CWA. Many more states are in the process of developing hydrologic standards under the CWA. Table 1 provides examples of how narrative criteria have been developed to protect not just the ecological conditions necessary to protect vital fisheries and aquatic life, but also recreation and all other designated uses under the CWA.

State/Tribe	Terms in WQS
NH	"surface water quantity shall be maintained at levels adequate to protect existing and designated uses"
RI	"quantity for protection of... fish and wildlife...adequate to protect designated uses" "For activities that will likely cause or contribute to flow alterations, streamflow conditions must be adequate to support existing and designated uses."
VT	Class A(1)- Changes from natural flow regime shall not cause the natural flow regime to be diminished, in aggregate, by more than 5% 7Q10 at any time; Class B WMT 1 Waters - Changes from the natural flow regime, in aggregate,

State/Tribe	Terms in WQS
	shall not result in natural flows being diminished by more than a minimal amount provided that all uses are fully supported; and when flows are equal to or less than 7Q10, by not more than 5% of 7Q10. Class A(2) Waters and Class B Waters other than WMT1 - Any change from the natural flow regime shall provide for maintenance of flow characteristics that ensure the full support of uses and comply with the applicable water quality criteria.
NY	For both Class N fresh surface waters and Class AA(S) fresh surface waters … "There shall be no alteration to flow that will impair the waters for their best usages."
VA	"Man-made alterations in stream flow shall not contravene designated uses including protection of the propagation and growth of aquatic life."
KY	"Aquatic Life. (1) Warm water aquatic habitat. The following parameters and associated criteria shall apply for the protection of productive warm water aquatic communities, fowl, animal wildlife, arboreous growth, agricultural, and industrial uses:...(c) Flow shall not be altered to a degree which will adversely affect the aquatic community."
TN	Criteria for Water Uses "(3) Fish and Aquatic Life (n) Habitat- The quality of stream habitat shall provide for the development of a diverse aquatic community that meets regionally-based biological integrity goals. Types of habitat loss include, but are not limited to: channel and substrate alterations… stream flow changes…. For wadeable streams, the instream habitat within each subecoregion shall be generally similar to that found at reference streams. However, streams shall not be assessed as impacted by habitat loss if it has been demonstrated that the biological integrity goal has been met. (o) Flow- Stream or other waterbody flows shall support the fish and aquatic life criteria." "(4) Recreational. (m) Flow- Stream flows shall support recreational uses."
MO	"Waters shall be free from physical, chemical, or hydrologic changes that would impair the natural biological community."
Seminole Tribe of FL	"Class 2-A waters shall be free from activities...that …Impair the biological community as it naturally occurs… due to …hydrologic changes"
Mole Lake Band of the Lake Superior Tribe of Chippewa Indians	"prohibited…human induced changes to … area hydrology that alter natural ambient conditions…such as…flow, stage…. Natural daily fluctuations of flow, stage… shall be maintained."
Bad River Band of the Lake Superior Tribe of Chippewa Indians	"Water quantity and quality that may limit the growth and propagation of, or otherwise cause or contribute to an adverse effect to wild rice, wildlife, and other flora and fauna of cultural importance to the Tribe shall be prohibited." "Natural hydrological conditions supportive of the natural biological community, including all flora and fauna, and physical characteristics naturally present in the waterbody shall be protected to prevent any adverse effects." "Pollutants or human-induced changes to waters, the sediments of waters, or area hydrology that results in changes to the natural biological communities

State/Tribe	Terms in WQS
	and wildlife habitat shall be prohibited. The migration of fish and other aquatic biota normally present shall not be hindered. Natural daily and seasonal fluctuations of flow (including naturally occurring seiche), level, stage, dissolved oxygen, pH, and temperature shall be maintained."

Table 1: Narrative language in WQS of select states and tribes relating to hydrologic criteria. See EPA website for full text of specific criteria: http://water.epa.gov/scitech/swguidance/standards/wqslibrary/index.cfm)

It should be noted that some other states have set instream flow standards that are implemented through provisions other than the state WQSs. Should Alabama choose to develop instream flow standards outside of the CWA, it should ensure that those instream flow standards are consistent with the state WQSs. That is, Alabama should not set conditions which would be less stringent than or in conflict with the state WQSs under the CWA. The EPA recommends setting the instream flow standard through existing CWA provisions in order to avoid that confusion. Specifically, EPA suggests that Alabama develop instream flow water quality criteria into the state WQSs (Chapter 335-6-10). Once approved, those standards would be in use for all purposes under the CWA in Alabama, such as Section 401, Section 404, etc.

The WMI Report states that the use of the public trust doctrine to protect instream flows often does not take into account the inter- and intra-annual flow variability needed to support stream ecology (p. 26). That is true of many state water policies or specific 'negotiated instream flow requirements' for regulated rivers that have historically focused on protecting a minimum or base flow. As Alabama succinctly captures, there is now a better understanding of the importance of addressing the seasonal, intra-annual and inter-annual variable flow patterns needed to maintain or restore processes that sustain natural riverine characteristics (Instream Flow Council 2009). The EPA concurs with Alabama and supports the approach that does not focus solely on the necessary minimum flows. While a low flow value such as the 7Q10 has been used as a critical flow value for developing waste load allocations for industrial and municipal dischargers, it was never intended as a value to protect ecological integrity.

The EPA Region 4 encourages states to consider adopting environmental flow standards under the CWA based on a "natural flow paradigm" that more closely resembles natural conditions (Poff et al. 1997). Where resources are available, site-specific environmental flow determinations can be made. When such studies are not practicable, the use of tools such as the "Ecological Limits of Hydrologic Alteration" (ELOHA; Poff et al. 2010) could be used which provides a scientifically sound means to assess environmental flows across large regions. Other natural flow approaches can be used where site-specific data are not available, such as using a Percent-of-Flow (POF) approach. The POF approach "explicitly recognizes the importance of natural flow variability and sets protection standards by using allowable departures from natural conditions, expressed as percentage alteration" (Richter et al. 2012). The POF approach is relatively simple to implement and may provide a high degree of protection for designated uses that are dependent on natural flow variability. Region 4 notes that the POF approach may need to be modified to be more protective for certain categories of highly sensitive or ecologically significant water bodies. This could include waters designated as Outstanding Alabama Waters or Outstanding National Resource Waters or waterbodies that have a significant contribution of base flow from ground water. The concept of supporting a "natural flow paradigm" as an important ecological objective fits in naturally with the structure of CWA WQS as it can be explicitly stated as a narrative or numeric criterion with frequency, duration and magnitude, utilized to protect designated uses and evaluated during antidegradation reviews.

Development of an instream flow WQS under the CWA would address many of the concerns stated in the Instream Flows section of the WMI Report (pgs. 26-27), including the following:

- *Consistency with fulfilling the trustee resource conservation requirements for the Alabama Department of Conservation and Natural Resources regarding wildlife (Code of Alabama, 1975, §9-2-2).*
- *Relieving concerns regarding 'complex and cumbersome' implementation and enforcement and multi-agency coordination. Use of WQSs under the CWA is an established and well understood process. Other agencies could rely on the standards as the metric to be used in other state programs.*
- *Providing clear definition of the needed natural, variable instream flows versus static minimum flows which do not afford adequate protection.*

Interstate Coordination

EPA would welcome the opportunity to participate in any way with other state and federal agencies to facilitate coordination of interstate issues. EPA has access to facilitation services that could be utilized as needed for resolution of interstate issues.

As well, we encourage all states to keep in mind the CWA provision to protect all downstream uses, including the hydrologic conditions needed to meet the designated uses (40 CFR 131.10(b)) of downstream states.

Water Resources Data

EPA welcomes the opportunity to work with Alabama and other federal partners to explore potential funding options in Alabama's efforts to acquire quality surface water and ground water data.

The EPA also notes that there is a wealth of data and research that is already being developed in the area of water management, water efficiency, the flow-ecology relationship and ground water/surface water interactions that can be used by the state to supplement its own data and research, including work being done by the Southern Instream Flow Network, the USGS, the US Fish and Wildlife Service and academic researchers. Research that is taking place in neighboring states may also be of use to Alabama in those areas with similar physical and geological formations.

References

Adams, T. (2011). "Whitewater rafting course to make big splash on Columbus area economy." Columbus *Ledger-Enquirer*: September 25, 2011.

ADCNR (Alabama Department of Conservation and Natural Resources). "Alabama Aquatic Biodiversity Center Fact Sheet." Retrieved October 26, 2012, from http:www.outdooralabama.com/research-mgmt/aquatic/factSheet.cfm.

ASCE (American Society of Civil Engineers) (2004). "Regulated Riparian Model Water Code." Reston, Virginia. ASCE/EWRI 40-03.

Breckenridge, L. P. (2004). "Maintaining instream flow and protecting aquatic habitat: Promise and perils on the path to regulated riparianism." *West Virginia Law Review* 106: 595-628.

Bunn, S. E. and A. H. Arthington (2002). "Basic Principles and Ecological Consequences of Altered Flow Regimes for Aquatic Biodiversity." *Environmental Management* 30(4): 492-507.

Carlisle, D. M., D. M. Wolock, et al. (2011). "Alteration of streamflow magnitudes and potential ecological consequences: a multiregional assessment." *Frontiers in Ecology and the Environment* 9(5): 264-270.

Commonwealth of Massachusetts (1984). *Interbasin Transfer Act*. Department of Conservation and Recreation (DCR) Office of Water Resources. MGL Ch 21 Section 8B-8D.

Commonwealth of Massachusetts (2006). "Water Conservation Standards," Executive Office of Environmental Affairs and Water Resources Commission.

EPA (Environmental Protection Agency) (2002). "Cases in Water Conservation: How Efficiency Programs Help Water Utilities Save Water and Avoid Costs." Washington, DC, Office of Water.

EPA (Environmental Protection Agency) (2003). "Funding Water Efficiency Through the State Revolving Fund Programs." Washington, DC, Office of Water. EPA 816-F-03-022.

EPA (Environmental Protection Agency) (2010a). "Control and Mitigation of Drinking Water Losses in Distribution Systems." Washington, DC, Office of Water.

EPA (Environmental Protection Agency) (2010b). "Guidelines on Water Efficiency Measures for Water Supply Projects in the Southeast." Atlanta, Georgia, EPA Region IV.

EPA (Environmental Protection Agency) (2012a). "2012 Guidelines for Water Reuse." EPA/600/R-12/618.

EPA (Environmental Protection Agency) (2012b). "The Economic Benefits of Protecting Healthy Watersheds Fact Sheet." Washington, DC, Office of Water. EPA 841-N-12-004.

Freeman, M. and P. Marcinek (2006). "Fish Assemblage Responses to Water Withdrawals and Water Supply Reservoirs in Piedmont Streams." *Environmental Management* 38(3): 435-450.

Hamilton, D. A. and P. W. Seelbach (2011). "Michigan's Water Withdrawal Assessment Process and Internet Screening Tool." Lansing, State of Michigan Department of Natural Resources.

Hanson, C., J. Talberth, et al. (2011). "Forests for Water: Exploring Payments for Watershed Services in the U.S. South." *WRI Issue Brief.* Washington, DC, World Resources Institute.

Instream Flow Council (2009). "International Instream Flow Program Initiative: A Status Report of State and Provincial Fish and Wildlife Agency Instream Flow Activities and Strategies for the Future." Cheyenne. Final Report for Multi-State Conservation Grant Project WY M-7-T.

Master, L. L., S. R. Flack, et al., Eds. (1998). *Rivers of Life: Critical Watersheds for Protecting Freshwater Biodiversity.* Arlington, Virginia, The Nature Conservancy.

MAWSS (Mobile Area Water and Sewer System) (2005). "Press Release: MAWSS Begins $1.1 Million EPA Project at Tricentennial Park." Mobile.

Mayer, P. W., E. Towler, et al. (2004). "National Multiple Family Submetering and Allocation Billing Program Study."

NCDWQ (North Carolina Department of Water Quality) (2007). *Subchapter 2B: Surface Water and Wetland Standards ("Red Book").* North Carolina Administrative Code Title 15A Environment and Natural Resources).

Outdoor Industry Foundation (2006). "The Active Outdoor Recreation Economy." Boulder, Colorado.

Outdoor Industry Foundation (2012). "The Outdoor Recreation Economy." Boulder, Colorado.

Poff, N. L., J. D. Allan, et al. (1997). "The natural flow regime: A paradigm for river conservation and restoration." *BioScience* 47(11): 769-784.

Poff, N. L., B. D. Richter, et al. (2010). "The ecological limits of hydrologic alteration (ELOHA): a new framework for developing regional environmental flow standards." *Freshwater Biology* 55(1): 147-170.

Richter, B. D., M. M. Davis, et al. (2012). "Short Communication: A presumptive standard for environmental flow protection." *River Research and Applications* 28(8): 1312-1321.

Ruswick, F., J. Allan, et al. (2010). "The Michigan Water Withdrawal Assessment Process: Science and Collaboration in Sustaining Renewable Natural Resources." *Renewable Resources Journal* 26(4): 13-18.

Scott, J. (2012). "Opening of Hickory Log Creek Reservoir could be delayed another six months." *Atlanta Journal-Constitution*: June 8, 2012.

Southern Instream Flow Network (2010). "Southern Instream Flow Research Agenda; A Proposal to Advance the Science for Instream Flow Protection in Southern Rivers."

Winter, T. C., J. W. Harvey, et al. (1998). "Ground water and surface water: A single resource." Denver, Colorado, USGS (United States Geological Survey).

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION I
JOHN F. KENNEDY FEDERAL BUILDING
BOSTON, MASSACHUSETTS 02203-0001

OFFICE OF THE
REGIONAL ADMINISTRATOR

June 25, 1996

Timothy R.E. Keeney
Director
Department of Environmental Management
9 Hayes Street
Providence, RI 02908

Dear Director Keeney:

As you know, governments at the federal, state, and local levels, along with the private sector, have expended enormous efforts to reduce the discharge of pollution to our surface waters. This investment has yielded great improvements in water quality over the past two decades.

But these improvements are threatened by a growing problem: the ever-increasing diversion of water for hydropower generation, industrial and commercial use, agriculture, snowmaking, and municipal water supply. Whatever the end use, the result of unchecked water withdrawals can be a dangerous reduction in flows in rivers and streams and severe reductions in lake levels.

The effects of flow reductions can include disruption of fish passage, reduced protective cover, increased accesibility to predation, increased stream temperatures, and reduced spawning habitat. In addition, these effects can exacerbate the effects of chemical stressors. Reduced seasonal variations in stream flows can increase the potential that aquatic organisms will be exposed to toxic concentrations of chemicals from wastewater discharges. Artificially reduced flows have interfered with recreational uses, the restoration of historic salmon runs, and the cultural heritage of Native Americans.

We all have a responsibility to tackle the flow problem. This will become even more important as we accelerate our move toward a "watershed" approach to environmental protection--water withdrawals are a key factor in the health of a watershed.

A critical first step is to ensure that reasonable conservation measures are implemented in places where flow levels have become a concern. Last summer, the Ipswich River in Massachusetts literally ran dry--and yet some municipal water suppliers (who draw their water from wells in the Ipswich River watershed, directly contributing to lower water levels) had imposed no conservation requirements at all. In other areas, significant stretches of riverbed are essentially dry due to the diversion of flow through pipelines to power plants. The unlimited use of water in a time of shortage is a luxury that our environment cannot afford.

Below, I have described some existing mechanisms to encourage conservation and prevent excessive water withdrawals. I believe that these mechanisms have been underused in the past. We must make more active use of these approaches.

In addition to these existing mechanisms, additional programs may be needed to protect water levels. At the end of this letter I have included some suggestions in that direction.

Existing authority to prevent excessive water withdrawals

1. Water Quality Standards. Water quality standards for each water body include two elements: the designated uses of that water body, and specific criteria designed to protect those uses. While attention is often focused on the criteria, the designated uses are of equal importance--and in many circumstances provide authority for states to regulate water withdrawals.

For example, the Supreme Court has ruled that states may deny certification pursuant to Section 401 of the Clean Water Act to a project which will interfere with a designated use set forth in the state's water quality standards--even if specific criteria will not be violated. PUD No. 1 of Jefferson County v. Washington Department of Ecology, 114 S.Ct. 1900 (1994). Section 401 certification is required whenever a federal permit or license is needed for a project involving a discharge to waters of the United States.

The PUD case concerned a proposed hydroelectric power plant, which required a license from the Federal Energy Regulatory Commission. The Court held that the State of Washington was entitled to require the plant to maintain certain stream flows as a condition of Section 401 certification. The Court noted that the distinction between water "quality" and water "quantity" is "artificial"--

> In many cases, water quantity is closely related to water quality; a sufficient lowering of the water quantity in a body of water could destroy all of its designated uses...

Id. at 1912-13.

I suggest that states use their water quality standards, in combination with the § 401 certification process or state laws which implement such standards, to prevent activities which will reduce stream flows to unacceptable levels. At a minimum, this approach could be used to require appropriate conservation measures. Moreover, as discussed below, I recommend that states consider increasing the effectiveness of water quality standards by incorporating numeric flow criteria.

2. **Antidegradation.** EPA regulations require that state water quality standards include an antidegradation program that ensures the protection of existing beneficial uses.

In order to protect such uses, an antidegradation program must obviously address water withdrawals as well as discharges. Each state should review its antidegradation program to ensure that there is adequate ability to protect existing uses.

3. **§ 404 permits.** The construction of new water withdrawal systems (or the maintenance of existing systems) may require § 404 permits. Those permits are subject to the § 401 certification process, which (as discussed above) provides a mechanism for states to protect flow levels.

4. **NPDES permits.** Some water withdrawals are linked to downstream discharges. For example, a municipality may withdraw drinking water from a river at one point and then discharge wastewater downstream of that point.

In permitting the wastewater discharge, the permitting authority should consider whether the water withdrawal by the municipality will reduce flow to the point where the discharge will cause exceedances of water quality standards. If so, the permitting authority should consider requiring conservation measures to ensure that stream flow is adequate to accomodate the discharge without exceeding standards.

5. **Endangered Species Act and state endangered species statutes**. If a river or stream provides habitat or potential habitat for endangered or threatened species, the federal Endangered Species Act or analogous state statutes may provide authority to restrict withdrawals or require conservation activities. This possibility should be considered in permitting and other decisions.

6. **Public Trust doctrine.** In some states the "public trust" doctrine may provide legal authority for the protection of water levels in rivers, lakes, and streams.

Additional programs to protect water levels

1. **Permitting withdrawals**. Those states which do not already have a system for permitting water withdrawals might consider creating one. Such a system does not have to be bureaucratically onerous or needlessly restrictive--the goal is to allow targeted efforts to conserve water and, if necessary, limit withdrawals in areas where low flows cause real environmental problems.

2. **Make water quality standards more explicitly protective of flows.** As discussed above, water quality standards already include designated uses, which can be applied to protect flow levels. Such protection could be enhanced, however, by including specific flow requirements in the standards.

For example, if a stream segment is designated as habitat for aquatic life, the standards might specify a flow level necessary to support such habitat. At the start, this might be done in a few segments with identified flow problems. The existence of such flow standards would support a state's efforts to impose conservation requirements through the § 401 certification process or other mechanisms.[1]

3. **Add biological criteria to water quality standards**. Water quality standards in many of the states have general biological criteria, in narrative form: for example, "high quality habitat," or "cold water fishery." These criteria provide a basis for the protection of habitat, but they are vague and subject to prolonged debate.

Maine has specific descriptive narrative criteria for its various classes of water. These criteria help to clarify habitat requirements and narrow the debate. We suggest that the states adopt at least class-specific narrative biological criteria, and preferably class-specific numeric measures of biological integrity.

I look forward to working with you on these issues. We will organize a meeting of appropriate staff to discuss how these approaches can be implemented in practice. We plan to hold such a meeting by the end of the summer.

Please feel free to call me or Ken Moraff at (617)/565-3741, with any comments, questions, or concerns. Thank you for your attention to this issue.

Sincerely,

John P. DeVillars
Regional Administrator

---

1. Fishery management/restoration plans can also be integrated into water quality standards. For example, anadromous fish goals of state/federal restoration plans for the Connecticut, Merrimack, or Penobscot Rivers can be integrated into the respective state standards.

Cabrillo Power I LLC
4600 Carlsbad Blvd.
Carlsbad, CA 92008
(760) 268-4000

August 12, 2016

San Diego Regional Water Quality Control Board
Attention: Xueyuan Yu
2375 Northside Dr., Suite 100
San Diego, CA 92108

Subject: Comment – CWA Section 305(b)/303(d) Integrated Report, Attn: Xueyuan Yu

Ms. Yu,

Cabrillo Power I LLC (Cabrillo) has reviewed the San Diego Regional Water Quality Control Board's (SD RWQCB) draft Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego Region (Integrated Report) dated July 2016. Cabrillo also attended the public workshop that provided an overview of the procedures used to develop the Integrated Report on July 19, 2016. Cabrillo is the owner of the Agua Hedionda Lagoon (AHL) and discharges stormwater in accordance with its Industrial General Permit to the outer and middle basins of the AHL. Cabrillo discharges associated with the operation of the Encina Power Station, in accordance to its individual Industrial National Pollutant Discharge Elimination Permit (NPDES) NO. CA0001350, are directed to a discharge basin connected to the ocean (i.e., direct ocean discharge).

Cabrillo understands that the SD RWQCB has recommended listing the AHL on the 303(d) list for Toxicity based on sediment results from studies conducted in 2003, 2004, 2005 and 2008. Cabrillo understands the procedures followed in developing the Toxicity recommendation; however, we disagree with the recommendation and provide the following comments.

Comment #1: Toxicity results 2003, 2004, 2005, and 2008

The AHL has been recommended to be added to the 303(d) list for "toxicity," and this is assumed to be sediment toxicity based on the results of the County of San Diego Ambient Bay and Lagoon Monitoring (ABLM) Project 2003-2005 – Chemistry, Pathogens, Toxicity and Benthic Infauna, and the San Diego County Municipal Copermittees Bight 2008 Sediment Chemistry, Toxicity and Benthic Infauna Data (08 Bight) studies. The two studies yielded eight unique results for sediment toxicity for four years of testing over a six year period. Of the eight results, three tests reported survival endpoints below 80 percent and five results reported greater than 80 percent. The Draft 303(d) Fact Sheet provides the AHL summary of the Line of Evidence (LOE) for toxicity as record 47577, and LOE's 72909 for the 08 Bight study and 72914 for the ABLM study. LOE 72909 reports five samples with one toxicity exceedance. LOE 72914 reports three samples with three exceedances. The data were reviewed in the referenced reports and is summarized in the following tables. As mentioned above, the exceedance criteria is considered survival endpoints of less than 80 percent (State Water Resource Control Board, June 2012); however, the ABLM report has only two results below 80 percent and one result above 80 percent. Cabrillo recommends revising the LOE records 47577 to reflect three of eight samples reporting exceedances, and LOE 72914 to reflect two of three samples reporting exceedances.

County of San Diego Ambient Bay and Lagoon Monitoring (ABLM) Project 2003-2005 – Chemistry, Pathogens, Toxicity and Benthic Infauna				
Lagoon Station Code	Latitude	Longitude	Portion of the AHL	Sample Composite Identification
904_AHL2M_2003	33.14337	-117.33153	Inner lagoon	904AHL_2003
904_AHL3L_2003	33.13972	-117.32448	Inner lagoon	904AHL_2003
904_AHL3M_2003	33.14092	-117.32435	Inner lagoon	904AHL_2003
904_AHL2L2_2004	33.14169	-117.33084	Inner lagoon	904AHL_2004
904_AHL3L1_2004	33.13990	-117.32367	Inner lagoon	904AHL_2004
904_AHL3R1_2004	33.13968	-117.31826	Inner lagoon	904AHL_2004
904_AHL3L1_2005	33.14028	-117.32638	Inner lagoon	904AHL_2005
904_AHL3M1_2005	33.14228	-117.32652	Inner lagoon	904AHL_2005
904_AHL3R1_2005	33.14230	-117.32293	Inner lagoon	904AHL_2005

ABLM Toxicity Results		
Lagoon Station Code	Toxicity Results	Portion of the AHL
904AHL_2003	45%	Inner lagoon
904AHL_2004	85%	Inner lagoon
904AHL_2005	62%	Inner lagoon

San Diego County Municipal Copermittees Bight 2008 Sediment Chemistry, Toxicity and Benthic Infauna Data (08 Bight)				
Lagoon Station Code	Latitude	Longitude	Toxicity Results	Portion of the AHL
904_6269	33.13925	-117.33775	83%	Outer Lagoon
904_6270	33.13962	-117.31861	92%	Inner lagoon
904_6271	33.14016	-117.3251	61%	Inner lagoon
904_6280	33.14456	-117.32811	81%	Inner lagoon
904_6282	33.1451	-117.33565	87%	Middle Lagoon

Comment #2: Toxicity Evaluation

The State Water Quality Control Policy for Developing California's Clean Water Act 303(d) List (Policy) (State Water Resources Control Board, September 2004), section 6.1.1 states that the RWQCBs should consider all readily available data when making a determination. The Policy section 6.1.5.3 also states that, "If the implementation of a management practice(s) has resulted in a change in the water body segment, only recently collected data [since the implementation of the management measure(s)] should be considered." The most recent sediment toxicity testing of the AHL was performed in 2013 and reported in December 2015 (SCCWRP Technical Report 899, December 2015). The results of the testing reported three results for AHL. One sample was collected from the outer lagoon and two samples from the inner lagoon. All samples reported greater than 80 percent survival. In addition, the 2015 evaluation methodology meets the requirements of California's sediment quality objectives (SQO) policy for bays and estuaries (Draft Proposed Amendments to the Water Quality Control Plan for Enclosed Bays and Estuaries Plan, Part I: Sediment Quality, SWRCB, January 2011) for having both short term survival and sublethal toxicity evaluation methods. The 2015 study used both *Eohaustorius* *estuaries* and *Mytilus galloprovincialis* species to test each sample. The previous studies only used *Eohaustorius estuaries* to determine toxicity. Considering that the ABLM and 08 Bight studies were performed over a six year period, and when combined with the most recent 2013 results (decade temporal range), the cumulative data set may indicate improving sediment quality (Policy section 3.10).

It is also Cabrillo's understanding that ideally, sediment toxicity be associated with a specific pollutant (Policy section 3.6); however, we acknowledge that a water body can be listed for toxicity alone. Based solely on the results of the ABLM and 08 Bight studies, there does not seem to be any association or correlation with a specific pollutant that would explain the toxicity observed in both studies.

In addition, recent changes in State policies for banning the use of certain pesticides, improved storm water runoff programs (new General Permits for industrial and construction storm water runoff), and the recent local management plan aimed at improving water quality and habitat in the Agua Hedionda watershed (City of Vista, 2008), Cabrillo requests that the SD RWQCB consider postponing the addition of AHL to the 303(d) list for sediment toxicity.

Comment #3 AHL Water Body Description and Beneficial Uses

The AHL is described in the Water Quality Control Plan for the San Diego Basin (Basin Plan) Region describes as, "Agua Hedionda Lagoon, at the mouth of Agua Hedionda Creek, is within the city of Carlsbad. The lagoon is routinely dredged to keep it open to the ocean. The lagoon serves as an integral part of a utility's power plant cooling water intake system and also provides a reserve cooling water supply. The easterly portion of the lagoon is used for water oriented recreation." The AHL is listed as having the following uses: industrial (IND), contact and non-contact recreation1 and 2 (REC1 and REC2), commercial and sport fishing (COMM), biological habitats of special significance (BIOL), estuary (EST), wildlife habitat (WILD), rare species habitat (RARE), marine (MAR), aquaculture (AQUA), migration of aquatic organisms habitat (MIGR), spawning and reproduction habitats (SPWN), and shellfish harvesting area (SHELL).

The AHL comprises approximately 247 acres consisting of three distinct lagoon areas. The outer lagoon is approximately 52 acres, the middle lagoon is approximately 19 acres, and the inner lagoon is approximately 176 acres. The lagoon areas are connected by narrow channels that run under major transportation corridors. All three basins of the AHL experience tidal influence, and to a lesser extent drainage from the Agua Hedionda Creek. Each of these portions of the AHL has different physical characteristics (tidal flushing and receiving waters) and uses.

- The outer lagoon currently supports the industrial uses for power plant intake of once-through cooling water, and desalination plant intake; and shellfish harvesting; and commercial fishery; and public access is restricted. Dredging of the outer lagoon is expected to continue to occur periodically, as needed, to maintain the power plant cooling and desalination plant intake systems. The dredging occurs in the most outer lagoon. The outer lagoon receives storm water runoff from the Encina Power Station western facilities, and runoff from the various City of Carlsbad streets and open areas, surrounding businesses.
- The middle lagoon is used for recreational contact and non-contact recreational activities (sporty fishing, YMCA Camp, etc.) with public access. The middle lagoon receives

storm water runoff from the Carlsbad Energy Center Project site (eastern portion of the EPS), the City of Carlsbad sewer lift station, Caltrans I-5 freeway, and the North County Transit District (NCTD) rail facility.

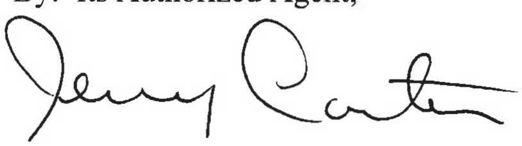
- The inner lagoon is utilized for contact and non-contact recreation and sport fishing with several public access points. The inner lagoon receives surface water from the Agua Hedionda Creek at the eastern end of the lagoon, and storm water runoff from various City of Carlsbad storm drains and the Caltrans I-5 freeway.

The Policy Section 6.1.5.4 recommends the RWQCB consider water body differences in land use, tributary inflow, or discharge input. The chemical and toxicity results from the ABLM and 08 Bight studies support the different water quality characteristics. The ABLM and 08 Bight studies also are consistent in that the reported failing toxicity results are all in the inner lagoon area. The outer and middle lagoon sections experience greater tidal flushing and the outer lagoon has significant sediment influx which requires periodic dredging events. In addition, if the AHL basins were treated as separate segments then the middle and outer lagoon would pass the toxicity evaluation criteria having no failing results reported.

Cabrillo respectfully requests SD RWQCB consider the different attributes and uses of AHL as described above, consider the respective toxicity data summarized above, and remove the recommendation to place AHL on the 303(d) list. If the SD RWQCB determines that the recommendation stands, Cabrillo requests the SD RWQCB consider breaking up the AHL into separate segments and only recommend listing the AHL inner lagoon for toxicity in the final report.

Cabrillo appreciates the opportunity to participate in the SD RWQCB's evaluation and 303(d) listing process. Should you have any questions regarding the enclosed you may contact Ms. Sheila Henika, P.E. at (760) 268-4018 or sheila.henika@nrg.com.

Regards,
Cabrillo Power I LLC
By: Its Authorized Agent,



By: NRG Cabrillo Operations Inc.
Jerry Carter
Plant Manager

cc: Ellan Lukey, City of Carlsbad
Peter. MacLaggan, Poseidon Water
Don Kent, Hubbs Seaworld

Unified Port of San Diego

3165 Pacific Highway, San Diego, CA 92101
P.O. Box 120488, San Diego, CA 92112-0488
619.686.6200 • www.portofsandiego.org

VIA EMAIL

August 11, 2016

California Water Quality Control Board – San Diego Region
2375 Northside Drive, Suite 100
San Diego, CA 92108-2700
Attention: Xueyuan Yu
Email: sandiego@waterboards.ca.gov

Subject: **Comment – CWA Section 305(b)/303(d) Integrated Report, Attn: Xueyuan Yu**

Dear Ms. Yu:

The San Diego Unified Port District (District) appreciates the opportunity to provide comments in response to the Draft Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego Region (Draft Report), which provides recommendations for changes to both the Clean Water Act (CWA) Section 303(d) List of Water Quality Limited Waterbodies, and the CWA Section 305(b) report on the condition of waterbodies within the San Diego Region. As the public trustee of San Diego Bay (Bay), the District shares a common interest with the San Diego Regional Water Quality Control Board (Regional Board) in ensuring the protection of the Bay's beneficial uses. The District supports the Regional Board's continued efforts to address water quality issues within the Bay, and remains committed to working collaboratively with the Regional Board to fulfill our agencies' shared goals. To this end, the District respectfully submits the following comments on the Draft Report. General comments are listed below, while supporting materials for points referenced below are enclosed as Attachments A and B.

1. **Understanding and controlling upstream loading and upstream areas of sediment toxicity is critical to achieving long-term improvements in the Bay.**

   The current waterbody segment listings and their associated management plan timelines (i.e. TMDL, TMDL Alternative or other actions) do not fully take into consideration the interconnectedness of the watershed as a whole and the role that upstream source loading may play in current Bay conditions. The District is committed to preservation and enhancement of the Bay and its resources, and recognizes that in addition to upstream loading issues associated with certain waterbody segments, legacy contaminants such as PCBs continue to flow into the Bay from upstream sources. These upstream sources should be eliminated through TMDLs, TMDL alternatives or other actions prior to or in tandem with Bay remediation efforts to avoid recontamination.

2. **There is concern that many of the scheduled TMDL completion dates pertaining to the Bay may not be achievable.**
   In the current Draft Report, 50 waterbodies or waterbody segments that affect (in, or adjacent to) the Bay are listed as Category 5 (defined as a water segment where standards are not met and a TMDL is required, but not yet completed), whereas 46 segments are designated as Category 5A (defined as a TMDL is still required), with TMDL scheduled

completion dates ranging from 2005-2027. The District fully supports the restoration of beneficial uses for these water segments; however it prefers to see programs adopted in a more expedited fashion than the projected TMDL completion timelines listed in Appendix B of the Draft Report. As such, the District offers the following recommendations:

a. TMDLs or TMDL alternatives should factor in the completed or near-term cleanup efforts in the Bay. Many impaired segments are adjacent to portions of the Bay in which clean up orders were recently completed. Moreover, some recent data suggests that recontamination of cleanup sites may be occurring from ongoing sources. For the most effective and efficient long-term improvements, both ongoing sources and legacy contaminants must be concurrently addressed.
b. Explore expedited management options (i.e. programs other than a TMDL or TMDL alternatives) so that restoration of the Bay's beneficial uses occurs in a timely manner.
c. Reprioritize TMDLs or TMDL alternatives based on the management goals identified within the San Diego Bay Strategy; adjust resources strategically to align timelines with the prioritized management goals.

3. **The Regional Board should accurately list the sources of PCB contamination in San Diego Bay.**

Decision ID 33669 for San Diego Bay lists several "sources" for PCBs including "Contaminated Sediments," "Dredging," and "Historic Land Management Activities" (Appendix I, page 155).

The following categories, however, are not accurate representations of sources of PCBs in San Diego Bay:

- **Contaminated sediments** were not contaminated prior to the discharge of PCBs from another source.
- **Dredging projects** are not a source of PCBs. Rather dredging projects are intended to remove PCBs and other contaminants from the Bay.
- **Historic land *management activities***, at most, designated acceptable or unacceptable uses for property but did not result in discharges of PCBs or any other contaminant. Rather, the facility activities, whether they were authorized or not resulted in these discharges.

These three categories of "sources" should be removed from the list and replaced with actual sources of PCBs. Examples include: paint, dielectric and coolant fluids, hydraulic fluids, pesticide extenders, sealants, caulking, adhesives, waterproofing compounds, industrial operations within the San Diego Bay watershed, and atmospheric deposition.

4. **Decision ID 52947 LOE ID 75595 San Diego Bay - Arsenic (Shellfish Tissue): The data analysis methodologies utilized to calculate inorganic arsenic and the spatial assumptions made with the inclusion of data from only two sampling locations may not appropriately estimate inorganic arsenic concentrations and therefore incorrectly categorize the entire waterbody.**

The District is concerned that the sampling and methodologies used by the Regional Board to estimate inorganic arsenic concentrations from measured dry-weight total arsenic concentrations may not represent the actual concentrations in San Diego Bay shellfish. Samples used were composited for multiple species of *Mytilus*, negating differences in tissue uptake that may be species specific. The State Mussel Watch data used for this listing failed to distinguish between species of *Mytilus.* In California, Oregon and Washington, *Mytlius californianus* has been found to contain slightly higher concentrations of total arsenic than *Mytilus edulis* from the same general locations (Neff 2002), which given the methodologies used for this listing, may result in different actual concentrations of inorganic arsenic that a 10% estimate on a multi-species composite may fail to identify.

The District recommends the Regional Board reconsider the reliability of using a 10% inorganic arsenic proportion factor, or more appropriately, use available data with *measured* (not estimated) inorganic arsenic concentrations to determine how San Diego Bay shellfish tissue concentrations screen against OEHHA guidelines, thus affecting 303(d) listing decisions. If using measured concentrations is not feasible, then at the very least the proportion factor should be recalculated reflecting more realistic conditions. This can be achieved by comparing calculated proportion factors to hard data collected at the same sampling locations using the same species used for this listing. This methodology has been successfully employed and has assisted in determining listing decisions in other regions such as in the state of Washington (see Washington State Dept. of Ecology 2002). Globally, other studies have specifically tested both total arsenic and inorganic arsenic for exact (i.e. not estimated) concentrations in both mussels and other bivalves and have found that inorganic arsenic often comprises much less and in rarer cases much greater (spatially dependent) than 10% of the total arsenic concentrations in both mussels and other shellfish alike (refer to Attachment A, Table A1). While the District understands the importance of monitoring data that comes from programs like State Mussel Watch, we feel this data should be reviewed to get an overall idea of pollutant concentrations in the Bay, but caution that this data set is not specific nor reliable enough both in its methodologies and sample size to use for 303(d) listings of an entire waterbody.

Further, the Bay has been identified as a multi-use, partitioned waterbody with known eco-regions distinguished by complex circulation and stratification components (San Diego Bay Integrated Natural Resources Management Plan, Port of San Diego 2013). As such, known concentration gradients on a spatial scale have been overlooked when listing the entire Bay based on data from only two sampling locations. The District also encourages the Regional Board to exude caution and review additional sediment, shellfish tissue and water chemistry data at more than two sampling locations before listing the entire Bay under Decision ID 52947. For example, 2013 Regional Harbor Monitoring (RHMP) data[1] compared sediment total arsenic concentrations by eco-region in San Diego Bay, and a potential decreasing trend in arsenic sediment chemistry emerged from north to south (refer to Attachment A, Figure A1). Such an example illustrates how spatial differences in total arsenic exist within the Bay, both at a macro- and micro-level within and across eco-regions. These key factors may be missed and/or overlooked when using just two sample locations coupled with an estimated 10% proportion factor for a Bay-wide listing.

5. **The District requests the removal of the Mercury (tissue) listing under Decision ID 33669 LOE ID 80842.**

   Decision ID 33669 identified PCBs as the pollutant driving a "Do Not Delist" decision for San Diego Bay. However, LOE ID 80842 under Decision ID 33669 lists both Mercury and PCBs for tissue when it should only list PCBs based on the pollutant listed under the Decision ID. If LOE

[1]Supporting information can be found in the final RHMP 2013 report. https://www.portofsandiego.org/document/environment/regional-harbor-monitoring-program/rhmp-2013/7289-final-2013-rhmp-report/file.html

ID 80842 also applies to Mercury, this portion of the LOE ID 80842 should be listed separately under Decision ID 52824.

6. **Indicator Bacteria Levels at Tidelands Park along the San Diego Bay Shoreline have improved over time and in addition are being actively addressed through the San Diego Bay Water Quality Improvement Plan (WQIP). It is recommended that this listing be re-categorized from Category 5 Waterbody Segments (Appendix B) to Category 4B Waterbody Segments (Appendix D).**

   Decision ID 44200 (Appendix I: Fact Sheet) states a Final Listing Decision to "not delist" this waterbody segment from the 303(d) list (TMDL required, Category 5). The District recognizes the past issues with indicator bacteria at this site related to the beneficial uses of water contact recreation and shellfish harvesting; however routine monitoring has shown indicator bacteria levels have decreased over time without a TMDL in place. In addition to the observed improvements identified via routine monitoring, increased and improved management and monitoring efforts are now also in place as part of the WQIP, further supporting water quality improvements at this location. Recent data (compiled since the data acquisition cutoff of 2010) further suggests that it may be inappropriate to place this waterbody segment within Category 5a. The District recommends a change in listing category for Tidelands Park to Category 4B, given that recent data demonstrate improved conditions and indicator bacteria (and therefore all 303(d) listings associated with this location) are being addressed via the San Diego Bay WQIP (an acceptable action other than a TMDL). See Attachment B for further justification and supporting data.

The District is committed to participating in and supporting cleanup, monitoring, and management programs that assist in achieving our agencies' shared goal of improving water quality in San Diego Bay. The District greatly appreciates the Regional Boards continued efforts and looks forward to continued collaboration on cleanup and monitoring efforts throughout the Bay.

If you have any questions or would like additional information related to the comments submitted herein, please contact Kelly Tait at (619) 686-6372 or via email at ktait@portofsandiego.org.

Sincerely,

Karen Holman
Principal
Planning & Green Port

KT/te
CC: Randa Coniglio, Jason Giffen, John Carter, and Paul Brown
Enclosures (2):
Attachment A: Justification and Data Supporting a Change in Inorganic Arsenic Calculations
Attachment B: Justification and Data Supporting a Change in Listing Category for Tidelands Park

Attachment A

Justification and Data Supporting a Change in Inorganic Arsenic Calculations

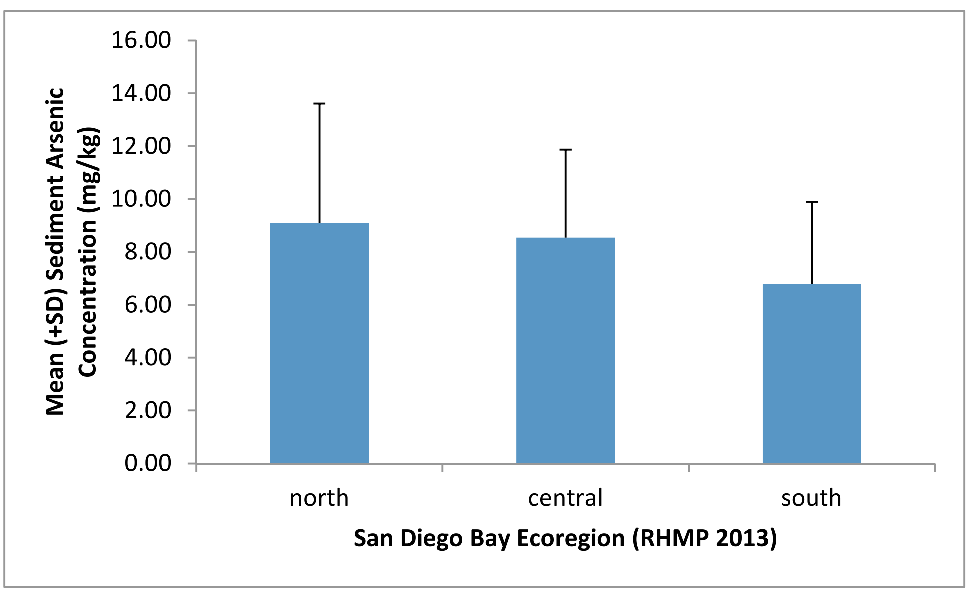
Arsenic is a naturally occurring element that is found in water, soil, plants and animals with two main forms: inorganic and organic. Typically, organic arsenic accumulates in both fish and shellfish and is not considered toxic (Washington State Department of Health 2014). Inorganic arsenic is of concern to human health and occurs in typically lower levels (Washington State Department of Health 2014).

Table A1. Literature Review Highlighting the Range of Percent Inorganic Arsenic found in Bivalve Tissues World Wide

Study	Study Species	Total Arsenic (mg/kg ww)	Inorganic Arsenic (mg/kg ww)	Percent of Inorganic Arsenic comprising Total Arsenic Result	Notes
Sloth and Julshamn 2008	*M. edulis* L.	< 3	< 0.25	< 9%	78% of samples in the study resulted in this overall pattern, however two specific sampling sites demonstrated a 42% inorganic arsenic concentration, futher suggesting that a ballpark estimate of 10% may not be in the Regional Board's best interest for data interpretation
Washington State Department of Ecology 2002	Mixed Native and Japanese Littlneck Clams	1.9-4.2	0.015-0.035	0.4-1.2%	Data ranges represent 15 sampling locations throughout 6 waterways of the Puget Sound; Sample size is approximately 363 individuals
Schoof and Yager 2007	Mollusks	NA*	0.00004-0.0065	1.80%	Literature review of 20 studies providing data on total and inorganic arsenic concentrations
Greenberg et al. 2014	Mussels	NA*	NA*	0.035-2.4%	Literature review of 24 studies, calculated using a sample size of 205
Steward and Turnbull 2015	*Mytilus* sp.	NA*	NA*	0.8-7.3%	Australian study using a sample size of 14

**- Raw data was not available in published articles, and in studies such as Schoof and Yager 2007, Greenberg et al. 2014 and Steward and Turnbull 2015, sometimes only the percent of Inorganic Arsenic comprising Total Arsenic was presented.*

Figure A1. Mean Sediment Total Arsenic Concentrations by Ecoregion in San Diego Bay



Note: Data displayed above was collected as part of the 2013 Regional Harbor Monitoring Program

References:

Greenberg, G.L., Lynch, H.N., and A.S. Lewis. 2014. A Literature Review of Inorganic Arsenic in Seafood and Its Implication in Dietary Intake Analyses. Poster Presentation at SETAC North America 35th Annual Meeting. Vancouver, BC, CAN. November 9-13, 2014.

Neff, J.M. 2002. Bioaccumulation in Marine Organisms: Effect of Contaminants from Oil Well Produced Water. Elsevier.

Port of San Diego et al. 2013. San Diego Bay Integrated Natural Resources Management Plan. San Diego, CA. November 19, 2013.

Schoof, R.A. and Yager, J.W. 2007. Variation of total and speciated arsenic in commonly consumed fish and seafood. Human and Ecological Risk Assessment. 13:946-965.

Sloth J.J. and Julshamn, K. 2008. Survey of total and inorganic arsenic content in blue mussels (Mytulus edulis L.) from Norwegian fiords: revelation of unusual high levels of inorganic arsenic; J Agric. Food Chem. 56(4): 1269-73.

Stewart, I. and Turnbull, A. 2015. Arsenic in Australian Seafood: A Review and Analysis of Monitoring Data 2000-2013. South Australian Research and Development Institute.

Washington State Department of Health. 2014. “Arsenic in Shellfish”. Document DOH 332-145. 1/06/2014.

Washington State Department of Ecology. 2002. Inorganic Arsenic Levels in Puget Sound Fish and Shellfish from 303(d) Listed Waterbodies and Other Areas. Olympia, WA. December 2002.

Attachment B

Justification and Data Supporting a Change in Listing Category for Tidelands Park

In the absence of a TMDL requirement or alternative program, ongoing monitoring data has shown that over time a general decrease in Indicator Bacteria levels has occurred at Tidelands Park. In addition to this observed improvement, a management plan has been developed to further protect beneficial uses at this location. The MS4 Permit Adoption that occurred on May 8, 2013 required a Water Quality Improvement Plan (WQIP) as well as the development of a Monitoring and Assessment Program (MAP) to assess impacts of MS4 discharges on receiving water conditions.

Tidelands Park bacteria monitoring of swimmable waters was designated within the MAP as a Focused Priority Condition (for the full monitoring schedule of the integrated monitoring programs, see Table B1), thus addressing the REC1/Water Contact Recreation Beneficial Use. A comparison of data exceedances by time period for Enterococcus (1999-2010 versus 2011-2016, see Figure B1) illustrates the reductions in the number of average exceedances for single samples, monthly geomeans and rolling geomeans as it relates to the REC1/Water Contact Recreation Beneficial Use. Table B2 numerically illustrates this same pattern, where the number of Fecal Coliform, Total Coliform and Enterococcus exceedances from 2011 through the present all fall below both the number of allowable exceedances as well as the percent allowable exceedances for single samples, monthly geomeans and rolling geomeans.

Similar patterns have been observed for data relating to the Shellfish Harvesting beneficial use (see Table B3 and Figure B2). Both the 30 day median and single sample water quality objectives have demonstrated improvement when comparing data from 1999-2010 (the time period used in the Draft Report) versus the 2011-present time period. In terms of allowable exceedances, both the 30 day median and the single sample maximum were below the allowance (Total Coliform 30 Day Median= 11/29, Single Sample=9/29; see Table B3).

All aforementioned data is publically available through CEDEN, via the Beach Watch program. Given that: a) all pollutants and beneficial uses addressed in the 303d listings at this site have shown reduction in exceedances by actions other than a TMDL, and (b) that the WQIP now acts as a management plan, the District recommends Tidelands Park be listed as Category 4B.

Table B1. Swimmable Waters Monitoring Summary for Tidelands Park
(adapted from *San Diego Bay WMA Water Quality Improvement Plan* June 2015)

	Receiving Water Wet Weather Monitoring	**Receiving Water Dry Season, Dry Weather Monitoring**	**Receiving Water Wet weather season, Dry Weather Monitoring**	**MS4 Monitoring**
Monitoring Approach	Monitor at Tidelands Park	• Tidelands Park[1]: Current San Diego County Department of Environmental Health (DEH) sites. (No additional monitoring to be done by RPs at these sites during this period)	• Expand DEH's dry weather monitoring to occur during the wet weather season. • Monitoring at Tidelands Park	• Paired Sampling: Perform MS4 monitoring at all beach sites at same time as monitoring receiving water quality • Sample three wet weather events during wet season at Tidelands Park in conjunction with receiving water, if feasible
Frequency (Number of Monitoring Events)	Annually sample three wet weather events during wet season at Tidelands Park	• Tidelands Park site: Weekly	• Monthly at Tidelands Park (November 1 – March 31)	Inspect MS4 monthly, year round
Timing of monitoring	Sample within 72 hours of a storm (consistent with Bacteria I TMDL[1])	During dry weather season (April 1 – October 31)	During dry periods, 72 hours or more after storm event	Take sample at MS4 if there is flow/discharge

Note: Monitoring Plans described within Table B1 specifically address REC1 beneficial uses.

[1]Regional Board. 2010. *Revised TMDL for Indicator Bacteria, Project I—Twenty Beaches and Creeks in the San Diego Region (including Tecolote Creek)*. Resolution No. R9-2010-0001. Approved February 10, 2010. http://www.waterboards.ca.gov/sandiego/water_issues/programs/ tmdls/docs/bacteria/updates_022410/2010-0210_BactiI_Resolution&BPA_FINAL.pdf.

Table B2. Tidelands Park REC-1 Indicator Bacteria Exceedances 2011-2016

Tidelands Park REC-1 Entero Exceedances, 2011-2016					
Single Sample	# Samples	# Exceedances	% Exceedance	Allowable Exceedances	Allowable Exceedance %
Fecal Coliforms	176	3	1.70%	29	16.48%
Total Coliforms	177	2	1.13%	29	16.38%
Enterococcus	175	17	9.71%	28	16.00%
Monthly Geomean	# Samples	# Exceedances	% Exceedance	Allowable Exceedances	Allowable Exceedance %
Fecal Coliforms	33	0	0.00%	5	15.15%
Total Coliforms	33	0	0.00%	5	15.15%
Enterococcus	37	3	8.11%	6	16.22%
Rolling Geomean	# Samples	# Exceedances	% Exceedance	Allowable Exceedances	Allowable Exceedance %
Fecal Coliforms	110	0	0.00%	18	16.36%
Total Coliforms	111	0	0.00%	18	16.22%
Enterococcus	107	14	13.08%	17	15.89%

Figure B1. Average Annual Enterococcus Exceedances at Tidelands Park in 1999-2010 (data period used for the Draft Report) versus 2011-2016

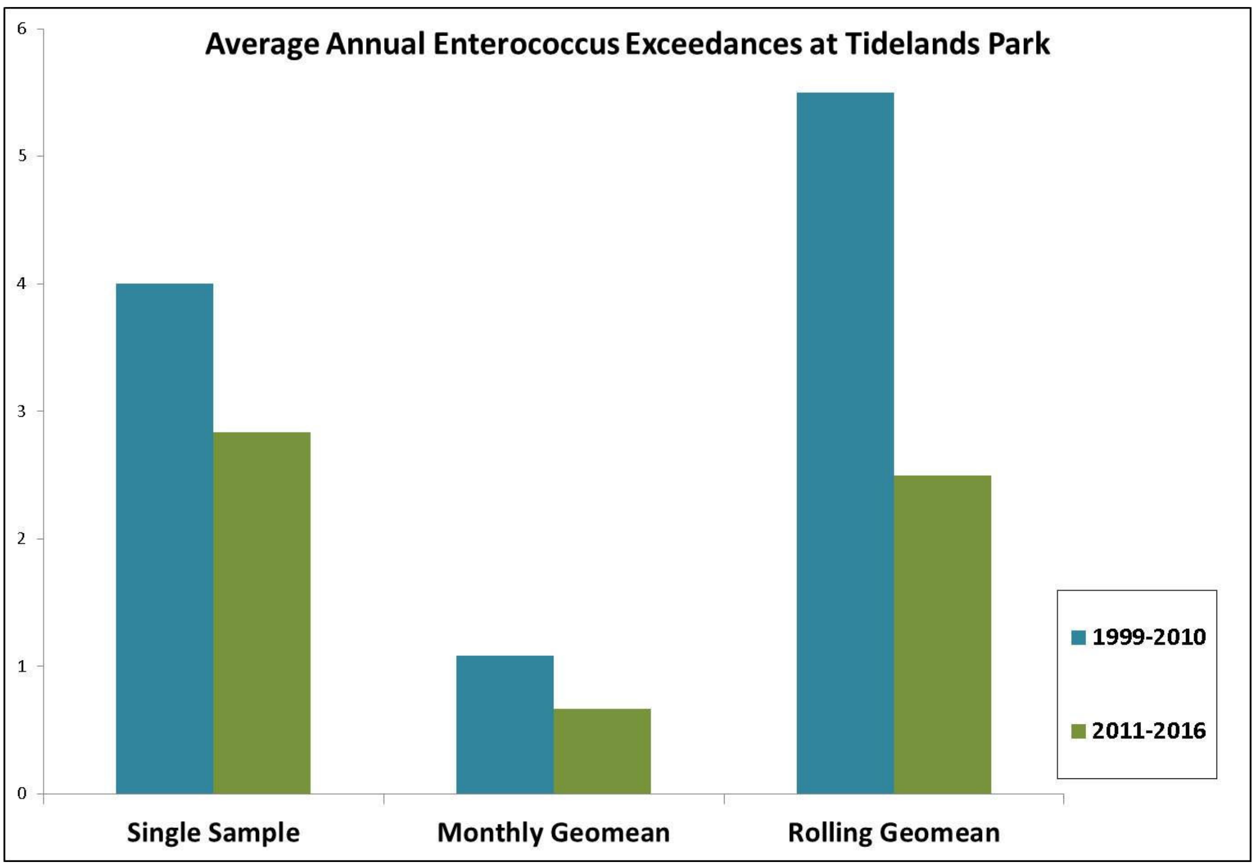
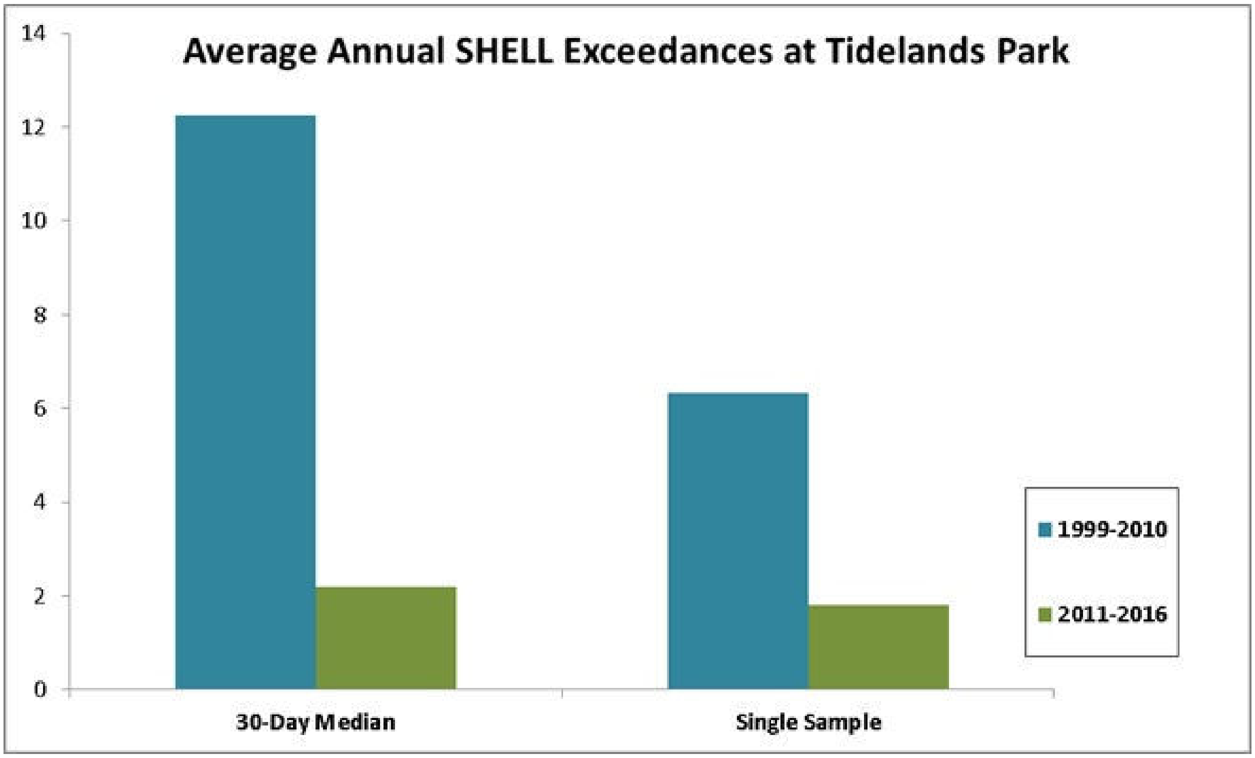


Table B3. Tidelands Park SHELL Indicator Bacteria Exceedances 2011-2016

Tidelands Park SHELL Total Coliform Exceedances, 2011-2016					
30-day Median	# Samples	# Exceedances	% Exceedance	Allowable Exceedances	Allowable Exceedance %
Total Coliforms	177	11	6.21%	29	16.38%
Single Sample	# Samples	# Exceedances	% Exceedance	Allowable Exceedances	Allowable Exceedance %
Total Coliforms	177	9	5.08%	29	16.38%

Figure B2. Average Annual SHELL Indicator Bacteria Exceedances at Tidelands Park in 1999-2010 (data period used for the Draft Report) versus 2011-2016



SAN DIEGO COASTKEEPER

August 9, 2017

San Diego Regional Water Quality Control Board
ATTN: Xeuyuan Yu
2375 Northside Drive
San Diego, CA 92108
sandiego@waterboards.ca.gov, heyu@waterboards.ca.gov

Re: Comment – CWA Section 305(b)/303(d) Integrated Report, Attn: Xueyuan Yu

Sent via email

Dear Chair Abarbanel and Board Members:

Thank you for the opportunity to comment on the draft 305(b)/303(d) Integrated Report for the San Diego Region. San Diego Coastkeeper (Coastkeeper) is a non-profit organization working to protect and restore San Diego County's fishable, swimmable, drinkable waters.

We wish to begin by taking this opportunity to voice our strong support for the efforts of the Regional Board that have led to the inclusion of 236 new listings decisions in our region.

Our comments below offer support for several elements of the Draft Report, include recommendations applicable to the 305(b) and 303(d) processes and decisions, and point out where both the process and Draft Report fail to comply with regulatory and legal requirements of the Clean Water Act and state policy and guidance.

<u>Data and Information Consideration is Inconsistent with Legal Mandates of the Clean Water Act</u>

In order to adequately identify the current state of waterbody health and address impairments to those waters, sections 305(b) and 303(d) of the Clean Water Act and associated regulations require states to assemble and evaluate all existing and available data and information, including data on waters for which water quality problems have been reported by government agencies, members of the public, and academic institutions.[1] The state's own policy directive to consider all information is likewise purposefully broad and includes narrative or photographic information, as well as information and data that lacks rigorous quality control when used in combination with other existing data.[2] Furthermore, Clean Water Act regulations specifically require a 305(b) report to be submitted biennially that includes, "a description of the water quality

[1] *See* 40 C.F.R. §130.7(b)(5), "Each state shall assemble and evaluate all existing and readily available water quality-related data and information to develop the list…"; *see also* 40 C.F.R. § 130.8.
[2] See Updated 2015 Listing Policy, p. 21., "Data without rigorous quality control can be used in combination with high quality data and information," and, "All data of whatever quality can be used as part of a weight of evidence determination."

of all navigable waters…"[3] Thus, the governing federal and state regulations and guidance dictate not only the scope of what information must be considered, but the timeliness with which it must be considered, assessed, and utilized.

Despite this clear intent to address impaired waters in a timely and continuous manner, the Solicitation of Data and Information and submittal of the report in this cycle is limited to data received prior to August of 2010. As the July 2016 Draft Staff Report itself points out, information and data gathered and submitted after August 2010 will not be considered until the next integrated report update in 2020. This limitation to 2010 data is illegal, as the Clean Water Act requires that descriptions of water quality and assessment of impairments are based on *current* or *contemporary* descriptions and impairments, and not water quality descriptions and impairments as they existed a decade or more ago.[4] The result of the failure to review all readily available data is that the List likely does not set forth the full extent of impaired waters in our region.

Furthermore, the process as it now exists does not and cannot allow for timely and effective action to address the poor quality of our region's and state waters. This undermines the very purposes of developing the list and assessing our waters, which is to enable identified impairments to be remedied. As it stands now information and data acquired by our own water quality monitoring staff and volunteers in late 2010 and since will not be used for 303(d) identification and listing purposes or 305(b) assessment purposes for up to 10 years after that data and information was acquired.[5] This is not only absurd, but also illegal, and counter to the clear language and intent of the Clean Water Act and its governing regulations.

Regardless of any agreement the State Board may have reached with the USEPA, the limitation of data and information and associated time constraint are contrary to Clean Water Act regulations, the Updated 2015 State Listing Policy, and ongoing EPA guidance, each of which requires the evaluation and assessment of *all* existing data and information. As such, both the State and Region 9 Water Boards are required to consider valid data and information generated after August 2010 in the current 305(b) and 303(d) process to ensure compliance with federal and state requirements.

<u>Off-Cycle Considerations and Waterbody Prioritization</u>

We strongly urge the San Diego Regional Board to allow for and consider regular (biennially) off-cycle considerations and examinations of data for 303(d) listing. As the Draft Report states, "it is anticipated that the process will allow for those Regional Boards that are "off cycle" to still examine high priority data and make decisions related

---

[3] See 22 USC §1315(b)(1)(A); *see also* 40 C.F.R. § 130.8 (section 305(b) report must include a "description of the water quality of all waters of the United States"); 50 Fed. Reg. 1,774 (Jan. 11, 1985) (CWA "305(b) …report must include recommendations on current and future program activities needed to address problems in priority areas… [40 C.F.R. § 130.8] emphasizes the role of the section 305(b) report as the primary water quality problem assessment document under the Act.")
[4] 33 U.S.C. § 1315(b)(1)(A); 40 C.F.R. §§ 130.7(b)(5), 130.8; *see also* 50 Fed. Reg. 1774 (Jan. 11, 1985).
[5] Coastkeeper and other organizations and institutions have gathered and submitted a wealth of data since August 2010.

directly to listings and de-listings and submit them for inclusion into the current listing cycle as appropriate."[6]

The Draft Report continues, "should the San Diego Water Board identify a priority waterbody(ies) for assessment or re-assessment during the interim time period, an off-cycle waterbody or pollutant specific report may be drafted for submitted during another Region's reporting period."[7] We believe, however, that adequate identification of "priority waterbodies" cannot occur based on outdated information. To ensure the most current data is utilized in assessment and prioritization we encourage the Regional Board to carry out within the next year a broader regional solicitation for all data and information available on our region's waterways, and put into place a process to assess that data and information for 303(d) inclusion on an expedited basis. Based upon the data submitted, the Regional Board could then use current data and information to determine priority waterbodies and plans for addressing impaired waters.

California Stream Condition Index and Biological Stream Integrity

Coastkeeper strongly supports the utilization of the California Stream Condition Index (CSCI) to evaluate the biological condition of wadeable streams in the San Diego Region. More specifically, we strongly support the utilization of benthic macroinvertebrate data and the CSCI to assess stream beneficial use attainment pursuant to CWA 303(d) and 305(b). The robust reference pool and predictor methods of the CSCI provide a large and consistently defined reference data set that allows for a comparative assessment of wadeable streams in our region. Moreover, the CSCI was developed specifically, "for use in regulatory applications that affect the management of individual reaches," and thus the application of CSCI to the 303(d)/305(b) process is appropriate and welcome.[8]

Invasive species

We strongly support the listing of San Mateo Creek for invasive species. We wish, however, to point out an inaccuracy in the Draft Report as it relates to listing under Category 4C of San Mateo Creek due to the presence of invasive species. The Draft report notes that invasive species are a, "pollution causing an impairment", and in Table 3 of the Draft it lists "None" under Category 5 Associated Pollutant(s).[9] In fact, invasive species are "biological materials" within the definition of "pollutants" as described in the Clean Water Act (and thus, requiring listing under Category 5)[10], and "invasive species" is consistently categorized as a "pollutant" in other listed waterbodies throughout the state.[11] We respectfully request the Draft Report revise this listing for invasive species in

---

[6] Draft Report, p. 3.
[7] Draft Report, p. 4.
[8] *See generally, Bioassessment in complex environments: designing an index for consistent meaning in different settings*, and p. 268.
[9] Draft Report, pages 16 and 21.
[10] *Northwest Environmental Advocates, et al. v. US EPA*, 2005 U.S. Dist. LEXIS 5373 (N.D. Cal. 2005).
[11] *See, for example*, listings for invasive species as "pollutants" in Las Virgenes Creek, Lindero Creek Reach 1, Malibu Creek, Cosumnes River (Upper), and Delta Waterways, among others.

San Mateo Creek as "pollutants", rather than "pollution", and place the listing under Category 5.

<u>4C Listings and Multiple Category Listings</u>

We support the Regional Board's actions in concurrently listing nearly 30 waterbody segments as impaired for Habitat Alteration and Hydromodification (4C listings) in addition to existing Category 5 listings for those waterbodies. Existing EPA guidance documents recommend placing water body segments into multiple categories as applicable.[12] Like the San Diego Water Board, Coastkeeper believes adherence to this practice is important for informational purposes related to human and ecological health. Multiple listings serve to further refine strategies needed to address ongoing impairments while focusing efforts on those conditions impairing beneficial uses. As such, Coastkeeper urges both the State and Regional Boards to work together to devise a uniform system whereby an assessed waterbody segment can be placed into multiple categories depending on which specific beneficial uses are, or are not, being met.

To that end, while we acknowledge the USEPA's 2015 Guidance document's finding that TMDLs are not required for water body impairments assigned to Category 4C, we also urge the Regional Board to employ the use of all tools at its disposal to ensure these waterbodies are addressed not only for chemical and/or biological impairments, but for pollution-impaired waters as well. The State Board's Impaired Waterways Guidance makes clear that, "the Porter Cologne Water Quality Control Act charges the SWRCB and the RWQCBs with the responsibility of protecting the beneficial uses and quality of all waters of the state, irrespective of the cause of the impairment."[13] A host of regulatory tools remain available to the Regional Board and include individual or general waste discharge requirements, enforcement actions, interagency agreements, Basin Plan amendments, or policy adoptions. Coastkeeper urges the Regional Board to prioritize restoration of waters listed as impaired for habitat alteration and hydromodification despite the fact that the EPA does not require TMDLs for pollution-caused impairments.

<u>Trends and Weight of Evidence Analyses</u>

We encourage the Regional and State Boards to more actively solicit, encourage, and consider evidence under both "Trends" (Section 3.10 of Listing Policy) and "Weight of Evidence" (Section 3.11) approaches in the off-cycle and upcoming integrated report processes. Under the weight of evidence approach, "when all other Listing Factors do not result in the listing of a water segment but information indicates non-attainment of standards, a water segment shall be evaluated to determine whether the weight of evidence demonstrates that the water quality standard is attained. If the weight of evidence indicates non-attainment, the water segment shall be places on the section 303(d) list."[14] Furthermore, "all data of whatever quality can be used as part of a weight

---

[12] *See, for example,* 2005 and 2015 EPA Guidance Documents.
[13] SWRCB Impaired Waterways Guidance, p. 1-4.
[14] Updated Listing Policy, p. 21.

of evidence determination."[15] Additionally, under a Trends analysis approach it would appear that allowances for data and information that are not accompanied by a QAPP would still need to be considered and used.[16] We believe that there is potential to add additional water body segments to the 303(d) list, and encourage use of these approaches in future analyses.

TMDLs and Insufficiency of 4B Listings Determinations

We once again express our serious concerns over the Regional Board's chosen strategy to employ TMDL-alternatives as opposed to TMDLs in addressing impaired waterways. Our concerns with this approach are heightened by the fact that such alternatives are not subject to a rigorous and transparent showing, such as a reasonable assurance analysis, that actions taken under those alternatives will result in outcomes sought and the attainment of beneficial uses and, ultimately, de-listings. Furthermore, the EPA's most recent Guidance expressly states that the Vision document (to which the Regional Board cites for its preference for TMDL-alternatives), "does not alter CWA 303(d) regulatory obligations to identify impaired or threatened waters and to develop TMDLs for such waters."[17] The Guidance continues, "TMDLs will remain the most dominant analytic and informational tool for addressing such waters."[18] The Region 9 Draft Report, however, lists zero TMDLs in development since 2012, and six "TMDL Alternatives" undertaken in that same time frame. Despite the EPA's clear and continued preference for TMDLs moving forward, by all appearances the San Diego Regional Board has chosen to refrain from developing new TMDLs altogether.

The Draft Report itself acknowledges USEPA guidance that states schedules should be expeditious and normally extend from eight to thirteen years in length, but could be shorter or slightly longer depending on state-specific factors.[19] The timeline for completing TMDLs – or TMDL alternative processes – for *new* listings should be no longer than 13 years, or a completion date of 2027. Previously listed waterbody impairments are expected to be addressed prior to that date. However, given the move away from TMDLs in our region and a move towards TMDL alternatives or other regulatory processes, we have strong concerns that there is, and will continue to be, a lack of assurance that impaired waters will be addressed in an effective and expeditious manner.

Importantly, as written there exists insufficient documentation included in the Draft Report and Appendices to support these 4B decisions, and the Draft Report fails to comply with EPA guidance on 4B demonstrations.

In each instance where the Draft Report does list those waterbodies subject to TMDL alternatives, the Report does not include the level of information EPA Guidance

[15] Updated Listing Policy, p. 21.
[16] *See* Updated Listing Policy pp. 7-8, and 21.
[17] 2015 Guidance, p. 1. See also page 1 of *A Long Term Vision for Assessment, Restoration, and Protection under the Clean Water Act Section 303(d) Program* ("Vision").
[18] *Id* at p. 4. The Vision echoes this language on page 9.
[19] Draft Report, p. 8.

documents require and as such contains insufficient information to justify 4B listings.[20] EPA Guidance is clear that Category 4B listings must be accompanied by demonstrations that other measures are expected to address all water-pollutant combinations and attain all WQS within a reasonable period of time.[21] Such demonstrations are expected to be accompanied by, "adequate documentation that the required control mechanisms will address all major pollutant sources and establish a clear link between the control mechanisms and WQSs."[22] For waters impaired by nonpoint sources (the bulk, if not all, of the waters listed in Region 9), demonstrations must be accompanied by specific detailed showings, including, but not limited to identification of the controls to be relied upon and documentation showing how the control measures are generally applicable to the impairment in question and can reasonably be expected to reduce pollutant loadings and ultimately *attain WQSs when fully implemented*.[23] Documentation is considered sufficient if it will:

- Describe the rational for why these control mechanisms will achieve WQSs within a reasonable period of time;
- List the suite of controls proposed for implementation and range of the controls' effectiveness;
- Estimate the number of acres that will be treated by the general class of controls to achieve the target load;
- Document that the water quality should be achieved as soon as practicable once full implementation occurs, *or for controls required as part of an iterative or adaptive management program, provide* ***reasonable assurance*** *that phased implementation will continue until WQSs are achieved,* and document the basis by which implementation of these measures is required.[24]

That Guidance continues that the state should, "provide a reasonable calculation that demonstrates that pollutant reductions (resulting from the implementation of the "other controls") will lead to attainment of WQS".[25] Thus, documentation to support 4B listings

[20] For a full list of those considerations to be included, *see* 2004, 2006, and 2008 Guidance documents for clarification of information needed for 4B demonstrations. *See also* pages 6-7 of the 2016 Guidance. The Draft Report as written fails to include many, if not most, of these requirements for each 4B listing. The 2015 State Listing Policy itself requires a determination in the fact sheets that, "an existing regulatory program is reasonable expected to result in the attainment of the water quality standard within a reasonable, specified time." P. 3.

[21] See 2004, 2006, and 2008 Guidance documents.

[22] 2004 Guidance, p. 5.

[23] 2004 Guidance, p. 6. Emphasis Added.

[24] 2004 Guidance, pp. 6-7. Emphasis Added.

[25] 2004 Guidance, p. 8. Guidance from 2006 and 2008 builds upon these requirements and calls for additional descriptions of, and schedules for, monitoring milestones for tracking progress, an estimate or projection of the time when water quality standards will be met (including an explanation of the basis for their conclusion), a description and schedule of the proposed implementation strategy and supporting pollution controls necessary to achieve WQS, among other things. *See* EPA's 2006 Guidance, pp. 54, 56; *and* 2008 Guidance, pp. 7, Attachment 2.

should be accompanied at the very least by a reasonable assurance analysis and calculations showing how and when such measures will be effective at attaining WQS.[26]

More recent Guidance discusses TMDL alternatives and lists among the information to be included an, "analysis to support why the State believes that the implementation of the alternative restoration approach is expected to achieve WQS," "an Action Plan or Implementation Plan to document: a) the actions to address all sources…necessary to achieve WQS…; and, b) a schedule of actions designed to meet WQS with clear milestones and dates, which includes interim milestones and target dates with clear deliverables," "an estimate or projection of the time when WQS will be met," and, "identification of available funding opportunities to implement the alternative restoration plan."[27]

Yet the Draft Report contains no such information, plan, reasonable assurance analysis, or calculations. For example, the Fact Sheet for Loma Alta Slough's TMDL alternative approach says only that compliance with the Regional MS4 permit will result in the "desired environmental outcome by 2023." The Fact Sheet for Famosa Slough notes only that, "pollutants will be addressed by implementing the MS4 permit," with no apparent date of expected completion or other accompanying data or analyses. Further, for each of the Pacific Ocean Shoreline and mission Bay Shorelines Trash listings the chosen strategy (without more) is listed as, "collected effort of public, agencies, organizations, and permittees. Methods include street sweeping, education programs on littering, installation of trash-catching devices on storm drains." This, despite the fact that Trash TMDLs have proven to be effective tools in other parts of southern California. Finally, we could not find detailed information of any sort of the 4B listing of Tijuana River and Estuary for in either the Fact Sheets or the separate 4B report. Should the Regional Board decide to attempt to list Tijuana River and Estuary under 4B for any number of waterbody-pollutant combinations, we expect to see all supporting documentation and analyses included.

Furthermore, even when following the requirements of the EPA's Guidance, TMDL alternatives are not held to the same level of rigor and accountability as are TMDLs. In fact, without requiring a rigorous and peer-reviewed reasonable assurance analysis (RAA), or some other form of equally stringent review to ensure actions taken will result in timely outcomes and de-listings, it is possible, if not likely, our waters will remain in a perpetual state of impairment. We therefore urge the Regional Board to reinstate TMDLs that are on hold and engage in the TMDL processes for those waters segments under categories 4b and 5. At the very least we recommend the Regional Board amend the Draft Report to include all information required by EPA Guidance documents for each TMDL alternative listed. Further, we strongly urge the Board, should it decide to continue to move forward with TMDL alternatives, to require that RAAs or similar

[26] We note that plans currently drawn up and accepted under the regional MS4 permit's WQIPs are insufficient when considered in light of EPA Guidance dating back some 12 or more years, as the WQIPs are accompanied by neither a reasonable assurance analysis or calculations showing they will be effective by a time and date certain.

[27] 2016 Guidance, p. 6.

assurances accompany any such TMDL alternative processes in order to ensure actions planned will result in the achievement of beneficial uses.

Finally, we note however the Regional Board decides to achieve compliance with Water Quality Standards in impaired waters, the Board cannot extend compliance deadlines beyond 2010 where pollutants listed in the California Toxics Rule (CTR) are causing the impairment. NPDES permits that include either a TMDL Waste Load Allocation or any alternative means of compliance cannot postpone compliance to the future. Both the Inland Surface Water Plan (ISWP), which implements the CTR for all NPDES permits except stormwater permits, and the CTR itself authorized 10-year compliance schedules for achieving CTR criteria, and included a specific sunset provision of May 2010 for CTR compliance.[28] Thus any NPDES permitting scheme purporting to achieve compliance later than 2010 with CTR standards in waters impaired for CTR pollutants is on its face illegal.

Thank you for the opportunity to comment on the draft 303(d)/305(b) Integrated Report. Please feel free to contact me with any questions or for additional feedback. We look forward to continuing to work together with the Regional Board to achieve fishable, swimmable, drinkable waters in our region through Clean Water Act listings, assessments, and corrective actions implementation.

Sincerely,

Matt O’Malley
Legal & Policy Director

cc:
David Gibson

[28] For more on this, *see* our comments dated March 31, 2016: “Comments for Draft TMDL-Specific Requirements for SWRCB’s Industrial General Storm Water Permit, Chollas Creek Metals”.

CITY OF VISTA
CALIFORNIA
P: 760-726-1340 | cityofvista.com
200 Civic Center Drive, Vista, California 92084-6275

CITY OF OCEANSIDE
WATER UTILITIES DEPARTMENT
300 NORTH COAST HIGHWAY • OCEANSIDE, CA 92054 •
TELEPHONE 760-435-5800 • FAX 760-435-5821

August 12, 2016

Ms. Xueyuan Yu
San Diego Regional Water Quality Control Board
2375 Northside Dr #100
San Diego, CA 92108
via email: sandiego@waterboards.ca.gov

Subject: Review and Comment of the Draft 2014 California Section (§) 303(d)/305(b) Integrated Report

Dear Ms. Yu,

The Cities of Vista and Oceanside (Cities) have reviewed the Draft 2014 California §303(d)/305(b) Integrated Report dated July 12, 2016. We appreciate the opportunity to provide comments to the San Diego Regional Water Quality Control Board (Regional Board) on this important document. This letter provides an overview of our key comments and then provides specific comments organized by constituent.

General Comments

1. <u>Selenium Standard Misapplied During Listing Assessment</u>
   The Regional Board utilized a criterion for total selenium of 0.005 mg/L from 40 CFR 131.38 (the Regional Board also references the San Diego Basin Plan, which in turn references 40 CFR 131.38) in the listing evaluations for selenium. The data collected as part of the Surface Water Ambient Monitoring Program (SWAMP) in 2002 in the San Diego region were analyzed for dissolved selenium. The regulation (40 CFR 131.38) clearly states that the criterion for selenium applies only to total selenium, not dissolved selenium. Therefore, the dissolved selenium samples included in the listing assessment should not be used as lines of evidence (LOEs) to support selenium listings.
2. <u>Inconsistent Application of Listing Policy for Conventional and Other Pollutants</u>
   Listings for conventional and other pollutants do not appear to follow the guidance presented in Table 3.2 of the Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) List (Listing Policy). The exceedances of conventional and other pollutants needed to place a water body on the §303(d) list should be greater than or equal to five. However, numerous listings, including total nitrogen, total phosphorus, benthic community, and surfactants are included on the Draft 2014 §303(d) list based on exceedance

counts of less than five. More detail is provided below regarding comments for specific decision IDs.

3. <u>Consider Recent Data Before Making A Listing Decision</u>
   Although acknowledged by the Regional Board, the age of some of the data used in the listing analysis was greater than 10 years for numerous waterbodies and therefore not likely representative of current water quality conditions. Inclusion of data greater than 10 years old, and arguably greater than five years old, will likely not result in a §303d list that is representative of water quality conditions in San Diego County and therefore not useful in the development of water quality priorities. If the Regional Board is required to list a waterbody using available data, please review listings off-cycle with additional available information not included in the Draft 2014 §303(d) listing evaluation.

4. The Cities would like to state our support of the County of San Diego's general comments on the 2014 §303(d) list, specifically general comments 5, 6, and 7 related to the benthic community listings.

Specific Comments by Constituent

1. <u>Surfactants</u>

Agua Hedionda Creek was listed for surfactants (MBAS) based on one LOE, and the listing referenced the San Diego County Municipal Copermittee (Copermittee) monitoring data from 2001 to 2008 as the basis of the listing. Further examination of the available data resulted in the following comments:

- Agua Hedionda Creek, Decision ID 47481; the single LOE states that eight of 11 samples collected by the Copermittees between 2001 and 2008 at AHC-MLS and AHC-TWAS-1 exceeded the criterion for surfactants (MBAS) (0.5 mg/L). According to the 2014-2015 Copermittee monitoring report (Transitional Monitoring and Assessment Program Report for the Carlsbad Watershed Management Area (2014-2015)), zero of two dry weather and zero of two wet weather samples at AHC-TWAS-1 exceeded the criteria between 2001 and October 2010. Additionally, between 2001 and October 2010, zero of three dry weather and zero of 31 wet weather samples collected at AHC-MLS exceeded the criterion. A total of 38 samples were collected between 2001 and October 2010, with zero exceedances of the criterion for surfactants (MBAS). Table 3.2 of the Listing Policy states that a minimum of seven exceedances are needed to list a waterbody for a conventional or other pollutant with 38 samples. These data do not meet the listing criteria for listing Agua Hedionda Creek for surfactants (MBAS).

RECOMMENDATION

- Recommend removal of Agua Hedionda Creek for surfactants (MBAS) from the Draft 2014 §303(d) list; the total number of exceedances for Agua

Hedionda Creek is zero of 38 (AHC-MLS and AHC-TWAS-1). There appears to be a discrepancy in the Regional Board's data analysis.

2. Diazinon

Diazinon was banned from sale in 2005, and since that time significant decreases in concentrations of this pesticide have been observed in receiving water bodies in San Diego County. Due to the inclusion of data greater than 10 years old in the Draft 2014 §303d list evaluation, the number of exceedances for this pesticide meets listing criteria in some water bodies. However, due to the ban on sales of Diazinon in the past 11 years, evaluation of the data should be limited to data collected since the time of the ban. Additionally, sections 3.10 and 4.10 of the Listing Policy allow for the inclusion of trend evaluation during §303d list development. Agua Hedionda Creek is currently proposed for listing on the Draft 2014 §303d list for Diazinon; however there have been no exceedances of the criterion for Diazinon since the early 2000's at any of the stations included in the analysis.

- Agua Hedionda Creek, Decision ID 47453; LOE ID 72872 states that nine of 28 samples exceeded the criterion for Diazinon at AHC-MLS and AHC-TWAS-1 between 2001 and 2008. Re-analysis of available data (Transitional Monitoring and Assessment Program Report for the Carlsbad Watershed Management Area (2014-2015)) shows that there have been zero exceedances of the criterion for Diazinon since 2006 at these two monitoring locations (zero of 18 samples during wet and dry weather). Based on the age of the exceedances and significantly decreasing trend results (step six of section 3.10 of the Listing Policy) this pollutant is not likely to exceed the criterion in the future. Therefore, Diazinon should not be included on the 2014 §303d list for Agua Hedionda Creek. See Attachment A for a table of monitoring results.

RECOMMENDATION

- Recommend Agua Hedionda Creek be removed from the Draft 2014 §303d list due to the ban on the sale of Diazinon, the significantly decreasing trends in Diazinon since 2005, no observed exceedances of Diazinon since 2006 (zero of 18 samples), and the likelihood that Diazinon will not exceed the criterion in the future.

3. Selenium

As stated in the general comment number 1 above, dissolved selenium samples collected as part of the SWAMP program were compared to the criterion for total selenium as part of the listing assessment. The listings for total selenium have been reevaluated based on data available from the San Diego County Copermittee Regional Monitoring Program. Results of the reanalysis are presented below.

- Agua Hedionda Creek, Decision ID 33134: LOE ID 3183 states that three of four total selenium samples collected as part of the SWAMP program exceeded the 40 CFR 131.38 criterion of 0.005 mg/L. However, examination of the California

Environmental Data Exchange Network (CEDEN) online database shows that the four selenium samples were analyzed for dissolved selenium instead of total selenium. Therefore, the criterion does not apply and the data should not be used in the listing evaluation. Additionally, the LOE should be updated to state that dissolved selenium were used in the analysis, and not total selenium.

LOE 77975 states that one of 28 samples collected as part of the San Diego County Copermittee Regional Monitoring program exceeded the total selenium criterion. Re-analysis of available data (Transitional Monitoring and Assessment Program Report for the Carlsbad Watershed Management Area (2014-2015)) show that between 1999 and October 2010, one of 30 wet samples and zero of three dry samples exceeded the criterion at AHC-MLS and zero of two samples exceeded during dry and zero of two samples exceeded during wet weather at AHC-TWAS-1. The assessment result is one exceedance out of 37, which does not meet the number of exceedances required to list the waterbody for selenium per Table 3.1 of the Listing Policy.

- Buena Vista Creek, Decision ID 42422: LOE 77985 references dissolved selenium collected as part of the San Diego Copermittee Regional Monitoring Program. As stated previously, total selenium should be used in the listing assessment for comparison with the criterion. Re-analysis of available data (Transitional Monitoring and Assessment Program Report for the Carlsbad Watershed Management Area (2014-2015)) shows that zero of three wet and zero of three dry samples collected at BVC-TWAS-1 exceed the total selenium criterion. The LOE should also be updated to reflect the total selenium results, and to remove references to dissolved selenium results.

  LOE 6549 references dissolved selenium samples collected as part of the SWAMP program in 2002. These data should not be used in the listing assessment, as the criterion is for total selenium. The LOE references the San Diego Basin Plan, which in Table C-1 references the USEPA National Ambient Water Quality Criteria (40 CFR 131.38). As stated previously, 40CFR131.38 explicitly states that the selenium criterion is for total selenium.

- Loma Alta Creek, Decision ID 43254: LOE 77791 references dissolved selenium collected as part of the San Diego Copermittee Regional Monitoring Program. As stated previously, total selenium should be used in the listing assessment for comparison with the criterion. Re-analysis of available data (Transitional Monitoring and Assessment Program Report for the Carlsbad Watershed Management Area (2014-2015)) shows that zero of three dry and zero of three wet samples collected at LAC-TWAS-1 exceeded the criterion for total selenium. The LOE should be updated to reflect the total selenium results and to remove references to dissolved selenium results.

  LOE 8875 states that three of three samples exceeded the criterion for selenium. The LOE references dissolved selenium, which should not be compared to the criterion for total selenium. These data should not be used in the listing assessment, as the criterion is for total selenium. The LOE references the USEPA

National Ambient Water Quality Criteria (40 CFR 131.38). As stated previously, 40CFR131.38 explicitly states that the selenium criterion is for total selenium.

RECOMMENDATION

- It is recommended that Agua Hedionda Creek be removed from the 2014 Draft §303(d) list for selenium, as the total number of exceedances of the total selenium criterion is one of 37 and does not meet the requirements for listing per Table 3.1 of the Listing Policy.
- It is recommended that Buena Vista Creek be removed from the 2014 Draft §303(d) list for selenium, as the total number of exceedances of total selenium is zero of six. This result does not meet the criteria for listing per Table 3.1 of the Listing Policy.
- It is recommended that Loma Alta Creek be removed from the 2014 Draft §303(d) list for selenium, as the total number of exceedances of total selenium is zero of six. This result does not meet the criteria for listing per Table 3.1 of the Listing Policy.

4. Indicator Bacteria

The indicator bacteria listings for Pacific Ocean Shoreline at Loma Alta HSA at Loma Alta Creek Mouth (Decision ID 43811) and Pacific Ocean Shoreline, San Luis Rey HU, at San Luis Rey River Mouth (Decision ID 44090) were examined. Although San Luis Rey is a category 4a waterbody, it should be noted that both listing evaluations included the shellfish objective. Neither Loma Alta Creek Mouth nor San Luis Rey River Mouth have a current beneficial use for shellfish (Basin Plan Table 2-3). This beneficial use should be removed from all future §303d listing assessments for these two water bodies.

RECOMMENDATION

- Remove assessment of the shellfish beneficial use from the §303d listing assessments for Loma Alta Creek Mouth and San Luis Rey River Mouth.

We thank you for consideration of our comments. If you have any questions or require additional information, please contact Cheryl Filar at (760) 643-5412 or email: cfilar@ci.vista.ca.us or Mo Lahsaie at (760) 435-5803 or email: mlahsaiezadeh@ci.oceanside.ca.us.

Respectfully Submitted,

Cheryl Filar, Stormwater Program Manager
City of Vista
Water Quality Protection Program

Mo Lahsaie, Environmental Officer
City of Oceanside
Clean Water Program

San Diego County Water Authority
4677 Overland Avenue • San Diego, California 92123-1233
(858) 522-6600 FAX (858) 522-6568 www.sdcwa.org

August 11, 2016

Sent via Electronic Mail to: sandiego@waterboards.ca.gov

Mr. David W. Gibson
Executive Officer
California Regional Water Quality Control Board, San Diego Region
2375 Northside Drive, Suite 100
San Diego, CA 92108-2700

Dear Mr. Gibson:

Subject: Comment - CWA Section 305(b)/303(d) Integrated Report, Attn: Xueyuan Yu
Delist Nitrogen at Miramar Reservoir, Lake Murray, and San Vicente Reservoir

Thank you for the opportunity to provide comments on the Draft *Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego Region*, dated July 2016. The purpose of this letter is to request that nitrogen, either as "total nitrogen as N" or "total nitrogen", be removed (delisted) from the 303(d) list as a constituent impairing the quality from the following imported water storage reservoirs:

- Miramar Reservoir,
- Lake Murray, and
- San Vicente Reservoir.

Overview

The 2016 Draft Integrated Report proposes that Miramar Reservoir and San Vicente Reservoir be listed as 303(d) impaired for nitrogen as a pollutant name change from an earlier 303(d) listing for "total nitrogen as N". It also recommends retaining nitrogen as a 303(d) impaired constituent for Lake Murray. Each of these reservoirs was originally listed on the basis of comparing nitrogen concentrations during 2005-2006 against an assumed Basin Plan numerical total nitrogen objective of 0.25 mg/l.[1]

1 Clean Water Act 303(d) listings for Lake Murray for nitrogen, Miramar Reservoir for "nitrogen as N", and San Vicente Reservoir for "nitrogen as N" were presented within *Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego* Region, San Diego Regional Water Quality Control Board, December 2009. The 2016 Draft Integrated Report proposes that all three reservoirs be listed as impaired for nitrogen on the basis that a preponderance of 2005-2006 water quality samples in each reservoir exceeded a total nitrogen concentration of 0.25 mg/l.

The original basis for listing these reservoirs is flawed due to the following reasons:

- The 303(d) support documents fail to demonstrate that the 2005-2006 data do not comply with the Basin Plan objective for nitrogen, and further, fail to implement guidance on how to evaluate compliance with the Basin Plan nitrogen objective.

- The 303(d) support documents fail to demonstrate non-compliance with the Basin Plan narrative objective for biostimulatory substances. Water clarity and chlorophyll data were presented in the 303(d) support documents for the three reservoirs during 2005-2006, but were not evaluated, which would have demonstrated a lack of adverse biostimulation effects, and no indication of adverse impacts to beneficial uses.

Importance of Recommended Delisting

Several Water Authority member agencies including the city of San Diego are studying and developing indirect potable reuse projects using reservoir augmentation for use as potable supply. Failure to correct the inappropriate 303(d) listings for nitrogen in Miramar Reservoir, Lake Murray, and San Vicente Reservoir may hinder the San Diego Water Board's ability to permit planned or future indirect potable reuse (IPR) reservoir augmentation discharges to the reservoirs.

If the San Diego Water Board were to require that total nitrogen concentrations be maintained at or below 0.25 mg/l in imported water reservoirs, the implementation of IPR/reservoir augmentation would be rendered infeasible, as compliance with such a 0.25 mg/l nitrogen standard cannot be achieved even with the highest level of treatment proposed with draft regulations being considered by the State Water Resources Control Board Division of Drinking Water.[2] Incidentally, compliance could also not be achieved using imported water since total nitrogen concentrations in imported water supplies also typically exceed 0.25 mg/l.[3]

Delisting nitrogen as a 303(d) impaired constituent for Miramar Reservoir, Lake Murray, and San Vicente Reservoir would:

- Properly reflect the fact that the Basin Plan does not establish a not-to-be-exceeded numerical nitrogen water quality standard of 0.25 mg/l for all reservoirs.
- Acknowledge that the San Diego Water Board has the flexibility to assess compliance with Basin Plan nitrogen objectives by taking into account reservoir-specific nitrogen:phosphorus (N:P) ratios and nutrient loading conditions.
- Be consistent with the "Sustainable Local Water Supply" element of the *San Diego Water Board Practical Vision*. The Sustainable Local Water Supply element of the Practical Vision encourages implementation of IPR and proposes that the San Diego

2 See Advanced Water Purification Facility Study Report (City of San Diego, January 2013) available at the following websites: https://www.sandiego.gov/sites/default/files/legacy/purewater/pdf/projectreport/awpfstudyreport.pdf.

3 See Limnology and Reservoir Detention Study of San Vicente Reservoir (Flow Science, 2013), available online at the following websites: https://www.sandiego.gov/sites/default/files/legacy/purewater/pdf/projectreport/limnologyreport.pdf.

Water Board "address" nitrogen 303(d) listings for San Vicente Reservoir and other IPR reservoirs.[4]

- Be consistent with guidance provided to date by the San Diego Water Board to Water Authority member agencies who are proceeding with IPR/reservoir augmentation projects.[5] This guidance is supportive of preventing biostimulation using a phosphorus-limited approach in which low reservoir phosphorus concentrations are consistently maintained and reservoir N:P ratios are managed to maintain targeted levels that are consistent with supporting reservoir beneficial uses.

Rationale for Proposed Delisting: Basin Plan Objective for Nitrogen
The 303(d) nitrogen listings were based on the incorrect assumption that the Basin Plan establishes a one-size-fits-all, not-to-be-exceeded numerical nitrogen concentration standard of 0.25 mg/l for all reservoirs. The Water Authority disagrees with this interpretation of the Basin Plan objectives, for the following reasons.

The Basin Plan establishes the following objective for biostimulatory substances:

> *Inland surface waters, bays and estuaries and coastal lagoon 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.*

While the Basin Plan establishes a numerical phosphorus threshold of 0.025 mg/l within any standing body of water, the Basin Plan clearly states that "analogous threshold values have not been set for nitrogen compounds." Instead, the Basin Plan directs that "natural ratios of nitrogen to phosphorus are to be determined by surveillance and monitoring and upheld." The intent of this requirement is clear – the Basin Plan directs that reservoir-specific N: P data are to be used in assessing compliance with the nitrogen objective.

In accordance with the Basin Plan, a required first step in evaluating compliance with the Basin Plan nitrogen objective is to identify whether data are available to assess reservoir-specific N:P

---

4 See pages 14-16 of the "Sustainable Local Water Supply" element the *San Diego Water Board Practical Vision*, adopted by the Regional Water Board in 2013.

5 See Regional Water Board correspondence to the City of San Diego dated February 7, 2013 (244506jllim), in which notes that the Regional Water Board could implement effluent concentration limitations in NPDES permits for IPR reservoir augmentation projects on the basis of site-specific nitrogen:phosphorus (N:P) ratios to implement the existing Basin Plan objectives for nitrogen and biostimulation.

ratios. If data are available, reservoir specific N:P ratios and reservoir-specific nutrient loading conditions can be assessed. If data are not available, the default 10:1 N:P value can be used.

In contradiction to this, however, the 2016 Draft Integrated Report and the prior December 2009 Integrated Report[6] make no attempt made to:

- Justify why an assumed 10:1 N:P ratio was used in the 303(d) analysis for each reservoir even through reservoir-specific N:P data were available,
- Utilize the available data to statistically assess reservoir-specific N:P ratios in Miramar Reservoir, Lake Murray, or San Vicente Reservoir,
- Evaluate how N:P ratios may affect compliance with the Basin Plan biostimulation narrative objective,
- Clarify that N:P ratios in Miramar Reservoir, Lake Murray, or San Vicente Reservoir are a function of the quality of imported water that is delivered to the reservoirs, or
- Acknowledge that the San Diego Water Board has the flexibility to assess compliance with the Basin Plan nitrogen objective through evaluation of reservoir-specific N:P data, reservoir-specific nutrient load conditions, and reservoir-specific effects on beneficial uses.

Instead, the 303(d) listings were established simply on the basis of comparing reservoir water quality concentrations for nitrogen during 2005-2006 with an assumed not-to-be-exceeded numerical total nitrogen standard of 0.25 mg/l.[6] In addition to being inconsistent with the Basin Plan requirement to "identify and uphold" N:P ratios, this approach ignores data presented within the 303(d) documentation. Data presented within the December 2009 Integrated Report clearly indicates the dominance of phosphorus-limiting conditions within the three reservoirs during 2005-2006, as:

- Phosphorus was detected in only one of the 28 Miramar Reservoir samples during 2005-2006, and N:P ratios in Miramar Reservoir were consistently significantly higher than 10:1.[7]
- Phosphorus was detected in only one of 28 Lake Murray samples during 2005-2006, and N:P ratios in Lake Murray were consistently significantly higher than 10:1.[7]

---

6 See Appendix H of the *Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego* Region, San Diego Regional Water Quality Control Board, December 2009.

7 See water quality data files from the City of San Diego presented in Appendix H of the *Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego* Region, San Diego Regional Water Quality Control Board, December 2009.

- Phosphorus was detected in six of the 37 San Vicente Reservoir samples during 2005-2006, but all of these detections occurred during the first 90 days of this two-year period. N:P ratios in San Vicente Reservoir were significantly in excess of 10:1 in an overwhelming majority of the samples collected during 2005-2006.[7]

Rationale for Proposed Delisting: Narrative Basin Plan Objective for Biostimulation
The intent of the Basin Plan objective is to ensure that concentrations of nitrogen and phosphorus are maintained at levels below which stimulate algae or emergent plant growth or otherwise adversely impact beneficial uses. Consistent with the Basin Plan, the goal of preventing adverse biostimulation can be achieved through a limited-nutrient approach in which reservoirs are managed to consistently achieve phosphorus-limited conditions (e.g. high N:P ratios). Provided that reservoir phosphorus concentrations can be effectively managed and controlled, total nitrogen concentrations in Miramar Reservoir, Lake Murray, and San Vicente Reservoir can exceed 0.25 mg/l without causing any adverse biostimulation, impacts to beneficial uses, or noncompliance with any Basin Plan numerical or narrative standard.

Data for 2005-2006 presented within the December 2009 Integrated Report and 2016 Draft Integrated Report demonstrate compliance with the Basin Plan narrative objective for biostimulation. Table 1 (page 5) summarizes water transparency data for the three reservoirs that are presented, but not otherwise evaluated or mentioned, in the December 2009 Integrated Report and 2016 Draft Integrated Report.

As shown in Table 1, Secchi disk values in Miramar Reservoir during 2005-2006 show a high degree of water clarity during all conditions. Observed Secchi disk values at Miramar Reservoir were typically on the order of 25 feet. Secchi disk values in Lake Murray were typically on the order of a dozen feet, while values in San Vicente were typically on the order of 14 feet. While 90^{th} percentile Secchi disk values for Lake Murray and San Vicente Reservoir were on the order of 6-7 feet, these lower values typically occurred in January/February, and may be more indicative of storm and climatic conditions than algae production. In general, water clarity at the three reservoirs during 2005-2006 tended to be highest (e.g. clearest) during summer months, when algal growth tends to be higher. This data substantiates the lack of adverse biostimulation effects in these reservoirs and should be considered as part of the weight-of-evidence approach for determining attainment of water quality standards, consistent with the state's *Water Quality Control Policy for Developing California's Clean Water Act Section 303(d) list.*

Table 1
Water Clarity Data, 2005-2006
Miramar Reservoir, Lake Murray, and San Vicente Reservoir

Parameter	Secchi Disk Depth (feet)		
	Miramar Reservoir	Lake Murray	San Vicente Reservoir
Maximum Value	37.4	27.2	26.6
Average Value	25.1	13.0	14.0
Median Value	25.6	11.8	14.4
90^{th} Percentile Value	18.8	6.6	6.9

Data Source: Data for 2005-2006 from the City of San Diego, as reported within *Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego* Region (San Diego Regional Water Quality Control Board, December 2009).

Table 2 summarizes chlorophyll "a" values for Miramar Reservoir, Lake Murray, and San Vicente Reservoir that were presented (but not evaluated) within the 2009 and 2016 303(d) support documents. Chlorophyll a is an indicator of algal biomass and is commonly used to assess eutrophic conditions in lakes or reservoirs. A number of states have or are considering water quality standards for Chlorophyll a, and have incorporated chlorophyll a numeric targets into nutrient TMDLs, including in California. Based on an analysis of the frequency of severe algal bloom conditions, setting a summer mean target of 5 μg/L means that blooms will almost never occur, while with a target of 10 μg/L blooms will be rare.[8] The North Carolina State University Water Quality Group suggests that water supply reservoirs maintain mean chlorophyll a concentrations less than 15 μg/L, and the State of Oregon has a phytoplankton water quality standard for lakes that thermally stratify of 10 μg/L.[8] In California, the Indian Creek Reservoir nutrient TMDL assigns a Secchi depth of not less than 2 ft and a maximum summer chlorophyll a concentration of 10 μg/L to protect beneficial uses.[8]

As shown in Table 2, chlorophyll a concentrations in Miramar Reservoir in the upper 20 feet of the reservoir were less than 2 μg/l during almost all times. Chlorophyll a concentrations in the epilimnion in San Vicente Reservoir were typically below 2 μg/l, and 90^{th} percentile values were on the order of 3 μg/l. Chlorophyll a concentrations in Lake Murray were also typically below 2 μg/l, and 90^{th} percentile values (which occurred during the spring of 2006) were below levels typically associated with eutrophic conditions.[9] This data further substantiates a lack of adverse biostimulation in these reservoirs.

8 See Tetra Teach Report Prepared for U.S. EPA Region IX and California State Water Resources Control Board, Planning and Standards Implementation Unit, *Technical Approach to Develop Nutrient Numeric Endpoints for California* (2006)

9 See U.S. Geological Survey Report 2004-5086, *Predicting Water Quality by Relating Secchi Disk and Chlorophyll a to Satellite Imagery for Michigan Inland Lakes* (2004), and Carlson R.E. (1977), A trophic state index for lakes. *Limnology and Oceanography.* Vol. 22, No. 2.

Table 2
Chlorophyll a Data, 2005-2006
Miramar Reservoir, Lake Murray, and San Vicente Reservoir

Reservoir	Reservoir Depth	Chlorophyll "a" Concentration (µg/l)	
		Median Value	90th Percentile
Miramar Reservoir	1 meter (3.3 feet)	0.6	1.7
	3 meters (9.9feet)	0.3	1.7
	5 meters (16.7 feet)	0.4	1.9
Lake Murray	1 meter (3.3 feet)	1.6	5.8
	3 meters (9.9feet)	1.6	5.1
	5 meters (16.7 feet)	1.5	5.1
San Vicente Reservoir	1 meter (3.3 feet)	1.5	3.5
	3 meters (9.9feet)	1.5	3.2
	5 meters (16.7 feet)	1.6	3.4

Data Source: Data for 2005-2006 from the City of San Diego, as reported within *Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego* Region (San Diego Regional Water Quality Control Board, December 2009).

Imported Water Dominance
Each of the three reservoirs was constructed for purposes of storing imported water. Imported water comprises virtually all of the water stored in Miramar Reservoir and Lake Murray, and imported water comprises an overwhelming majority of the water stored in San Vicente Reservoir. Table 3 summarizes capacities and watersheds of the three reservoirs. These reservoirs thermally stratify during spring, summer, and fall months.

Table 3
Dominance of Imported Water
Miramar Reservoir, Lake Murray, and San Vicente Reservoir

Reservoir	Storage Capacity (acre-feet)	Watershed Area[10] (acres)	Average Local Runoff[9] (acre-feet/year)	Runoff as a Percent of Storage Volume
Miramar Reservoir	6,680	640	170	3%[11]
Lake Murray	4,680	2,300	110	2%[12]
San Vicente Reservoir	242,000[13]	47,360	3,290	1%

Note: Values rounded to nearest 10 acre-feet per year or 10 acres.

Lake Murray has a tributary watershed area of approximately 2,300 acres, but the reservoir is surrounded by a diversion ditch which intercepts dry weather flows and first flush runoff from all tributaries and diverts it around the reservoir to a discharge point below the dam. As a result of this diversion system, the local watershed does not typically contribute significant runoff to Lake Murray, and the reservoir is normally comprised almost exclusively of imported water.

Similarly, storm drain systems that serve the limited development within the small Miramar Reservoir watershed direct runoff to adjoining watersheds. Imported water thus comprises virtually 100 percent of all water stored in Miramar Reservoir.

The project to raise the San Vicente Reservoir dam has been completed, and the reservoir's capacity has increased from 90,000 to 242,000 acre-feet. This new capacity is owned by the Water Authority will be used for storing water (imported water and other local sustainable supplies such as desalinated seawater) for use in dry years or emergency supply. With this expansion, imported water will comprise an even larger share of the volume stored in San Vicente Reservoir supply. Because nutrient loads from local runoff will be diluted into a considerably larger volume of water, future nutrient concentrations within San Vicente Reservoir are projected to decrease from historic values.[14]

---

10 Source: 2015 *City of San Diego Watershed Survey*. Available online at https:////www.sandiego.gov/water/quality/environment/sanitarysurvey.

11 Lake Murray is surrounded by a diversion ditch which intercepts dry weather flows and first flush runoff from all tributaries and diverts the runoff to a discharge point below the dam. Imported water typically comprises virtually 100 percent of Lake Murray, as the annual average local runoff that reaches Lake Murray is significantly less than 1% of the total annual imported water deliveries to the lake.

12 Storm runoff collected in the storm drain system in developed areas within the Miramar Reservoir watershed is diverted from the watershed. Imported water comprises virtually 100 percent of the water stored in Miramar Reservoir, as the local runoff contribution is negligible to the quantity of imported water to the reservoir each year.

13 The original 90,000-acre-foot capacity of San Vicente Reservoir has been expanded to 242,000 acre-feet with the recent completion of the San Vicente dam raise project. With expansion of the reservoir, nutrient loads from local runoff will now be distributed over a significantly larger reservoir volume, resulting in a projected decrease in reservoir nutrient concentrations compared to historic values.

14 See *City of an Diego Water Purification Demonstration Project, Project Report* (July 2013), available at: https://www.sandiego.gov/sites/defalut/files/legacy/water/purewater/pdf/projectreports and *Limnology and Reservoir Detention Study of San Diego Reservoir* (Flow Science Inc., 2012, located at the following website: https://www.sandiego.gov/sites/default/files/legacy/water/pure3water/pdf/projectreport/limnologyreport.pdf.

TMDLs Are Not Warranted or Necessary
The Integrated Report designated Miramar Reservoir, Lake Murray, and San Vicente Reservoir as "Category 5" impaired water bodies. With this Category 5 designation, the San Diego Water Board would be required to develop and implement Total Daily Maximum Loads (TMDLs) to reduce reservoir nitrogen concentrations in the reservoirs.

Water quality in the three reservoirs, however, is a function of the quality of imported water delivered to each reservoir. Since virtually all nitrogen loads into the reservoir originate with imported water delivery and storage, no viable regulatory control strategies exist for reducing nitrogen loads into the reservoir. As a result, no meaningful water quality benefit can be gained by requiring the development and implementation of a TMDL.

Benefits of IPR Reservoir Augmentation
The City of San Diego has committed to implementing a large-scale IPR reservoir augmentation program called Pure Water San Diego. The City plans to deliver 30 million gallons per day (mgd) of purified water to Miramar Reservoir by 2021 as a first element of this long-range plan. The 30 mgd of purified water supply would replace the current imported source water for Miramar Reservoir. As part of this project, purified water would typically comprise 100 percent of the Miramar Reservoir supply.

The City proposes to implement an additional 53 mgd of potable reuse as a second element of this long-range plan by year 2035. This additional potable reuse could involve directing purified water to San Vicente Reservoir or Lake Murray.

San Diego Water Board action to delist these reservoirs as 303(d) impaired for nitrogen would remove a potentially significant regulatory obstacle to potable reuse. Since concentrations of phosphorus are projected to be lower in the purified water supply than the imported water supply, San Diego Water Board action to delist the three reservoirs as 303(d) impaired will allow for improved control of reservoir biostimulation through a reduction in reservoir phosphorus loads. Additionally, purified water will contain lower concentrations of total dissolved solids and other dissolved minerals than the existing imported supply. As a result, IPR reservoir augmentation will reduce salinity concentrations in the reservoirs, in applied irrigation waters, and in non-potable recycled water supplies. Such load reductions will, in turn, reduce irrigation-related effects on groundwater salinity and improve the ability to comply with Basin Plan groundwater quality objectives and applicable Salt and Nutrient Management Plans.

All in all, delisting Miramar Reservoir, Lake Murray, and San Vicente Reservoir as 303(d) impaired for nitrogen offers the potential for improving reservoir biostimulation control while at the same time enhancing both the quality and quantity of sustainable local water supplies.

Summary

In summary, the 303(d) impaired water listings for nitrogen in Miramar Reservoir, Lake Murray, and San Vicente Reservoir are erroneously based on the assumption that the Basin Plan establishes a one-size-fits-all, not-to-be-exceeded nitrogen water quality standard of 0.25 mg/l. Such a misinterpretation of the Basin Plan (e.g. assuming that nitrogen concentrations in all reservoirs must not exceed 0.25 mg/l):

- Is inconsistent with Basin Plan biostimulation objective that state that "analogous thresholds have not been established for nitrogen compounds,"
- Is inconsistent with the Basin Plan objective that N:P ratios are to be identified and upheld,
- Would eliminate the Water Board's ability to approve IPR reservoir augmentation projects,
- Is inconsistent with existing San Diego Water Board guidance on IPR reservoir augmentation,
- Is inconsistent with imported water quality which historically has represented the overwhelming majority of all water stored in the three reservoirs,
- Is inconsistent with the state's policy for developing the 303(d) list that advocates for a weight-of evidence approach in determining attainment of water quality standards,
- Is inconsistent with data presented within the 303(d) support documents that show no impacts to beneficial uses or significant eutrophication in the reservoirs, and
- Is inconsistent with the long-range vision of implementing IPR reservoir augmentation presented within the 2013 *San Diego Water Board Practical Vision*.

The Water Authority looks forward to working with the San Diego Water Board to protect beneficial uses of the region's reservoirs, and to help meet the sustainable local water supply goals established within the *San Diego Water Board Practical Vision*. An important step in this process is for the San Diego Water Board to delist Miramar Reservoir, Lake Murray, and San Vicente Reservoir as impaired by nitrogen.

Thank you for considering this request to delist Miramar Reservoir, Lake Murray, and San Vicente Reservoir as impaired for nitrogen. Please contact Lesley Dobalian at (858) 522-6747, with any questions.

Sincerely,

Robert R. Yamada, P.E.
Director of Water Resources

OC Public Works
Integrity, Accountability, Service, Trust
Shane L. Silsby, Director

August 12, 2016

Ms. Xueyuan Yu
California Regional Water Quality Control Board, San Diego Region
2375 Northside Drive Suite 100
San Diego, CA 92108

RE: Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego Region Draft Final Staff Report July 2016

Dear Ms. Yu:

OC Public Works, on behalf of City of Laguna Niguel, City of Dana Point, City of Mission Viejo, City of Laguna Beach and City of Lake Forest, appreciates the opportunity to comment on the draft Clean Water Act Sections 305(b) and 303(d) Integrated Report for the San Diego Region Draft Final Staff Report July 2016. After review of the report and associated fact sheets and data provided on your website, the following comments are provided.

1. As stated in the Draft Report, a "significant amount of available data collected between August 2010 and July 2016" was not included in the analysis. Rather, only the data submitted as part of the 2010 solicitation was evaluated as part of this listing cycle. It is significant that the timing of the 2014 draft report results in a report that does not represent current water quality conditions. Therefore, Regional Board's suggestion on an off-cycle review is appropriate.

2. With respect to using the California Stream Condition Index (CSCI) to establish Benthic Community Effects listings: 1) CSCI needs to be validated in reference streams with naturally high total dissolved solids (TDS) because a naturally high TDS site will likely have a poorer CSCI score; 2) selection of the 10th percentile of the reference dataset to indicate impairment is arbitrary and may not indicate impairment. It is important to recognize that the bottom 10% of sites in the reference dataset are still reference sites with limited human impact. Therefore, the CSCI should be used with caution and those associated listings should be deferred until a more rigorous and scientific method is developed that definitively links CSCI scores to other metrics with known adverse impacts on benthic biological communities.

3. Multiple listings for Pacific Ocean Shoreline sites are based on lines of evidence (LOEs) and use data collected from sampling stations that are not associated with these sites. These data should not be used to evaluate these sites, and associated LOEs should be deleted. The affected listing decisions.(See also **Appendix A** and **B**)

300 N. Flower Street, Santa Ana, CA 92703
P.O. Box 4048, Santa Ana, CA 92702-4048
www.ocpublicworks.com
714.667.8800 | Info@OCPW.ocgov.com

Decision ID	Pollutant	Water Body (correct station)	Comment	LOEs (those LOEs should be deleted)	Corrected Listing Decision
43047	FIB	Pacific Ocean Shoreline, Aliso HSA, at Aliso Creek mouth (ACM1d, ACM1u)	ACM1/C1 are estuary sites. The analysis for those sites should be moved to water body "Aliso Creek (mouth)".	30625, 61093, 29740, 29741, 29742	Delist
49665	Toxicity			74533	List
43790	FIB	Pacific Ocean Shoreline, Lower San Juan HSA, at North Beach Creek (DSB5d , ODB02)	Multiple LOEs used data from DSB5/BW622, which is an estuary site.	29488, 29353, 29371, 7499, 43790, 77796, 77640, 74933	List
43665	FIB	Pacific Ocean Shoreline, Lower San Juan HSA, at North Doheny State Park Campground (DSB4u,DSB4d)	Sampling locations outside of the Doheny State Beach area were included in the evaluation.	74957,74958,74981,74982,74986,74010,77641, 74983	List but remove LOEs
49808	FIB	Pacific Ocean Shoreline, Laguna Beach HSA, at Broadway Creek (OLB00)	Data were collected from pooled creek water (CLBBC) that does not drain to the ocean during dry weather. Station OLB00 has been updated and combined with station MAINBC as part of the 2014 Unified Monitoring Program. It is redundant to list this water body given the fact that Laguna Beach at Main Beach is already listed and being addressed by a TMDL.	All LOEs	Do not list
49742	Copper	Pacific Ocean Shoreline, Dana Point HSA, at Salt Creek outlet at Monarch Beach (SCM1d)	Site SCM1 is a creek site. Data only from the ocean site (SCM1d) should have been used.	74526	Do not list
49749	Malathion			75133	Do not list
49751	Mercury			75134	Do not list
49753	Nickel			75135	Do not list
49848	Copper	Pacific Ocean Shoreline, Lower San Juan HSA, at San Juan Creek (SJC1d)	Site SJC1 is a creek site. Data only from the ocean site (SJC1d) should have been used.	75013	Do not list
49852	Nickel			75067	Do not list
49468	Mercury	Segunda Deshecha Creek (SDCM02,SD-AP)	Trabuco Creek sites (TC-AP, TC-DO, TCOL02, REF-TCAS and SMC00206) were incorrectly used to list Segunda Deshecha Creek.	76719	Do not list
43129	Selenium	Aliso Creek (ACJ01,AC-CCR, AC-PPD)	Station 901SJALC6 is at the Aliso Creek mouth, which is a tidal influenced area. It is inappropriate to apply freshwater standards to brackish water samples.	9076	List
46397	Toxicity			21397	

4. Only data from 2006-10 should be evaluated for listing decisions in the 2014 listing cycle. A large number of Best Management Practices (BMPs), including multiple sewer diversions, were implemented after 2005. Therefore, it is inappropriate to evaluate data from prior to

2006 to represent water quality for the 2014 303(d) list. After review of OC Public Works data from 2006-2010,the listing decisions for the following sites should be corrected to "Delist."

Decision ID	Water Body	Pollutant	Recommendation
43047	Pacific Ocean Shoreline, Aliso HAS, at Aliso Creek mouth	FIB	Delist
43112	Pacific Ocean Shoreline, Aliso HSA, at Aliso Beach - middle	FIB	Delist
44695	Pacific Ocean Shoreline, Laguna Beach HSA, at Main Beach	FIB	Delist
43763	Pacific Ocean Shoreline, Dana Point HSA, at Dana Point Harbor at Baby Beach	FIB	Delist
43328	Pacific Ocean Shoreline, San Clemente HA, at San Clemente City Beach, North Beach	FIB	Delist
42259	Arroyo Trabuco Creek	Diazinon	Delist
48964	San Juan Creek	Malathion	Do not list

5. Several new proposed listings for indicator bacteria are within coastal segments that are already included in the Bacteria Impaired Waters TMDLs Project I for Beaches and Creeks. These include listings for Pacific Ocean Shoreline, Lower San Juan HSA at surfzone outfall at Doheny State Beach (49877) and Pacific Ocean Shoreline, Laguna Beach HSA, at Broadway Creek (49808). Creating additional listings in an area already covered by a TMDL is unnecessary.

6. A number of indicator bacteria listings are based on California Department of Public Health draft guidance for freshwater beaches. This guidance was first drafted in 1997 and has not been finalized. Total coliform LOEs also contradict USEPA recommendations for water contact recreation, which recommend *Escherichia coli* as the preferred bacterial indicator in freshwater. Finally, there are no total coliform water quality objectives in the San Diego Region Basin Plan (Basin Plan). For these reasons, the following LOEs using total coliforms in fresh water should not be considered.

Decision ID	Water Body	LOE
48801	Laguna Canyon Channel	74121, 74122
48376	Cristianitos Creek	73463
51713	Segunda Deshecha Creek	76734, 76735
48514	Prima Deshecha Creek	75510, 75511
41422	San Juan Creek	75978, 75979, 75980
47816	Arroyo Trabuco Creek	73021, 73022
46398	Aliso Creek	72952, 72953

7. Multiple new listings for mercury refer to data sets where mercury was either not detected or not analyzed. Samples where mercury was detected were well below the Ocean Plan marine water quality objective of 0.04 ug/L. OC Public Works mass emissions and

bioassessment data from 2006-16 do not show a single exceedance for mercury for any of these sites.

Listings for Arroyo Trabuco Creek (47807), Bell Canyon Creek (47986), San Juan Creek (49000), Dana Point at Niguel Marine Life Refuge (49724), Salt Creek outlet at Monarch Beach (49751), Salt Creek (48631), Segunda Deshecha Creek (49468) and Prima Deshecha Creek (48508) and associated LOEs (73009, 73052, 74496, 75134, 75494, 75512, 75557, 75948 and 76719) are therefore erroneous and should not be considered.

8. The listing decisions for cadmium, nickel, and copper in Cristianitos Creek, Segunda Deshecha and Prima Deshecha Creek use data that do not appear to be hardness adjusted as required under the California Toxics Rule, despite the fact that hardness data were provided in the referenced dataset. Targets should be adjusted by hardness and the dataset should be re-evaluated accordingly. The affected listing decisions are 48375, 48374, 49444, 49449, 49454, 36180, and 43494.

9. The listing decision for Aliso Creek (mouth) for arsenic is based on exceedances of water quality objectives associated with the MUN beneficial use. MUN is not an existing or potential beneficial use of Aliso Creek. Therefore, listing decision 47590 should be removed.

10. The data citation in LOE 9096 for the proposed San Juan Creek selenium listing (Decision ID 43131) is incorrect. The citation link should go to SWAMP monitoring data "Ref 2618." In addition, there are 2 San Juan Creek stations in the reference dataset but only one station is included in the evaluation. After re-evaluating this listing using both stations, the exceedance rate for this LOE should be 2/8 instead of 2/4.

11. For the list decisions for metals and pesticides in Dana Point Harbor, Prima Deshecha Creek and Segunda Deshecha Creek, toxicity LOEs are being used in support of a metal or pesticide listing. There is no evidence to show that they are directly linked. Total sample exceedance numbers are inflated due to the inclusion of exceedances from toxicity samples, which adversely affected the listing decision. Moreover, historical toxicity data can have credibility issues: A preliminary lab intercalibration study results for toxicity conducted by Southern California Coastal Water Research Project (SCCWRP) shows the results among labs have poor comparability for two fresh water species (*Ceriodaphnia dubia* and *Hyalella Azteca*). Therefore, the following listings should be re-evaluated: 42746 for Zinc, 43226 and 49449 for copper, 36180 and 49444 for cadmium, 43494 and 49454 for nickel, 48508 for mercury, 49459 for selenium and 48507 for malathion.

12. OC Public Works data has been utilized in an inconsistent manner in the 2014 listing process. In many cases all NPDES bioassessment data or its data from certain stations (e.g. OC Public Works bioassessment data for total nitrogen for English Canyon, bioassessment data for phosphorus, turbidity and nitrogen for Segunda Deshecha Creek) were not used while it was used for other pollutant analyses in the same water body. All of the OC Public Works data should be considered consistently in the listing process. After the OC Public Works samples at station EC-MD were taken into account for the total nitrogen analysis at English Canyon (Decision ID 42811), the actual exceedance rate should be 2/9 instead of 2/4

as indicated in the factsheet resulting in a "Do not list" decision. Therefore, listing 42811 should be removed and the following listing IDs should be re-evaluated by applying a consistent approach when including OC Public Works data: 34545, 42917, 47816, 42285, 34172, and 41422.

13. There is an inconsistency in using water quality objectives among the LOEs under listing 49033 for dissolved oxygen (DO) at San Juan Creek. The total number of samples and exceedance counts derived from different water quality objectives were added together as evidence for the listing. An evaluation using OC Public Works data from 2006-10 by comparing against the more stringent target used in this listing (no less than 6 mg/L) indicates that the exceedance rate is 7/141. Thus this water body should not be listed for DO.

14. The report did not evaluate all readily available data as required by the listing policy, including data readily available in CEDEN and within the cut-off dates as stated in the draft report. These records include: Aliso Creek (mouth)(34761), Aliso Creek(42917, 34545), San Juan Creek(43657, 32893), San Juan Creek Mouth(34549), Dana Point Harbor(34003, 43763,49696,49699), Poche Beach(44202), North Beach(43328),Segunda Deshecha(49566), and San Clemente City Beach at Pier(42681). An evaluation for those listings has been completed as shown in **Appendix B** attached to this comment letter.

15. There are editorial errors requiring correction as shown below:

Water Body	Decision ID	Comment
Aliso Creek	42917	The waterbody was listed during last cycle, the current final listing decision should be "Do Not Delist" instead of "List on 303(d)List"
Aliso Creek	34545	Previous listing decision should not be blank as it was listed in the previous listing cycle.
English Canyon	33516	The last cycle decision was "List on 303(d) list". This year's decision should be "Do not delist from 303(d) List".
English Canyon	33023	The last cycle decision was "List on 303(d) list". This year's decision should be "Do not delist from 303(d) List".
Pacific Ocean Shoreline, Dana Point HSA, at Salt Creek outlet at Monarch Beach	49751	Regional Board staff concludes that the water body-pollutant combination should not be placed on the section 303(d) list due to insufficient data and information. The final listing decision should be "Do Not List on the 303(d) List".
Pacific Ocean Shoreline, San Clemente HA, at San Clemente City Beach, North Beach	43328	Regional Board Staff concludes that the waterbody-pollutant combination should be removed from the 303(d) list because applicable water quality standards for the pollutant are not being exceeded. The final listing decision should be "Delist from 303(d) List".

Appendix A provides detailed information regarding all the listing decisions that need to be corrected. **Appendix B** provides detailed information regarding all the listings that do not need to be corrected, but need to be re-evaluated by deleting certain LOEs or re-calculating the number of exceedances.

Thank you for the opportunity to provide comments on the 2014 proposed revisions to the California Clean Water Act Section 303(d) List. Please contact Stella Shao at 714-955-0651 if you have any questions regarding these comments.

Very truly yours,

Chris Crompton, Manager
Water Quality Compliance

Attachment: Comments Matrix/Data Analysis Summary (Appendix A and B)
cc: South Orange County NPDES Permittees

300 N. Flower Street, Santa Ana, CA 92703
P.O. Box 4048, Santa Ana, CA 92702-4048
www.ocpublicworks.com
714.667.8800 | Info@OCPW.ocgov.com

Appendix A

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Aliso Creek (mouth)	Arsenic	ACM-1	47590	SDR ACRW data 2007-2010	2	0	Do not list	LOE 72979 is not valid because Aliso Creek mouth has no designated beneficial use for MUN (Municipal & Domestic Supply). Therefore, Aliso creek (mouth) should not be listed for Arsenic. LOE 47590 inacurrately includes ACM1-d data. ACM-1d is an ocean station downstream Aliso Creek mouth, thus it should be included in water body "Pacific Ocean Shoreline, Aliso HAS, at Aliso Creek mouth" instead of "Aliso Creek (mouth)" Evaluation in OC Public Works data from 2007-2010 indicates the exceedance rate for Arsenic is 0.
Arroyo Trabuco Creek	Diazinon	REF-TCAS,TC-DO,TCOL02,TC-AP,SMC00206	42259	SDR USB data 2006-2009 SDR ME data 2006-2009	41	0	Delist	Historic data prior to 2005 should not be utilized. In 2003 diazinon was banned by EPA for turf, lawn and outdoor application. The pesticide is no longer commercially available to the public. The proposed listing (42259) of Arroyo Trabuco is based on 6 exceedances of the diazinon criterion which occurred during the period from March 25, 1999 to February 23, 2000. This period included collection of 20 total samples on 9 separate days. Of these 20 samples, all four collected on April 6, 1999 exceeded the diazinon criterion. The fact sheet (LOE21274) contains a link to the Department of Pesticide Regulation (DPR) study which contains the data for the assessment. This study includes data beyond the assessment period cited in the fact sheet. There were 14 additional samples collected during 10 days of sampling from March 27, 2000 to January 17, 2001. Of 14 samples, no exceedances of the criterion were observed. LOE 73034 has also included sufficient and up-to-date data indicating this water body should be delisted for diazinon.

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Arroyo Trabuco Creek	Mercury	REF-TCAS,TC-DO,TCOL02,TC-AP,SMC00206	47807	SDR USB data 2006-2009 SDR ME data 2006-2009	2	0	Do not list	5 exceedances was erroneously counted in LOE73009. There is no mercury exceedance in the reference dataset. An evaluation using OC Public Works NPDES data also indicates that no mercury sample has exceeded the target.(all data are lower than detection limit). Therefore, this water body should not be listed for mercury.
Bell Canyon	Mercury	REF-BC	47986	SDR USB data 2005-2016	2	0	Delist	3 exceedances was erroneously counted in LOE 73052. There is no mercury data for sample REF-BC on 6/6/07, 5/20/08 and 4/28/09 listed in the detail data reference under this LOE. An evaluation using OC Public Works data indicates that no mercury sample has exceeded the target.
Cristianitos Creek	Cadmium	CR1 -upper cristianitos creek CR2-cristianitos creek	48375	Inland Empire Canyons Baseline Monitoring Project--San Mateo,San Juan and Cristianitos, 2008-2009	7	1	Do not list	LOE48375 did not adjust Cadmium criteria using hardness data. After recalculating the exceedance rate by using the dissolved data provided in the reference and applying the hardness level, the actual exceedance rate is only 1/7 instead of 7/13.
Cristianitos Creek	Nickel		48374		7	0	Do not list	LOE73457 did not adjust Nickel criteria using hardness data. After recalculating the exceedance rate by using the same dataset provided in the reference and applying the hardness level, the actual exceedance rate is 0. Thus , the water body should not be listed as Nickel.
Dana Point Harbor	Indicator Bacteria	BDP 08, BDP 16, BDP 07, MDP 18, BDP 17, PIER, PILGRIM, FUEL DOCK, YOUTH DOCK	34003	Beach Watch data 2005-2013	1336	470	Do not list	No shellfish harvesting is allowed in this area. Also, the state recognized some serious flaws with the shellfish standard and begain to address them back in 2007 with a scoping meeting. However the project has not been completed and the latest work to our knowledge is the draft white paper indicating "inherent difficulties in achieving the existing water quality standards at all locations where shellfish habitat exists."
English Canyon	Total Nitrogen as N	EC-MD	42811	SDR USB data 2006-2010	9	2	Do not list	There is an inconsistancy in treating OC Public Works NPDES SDR Bioassessment data. In this case, the data was not included in the evaluation. An evaluation using OC Public Works data for 2006-2010 indicates that the water body should not be listed.

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Pacific Ocean Shoreline, Aliso HSA, at Aliso Beach - middle	Indicator Bacteria	S9	43112	OCHCA Beach Monitoring 2007-2010	824	TC: 1 FC: 4 ENT: 76 TC(shellfish): 114	Delist	All data used in this decision are from 1999-2007 which does not reflect water quality status during current listing cycle. A re-evaluation using data from 2007-2010 indicates that the water body should be delisted. Search in the CEDEN system indicates that the 2007-2010 data, that was used in above analysis, is readily available in the system.
Pacific Ocean Shoreline, Aliso HSA, at Aliso Creek mouth	Indicator Bacteria	ACM1d/u	43047	SDR CSDO data 2007-2010	SSM-187 GM-145	ENT: SSM-15 GM-6	Delist	ACM1/C1 are estuary sites.Multiple LOEs (30625, 61093, 29740, 29741 and 29742) incorrectely use data from those sites. Those data should be included in Decision 34761 (Aliso Creek Mouth) instead of this decision. It is inapproriate to combine old estuary data, as mentioned in previous paragraph, with new ocean data (LOE 74509, 74518) in assessing the listing decision. Both LOE 74509 and 74518, which use the correct calculation at correct location indicate this water body has met delisting criteria. An evaluation using OC Public Works NPDES data (2007-2010) also indicates that enterococcus concentration meets de-listing criteria.
Pacific Ocean Shoreline, Dana Point HSA, at Dana Point Harbor at Baby Beach	Indicator Bacteria	BDP 12, BDP 13, BDP14, BDP15	43763	Beach Watch data 2006-2010	ENT SSM-678	ENT-82	Delist	LOE 81133 states that the data used is from 2008-2010 but per the reference file, the data goes back to 2005. Results of LOE 30911(data from 2002-2006) and LOE 81133 were considered to come up with decision. Taking into account that a diversion BMP was put into place in 2005, it would be more appropriate to use data from 2006 to 2010. No shellfish harbvesting allowed in this area.
				Beach Watch data 2008-2010 (from LOE81133)	SSM-247	SSM-23	Delist	
		WEST END, BUOY LINE, EAST END, SWIM AREA		Beach Watch data 2010-2013 (from CEDEN)	SSM-465	SSM-65	Delist	
Pacific Ocean Shoreline, Dana Point HSA, at Dana Point Harbor at guest dock	Indicator Bacteria	Guest Dock	49696	Beach Watch data 2006-2010	GM=99	GM=11	Do not list	This location is in current TMDL. There is no need to list again.

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Pacific Ocean Shoreline, Dana Point HSA, at Niguel Marine Life Refuge	Mercury	NI1d	49724	SDR ACRW data Sep 07 to Apr 09	3	0	Do not List	Only 3 of the 5 samples referenced in LOE 74496 had actual/verified mercury results. No exceedances were observed for all samples.
				SDR ACRW data Nov 09 to Jun 10	4	0	Do not List	Data from OC Public Works database
Pacific Ocean Shoreline, Dana Point HSA, at Salt Creek outlet at Monarch Beach	Copper	SCM1d	49742	SDR ACRW SCM1d samples Oct 07 - June 10	9	0	Do not List	LOE 74526 uses site SCM1, which is a pipe outfall/creek sample and not an ocean sample. If only SCM1d copper data is used. The result would be to not list.
Pacific Ocean Shoreline, Dana Point HSA, at Salt Creek outlet at Monarch Beach	Malathion	SCM1, SCM1d	49749	SDR ACRW samples Oct 07 - Apr 09	5	0	Do not List	LOE 74526 uses site SCM1, which is a pipe outfall/creek sample and not an ocean sample. If only SCM1d data is used. The result would be to not list.
		SCM1d		SDR ACRW SCM1d samples Oct 07 - June 10	9	0	Do not List	
Pacific Ocean Shoreline, Dana Point HSA, at Salt Creek outlet at Monarch Beach	Mercury	SCM1,SCM1d	49751	SDR ACRW SCM1d samples 2008	2	1	Do not List	The recommendation states that it should not be placed on the section 303(d) list, however the final listing decision was to List on 303(d). LOE 75134 lists samples that do not exist: no samples for Hg were collected at SCM1 for all the dates listed and only SCM1d has mercury data (5/14/2008 and 10/1/2008).
Pacific Ocean Shoreline, Dana Point HSA, at Salt Creek outlet at Monarch Beach	Nickel	SCM1, SCM1d	49753	SDR ACRW samples Oct 07 - Apr 09	5	0	Do not List	LOE 74526 uses site SCM1, which is a pipe outfall/creek sample and not an ocean sample. If only SCM1d copper data is used. The result would be to not list.
		SCM1d		SDR ACRW SCM1d samples Oct 07 - June 10	9	0	Do not List	
Pacific Ocean Shoreline, Laguna Beach HSA, at Broadway Creek	Indicator Bacteria	OLB00	49808	OCHCA Beach Monitoring 2006-2010	SSM-209 GM-154	TC: SSM-0 GM-0 FC: SSM-0 GM-0 ENT: SSM-2 GM-0 TC(shellfish): SSM-5 GM-8	Do not list	Data used in this analysis is not from ocean samples. It was collected from pooled water from the creek (station:CLBBC), which never reaches the ocean during dry weather. Station OLB00 has been updated and combined with station MAINBC as part of the 2014 NPDES Unified Monitoring Program. Station MAINBC is taken at the surf at Laguna Main Beach adjacent to the Broadway Creek outlet. A re-evaluation at OLB00 shows that the ocean segment should not be listed.

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Pacific Ocean Shoreline, Laguna Beach HSA, at Main Beach	Indicator Bacteria	OLB00	44695	OCHCA Beach Monitoring 2006-2010	SSM-209 GM-154	TC: SSM-0 GM-0 FC: SSM-0 GM-0 ENT: SSM-2 GM-0 TC(shellfish): SSM-5 GM-8	Delist	It is inappriorate to combine old data from 1999-2000 with data from 2006-2009. Latest data in LOE 75066 has included sufficient data to delist this waterbody. A re-evaluation using OC HCA data from 2006-10 also shows the water body has met delisting criteria.
Pacific Ocean Shoreline, Lower San Juan HSA, at San Juan Creek	Copper	SJC1d	49848	SDR ACRW data 2006-2009	1	0	Do not list	In LOE 75013, SJC1 is creek station. SJC1d is ocean station. It is inapproriate to include creek station data. The copper criteria is not hardness adjusted. A hardness sample was collected in 2008 at SJC-1 with a result of 3200 mg/L indicating that the criteria of 3 ug/L may not be approriate in this case.
Pacific Ocean Shoreline, Lower San Juan HSA, at San Juan Creek	Nickel	SJC1d	49852	SDR ACRW data 2006-2009	1	0	Do not list	In LOE 75067, SJC1 is a creek station. SJC1d is ocean station. It is inapproriate to include creek station. The Nickel criteria is not hardness adjusted. A hardness sample was collected in 2008 at SJC-1 with a result of 3200 mg/L indicating that the criteria of 3 ug/L may not be approriate in this case.
Pacific Ocean Shoreline, San Clemente HA, at San Clemente City Beach at Pier	Indicator Bacteria	PIERu, PIERd	42681	CSDO Data July 2009-Aug 2010	GM=35; SSM=54	GM=2; SSM=4	Delist	GM and SSM exceedances within acceptable frequencies
Prima Deshecha Creek	Cadmium	PDCM01	36180	SDR ME and USB Data 2006-2009	27	0	Delist	The data was recalculated using hardness corrected values and no exceedance is observed. Toxicity data should not be used as LOE.
Prima Deshecha Creek	Nickel	PDCM01	43494	SDR ME and USB Data 2006-2009	27	0	Delist	Recalculated using hardness corrected values and no exceedance observed. Toxicity data should not be used as LOE.
Prima Deshecha Creek	Malathion	PDCM01	48507	SDR ME Data 2010-2016	44	3	Do not List	The data does not exceed allowable frequency limits in Table 3.1; Toxicity data should not be used as LOE.
				SDR ME Data 2010-2013	32	2	Do not List	Does not exceed allowable frequency limits in Table 3.1
Prima Deshecha Creek	Mercury	PDCM01, PD-CGV	48508	SDR ME Data 2007-2009	1	0	Do not List	LOE 75494 references 27 samples for Hg, but only 1 sample for PDCM01 had Hg results and it was non-detect. Toxicity data should not be used as LOE.

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Salt Creek (Orange County)	Mercury	SC-MB	48631	SDR USB Data 2006-2009	0	0	Do not List	The samples referenced on LOE 75557 were not analyzed for Mercury - no such samples exist.
San Juan Creek	Malathion	SJNL01,REF-CS,SJC-74, SJC-CC	48964	SDR ME data2006-2010 SDR USB Program 2006-2010	50	3	Do not list	Data post 2009 is not included. A review using OC Public Works NPDES's data from 2006-10 shows that the exceedance rate is 3/50.
San Juan Creek	Mercury	REF-CS, SJNL01,SJC-CC,SJC-74	49000	SDR ME data2006-2015 SDR USB Program 2006-2015	4	0	Do not list	LOE 75948 erroneously counted 6 exceedances while there is no mercury data for stations SJNL01,REF-CS,SJC-74 and SJC-CC as mentioned in this LOE. An evaluation using OC Public Works NPDES data indicates that no mercury sample has exceeded the target(all data are lower than detection limit). In addition, the LOE75947 under this decision also indicates no exceedance. Therefore, this water body should not be listed for mercury.
San Juan Creek	Oxygen, Dissolved	SJNL01,REF-CS,SJC-74, SJC-CC	49033	SDR ME data2006-2010 SDR USB Program 2006-2010	141	7	Do not list	There is an inconsistancy in the water quality objective among the LOEs under this listing. Data counts derived from multiple standards should not be lumped together to be used as the reason for the listing. An evaluation using OC Public Works NPDES data from 2006-10 by comparing against the more strigent target used in this listing (no less than 6 mg/L), indicates that the exceedance rate is 7/141. Thus this water body should not be listed as DO.
Segunda Deshecha Creek	Cadmium	SDCM02, SD-AP	49444	SDR ME and USB Data 2006-2009	29	0	Do not list	The data was recalculated using hardness corrected values and no exceedance observed. Toxicity data should not be used as LOE.
Segunda Deshecha Creek	Copper	SDCM02, SD-AP	49449	SDR ME and USB Data 2006-2009	29	0	Do not list	The data was recalculated using hardness corrected values and no exceedance observed. Toxicity data should not be used as LOE.
Segunda Deshecha Creek	Malathion	SDCM02, SD-AP	49566	SDR ME and USB Data 2009-2010	18	0	Do not List	No exceedance
Segunda Deshecha Creek	Mercury	SDCM02, SD-AP	49468	NA	NA	NA	Do not List	LOE 76719 incorrectly uses Trabuco Creek sites to list Segunda Deshecha for mercury
		SDCM02, SD-AP		SDR ME and USB Data 2009-2010	1	0	Do not List	There was only one sample and it was ND

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Segunda Deshecha Creek	Nickel	SDCM02, SD-AP	49454	SDR ME and USB Data 2006-2009	29	0	Do not list	The data was recalculated using hardness corrected values and no exceedance observed. Toxicity data should not be used as LOE.

Appendix B

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Aliso Creek	Indicator Bacteria	ACJ01	46398	SDR USB data 2007-2010 Aliso Creek 13225 Directive Monitoring Program 2007-2010	ENT: GM-66, SSM-99 FC: GM-66, SSM-99	ENT: GM-66, SSM-89 FC: GM-31, SSM-30	Remove LOEs 72952, 72953 for TC listing	Total Coliform should not be listed as LOE 72952 and 72953 are based on a draft guidance for beach water (Draft Guidance for Fresh Water Beaches. Last Update: May 8, 2006. Initial Draft: November 1997. California Department of Public Health.). There is no basin plan water quality objective for Total Coliform for recreational use in fresh water.
Aliso Creek	Phosphorus	ACJ01,AC-CCR, AC-PPD	34545	SDR USB data 2007-2010 SDR ME data 2007-2010	ACJ01: 37 AC-CCR:6 AC-PPD:6	ACJ01: 37 AC-CCR:6 AC-PPD:5	NA	Previous listing decision should not be blank as it was listed in the previous listing cycle. There is an inconsistency in using OC Public Works NPDES data: Decision 43129 considered sites at ACJ01, AC-CCR and ACPPD while this decision only considered ACJ01 data. No recent data is evaluated. After re-evaluate the data using OC Public Works NPDES 07-10 data, the actual exceedance rate is 48/49
Aliso Creek	Selenium	ACJ01,AC-CCR, AC-PPD	43129	SDR USB data 2007-2010 SDR ME data 2007-2010	ACJ01: 33 AC-CCR:5 AC-PPD:5	ACJ01: 9 AC-CCR:4 AC-PPD:1	NA	In LOE 9076,station 901SJALC6 is at the ALiso Creek mouth, which is a tidal influenced area. It is not appropriate to apply freshwater selenium target to brakish/salt water samples. In LOE 72948, although all USB and MLS should both be included in calculating exceedances, only dry weather data were actually included. Instead of 8/10 exceedance rate, according to provided data reference, the actual exceedance rate is 9/24. In addition,the CTR standard is for total recoverable selenium. To be consistent with CTR, total recoverable selenium is evaluated using OC Public Works NPDES data from 2007-2010 suggesting that the actual exceedance rate is 14/43

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Aliso Creek	Toxicity	ACJ01,AC-CCR, AC-PPD	46397	SDR USB data 2006-2010 SDR ME data 2006-2010	36	15	NA	In LOE 21397,station 901SJALC6 is at the ALiso Creek mouth, which is a tidal influenced area. It is not appropriate to apply brakish water samples to freshwater habitat analysis.
Aliso Creek	Benthic Community Effects	ACJ01,AC-CCR, AC-PPD,901S01811	44339	Region CSCI scores	NA	NA	NA	In LOE 9076,station 901SJALC6 is at the ALiso Creek mouth, which is a tidal influenced area. It is not appropriate to apply freshwater selenium target on brakish/salt water samples.
Aliso Creek	Malathion	ACJ01,AC-CCR, AC-PPD	47640	SDR USB data 2007-2010 SDR ME data 2007-2010	ACJ01: 41 AC-CCR:7 AC-PPD:7	ACJ01: 8 AC-CCR:0 AC-PPD:0	NA	NA
Aliso Creek	Nitrogen	ACJ01,AC-CCR, AC-PPD	42917	SDR USB data 2007-2010 SDR ME data 2007-2010	ACJ01: 37 AC-CCR:6 AC-PPD:8	ACJ01: 37 AC-CCR:6 AC-PPD:8	NA	It was listed during last cycle, the current final listing decision should be "Do Not Delist" instead of "List on 303(d)List" There is an inconsistency in using OC Public Works NPDES data: Decision 43129 were using sites at ACJ01, AC-CCR and ACPPD while this decision only considered ACJ01 data. There are no recent data is evaluated. After re-evaluate the data using OC Public Works NPDES 07-10 data, the actual exceedance rate is 51/51
Aliso Creek (mouth)	Indicator Bacteria	ACM-1	34761	SDR ACRW data 2007-2010	SSM-182 GM-138	ENT: GM-129, SSM-54 TC: GM-0 SSM-0 FC: GM-3, SSM-9	NA	No new data was evaluated for this waterbody. A evaluation using OC Public Works NPDES data is completed as shown in the left columns.

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Arroyo Trabuco Creek	Toxicity	REF-TCAS,TC-DO,TCOL02,TC-AP,SMC00206	42387	SDR USB data 2006-2010 SDR ME data 2006-2010	33	6	NA	NA
Arroyo Trabuco Creek	Benthic Community Effects	REF-TCAS,TC-DO,TCOL02,TC-AP,SMC00206	45845	Region CSCI scores	NA	NA	NA	NA
Arroyo Trabuco Creek	Indicator Bacteria	TCOL02	47816	SDR USB data 2006-2010 SDR ME data 2006-2010	SSM-15	TC-11 FC-13 ENT-15	Remove LOEs 73021 and 73022 for TC listing	There is an inconsistancy in using OC Public Works NPDES data. REF-TCAS,TC-DO,TC-AP,SMC00206 were not included in evaluating FIB while those sites were included in other decision IDs for other pollutants. Total Coliform should not be listed as LOE 73021 and 73022 are based on a draft guidance for beach water (Draft Guidance for Fresh Water Beaches. Last Update: May 8, 2006. Initial Draft: November 1997. California
Arroyo Trabuco Creek	Lead	REF-TCAS,TC-DO,TCOL02,TC-AP,SMC00206	47805	SDR USB data 2006-2009 SDR ME data 2006-2009	25	7	NA	NA
Arroyo Trabuco Creek	Malathion	REF-TCAS,TC-DO,TCOL02,TC-AP,SMC00206	47806	SDR USB data 2006-2009 SDR ME data 2006-2009	70	8	NA	A review of OC Public Works NPDES data post 2010 indicates that there is no exceedance anymore at station TCOL02 which had 8/45 exceedances before 2010.
Arroyo Trabuco Creek	Nitrogen	REF-TCAS,TC-DO,TCOL02,TC-AP,SMC00206	42285	SDR USB data 2006-2010 SDR ME data 2006-2010	TCOL02-46 Other sites-25	TCOL02-38 Other sites-1	NA	There is an inconsistancy in treating OC Public Works NPDES SDR Bioassessment data. In this case, the data from REF-TCAS,TC-DO,TC-AP and SMC00206 were not included in the evaluation.
Arroyo Trabuco Creek	Phosphorus	REF-TCAS,TC-DO,TCOL02,TC-AP,SMC00206	34172	SDR USB data 2006-2010 SDR ME data 2006-2010	TCOL02-46 Other sites-46	TCOL02-41 Other sites-1	NA	There is an inconsistancy in treating OC Public Works NPDES SDR Bioassessment data. In this case, the data from REF-TCAS,TC-DO,TC-AP and SMC00206 were not included in the evaluation.
Bell Canyon Creek	Toxicity	REF-BC	53411	SDR USB data 2006-2010 SDR ME data 2006-2010	5	2	NA	LOE 73052 is invalid as mentioned in comments for decision 47986
Cristianitos Creek	Indicator Bacteria	CR1 -upper cristianitos creek CR2-cristianitos creek	48376	Inland Empire Canyons Baseline Monitoring Project--San Mateo,San Juan and Cristianitos, 2008-2009	17	9	Remove LOE 73463 for TC listing	Total Coliform should not be listed as LOE 73463 is based on a draft guidance for beach water (Draft Guidance for Fresh Water Beaches. Last Update: May 8, 2006. Initial Draft: November 1997. California Department of Public Health.). There is no basin plan water quality objective for Total Coliform for recreational use in fresh water.
Cristianitos Creek	Selenium		48379		13	7	NA	NA

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Dana Point Harbor	Copper	6328, 6320, 6327, 6325	43226	RHMP 2008	4	Sediment = 4; Water = 3	NA	SED: 4/4 exceedance of ERL, 2/4 exceedance of ERM; Toxicity data should not be used as LOE. There is a separate listing for Toxicity and the LOE's referenced were used there already.
Dana Point Harbor	Toxicity	6328, 6320, 6327, 6325	42684	RHMP 2008	8	1	NA	Sed toxicity
Dana Point Harbor	Zinc	6328, 6320, 6327, 6325	42746	RHMP 2008	4	Sediment = 2; Water = 0	NA	Toxicity data should not be used as LOE.
Dana Point Harbor	Oxygen, Dissolved	DAPTDC, DABTEB, DAPTLB, DAPTLR	48410	SDR ACRW data 2006-2008	133	24	NA	recalculated using OC Public Works NPDES data
English Canyon	Selenium	EC-MD	43273	SDR USB data 2006-2010	5	5	NA	NA
English Canyon	Toxicity	EC-MD	33502	SDR USB data 2006-2010 SDR ME data 2006-2010	10	2	NA	NA
English Canyon	Benthic Community Effects	EC-MD	51688	Region CSCI scores	NA	NA	NA	NA
English Canyon	Benzo[b]fluoranthene	NA	33516	NA	NA	NA	NA	The last cycle decision was "List on 303(d) list". This year's decision should be "Do not delist from 303(d) List" .
English Canyon	Dieldrin	EC-MD	33023	SDR USB data 2006-2010	NA	NA	NA	The last cycle decision was "List on 303(d) list". This year's decision should be "Do not delist from 303(d) List" .
English Canyon	Phosphorus	EC-MD	42810	SDR USB data 2006-2010	9	9	NA	NA
Laguna Canyon Channel	Toxicity	LCWI02,LC-133	43324	SDR USB data 2006-2010 SDR ME data 2006-2010	18	5	NA	LOE 74109 is invalid. There are no Mercury data at LCWI02 and LC-133 during 2006-2009 as claimed in the LOE.
Laguna Canyon Channel	Benthic Community Effects	LCWI02,LC-133	48645	Region CSCI scores	NA	NA	NA	NA
Laguna Canyon Channel	Indicator Bacteria	LCWI02	48801	SDR ME data2006-2009	16	ENT SSM-16 FC: SSM-10 TC SSM-5	Remove LOE 74121 and 74122 for TC listing	Total Coliform should not be listed as LOE 74121 and 74122 are based on a draft guidance for beach water (Draft Guidance for Fresh Water Beaches. Last Update: May 8, 2006. Initial Draft:
Laguna Canyon Channel	Phosphorus	LCWI02	43194	SDR ME data2006-2010	38	37	NA	NA

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Laguna Canyon Channel	Total Nitrogen as N	LCWI02	43329	SDR ME data2006-2010	38	23	NA	NA
Moro Canyon Creek	Nitrogen	NA	43125	NA	NA	NA	NA	Data from swamp. A re-check is done
Moro Canyon Creek	Phosphorus	NA	42334	NA	NA	NA	NA	Data from swamp. A re-check is done
Moro Canyon Creek	Selenium	NA	42852	NA	NA	NA	NA	Data from swamp. A re-check is done
Moro Canyon Creek	Toxicity	NA	43527	NA	NA	NA	NA	Data from swamp. A re-check is done
Oso Creek (at Mission Viejo Golf Course)	Chloride	SMC03523	34925	SDR USB data 2013	1	1	NA	No new data is assessed during this cycle. Data is not provided in the factsheet. A sample collected through OC Public Works NPDES program in 2013 is evaluated.
Oso Creek (at Mission Viejo Golf Course)	Sulfates		33700		1	1	NA	
Oso Creek (at Mission Viejo Golf Course)	Total Dissolved Solids		34850		1	1	NA	
Oso Creek (lower)	Nitrogen	NA	43534	SWAMP data	4	3	NA	No station in OC Public Works NPDES. SWAMP data checked
Oso Creek (lower)	Phosphorus	NA	43302	SWAMP data	4	3	NA	
Oso Creek (lower)	Selenium	NA	44429	SWAMP data	4	3	NA	
Oso Creek (lower)	Toxicity	NA	42685	SWAMP data	4	4	NA	
Pacific Ocean Shoreline, Aliso HSA, at Aliso Creek mouth	Toxicity	ACM1d	49665	SDR ACRW data 2007-2010	11	5	NA	ACM1 is estuary site, its result should be included in decision 34761 (Aliso Creek Mouth).
Pacific Ocean Shoreline, Dana Point HSA, at Dana Point Harbor at patrol dock	Indicator Bacteria	HARBOR PATROL DOCK	49699	Beach Watch data 2006-2010	GM=101	GM=55	NA	LOE 77600 had incorrect sample number and exceedances based on the reference data provided. 2006-2010 data from reference was used to recalculate.
Pacific Ocean Shoreline, Dana Point HSA, at Salt Creek outlet at Monarch Beach	Indicator Bacteria	SCMd, SCMu	43463	SDR ACRW data Jul 09 to Aug 10	26	26	NA	Shellfish harvesting
			43463	SDR ACRW data Jul 09 to Aug 10	GM=26, SSM=50	0	Delist for TC	No exceedance for both geomean and SSM for TC
			43463	SDR ACRW data Jul 09 to Aug 10	GM=26, SSM=50	GM=8, SSM=10	NA	NA
Pacific Ocean Shoreline, Dana Point HSA, at Salt Creek outlet at Monarch Beach	Copper	SCM1d	49742	SDR ACRW SCM1d samples Oct 07 - June 10	9	0	Do not List	LOE 74526 uses site SCM1, which is a pipe outfall/creek sample and not an ocean sample. If only SCM1d copper data is used. The result would be to not list.

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Pacific Ocean Shoreline, Lower San Juan HSA, 1000 feet south of outfall	Indicator Bacteria	S-1	49833	OCHCA Beach Monitoring 2006-2010	SSM-369 GM-364	TC: SSM-0 GM-0 FC: SSM-1 GM-3 ENT: SSM-87 GM-139 TC(shellfish): SSM-52 GM-90	NA	NA
Pacific Ocean Shoreline, Lower San Juan HSA, 10000 feet south of outfall	Indicator Bacteria	S-13	49834	OCHCA Beach Monitoring 2006-2010	SSM-371 GM-366	TC: SSM-0 GM-0 FC: SSM-4 GM-0 ENT: SSM-46 GM-77 TC(shellfish): SSM-27 GM-50	NA	NA
Pacific Ocean Shoreline, Lower San Juan HSA, 2000 feet south of outfall	Indicator Bacteria	S-3	49835	OCHCA Beach Monitoring 2006-2010	SSM-420 GM-408	TC: SSM-0 GM-0 FC: SSM-18 GM-8 ENT: SSM-133 GM-193 TC(shellfish): SSM-67 GM-87	NA	NA

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Pacific Ocean Shoreline, Lower San Juan HSA, 3000 feet south of outfall	Indicator Bacteria	S-5	49836	OCHCA Beach Monitoring 2006-2010	SSM-421 GM-409	TC: SSM-0 GM-0 FC: SSM-15 GM-2 ENT: SSM-117 GM-166 TC(shellfish): SSM-66 GM-68	NA	NA
Pacific Ocean Shoreline, Lower San Juan HSA, 4000 feet south of outfall	Indicator Bacteria	S-7	49837	OCHCA Beach Monitoring 2006-2010	SSM-406 GM-394	TC: SSM-0 GM-0 FC: SSM-7 GM-0 ENT: SSM-89 GM-88 TC(shellfish): SSM-50 GM-54	NA	A review using County's data within the same time frame shows that shell fish should not be listed.
Pacific Ocean Shoreline, Lower San Juan HSA, 5000 feet south of outfall	Indicator Bacteria	S-9	49838	OCHCA Beach Monitoring 2006-2010	SSM-408 GM-397	TC: SSM-0 GM-0 FC: SSM-8 GM-1 ENT: SSM-93 GM-116 TC(shellfish): SSM-57 GM-63	NA	A review using County's data within the same time frame shows that shell fish should not be listed.

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Pacific Ocean Shoreline, Lower San Juan HSA, 7500 feet south of outfall	Indicator Bacteria	S-11	49839	OCHCA Beach Monitoring 2006-2010	SSM-408 GM-396	TC: SSM-0 GM-0 FC: SSM-6 GM-0 ENT: SSM-81 GM-80 TC(shellfish): SSM-39 GM-39	NA	A review using County's data within the same time frame shows that shell fish should not be listed.
Pacific Ocean Shoreline, Lower San Juan HSA, at North Beach Creek	Indicator Bacteria	DSB5d , ODB02	43790	OCHCA Beach Monitoring 2006-2010 SDR CSDO 2006-2010	SSM-603 GM-597	TC: SSM-8 GM-18 FC: SSM-71 GM-65 ENT: SSM-223 GM-334 TC(shellfish): SSM-199 GM-330	NA	Many LOEs in this record inappropriately include creek sample results (DSB5, BW622) in the evaluation. Those LOEs include but not limit to: 29488,29353,29371,7499,43790,77796,77640,74933. An evaluation using OC Public Works NPDES data is shown on the left columns.Station used in the analysis include HCA site (ODB02) and OC Public Works NPDES site (DSB5d). Those two sites has been combined as one site in 2014 unified monitoring program. Instead of table 3.2, table 4.2(de-listing table) should be used in this decision.
Pacific Ocean Shoreline, Lower San Juan HSA, at North Doheny State Park Campground	Indicator Bacteria	DSB4u/d	43665	SDR CSDO 2006 July-2010 June	SSM-147 GM-124	TC: SSM-1 GM-0 FC: SSM-9 GM-0 ENT: SSM-46 GM-67 TC(shellfish): SSM-31 GM-39	NA	Wrong location(those sites are not in Doheny Beach): LOE74957,74958,74981,74982,74986,74010,77641,74983 An evaluation using OC Public Works NPDES data is shown on the left columns. Station used in the analysis is DSB-4 up/down coast which ever is bigger. This method align to the method used in LOE74956

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Pacific Ocean Shoreline, Lower San Juan HSA, at San Juan Creek	Indicator Bacteria	SJC1 u/d	44645	SDR CSDO 2006-2010	SSM-247 GM-204	TC: SSM-11 GM-33 FC: SSM-61 GM-66 ENT: SSM-138 GM-144 TC(shellfish): SSM-126 GM-129	NA	A evaluation using OC Public Works NPDES data at location SJC1 up/downcoast whichever is larger is completed as shown on the left columns. This method aligns with the method used in LOE75039.
Pacific Ocean Shoreline, Lower San Juan HSA, at South Doheny State Park Campground	Indicator Bacteria	DSB1u/d	44451	SDR CSDO 2006-2010	SSM-224 GM-176	TC: SSM-0 GM-0 FC: SSM-12 GM-5 ENT: SSM-68 GM-80 TC(shellfish): SSM-27 GM-55	NA	NA
Pacific Ocean Shoreline, Lower San Juan HSA, at surfzone outfall at Doheny State Beach	Indicator Bacteria	S-0	49877	OCHCA Beach Monitoring 2006-2010	SSM-371 GM-359	TC: SSM-3 GM-9 FC: SSM-28 GM-15 ENT: SSM-138 GM-181 TC(shellfish): SSM-105 GM-141	NA	This location is about only 25 yards adjacent to a water body that has been addressed in 2010 Beaches and Creeks TMDL
Pacific Ocean Shoreline, San Clemente HA, at Poche Beach	Indicator Bacteria	S-15	44202	OCHCA Data 2008-2010	GM=238; SSM=252	GM=211; SSM=121	NA	ENT
					GM=235; SSM=250	GM=7; SSM=55	NA	FC-SSM Exceedance

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
					250	96	NA	TC SHELL -median is 120, 38% above 230
Pacific Ocean Shoreline, San Clemente HA, at San Clemente City Beach, North Beach	Indicator Bacteria	S-17	43328	CSDO Data Jan 2002 - Dec 2007			Delist for TC, FC for REC-1	Conflicting information: On decision ID 43328, RB staff decision recommendation section states that "the water pollutant combination should be removed from the section 303d list" but the Final Listing Decision is "List on 303d". On RB Staff Conclusion Section, LOEs 28347,28372,28368 and 28362 were cited as exceeding the allowable frequency listed in Table 3.2, they actuallly do not exceed the limits.
				CSDO Data Jan 2006 - Aug 2010	GM= 400; SSM=411	TC - GM=0, SSM=1; FC - GM=1, SSM=12; ENT - GM=133, SSM=94	Delist for TC, FC for REC-1	Recalculated with 2006-2010 data; Exceedance for ENT (REC-1 GM)
				CSDO Data Jan 2006 - Aug 2010	411	65	NA	NA
Pacific Ocean Shoreline, San Clemente HA, at South Capistrano Beach at Beach Road	Indicator Bacteria	CSBBR1d, CSBBR1u	43737	CSDO Data July 2009-Dec 2013	GM=136; SSM=200	GM=26; SSM=31	NA	NA
Pacific Ocean Shoreline, San Clemente HA, at South Capistrano County Beach	Indicator Bacteria	CSBMP1d, CSBMP1u	43951	CSDO Data July 2009-Dec 2013	GM=137; SSM=201	GM=56; SSM=51	NA	NA
Prima Deshecha Creek	Phosphorus	PDCM01	33809	SDR ME Data 2007-2013	58	37	NA	RB did not assess any new data this cycle; used data from OC Public Works NPDES for assessment
Prima Deshecha Creek	Turbidity	PDCM01	44624	SDR ME Data 2006-2016	68	31	NA	RB did not assess any new data this cycle; used data from OC Public Works NPDES for assessment
Prima Deshecha Creek	Indicator Bacteria	PDCM01	48514	SDR ME Data 2010-2016	SSM=28	TC,ENT=28; FC=26	Remove LOEs 75510 and 75511 for TC listing	Total Coliform should not be listed as LOE 75510 and 75511 are based on a draft guidance for beach water (Draft Guidance for Fresh Water Beaches. Last Update: May 8, 2006. Initial Draft: November 1997. California Department of Public Health.). There is no basin plan water quality objective for Total Coliform for recreational use in fresh water.

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Prima Deshecha Creek	Nitrogen	PDCM01	43927	SDR ME Data 2007-2013	58	58	NA	RB did not assess any new data this cycle; used data from OC Public Works NPDES for assessment
Salt Creek (Orange County)	Benthic Community Effects	SC-MB	48640	Region CSCI scores	NA	NA	NA	NA
Salt Creek (Orange County)	Malathion	SC-MB	48639	SDR USB Data 2006-2010	8	2	NA	NA
Salt Creek (Orange County)	Toxicity	SC-MB	48633	SDR USB Data 2006-2010	9	3	NA	NA
San Juan Creek	DDE (Dichlorodiphenyldichloroethylene)	no data	33513	NA	NA	NA	NA	NA
San Juan Creek	Indicator Bacteria	SJNL01	41422	SDR ME data2007-2009	SSM-10 GM-NA	TC: SSM-4 FC: SSM-5 ENT: SSM-10	Remove LOEs 75978, 75979, and 75980 for TC listing	six out of the 10 samples at SJNL01 are wet weather samples. Data were not compared against REC-1 standard. An evaluation using the same dataset (SJNL01) is shown on left columns. There is an inconsistancy in treating OC Public Works NPDES SDR Bioassessment data. In this case, the data from REF-CS,SJC-74 and SJC-cc were not included in the evaluation while in case 43131, data were from above sites were included in evaluation. Total Coliform should not be listed as LOE 75978, 75979 and 75980 are based on a draft guidance for beach water (Draft Guidance for Fresh Water Beaches. Last Update: May 8, 2006. Initial Draft: November 1997. California Department of Public Health.). There is no basin plan water quality objective for Total Coliform for recreational use in fresh water.
San Juan Creek	Selenium	REF-CS, SJNL01,SJC-CC,SJC-74	43131	SDR ME data2006-2010 SDR USB Program 2006-2010	36	12	NA	Data source in LOE 9096 is incorrect, it should link to Ref 2618. In addition, in Ref 2618, there are 2 San Juan Creek stations (901SJSJC9 and 901SJSJC5), but only one station is included in this evaluation. The actual exceedance rate for this LOE should be 2/8.
San Juan Creek	Toxicity	REF-CS, SJNL01,SJC-CC,SJC-74	37571	SDR USB data 2006-2010 SDR ME data 2006-2010	28	8	NA	NA

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
San Juan Creek	Benthic Community Effects	SJNL01,REF-CS,SJC-74, SJC-CC	43761	Region CSCI scores	NA	NA	NA	LOE 75948 errorly counted 6 exceedances while there is no mercury data for stations SJNL01,REF-CS,SJC-74 and SJC-CC as mentioned in this LOE.
San Juan Creek	Nitrogen	SJNL01	43657	SDR ME data2006-2010	39	28	NA	No new data was evaluated for this waterbody. A evaluation using OC Public Works NPDES data(2006-2010) is completed as shown in the columns to the left.
San Juan Creek	Phosphorus	SJNL01	32893	SDR ME data2006-2010	39	35	NA	No new data was evaluated for this waterbody. A evaluation using OC Public Works NPDES data(2006-2010) is completed as shown in the columns to the left.
San Juan Creek (mouth)	Indicator Bacteria	C-1	34549	OCHCA Monitoring 2006-2010	SSM-394 GM-381	ENT: GM-381, SSM-367 TC: GM-309 SSM-144 FC: GM-348, SSM-305	NA	No new data was evaluated for this waterbody. A evaluation using OC Public Works NPDES data is completed as shown in the left columns.
Segunda Deshecha Creek	Phosphorus	SDCM02, SD-AP	34533	SDR ME and USB Data 2009-2010	20	18	NA	RB did not assess any new data this cycle and used only SDCM02 data; used data from OC Public Works NPDES for assessment
Segunda Deshecha Creek	Toxicity	SDCM02, SD-AP	44886	SDR USB and ME Data 2010	4	4	NA	NA
Segunda Deshecha Creek	Turbidity	SDCM02, SD-AP	34534	SDR ME and USB Data 2009-2010	20	9	NA	RB did not assess any new data this cycle and used only SDCM02 data; used data from OC Public Works NPDES for assessment
Segunda Deshecha Creek	Benthic Community Effects	901S00997, SDCM02, SD-AP	51745	Region CSCI scores	NA	NA	NA	LOE 76719 incorrectly used Trabuco Creek sites to list Segunda Deshecha for Mercury
Segunda Deshecha Creek	Indicator Bacteria	SDCM02, PICOu, PICOd	51713	SDR ME and CSDO Data 06-2010	NA	NA	NA	Total Coliform should not be listed as LOE 76734 and 76735 are based on a draft guidance for beach water (Draft Guidance for Fresh Water Beaches. Last Update: May 8, 2006. Initial Draft: November 1997. California Department of Public Health.). There is no basin plan water quality objective for Total Coliform for recreational use in fresh water.
Segunda Deshecha Creek	Nitrogen	SDCM02, SD-AP	43140	SDR ME and USB Data 2009-2010	20	20	NA	RB did not assess any new data this cycle and used only SDCM02 data; used data from OC Public Works NPDES for assessment

Water Body	Parameter	Site Name	Decision ID	Data Source	Total number of samples	number of exceedances	Recommended action *(if different from RB Factsheet)*	Comment(if any)
Segunda Deshecha Creek	Selenium	SDCM02, SD-AP	49459	SDR ME and USB Data 2009-2010	18	11	NA	Toxicity data should not be used as LOE. On LOE used dissolved fraction to evaluate against the CTR
Wood Canyon (Orange County)	Benthic Community Effects	WC-WCT	43928	Region CSCI scores	NA	NA	NA	NA

August 11, 2016

Ms. Xueyuan Yu
San Diego Regional Water Quality Control Board
2375 Northside Drive, #100
San Diego, CA 92108

Electronic submission: sandiego@waterboards.ca.gov

Re: Review and Comment of the Draft 2014 California Section (§) 303(d)/305(b) Integrated Report

Dear Ms. Yu,

The City of National City has reviewed the Draft 2014 California §303(d)/305(b) Integrated Report dated July 12, 2016. We appreciate the opportunity to provide comments to the San Diego Regional Water Quality Control Board on this important document. This letter first provides a general comment and then provides specific comments organized by specific constituent or water body condition.

General Comment

1. Although acknowledged by the Regional Board, the age of some of the data used in the listing analysis was greater than 10 years for numerous waterbodies and therefore not likely representative of current water quality conditions. Inclusion of data older than 10 years, and arguably even including data older than five years, will likely not result in a §303d list that is representative of water quality conditions in San Diego County and therefore not useful in the development of water quality priorities.

Specific Comments by Analyte

1. Chlorpyrifos

Lower Sweetwater River was placed on the Draft 2014 §303d list for chlorpyrifos. This listing was based on Copermittee data collected between 2001 and 2008. Re-evaluation of the data available up to October 2010 and to 2015 results in the following findings:

Sweetwater River, Lower, Decision ID 53457; LOE ID 77930 states that three of 14 samples exceeded the chlorpyrifos criterion at SR-MLS and SR-TWAS-1 between 2001 and 2008. Re-analysis of available data (Transitional Monitoring and Assessment Program Report for the San Diego Bay Watershed Management Area (2014-2015)) shows that there have been no exceedances of the chlorpyrifos criterion at SR-MLS or SR-TWAS-1 since 2003. Between 2001 and 2010, three of 16 wet weather samples and zero of two dry weather samples exceeded the criterion at SR-MLS, and zero of two samples for both wet and dry weather exceeded the criterion at SR-TWAS-1 for a total of three out of 22 samples exceeding the chlorpyrifos criterion. Given the age of the exceedances, it is prudent to consider the available data from 2001 through 2014. During this time period, three of 21 wet weather samples and zero of seven dry weather samples exceeded the criterion at SR-MLS, and zero of six samples exceeded the criterion at SR-TWAS-1 during both wet and dry weather. The total number of exceedances between 2001 and 2014 was three out of 40 samples. This does not meet the criteria for listing presented in Table 3.1 of the Listing Policy. See Attachment A for monitoring results.

Additionally, results from the County of San Diego Dry Weather Monitoring from 2006-2009 in the Lower Sweetwater River at sites 909SWT01, 909SWT02, 909SWT03, and 909SWT05 show that zero of 18 samples exceeded the criterion continuous concentration of 0.014 ug/l. Two additional samples were less than the detection limit of 0.04 ug/l; however, this level is not low enough to determine if an exceedance was observed. See Attachment A for monitoring results.

RECOMMEDATION:

Based on the re-analysis of existing data, Lower Sweetwater River should not be included on the 2014 §303d list for Chlorpyrifos.

2. Diazinon

Diazinon was banned from sale in 2005, and since that time significant decreases in concentrations of this pesticide have been observed in receiving water bodies in San Diego County. Due to the inclusion of data greater than 10 years old in the Draft 2014 §303d list evaluation, the number of exceedances for this pesticide meets listing criteria in some water bodies. However, due to the ban on sales of Diazinon in the past 11 years, evaluation of the data should be limited to data collected since the time of the ban. Additionally, sections 3.10 and 4.10 of the Listing Policy allow for the inclusion of trend evaluation during §303d list development.

The Sweetwater River, Lower is currently proposed for listing on the Draft 2014 §303d list for Diazinon; however there have been no exceedances of the criteria for Diazinon since the early 2000s at any of the stations included in the analysis.

Lower Sweetwater River, Decision ID 53461; LOE ID 77012 states that five of 27 samples exceeded the criterion for Diazinon at SR-MLS and SR-TWAS-1 between 2001 and 2008. Re-analysis of available data (Transitional Monitoring and Assessment Program Report for the San Diego Bay Watershed Management Area (2014-2015)) shows that there have been zero exceedances of the criterion for Diazinon since 2003 at these two monitoring locations (zero of 38 samples). Based on the age of the exceedances (pre-dating the ban on Diazinon); no exceedances since 2003, two year before the ban; and significantly decreasing trend results as shown in the Transitional Monitoring and Assessment Program Report for the San Diego Bay Watershed Management Area (2014-2015) (step six of section 3.10 of the Listing Policy) this pollutant is not likely to exceed the criterion in the future. Therefore, Diazinon should not be included on the 2014 §303d list for the Lower Sweetwater River. See Attachment A for a table of monitoring results.

Additionally, results from the County of San Diego Dry Weather Monitoring from 2006-2009 in the Lower Sweetwater River at sites 909SWT01, 909SWT02, 909SWT03, and 909SWT05 show that zero of 20 samples exceeded the freshwater chronic value of 0.1 ug/l. See Attachment A for monitoring results.

RECOMMENDATION:

It is recommended that the Lower Sweetwater River be removed from the Draft 2014 §303d list due to the ban on the sale of Diazinon, the significantly decreasing trends in Diazinon since 2005, no exceedances of Diazinon since 2003 (zero of 38 samples), and the likelihood that Diazinon will not exceed the criterion in the future.

3. **Selenium**

Additional data were collected from Paradise Creek (HSA 908.32) by the City of National City for use in the delisting evaluation and compared to the California Toxics Rule (CTR) Freshwater Criterion of 5 µg/l. At total of 46 samples were collected by the City in 2014 in accordance with the project's Quality Assurance Project Plan (see Attachment A). Collected samples were submitted to EnviroMatrix Analytical, Inc., a laboratory certified by the California Department of Health Services, for analysis. All samples had results less than the criterion of 5 µg/l.

According to Table 4.1 of the Listing Policy, a water segment can be delisted if the sample size is between 48 and 59 samples with four or fewer exceedances. The City's 2014 data in combination with SWAMP's 2005-2006 samples listed in the LOE, equate to a total of 50 samples, with four of 50 samples with exceedances.

The City requests that these data be considered as part of the 2014 §303(d) list development process. See Attachment A for monitoring results.

RECOMMENDATION:

It is recommended that Paradise Creek (HSA 908.32) be removed from the Draft 2014 §303d list since the number of exceedances and number of samples meets the delisting requirements (Table 4.1 in the Listing Policy).

4. <u>Phosphorus</u>

During the previous listing cycle, Paradise Creek (HSA 908.32) was assessed with respect to listing the water body for total phosphorus. Four samples from 2005 and 2006 were reviewed, and the determination was that the water body should not be listed for phosphorus (2008 Integrated Report, decision ID 16949). No new data has been collected for phosphorus since the last listing cycle, but the Draft 2014 §303(d) includes a new listing for phosphorus in Paradise Creek.

RECOMMENDATION

It is recommend to remove Paradise Creek (HSA 908.32) from the Draft 2014 §303(d) List for total phosphorus because the analysis in the previous listing cycle concluded listing Paradise Creek for total phosphorus was not warranted or supported, and no new data has been collected since that time.

Sincerely,

Kuna Muthusamy, PE
Assistant Director of Engineering & Public Works
City of National City

Attachment A

Dry Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014			2014-2015		
					01/06/10	05/18/10	-	09/12/11-09/13/11	05/08/12-05/09/12	-	09/17/13-09/18/13	1/13/14-1/14/14	05/01/14-05/02/14	-		
Physical Chemistry																
2013	Dissolved Oxygen	mg/L	<5.0 (a)	1. Basin Plan							**3**	6.44	5.68		33%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.38	7.39		7.26	7.29		7.36	7.38	7.46		0%	0.31
2007, 2013	Specific Conductivity	µmhos/cm	NA		4,810	4,630		5,010	4,640		5,229	5,167	5,109			
2007, 2013	Water Temperature	Celsius	NA		12.70	18.10		19.3	16.8		21.24	16.28	19.91			
2013	Color	Color units	20	1. Basin Plan							20	20	**25**		33%	NA[1]
2007, 2013	Turbidity	NTU	20	1. Basin Plan	1.4J	2.5		0.98	4		3.2	0.1	**63.4**		14%	0.54
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	151 (b)	1. Basin Plan	80	**170**		130	**300**		78	140	**310**		43%	1.14
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	120	90		20	<20		130	45	20		0%	0.02
2007, 2013	Total Coliform	MPN/100 mL	NA		800	13,000		1,300	500		1,400	490	1,100			
Nutrients																
2007, 2013	Ammonia as N	mg/L	(c)	6. USEPA Water Quality Criteria (Freshwater)	0.03J	0.14		0.18	0.06J		0.11	<0.10	0.044J		0%	0.02
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.17	0.33		0.063J	0.24		0.085J	0.098J	0.065J		0%	0.02
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	0.045J		<0.1	<0.1		<0.1	0.012J	0.022J		0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.554J	0.51		0.62	0.46		0.4	0.3	0.42			
2007, 2013	Total Nitrogen (calculated)	mg/L	1	1. Basin Plan	0.724	0.885		0.683	0.7		0.485	0.41	0.507		0%	0.63
2007	Dissolved Phosphorus	mg/L	0.1	1. Basin Plan	**0.132**	0.077		**0.18**	0.097		**0.15**	NR	0.1		50%	1.23
2013	Orthophosphate	mg/L	NA								0.15	0.097	0.11			
2007, 2013	Total Phosphorus	mg/L	0.1	1. Basin Plan	0.098	**0.14**		**0.21**	**0.12**		**0.16**	0.096	**0.11**		71%	1.33
General Chemistry																
2007	Biochemical Oxygen Demand	mg/L	10	8. McNeeley (1979)	<2	1.5J		2.7	0.54J		1.5J	NR	<2.0		0%	0.14
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	40.9	22		29	22		24	NR	28		0%	0.23
2007, 2013	Dissolved Organic Carbon	mg/L	NA		7.8	6.7		5.3	6		6.1	3.9	4.9			
2007, 2013	Total Organic Carbon	mg/L	NA		7.7	6.1		4.3	6.2		5.9	3.8	4.9			
2007	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL	<5	<5		<5	2J		<5.0	NR	1.4J		0%	0.22
2013	Sulfate	mg/l	500 (a)	1. Basin Plan							410	420	470		0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.074	0.06		0.063	0.057		0.071	0.059	0.072		0%	0.13
2007, 2013	Total Dissolved Solids	mg/L	1,500 (a)	1. Basin Plan	**2,642B**	**2,700**		**3,400**	**2,700**		**3,200**	**2,900**	**3,000**		100%	1.96
2007, 2013	Total Suspended Solids	mg/L	58	14. NSQD, 1. Basin Plan	1.8J	5		2	4		4	6	4		0%	0.07
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		978.7	1,100	No Samples Collected	1,200	1,100	No Samples Collected	1,290	1,270	1,260	No Samples Collected		
Total Metals																
2013	Aluminum	mg/L	0.2 (d)	1. Basin Plan							0.0049J	0.0085	0.021		0%	0.06
2007	Antimony	mg/L	0.006 (d)	1. Basin Plan	0.0002J	0.00016J		0.00011J	0.00017J		0.000083J	0.000070J	0.00013J		0%	0.02
2007, 2013	Arsenic	mg/L	0.01 (d)	1. Basin Plan	0.0031	0.0016		0.0014	0.0024		0.0014	0.00092	0.0013		0%	0.17
2007, 2013	Cadmium	mg/L	0.005 (d)	1. Basin Plan	<0.0004	<0.0001		0.00002J	0.00002J		0.000025J	0.000022J	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	0.05 (d)	1. Basin Plan	<0.0005	0.000077J		<0.0002	0.00011J		0.00015J	0.000065J	0.000046J		0%	0.00
2013	Chromium, Trivalent	mg/L	NA								<0.0005	<0.0005	<0.0005			
2013	Chromium, Hexavalent	mg/L	0.010 (d)	1. Basin Plan							0.000036J	0.000025J	0.00016J		0%	NA[1]
2007, 2013	Copper	mg/L	1.0 (d)	1. Basin Plan	0.0005J	0.00063		<0.0005	<0.0005		0.0011	0.001	0.00040J		0%	0.00
2013	Iron	mg/L	0.3 (a)	1. Basin Plan							0.024	0.024	0.06		0%	NA[1]
2007, 2013	Lead	mg/L	NA		0.00007J,B	0.000062J		0.00004J	0.00011J		0.000028J	0.000030J	0.000061J			
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan							**0.39**	**0.14**	**0.31**		100%	NA[1]
2013	Mercury	mg/L	0.002 (d)	1. Basin Plan							0.000039J	<0.000050	<0.000050		0%	NA[1]
2007, 2013	Nickel	mg/L	0.1 (d)	1. Basin Plan	0.0015	0.0051		0.0011	0.0015		0.0069	0.0073	0.00093		0%	0.03
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.0003J	0.00045		<0.0004	0.00043		0.001	0.0026	0.00022J		0%	0.15
2013	Silver	mg/L	0.1 (d)	1. Basin Plan							0.000013J	0.000056J	<0.00020		0%	NA[1]
2013	Thallium	mg/L	0.002 (d)	1. Basin Plan							<0.00020	<0.00020	<0.00020		0%	NA[1]
2007, 2013	Zinc	mg/L	5.0 (d)	1. Basin Plan	0.0023B	0.0017J		0.0011J	0.003J		0.0024J	0.0016J	0.0014J		0%	0.00
Dissolved Metals																
2013	Aluminum										<0.0050	<0.0050	<0.0050			
2007	Antimony	mg/L	0.006	1. Basin Plan	0.0002J	0.00019J		0.0001J	0.00016J		0.000085J	0.000078J	0.00014J		0%	0.02
2007, 2013	Arsenic	mg/L	0.34 acute / 0.15 chronic	16. 40 CFR 131.38	0.0033	0.0015		0.0014	0.002		0.0014	0.0009	0.0012		0%	0.01
2007, 2013	Cadmium	mg/L	(e)	16. 40 CFR 131.38	<0.0004	<0.0001		0.00002J	0.00002J		0.000022J	0.000017J	<0.00010		0%	0.01
2007, 2013	Chromium	mg/L	(e)	16. 40 CFR 131.38	<0.0005	0.000083J		<0.0002	<0.0002		<0.00020	0.000052J	0.000039J		0%	0.00
2007, 2013	Copper	mg/L	(e)	16. 40 CFR 131.38	0.0005J	0.0007		<0.0005	<0.0005		0.0011	0.0011	0.00030J		0%	0.02
2013	Iron	mg/L	NA								<0.010	0.0017J	<0.010			
2007, 2013	Lead	mg/L	(e)	16. 40 CFR 131.38	<0.0001	<0.0002		0.00002J	<0.0002		<0.00020	<0.00020	<0.00020		0%	0.01
2013	Manganese	mg/L	NA								0.38	0.1	0.27			
2013	Mercury	mg/L	NA								0.000048J	0.0000040J	<0.000050			
2007, 2013	Nickel	mg/L	(e)	16. 40 CFR 131.38	0.0014	0.0054		0.001	0.0014		0.007	0.0071	0.00084		0%	0.02
2007, 2013	Selenium	mg/L	NA		0.0005	0.00047		<0.0004	0.0004		0.00089	0.0025	0.00022J			
2013	Silver	mg/L	(e)	16. 40 CFR 131.38							0.000029J	0.000058J	<0.00020		0%	NA[1]
2013	Thallium	mg/L	NA								<0.00020	<0.00020	<0.00020			
2007, 2013	Zinc	mg/L	(e)	16. 40 CFR 131.38	0.0021B	0.0029J		0.0019J	0.0027J		0.0011J	0.0024J	0.0016J		0%	0.01

Dry Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014			2014-2015		
					01/06/10	05/18/10	-	09/12/11-09/13/11	05/08/12-05/09/12	-	09/17/13-09/18/13	1/13/14-1/14/14	05/01/14-05/02/14	-		
Organophosphorus Pesticides																
2013	Azinphos methyl (Guthion)	µg/L	NA				No Samples Collected			No Samples Collected	<0.010	<0.010	<0.010	No Samples Collected		
2013	Bolstar	µg/L	NA								<0.010	<0.010	<0.010			
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.002	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010		0%	0.32
2013	Coumaphos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Demeton-o	µg/L	NA								<0.010	<0.010	<0.010			
2013	Demeton-s	µg/L	NA								<0.010	<0.010	<0.010			
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.004	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010		0%	0.09
2013	Dichlorvos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Dimethoate	µg/L	NA								<0.010	<0.010	<0.010			
2013	Disulfoton	µg/L	NA								<0.010	<0.010	<0.010			
2013	Ethoprop	µg/L	NA								<0.010	<0.010	<0.010			
2013	Ethyl parathion	µg/L	NA								<0.010	<0.010	<0.010			
2013	Fensulfothion	µg/L	NA								<0.010	<0.010	<0.010			
2013	Fenthion	µg/L	NA								<0.010	<0.010	<0.010			
2007, 2013	Malathion	µg/L	0.43 acute / 0.1 chronic	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.006	<0.01		<0.01	<0.01		<0.010	<0.010	<0.010		0%	0.47
2013	Merphos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Methyl parathion	µg/L	NA								<0.010	<0.010	<0.010			
2013	Mevinphos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Naled	µg/L	NA								<0.010	<0.010BS-L	<0.010			
2013	Phorate	µg/L	NA								<0.010	<0.010	<0.010BS-L			
2013	Ronnel	µg/L	NA								<0.010	<0.010	<0.010			
2013	Stirophos	µg/L	NA								<0.010	<0.010	<0.010			
2013	Tokuthion (Prothiofos)	µg/L	NA								<0.010	<0.010	<0.010			
2013	Trichloronate	µg/L	NA								<0.010	<0.010	<0.010			
PCB Congeners																
2013	PCB-8	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-18	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-28	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-44	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-52	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-66	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-77	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-81	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-101	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-105	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-114	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-118	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-123	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-126	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-128	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-138	µg/L	0.014 (f)	16. 40 CFR 131.38							<0.010	<0.010	<0.010		0%	NA[1]
Polynuclear Aromatic Hydrocarbons																
2013	1-Methylnaphthalene	µg/L	NA								<0.10	<0.10	<0.10			
2013	1-Methylphenanthrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	2,6-Dimethylnaphthalene	µg/L	NA								<0.10	<0.10	<0.10			
2013	2-Methylnaphthalene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Acenaphthene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Acenaphthylene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Anthracene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (a) anthracene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (a) pyrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (b) fluoranthene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (e) pyrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (g,h,i) perylene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Benzo (k) fluoranthene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Biphenyl	µg/L	NA								<0.10	<0.10	<0.10			
2013	Chrysene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Dibenzo (a,h) anthracene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Fluoranthene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Fluorene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Indeno (1,2,3-cd) pyrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Naphthalene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Perylene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Phenanthrene	µg/L	NA								<0.10	<0.10	<0.10			
2013	Pyrene	µg/L	NA								<0.10	<0.10	<0.10			

Dry Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark References	Historical Monitoring Data						Long Term and Transitional Monitoring	Long Term Monitoring Only	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2009-2010		2010-2011	2011-2012		2012-2013	2013-2014			2014-2015		
					01/06/10	05/18/10	-	09/12/11-09/13/11	05/08/12-05/09/12	-	09/17/13-09/18/13	1/13/14-1/14/14	05/01/14-05/02/14	-		
Pyrethroids							No Samples Collected			No Samples Collected				No Samples Collected		
2013	Allethrin	μg/L	NA								<0.002	<0.002	<0.002			
2013	Bifenthrin	μg/L	0.0093	15. Anderson et al., 2006							<0.002	<0.002	<0.002		0%	NA[1]
2013	Cyfluthrin	μg/L	0.344	17. Wheelock et al., 2004							<0.002	<0.002	<0.002		0%	NA[1]
2013	Cypermethrin	μg/L	0.683	17. Wheelock et al., 2004							<0.002	<0.002	<0.002		0%	NA[1]
2013	Danitol (Fenpropathrin)	μg/L	NA								<0.002	<0.002	<0.002			
2013	Deltamethrin/Tralomethrin	μg/L	NA								<0.002	<0.002	<0.002			
2013	Esfenvalerate	μg/L	0.25	17. Wheelock et al., 2004							<0.002	<0.002	<0.002		0%	NA[1]
2013	Fenvalerate	μg/L	NA								<0.002	<0.002	<0.002			
2013	Fluvalinate	μg/L	NA								<0.002	<0.002	<0.002			
2013	L-Cyhalothrin	μg/L	0.2	17. Wheelock et al., 2004							<0.002	<0.002	<0.002		0%	NA[1]
2013	Permethrin	μg/L	0.021	15. Anderson et al., 2006							<0.01	<0.01	<0.01		0%	NA[1]
2013	Prallethrin	μg/L	NA								<0.002	<0.002	<0.002			
2013	Resmethrin	μg/L	NA								<0.01	<0.01	<0.01			
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100		>100	>100		>100	NR	>100		0%	1.00
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100		100	100		100	NR	**50**		17%	1.17
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**50**	**50**		**50**	**50**		**25**	NR	**25**		100%	2.67
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100		>100C	>100		>100	NR	>100		0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	**50**		**50**	**50**		**25**	NR	**25**		100%	2.67
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail								Pass	Pass	Pass		0%	

Blank spaces have been verified and no data is available.

NA indicate no criteria or published value was available or applicable to the matrix or program.

(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011) and may vary by hydrologic area.

(b) Water Quality Benchmark for Enterococcus is based on the maximum criteria for infrequently used freshwater area by the San Diego Regional Water Quality Control Plan for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).

(c) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) and CCC (early life stages present) using water temperature and pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC and CCC were calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.

(d) Water Quality Benchmark for total metals is based on the MUN beneficial as described in the Basin Plan, 1994 (with amendments effective on or before April 4, 2011).

(e) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) and Continuous Criteria Concentration (CCC) were used.

(f) Water Quality Benchmark for PCBs is the CCC (USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000).

B-Analyte was detected in the associated method blank.

BS-L-Blank Spike recovery of this analyte was below the control limits. Results may be biased low.

C - Control failed; however, sample showed no toxic response.

J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.

NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.

NR-Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources

Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Historical Monitoring Data											
					2001-2002			2002-2003			2003-2004			2004-2005		
					02/17/02	03/17/02	04/25/02	12/16/02	02/11/03	02/25/03	11/12/03	02/03/04	02/18/04	10/17/04	02/11/05	02/18/05
Physical Chemistry																
2013	Dissolved Oxygen	mg/L	<5.0 (a)													
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.5	7.4	7.3	7.56	6.87	6.94	7.20	7.83	7.58	7.24	7.52	7.49
2007, 2013	Specific Conductivity	µmhos/cm	NA		3,820	3,430	2,980	2,990	2,760	1,955	3,040	1,742	1,995	529	5,070	3,260
2007, 2013	Water Temperature	Celsius	NA					14.30	17.00	14.40	14.90	12.20	15.40	19.30	14.60	14.00
2013	Color	Color units														
2007, 2013	Turbidity	NTU	20	1. Basin Plan	7.7	**20.2**	8.24	**62.9**	13	**46.5**	15.2	11.5	16.8	4.03	5.8	**48.8**
Bacteriological																
2007, 2013	Enterococcus	MPN/100 mL	NA		300	16,000	9,000	8,000	14,000	30,000	18,792	1,879	17,000	800	3,000	50,000
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	130	500	**11,000**	**23,000**	**7,000**	1,700	4,000	2,200	2,300	300	1,300	1,300
2007, 2013	Total Coliform	MPN/100 mL	NA		23,000	5,000	230,000	30,000	30,000	170,000	300,000	130,000	130,000	30,000	13,000	28,000
Nutrients																
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.16	0.3	0.2	0.25	0.28	0.19	0.16	0.1	0.15	0.39	0.14	0.14
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.4	0.3	0.2	0.54	0.81	0.39	2.19	0.25	0.27	0.07	1.02	1.93
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	0.08	<0.05	<0.05	<0.05	<0.05	<0.05
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1.5	3	1.2	1.0	1.0	0.8	2.8	<0.5	0.7	2.1	1.4	1.8
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	<0.05	0.2	0.1	0.34	0.20	0.10	0.4	0.18	0.12	0.2	0.18	0.45
2013	Orthophosphate	mg/L	NA													
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.18	0.29	0.1	0.54	0.22	0.14	0.43	0.22	0.16	0.25	0.57	0.47
General Chemistry																
2007, 2013	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	2	14.2	4.7	<2.0	20.4	5.89	9.32	**46.7**	15.3	19.8	2.57	3.42
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	70	63	55	59	85	39	104	69	86	44	**123**	74
2007, 2013	Dissolved Organic Carbon	mg/L	NA					9.68	25.2	8.94	21.9	7.94	88.2	25.7	5.24	6.19
2007, 2013	Total Organic Carbon	mg/L	NA					40.7	12.9	6.72	20.8	12.5	96.4	30.1	10.9	11.7
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	1	1	1	4.47	2	1	4.43	<1	1.05	<1	<1	<1
2013	Sulfate	mg/L	500 (a)	1. Basin Plan												
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	<0.1	<0.1	<0.1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
2007, 2013	Total Dissolved Solids	mg/L	1,500 (a)	1. Basin Plan	**2,000**	1,050	**2,870**	793	**1,660**	1,150	**1,880**	**1,780**	**2,230**	**2,860**	**2,370**	1,410
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	21	47	23	74	14	51	<20	<20	<20	20	26	**102**
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		932	499	1,010	344	758	549	817	728	816	1,210	991	556
Total Metals																
2013	Aluminum	mg/L	NA													
2007	Antimony	mg/L	NA		<0.002	<0.002	<0.002	0.004	0.004	0.003	<0.005	<0.005	<0.006	<0.005	<0.005	<0.005
2007, 2013	Arsenic	mg/L	NA		0.002	0.002	0.003	0.004	0.002	0.003	0.005	0.007	0.005	0.004	0.005	<0.002
2007, 2013	Cadmium	mg/L	NA		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2007, 2013	Chromium	mg/L	NA		<0.005	0.007	<0.005	0.009	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	NA		<0.005	0.010	0.006	0.010	0.018	0.007	0.009	0.013	0.012	<0.005	<0.005	0.005
2013	Iron	mg/L	0.3 (a)	1. Basin Plan												
2007, 2013	Lead	mg/L	NA		0.002	0.006	0.003	0.010	0.003	<0.002	0.002	<0.002	0.003	<0.002	<0.002	0.002
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan												
2013	Mercury	mg/L	NA													
2007, 2013	Nickel	mg/L	NA		0.003	0.003	0.004	<0.002	0.002	<0.002	0.004	0.002	<0.002	0.002	0.003	0.002
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.003	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2013	Thallium	mg/L	NA													
2007, 2013	Zinc	mg/L	NA		<0.02	0.045	<0.020	0.042	0.029	0.025	0.036	<0.02	0.029	<0.02	<0.02	<0.02
Dissolved Metals																
2013	Aluminum	mg/L	NA													
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.002	<0.002	<0.002	0.006	<0.002	0.004	<0.005	<0.005	<0.006	<0.005	<0.005	<0.005
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	<0.001	0.001	0.003	0.003	0.003	0.003	0.003	0.004	0.003	<0.002	<0.002	<0.002
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	0.007	0.025	0.008	0.005	0.006	0.008	<0.005	<0.005	<0.005
2013	Iron	mg/L	NA													
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.002	<0.002	<0.002	0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002
2013	Manganese	mg/L	NA													
2013	Mercury	mg/L	NA													
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.004	<0.002	0.003	<0.002	0.002	<0.002	0.003	0.002	<0.002	0.002	0.003	0.002
2007, 2013	Selenium	mg/L	NA		<0.002	<0.002	<0.002	<0.004	<0.004	<0.004	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
2013	Thallium	mg/L	NA													
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	<0.020	<0.020	<0.020	0.043	0.097	0.021	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Historical Monitoring Data											
					2001-2002			2002-2003			2003-2004			2004-2005		
					02/17/02	03/17/02	04/25/02	12/16/02	02/11/03	02/25/03	11/12/03	02/03/04	02/18/04	10/17/04	02/11/05	02/18/05
Chlorinated Pesticides																
2013	Chlordane (tech)	ug/L	2.4	16. 40 CFR 131.38												
Organophosphorus Pesticides																
2013	Azinphos methyl (Guthion)	µg/L	NA													
2013	Bolstar	µg/L	NA													
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.03*	<0.03*	**0.03**	**0.053**	**0.059**	<0.03*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
2013	Coumaphos	µg/L	NA													
2013	Demeton-o	µg/L	NA													
2013	Demeton-s	µg/L	NA													
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	**0.10**	**0.27**	<0.03	**0.301**	**0.146**	**0.171**	**0.084**	<0.01	0.026	<0.01	<0.01	<0.01
2013	Dichlorvos	µg/L	NA													
2013	Dimethoate	µg/L	NA													
2013	Disulfoton	µg/L	NA													
2013	Ethoprop	µg/L	NA													
2013	Ethyl parathion	µg/L	NA													
2013	Fensulfothion	µg/L	NA													
2013	Fenthion	µg/L	NA													
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook				0.24	<0.10	<0.10	0.423	<0.01	<0.01	<0.01	<0.01	<0.01
2013	Merphos	µg/L	NA													
2013	Methyl parathion	µg/L	NA													
2013	Mevinphos	µg/L	NA													
2013	Naled	µg/L	NA													
2013	Phorate	µg/L	NA													
2013	Ronnel	µg/L	NA													
2013	Stirophos	µg/L	NA													
2013	Tokuthion (Prothiofos)	µg/L	NA													
2013	Trichloronate	µg/L	NA													
PCB Congeners																
2013	PCB-8	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-18	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-28	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-44	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-52	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-66	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-77	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-81	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-101	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-105	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-114	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-118	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-123	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-126	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-128	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-138	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-153	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-156	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-157	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-167	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-169	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-170	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-180	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-187	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-189	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-195	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-206	µg/L	0.014 (d)	16. 40 CFR 131.38												
2013	PCB-209	µg/L	0.014 (d)	16. 40 CFR 131.38												

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Historical Monitoring Data											
					2001-2002			2002-2003			2003-2004			2004-2005		
					02/17/02	03/17/02	04/25/02	12/16/02	02/11/03	02/25/03	11/12/03	02/03/04	02/18/04	10/17/04	02/11/05	02/18/05
Polynuclear Aromatic Hydrocarbons																
2013	1-Methylnaphthalene	µg/L	NA													
2013	1-Methylphenanthrene	µg/L	NA													
2013	2,6-Dimethylnaphthalene	µg/L	NA													
2013	2-Methylnaphthalene	µg/L	NA													
2013	Acenaphthene	µg/L	NA													
2013	Acenaphthylene	µg/L	NA													
2013	Anthracene	µg/L	NA													
2013	Benzo (a) anthracene	µg/L	NA													
2013	Benzo (a) pyrene	µg/L	NA													
2013	Benzo (b) fluoranthene	µg/L	NA													
2013	Benzo (e) pyrene	µg/L	NA													
2013	Benzo (g,h,i) perylene	µg/L	NA													
2013	Benzo (k) fluoranthene	µg/L	NA													
2013	Biphenyl	µg/L	NA													
2013	Chrysene	µg/L	NA													
2013	Dibenzo (a,h) anthracene	µg/L	NA													
2013	Fluoranthene	µg/L	NA													
2013	Fluorene	µg/L	NA													
2013	Indeno (1,2,3-cd) pyrene	µg/L	NA													
2013	Naphthalene	µg/L	NA													
2013	Perylene	µg/L	NA													
2013	Phenanthrene	µg/L	NA													
2013	Pyrene	µg/L	NA													
Pyrethroids																
2007, 2013	Allethrin	µg/L	NA													
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006												
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004												
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004												
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004												
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA													
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA													
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004												
2007, 2013	Fenvalerate	µg/L	NA													
2007, 2013	Fluvalinate	µg/L	NA													
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006												
2007, 2013	Prallethrin	µg/L	NA													
2007, 2013	Resmethrin	µg/L	NA													
Toxicity																
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	**70.71**	>100	**72.22**	>100	>100	>100	>100	>100	**80.53**	>100	>100
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	**25**	100	**50**	100	100	100	100	100	**25**	100	100
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	**50**	**50**	**50**	100	100	100	100	100	**12.5**	**50**	100
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100	>100
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	**50**	**25**	**12.5**	100	100	100	100	**50**	**50**	100	100
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail													

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Historical Monitoring Data													
					2005-2006			2006-2007			2007-2008	2008-2009	2009-2010		2010-2011	2011-2012		2012-2013
					10/18/05	01/02/06	02/19/06	10/14/06	01/30/07	02/19/07	-	10/05/08	11/28/09	02/06/10	-	10/05/11-10/06/11	02/07/12	-
Physical Chemistry																		
2013	Dissolved Oxygen	mg/L	<5.0 (a)															
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.66	8.14	8.09	7.80	7.79	7.60		7.49	7.32	7.05		7.55	7.71	
2007, 2013	Specific Conductivity	µmhos/cm	NA		3,430	4,090	2,690	1,890	4,100	3,520		5,180	4,680	3,410		4,380	1,219	
2007, 2013	Water Temperature	Celsius	NA		16.50	15.20	12.20	16.10	11.10	13.10		14.90	12.80	16.30		16.6	13.9	
2013	Color	Color units																
2007, 2013	Turbidity	NTU	20	1. Basin Plan	11.4	9.07	**21.7**	**32.2**	9.6	**65.8**		3.7	5.4	**89.7**		9.4	16	
Bacteriological																		
2007, 2013	Enterococcus	MPN/100 mL	NA		50,000	5,000	13,000	110,000	3,000	1,300		80,000	340	8,000		50,000	5,000	
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	3,000	**8,000**	2,300	**8,000**	170	**5,000**		**230,000**	170	**17,000**		**23,000**	2,200	
2007, 2013	Total Coliform	MPN/100 mL	NA		130,000	30,000	80,000	50,000	3,000	30,000		500,000	2,300	220,000		80,000	80,000	
Nutrients																		
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	<0.1	<0.1	0.19	0.79	0.67	1.24		0.11	0.1	0.07		0.22	<0.1	
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.55	1.52	1.44	1.36	<0.05	0.74		0.22	0.36	0.67		0.39	0.64	
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	<0.05	<0.05	<0.05	0.06	<0.05	<0.05		<0.05	<0.05	<0.75		0.033J	0.021J	
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		1	1.7	2.5	2.2	1.4	2.4		2.4	1.12	0.644J		1	0.89	
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.26	0.43	0.24	0.28	0.21	0.32		0.133	0.163	0.263		0.2	0.11	
2013	Orthophosphate	mg/L	NA															
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.52	0.45	0.54	0.4	0.28	0.39		0.19	0.17	0.396		0.24	0.15	
General Chemistry																		
2007, 2013	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	4.96	3.72	2.22	**115**	3.66	3.36		**45.7**	5.5	2.9		10	3.5[†]	
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	47	44	102	119	54	45		52	36.1	55		34	36	
2007, 2013	Dissolved Organic Carbon	mg/L	NA		5.04	19	10.5	86.9	13.6	12.8		9.7	8.6	9.9		7.6	7.9	
2007, 2013	Total Organic Carbon	mg/L	NA		12.1	14	13.2	88.8	13.8	13		9.9	8.8	9.4		7.6	8.5	
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	<1	<1	<1	<5	<5	<5		**14.3**	3.4J	<5		1.9J	3.1J	
2013	Sulfate	mg/L	500 (a)	1. Basin Plan														
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5		0.16	0.1H	0.031		0.1	0.14	
2007, 2013	Total Dissolved Solids	mg/L	1,500 (a)	1. Basin Plan	**2,640**	**2,140**	**2,070**	**1,990**	**2,060**	1,290	No Sample Collected	**3,038**	**2,878**	952B	No Sample Collected	**2,900**	**1,800**	No Sample Collected
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	<20	<20	<20	45	<20	91		8.2	6.8	**106**		9	12	
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		1,130	1,020	966	807	999	626		1,010.8	1,086.9	336.8		1200	950	
Total Metals																		
2013	Aluminum	mg/L	NA															
2007	Antimony	mg/L	NA		<0.005	<0.005	<0.005	0.002	0.002	0.004		0.0009	0.0004J	0.0006		0.0006	0.00072	
2007, 2013	Arsenic	mg/L	NA		0.008	0.005	0.005	0.011	0.002	0.003		0.004	0.0084	0.0046		0.0017	0.002	
2007, 2013	Cadmium	mg/L	NA		<0.001	<0.001	<0.001	0.003	<0.001	<0.001		<0.0004	<0.0004	<0.0004		0.00004J	0.000037J	
2007, 2013	Chromium	mg/L	NA		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		0.0021	0.0006	0.0015		0.0019	0.0008	
2007, 2013	Copper	mg/L	NA		<0.005	0.005	0.005	0.011	0.006	0.012		0.0053	0.0035	0.0059		0.005	0.005	
2013	Iron	mg/L	0.3 (a)	1. Basin Plan														
2007, 2013	Lead	mg/L	NA		<0.002	<0.002	<0.002	0.003	<0.001	0.004		0.0005	0.00026	0.00338		0.00075	0.0013	
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan														
2013	Mercury	mg/L	NA															
2007, 2013	Nickel	mg/L	NA		0.007	0.004	0.003	0.004	0.003	0.004		0.0017	0.003	0.0022		0.005	0.0037	
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	<0.005	<0.004	<0.005	<0.004	<0.004	<0.004		0.0002J	<0.0005	0.0013		0.0004	0.00062	
2013	Thallium	mg/L	NA															
2007, 2013	Zinc	mg/L	NA		0.044	<0.02	<0.02	0.047	0.022	0.047		0.021	0.011	0.0261		0.013	0.011	
Dissolved Metals																		
2013	Aluminum	mg/L	NA															
2007	Antimony	mg/L	0.006	1. Basin Plan	<0.005	<0.005	<0.005	<0.002	<0.002	0.002		0.0004J	0.0002J	0.0006		0.00034J	0.00047J	
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	<0.001	<0.001	<0.001	0.002	<0.001	<0.001		0.0041	0.008	0.0039		0.0017	0.0017	
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001		<0.0004	<0.0004	<0.0004		0.000034J	0.000029J	
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		0.0018	0.0005	0.0003J		0.0014	0.00043	
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	<0.005	<0.005	<0.005	0.006	0.004	0.005		0.0026	0.0019	0.0029		0.0031	0.0029	
2013	Iron	mg/L	NA															
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.002	<0.002	<0.002	<0.001	<0.001	<0.001		<0.0001	0.00009J	0.00007J		0.000039J	0.000071J	
2013	Manganese	mg/L	NA															
2013	Mercury	mg/L	NA															
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	<0.002	0.004	0.003	0.004	<0.002	0.002		0.0017	0.0030	0.0014		0.0048	0.0031	
2007, 2013	Selenium	mg/L	NA		<0.005	<0.004	<0.005	<0.004	<0.004	<0.004		0.0002J	0.0003J	0.0007		0.00029J	0.00061	
2013	Thallium	mg/L	NA															
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.04	<0.02	<0.02	0.023	<0.02	<0.02		0.0135	0.0050	0.0021		0.01	0.0064	

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Historical Monitoring Data													
					2005-2006			2006-2007			2007-2008	2008-2009	2009-2010		2010-2011	2011-2012		2012-2013
					10/18/05	01/02/06	02/19/06	10/14/06	01/30/07	02/19/07	-	10/05/08	11/28/09	02/06/10	-	10/05/11-10/06/11	02/07/12	-
Chlorinated Pesticides											No Sample Collected				No Sample Collected			No Sample Collected
2013	Chlordane (tech)	ug/L	2.4	16. 40 CFR 131.38														
Organophosphorus Pesticides																		
2013	Azinphos methyl (Guthion)	µg/L	NA															
2013	Bolstar	µg/L	NA															
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.01	<0.02	<0.02	<0.002	<0.002	<0.002		<0.002	<0.002	<0.002		<0.01	<0.01	
2013	Coumaphos	µg/L	NA															
2013	Demeton-o	µg/L	NA															
2013	Demeton-s	µg/L	NA															
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.01	<0.02	<0.02	<0.004	<0.004	<0.004		<0.004	<0.004	<0.004		<0.01	<0.01	
2013	Dichlorvos	µg/L	NA															
2013	Dimethoate	µg/L	NA															
2013	Disulfoton	µg/L	NA															
2013	Ethoprop	µg/L	NA															
2013	Ethyl parathion	µg/L	NA															
2013	Fensulfothion	µg/L	NA															
2013	Fenthion	µg/L	NA															
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.01	<0.02	<0.02	0.097	0.063	<0.006		<0.006	<0.006	0.059		<0.01	<0.01	
2013	Merphos	µg/L	NA															
2013	Methyl parathion	µg/L	NA															
2013	Mevinphos	µg/L	NA															
2013	Naled	µg/L	NA															
2013	Phorate	µg/L	NA															
2013	Ronnel	µg/L	NA															
2013	Stirophos	µg/L	NA															
2013	Tokuthion (Prothiofos)	µg/L	NA															
2013	Trichloronate	µg/L	NA															
PCB Congeners																		
2013	PCB-8	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-18	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-28	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-44	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-52	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-66	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-77	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-81	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-101	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-105	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-114	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-118	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-123	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-126	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-128	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-138	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-153	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-156	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-157	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-167	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-169	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-170	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-180	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-187	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-189	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-195	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-206	µg/L	0.014 (d)	16. 40 CFR 131.38														
2013	PCB-209	µg/L	0.014 (d)	16. 40 CFR 131.38														

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Historical Monitoring Data													
					2005-2006			2006-2007			2007-2008	2008-2009	2009-2010		2010-2011	2011-2012		2012-2013
					10/18/05	01/02/06	02/19/06	10/14/06	01/30/07	02/19/07	-	10/05/08	11/28/09	02/06/10	-	10/05/11-10/06/11	02/07/12	-
Polynuclear Aromatic Hydrocarbons											No Sample Collected				No Sample Collected			No Sample Collected
2013	1-Methylnaphthalene	µg/L	NA															
2013	1-Methylphenanthrene	µg/L	NA															
2013	2,6-Dimethylnaphthalene	µg/L	NA															
2013	2-Methylnaphthalene	µg/L	NA															
2013	Acenaphthene	µg/L	NA															
2013	Acenaphthylene	µg/L	NA															
2013	Anthracene	µg/L	NA															
2013	Benzo (a) anthracene	µg/L	NA															
2013	Benzo (a) pyrene	µg/L	NA															
2013	Benzo (b) fluoranthene	µg/L	NA															
2013	Benzo (e) pyrene	µg/L	NA															
2013	Benzo (g,h,i) perylene	µg/L	NA															
2013	Benzo (k) fluoranthene	µg/L	NA															
2013	Biphenyl	µg/L	NA															
2013	Chrysene	µg/L	NA															
2013	Dibenzo (a,h) anthracene	µg/L	NA															
2013	Fluoranthene	µg/L	NA															
2013	Fluorene	µg/L	NA															
2013	Indeno (1,2,3-cd) pyrene	µg/L	NA															
2013	Naphthalene	µg/L	NA															
2013	Perylene	µg/L	NA															
2013	Phenanthrene	µg/L	NA															
2013	Pyrene	µg/L	NA															
Pyrethroids																		
2007, 2013	Allethrin	µg/L	NA									<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006								<0.002	<0.0005	**0.0358B**		<0.002	0.009	
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004								<0.002	<0.0005	0.0179		<0.002	0.0142	
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004								<0.002	<0.0005	0.0264		<0.002	<0.002	
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004								<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA									<0.002	<0.0005	0.0009J		<0.002	<0.002	
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA									<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004								<0.002	<0.0005	0.0022		<0.002	<0.002	
2007, 2013	Fenvalerate	µg/L	NA									<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Fluvalinate	µg/L	NA									<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006								<0.025*	<0.005	<0.005		<0.025[††]	<0.025[††]	
2007, 2013	Prallethrin	µg/L	NA									<0.002	<0.0005	<0.0005		<0.002	<0.002	
2007, 2013	Resmethrin	µg/L	NA									<0.025	<0.005			<0.025	<0.025	
Toxicity																		
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100		>100	>100	>100		>100	>100	
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	100	100	100	100	100		100	100	100		100	100	
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		100	100	100	**6.25**	100	100		**50**	**50**	100		**50**	100	
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	>100	>100	>100	>100	>100		>100	>100	>100		>100	>100	
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	100	100	100	100	100		**50**	**50**	100		**50**	**50**	
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail															

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2013-2014			2014-2015		
					10/10/13	12/07/13-12/08/13	02/07/14	-		
Physical Chemistry										
2013	Dissolved Oxygen	mg/L	<5.0 (a)		5.58	8.89	5.47	No Sample Collected	0%	NA[1]
2007, 2013	pH	pH units	6.5-9.0	1. Basin Plan	7.64	7.63	7.48		0%	0.24
2007, 2013	Specific Conductivity	µmhos/cm	NA		4,854	2,450	5,107			
2007, 2013	Water Temperature	Celsius	NA		15.7	12.65	13.77			
2013	Color	Color units			**50**	**25**	**30**		100%	NA[1]
2007, 2013	Turbidity	NTU	20	1. Basin Plan	2.1	**52.5**	**26.8**		38%	1.18
Bacteriological										
2007, 2013	Enterococcus	MPN/100 mL	NA		330	28,000	490			
2007, 2013	Fecal Coliform	MPN/100 mL	4,000	1.Basin Plan REC-1/REC-2	330	**17,000**	<18		38%	3.57
2007, 2013	Total Coliform	MPN/100 mL	NA		7,900	110,000	13,000			
Nutrients										
2007, 2013	Ammonia as N	mg/L	(b)	6. USEPA Water Quality Criteria (Freshwater)	0.18	<0.10	<0.10		0%	0.01
2007, 2013	Nitrate as N	mg/L	10	1. Basin Plan	0.25	0.44	0.22		0%	0.07
2007, 2013	Nitrite as N	mg/L	1	1. Basin Plan	0.032J	<0.10	0.026J		0%	0.04
2007, 2013	Total Kjeldahl Nitrogen	mg/L	NA		0.7	0.54	0.67			
2007	Dissolved Phosphorus	mg/L	2	4. MSGP 2015	0.22	NR	0.11		0%	0.11
2013	Orthophosphate	mg/L	NA		0.18	0.13	0.11			
2007, 2013	Total Phosphorus	mg/L	2	4. MSGP 2015	0.23	0.16	0.13		0%	0.15
General Chemistry										
2007, 2013	Biochemical Oxygen Demand	mg/L	30	4. MSGP 2015, 8. McNeeley (1979)	<2.0	NR	6.2		12%	0.47
2007	Chemical Oxygen Demand	mg/L	120	4. MSGP 2015	36	NR	29		4%	0.52
2007, 2013	Dissolved Organic Carbon	mg/L	NA		9.8	8.6	6.6			
2007, 2013	Total Organic Carbon	mg/L	NA		9.8	8.2	6.4			
2007, 2013	Oil and Grease	mg/L	10	1. Basin Plan, 3. Anacostia River TMDL, 4. MSGP 2015	2.4J	NR	1.8J		4%	0.23
2013	Sulfate	mg/L	500 (a)	1. Basin Plan	430	210	420		0%	NA[1]
2007, 2013	Surfactants (MBAS)	mg/L	0.5	1. Basin Plan	0.096	0.1	0.084		0%	0.36
2007, 2013	Total Dissolved Solids	mg/L	1,500 (a)	1. Basin Plan	**3,000**	**2,800**	**2,900**		77%	1.40
2007, 2013	Total Suspended Solids	mg/L	100	4. MSGP 2015, 1. Basin Plan	28	13	4		8%	0.30
2007, 2013	Total Hardness	mg $CaCO_3$/L	NA		1,240	1,150	1,260			
Total Metals										
2013	Aluminum	mg/L	NA		0.88	0.39	0.033			
2007	Antimony	mg/L	NA		0.0006	NR	0.00021J			
2007, 2013	Arsenic	mg/L	NA		0.0016	0.0016	0.0014			
2007, 2013	Cadmium	mg/L	NA		0.000070J	0.000040J	0.000028J			
2007, 2013	Chromium	mg/L	NA		0.0016	0.0029	0.00015J			
2007, 2013	Copper	mg/L	NA		0.007	0.0052	0.0012			
2013	Iron	mg/L	0.3 (a)	1. Basin Plan	**1.3**	**0.63**	0.1		67%	NA[1]
2007, 2013	Lead	mg/L	NA		0.0022	0.0011	0.000089J			
2013	Manganese	mg/L	0.05 (a)	1. Basin Plan	**0.16**	**0.12**	**0.14**		100%	NA[1]
2013	Mercury	mg/L	NA		<0.000050	0.000032J	<0.000050			
2007, 2013	Nickel	mg/L	NA		0.002	0.0079	0.006			
2007, 2013	Selenium	mg/L	0.005	16. 40 CFR 131.38	0.00022J	0.00082	0.0023		0%	0.35
2013	Thallium	mg/L	NA		<0.00020	<0.00020	<0.00020			
2007, 2013	Zinc	mg/L	NA		0.029	0.014	0.0033J			
Dissolved Metals										
2013	Aluminum	mg/L	NA		0.0025J	<0.0050	<0.0050			
2007	Antimony	mg/L	0.006	1. Basin Plan	0.00026J	NR	0.00022J		0%	0.29
2007, 2013	Arsenic	mg/L	0.34	16. 40 CFR 131.38	0.0013	0.0015	0.0013		0%	0.01
2007, 2013	Cadmium	mg/L	(c)	16. 40 CFR 131.38	0.000050J	0.000027J	0.000028J		0%	0.02
2007, 2013	Chromium	mg/L	(c)	16. 40 CFR 131.38	0.00063	0.0022	0.00014J		0%	0.00
2007, 2013	Copper	mg/L	(c)	16. 40 CFR 131.38	0.0038	0.0036	0.0017		0%	0.09
2013	Iron	mg/L	NA		<0.010	<0.010	0.01			
2007, 2013	Lead	mg/L	(c)	16. 40 CFR 131.38	<0.00020	<0.00020	<0.00020		0%	0.00
2013	Manganese	mg/L	NA		0.0018	0.001	0.11			
2013	Mercury	mg/L	NA		<0.000050	0.000030J	<0.000050			
2007, 2013	Nickel	mg/L	(c)	16. 40 CFR 131.38	0.0015	0.0071	0.0074		0%	0.00
2007, 2013	Selenium	mg/L	NA		0.00021J	0.00076	0.0018			
2013	Thallium	mg/L	NA		<0.00020	<0.00020	<0.00020			
2007, 2013	Zinc	mg/L	(c)	16. 40 CFR 131.38	0.013	0.005	0.0042J		0%	0.04

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2013-2014			2014-2015		
					10/10/13	12/07/13-12/08/13	02/07/14	-		
Chlorinated Pesticides										
2013	Chlordane (tech)	ug/L	2.4	16. 40 CFR 131.38	<0.10	<0.10	<0.10	No Sample Collected	0%	NA[1]
Organophosphorus Pesticides										
2013	Azinphos methyl (Guthion)	µg/L	NA		<0.010	<0.010	<0.010			
2013	Bolstar	µg/L	NA		<0.010	<0.010	<0.010			
2007, 2013	Chlorpyrifos	µg/L	0.02 acute / 0.014 chronic	12. CA Dept. of Fish & Game, 2000	<0.010	<0.010	<0.010		13%	0.50
2013	Coumaphos	µg/L	NA		<0.010	<0.010	<0.010			
2013	Demeton-o	µg/L	NA		<0.010	<0.010BS-L	<0.010			
2013	Demeton-s	µg/L	NA		<0.010	<0.010BS-L	<0.010			
2007, 2013	Diazinon	µg/L	0.08 acute / 0.05 chronic	12. CA Dept. of Fish & Game, 2000, 11. Chollas Creek TMDL for Diazinon, 10. USEPA, Aquatic Life Ambient Water Quality Criteria Diazinon	<0.010	<0.010	<0.010		23%	0.57
2013	Dichlorvos	µg/L	NA		<0.010	<0.010	<0.010			
2013	Dimethoate	µg/L	NA		<0.010	<0.010	<0.010			
2013	Disulfoton	µg/L	NA		<0.010	<0.010BS-L	<0.010			
2013	Ethoprop	µg/L	NA		<0.010	<0.010	<0.010			
2013	Ethyl parathion	µg/L	NA		<0.010	<0.010	<0.010			
2013	Fensulfothion	µg/L	NA		<0.010	<0.010	<0.010			
2013	Fenthion	µg/L	NA		<0.010	<0.010	<0.010			
2007, 2013	Malathion	µg/L	0.43	13. CA Dept. of Fish & Game, 1998, 5. Goldbook	<0.010	<0.010	<0.010		0%	0.11
2013	Merphos	µg/L	NA		<0.010	<0.010	<0.010			
2013	Methyl parathion	µg/L	NA		<0.010	<0.010	<0.010			
2013	Mevinphos	µg/L	NA		<0.010	<0.010	<0.010			
2013	Naled	µg/L	NA		<0.010BS-L	<0.010BS-L	<0.010			
2013	Phorate	µg/L	NA		<0.010	<0.010	<0.010			
2013	Ronnel	µg/L	NA		<0.010	<0.010	<0.010			
2013	Stirophos	µg/L	NA		<0.010	<0.010	<0.010			
2013	Tokuthion (Prothiofos)	µg/L	NA		<0.010	<0.010	<0.010			
2013	Trichloronate	µg/L	NA		<0.010	<0.010	<0.010			
PCB Congeners										
2013	PCB-8	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-18	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-28	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-44	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-52	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-66	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-77	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-81	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-101	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-105	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-114	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-118	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-123	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-126	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-128	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-138	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-153	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-156	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-157	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-167	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-169	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-170	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-180	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-187	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-189	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-195	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-206	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]
2013	PCB-209	µg/L	0.014 (d)	16. 40 CFR 131.38	<0.010	<0.010	<0.010		0%	NA[1]

Wet Weather Historical Monitoring Table for SR-MLS

Permit Requirement	Analyte	Units	Water Quality Benchmarks	Benchmark Reference	Long Term and Transitional Monitoring	Long Term Monitoring	Long Term and Transitional Monitoring	Long Term and Transitional Monitoring	Frequency Above Benchmarks	Mean Ratio to Benchmarks
					2013-2014			2014-2015		
					10/10/13	12/07/13-12/08/13	02/07/14	-		
Polynuclear Aromatic Hydrocarbons								No Sample Collected		
2013	1-Methylnaphthalene	µg/L	NA		<0.10	<0.10	<0.10			
2013	1-Methylphenanthrene	µg/L	NA		<0.10	<0.10	<0.10			
2013	2,6-Dimethylnaphthalene	µg/L	NA		<0.10	<0.10	<0.10			
2013	2-Methylnaphthalene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Acenaphthene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Acenaphthylene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Anthracene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Benzo (a) anthracene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Benzo (a) pyrene	µg/L	NA		<0.10BS-L	<0.10	<0.10			
2013	Benzo (b) fluoranthene	µg/L	NA		<0.10BS-L	<0.10	<0.10			
2013	Benzo (e) pyrene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Benzo (g,h,i) perylene	µg/L	NA		<0.10BS-L	<0.10	<0.10			
2013	Benzo (k) fluoranthene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Biphenyl	µg/L	NA		<0.10	<0.10	<0.10			
2013	Chrysene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Dibenzo (a,h) anthracene	µg/L	NA		<0.10BS-L	<0.10	<0.10			
2013	Fluoranthene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Fluorene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Indeno (1,2,3-cd) pyrene	µg/L	NA		<0.10BS-L	<0.10BS-L	<0.10			
2013	Naphthalene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Perylene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Phenanthrene	µg/L	NA		<0.10	<0.10	<0.10			
2013	Pyrene	µg/L	NA		<0.10	<0.10	<0.10			
Pyrethroids										
2007, 2013	Allethrin	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Bifenthrin	µg/L	0.0093	15. Anderson et al., 2006	0.0021	0.0013J	<0.002		20%	1.01
2007, 2013	Cyfluthrin	µg/L	0.344	17. Wheelock et al., 2004	<0.002	<0.002	<0.002		0%	0.02
2007, 2013	Cyhalothrin, Total Lambda	µg/L	0.20	17. Wheelock et al., 2004	0.001J	<0.002	<0.002		0%	0.06
2007, 2013	Cypermethrin	µg/L	0.683	17. Wheelock et al., 2004	<0.002	<0.002	<0.002		0%	0.00
2007, 2013	Danitol (Fenpropathrin)	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Deltamethrin/Tralomethrin[£]	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Esfenvalerate	µg/L	0.25	17. Wheelock et al., 2004	<0.002	<0.002	<0.002		0%	0.00
2007, 2013	Fenvalerate	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Fluvalinate	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Permethrin	µg/L	0.021	15. Anderson et al., 2006	<0.01	<0.01	<0.01		0%	0.21
2007, 2013	Prallethrin	µg/L	NA		<0.002	<0.002	<0.002			
2007, 2013	Resmethrin	µg/L	NA		<0.01	<0.01	<0.01			
Toxicity										
2007, 2013	*Ceriodaphnia* 96-hr	LC_{50} (%)	>100		>100	NR	>100		13%	1.05
2007, 2013	*Ceriodaphnia* 7-day survival	NOEC (%)	100		100	NR	100		13%	1.30
2007, 2013	*Ceriodaphnia* 7-day reproduction	NOEC (%)	100		**50**	NR	**50**		39%	2.26
2007	*Hyalella* 96-hr	LC_{50} (%)	>100		>100	NR	>100		0%	1.00
2007, 2013	*Selenastrum* 96-hr	NOEC (%)	100		**50**	NR	**25**		48%	1.83
2013	*Strongylocentrotus* 96-hr	TST	Pass/Fail		Pass	Pass	Pass		0%	

See last page for footnotes and source references.

Wet Weather Historical Monitoring Table for SR-MLS

Blank spaces have been verified and no data is available.

(a) Water Quality Benchmark are based on the San Diego Regional Water Quality Control Plan by watershed for the San Diego Region (Basin Plan), 1994 (with amendments effective on or before April 4, 2011).
(b) Prior to the 2014-2015 monitoring year, Water Quality Benchmark was calculated based on CMC (salmonids absent) using pH described in the U.S. EPA, 1999 Update of Ambient Water Quality Criteria for Ammonia, EPA-822-R-99-014, December 1999. For 2014-2015 monitoring year, Water Quality Benchmark CMC was calculated based on pH and water temperature (when applicable) as described in the U.S. EPA, 2013 Aquatic Life Ambient Water Quality Criteria for Ammonia - Freshwater, EPA-822-R-13-001, April 2013.
(c) Water Quality Benchmark for dissolved metal fractions are based on total hardness and are calculated as described by the USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000. The Criteria Maximum Concentration (CMC) was used.
(d) Water Quality Benchmark for PCBs is the Criteria Continuous Concentration (CCC) was used (USEPA Federal Register Doc. 40 CFR Part 131, May 18, 2000). There is no Criteria Maximum Concentration (CMC) for PCBS.
NA indicate no criteria or published value was available or applicable to the matrix or program.
* Indicates detection limit above water quality benchmark.
† Result was from composite sample. The grab sample was analyzed outside of the holding time.
£ Historical results for Deltamethrin/Tralomethrin contain results reported by lab as Deltamethrin.
†† Permethrin was non-detect at the method detection limit of 0.005 µg/L.
B-Analyte was detected in the associated method blank.
BS-L-Blank Spike recovery of this analyte was below the control limits. Results may be biased low.
H-Sample received and or/analyzed past the recommended holding time.
J-Analyte was detected at a concentration below the reporting limit and above the method detection limit. Reported value is estimated.
NA[1] Three or more years of data required to calculate the Mean Ratio to Benchmark.
NR-Sampling of this analyte not required for transitional monitoring (RWQCB Order No. R9-2007-0001) and/or for long term monitoring (RWQCB Order No. R9-2013-0001).

Values with **red bold font and shading** do not meet Water Quality Benchmarks.

Sources
Please refer to the San Diego County Copermittee Regional Monitoring Program Benchmark Sources in Attachment B to Appendix A for benchmark source citations.

LabSampleID	StationCode	EventCode	ProtocolCode	LocationCode	SampleDate	CollectionTime	CollectionMethodCode	SampleTypeCode	Replicate	CollectionDepth	UnitCollectionDepth	ProjectCode	AgencyCode	CollectionComments	SampleID	PreparationPreservation	PreparationPreservationDate	DigestExtractMethod	DigestExtractDate
954525-002	909SWT01	WQ	Not Recorded	Not Recorded	04/May/2006	11:20	Water_Grab	grab	1	0.1	m	JDWM-2006	COSD_WPP		1806	Not Recorded	01/Jan/1950	Not Recorded	15/May/2006
967987-005	909SWT01	WQ	Not Recorded	Not Recorded	19/Jul/2007	12:40	Water_Grab	grab	1	0.1	m	JDWM-2007	COSD_WPP		2120	Not Recorded	01/Jan/1950	Not Recorded	28/Jul/2007
977450-003	909SWT01	WQ	Not Recorded	Not Recorded	28/Jul/2008	11:15	Water_Grab	grab	1	0.1	m	JDWM-2008	COSD_WPP		2455	Not Recorded	01/Jan/1950	Not Recorded	31/Jul/2008
983663-002	909SWT01	WQ	Not Recorded	Not Recorded	04/Jun/2009	10:10	Water_Grab	grab	1	0.1	m	JDWM-2009	COSD_WPP		2637	Not Recorded	01/Jan/1950	Not Recorded	10/Jun/2009
954525-002	909SWT01	WQ	Not Recorded	Not Recorded	04/May/2006	11:20	Water_Grab	grab	1	0.1	m	JDWM-2006	COSD_WPP		1806	Not Recorded	01/Jan/1950	Not Recorded	15/May/2006
967987-005	909SWT01	WQ	Not Recorded	Not Recorded	19/Jul/2007	12:40	Water_Grab	grab	1	0.1	m	JDWM-2007	COSD_WPP		2120	Not Recorded	01/Jan/1950	Not Recorded	28/Jul/2007
977450-003	909SWT01	WQ	Not Recorded	Not Recorded	28/Jul/2008	11:15	Water_Grab	grab	1	0.1	m	JDWM-2008	COSD_WPP		2455	Not Recorded	01/Jan/1950	Not Recorded	31/Jul/2008
983663-002	909SWT01	WQ	Not Recorded	Not Recorded	04/Jun/2009	10:10	Water_Grab	grab	1	0.1	m	JDWM-2009	COSD_WPP		2637	Not Recorded	01/Jan/1950	Not Recorded	10/Jun/2009
0505289-05	909SWT02	WQ	Not Recorded	Not Recorded	19/May/2005	11:40	Water_Grab	grab	1	0.1	m	JDWM-2005	COSD_WPP		1324	Not Recorded	01/Jan/1950	EPA 3520B	22/May/2005
954525-004	909SWT02	WQ	Not Recorded	Not Recorded	04/May/2006	12:30	Water_Grab	grab	1	0.1	m	JDWM-2006	COSD_WPP		1808	Not Recorded	01/Jan/1950	Not Recorded	15/May/2006
967987-004	909SWT02	WQ	Not Recorded	Not Recorded	19/Jul/2007	11:45	Water_Grab	grab	1	0.1	m	JDWM-2007	COSD_WPP		2119	Not Recorded	01/Jan/1950	Not Recorded	28/Jul/2007
977450-004	909SWT02	WQ	Not Recorded	Not Recorded	28/Jul/2008	11:45	Water_Grab	grab	1	0.1	m	JDWM-2008	COSD_WPP		2456	Not Recorded	01/Jan/1950	Not Recorded	31/Jul/2008
983663-003	909SWT02	WQ	Not Recorded	Not Recorded	04/Jun/2009	11:00	Water_Grab	grab	1	0.1	m	JDWM-2009	COSD_WPP		2638	Not Recorded	01/Jan/1950	Not Recorded	10/Jun/2009
0505289-05	909SWT02	WQ	Not Recorded	Not Recorded	19/May/2005	11:40	Water_Grab	grab	1	0.1	m	JDWM-2005	COSD_WPP		1324	Not Recorded	01/Jan/1950	EPA 3520B	22/May/2005
954525-004	909SWT02	WQ	Not Recorded	Not Recorded	04/May/2006	12:30	Water_Grab	grab	1	0.1	m	JDWM-2006	COSD_WPP		1808	Not Recorded	01/Jan/1950	Not Recorded	15/May/2006
967987-004	909SWT02	WQ	Not Recorded	Not Recorded	19/Jul/2007	11:45	Water_Grab	grab	1	0.1	m	JDWM-2007	COSD_WPP		2119	Not Recorded	01/Jan/1950	Not Recorded	28/Jul/2007
977450-004	909SWT02	WQ	Not Recorded	Not Recorded	28/Jul/2008	11:45	Water_Grab	grab	1	0.1	m	JDWM-2008	COSD_WPP		2456	Not Recorded	01/Jan/1950	Not Recorded	31/Jul/2008
983663-003	909SWT02	WQ	Not Recorded	Not Recorded	04/Jun/2009	11:00	Water_Grab	grab	1	0.1	m	JDWM-2009	COSD_WPP		2638	Not Recorded	01/Jan/1950	Not Recorded	10/Jun/2009
954525-001	909SWt03	WQ	Not Recorded	Not Recorded	04/May/2006	10:50	Water_Grab	grab	1	0.1	m	JDWM-2006	COSD_WPP		1805	Not Recorded	01/Jan/1950	Not Recorded	15/May/2006
967987-001	909SWT03	WQ	Not Recorded	Not Recorded	19/Jul/2007	10:10	Water_Grab	grab	1	0.1	m	JDWM-2007	COSD_WPP		2116	Not Recorded	01/Jan/1950	Not Recorded	28/Jul/2007
967987-002	909SWT03	WQ	Not Recorded	Not Recorded	19/Jul/2007	10:15	Water_Grab	FieldBLDup	2	0.1	m	JDWM-2007	COSD_WPP		2117	Not Recorded	01/Jan/1950	Not Recorded	28/Jul/2007
977450-001	909SWT03	WQ	Not Recorded	Not Recorded	28/Jul/2008	10:15	Water_Grab	grab	1	0.1	m	JDWM-2008	COSD_WPP		2453	Not Recorded	01/Jan/1950	Not Recorded	31/Jul/2008
977450-002	909SWT03	WQ	Not Recorded	Not Recorded	28/Jul/2008	10:20	Water_Grab	FieldBLDup	2	0.1	m	JDWM-2008	COSD_WPP		2454	Not Recorded	01/Jan/1950	Not Recorded	31/Jul/2008
983663-001	909SWT03	WQ	Not Recorded	Not Recorded	04/Jun/2009	9:45	Water_Grab	grab	1	0.1	m	JDWM-2009	COSD_WPP		2636	Not Recorded	01/Jan/1950	Not Recorded	10/Jun/2009
954525-001	909SWt03	WQ	Not Recorded	Not Recorded	04/May/2006	10:50	Water_Grab	grab	1	0.1	m	JDWM-2006	COSD_WPP		1805	Not Recorded	01/Jan/1950	Not Recorded	15/May/2006
967987-001	909SWT03	WQ	Not Recorded	Not Recorded	19/Jul/2007	10:10	Water_Grab	grab	1	0.1	m	JDWM-2007	COSD_WPP		2116	Not Recorded	01/Jan/1950	Not Recorded	28/Jul/2007
967987-002	909SWT03	WQ	Not Recorded	Not Recorded	19/Jul/2007	10:15	Water_Grab	FieldBLDup	2	0.1	m	JDWM-2007	COSD_WPP		2117	Not Recorded	01/Jan/1950	Not Recorded	28/Jul/2007

LabSampleID	StationCode	EventCode	ProtocolCode	LocationCode	SampleDate	CollectionTime	CollectionMethodCode	SampleTypeCode	Replicate	CollectionDepth	UnitCollectionDepth	ProjectCode	AgencyCode	CollectionComments	SampleID	PreparationPreservation	PreparationPreservationDate	DigestExtractMethod	DigestExtractDate
977450-001	909SWT03	WQ	Not Recorded	Not Recorded	28/Jul/2008	10:15	Water_Grab	grab	1	0.1	m	JDWM-2008	COSD_WPP		2453	Not Recorded	01/Jan/1950	Not Recorded	31/Jul/2008
977450-002	909SWT03	WQ	Not Recorded	Not Recorded	28/Jul/2008	10:20	Water_Grab	FieldBLDup	2	0.1	m	JDWM-2008	COSD_WPP		2454	Not Recorded	01/Jan/1950	Not Recorded	31/Jul/2008
983663-001	909SWT03	WQ	Not Recorded	Not Recorded	04/Jun/2009	9:45	Water_Grab	grab	1	0.1	m	JDWM-2009	COSD_WPP		2636	Not Recorded	01/Jan/1950	Not Recorded	10/Jun/2009
0505289-03	909SWT05	WQ	Not Recorded	Not Recorded	19/May/2005	11:05	Water_Grab	FieldBLDup	2	0.1	m	JDWM-2005	COSD_WPP		1323	Not Recorded	01/Jan/1950	EPA 3520B	22/May/2005
954525-003	909SWT05	WQ	Not Recorded	Not Recorded	04/May/2006	12:00	Water_Grab	grab	1	0.1	m	JDWM-2006	COSD_WPP		1807	Not Recorded	01/Jan/1950	Not Recorded	15/May/2006
967987-003	909SWT05	WQ	Not Recorded	Not Recorded	19/Jul/2007	11:15	Water_Grab	grab	1	0.1	m	JDWM-2007	COSD_WPP		2118	Not Recorded	01/Jan/1950	Not Recorded	28/Jul/2007
977450-005	909SWT05	WQ	Not Recorded	Not Recorded	28/Jul/2008	12:30	Water_Grab	grab	1	0.1	m	JDWM-2008	COSD_WPP		2457	Not Recorded	01/Jan/1950	Not Recorded	31/Jul/2008
983663-004	909SWT05	WQ	Not Recorded	Not Recorded	04/Jun/2009	11:35	Water_Grab	grab	1	0.1	m	JDWM-2009	COSD_WPP		2639	Not Recorded	01/Jan/1950	Not Recorded	10/Jun/2009
0505289-03	909SWT05	WQ	Not Recorded	Not Recorded	19/May/2005	11:05	Water_Grab	FieldBLDup	2	0.1	m	JDWM-2005	COSD_WPP		1323	Not Recorded	01/Jan/1950	EPA 3520B	22/May/2005
954525-003	909SWT05	WQ	Not Recorded	Not Recorded	04/May/2006	12:00	Water_Grab	grab	1	0.1	m	JDWM-2006	COSD_WPP		1807	Not Recorded	01/Jan/1950	Not Recorded	15/May/2006
967987-003	909SWT05	WQ	Not Recorded	Not Recorded	19/Jul/2007	11:15	Water_Grab	grab	1	0.1	m	JDWM-2007	COSD_WPP		2118	Not Recorded	01/Jan/1950	Not Recorded	28/Jul/2007
977450-005	909SWT05	WQ	Not Recorded	Not Recorded	28/Jul/2008	12:30	Water_Grab	grab	1	0.1	m	JDWM-2008	COSD_WPP		2457	Not Recorded	01/Jan/1950	Not Recorded	31/Jul/2008
983663-004	909SWT05	WQ	Not Recorded	Not Recorded	04/Jun/2009	11:35	Water_Grab	grab	1	0.1	m	JDWM-2009	COSD_WPP		2639	Not Recorded	01/Jan/1950	Not Recorded	10/Jun/2009

LabSampleID	StationCode	LabBatch	AnalysisDate	LabReplicate	MatrixName	MethodName	AnalyteName	FractionName	Unit	DilFactor	Result	ResultQualCode	MDL	RL	QACode	ExpectedValue	LabResultComments
954525-002	909SWT01	TRU_705844_W_OP	15/May/2006	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
967987-005	909SWT01	TRU_706800_W_OP	28/Jul/2007	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
977450-003	909SWT01	TRU_707617_W_OP	31/Jul/2008	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
983663-002	909SWT01	TRU_708235_W_OP	10/Jun/2009	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
954525-002	909SWT01	TRU_705844_W_OP	15/May/2006	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
967987-005	909SWT01	TRU_706800_W_OP	28/Jul/2007	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
977450-003	909SWT01	TRU_707617_W_OP	31/Jul/2008	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
983663-002	909SWT01	TRU_708235_W_OP	10/Jun/2009	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
0505289-05	909SWT02	EMA_5052201_W_OP	23/May/2005	1	Samplewater	EPA 8141A	Chlorpyrifos	None	ug/l	1	-88	ND	0.04	0.05	None		
954525-004	909SWT02	TRU_705844_W_OP	15/May/2006	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
967987-004	909SWT02	TRU_706800_W_OP	28/Jul/2007	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
977450-004	909SWT02	TRU_707617_W_OP	31/Jul/2008	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
983663-003	909SWT02	TRU_708235_W_OP	10/Jun/2009	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
0505289-05	909SWT02	EMA_5052201_W_OP	23/May/2005	1	Samplewater	EPA 8141A	Diazinon	None	ug/l	1	-88	ND	0.04	0.05	None		
954525-004	909SWT02	TRU_705844_W_OP	15/May/2006	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
967987-004	909SWT02	TRU_706800_W_OP	28/Jul/2007	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
977450-004	909SWT02	TRU_707617_W_OP	31/Jul/2008	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
983663-003	909SWT02	TRU_708235_W_OP	10/Jun/2009	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
954525-001	909SWt03	TRU_705844_W_OP	15/May/2006	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
967987-001	909SWT03	TRU_706800_W_OP	28/Jul/2007	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
967987-002	909SWT03	TRU_706800_W_OP	28/Jul/2007	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
977450-001	909SWT03	TRU_707617_W_OP	31/Jul/2008	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
977450-002	909SWT03	TRU_707617_W_OP	31/Jul/2008	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
983663-001	909SWT03	TRU_708235_W_OP	10/Jun/2009	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
954525-001	909SWt03	TRU_705844_W_OP	15/May/2006	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
967987-001	909SWT03	TRU_706800_W_OP	28/Jul/2007	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
967987-002	909SWT03	TRU_706800_W_OP	28/Jul/2007	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		

LabSampleID	StationCode	LabBatch	AnalysisDate	LabReplicate	MatrixName	MethodName	AnalyteName	FractionName	Unit	DilFactor	Result	ResultQualCode	MDL	RL	QACode	ExpectedValue	LabResultComments
977450-001	909SWT03	TRU_707617_W_OP	31/Jul/2008	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
977450-002	909SWT03	TRU_707617_W_OP	31/Jul/2008	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
983663-001	909SWT03	TRU_708235_W_OP	10/Jun/2009	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
0505289-03	909SWT05	EMA_5052201_W_OP	23/May/2005	1	Samplewater	EPA 8141A	Chlorpyrifos	None	ug/l	1	-88	ND	0.04	0.05	None		
954525-003	909SWT05	TRU_705844_W_OP	15/May/2006	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
967987-003	909SWT05	TRU_706800_W_OP	28/Jul/2007	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
977450-005	909SWT05	TRU_707617_W_OP	31/Jul/2008	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
983663-004	909SWT05	TRU_708235_W_OP	10/Jun/2009	1	Samplewater	EPA 8081AM	Chlorpyrifos	None	ug/L	1	-88	ND	0.0076	0.05	None		
0505289-03	909SWT05	EMA_5052201_W_OP	23/May/2005	1	Samplewater	EPA 8141A	Diazinon	None	ug/l	1	-88	ND	0.04	0.05	None		
954525-003	909SWT05	TRU_705844_W_OP	15/May/2006	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
967987-003	909SWT05	TRU_706800_W_OP	28/Jul/2007	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
977450-005	909SWT05	TRU_707617_W_OP	31/Jul/2008	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		
983663-004	909SWT05	TRU_708235_W_OP	10/Jun/2009	1	Samplewater	EPA 8081AM	Diazinon	None	ug/L	1	-88	ND	0.0072	0.05	None		

StationCode	SampleDate	CollectionTime	CollectionMethodCode	SampleTypeCode	Replicate	CollectionDepth	UnitCollectionDepth	LabCollectionComments	LabBatch	AnalysisDate	MatrixName	MethodName	AnalyteName	FractionName	UnitName	LabReplicate	Result	ResQualCode	MDL	RL	QACode
KP-4	1/24/2014	11:10	Water_Grab	Grab	1	-88	cm		4012919	1/29/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2	1/24/2014	10:30	Water_Grab	Grab	1	-88	cm		4012919	1/29/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-3	1/24/2014	10:55	Water_Grab	Grab	1	-88	cm		4012919	1/29/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2	2/13/2014	16:00	Water_Grab	Grab	1	-88	cm	Field dup collected	4022029	2/20/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2	2/13/2014	15:55	Water_Grab	Grab	2	-88	cm		4022029	2/20/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-3	2/13/2014	15:30	Water_Grab	Grab	1	-88	cm		4022029	2/20/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	1.34	=	0.5	1	None
KP-4	2/13/2014	15:20	Water_Grab	Grab	1	-88	cm		4022029	2/20/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.99	DNQ	0.5	1	JDL
KP-3	2/27/2014	8:25	Water_Grab	Grab	1	-88	cm		4030529	3/6/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-4	2/27/2014	8:10	Water_Grab	Grab	1	-88	cm		4030529	3/6/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2.1	3/10/2014	12:45	Water_Grab	Grab	1	-88	cm		4031755	3/17/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2.2	3/10/2014	12:30	Water_Grab	Grab	1	-88	cm		4031755	3/17/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-3	3/10/2014	12:20	Water_Grab	Grab	1	-88	cm		4031755	3/17/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-4	3/10/2014	12:10	Water_Grab	Grab	1	-88	cm		4031755	3/17/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2	3/10/2014	12:55	Water_Grab	Grab	1	-88	cm		4031755	3/17/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-4	3/25/2014	11:00	Water_Grab	Grab	1	-88	cm		4033028	3/31/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2	3/25/2014	11:40	Water_Grab	Grab	1	-88	cm		4033028	3/31/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-3	3/25/2014	11:15	Water_Grab	Grab	1	-88	cm		4033028	3/31/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2.1	3/25/2014	11:35	Water_Grab	Grab	1	-88	cm		4033028	3/31/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2.2	3/25/2014	11:25	Water_Grab	Grab	1	-88	cm		4033028	3/31/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-3	4/2/2014	9:50	Water_Grab	Grab	1	-88	cm		4040820	4/9/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-4	4/2/2014	10:05	Water_Grab	Grab	1	-88	cm		4040820	4/9/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2.2	4/2/2014	9:32	Water_Grab	Grab	1	-88	cm		4040820	4/9/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2.1	4/2/2014	9:15	Water_Grab	Grab	1	-88	cm		4040820	4/9/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-3	4/29/2014	15:25	Water_Grab	Grab	1	-88	cm		4050523	5/5/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.63	DNQ	0.5	1	JDL
KP-4	4/29/2014	15:10	Water_Grab	Grab	1	-88	cm		4050523	5/5/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.69	DNQ	0.5	1	JDL
KP-2.2	4/29/2014	15:35	Water_Grab	Grab	1	-88	cm		4050523	5/5/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.89	DNQ	0.5	1	JDL
KP-2.1	4/29/2014	15:50	Water_Grab	Grab	1	-88	cm		4050523	5/5/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.77	DNQ	0.5	1	JDL
KP-2	4/29/2014	16:10	Water_Grab	Grab	1	-88	cm		4050523	5/5/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.71	DNQ	0.5	1	JDL
KP-2.1	5/22/2014	12:15	Water_Grab	Grab	1	-88	cm		4052304	5/27/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-4	5/22/2014	11:45	Water_Grab	Grab	1	-88	cm		4052304	5/27/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.86	DNQ	0.5	1	JDL
KP-3	5/22/2014	11:55	Water_Grab	Grab	1	-88	cm		4052304	5/27/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.79	DNQ	0.5	1	JDL
KP-2.2	5/22/2014	12:05	Water_Grab	Grab	1	-88	cm		4052304	5/27/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.51	DNQ	0.5	1	JDL
KP-2	5/22/2014	12:25	Water_Grab	Grab	1	-88	cm		4052304	5/27/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.52	DNQ	0.5	1	JDL
KP-4	6/4/2014	9:45	Water_Grab	Grab	1	-88	cm	Field dup collected	4060836	6/12/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-4	6/4/2014	9:50	Water_Grab	Grab	2	-88	cm		4060836	6/12/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2.1	6/4/2014	10:25	Water_Grab	Grab	1	-88	cm		4060836	6/12/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2	6/4/2014	10:35	Water_Grab	Grab	1	-88	cm		4060836	6/12/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-4	6/12/2014	14:10	Water_Grab	Grab	1	-88	cm	Field dup collected	4061623	6/17/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.6	DNQ	0.5	1	JDL

StationCode	SampleDate	CollectionTime	CollectionMethodCode	SampleTypeCode	Replicate	CollectionDepth	UnitCollectionDepth	LabCollectionComments	LabBatch	AnalysisDate	MatrixName	MethodName	AnalyteName	FractionName	UnitName	LabReplicate	Result	ResQualCode	MDL	RL	QACode
KP-4	6/12/2014	14:15	Water_Grab	Grab	2	-88	cm		4061623	6/17/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.51	DNQ	0.5	1	JDL
KP-3	6/12/2014	14:30	Water_Grab	Grab	1	-88	cm		4061623	6/17/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.65	DNQ	0.5	1	JDL
KP-2.2	6/12/2014	14:40	Water_Grab	Grab	1	-88	cm		4061623	6/17/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.96	DNQ	0.5	1	JDL
KP-2.1	6/12/2014	14:50	Water_Grab	Grab	1	-88	cm		4061623	6/17/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.63	DNQ	0.5	1	JDL
KP-2	6/12/2014	15:00	Water_Grab	Grab	1	-88	cm		4061623	6/17/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1	0.62	DNQ	0.5	1	JDL
KP-4	6/20/2014	11:20	Water_Grab	Grab	1	-88	cm	Field dup collected	4062223	6/23/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-4	6/20/2014	11:25	Water_Grab	Grab	2	-88	cm		4062223	6/23/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-3	6/20/2014	11:35	Water_Grab	Grab	1	-88	cm		4062223	6/23/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2.2	6/20/2014	11:45	Water_Grab	Grab	1	-88	cm		4062223	6/23/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2.1	6/20/2014	12:05	Water_Grab	Grab	1	-88	cm		4062223	6/23/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-2	6/20/2014	12:20	Water_Grab	Grab	1	-88	cm		4062223	6/23/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None
KP-3	7/9/2014	13:25	Water_Grab	Grab	1	-88	cm		4071536	7/15/2014	samplewater	EPA 200.8	Selenium	Total	ug/L	1		ND	0.5	1	None

CITY OF NATIONAL CITY

PARADISE CREEK SELENIUM MONITORING QUALITY ASSURANCE PROJECT PLAN

APRIL 2014

PREPARED FOR: CITY OF NATIONAL CITY
Engineering Department
1243 National City Boulevard
National City, CA 91950

PREPARED BY: D-MAX ENGINEERING, INC.
7220 Trade Street, Suite 119
San Diego, CA 92121
(858) 586-6600

CALIFORNIA NATIONAL CITY 1887 INCORPORATED

DMAX

GROUP A: PROJECT MANAGEMENT

1. APPROVAL SIGNATURES

Title:	Name (Affiliation):	Signature:	Date:
Project Manager	Stephen Manganiello (City of National City)		
D-MAX Project Manager	Arsalan Dadkhah (D-MAX Engineering, Inc.)		
Project Quality Assurance (QA) Officer	John Quenzer (D-MAX Engineering, Inc.)		

2. TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

ABBREVIATIONS AND ACRONYMS

µg/L	micrograms per liter
°C	Degrees Celsius
Basin Plan	Water Quality Control Plan for the San Diego Basin
BMP	Best Management Practice
CI	Confidence Interval
City	City of National City
CRM	Certified Reference Materials
CWA	Clean Water Act
D-MAX	D-MAX Engineering, Inc.
EC	Electrical Conductivity
ELAP	Environmental Laboratory Accreditation Program
EMA	EnviroMatrix Analytical, Inc.
EPA	U.S. Environmental Protection Agency
FS	Functional Sensitivity
GIS	Geographic Information Systems
mg/L	Milligrams per Liter
mS/cm	Millisiemens per Centimeter
PDL	Practical Detection Limit
PT	Proficiency Test
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
QAPrP	Quality Assurance Program Plan
RL	Reporting Limit
RPD	Relative Percent Difference
RWQCB	Regional Water Quality Control Board
SOP	Standard Operating Procedure
SWAMP	Surface Water Ambient Monitoring Program
SWRCB	State Water Resources Control Board
WQO	Water Quality Objective

3. DISTRIBUTION LIST

Title:	Name (Affiliation):	Telephone No.:	QAPP copies:
Project Manager	Stephen Manganiello (City of National City)	(619) 336-4382	1
D-MAX Project Manager	Arsalan Dadkhah (D-MAX Engineering, Inc.)	(858) 586-6600 x.22	1

4. PROJECT/TASK ORGANIZATION

4.1 Involved Parties and Roles

Table 1. (Element 4) Personnel Responsibilities

Name	Organizational Affiliation	Title	Contact Information (Telephone number, email address)
Stephen Manganiello	City of National City	Project Manager	(619) 336-4382 smanganiello@nationalcityca.gov
Arsalan Dadkhah	D-MAX Engineering, Inc.	D-MAX Project Manager	(858) 586-6600 arsalan@dmaxinc.com
John Quenzer	D-MAX Engineering, Inc.	QA Officer	(858) 586-6600 jquenzer@dmaxinc.com
Brianna Martin	D-MAX Engineering, Inc.	Field Activities Coordinator	(858) 586-6600 bmartin@dmaxinc.com
Jennifer Beyer	EnviroMatrix Analytical, Inc.	QA Director	(858) 560-7717 jbeyer@enviromatrixinc.com

4.2 Quality Assurance Officer Role

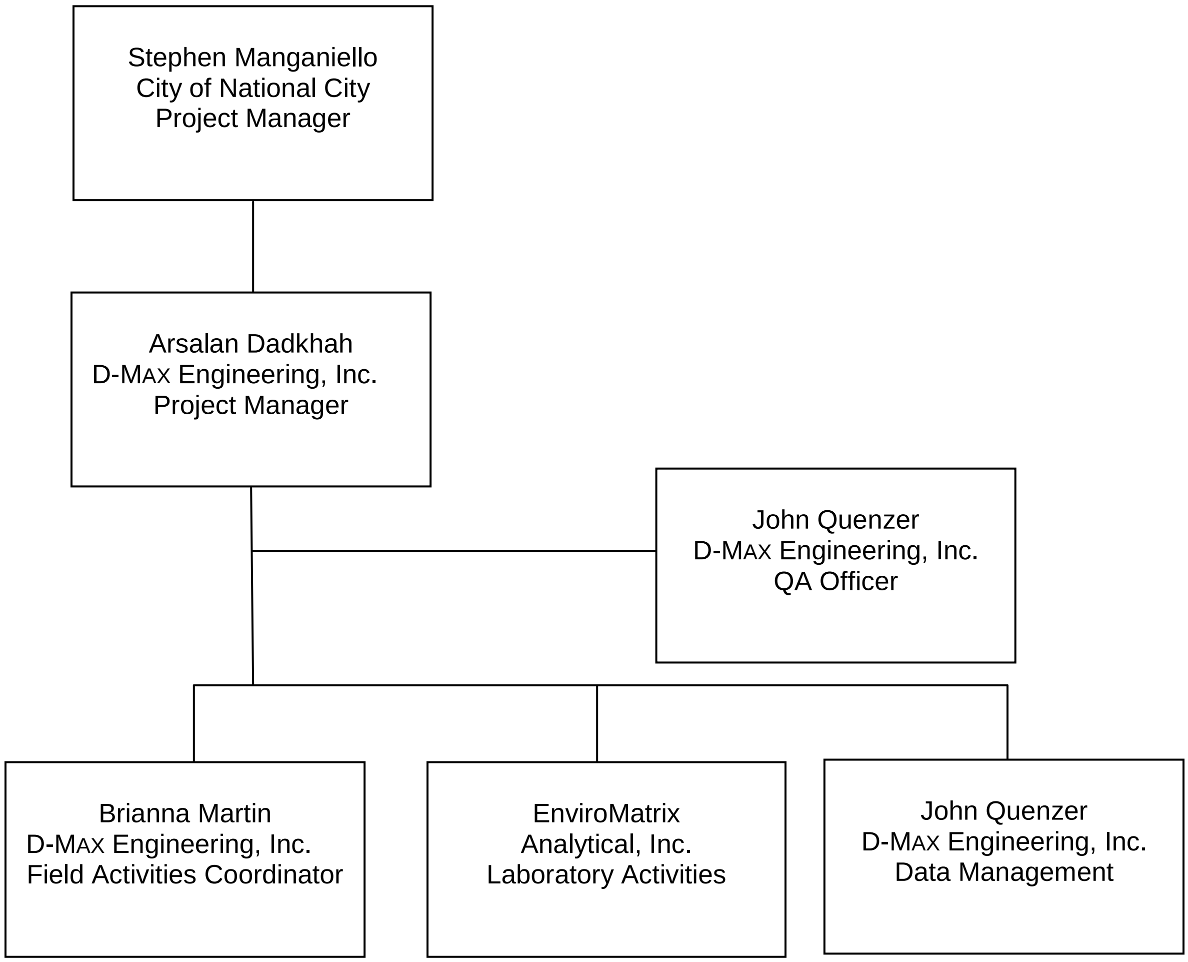
John Quenzer, with D-MAX Engineering, Inc. (D-MAX), will fill the role of the sampling QA Officer and is independent of data generation. This role will include maintaining the official, approved quality assurance and quality control (QA/QC) procedures found in this Quality Assurance Project Plan (QAPP) as part of the monitoring procedures. Mr. Quenzer will also work with Jennifer Beyer, the QA Director for EnviroMatrix Analytical, Inc. (EMA), by communicating all QA/QC issues contained in this QAPP to EMA.

4.3 Persons Responsible for QAPP Update and Maintenance

Changes and updates to this QAPP may be made after a review of the evidence for change by the City's Project Manager or by D-MAX'S Project Manager.

4.4 Organizational Chart and Responsibilities

Figure 1. Organizational Chart



5. PROBLEM DEFINITION/BACKGROUND

5.1 Problem Statement

Paradise Creek is on the 2010 Clean Water Act (CWA) 303(d) list of impaired water bodies with a selenium impairment. The Surface Water Ambient Monitoring Program (SWAMP) data collected in 2005 and 2006 indicated selenium results exceeded the water quality objective (WQO) of 5 µg/L in four of four samples. Beneficial uses of Paradise Creek include warm freshwater habitat, wildlife habitat, and non-contact water recreation. Elevated selenium levels pose a threat to warm freshwater habitat. While no Total Maximum Daily Load has been established for Paradise Creek, this water body is of great importance to the City of National City (City) since it runs through the center of the city, directly through Kimball Park at City Hall. Paradise Creek is one of the few urban creeks within the Pueblo San Diego Watershed (908.32) that has not been completely channelized or undergrounded. Paradise Creek is also tributary to Paradise Marsh, which is part of the Sweetwater Marsh National Wildlife Refuge.

5.2 Decisions or Outcomes

The objective of Paradise Creek selenium monitoring is to collect additional selenium data in the portion of the creek adjacent to Kimball Park within the City that would support the removal of the selenium 303(d) listing in the future.

According to the State Water Resources Control Board's *Water Quality Control Policy for Developing California's CWA Section 303(d) List* (2004) for toxicants, the pollutant/water segment combinations should be removed from the 303(d) list if the WQOs or California/National Toxics Rule water quality criteria are not exceeded as follows:

- Using the binomial distribution, waters shall be removed from the section 303(d) list if the number of measured exceedances supports rejection of the null hypothesis as presented in the table below.
- The binomial distribution cannot be used to support a delisting with sample sizes less than 28.

TABLE 4.1: MAXIMUM NUMBER OF MEASURED EXCEEDANCES ALLOWED TO REMOVE A WATER SEGMENT FROM THE SECTION 303(D) LIST FOR TOXICANTS.

Null Hypothesis: Actual exceedance proportion ≥ 18 percent.
Alternate Hypothesis: Actual proportion < 3 percent of the samples
The minimum effect size is 15 percent.

Sample Size	Delist if the number of exceedances equal or is less than
28 – 36	2
37 – 47	3
48 – 59	4
60 – 71	5
72 – 82	6
83 – 94	7
95 – 106	8
107 – 117	9
118 – 129	10

For sample sizes greater than 129, the maximum number of measured exceedances allowed is established where α and $\beta \leq 0.10$ and where $|\alpha - \beta|$ is minimized.

α = Excel® Function BINOMDIST(k, n, 0.18, TRUE)
β = Excel® Function BINOMDIST(n-k-1, n, 1 – 0.03, TRUE)
where n = the number of samples,
k = maximum number of measured exceedances allowed,
0.03 = acceptable exceedance proportion, and
0.18 = unacceptable exceedance proportion.

5.3 Water Quality or Regulatory Criteria

This monitoring is not performed in response to any specific regulatory requirement. However, the water samples collected during storm events will be compared to the pertinent WQOs, as listed in the Water Quality Control Plan for the San Diego Basin 9 (Basin Plan).

6. PROJECT/TASK DESCRIPTION

6.1 Work Statement and Produced Products

Monitoring will be conducted between January and June 2014 at five sites during dry and wet weather to represent various conditions of the creek. The five monitoring sites selected for this project are described below in Table 2.

The sites selected for monitoring are presented in Table 2, below, and Figure 3 at the end of this section displays a map of the sampling locations.

Table 2. (Element 6) Monitoring Locations

Site	Location	Latitude	Longitude
KP-2	Paradise Creek, adjacent to Kimball Park, east of footbridge (approximately 175 feet), within depressed area of channel	32.67036	-117.10223
KP-2.1	Paradise Creek, adjacent to Kimball Park, upstream of Site KP-2	32.67068	-117.1022
KP-2.2	Paradise Creek, adjacent to Kimball Park, upstream of Site KP-2.1	32.67099	-117.10201
KP-3	Paradise Creek, adjacent to Kimball Park, approximately 125 feet west of D Ave parking lot	32.67128	-117.10172
KP-4	Paradise Creek, adjacent to Kimball Park, just downstream of three outlet pipes/culvert (upstream-most point of creek segment adjacent to Kimball Park)	32.67146	-117.10133

6.2 Constituents to be Monitored and Measurement Techniques

Specific conductance will be measured with field meters at each site during dry or wet weather sampling. Results will only be used as an indication of tidal influence from the San Diego Bay and will not be otherwise reported. Samples will not be collected if there is evidence of tidal water at the five monitoring locations. Samples collected at each monitoring site will be transported to EMA, a laboratory certified by the California Department of Health Services, and will be analyzed for total selenium.

6.3 Project Schedule

Note that the project timeline, as shown in Table 3 below, is subject to change, based on work scheduling constraints. D-MAX is responsible for providing data and other supporting documentation for the monitoring component of this project to the City of National City.

Table 2. (Element 6) Project Schedule Timeline

Activity	Date of Initiation	Anticipated Date of Completion	Deliverable	Deliverable Due Date
Wet and dry weather sampling	January 2014	June 2014	Final monitoring report	July 2014
Upload monitoring data to CEDEN	June 2014	July 2014	N/A	N/A

6.4 Geographical Setting

The City of National City is located within the San Diego Bay Watershed and constitutes approximately 1.6 percent of its total area. More specifically, the City is located within two sub-watersheds: Sweetwater Pueblo San Diego and Sweetwater, hydrologic units 908 and 909, respectively. The majority of the southern part of National City drains to the Sweetwater River and ultimately discharges into San Diego Bay. La Paleta Creek (also known as 7th Street Channel) drains the northern part of the City and also discharges into San Diego Bay, while a very small western portion of the City drains directly to the San Diego Bay shoreline. Almost all areas of the City that drain directly to San Diego Bay are within the San Diego Unified Port District. Lastly, the central portion of the City drains to Paradise Creek, a small salt marsh creek, which ultimately discharges into the Sweetwater River. See Figure 2 at the end of this section for a map of the hydrologic subareas encompassing the City of National City.

6.5 Constraints

Constraints may include an abnormally dry wet season. In this case, wet weather sampling may not occur. Also, for safety purposes, wet weather sampling will be limited to daylight hours.

Figure 2. Watershed Map with Hydrologic Subareas

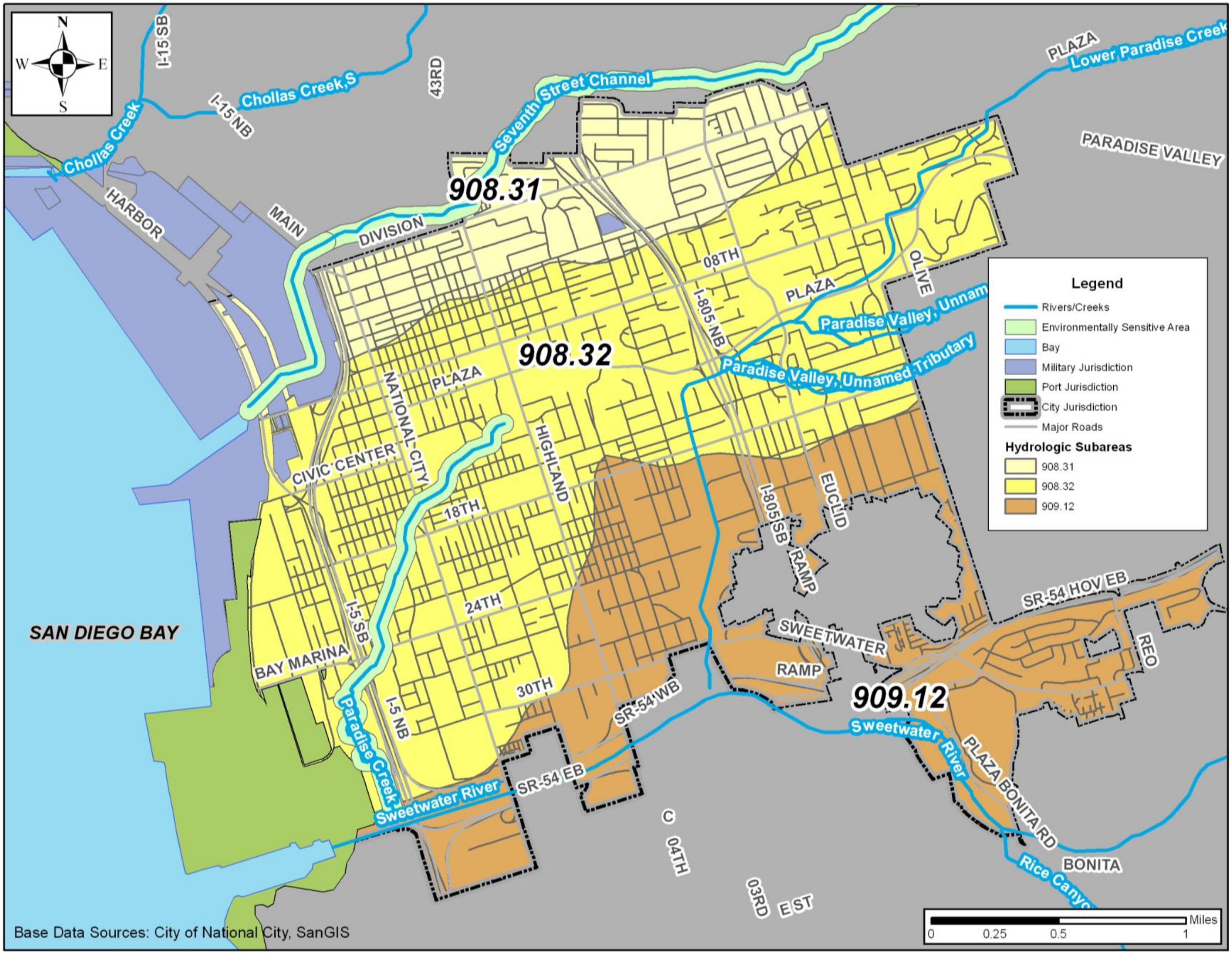


Figure 3. Monitoring Locations Map

Base Data Sources: ESRI, SanGIS, City of National City. See note in bottom right corner of map for additional information.

7. Quality Objectives and Criteria for Measurement Data

7.1 Data Quality Indicators

Measurement or Analyses Type	Applicable Data Quality Indicators
Field Measurement, Conventional Analytes in Water	Accuracy, Comparability, Completeness, Precision Representativeness, Sensitivity
Laboratory Analysis, Conventional Analytes in Water	Accuracy, Comparability, Completeness, Precision, Representativeness, Sensitivity

Attachment A includes in depth information about the laboratory assessments and controls for each data quality indicator.

Accuracy measures how close results are to a true or expected value. All instruments will be calibrated according to manufacturer instructions.

Bias is the misrepresentation of a set of data that systematically or persistently skews that data. These will be minimized through routine inspection and calibration of the automatic sampler and flow meter and duplicate samples will be collected at a rate of 5% for quality assurance.

Comparability is the extent to which data can be compared between periods of time within the project or between projects. To ensure comparability within and between years, monitoring conducted as part of this project will use the standardized sampling methods, analytical methods, and units of reporting described in this document.

Completeness is the difference between the planned amount of samples and data and the actual amount collected.

Precision is the degree of agreement among repeated measurements of the same characteristic.

Representativeness is the extent to which measurements actually represent the true condition at the time of sample collection.

Sensitivity is the capability of a method or instrument to discriminate between different levels of the variable of interest. Method sensitivity is dealt with by the inclusion of the required Surface Water Ambient Monitoring Program (SWAMP) Target Reporting Limits, where such values exist.

EMA will retain all QA/QC records for laboratory analyses and D-MAX will retain all QA/QC records for field measurements, including field duplicates of laboratory analyses.

7.2 Field and Laboratory Measurement Quality Objectives Tables

Table 3. (Element 7) Measurement Quality Objectives for Field Data

Group	Parameter	Accuracy	Precision	Recovery	Target Reporting Limit	Complete-ness
Field Measurement, Conventional Analytes in Water	Specific Conductivity (mS/cm)	± 2% of functional sensitivity 1% & 2% of range	± 2% of functional sensitivity 1% & 2% of range	N/A	0.01 mS/cm	No SWAMP requirement; will use 90%

Notes: Specific conductance will be measured with field meters at each site during dry or wet weather sampling, however, results will only be used as an indication of tidal influence from the San Diego Bay and will not be otherwise reported. FS = functional sensitivity; mS/cm = millisiemens per centimeter.

Table 4. (Element 7) Measurement Quality Objectives for Laboratory Data[1]

Group	Parameter	Accuracy	Precision	Recovery	Minimum Detection Limit	Target Reporting Limit	Complete-ness
Laboratory Analysis, Conventional Analytes in Water	Total selenium	Standard Reference Materials (SRM, CRM, PT) within 95% CI stated by provider of material	Laboratory duplicate 20% RPD.	Matrix spike 80% - 120%	0.5 µg/L	1.0 µg/L*	90%

Notes:
[1] Information in this table is based on SWAMP QAPrP 2013.
SRM= standard reference materials; CRM = certified reference materials; PT = proficiency test; CI = confidence interval; RPD = relative percent difference; µg/L = micrograms per Liter.
*Although the SWAMP target reporting limit is 0.30 µg/L for selenium, the lowest reporting limit EMA is capable of reliably achieving is 1.0 µg/L. Because the WQO for selenium is 5 µg/L, five times higher than the lab's minimum reporting limit and 10 times higher than the lab's MDL, this project's target reporting limit and minimum detection limit will be suitable for achieving the goals of this project.

8. Special Training/Certifications

8.1 Specialized Training or Certifications

All D-MAX staff members performing sampling are trained in proper sampling techniques under the supervision of project field managers. Training includes a review of the SWAMP standard operating procedures (SOPs) for field measurements and sample collection, detailed information on filling sample bottles for the various types of analysis, handling and storage, chain of custody procedures, GPS use, and sample site confirmation.

All laboratory analysis will be conducted by EMA, certified through the Environmental Laboratory Accreditation Program (ELAP #2564) of the California Department of Public Health (formerly the Department of Health Services, or DOHS). Details of EMA's training are discussed in Section 4 of their internal QA/QC plan and are available in Attachment A of this report.

8.2 Training and Certification Documentation

Documentation of field personnel training is maintained at D-MAX Engineering, Inc. Documentation of laboratory certification can be found in the EMA QA/QC plan, available from the laboratory upon request.

8.3 Training Personnel

There are no training personnel applicable to this project.

Table 5. (Element 8) Specialized Personnel Training or Certification

Specialized Training Course Title or Description	Training Provider	Personnel Receiving Training/ Organizational Affiliation	Location of Records & Certificates
Laboratory certification	California ELAP	EnviroMatrix Analytical, Inc.	Lab QA/QC document (Attachment A)

9. DOCUMENTATION AND RECORDS

D-MAX Engineering, Inc. will maintain all records for the field and laboratory sample analyses. Samples sent to EMA are accompanied by a chain of custody form. The laboratory generates records for sample receipt and storage, analyses, and reporting. The results of the laboratory analyses are transmitted to D-MAX in electronic form.

D-MAX will record all of the sampling data in an electronic database compatible with the SWAMP information management standards. Laboratory analytical reports will also be saved electronically as pdf and Excel files. All field and laboratory electronic files will be backed up within the D-MAX server continuously.

Records of field test results and observations, laboratory analytical reports, sampling locations and GPS coordinates, and photographs of sampling locations will be provided by D-MAX. Electronic and hard copies of this information will be available.

An electronic or hard copy of this QAPP and any updates made to the plan will be distributed to all parties involved. See Section 3 – Distribution List.

Table 6. (Element 9) Document and Record Retention, Archival, and Disposition Information

Records	Identify Type Needed	Retention	Archival	Disposition
Sample Collection Records	Field datasheets	Paper, Electronic (.pdf)	Paper file, Hard disk	5 years
	Chain of custody forms	Paper, Electronic (.pdf)	Paper file, Hard disk	5 years
Field Records	Field datasheets	Paper, Electronic (.pdf)	Paper file, Hard disk	5 years
	Site photographs	Electronic (.jpg)	Hard disk	5 years
Analytical Records	Laboratory reports	Electronic (.pdf)	Hard disk	5 years
	Chain of custody forms	Paper, Electronic (.pdf)	Paper file, Hard disk	5 years
Data Records	Analytical data	Electronic (.mdb or .xls)	Hard disk	5 years
	Field datasheets	Paper, Electronic (.pdf)	Hard disk	5 years
Assessment Records	Calibration log sheets	Paper, Electronic (.pdf)	Paper file, Hard disk	5 years
Data Analysis & Reports	Analysis of data	Electronic	Hard disk	5 years
	Monitoring reports	Electronic (.pdf)	Hard disk	5 years

GROUP B: DATA GENERATION AND ACQUISITION

10. SAMPLING PROCESS DESIGN

Approximately 50 grab samples will be collected by field personnel between January and June 2014, during dry and wet weather to represent various conditions of the creek. Since four samples collected from Paradise Creek have exceeded the WQO in the past, at least 48 samples must have selenium values below the WQO in order to remove the Paradise Creek from the CWA 303(d) list, according to the SWRCB's Water Quality Control Policy for Developing California's CWA Section 303(d) List.

Because Paradise Creek is tidally influenced, samples will only be collected at low tide to avoid sampling of seawater. Based on recent monitoring of low and high tide conditions of the creek, it is known that tidal influence is typically a major source of water at the lower end of the creek segment in question. Seawater has elevated conductivity and salinity that may interfere with the laboratory selenium testing, which would require sample dilution and therefore higher reporting limits. Higher reporting limits may result in data that is not useful for the stated purposes of this study. A tentative specific conductivity limit of 12 mS/cm has been set as a threshold for deciding whether collected samples should be submitted for laboratory analysis. Samples with conductivity values above this threshold will not be submitted for analysis due to a high possibility that significant dilution will be required, and the resultant data will not meet the selenium target reporting limit for this study.

11. SAMPLING METHODS

Field method SOPs are based on *Standard Operating Procedures for Conducting Field Measurements and Field Collections of Water and Bed Sediment Samples in SWAMP* (2007), SOP Procedure Number 1.0.

At each site visit, measurements of specific conductance will be performed once from a grab sample. These measurements will be taken in-situ, where feasible, otherwise a clean sample container, rinsed with distilled water and sample water, will be used. Grab samples will be collected for laboratory analysis for the analytes described in Table 8.

When collecting samples, field personnel will wear clean latex gloves to protect themselves and to prevent contamination of the samples. Samples will be collected by manual grab sampling at an approximate depth of six inches below the water surface, pointing the bottle opening upstream, and avoiding floating debris. In shallow water (less than six inches deep), bottles are filled from the surface of the flowing water. A sterile, triple-rinsed glass beaker, or syringe, may be used when flow depth is very shallow. Field datasheets are completed for each site visit.

Samples for laboratory analysis are stored in an ice cooler at ≤ 6 °C, in appropriate sample containers with appropriate preservatives. All samples are to be transported to the laboratory within the specified holding times. Samples will be acidified for preservation once the laboratory is in custody of the samples.

Table 8, on the following page, lists the analytical parameters assessed to represent water quality. Grab samples taken during wet weather conditions will be analyzed for the same list of parameters. If any of the samples cannot be taken or analyses cannot be performed for any reason, the QA/QC Officer will be notified. Any appropriate corrective actions will be documented.

Table 7. (Element 11) Sample Volumes, Methods, Preservation, and Holding Times

Analytical Parameter	Analytical Method	Minimum Sample Volume	Container Type	Preservation (chemical, temperature, light protected)	Maximum Holding Time
Specific conductance	N/A	N/A	Analyzed in field	N/A	N/A
Total selenium	EPA 200.8	500 mL	Polyethylene bottles	Cool to <6 °C and store in the dark. Acidify with HNO_3 to pH<2	6 months

Notes: N/A = not applicable; mL = milliliter

12. SAMPLE HANDLING AND CUSTODY

The samples collected during monitoring events are labeled with site location, date, sample time, analysis to be performed, sample preservation (if any) and field sampler's name. For each site visit, the time, date, site, and event type are recorded on a field datasheet (Attachment B). Sample containers are stored and transported at ≤ 6 °C in an ice cooler until processed. Samples are delivered to EMA within specific holding times (Table 8). An example chain-of-custody form is included in Appendix C of Attachment A.

13. ANALYTICAL METHODS AND FIELD MEASUREMENTS

Field and laboratory analytical methods are displayed in tables 9 and 10, respectively. The SOPs for the laboratory methods can be found in Attachment A. Laboratory analyses are performed in accordance with the approved method number listed.

Table 8. (Element 13) Field Analytical Methods

Analyte	Laboratory/ Organization	Analytical Method/SOP	Reporting Limit	Units
Specific Conductance	Field monitoring by D-MAX staff	Hanna Instruments HI 991301 Portable pH/EC/TDS/Temperature Meter	0.01	mS/cm

Notes: mg/L = milligrams per Liter; EC = electrical conductivity; TDS = total dissolved solids; mS/cm = millisiemens per centimeter

Table 9. (Element 13) Laboratory Analytical Methods

Analyte	Laboratory/ Organization	Analytical Method/ SOP	Minimum Detection Limit	Reporting Limit	Units
Total selenium	EMA	EPA 200.8	0.500	1.00	µg/L

Notes: µg/L = micrograms per Liter

14. QUALITY CONTROL

Quality control samples will be collected both in the field and in the lab to verify that valid data are recorded. Proper collection of all samples, using clean disposable gloves and appropriate clean containers and preservative, is primary in ensuring the quality of collected data. Field instruments will be calibrated prior to each day of sampling, and records will be retained by D-MAX Engineering, Inc. An example calibration log sheet is included in Attachment C.

Field duplicates help quantify intrinsic variability associated with sampling activities. Field duplicate samples will be used to replicate field measurements as well as laboratory analyses. Field duplicates are comprised of a second sample taken at a rate of 5%. There are no specific criteria for field duplicate variability, but these data are evaluated in the data analysis/assessment process.

Laboratory blanks, duplicates, matrix spikes and laboratory control standards are used to ensure proper sample handling, identify bias, check for consistent analysis of samples, and verify correct operation of laboratory equipment. All contract laboratory analysis will be performed in accordance with the guidelines of the QA/QC plan of EnviroMatrix Analytical, Inc.

Table 10. (Element 14) Sampling (Field) Quality Control

Matrix: Water		
Sampling SOP: SWAMP Procedure No. 1.0		
Analytical Parameter(s): Conventionals in Water		
Analytical Method/SOP Reference: N/A		
# Sample locations: All locations		
Field QC	**Frequency/Number per sampling event**	**Acceptance Limits**
Cooler Temperature	≤ 6 °C	0 – 6 °C
Field Duplicate	5%	RPD<25% (N/A if native concentration of either sample <RL)

Notes: RPD = relative percent difference; RL = reporting limit

Table 11. (Element 14) Analytical Quality Control

Matrix: Water		
Sampling SOP: SWAMP Procedure No. 1.0		
Analytical Parameter(s): Conventionals in Water		
Analytical Method/SOP Reference: N/A		
# Sample locations: All locations		
Laboratory QC	**Frequency/Number**	**Acceptance Limits**
Laboratory Blank	Per 20 samples or per analytical batch, whichever is more frequent	<RL for target analyte
Laboratory Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	RPD <25% (N/A if native concentration of either sample <RL)
Laboratory Matrix Spike	Per 20 samples or per analytical batch, whichever is more frequent	80-120% recovery
Matrix Spike Duplicate	Per 20 samples or per analytical batch, whichever is more frequent	80-120% recovery RPD <25% for duplicates

Notes: RPD = relative percent difference; RL = reporting limit

If any of the quality control acceptance limits are not met for field measurements or laboratory analysis, the corresponding batch of data will be flagged to be excluded from analysis and the QA Officer for the project will be notified. The QA Officer will determine whether to re-analyze the sample, if holding times have not been exceeded, or to re-sample at the monitoring location(s).

15. INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

Field measurement equipment will be checked for operation in accordance with the manufacturer's specifications prior to sampling. Duplicate or back-up equipment will be available to the field crew. Spare instruments and parts are kept in the field sampling vehicle, at the D-MAX or ADS office in the City of San Diego. Quality control for data collected in the field will be accomplished by proper calibration and care of the instruments used to take the readings and by proper handling of sampling equipment and containers, as described in Section 16 below.

EMA maintains its equipment in accordance with its QA Program Manual, included as Attachment A. Laboratory instrumentation will be calibrated and maintained by EMA staff under the direction of Jennifer Beyer, QA Director. All corrective actions are documented in logbooks for each instrument or piece of equipment. EMA maintains SOPs for each methodology or procedure used, which are standard EPA methods.

Table 12. (Element 15) Testing, Inspection, Maintenance of Sampling Equipment

Instrument/ Equipment	Maintenance Activity, Testing Activity or Inspection Activity	Responsible Person	Frequency	SOP Reference
Hanna Instruments HI 991301 Portable pH/EC/TDS/ Temperature Meter	Clean, inspect, check with conductivity solution, check/replace batteries	D-MAX field staff	Daily inspection and replacement as necessary	SWAMP Procedure Number 1.0
Field Camera	Clean, inspect, check/replace batteries	D-MAX field staff	Daily inspection and replacement as necessary	SWAMP Procedure Number 1.0

16. INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

The field meters will be calibrated and checked as recommended by the manufacturer. The sensors and membranes of field meters will be kept moist to preserve the instruments' accuracy during field work. EnviroMatrix Analytical, Inc. maintains calibration practices as part of its QA/QC procedures, included in Attachment A.

Table 13. (Element 16) Instrument/Equipment Calibration and Frequency.

Instrument/ Equipment	SOP Reference	Calibration Description and Criteria	Frequency of Calibration	Responsible Person
Hanna Instruments HI 991301 Portable pH/EC/TDS/Temp. Meter	SWAMP Procedure Number 1.0	Calibrate and check with EC 12.88 mS/cm solution	Calibrate and check before each field day, post-field check also for pH	D-MAX field staff

If a field instrument does not pass inspection, the instrument should be recalibrated following its manufacturer's cleaning and maintenance procedures. If measurements continue to fail measurement quality objectives, affected data should not be reported and the instrument should be returned to the manufacturer for maintenance. All troubleshooting and corrective actions should be recorded in the calibration and field data records.

17. INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

Supplies necessary for this project include calibration standard solutions, reagents, and sample collection bottles provided by EnviroMatrix Analytical, Inc. Upon receipt, all supplies are inspected for leaks or broken seals. Supplies are stored in accordance with manufacturer's recommendations in a secure location. If these chemicals do not meet the acceptance criteria or whenever they exceed their manufacturer recommended shelf life, they are disposed of appropriately and replaced. EnviroMatrix Analytical, Inc. maintains its laboratory supplies in accordance to their QA/QC procedures, included as Attachment A of this report.

Table 14. (Element 17) Inspection/Acceptance Testing Requirements for Consumables and Supplies

Project-Related Supplies/ Consumables	Inspection/Testing Specifications	Acceptance Criteria	Frequency	Responsible Individual
Calibration standard solutions	Check containers and seals for breakage; check expiration dates; ensure proper storage	Containers and seals intact; stored closed in proper conditions; shelf life not exceeded	Upon receipt and each use	D-MAX field staff
Reagents	Check containers and seals for breakage; check expiration dates; ensure proper storage	Containers and seals intact; stored closed in proper conditions; shelf life not exceeded	Upon receipt and each use	D-MAX field staff
Sample collection bottles	Check containers and seals for breakage; ensure proper storage	Containers and seals intact; stored closed in proper conditions	Upon receipt and each use	D-MAX field staff

18. NON-DIRECT MEASUREMENTS

Potential non-direct measurements may be made using historical data collected during previous years of creek monitoring. SWAMP data or data obtained from other agencies may also be used. In addition, photo documentation, topographical maps, land use maps, and hydrological maps generated from San Diego Association of Governments GIS database, may be used.

19. DATA MANAGEMENT

Field datasheets will be checked at the end of the sampling period by D-MAX field staff. Electronic data from EMA is also reviewed by D-MAX, following data entry, for completeness, accuracy, and errors in data entry or transcription. Data will be maintained as previously discussed in Element 9. All document and data hard copies will be retained in a project file, and all document and data electronic copies will be stored on a backed up hard disk at the office of D-MAX Engineering, Inc. EnviroMatrix Analytical will also retain records of all transmitted laboratory reports. Data collected from field and laboratory analysis will be formatted and entered into SWAMP's Information Management System by D-MAX.

GROUP C: ASSESSMENT AND OVERSIGHT

20. ASSESSMENTS AND RESPONSE ACTIONS

Laboratory data will be reviewed for consistency as they are received from the laboratory by D-MAX. D-MAX will also conduct an internal review of the collected field data as soon as the data is made available. Further, the City of National City Project Manager will review the data as reported by D-MAX according to the schedule of deliverables as delineated in Table 3. If a reviewer discovers any discrepancy, the reviewer will discuss the observed discrepancy with the appropriate person responsible for the activity (see Figure 1).

EMA has a defined process for corrective action outlined in their QA/QC Plan, which is included in Attachment A. In the case of a discrepancy in the data, the D-MAX QA Officer will consult with EMA and/or the City of National City Project Manager, as appropriate, to discuss whether the information collected is accurate, what were the cause(s) leading to the deviation, how the deviation might impact data quality, and what corrective actions might be considered. Depending on the type of discrepancy, corrective actions may include, but are not limited to, review of data entry practices, additional training for laboratory personnel, or re-sampling.

The City of National City Project Manager has the power to halt all sampling and analytical work if the deviation(s) noted are considered detrimental to data quality of the project.

21. Reports to Management

At each site visit, the field crew will complete a field datasheet. The datasheet contains information regarding site identification, location, and field measurement results. The City of National City will be notified immediately in the event that there is visual or numeric evidence of a significant threat to water quality. Criteria for a significant threat to water quality consist of evidence of an illegal discharge, observation of unusual water color or odor, numeric results significantly above historical data, and best professional judgment. Monitoring results from laboratory analyses will be reviewed after being received from EMA. If any of the laboratory results indicate evidence of a threat to water quality, the City will be notified immediately.

All monitoring data will be prepared and presented to the City of National City Project Manager. Records of sampling locations and GPS coordinates, field measurement results, laboratory analytical reports, and photographs of sampling locations will also be furnished to the City as needed. The monitoring results will be compared to the applicable WQOs listed in the Basin Plan. Statistical analyses, such as medians, means, maximums, and minimums will be conducted as appropriate to provide the City with the capability of comparing the test results with other published results. Table 3 includes a list of deliverables to be submitted to the City throughout the project.

Group D: Data Validation and Usability

22. Data Review, Verification, and Validation

Data generated by project activities will be reviewed against the data quality objectives previously cited in Element 7 and the quality assurance/quality control practices cited in Elements 14, 15, and 16. Data will be separated into three categories: data meeting all data quality objectives, data failing to meet precision or recovery criteria, and data failing to meet accuracy criteria. Data meeting all data quality objectives, but with failures of quality assurance/quality control practices will be set aside to determine the impact of the failure on data quality. Once determined, the data will be moved into either the first category (meeting all data quality objectives) or the last category (failing to meet quality control practices).

Data in the first category is considered usable by the project. Data falling in the last category is considered unusable. Data falling in the second category will be assessed before it is used in the project, but will likely be exclude from the data set for this particular project. If sufficient evidence is found supporting data quality, the data will be moved to the first category, but will be flagged with a “J” as per EPA specifications.

23. Verification and Validation Methods

Generally, data verification will be performed first internally and then later performed by externally. At each sampling event, the D-MAX’s field crew will complete a field datasheet (included as Attachment B).

The datasheet, which contains information regarding site identification and location, visual observations, and field measurement results, will be submitted to D-MAX's QA Officer for review upon completion of sampling to ensure the data have been recorded and processed correctly. The field equipment calibration log sheet will also be submitted upon completion of sampling (see Attachment C). The sampling chain-of-custody form will be reviewed by both EMA and D-MAX upon completion of sampling (included in Appendix C of Attachment A).

Monitoring results from laboratory analyses will be reviewed for validity and completeness by D-MAX's QA Officer after being received from EMA. Each lab report will contain a complete list of sample information such as sample matrixes, blanks, duplicates, etc. An example of a lab report is included as Appendix B of Attachment A. All data entry of field and laboratory results will be checked by D-MAX's QA Officer. D-MAX will review all collected field and lab data and the D-MAX QA Officer will review the lab reports, notifying the EMA QA Director in the case of an inconsistency.

If there is any uncertainty of the validated data the issues, a committee composed of the City of National City Project Manager, the D-MAX Project Manager, the D-MAX QA Officer and Data Manager, the EMA Laboratory Manager/QA Director will work to reconcile and correct data as needed. D-MAX will keep the City of National City informed of any pertinent data inconsistencies as they arise. The committee will attempt to reach unanimous consent on any issues, but the City of National City Project Manager will make the determination if agreement cannot be reached. For this project, there are no differences between validation issues and verification issues.

24. RECONCILIATION WITH USER REQUIREMENTS

The project needs adequate numbers of data points, as represented by the completeness data quality objective in order to perform statistical analyses, such as means, medians, maximums, and minimums. The sampling frequencies that have been developed should provide sufficient data points to complete the necessary statistical analyses such as tests for outliers, trends, etc. The data will be presented in either tables or charts to illustrate trends or relationships and will be uploaded to the SWAMP database in the SWAMP compatible format. Data that do not meet the monitoring quality objectives in the SWAMP QAPrP will be flagged and included in analyses on a case-by-case basis. Rejected data will not be used in analyses. Uncertainty of the validated data will be evaluated using the methods described in Element 23.

REFERENCES

EnviroMatrix Analytical, Inc. *Quality Assurance Program Manual*. 9 Jan. 2013.

Marine Pollution Studies Lab – Department of Fish and Game. *Standard Operating Procedures (SOPs) for Conducting Field Measurements and Field Collections of Water and Bed Sediment Samples in SWAMP. SOP Procedure Number 1.0*. Prepared by MPSL-DFG Field Sampling Team. 2007. Web. 2 Oct. 2013. http://swamp.mpsl.mlml.calstate.edu/wp- content/uploads/2009/04/ swamp_sop_field_measures_water_sediment_collection_v1_0.pdf.

San Diego Regional Water Quality Control Board. RWQCB. *Water Quality Control Plan for the San Diego Basin 9 (with amendments effective prior to April 25, 2007)*. 2007. Web. 2 Oct. 2013. http://www.waterboards.ca.gov/sandiego/water_issues/programs/basin_plan/docs/update102207/title042507.pdf.

State Water Resources Control Board, San Diego RWQCB and EPA. *2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report.* 11 Oct. 2011. Web. 2 Oct. 2013. http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml.

Surface Water Ambient Monitoring Program. *Quality Assurance Program Plan*. State Water Resources Control Board. Sacramento, CA. 2008. Web. 2 Oct. 2013 http://www.waterboards.ca.gov/water_issues/programs/swamp/docs/qapp/qaprp082209.pdf.

U.S. Environmental Protection Agency. *Guidance for Quality Assurance Project Plans (G-5). EPA/240/R-02/009*. 2002. Web. 2 Oct. 2013. http://www.epa.gov/quality/qs-docs/g5-final.pdf.

Attachment A. Laboratory Quality Assurance Program Manual and Standard Operating Procedures

Attachment B. Field Datasheet

Attachment C. Calibration Log Sheet

ENVIROMATRIX ANALYTICAL, INC.

QUALITY ASSURANCE PROGRAM MANUAL

This document has been prepared by EnviroMatrix Analytical, Inc. (EMA) and is approved by EMA Management. It will be reviewed on an annual basis and modified as necessary.

Document Approval and Release

Leland S. Pitt President/CEO	Leland S. Pitt	1-9-2013
Dan Verdon Laboratory Director		1/9/13
Jennifer Beyer Q.A. Director	Jennifer Beyer	1/9/13

Table of Contents

Table of Contents-Continued...

Table of contents-Continued...

1.0 Quality Assurance Policy

The entire EnviroMatrix Analytical, Inc. (EMA) staff is dedicated to providing reliable, superior quality analytical data to our clients. EMA management believes that Quality Assurance is not simply a management function, but that **every individual** in the laboratory is responsible for ensuring the quality of their analytical data. Therefore, each person within the laboratory is fully trained in evaluating data, monitoring control limits, and taking the corrective action necessary to assure a reliable, superior product for all EMA clients.

1.1 Purpose

The purpose of the Quality Assurance Program is to ensure that all information, data, and resulting decisions compiled under a specific task are technically sound, statistically reliable, and properly documented.

The EMA Quality Assurance Program Manual communicates to employees, clients, and certification organizations EMA's quality assurance policies and procedures.

The Quality Assurance Program Manual defines the purpose, organizational structure, and operating principles of the laboratory. The Quality Assurance Program Manual governs all activities and personnel of EMA including all aspects of administration, sample receipt, sample control, sample preparation, inorganic analysis, organic analysis, quality assurance, sample and waste disposal, data entry, and report production. Any deviation from this program must be approved by the Quality Assurance Director.

Quality Assurance is the structure within an organization which plans, designs, and monitors the frequency and methods of the checks, audits, and reviews necessary to identify problems and dictate corrective actions.

Quality Control is the mechanism or activities through which Quality Assurance achieves its goals. It is the methodical maintenance of strict quality through all activities from sample receipt through report generation; including standard preparation, instrument maintenance, calculation, recording of results, etc.

Quality Control is the function and responsibility of each individual within the laboratory.

1.2 General Description

EMA Quality Policy Statement

"The entire EMA staff is committed to consistently providing our clients with data which is statistically reliable, technically sound, and of the highest quality."

The contents of this Quality Assurance Program Manual describe the activities which are utilized in order to ensure this commitment is maintained.

Written analytical procedures (Standard Operating Procedures – SOP) are used to ensure strict adherence to approved analytical methods throughout the laboratory. Bench-level quality control measures with established acceptance criteria are included in each analytical procedure employed by the laboratory. Laboratory records and quality control data are monitored by management on a regular basis.

This manual describes the Quality Assurance Program adhered to by EMA and has been written by EMA personnel and approved by Management. All EMA staff has received copies of this manual and is required to comply with the program's stated goals, requirements, and responsibilities. The Quality Assurance Director has been designated to monitor the program and report program findings to the President and the Laboratory Director.

EMA is a State of California Department of Health Services fully accredited laboratory under the Environmental Laboratory Accreditation Program. EMA is evaluated by external audit under this program and certification is granted for a term of two years. Additional information as to the scope and expiration of this certification is presented in Appendix H.

EMA has been granted approval from the United States Department of Agriculture to handle foreign soil. This approval grants EMA permission to import and ship foreign soil as well as soils from Hawaii, Guam, Puerto Rico, and the US Virgin Islands. The approval is granted for a term of three years and expires May 12, 2013, whereupon it will be renewed.

1.3 Objective

The Quality Assurance Program is designed to provide EMA and its clients with accurate and reliable data.

The Quality Assurance Program ensures that EMA produces valid data for all analytical procedures. In order to accomplish this objective, the following criteria must be achieved:

1. All procedures and practices must be accepted by both the client and/or regulatory agency.

2. A program must be in place to monitor, document, and improve the performance of EMA.
3. There must be a mechanism for correcting problems which are determined by the Quality Assurance Program.

Specific objectives of our performance standards are:

1. Laboratory practices and methodologies are routinely updated and developed as new and improved methods and practices become available.
2. Only trained personnel having the appropriate expertise perform assigned tasks.
3. All data is reviewed prior to release to ensure validity, completeness, accuracy, and precision.

1.4 Intended Use of Data

This Quality Assurance Program Manual applies to the generation of analytical data for environmental monitoring and assessment programs. This Quality Assurance Program has been designed to meet the requirements of various federal and state regulatory agencies with which clients need to comply. The data generated under this Quality Assurance Program is provided in support of investigations or monitoring of sites that will have significant environmental impact on the public and private sector.

2.0 Laboratory Organization and Responsibility

EMA is a full-service environmental laboratory specializing in analytical services and is the sole laboratory operating under this quality management system. EMA maintains two locations that include the main facility and one auxiliary laboratory:

Main Facility	Auxiliary Facility
4340 Viewdridge Avenue	4380 Viewridge Avenue
Suite A	Suite B
San Diego, CA 92123	San Diego, CA 92123
858-560-7717	858-430-0379

EMA provides analytical testing services for the environmental industry. Services include:

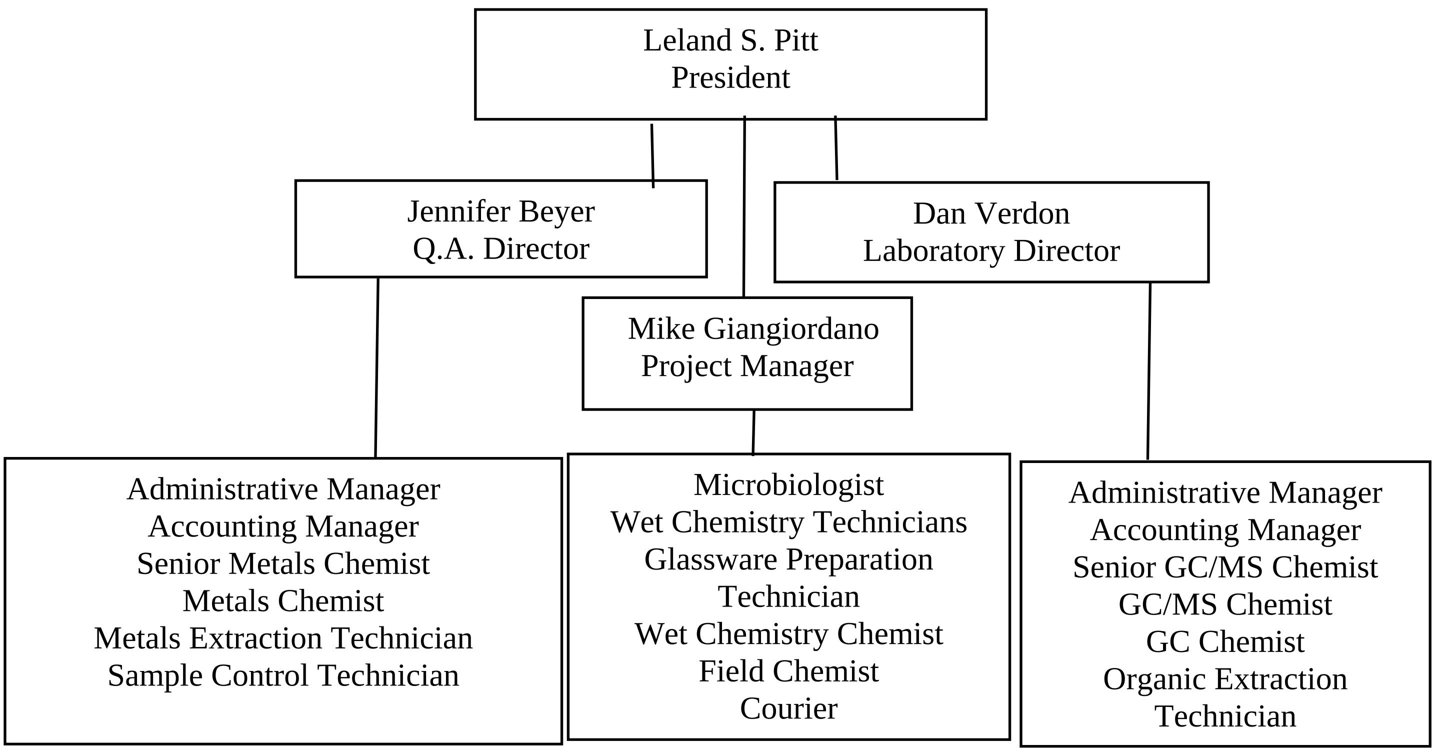
- Classical chemistry (titrametric, gravimetric, colorimetric, infrared, etc.),
- Inorganic chemistry by Atomic Absorption (cold vapor), Inductively Coupled Plasma-Mass Spectrometry, and Inductively Coupled Plasma-Atomic Emission Spectrometry,
- Organic chemistry by Gas Chromatography (GC) and Gas Chromatography/Mass Spectrometry (GC/MS),
- Microbiology by Multiple Tube Fermentation, Presence/Absence Media, and Plate Count.

A list of analytical services and methods performed by EMA is presented in Appendix E.

A list of major instrumentation and equipment used by EMA is presented in Appendix F. EMA has been operating as an analytical laboratory since 1974. EnviroMatrix Analytical, Inc. (EMA) was incorporated in the State of California on July 10, 1992.

The success of the quality assurance program is the responsibility of key laboratory personnel. All laboratory chemists and technicians are vested with the authority to stop work in response to quality related problems. Personnel notify their supervisor and the Quality Assurance Director immediately if any quality related problems or out-of-control events occur. In the temporary absence of their supervisor, lab personnel notify another member of laboratory management.

EnviroMatrix Analytical, Inc.
Organizational Chart



2.1 The President

The President of EMA approves overall policy, including the Quality Assurance policy and goals contained in this Quality Assurance Program. The president maintains the ultimate responsibility and authority for quality related matters.

2.2 Laboratory Director

The Laboratory Director is ultimately responsible for the timeliness and reliability of all analytical data.

The Laboratory Director's responsibilities with respect to the Quality Assurance Program are to:

- Supervises all department supervisors and chemistry laboratory personnel;
- Oversee and coordinate instrument and equipment maintenance;
- Review work procedures and daily laboratory practices;
- Training of laboratory personnel;
- Implement and develop new methodologies;
- Oversee the implementation of valid and reliable quality control procedures;
- Oversee the administration of quality control procedures;
- Oversee the implementation of corrective action(s);
- Oversee performance evaluation and auditing;
- Review analytical data and reporting to clients.

2.3 Quality Assurance Director

The Quality Assurance Director is responsible for the operational budgeting, laboratory management, and the Quality Assurance Program activities.

Duties are to:

- Prepare and maintain the financial operational budget;
- Develop mechanisms to carry out quality objectives;
- Administrate quality control procedures;
- Implement corrective action(s);
- Manage a document control numbering system;
- Performance evaluation and auditing;
- Liaison with regulatory agencies;
- Propose Quality Assurance Program amendments, provide feedback, and conduct Quality Assurance training.
- Train and monitor chemists and technicians in implementation of Quality Assurance/Quality Control procedures;
- Review final analytical reports for accuracy and completeness;
- Manages all facets of the EMA safety program.

2.4 Project Managers/Project Coordinators/Sales Manager

The Project Managers and Project Coordinators have responsibilities relating to the Quality Assurance Program. They are to:

- Respond promptly to client needs and inquiries;
- Track project reports to ensure they are delivered on time;
- Communicate any client inquires or concerns promptly to the appropriate management person (i.e.: President, Vice-President/Laboratory Director, or other Project Manager);
- Ensure that all client inquires are resolved by continued communication and follow-up;
- Act as client advocate;
- Determine any client project specific quality assurance or deliverable needs and communicate those needs to the laboratory through written and verbal notification;
- Define, document, and communicate work requirements for specific projects to the laboratory through written and verbal notification;
- Communicate changes in project requirements during the course of work to laboratory personnel through written and verbal notification.

2.5 Sample Control Technician (Sample Receiving Coordinator)

The Sample Control Technician is responsible for sample integrity, sample holding time adherence at receipt, proper container usage, proper sample storage, and sample custody.

Duties include to:

- Receives all client samples and enters project and samples into the EMA Laboratory Information Management System (LIMS);
- Labels all client samples and tracks the internal chain-of-custody.
- Prepares preserved sample containers and adds preservatives to incoming samples where indicated (includes documentation of pH for all metal samples);
- Document sample condition as received;
- Inform client, and/or Laboratory Director or chemists of any holding time considerations;
- Maintains internal chain-of-custody through sample control;
- Ensure and document proper sample container type;
- Control sample storage;
- Implement prescribed procedures for sample receipt and log-in;
- Document project-specific requirements or changes in project requirements during the course of work on the daily in-house aging report;
- Maintains logbook of daily verification of all laboratory balances (as well as refrigerator temperatures).

2.6 Department Supervisors/Senior Chemists

The Laboratory Department Supervisors are responsible for the daily operation of their respective area.

Their duties as they relate to the Quality Assurance Program are to:

- Make recommendations for technical decisions to the Laboratory Director;
- Develop, review, and evaluate test procedures;
- Assist in the training and monitoring of chemists and technicians in implementation of Quality Assurance/Quality Control procedures;
- Ensure completion of analytical work within the requested turn-around time and prior to expiration of sample holding time;
- Initiate or respond to required corrective action(s);
- Perform method detection limit and instrument detection limit studies on instruments used.

2.7 Laboratory Chemists and Technicians

The Chemist's duties as they relate to the Quality Assurance Program are to:

- Comply with Quality Assurance Program requirements and method specified Quality Control;
- Maintain a clean and safe working environment;
- Implement any prescribed corrective action(s);
- Utilize only methodologies as approved by EMA and follow EMA Standard Operating Procedures (SOPs);
- Keep accurate laboratory records;
- Routinely check expiration dates of reagents prior to initiating work, and make fresh reagents when necessary.

2.8 Purchasing Agent/Client Services Coordinator/Administrative Assistant

The Purchasing Agent's duties in relation to the Quality Assurance Program are to notify Laboratory Director immediately if incoming purchase requisitions request materials of a different quality or source (vendor) than prior orders. Purchase requisitions that request materials that vary from prior approved materials must have an indication that the Laboratory Director has approved such action.

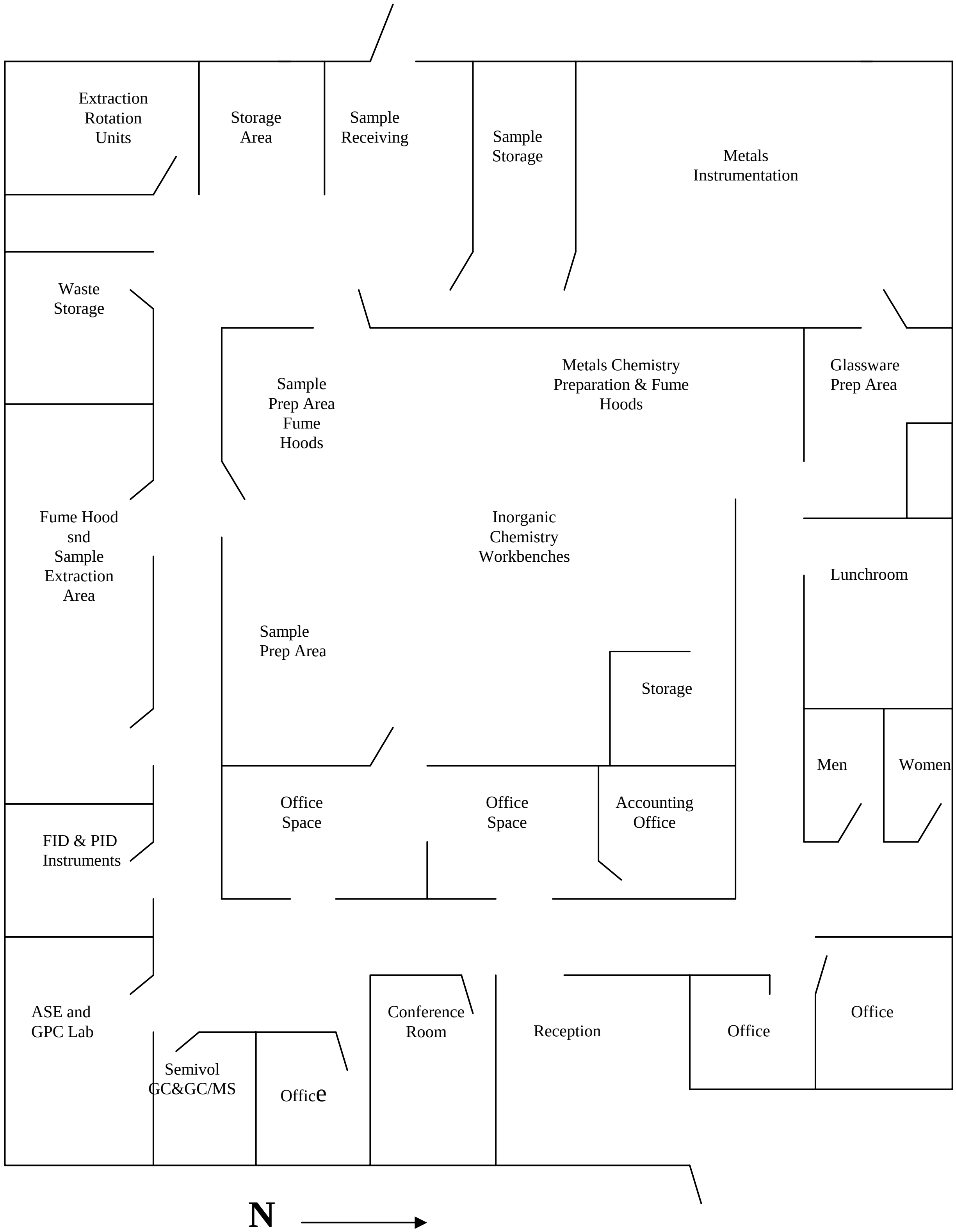
The Client Services Coordinator duties in relation to the Quality Assurance Program are to:

- Ensure completion of report deliverable prior to due date;
- Files and maintains copies of all analytical reports and project information.
- Scans all incoming Chain-Of-Custody forms (COCs) into the EMA Server Files.

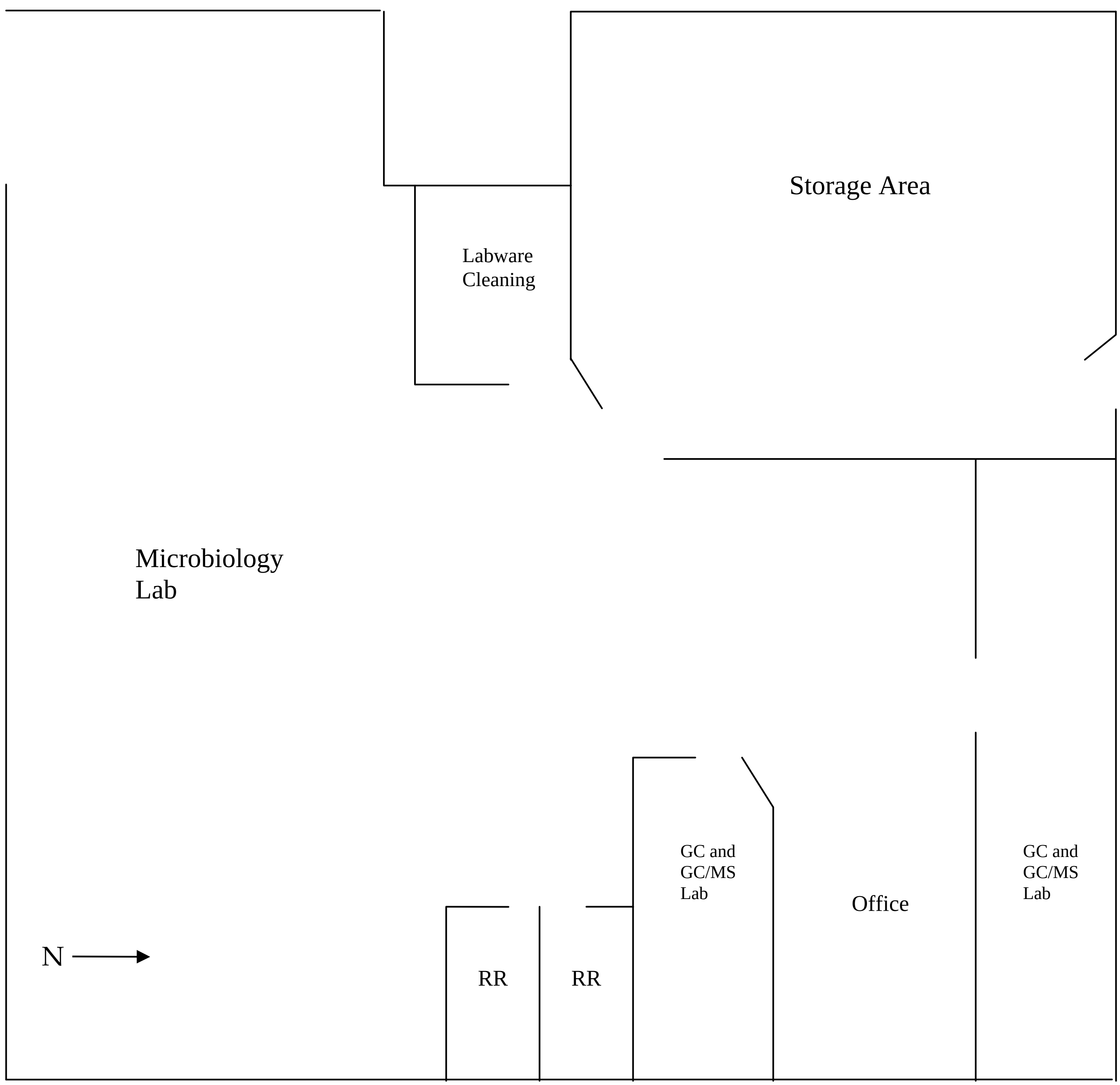
3.0 Facilities

EMA occupies one approximately 6,000 square foot building of which 90% is dedicated to the analytical laboratories. EMA maintains an additional auxiliary laboratory which includes approximately 1800 square foot building within the same business complex of which 65% is dedicated to the analytical laboratories. Separate laboratory areas are dedicated to volatile analyses, semi-volatile analyses, inorganic analyses, microbiological analyses, extraction for organic analyses, digestion for metals analyses, sample receiving/sample preparation, metals analyses, and glassware cleaning.

Facility Map of 4340 Viewridge Ave. Ste. A



Facility Map of 4380 Viewridge Ave. Ste. B



4.0 Personnel Training

EMA provides all personnel with extensive training to assure all employees are provided with the necessary information to make educated, decisive and merited decisions. The guidelines set forth create parameters for all employees to follow that will aid in quality of all laboratory processes.

4.1 Quality Commitment

EMA staff is committed to providing superior service and quality. EMA management believes that achieving excellence requires the dedication of all employees and has established training programs throughout the organization to foster employee involvement and growth.

4.2 Safety Training and Compliance

A formal safety program is established in accordance with local, state and federal requirements. Safety training is provided for all laboratory employees initially upon hire and thereafter on a routine basis. The safety program is maintained by the Safety Officer with the help of the Safety Coordinator and Waste Management Coordinator.

4.3 Qualifications of Laboratory Personnel

EMA is very proud of its highly qualified and professional staff and is committed to furthering the skills of employees at all levels.

Technical training is performed by management and qualified individuals to ensure method proficiency. The staff is updated as to current technical advances at an as-needed basis. All laboratory personnel are required to acknowledge through signature that they have read and understand the SOPs appropriate for their area. All training beyond acknowledgment of SOPs is documented. Continuing qualification of laboratory personnel is demonstrated through systems and performance audits conducted by the Quality Assurance Director. Additionally, Quality Assurance training sessions are conducted by the Quality Assurance Director on a regular basis. External courses and conferences are attended when appropriate. The EMA staff further their expertise through present and past membership in professional organizations such as:

- San Diego Environmental Professionals (SDEP)
- American Council of Independent Laboratories (ACIL)
- Professional Environmental Marketing Association (PEMA)
- Association of Environmental Professionals (AEP)
- San Diego Dry Weather monitoring workgroup
- Stormwater Monitoring Coalition workgroup

All new employees receive a comprehensive orientation to quality assurance, quality control, and safety programs administered by the Quality Assurance Director within approximately the first week of employment. All new personnel, or personnel performing a new analysis, must demonstrate

proficiency through the analysis of Quality Control check samples prior to the analyst conducting independent analysis of client samples.
Copies of all training records, including the results of Precision and Accuracy Studies and single- and double-blind performance evaluations, are maintained in the Quality Assurance program files. Appendix G presents professional profiles of key personnel.

5.0 Quality Assurance Objectives

The objectives of EMA are to supply precise, accurate data reports to clients which are representative of the sample supplied. All data reported are generated and calculated according to recognized standards of the environmental laboratory industry. Data reported by EMA are calculated and reported in units that are consistent with data produced by other organizations. EMA strives to present data reports that are complete and contain all data elements and supporting documentation for the type of deliverable requested by the client.

The precision and accuracy control limits utilized by EMA are based upon limits contained in the published methods. When warranted by EMA's experience with a particular method, more restrictive control limits than those cited in the method are set.

Method performance characteristics are determined prior to method use for analytical methods. This is accomplished through Precision and Accuracy, Method Detection Limit, and Instrument Detection Limit Studies performed according to standard operating procedures. Additionally, Quality Control reference materials are analyzed to verify method performance characteristics. All method performance data is compiled by the individual analyst and is documented and maintained by the Quality Assurance Director in the Quality Assurance program files.

5.1 Data Quality Characteristics

There are five recognized characteristics of data quality. They are:

Accuracy
The degree of agreement of a measurement (or measurement average) with an accepted reference or true value. It is a measure of system bias. It is usually expressed as the difference of "measured" from "true" values, or as a percentage of the difference. The accuracy of laboratory analyses can be evaluated through the concurrent analyses of standard reference materials, if available.

Precision
A measure of agreement among individual measurements of the same property under similar conditions. It is expressed in terms of percent difference between replicates or in terms of the standard deviation.

Completeness
A measure of the amount of valid data obtained compared to the amount expected to be collected under normal conditions; it is usually expressed as a percentage. The completeness objective is calculated on those samples analyzed, not the remainder archived. Data from samples are

considered to be complete if the samples have been properly collected, labeled, stored, prepared, and analyzed and the associated quality control criteria have been met.

Representativeness
Expresses the degree to which data accurately and precisely represents a characteristic of a data population, process condition, or a sample. The samples expected characterization would be compared to that obtained by laboratory analyses to evaluate the representativeness of the data to the expected data.

Comparability
Expresses the confidence with which one data set can be compared to another. To achieve comparability, the data generated will be reported using units specified in the Standard Operating Procedures as appropriate. Analytical results will be comparable to those produced from similar laboratories using the same instrumentation and methodology. This is accomplished through the following practices:

- Demonstrate traceability of standards to NIST or EPA sources.
- Use of standard and approved methodologies.
- Standardized units of measure.
- Standardized Quality Control Acceptance Criteria
- Analysis of Performance Evaluation (PE) samples to demonstrate laboratory performance.

5.2 Completeness, Representativeness, and Comparability

Prior to the results being disseminated, the report is reviewed and evaluated for completeness, representativeness, and comparability.

The report and associated data is evaluated to ensure that it is; sufficient for its intended use, representative of the matrix and conditions being measured, and representative of the method and instrument utilized.

The Laboratory Director will review and approve all EMA reports to clients.

6.0 Sample Custody

The Sample Control Technician is responsible for initiating and maintaining external and internal chain-of-custody, managing and tracking sample storage and distribution, ensuring proper containers, preservation, temperature requirements and adherence to holding time requirements. In the absence of the Sample Control Technician, only properly trained personnel may receive samples with all activities reviewed by the Sample Control Technician or Laboratory Management. All samples received are sent through an additional review process by a qualified employee to ensure the laboratory adheres to the client’s needs and representations.

Samples are physical evidence and are handled at EMA according to certain procedural safeguards. The strict adherence to chain-of-custody procedures is critical to legal proceedings and an integral part of a Quality Assurance Program. Chain-of-custody procedures are initiated during sampling events in the field and continued through laboratory analysis, and finally, the ultimate disposal or return of the sample.

EMA chain-of-custody procedures ensure traceability through proper sample handling, Quality Control procedures and internal chain-of-custody. The components of the chain-of-custody procedure include chain-of-custody documentation forms and unique sample identification numbers.

The National Enforcement Investigations Center of EPA defines custody of evidence in the following ways:

1. In a person's physical possession,
2. In view of the person after possession has taken place,
3. Secured by that person so that the sample cannot be tampered with, or
4. Secured by that person in an area which is restricted to unauthorized personnel.

6.1 Laboratory Custody Procedures

EMA has implemented the following standard operating procedures with regard to laboratory internal chain-of-custody:

- Samples are stored in a secure area except when being analyzed or prepared.
- Non-employee access to the laboratory is controlled through the use of limited access points at the facility. Outside personnel can access the building either through the front reception area or the sample receiving area.
- The designated Sample Control Technician controls access to the sample storage area.
- Samples remain in secured sample storage until removed for sample preparation or analysis.
- Each sample container is assigned a unique identifier and this identifier is used to track the sample location and status throughout the analytical process, storage and disposal.
- After the sample is assigned an identifier and logged in, sample tracking is utilized to trace the transfer of the sample from the Sample Control Technician to the chemists.
- Sample tracking is maintained through the internal chain-of-custody program in the EMA LIMS in order to document sample location and responsible party within the laboratory.
- All samples are to be returned to the Sample Control Technician and documented within the chain-of-custody program in the LIM system.
- Any remaining samples are archived in locked storage areas, returned to the client, or disposed of properly as required by the client and federal and state regulations.

The Sample Control Technician is responsible for ensuring that all samples are maintained in a secure area while being logged-in.

Internal sample chain-of-custody is maintained through sample tracking program in the EMA LIMS. This program is used to log samples in and out of sample storage and indicate sample custody at all times. It is the responsibility of all personnel to document when a sample is in their custody.

Coolers containing samples are received through the sample receiving/sample management area. Upon sample receipt at the laboratory, samples are assigned a unique identification number and entered into the sample receipt logbook. All samples are entered into the EMA LIM system. Details include client name, laboratory identification number, parameters requested, date received, date and time sampled, date due and relinquishing parties.

For sample shipments that contain a temperature blank (i.e.: a separate water-filled container for verifying receipt temperature), the temperature of the water in the designated bottles will be obtained using an NIST calibrated thermometer. The thermometer will be inserted into the temperature blank as soon as possible after sample receipt; once equilibrium is reached the temperature will be recorded. In the event that there is no temperature blank present, the temperature of the samples are taken with a probe which indicates the temperature of the sample bottles. The temperature or condition of the samples on receipt will be recorded on the associated chain-of-custody.

If samples are not received within the temperature requirements or if the samples are received outside of the protocol holding time requirements, the client will be contacted and notified of the discrepancy. In the event the client cannot be contacted, the samples will be processed on an as received basis. The discrepancy is noted on the chain-of-custody.

The samples are carefully removed from the shipping container. The condition of the samples will be noted on the associated chain-of-custody form (intact, broken, leaking, etc.). The client will be contacted immediately if there is evidence of damage. Broken/damaged sample bottles will be transferred to the EMA waste drums. The coolers containing the broken samples will be rinsed several times with water; the water will be transferred to the waste drums if necessary.

The Sample Control Technician will verify agreement between the labeled sample containers and the chain-of-custody. In the event of a discrepancy, the client will be contacted immediately.

The samples will be visually inspected to determine that adequate sample volume was collected for the parameters requested, correct sample containers were utilized, and proper preservation was indicated on the label. This will be documented on the chain-of-custody form. Any problems will warrant immediate client contact.

All liquid samples requiring any metals analysis must be verified to have a $pH < 2$. The Sample Control Technician will maintain a logbook which will contain pH upon receipt, amount of acid added (if necessary) and pH of sample after 24 hours. Samples with $pH < 2$ are ready for analysis. Those which are above the required pH must be maintained at a pH of 2 or below for at least 24 hours.

If a problem is not resolved with the client during sample delivery, the client will be notified by telephone to clarify any discrepancies found during sample log-in and stipulate corrective actions. All samples that are affected by the problem are placed in the appropriate contaminant free refrigerator and maintained at 4°C until resolved. A record of the telephone call will be kept with the chain-of-custody information in the LIMS system.

If no problems are observed, the samples are placed in sample storage areas controlled by the Sample Control Technician until analysis. Maximum holding times for samples are observed and strict sample control is maintained by the Sample Control Technician.

In the absence of the Sample Control Technician, only personnel who have been trained in sample receipt and sample custody procedures have access to samples in the sample control area.

Controlled custody of digestates and extracts is maintained by transfer documentation on extraction/digestion log forms. Digestates and extracts are stored for thirty days after analysis and are promptly disposed of thereafter.

6.2 Chain-of-custody

To trace sample possession from the time of collection, a chain-of-custody record is completed and accompanies the sample(s).

The chain-of-custody contains the following information:

- Client sample identification number;
- Signature of the collector and any person who has had the sample in their possession;
- Date and time collected;
- Sample type;
- Client name and address,
- Inclusive date of possession;
- Analyses requested;
- Intact seals present on sample containers (if applicable);
- Sample condition when received (temperature, proper container, etc.);
- Samples properly preserved, as applicable;
- Time and date sample was received and by whom.

The chain-of-custody establishes the documentation and control necessary to identify and trace a sample from sample collection to final analysis. It includes sample labeling to ensure proper identification of each sample, secure custody, and provides the recorded support information for potential litigation.

Chain-of-custody forms are used to document the integrity of all samples. To maintain a record of sample collection, transfer between personnel, shipment and receipt by the laboratory, a chain-of-custody form will be filled out for each sample or batch of samples provided by the client.

Whenever the possessions of the samples are transferred, the individual relinquishing the sample(s) signs and records the date and time of sample transfer on the chain-of-custody document. The individual receiving the sample(s) repeats the procedure. This record represents the official documentation for all sample custody transfers until the samples have arrived at the laboratory.

A copy of the chain-of-custody is provided to the client when samples are logged in at the laboratory.

7.0 Sample Security, Storage, and Disposal

The Sample Control Technician is responsible for ensuring that samples are maintained in secured storage areas under the appropriate conditions and are properly disposed of once deemed suitable.

7.1 Sample Security

Samples are kept in secured storage areas except during laboratory analysis. All laboratory personnel who receive samples are responsible for the care and custody of samples from the time each sample is received into that person's possession until the sample is returned to the Sample Control Technician.

The following security measures are employed:

- Doors to the sample storage area are secured at all times.
- Authorized personnel escort all visitors and deliveries through the laboratory from the rear receiving area or the main reception area.
- Laboratory personnel are responsible for the control and maintenance of sample integrity while they have custody of samples.

Information provided by the client about samples, recorded on the chain-of-custody or project documents, is available to analysts and can prove useful guidance when analyzing samples. EMA policies prohibit disclosure of confidential client information to third parties. All laboratory personnel are instructed to maintain confidentiality of client project information.

7.2 Sample Storage

Once samples are logged into the sample tracking system, the Sample Control Technician is responsible for ensuring the following procedures:

- Water samples for volatile analyses are stored in a separate refrigerator reserved only for volatile samples to avoid contamination. Solid samples that are to be analyzed for volatile organic compounds are to be sub-sampled prior to any other analyses being performed on those samples.
- Samples for microbiological analyses are delivered to the analyst and processed immediately. These samples are not stored due to method recommendations.

- Samples are stored in a secured area.
- Samples are removed from the shipping container or cooler and stored in their original containers unless damaged.
- Damaged samples are documented and reported to the Project Manager.
- Sample storage areas are kept secured and tidy at all times.
- Samples are removed from storage only by authorized personnel trained in sample custody procedures.
- Standards are not stored with samples.

7.3 Sample and Waste Disposal

Upon completion of the analysis, any remaining sample will be placed into long-term storage, returned to the client, or disposed of in compliance with all applicable federal, state, and local laws. All samples disposed of are documented in the LIM system by the Sample Control Technician.

When sample analysis and all Quality Control checks have been completed and a final report has been issued, the unused sample will be stored for a period of no less than one week after the sample report was received (30 days maximum if storage space allows; longer archival available with nominal fee).

Any unused portions requested by the client shall be returned.

Laboratory waste is collected in individual laboratory areas in appropriate satellite containers labeled with water-proof labels. Labels identify the hazardous waste collected and all pertinent information from the Material Safety Data Sheets (MSDS). When filled, containers are taken to the Hazardous Waste Room and composited into larger containers for storage until transport to a designated disposal facility. The Safety Officer works with the waste transporters to obtain disposal of waste which meets regulatory standards.

Non-hazardous waters may be disposed of in sink drains as permitted by a wastewater permit granted from the City of San Diego Metropolitan Wastewater Department.

7.4 Sample Preservation and Holding Times

It is critical to sample integrity and data validity that EMA analyze samples within the method stated holding times. EMA follows regulatory guidelines for sample preservation and holding time requirements as specified by the method references. Sample holding time begins with the collection of the sample.

Appendix A contains the Sample Holding Times and Preservation Requirements which identifies holding time requirements by method and parameter for water and soil/wastes.

Adherence to holding time requirements is maintained through several laboratory policies:

- When a sample holding time is identified in terms of hours, the chain-of-custody must indicate the time of sampling.
- The Sample Control Technician verbally notifies the appropriate analyst immediately upon receipt of samples with holding times of 72 or less hours.
- All laboratory personnel receive a daily in-house aging report listing the status of requested analyses for current samples.
- All data is subject to supervisory review and audits in which adherence to holding time requirements are monitored.
- Time of analysis is reported with analytical results when requested.

Accurate sample preservation is critical for following procedural guidelines dictated by recognized standards of the environmental laboratory industry. Preservation of samples is noted in the LIM system and if contradictory to the standardized procedure noted within the chain-of-custody. All liquid samples to be analyzed for metals must be documented in a designated logbook, recording the pH of the sample upon arrival. Liquid samples for metals analysis must be at a pH of 2 or below. Additional acid may be needed to accomplish this requirement (with an adjustment period of 24 hours before analysis). Occasionally samples will come in unpreserved whereupon the Sample Receiving Technician must sub-sample into correct containers pertaining to requested analyses.

8.0 Material Procurement and Control

Only chemicals and supplies of the quality specified in the appropriate method or Standard Operating Procedure shall be used for analyses. Purchase requisitions require review by the Laboratory Director for suitability prior to being issued. The Laboratory Director is responsible for ensuring that the materials being ordered are of the appropriate grade/quality for the methodologies.

The Purchasing Agent verifies that materials ordered are of the same grade/quality previously ordered and are requested from an approved vendor. If any deviations are noted the Purchasing Agent immediately notifies the Laboratory Director for approval/disapproval prior to placing order.

Upon receipt of orders, the purchase order is compared to the grade of material shipped to ensure that the correct quality/grade was received prior to acceptance by the laboratory.

8.1 Containers and Reagents

EMA provides required bottles, ultra-pure water (for use for trip blanks), coolers, sampling instructions, labels, ice packs, and chain-of-custody forms for sample collection. EMA utilizes EPA approved, pre-cleaned glassware for sample collection. Sample container preservatives are certified free from analytes of interest and contaminants. Compliance certificates that indicate freedom from contamination are maintained by the Sample Control Technician for each lot number of preservative and sample container.

Sample containers and preservatives are fully traceable to their sources and lot numbers through use of a logbook maintained by the Sample Control Technician. Containers provided to clients are labeled with the date the containers were prepared. All container and preservative lot numbers used for each day are recorded in a container preparation logbook along with the date that the preservative lot number was in use.

Upon request, EMA will provide trip blanks to clients.

8.2 Calibration Standards and Reagents

The chemicals and reagents used by EMA are selected with care. Reagent lot numbers are recorded for every analytical batch processed. Analytical reagent grade is the minimum quality used within the laboratory. Ultra pure/trace metal free acids are employed for low detection limit metals analysis. Pesticide grade solvents are used for all organic extractions. The extraction solvents are treated to all steps of the sample preparation and analysis process.

The following acceptance criteria applies to solvents:

- No analyte present at concentrations equal to or greater than one-half the reported detection limit.
- No non-analyte peak present in the test chromatogram greater than 10% of the closest internal standard for GC/MS analysis or which would interfere with the identification and quantitation process for GC analysis.

Records showing the reagent lots employed are maintained for all analyses. The method blank serves as a continual verification of the quality of the reagents as well as the quality of the analytical laboratory environment.

8.3 Equipment Procurement

Only equipment and supplies of the quality specified in the appropriate method or Standard Operating Procedure shall be used for analyses. Purchase requisitions require review by the Laboratory Director for suitability prior to purchase orders being issued. The Laboratory Director is responsible for ensuring that the materials being ordered are of appropriate grade/quality for the methodologies.

Upon receipt of orders, the purchase order and requisition are compared to the grade of the material shipped to ensure that the correct quality/grade was received prior to acceptance by the laboratory. The Sample Control Technician is responsible for receiving products and is required to date and initial the invoice as verification of material acceptance.

9.0 Analytical Procedures

EMA utilizes methodologies from the following accepted standard references:

- Methods for the Chemical Analysis of Water and Wastes,
- EPA-600/4-79-020, Revised 1983.
- Test Methods for Evaluating Solid Waste, EPA-SW-846, Revised 1996.

- Federal Register, 40 CFR Part 136, 2000.
- California Code of Regulations, Title 22, Divisions 4 and 4.5.

Additional methods are taken from:

- Inland Testing Manual, EPA 823-B-98-004, February 1998.
- Recommended Guidelines for Measuring Metals, Organics Compounds in Puget Sound Marine Water, Sediment and Tissue Samples, and related QA/QC Guideleines.
- LUFT Field Manual for Leaking Underground Fuel Tanks, DHS, Rev. March 1989.
- Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998.
- American Society for Testing and Materials (ASTM).
- The United States Geological Survey (USGS).
- Association of Official Analytical Chemists (AOAC).
- NIOSH Analytical Manual.
- Air Resources Board Manual.

Additionally, EMA has developed proprietary in-house methods for some parameters.

Clients are notified by EMA Project Managers through written and/or verbal communication when non-standard or significantly modified methods are to be used. Written or documented verbal client approval is required prior to use of new, non-standard, or significantly modified methods for client sample analysis. In the absence of client direction, selection of a method to be used for analysis is determined by the Laboratory Director.

Each data report issued by EMA includes a reference to the exact method employed for the analysis.

As new methods become promulgated and the laboratory demonstrates capability of performing new methods, SOPs are revised and updated accordingly to replace existing methods. Only the most recent revision for a method is used. Revised SOPs issued to personnel are accompanied by a form which personnel sign and date indication that they have read and understand the procedure.

Capability of performing an analytical method must be demonstrated prior to client sample analysis for all new and modified methods, This is accomplished through personnel training, QC Check sample analysis, Method Detection Limit, Instrument Detection Limit and Precision and Accuracy Studies.

Method capability data is maintained by the Quality Assurance Director in the Quality Assurance program files. The Quality Assurance Director is also responsible for ensuring that the laboratory staff is aware of the most current version for all methods.

10.0 Calibration Procedures

Calibration procedures are required in all areas of a laboratory setting. It is an essential component of quality control providing the correctness (or lack thereof) of laboratory procedures and instrumentation/equipment, to ensure that all aspects of data processing are of the utmost integrity.

10.1 Calibration Procedures and Frequencies

Instrument calibration is critical to generating accurate analytical data. EMA maintains strict controls on the calibration procedures for the various types of analytical equipment. Each instrument is calibrated prior to sample analysis in accordance with method criteria. The specific criteria for calibration can be found in each method SOP. Corrective action must be taken to remedy any out-of-control situations prior to analysis of any samples. Deviations from stated criteria are not acceptable.

Initial demonstration of capability for each instrument and analyst must be conducted before analysis of any samples. This includes performing instrument detection limit (IDL) and method detection limit (MDL) studies as well as having each analyst demonstrate proficiency to perform the method and obtain acceptable results for each analyte. IDL and MDL studies are updated according to each instrument SOP, occurring yearly in some cases or when major changes to the instrumentation are involved.

Instruments are calibrated in accordance with the appropriate analytical method and the manufacturer instructions. The analytical methods cite the appropriate calibration procedures and frequencies. In the event that the calibration specifications are not listed, a minimum correlation coefficient (R^2) of 0.99 or better is required.

Prior to the ongoing of analysis of samples, instruments are either calibrated or their calibrations verified. Calibration curves of signal versus concentration are generated on each analytical instrument. Calibration curves are established for each analyte of interest.

Most methods use either four or five (with a minimum of two) different calibration points for standardization. Current calibration curves are evaluated daily using a continuing calibration curve verification standard (CCV) or a laboratory control sample (LCS) or laboratory blank spike (LBS).

It is EMA's policy to validate all new standards against existing standards prior to use. The new standard's response factor (RF) should be within 10% of the previous standard's RF.

Hardcopy records of all instrument calibrations are maintained in the individual laboratory areas. These records are reviewed and are included in internal audits.

When calibration acceptance criteria or guidelines are available in a method, those criteria, or that of which is more stringent, are utilized. In the absence of method-stated criteria or guidelines, calibration acceptance criteria or guidelines from a similar method are considered to be technically sound.

10.2 Laboratory Standards and Reagents

Analytical standards utilized for method calibration and preparation of quality control samples are traceable to standard reference materials, or a certificate of analyses provided by the manufacturer.

Standards are purchased from approved and reputable commercial vendors such as Aldrich, Fisher Scientific, Supelco, etc. for use in all laboratory analyses. Certificates of analysis and expiration date information are received with standards and are maintained by each analyst.

Standards and reagents are dated upon opening, and the date of expiration recorded (expiration dates are determined by the vendor or indicated in the individual method SOP). This procedure establishes the order of use and eliminates the possibility of exceeding shelf life. A stock or working standard will be assigned an expiration date of the component with the shortest time of expiration.

Standards are protected from degradation, deterioration and contaminations based upon storage requirements and are stored properly to ensure chemical compatibility and integrity.

Each analytical batch corresponds to a sample preparation log (i.e., bench sheet) where all applicable reagent and standard lot numbers are recorded. Control check samples are analyzed with each analytical batch for all analytical procedures to ensure that the reagents used have not degraded or become contaminated.

Stock and working standard solutions are prepared fresh as required by their stability, and are checked regularly for signs of deterioration. Standards are properly labeled as to name, concentration, date prepared, solvent/medium, signature of person preparing the standard, and expiration date. Standards are traceable to analytical batches through the use of standard preparation logs and recorded dates on extraction/preparation logs.

The laboratory has established the following guidelines for the preparation of analytical standards:

1. Laboratory chemists who prepare standards are trained and experienced in calibration and the use of analytical measuring techniques.
2. Analytical reagent grade materials are utilized in preparation of standards.
3. Analytical measurement tools are calibrated to obtain accurate measurements.
4. All data generated are documented immediately in the appropriate standard preparation notebook.
5. Standards are properly labeled and referenced to standard preparation notebooks.

Laboratory contamination is minimized through implementation of a standard operation procedure (SOP) for glassware and lab-ware cleaning. The SOP is followed to ensure the removal of all traces of parameter(s) of interest and contaminants that could interfere with analysis.

Three grades of reagent water are used in the laboratory:

1. City water - The tap water used in the laboratory is supplied from the City of San Diego water supply. Its primary use is for the washing of glassware.
2. De-ionized water - This water is produced by passing tap water through a demineralization system. This water is used for some STLC preparations and as the final rinse for laboratory glassware.
3. Ultra-pure distilled water - This higher quality water is provided to the laboratory by an external supplier and meets specifications for Type I ASTM Reagent Water. This water is used for preparing inorganic and organic reagent blanks, reagent, solutions and standards.

Ultra-pure distilled waters are analyzed upon receipt of a new lot number to make sure that they meet pH and conductivity criteria for ASTM Type I and II Reagent Waters.

10.3 General Laboratory Equipment Calibration Requirements

Laboratory equipment requiring calibration, but not operational calibration, is checked on a routine basis for accuracy. These include; balances, ovens, refrigerators, freezers, automatic pipettes, and thermometers. Additionally, calibration is also performed and documented following maintenance and repair to show a return to control.

Each piece of support equipment is calibrated for every day of use. Calibration is documented in calibration logbooks for each piece of equipment. Acceptance criteria and correction factors observed are stated below or found in the support documents for individual pieces of support equipment. All out-of-control measurements and their resulting actions are documented on a corrective action form. The Laboratory Director and Quality Assurance Director are notified immediately of the out-of-control event. Non-compliant equipment is not used in the process of analyzing client samples. All out-of-compliance monitoring and corrective action measures are documented.

Equipment is calibrated against a standard traceable to NBS or other recognized physical or chemical constants. Calibration procedures are specified by the manufacturer, regulatory agency or method SOP. Procedures provide step-by-step detail for obtaining and documenting results. The data are kept on file in the laboratory and allow traceability to data generated under each equipment calibration. Calibration due dates are maintained by the Quality Assurance Director to maintain proper calibration intervals.

Balances
The calibration of balances are verified before each use with standard Class-S calibration referenced weights to within 0.001 grams of "true weight," and are calibrated annually by a licensed specialist across the full weight range of the balance.

Ovens/Furnace
Oven temperatures will be recorded during each use. The required temperature tolerance is $\pm$ 2^{o} C at the operating range of 60 - 300^{o} C for ovens and 500 - 1500°C for furnaces. If the temperature is found to be out-of-control during analysis, the results of that analysis will not be reported and the analysis will be repeated after the oven has stabilized for 8 hours.

Refrigerators/freezers
The temperature in all the refrigerators shall be recorded each working day in the refrigerator logs and maintained at 0 - 6^{o}C. In cases where temperatures are out of these limits, the temperature will be adjusted accordingly with the Lab Director's approval. Freezer control limits are -14°C ± 2°C.

Thermometers
Every thermometer must be checked annually against an NBS thermometer of equal or greater precision. The procedures of ASTM E77-92 for calibration are followed. Errors in temperature indications of the thermometer should not exceed the scale errors as expressed in Table 1 of ASTM E1-83.

Pipets
All automatic pipets are given a unique identification marker and calibrated on a weekly and quarterly basis according to ASTM gravimetric methods and acceptance criteria.

Syringes
Calibration certificates from the manufacturer and frequent replacement of syringes ensure accuracy of measurements.

10.4 Sample Storage Temperature Monitoring

Maintaining appropriate temperature during sample storage is of critical importance in the task of attaining valid data. The following procedures must be followed in order to maintain and monitor appropriate sample storage temperatures.

Upon sample receipt, samples for analysis are transferred to the appropriate storage refrigerators. A daily temperature check is performed to verify refrigerator temperature and these temperature readings are recorded on a log sheet for that refrigerator. Each refrigerator has a unique identification number and a separate Daily Temperature Log is maintained for each refrigerator. The thermometer in each refrigerator is immersed in a liquid such as glycerin or water. If a daily temperature reading exceeds the $4^{o} \pm 2^{o}$C acceptance criterion, all project samples will be transferred to another refrigerator that is documented to be within the acceptable temperature range. The problem will be corrected, and corrective actions will be documented for the faulty refrigerator.

11.0 Analytical Requirements

Analytical instruments are calibrated at regular intervals recommended by the manufacturer and as required by ASTM, EPA, or other standard methods. Calibration of all equipment used and documentation of the calibration will be performed by individual chemists/ technicians as assigned by the Laboratory Director or by independent calibration firm.

11.1 GC/MS System Calibration

The gas chromatograph/mass spectrometer (GC/MS) systems are calibrated for mass and then tuned using specific instrument and method parameters. They are then calibrated for quantitation using the internal standard technique. Specific methods impose variations and/or different acceptance criteria on both the tuning and the calibration practices. These specific requirements are followed per the particular method Standard Operating Procedure.

Mass Calibration and Tuning:

The calibration of each instrument is verified at frequencies specified in the methods. Calibration and tuning the GC/MS systems is instrument specific and includes the following:

- GC/MS mass calibration using perfluorotributylamine (PFTBA);
- The tune of each system is checked using 4-bromofluorobenzene (BFB) for determinations of volatiles and with dacafluorotriphenylphosphine (DFTPP) for determination of semi-volatiles;
- The required ion abundance criteria must be met before determination of any analytes.

The background subtraction performed per the methodologies is straightforward and designed to eliminate column bleed or instrument background ions. Background subtraction actions resulting in spectral distortions for the sole purpose of meeting special requirements are contrary to the objectives of quality assurance and are unacceptable.

11.2 Gas Chromatography System Calibration

The gas chromatography systems are calibrated using either the external or internal standard techniques. The specific acceptance criterion varies for different methods and can be located in the method in question or the EMA Standard Operating Procedure.

External Standard Calibration Procedure

For each analyte, or group of analytes, five or more concentration levels of standard are prepared by adding aliquots of one or more stock standards to volumetric flasks. The standard solutions are then diluted to volume with the appropriate solvent for the method. The lowest concentration standard should be at the concentration of the method detection limit (MDL). The other concentrations should define the working range of the system.

Each of the calibration standards are injected into the GC system using the same technique employed for actual environmental sample extracts. (i.e., 1-5 ul liquid injections, purge & trap, etc.) A series of calibration factors (CFs) are calculated for each analyte, at each standard concentration. The calibration curve is a plot of the relative response vs. the amount injected.

The CF = amount injected/total response (area). Multi-response (multi-peak) compounds use the total area of all peaks for quantitation or the average concentration of several peaks.

Each of the calibration standards is injected into the GC system using the same technique as actual samples. A series of response factors (RFs) are calculated for each analyte, at each standard concentration for the mass peak of interest for each analyte. The linearity (%RSD) is to be determined and compared to the method requirement. If the criterion is not met, the standard analyses must be repeated if quantitation of unknown samples is desired.

If the quantitation criteria are not met, in certain cases, the documentation of the ability to detect the minimum detectable concentration is sufficient to determine the presence or absence of target compounds with "estimated only" concentrations provided or a qualitative determination only.

The working average calibration factor or calibration curve must be verified each working day by the injection of a continuing calibration curve verification standard (CCV). The frequency of verification is detector dependent and varies from once per day to an average of once every five samples. If the response of any analyte is outside the acceptable response for the specified method, a new calibration curve must be prepared for that analyte.

Internal Standard Calibration Procedure:

For each analyte, or group of analytes, five concentration levels of standards are prepared by adding aliquots of one or more stock standards to volumetric flasks. In addition, a known and constant amount of one or more internal standards (IS) is added to each volumetric flask and they are then diluted to volume with an appropriate solvent. The lowest concentration should be at the method detection limit. The other concentrations should define the working range of the system.

Each of the calibration standards is injected into the GC system using the same technique as actual samples. A series of response factors (RFs) are calculated for each analyte, at each standard concentration for the mass peak of interest for each analyte. The linearity (%RSD) is to be determined and compared to the method requirement. If the criterion is not met, the standard analyses must be repeated if quantitation of unknown samples is desired.

The working average response factor must be verified on each working day by the analysis of continuing calibration verification (CCV) standard. The frequency of verification is method specific.

If the response of any analyte is outside the acceptable response for the specified method, a corrective action must be taken before the analysis continues.

If the quantitation criterion is not met, in certain cases, the documentation of the ability to detect the minimum detectable concentration is sufficient to determine the presence or absence of target compounds with "estimated only" concentrations provided or a qualitative determination only.

11.3 Inductively Coupled Plasma – Optical Emission Spectroscopy (ICP-OES) and ICP-Mass Spectroscopy Calibration

The ICP-OES system is calibrated daily by an external standard calibration process. The ICP-MS is calibrated daily using an external and internal standard method calibration process. The calibration specifications may vary from method to method and can be found in the particular reference or EMA SOP for that method.

Daily Standard Calibration Procedures:

For each analyte, or group of analytes, a calibration curve is generated by preparing standards from one or more stock solutions according to the method outlined in the appropriate EMA SOP. Continuing calibration standards, containing the same analyte(s) as the calibration standards are prepared in the same manner at an appropriate concentration within the calibration curve for the specified method.

Before the analysis and determination of elemental concentrations of interest can be determined, the instrument must be calibrated. This is done by creating a calibration curve from the measurement of emission for standard solutions and a blank. To ensure calibration correctness, an initial calibration verification solution (ICV) is analyzed immediately after calibration. The ICV must be prepared from a second source vendor, i.e.; source different from calibration stock standards. Continuation of calibration validation is monitored through the use of a continuing calibration verification (CCV) solution. The CCV standard is analyzed after every 10 samples. Laboratory control samples, matrix control samples, and duplicates are also used to verify calibration and method preparation techniques. Results are generally accepted if they have a percent relative deviation (%RSD) of ≤ 20. If this criterion is not met, the sample or standard analysis must be repeated.

Results from continuing calibration standards must fall within the method specified acceptance limits. If this criterion is not met, the standard analysis must be repeated. If upon reanalysis, the standard again fails to meet this criterion, a corrective action must be taken, and the entire standardization procedure must be repeated (after source of error is indicated and resolved).

12.0 Detection and Reporting Limits

Detection levels are determined to signify the smallest amount of an analyte that can be detected in a given procedure and within a stated confidence level. These levels (limits) are defined by their purpose, ranging from levels of instrument noise, to method confidence.

12.1 Method Detection Limits

The method detection limit is the minimum concentration of a substance that can be measured with 99% confidence that the analyte concentration is greater than zero. A constituent is added to soil and water matrices to make a concentration near (within one to five times) the expected detection limit. Seven or more replicates of this sample are processed through the entire analytical method.

The MDL is determined using the standard deviation of the replicates. EMA performs Method Detection Limit Studies (MDLs) accordingly, based on each individual method criteria and for all new or modified methods. The results of all MDL studies will be reviewed by the Laboratory Director for approval before client samples are analyzed. For all analysis, the MDLs may not be higher than the regulatory limits for that parameter of interest, (taking into consideration the instrument and method limitations). MDLs must be performed for new or modified analytical methods before the analysis of client samples. All MDL data and documentation are maintained by the QA Director in the QA program files. Experimentally derived MDLs are evaluated by the QA Director and checked against method specific MDL guidelines to ensure method performance comparable to that of peer laboratories.

12.2 Instrument Detection Limits

EMA performs Instrument Detection Limit Studies (IDLs), for initial setup and verification for an analytical instrument and any time there is a major change in or maintenance of instrumentation for a particular method. A standard with a concentration near (within one to three times) the expected instrument detection limit is made. Seven aliquots of this standard is analyzed each day on three non-consecutive days and the IDL is calculated using the pooled standard deviation. The IDL is the minimum concentration of a substance that can be identified by an instrument with 99% confidence that the analyte concentration is greater than zero.

12.3 Reporting Limits

Reporting limits take into account the sample size, matrix effects, and any dilution factors. The Reporting Limit is always greater than or equal to the MDL.

Reporting Limits are evaluated by the QA Director to verify that reporting limits are greater than or equal to the experimentally determined MDL and less than or equal to project-specific reporting limit requirements.

12.4 Practical Quantitation Limits

The practical quantitation limit (PQL) is the lower limit of concentration or amount of substance that must be present before a method is considered to provide quantitative results.

13.0 Analytical Quality Control

When a referenced method contains definitive acceptance criteria and performance criteria or guidelines for QC and calibration samples, those criteria, or more stringent criteria are required by the method SOP. Data is reviewed by the analyst to SOP criteria and accepted or rejected on that basis. When QC and calibration criteria are not listed in the method, criteria from similar methods are considered technically sound for that method.

Documenting that an approach is technically sound belongs to the analyst developing a method and is reviewed for technical merit by the Laboratory Director.

13.1 Quality Control Checks

Method blanks, laboratory control samples, and matrix spikes are required for every analytical batch. Additional QC and calibration checks may be required. The corresponding frequency and performance acceptance criteria are specified in each individual method's SOP. In the absence of SOP instruction, the Laboratory Director is consulted.

The procedures used in the laboratory to ensure analytical data quality include:

Matrix Spike, Matrix Spike Duplicate, and Duplicates - are analyzed with every analytical batch or once in twenty samples, whichever is greater. Analytes stipulated by the method or applicable regulations are spiked into the matrix spike and matrix spike duplicate sample. Selection of the sample to be spiked and/or split depends on the information required and the variety of conditions within a typical sample matrix. In some situations, requirements of the site being sampled may dictate that the person sampling select a sample to be spiked and/or split based on a pre-visit evaluation or on-site inspection. This does not preclude the laboratory's spiking a sample of its own selection. In most cases, the laboratory's selection is based on the attempt to determine the extent of matrix bias or interference on the analyte recovery and sample to sample precision.

Trip Blanks - Analysis of a sealed ultrapure water sample which accompanied samples during transit, collection, and storage. The trip blank measures cumulative contamination derived from the travel blank source water, sample transit, the sample site, and the sample storage.

Field Blank - Similar to a trip blank; the field blank is opened during the sample collection process to measure the same contamination that the trip blank measures as well as the volatile airborne contaminants which may be present at the sample location that will not infiltrate the closed sample container.

Rinse Blank - Pure water which has been poured over field sampling equipment prior to sample collection to determine the possibility of equipment contamination. The rinse blank should be collected prior to use of equipment at each sampling point. It measures the possible combined contamination associated with field sampling equipment, rinse blank source water, sample transit, the sample site, and sample storage.

Source Water Blank - Analysis of the water used to prepare the rinse blanks which measure the background contaminants present in the water used for the rinse blanks.

Laboratory Water Blank - The water used to prepare trip blanks sent out by the laboratory (stored at the laboratory). They are analyzed only if the trip blank demonstrates contamination. The laboratory blank water measures contaminants derived from the laboratory pure water and laboratory sample storage facilities.

Instrument Blank - Laboratory pure water or other pure solvent analyzed at the initiation of an analytical run sequence by an instrument or between high level samples. It measures contamination which may be present in the instrument from carry-over following the analysis of a high level sample. If contamination is present, the chemist must perform maintenance on the instrument prior to analyzing client samples.

Method Blank/Reagent Blank - Laboratory pure water that has been processed exactly the same as sample as dictated by the method procedure. It contains all of the method reagents and measures combined contamination from the laboratory pure water, the instrument, the reagents, and the sample preparation steps. This type of blank is important in distinguishing between low level field contamination and lab contamination.

Surrogates – A pure compound added to a sample in the laboratory just before processing (according to the appropriate analytical methods) which provide information on the sample extraction procedure and/or the purge efficiency. Surrogate spike recoveries should fall within the control limits set by the laboratory in accordance with the procedures specified in the method.

Laboratory Control Spike and Laboratory Control Spike Duplicate – A certified standard reference material that is spiked into a reagent blank. It is carried through all steps of sample preparation to demonstrate method performance inclusive of sample preparation steps.

Reference Standards/Reference Samples - Purchased reference standards and matrix standards are used routinely to evaluate method/analyst performance. These standards are purchased from reputable sources with certified true values.

Calibration Blanks - A standard prepared in the same manner as other standards except that it contains no analyte. Calibration blanks are used to verify a calibration curve at a low concentration.

Calibration Verification Samples – A standard used to determine the state of calibration of an instrument between periodic calibrations, or after every 10 samples of analysis, depending on method.

Internal Standards - An element or compound that is not an analyte which is added to a prepared sample and is used to quantitate analytes.

Post Digestion Spikes - Post digestion spikes are performed when a new matrix is analyzed. An analyte of interest is spiked into a sample after digestion and analyte recoveries are determined based on the analyte concentration observed.

Interference Check Samples - One or more standards with high concentrations of interfering analytes are analyzed to check compensation for interferences.

Method of Standard Additions - A sample is analyzed and then an aliquot is spiked with the analyte of interest and re-analyzed. The original sample concentration is derived based on the recovery of the standard addition sample. This practice allows for compensation for some matrix effects.

Instrument Adjustment - Requirements and procedures are instrument and method specific. Analytical instrumentation is tuned and aligned in accordance with requirements which are specific to the instrumentation procedures employed. Additionally, EMA has service contracts with instrument manufacturers. All adjustments are documented in the instrument logbook.

Calibration - Performed in accordance with the manufacturers' requirements and the procedures specified in the applicable method. All calibration procedures are documented.

Gases – Only ultra-high purity gases, filtered on line through a 5-micron molecular sieve are used. All carrier gases also flow through an oxygen removal system and a hydrocarbon trap.

Analytical batches - A unique analytical batch number is assigned to each and every set of samples and their corresponding QC Checks. These batch numbers are created by the individual chemist or technician according to standard operating procedures and are documented in notebooks. The QC requirements and number of samples composing an analytical batch vary for each method and are specified in the individual method SOP. An analytical batch consists of a group of samples with similar matrices, which are analyzed together with the same preparation sequence and the same lots of reagents. They are prepared and analyzed within the same time period or in continuous sequential time periods. An analytical batch consists of no more than 20 samples.

Certified Reference Materials – When project requirements call for analysis of certified reference materials (CRMs), applicable CRMs are purchased through the National Institute for Standards & Technology (NIST) or other applicable vendor.

13.2 Control Chart Monitoring

Control charts are used to monitor real-time and long term assessment of data quality. Control charts for each analyte of control are prepared for both water and soil matrices. For organic analyses, the analytes which are charted are those analytes required to be present in the spiking solution based upon the current SW-846 methodology.

Each control chart consists of a center line, an upper and lower warning limit, and an upper and lower control limit. For each chart, a minimum of 20 points is included. Control charts are updated periodically to ensure quality control of analytical methods.

- The center line of the control chart is the mean of the time ordered points.
- The upper/lower control limit is defined as the mean plus/minus 3 times the standard deviation of the points.
- The upper/lower warning limits are defined as the mean plus/minus 2 times the standard deviation of the mean.

A laboratory method will be considered out of statistical control when the following are observed from the control charts:

- Any one point is outside the control limits.

- Any three consecutive points are outside the warning limits.
- Any eight consecutive points are on the same side of the centerline.
- Any six consecutive points are such that each point is larger or smaller than its immediate predecessor
- Any obvious cyclic pattern is seen in the points.

The Laboratory and Quality Assurance Directors generate the control charts using the EMA LIMS system. Out-of-control events will illicit the response of direct notification to the appropriate departmental supervisor whereby an investigation will occur. If it is determined to be an out-of-control event, and not a possible random error, corrective actions such as instrument recalibration and sample reanalysis will be taken. Corrective actions are determined on a case-by-case incidence. All corrective actions shall be documented and maintained in the QA program files.

14.0 Project Documentation

Guidelines set forth by the EPA and other regulatory bodies maintain that a comprehensive set of documentation pertaining to each sample must be thorough and complete. At EMA, Inc. our clients are ensured that all pertinent information, including project parameters scripted by the client, are included in our records for traceability and comparative reasons.

14.1 Recording Raw Data

Laboratory data can be generated in the following ways: instrument generation of electronic data files, local generation of data using instrument software and in-house spreadsheets, and manual recording of observed measurements. Reporting forms are completed by the individual analyst. Raw data is maintained in completed notebooks or data packages. Reduced raw data will be checked for error by peer review, Senior Chemists/Supervisors, and the Laboratory Director and subject to spot checks during internal audits by the QA Director.

14.2 Project Documentation Storage

There are two document categories associated with a project. The first is the project file. This file contains the following documents:

- Contracts, purchase orders, task orders, and other work authorization
- Correspondence and documentation of telephone conversations
- Project Plans and Project QA Plans (if provided)
- Project specific Statements of Work (SOWs), (if applicable)
- Project related internal laboratory correspondence

This file is under the custody of the Project Manager/Q.A. Director and available to all whom may need to retrieve the information. A majority of the information is stored in the EMA LIMS system for direct access.

The second category of document storage pertains to the analytical data gathered for the specific project. The files maintained for this sort of information include a copy of the final project report/QC report, copies of any bench sheets and raw data, as well as references to the file location of the original raw data. These files are kept throughout the lab and are under the custody of all those involved in the data process. The files will be stored in an accessible format for 5 years.

14.3 Communication of Project Requirements

Upon receipt of samples, the Sample Control Technician notes any project-specific requirements on the chain-of-custody and verbally notifies chemists and technicians of any requirements that differ from “standard” methods. These requirements are also documented on the daily in-house aging report issued to all personnel.

When project managers receive notice of changes to project requirements during the course of work, they communicate these changes verbally to the affected chemists or technicians and in a written communication log which is attached to the project documents. They also notify the Sample Control Technician, who documents the changes on the daily in-house aging report issued to all personnel.

15.0 Data Reduction, Validation and Reporting

Data reduction includes all processes that change either the form of expression (i.e.: units) or the quantity of the data values (rounding). Data reduction often involves statistical and mathematical analysis of data and usually results in a reduced subset of the original data set (i.e.: an average of three data points). Wherever employed, mathematical procedures will be verified for accuracy of computation.

All data are generated and reduced in accordance with the method SOPs. The data can be reduced by:

1. Manual computation directly found on an instrument/analysis logbook page or data sheet or
2. Computer processing of raw data via direct instrument linkage or manual entry.

The analyst who generates the data is directly responsible for ensuring that the computations are correct and complete and that all data reduction is documented appropriately for subsequent data review and validation. Any additional equations used in the data reduction process are required to be evident in the documentation. The computations are reviewed on a regular basis for accuracy by the Laboratory Director.

The analyst is responsible for verifying that the data reduction is correct for the project, sample numbers, calibration RFs and/or correlation coefficients, units, detection limits, dilution factors, volumes/weights used and moisture correction (when applicable).

15.1 Laboratory Data

All sample preparation activities are documented by the chemist or technician performing the work in laboratory notebooks or laboratory worksheets. These serve as the primary record for subsequent data reduction.

Laboratory data is generated in the following ways: instrument generation of electronic data files, local generation of data using instrument software and in-house spreadsheets, manual recording of observed measurements. Consistent data collection is achieved through the existence and use of SOPs.

Outputs from all instruments are monitored for readability and consistency. If clarity is less than desired, corrective actions are undertaken to rectify the output based on instrument manufacturers' recommendations.

Laboratory forms, data sheets, logbooks, and reporting forms have a standard format to ensure that all pertinent information is recorded consistently. These forms are generated by the QA Director and are regularly monitored to ensure compliance with established requirements.

Analysts have control over and access to all data they have generated. Limited access policies, including password codes for computer generated data access, maintain security of data.

Data are checked for accuracy and precision by the chemist, the QA Director, and the Laboratory Director. The validity of data shall be supported by the maintenance and inspection of the following records:

- Description of calibration
- Documentation of traceability of standards
- Documentation of analytical methodologies (SOPs) and QC Methodology
- Method blank results to check for contamination and interference
- Laboratory Control Sample results will be inspected as to whether they fall inside the acceptable control limits.

15.2 Laboratory Data Validation and Reporting

Data validation is the systematic process of data evaluation for acceptance or rejection based upon a set of criteria. It is a systematic procedure of reviewing a body of data against a set of criteria to provide assurance of validity prior to its intended use.

Chemistry data validation is performed by the Chemist, Departmental Supervisor, the Laboratory Director, and the QA Director. Validation is accomplished through routine audits of the data collection and flow procedures and by monitoring of QC sample results.

Data validation includes dated and signed entries by chemists on the worksheets and laboratory notebooks used for all samples; the use of sample tracking and numbering systems to track the progress of the sample in the laboratory; and the use of quality control criteria to reject or accept specific data.

The raw data is compared with the report forms for agreement. The raw data and/or report forms are compared to the final LIMS generated report for agreement. This review is the final assessment of completeness and accuracy of the data. If there is a discrepancy of any type, the standard procedure for verification and confirmation is followed.

If raw data does not agree with the forms, the cause will be determined, the source of the problem will be corrected, and all incorrect data from the point of error will be corrected. A corrective action form will be completed to indicate the corrective action for the results and/or laboratory samples affected. Audit trails are maintained for data changes through analytical batch preparation records.

After all appropriate changes are made; another review of the data in question is performed. This will ensure that forms and raw data agree.

15.3 Data Collection and Flow Audits

Data collection and flow audits are performed routinely and include:

- Review of sample documents for completeness
- Daily review of test results
- Daily review of performance indicators and QC sample results
- Random calculation checks
- Review of all reports prior to and subsequent to data entry
- Review and approval of final report by Laboratory Director

15.4 Data Review

Data review is performed prior to release of the data to the client. It is performed as soon as possible after data acquisition in order to provide sufficient time for corrective action if required.

In the data review process, the data undergo a minimum of two separate reviews. The data are compared to information such as the expected characteristics of the sample, the sample preparation steps, and QC sample data to evaluate the validity of the results.

Corrective action is minimized through the development and implementation of routine internal system controls. Chemists are provided with specific criteria that must be met for each procedure, operation, or measurement system.

In order to prevent transcription errors, all stages of data deliverable preparation are subject to audit, peer review, and supervisory review.

Supporting material, such as chromatograms are compiled by the analyst and incorporated into the data deliverables by the data processor.

The final deliverable is reviewed for transcription and typographical errors by the Laboratory Director prior to release to the client.

15.5 Documentation

Upon completion of the project or job task, the final report will be compiled and includes a brief narrative discussion of the analyses, the analytical results, and the QC results. The final report is reviewed and approved by both the QA Director and the Laboratory Director.

A documentation control system assures that all documents for a given project are accountable and traceable. It includes chain-of-custody records, all logbooks, graphs, raw data, and other miscellaneous items.

15.6 Recordkeeping

Documentation in the laboratory is initiated by the Sample Control Technician who receives samples, assigns laboratory numbers and maintains laboratory custody logbooks which document sample movement in the laboratory.

Samples are processed together in a batch by the analysts. A batch consists of a number of samples carried through the entire analytical procedure, along with QC samples and blanks. All work performed on a sample batch is documented in laboratory logbooks which are described as follows:

<u>Sample Receiving Logbook</u>

This logbook lists samples as they are received into the laboratory and assigned unique sample identification numbers. This number corresponds to the LIMS generated numbering system.

<u>Instrument Maintenance Logbook</u>

A unique logbook is maintained for each system and used to record the maintenance and upkeep of analytical instruments.

<u>Standards Logbook</u>

Used for tracing all laboratory prepared or purchased standards back to certified standards or stock solutions. All standards are entered into the EMA LIMS from the vendor certified standard sheets. It indicates standard traceability. Documented in this logbook are all activities associated with the standard preparation process.

<u>Data Notebook or Bench sheets</u>

This is used to document all activities associated with the analytical process and recording raw data of every batch.

In some instances, analytical data recording and standards preparation may be included in a single notebook.

15.7 Rules Governing the Use of Logbooks

1. Bound notebooks with pre-numbered pages are preferred record-keeping forms. Loose sheets, if used, are ultimately secured in notebooks.
2. All writing must be legible and in ink. All numbers are clear. Corrections are made by drawing one line through the incorrect entry, entering the correct information, initialing, and dating the entry.
3. Complete information should be entered so that in an examination, it can be determined what was done, when and what the results were.
4. If any data are determined to be invalid, reasons are indicated.
5. All relevant information is included (i.e.: the manufacturer and lot number of a chemical, the specific procedure reference, etc.)
6. When work is continued in another notebook or logbook, the number of the first notebook is written in the first page of the new notebook and vise-versa for easy reference.

15.8 Document Control

Document control is accomplished through the use of a centralized location of document inventories. Records, including raw data, supporting documentation, and electronic media are retained for a minimum of 5 years. After on-site storage for one full year, records may be transferred to a secured off-site storage facility. The QA Director maintains control of laboratory generated documents.

The EMA document control system, under the control of the QA Director, ensures that methods and procedures are followed in a consistent manner.

The document control system provides for the following:

- Managerial review and approval of documents prior to issue;
- A unique document control number for each document including the QA Program
- Manual and SOPs;
- A central location for all documents;
- A systematic method for distribution of all documents;
- A tracking system for existing documents;
- Identification of document revisions;
- A mechanism for periodic review of documents;
- Cataloging and archival of outdated materials in secured storage;
- Retrieval of raw data by authorized personnel only;
- A focal point for information exchange;
- Establishment of standardized methods and procedures;
- Scheduled review and revision of documents, including QA program documents.
- Internal systems audits confirm use of current SOPs
- All quality assurance program documents are revised by the QA Director; and,
- Current revisions of documents replace older versions.

15.9 Standard Operating Procedures

The laboratory maintains SOPs for each methodology or procedure used. SOPs are updated frequently for any revisions made. Changes in documents reflect actual procedures being followed. Before any revision is made, documents are submitted to the Quality Assurance Director for approval of the proposed revision. Minor changes are those which do not affect the content or quality of the action being prescribed in the document.

An addendum, subject to review and approval by the Quality Assurance Director, may be attached to a document to reflect policy and procedural changes which become effective between revisions. These changes are then incorporated into the body of the document at the time of the next revision.

15.10 Verification of Software

All computer software used to acquire, process, or report data shall be verified upon initial use and re-verified after any modification. Manual calculations are performed to verify all computer calculations for at least one sample from every analytical batch.

Limited access policies for software and data maintain security and integrity of these systems.

EMA currently uses local and instrument software, and the Element Datasystem Laboratory Information Management Systems (LIMs). Data is backed up on a daily basis and the data storage tape removed off site daily. Additional software quality assurance requirements will be added as deemed necessary.

16.0 Quality Assurance Project Plans

Project specific Quality Assurance Project Plans (QAPjPs) may be developed to meet contract and agency requirements on a project specific basis. These plans discuss specific terms, policies, objectives and QA activities to achieve the data quality objectives of the project.
QA Project Plans are generally written in accordance with the US EPA Document Guidelines and Specifications for Preparing Quality Assurance Project Plans.

The QAPjPs follow the format listed below as applicable (additional information is added, if required):

Section

- Title Page
- 1.0 Table of Contents
- 2.0 Approval Signatory Page
- 3.0 Introduction
  - 3.1 Project Description
  - 3.2 Background
  - 3.3 Definition of Terms
  - 3.4 Purpose

- 3.5 Scope
- 4.0 Project Organization and Responsibilities
- 5.0 QA Objectives for Measurement Data, in terms of precision, accuracy, completeness, comparability and representativeness
- 6.0 Sampling Requirements
- 7.0 Sample Custody
- 8.0 Calibration Procedures and References
- 9.0 Analytical Procedures
- 10.0 Data Analysis, Validation, and Reporting
- 11.0 Quality Control
  - 11.1 Internal QC Checks
  - 11.2 Performance and System Audits
  - 11.3 Preventative Maintenance Procedures and Schedules
- 12.0 Data Quality Assessment
- 13.0 Corrective Action
- 14.0 QA Reports to Management

17.0 Performance and System Audits

The laboratory is subject to both internal and external audits, in order to monitor the capability and performance of the total measurement systems.

Performance and systems audits are conducted semi-annually by the QA Director and encompass all activities of the laboratory, to assess compliance with established methods, policies and procedures. These audits are both scheduled and unscheduled.

An audit is defined as a systematic check to determine the quality of the laboratory operation and activities. The following are definitions of audit types:

Performance Audit - determines the accuracy of the total measurement system, or portions. Test samples are analyzed and results evaluated.

System Audit - an evaluation of all components of the lab's measurement systems to determine their proper selection and use, including QC procedures.

A copy of audit findings and any proficiency test results obtained are submitted to the EMA President and Laboratory Director in monthly quality assurance reports.

17.1 Performance Audit

A performance audit involves analysis of reference samples of concentrations unknown to laboratory personnel to evaluate analyst/method performance. Reference standards or matrix standards are purchased from reputable suppliers (Environmental Resource Associates and USEPA) or prepared using traceable standards and submitted to the laboratory by the QA Director. The true values or reference values are available only to the QA Director.

Internal performance audits are accomplished by the laboratory through the use of blind check samples (when available), replicate measurement evaluations, and individual proficiency test samples. Results are compared to "true" values and evaluated for accuracy and/or precision. Records are maintained by the QA Director.

EMA is a participant in the EPA Water Pollution (WP), Water Supply (WS) and Soil Proficiency programs. Performance evaluation check samples are analyzed on an annual basis and are submitted to the California Department of Health Service, Environmental Laboratory Accreditation Program and EPA Region 9 for compliance under the State Certification. Please refer to Appendix H for a copy of our external certification.

17.2 Systems Audit

The laboratory systems audit is designed to verify that all QA/QC practices are being followed and that all procedures and protocols are fully understood and upheld by laboratory personnel. It also is used to find problems which may have entered the system or for which the QA/QC program is insufficient. General audit checklists which apply to all lab areas and procedures have been developed, and are used for documenting audit and surveillance findings.

Audits ensure that laboratory quality control criteria are adhered to and proper corrective action is implemented, when required. All inquires relative to data quality issues are reviewed and any corrective actions identified.

Additional audits performed by various regulatory agencies will be conducted periodically.

System audits are performed to provide an objective evaluation of compliance with established requirements, methods, and procedures. Audits also determine the adequacy of the QA program. Re-audits verify efficacy of corrective actions.
The audits include an evaluation of the work areas, activities, processes, review of documents and records, storage of standards and reagents, housekeeping, good laboratory practice, analytical procedures, and quality control.

The auditor uses a prepared audit checklist, documents the audit in writing, and signs the audit report. The audit report contains sufficient information to stand alone as a document.

Any deficiencies noted during the audit are discussed with the audited department within 5 days of the audit. All corrective actions are taken and a formal response submitted to the auditor following receipt of the audit report. The auditor re-audits the area to determine that the corrective action was implemented and the deficiency corrected.

System audits include an evaluation of the following:

1. Assessment of compliance with the QA Program
2. Verification of and adherence to written procedures

3. Data storage and record keeping
4. Analytical data review and validation procedures

17.3 External Audits

An on-site audit is performed every two years by the California Department of Health Service, Environmental Laboratory Accreditation Program to verify the laboratory has all equipment, documentation, personnel, and standard operation procedures needed for performance of EPA requirements. Other agencies with which EMA has contracts may perform site audits.

17.4 Subcontracted Services Audits

EMA occasionally sends selected analyses to a subcontract laboratory. The most common reason for utilization of a subcontractor facility is that the procedure is not routinely performed by EMA. Subcontracting of analyses is not conducted without client approval.

All subcontract laboratories utilized by EMA on a continuing basis are overseen by EMA Project Managers and require approval of the QA Director prior to use. The subcontractor and EMA agree on the specific quality control, analytical requirements, and acceptance limits to be performed prior to use.

Subcontract laboratories may receive an on-site systems audit by a representative of EMA' staff or be subjected to double-blind performance evaluations.

All data produced by another laboratory is identified.

18.0 Instrument Maintenance Procedures

Preventative maintenance is the program of defensive actions for averting failure of equipment and ensuring optimal performance of instrumentation. These actions may include specification checks, lubrication, cleaning, reconditioning, adjusting, etc.

A preventative maintenance program for the instrumentation ensures fewer interruptions of analyses, personnel efficiency, and lower repair costs. It eliminates premature replacement of parts, and reduces discrepancy among test results.

All EMA laboratory employees using the instrumentation are fully trained; having developed troubleshooting skills that enable them to recognize problems, their causes and appropriate corrective actions, quickly and accurately to reduce equipment failure. Service contracts are maintained for several pieces of equipment to guarantee expedient service and reduce analytical down-time.

Instrument maintenance is deemed necessary when an instrument is inoperable, is not performing acceptably or as expected, or a change in the performance characteristics of the instrument is noted.

EMA maintains maintenance logs and several service contracts for all major instrumentation. Major maintenance and repair of instrumentation is only performed by qualified analysts and manufacturer recommended service representatives.

Following major instrument maintenance and repair activities, a return to analytical control must be demonstrated and documented through performance according to typical QA/QC requirements.

Written equipment maintenance records are kept to document all maintenance and repair activities. Instrument performance criteria are established to determine the need to make adjustments to the instrument operating conditions.

The following are examples of general measures that are performed throughout the laboratory as a part of the preventative maintenance program.

GC/MS Systems

- Injection port liners and gold seals are replaced daily or as deemed necessary.
- Two to three inches of the front of the pre columns or capillary columns are removed as deemed necessary.
- Septa are inspected and replaced (if necessary) before each batch sequence.
- Ion source is cleaned as required.
- Mass Spectrometers are tuned every 12 hours of use.
- Compressed gas cylinders are checked daily.
- Autosampler wash bottles are changed at the beginning of each sequence.
- Gas filters on carrier lines are checked weekly.

GC Systems

- Septa are replaced before starting a new sequence run.
- Compressed gas cylinders are checked daily.
- Solvent blank is injected before starting a new sequence run to demonstrate the system is free of interfering artifacts.
- Flows are checked before starting sequence.
- Autosampler wash bottles are changed at the beginning of each new sequence run.
- Gas filters on carrier lines are checked weekly.

ICP and ICP-MS

- Nebulizer and spray chamber are cleaned as needed.
- Torch, sample cones, center tubes and other consumables are cleaned on a regular basis.
- Tubing is replaced daily or every other day depending on use.
- Filters for the ICP-OES are cleaned weekly.
- Waste containers are disposed of in the proper waste receptacle weekly.
- Lenses are cleaned as deemed necessary.

pH Meters

- Gel-type electrodes are inspected prior to use and cleaned with Alconox-type soap solution to remove oily residues.
- Meter is calibrated daily before use using a two point calibration and verifying with a third point for the slope check. If calibration or slope has deteriorated, the electrode is cleaned and treated with 1N HCL, then recalibrated.
- pH electrodes are stored in fresh pH 7.0 buffer solution when not in use.

Analytical Balances

- All balance surfaces are cleaned daily and covered when not in use.
- Analytical balances are calibrated and cleaned annually by manufacturer's representatives.
- Labels are attached to each balance indicating date of last calibration.
- The accuracy of each balance is checked against "S" Class weights prior to use.

Autoclave

- All interior and exterior surfaces are cleaned daily.
- Sterilization temperatures are monitored to be in control for every sterilization task.

Incubators and Water-baths

- All interior and exterior surfaces are cleaned daily.
- Incubator and water-bath temperatures are monitored two times per day at least four hours apart for temperature control.

19.0 Procedures for Assessing Precision, Accuracy and Completeness

Definitions according to *Standard Methods For The Examination of Water and Wasterwater 20th Ed*.:

Precision: Measure of the degree of agreement among replicate analyses of a sample, usually expressed as the standard deviation.

Accuracy: Combination of bias and precision of an analytical procedure, which reflects the closeness of a measured value to a true value.

Bias: Consistent deviation of measured values from the true value, caused by systematic errors in a procedure.

19.1 Precision

Reproducibility among duplicate samples provides a determination of precision in analytical testing. Precision is determined by splitting actual samples which cover a wide range of concentrations and a variety of commonly encountered interfering materials.

Duplicates and Duplicate Matrix Spiked Samples are run at a frequency of every 10 to every 20 samples analyzed as specified in the particular method or SOP. Acceptable RPD (relative percent difference) results are <20% or <30% depending upon the sample matrix type analyzed and specific analysis performed.

Duplicate

A duplicate is a regular sample which is split and carried through the entire sample preparation and analysis procedure with the sample set. Duplicate results provide information regarding the sample matrix effects, and the method efficiency. Duplicate samples are run at a frequency of one for every 20 samples analyzed, or at a minimum of one per analyzed batch and matrix, whichever is greater.

Matrix Spike

A matrix spike is a regular sample that is split into three sub-samples and two of the replicates are spiked with analyte solution at the same concentration. The two spiked replicates are defined as the matrix spike and the matrix spike duplicate. The matrix spike and the matrix spike duplicate samples are carried through the sample preparation and analysis procedure with the sample set. Matrix spikes are run at a frequency of every 10 to 20 samples analyzed, or at a minimum of once per analyzed batch and matrix, whichever is greater. The matrix spike and matrix spike duplicate results provide information regarding the precision of the matrix spike and matrix spike duplicate, the sample matrix effects, and the method efficiency.

The difference between the matrix spike and the matrix spike duplicate are reported as RPD as calculated below.

$$RPD = \frac{MS - MSD}{\frac{(MS + MSD)}{2}} \times 100$$

RPD = relative percent difference
MS = Matrix Spike Result
MSD = Matrix Spike Duplicate Result

19.2 Accuracy

Accuracy is the degree of difference between observed and actual (known) values. Accuracy is determined by analyzing reference samples. Acceptable percent recoveries for matrix spikes are based upon statistical control limits. Control limits are equal to or narrower than the EPA published control limit ranges for each method.

Percent recovery calculations are determined through the following equation:

$$\% \text{ Recovery} = \frac{(C_o - C_S) \times 100}{C}$$

C_o = Concentration observed in analysis
C = True value of standard

Cs = Concentration observed in unspiked sample

Spike data can be indicative of matrix bias or interference on analyte recovery as well as sample preparation procedure performance. A spiked sample is a regular sample to which a known concentration of analyte is introduced. The sample is then carried through the entire workup or extraction and analysis procedure with the other samples in the sample set. The spike is reported as percent recovery.

20.0 Corrective Actions

The purpose of a formal corrective action process is to identify areas that require improvement and to ensure that long term corrective action is put in place to resolve the problem in a permanent manner.

Corrective actions are required any time project or method requirements are not met or as a result of audit deficiency findings. The laboratory Director and QA Director are notified immediately and the approach and time frame of the corrective action is discussed. The out-of-control situation is documented and the client is notified.

Whenever possible, a long term resolution to the occurrence is desirable. In some instances involving unusual circumstances, a long term corrective action may not be appropriate. This process is designed to handle both types of occurrences and to document the action that was taken.
A fundamental goal of the corrective action process is to foster continual improvement in laboratory operations. Corrective actions are monitored to make certain that similar problems do not recur.

Daily quality control procedures are designed to identify the need for corrective action. Most corrective actions are performed by the chemists doing the analysis, and are usually as simple as re-calibrating an instrument should the instrument check sample or CCV fall outside it's acceptable range, or resulting because of a power failure. Most corrective actions are described in methods, standard operating procedures, and instrument manuals.

Corrective actions may also be initiated as a result of various quality assurance activities, including:

- Performance audits
- System audits
- Performance evaluation or check sample studies
- Program audits, and
- Review of raw data

Standard operating procedures for corrective actions are to:

- Define the problem
- Determine the cause(s) of the problem
- Determine possible solutions to the problem
- Implement corrective action

- Verify that the corrective action is effective, and
- Document the corrective action and it's effectiveness

All employees must immediately bring to their supervisor's attention any problem or practice which they feel may affect data quality. If control parameters are outside acceptability criteria analysis must cease immediately and all affected samples must be reanalyzed when the system is corrected.

The need for corrective action may result from:

- Instrument malfunction
- Failure of internal QA/QC checks
- Failure to follow-up on performance or system audit findings
- And non-compliance with QA requirements

Corrective actions taken depend on the type of analyses and the extent of the error and are discussed with the Laboratory Supervisor and/or Laboratory Director. If the problem is indeterminate and cannot be controlled, the laboratory evaluates its impact on the data.

The QA Director and Laboratory Director shall determine that corrective actions proposed and agreed upon are actually implemented and successful. When corrective actions are implemented, evidence of their success shall be documented. Corrective action documents are to be signed and dated by the Chemist, and the Laboratory Director.

All corrective action documents are reviewed and maintained by the QA Director in the QA program files.

20.1 Client Concerns

The corrective action procedure is used to handle routine client inquiries concerning data reports. In some cases, an investigation regarding the concern may indicate that no problem was found. In other situations, the investigation may reveal a problem and the corrective action to prevent that occurrence in the future will be required.

The corrective action process involves the following actions:

- Client concerns are addressed accurately and in a timely fashion.
- The concern is properly identified and documented.
- Responsibility for investigation is assigned.
- The cause of the problem is investigated and determined.
- The appropriate long-term corrective action is determined and implemented.
- The complete corrective action process is documented.

If a new data report needs to be issued as a result of the investigation, the Laboratory Director is responsible for issuance of the revised report. All revised data are marked as such.

20.2 Criteria Used for Determining an Out-of-Control Event

Factors that affect data quality require investigation and corrective actions. All out-of-control events are investigated to determine whether the condition indicates a procedure that is truly out-of-control, or a possible random error. Any corrective actions taken are to be documented, whether the analytical batch is repeated or the data was reviewed and released to the client (included in the documentation is the rationale behind this decision).

20.3 Procedures for Stopping Analysis

Whenever an analytical system is out-of-control, investigative-corrective action is initiated. Once corrective actions have been implemented, samples may be reanalyzed. If a sample batch reanalysis is out-of-control following corrective actions, all analytical work for the method will cease immediately. A detailed investigation shall be conducted to identify the source of the problem. Sample security, integrity of standards, glassware preparation, reagents, notebooks, instrument performance, and method adherence shall be included in this investigation.

All actions taken will be documented.

21.0 Timeliness of Data Reports

EMA recognizes the timeliness of data reports is assessed as an important part of the quality of our services from the client's perspective. High quality data when received several weeks late is not acceptable. In recognition of this, EMA tracks all projects from the time they are received to the report completion and mailing (or facsimile transmission) of results. EMA's tracking procedure is designed to monitor and maintain on-time report generation.
All staff queries for their respective analyses a daily basis. Project Managers track the status of all samples as they are processed from the moment they are received through the final delivery of the report. Weekly status meetings are held to assess the status of samples processed in the laboratory. When problems arise, clients are notified well in advance.

EMA monitors our success in the timely delivery of reports to clients on a monthly basis. The date clients are promised delivery is compared to the date actually mailed or faxed to the client. This monitoring serves to identify service trends, helps to maintain timeliness, and ensures that corrective action will be taken before problems occur.

22.0 Quality Assurance Reports to Management

The QA Director completes monthly reports issued to the President and Laboratory Director of EMA regarding quality activities of the laboratory.

- A typical report includes such information as:
- Proposed revisions in the QA program;
- Performance evaluation results;
- Systems audit results;

- Changes in certification status;
- Significant QA concerns and recommendations for resolution; and,
- Accomplishments since previous report.

Copies of quality assurance reports are maintained by the QA Director in the quality assurance program files.

23.0 Quality Assurance Program Revisions

Revisions to the EMA Quality Assurance Program Manual can be made upon written approval of the Laboratory Director and the QA Director. Program revisions are to be presented to the Laboratory staff for implementation immediately following approval. Client-requested QC procedures may be incorporated on a project basis provided the procedures are not in opposition to the objectives of quality assurance and the EMA Quality Assurance Program. Revisions must be documented and kept on file for review.

Appendix A
Sampling Guidelines

General Wet Chemistry Analyses

ANALYSIS/TEST	SPECIFIC METHOD	CONTAINER Water; Soil	PRESERVATIVE	TEMPERATURE	MINIMUM SAMPLE REQUIRED Water; Soil	HOLDING TIME
Alkalinity	SMEWW 2320 B	250 ml poly; 4 oz. glass jar	UNPRESERVED	0 - 6°C	100 ml; 25 g	14 days
Ammonia	SMEWW 4500-NH3 B,C	250 ml poly; 4 oz. glass jar	**H_2SO_4 to pH < 2**	0 - 6°C	50 ml; 5 g	28 days
* BOD	SMEWW 5210 A-B	1 L poly	UNPRESERVED	0 - 6°C	1 L	48 hr
Bicarbonate	SMEWW 2320 B	250 ml poly	UNPRESERVED	0 - 6°C	100 ml	14 days
Carbonate	SMEWW 2320 B	250 ml poly; 8 oz. glass jar	UNPRESERVED	0 - 6°C	100 ml; 25 g	14 days
Chloride	SMEWW 4500 Cl- C,D	250 ml poly; 4 oz. glass jar	UNPRESERVED	0 - 6°C	50 ml; 50 g	28 days
* Chlorine, Residual	SMEWW 4500 Cl- G	125 ml poly; 4 oz. glass jar	UNPRESERVED	0 - 6°C	100 ml; 25 g	15 minutes
COD	EPA 410.4, HACH 8000	125 ml poly; 4 oz. glass jar	**H_2SO_4 to pH < 2**	0 - 6°C	25 ml; 5 g	28 days
* Coliform (Total+Fecal)	SMEWW 9221 B, E	100 ml poly-bacti	**Sodium Thiosulfate**	0 - 6°C	100 ml	6 hrs**/24hrs**
* Coliform (Total+E. Coli) by Colilert	SMEWW 9223, Colilert®	100 ml poly-bacti	**Sodium Thiosulfate**	0 - 6°C	100 ml	6 hrs**/24hrs**
Conductivity (E.C.)	EPA 120.1, SMEWW 2510 B	125 ml poly	UNPRESERVED	0 - 6°C	25 ml	28 days
Cyanide (liquid)	EPA 9014, SMEWW 4500 CN C	500 ml poly	**NaOH to pH > 12**	0 - 6°C	250 ml	14 days
Cyanide (solid)	EPA 9014	4 oz. glass jar	UNPRESERVED	0 - 6°C	25 g	14 days
* Fecal Streptococcus & Enterococcus Groups	SMEWW 9230, Enterolert®	100 ml poly	**Sodium Thiosulfate**	0 - 6°C	100 ml	6 hrs**/24hrs**
Flashpoint	EPA 1010, 1030	250 ml poly; 4 oz. glass jar	UNPRESERVED	0 - 6°C	100 ml; 100 g	none
Fluoride	EPA 9214, SMEWW 4500 F C	250 ml poly; 4 oz. glass jar	UNPRESERVED	0 - 6°C	100 ml; 25 g	28 days
* Heterotrophic Plate Count	SMEWW 9215 B	100 ml poly	**Sodium Thiosulfate**	0 - 6°C	100 ml	6 hrs**/24hrs**
* Hexavalent Chrome (Cr+6)	EPA 3060, EPA 7196 A, SMEWW 3500 Cr D	250 ml poly; 4 oz. glass jar	UNPRESERVED	0 - 6°C	50 ml; 10 g	24 hr
* MBAS (Surfactants)	SMEWW 5540 C	250 ml poly; 4 oz. glass jar	UNPRESERVED	0 - 6°C	200 ml; 10 g	48 hr
* Nitrate	SMEWW 4500 NO3 E	250 ml poly; 4 oz. glass jar	UNPRESERVED	0 - 6°C	100 ml; 100 g	48 hr
* Nitrite	SMEWW 4500 NO2 B	250 ml poly; 4 oz. glass jar	UNPRESERVED	0 - 6°C	100 ml; 100 g	48 hr
Nitrogen; TKN	SMEWW 4500 N C	250 ml poly; 4 oz. glass jar	**H_2SO_4 to pH < 2**	0 - 6°C	50 ml; 10 g	28 days
* pH	EPA 9045 C, SMEWW 4500 H+ B	250 ml poly; 4 oz. glass jar	UNPRESERVED	0 - 6°C	25 ml; 10 g	15 minutes
Phenols, Total	EPA 420.1, 9065	250 ml Amber; 4 oz. glass jar	**H_2SO_4 to pH < 2**	0 - 6°C	250 ml; 50 g	28 days
* Phosphate, Ortho	SMEWW 4500 P E, HACH 8048	125 ml poly; 4 oz. glass jar	UNPRESERVED	0 - 6°C	50 ml; 10 g	15 minutes
Phosphorus, Total	SMEWW 4500 P E, HACH8190	125 ml poly; 4 oz. glass jar	**H_2SO_4 to pH < 2**	0 - 6°C	50 ml; 5 g	28 days
* Solids, Settleable (SS)	SMEWW 2540 F	1 L poly	UNPRESERVED	0 - 6°C	1 liter	48 hr
Solids, Total Dissolved (TDS)	SMEWW 2540 C	250 ml poly	UNPRESERVED	0 - 6°C	100 ml	7 days
Solids, Total Suspended (TSS)	SMEWW 2540 D	250 ml poly	UNPRESERVED	0 - 6°C	100 ml	7 days
Solids, Total	SMEWW 2540 B	250 ml poly	UNPRESERVED	0 - 6°C	100 ml	7 days
Sulfate	SMEWW 4500 SO4 E	250 ml poly; 4 oz. glass jar	UNPRESERVED	0 - 6°C	100 ml; 25 g	28 days
Sulfide, Total	EPA 9034, SMEWW 4500 S D	250 ml poly; 4 oz. glass jar	**NaOH/Zn Acetate**	0 - 6°C	50 ml; 5 g	7 days
Sulfide, Dissolved	SMEWW 4500 S D	250 ml poly; 4 oz. glass jar	UNPRESERVED	0 - 6°C	50 ml; 5 g	7 days
Total Organic Carbon (TOC)	EPA 9060, SMEWW 5310 B	125 ml Amber; 4 oz. glass jar	**H_2SO_4 to pH < 2**	0 - 6°C	50 ml; 10 g	28 days
* Turbidity	SMEWW 2130 B	250 ml poly	UNPRESERVED	0 - 6°C	50 ml	48 hr
Total Volatile Solids (TVS or VSS)	SMEWW 2540 E	250 ml poly	UNPRESERVED	0 - 6°C	100 ml	28 days

g-gram ml-milliliter

* These analyses have short holding times. Please coordinate delivery time for these analyses.

** Recommended holding times for coliforms are 6 hours. Between 6 - 24 hours holding results become questionable. After 24 hours holding, results are considered unacceptable.

4340 Viewridge Ave., Suite A
San Diego, CA 92123
Phone/Fax: (858) 560-7717 / (858) 560-7763

Organic Analyses

ANALYSIS/TEST	SPECIFIC METHOD(S)	CONTAINER Water; Soil	PRESERVATIVE	TEMPERATURE	MINIMUM SAMPLE REQUIRED Water; Soil	HOLDING TIME Water^; Soil
Oil & Grease	EPA 1664A	1 L amber	**HCl to pH < 2**	0 - 6°C	1 L	28 days
Oil & Grease	EPA 413.2	500 ml amber; 4 oz. glass jar	**H_2SO_4 to pH < 2 for liquids**	0 - 6°C	500 ml; 50 g	28 days
TRPH	EPA 418.1	500 ml amber; 4 oz. glass jar	**H_2SO_4 to pH < 2 for liquids**	0 - 6°C	500 ml; 5 g	28 days
Purgeable Halocarbons (Chlorinated Solvents)	EPA 601, EPA 8021 B	(2) 40 ml VOA Vial; 4 oz. glass jar	**HCL to pH < 2 for liquids**	0 - 6°C	40 ml; 40 g	14 days
Aromatic Volatile Organics	EPA 602, EPA 8021 B	(2) 40 ml VOA Vial; 4 oz. glass jar	**HCL to pH < 2 for liquids**	0 - 6°C	40 ml; 40 g	14 days
Organochlorine Pesticides and PCBs	EPA 608, EPA 8081, EPA 8082	1 Liter Amber; 8 oz. glass jar	UNPRESERVED	0 - 6°C	1 L; 30 g	7/40; 14 days
Organophosphorous Pesticides	EPA 8141	1 Liter Amber; 8 oz. glass jar	UNPRESERVED	0 - 6°C	1 L; 40 g	7/40; 14 days
Volatile Organic Compounds (VOCs)	EPA 624, EPA 8260 B	(2) 40 ml VOA Vials; 4 oz. glass jar	**HCL to pH < 2 for liquids**	0 - 6°C	40 ml; 40 g	14 days
Semi Volatile Organics (SVOCs)	EPA 625, EPA 8270 C	1 Liter Amber; 8 oz. glass jar	UNPRESERVED	0 - 6°C	1 L; 40 g	7/40; 14/40 days
Organotin Compounds - Tributyltins (TBT)	GCFPD	1 Liter Amber; 8 oz. glass jar	UNPRESERVED	0 - 6°C	1 L; 40 g	7/40; 14/40 days
Total Petroleum Hydrocarbons (TPH) - Gas	EPA 8015 B, DOHS LUFT Method (liquid), ASTM D2887 (solid)	(2) 40 ml VOA Vials; 4 oz. glass jar	**HCL to pH < 2 for liquids**	0 - 6°C	40 ml; 10 g	14 days
Total Petroleum Hydrocarbons (TPH) - Diesel	EPA 8015 B, DOHS LUFT Method (liquid), ASTM D2887 (solid)	125 ml Amber; 4 oz. glass jar	**HCl to pH < 2 for liquids**	0 - 6°C	40 ml; 10 g	14 days

Metals Analyses

ANALYSIS/TEST	SPECIFIC METHOD(S)	CONTAINER Water; Soil	PRESERVATIVE	TEMPERATURE	MINIMUM SAMPLE REQUIRED Water; Soil	HOLDING TIME
Hexavalent Chrome (Cr+6)	EPA 3060, EPA 7196 A, SMEWW 3500 Cr D	250 ml poly; 8 oz. glass jar	UNPRESERVED	0 - 6°C	50 ml; 10 g	28 days (with preservation)
Mercury	EPA 245.1, EPA 7471, EPA 7470	500 ml poly; 4 oz. glass jar	**HNO_3 to pH < 2**	0 - 6°C	500 ml; 100 g	28 days
Metals*	EPA 6010, EPA 6020, EPA 3050, EPA 200.7, EPA 200.8	500 ml poly; 8 oz. glass jar	**HNO_3 to pH < 2**	0 - 6°C	500 ml; 100 g	6 mos
STLC metals	Title 22-WET	500 ml poly; 8 oz. glass jar	UNPRESERVED	0 - 6°C	500 ml; 200 g	Method Dependant
SPLP metals	EPA 1312	500 ml poly; 8 oz. glass jar	UNPRESERVED	0 - 6°C	500 ml; 200 g	Method Dependant
TCLP metals	EPA 1311	500 ml poly; 8 oz. glass jar	UNPRESERVED	0 - 6°C	500 ml; 200 g	Method Dependant

* Including but not limited to: Al, Ag, As, B, Ba, Be, Ca, Cd, Co, Cr, Cu, Fe, Mn, Mg, Mo, Na, Ni, Pb, Sb, Se, Sn, Tl, Ti, V, Zn

^ 7/40, 14/40 refers to hold time before extract/hold time after extract

Appendix B
Sample Report

EnviroMatrix Analytical, Inc.

03 November 2003

Enviromatrix Analytical, Inc
Attn: Dave Renfrew
4340 Viewridge Ave., Suite A
San Diego, CA 92123

EMA Log #: 0208147

Project Name: Soil 39

Enclosed are the results of analyses for samples received by the laboratory on 08/15/02 08:59. Samples were analyzed pursuant to client request utilizing EPA or other ELAP approved methodologies. I certify that this data is in compliance both technically and for completeness.

Dan Verdon
Laboratory Director

CA ELAP Certification #: 1931

Client Name: Enviromatrix Analytical, Inc	**EMA Log #: 0208147**
Project Name: Soil 39	

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Soil-39 Anions	0208147-01	Soil	08/15/02 08:00	08/15/02 08:59
Known Anions	0208147-02	Soil	08/15/02 08:00	08/15/02 08:59
Known pH	0208147-06	Soil	08/15/02 08:00	08/15/02 08:59
Known Cr+6	0208147-08	Soil	08/15/02 08:00	08/15/02 08:59

Client Name: Enviromatrix Analytical, Inc | EMA Log #: 0208147
Project Name: Soil 39

Conventional Chemistry Parameters by Standard/EPA Methods

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Soil-39 Anions (0208147-01) Soil Sampled: 08/15/02 08:00 Received: 08/15/02 08:59									
Fluoride	**67.0**	3.00	mg/kg	2	2090409	09/03/02	09/03/02	EPA 9214	
Known Anions (0208147-02) Soil Sampled: 08/15/02 08:00 Received: 08/15/02 08:59									
Chloride	**320**	0.5	mg/kg	1	2091809	09/17/02	09/17/02	SM4500 Cl C	A-01a
Fluoride	**87.5**	7.50	"	5	2090409	09/03/02	09/03/02	EPA 9214	
Sulfate as SO4	**2660**	50.0	"	1	2092006	09/19/02	09/19/02	SM4500 SO4 E	
Known pH (0208147-06) Soil Sampled: 08/15/02 08:00 Received: 08/15/02 08:59									
pH	**4.28**	0.10	pH Units	1	2082706	08/26/02	08/26/02	EPA 9045B	A-01
Known Cr+6 (0208147-08) Soil Sampled: 08/15/02 08:00 Received: 08/15/02 08:59									
Hexavalent Chromium	**90.2**	4.00	mg/kg	5	2082908	08/26/02	08/27/02	EPA 7196A	

Client Name: Enviromatrix Analytical, Inc		EMA Log #: 0208147
Project Name: Soil 39		

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2082706										
Reference (2082706-SRM1)				Prepared & Analyzed: 08/26/02						
pH	8.85	0.10	pH Units	9.10		97	96.7-103.3			
Batch 2082908										
Blank (2082908-BLK1)				Prepared: 08/26/02 Analyzed: 08/27/02						
Hexavalent Chromium	ND	0.800	mg/kg							
LCS (2082908-BS1)				Prepared: 08/26/02 Analyzed: 08/27/02						
Hexavalent Chromium	32.0	0.800	mg/kg	40.0		80	80-120			
LCS Dup (2082908-BSD1)				Prepared: 08/26/02 Analyzed: 08/27/02						
Hexavalent Chromium	32.4	0.800	mg/kg	40.0		81	80-120	1	20	
Duplicate (2082908-DUP1)		**Source: 0208147-08**		Prepared: 08/26/02 Analyzed: 08/27/02						
Hexavalent Chromium	89.6	4.00	mg/kg		90.2			0.7	20	
Batch 2090409										
Blank (2090409-BLK1)				Prepared & Analyzed: 09/03/02						
Fluoride	ND	1.50	mg/kg							
LCS (2090409-BS1)				Prepared & Analyzed: 09/03/02						
Fluoride	1.00	0.100	mg/kg	1.00		100	80-120			
LCS Dup (2090409-BSD1)				Prepared & Analyzed: 09/03/02						
Fluoride	1.00	0.100	mg/kg	1.00		100	80-120	0	20	

Client Name:	Enviromatrix Analytical, Inc	EMA Log #: 0208147
Project Name:	Soil 39	

Conventional Chemistry Parameters by Standard/EPA Methods - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch 2090409										
Duplicate (2090409-DUP1)		**Source: 0208147-01**		Prepared & Analyzed: 09/03/02						
Fluoride	67.0	3.00	mg/kg		67.0			0	20	
Batch 2091809										
Blank (2091809-BLK1)				Prepared & Analyzed: 09/17/02						
Chloride	ND	0.05	mg/kg							
LCS (2091809-BS1)				Prepared & Analyzed: 09/17/02						
Chloride	194	0.05	mg/kg	200		97	80-120			
LCS Dup (2091809-BSD1)				Prepared & Analyzed: 09/17/02						
Chloride	200	0.05	mg/kg	200		100	80-120	3	20	
Batch 2092006										
Blank (2092006-BLK1)				Prepared & Analyzed: 09/19/02						
Sulfate as SO4	ND	50.0	mg/kg							
LCS (2092006-BS1)				Prepared & Analyzed: 09/19/02						
Sulfate as SO4	10.3	10.0	mg/kg	10.0		103	80-120			
LCS Dup (2092006-BSD1)				Prepared & Analyzed: 09/19/02						
Sulfate as SO4	10.5	10.0	mg/kg	10.0		105	80-120	2	20	
Duplicate (2092006-DUP1)		**Source: 0208147-02**		Prepared & Analyzed: 09/19/02						
Sulfate as SO4	2960	50.0	mg/kg		2660			11	20	

Notes and Definitions

A-01	24 hour holding time does not apply to PT samples.
A-01a	Sample for internal QC
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference

Appendix C
Chain-Of-Custody Form

CHAIN-OF-CUSTODY RECORD

EnviroMatrix Analytical, Inc.

4340 Viewridge Ave., Ste. A - San Diego, CA 92123 - Phone (858) 560-7717 - Fax (858) 560-7763

EMA LOG #:

EMA DATE/TIME STAMP

Client:

Address:

Attn: Phone:

Sampled by: Fax:

Billing Address:

Project: PO #:

REQUESTED ANALYSIS

EMA ID #	Client Sample ID	Sample Date	Sample Time	Sample Matrix	Container(s) #	Type*	418.1 (TRPH)	Oil & Grease 413.1___ 413.2___ 1664___	TPH (8015B) Gas___ Diesel___	TPH-Extended 8015B ___ ASTM D2887___	602 / 8021 B BTXE___ MTBE___	601 / 8021 B (Volatile Organics)	EPA 8021 B Aromatics__ Halogenated__	608 / 8081 (Pesticides)	608 / 8082 (PCB's)	624 / 8260 (Volatile Organics)	625 / 8270 (Semi Volatile Organics)	TTLC Metals (CAC Title 22)	STLC Metals (CAC Title 22)	TCLP (RCRA) Metals___ Organics___	Cd Cr Cu Pb Ni Ag Zn	pH EC TSS							
1																													
2																													
3																													
4																													
5																													
6																													
7																													
8																													
9																													
10																													

*Container Types: B=Brass Tube; V=VOA; G=Glass; P=Plastic; O=Other (list)

Tamper-Proof Seals Intact: Yes No N/A

Correct Containers: Yes No

Sample(s): Cold Ambient Warm

VOAs w/ZHS: Yes No N/A

All Samples Properly Preserved: Yes No N/A

Disposal: N/C (aqueous) *EMA (@$5.00/sample) Return Hold

Turnaround Time: 24 hr 48 hr 3 day 4 day 5 day Normal

Comments:

RELINQUISHED BY	DATE/TIME	RECEIVED BY
Signature		Signature
Print		Print
Company:		Company:
Signature		Signature
Print		Print
Company:		Company:
Signature		Signature
Print		Print
Company:		Company:

* EMA reserves the right to return samples that do not match our waste profile.

White - EMA Canary - Accounting Pink - Client (w/Report) Goldenrod - Client (Relinquish Samples

Appendix D
Corrective Action Form

EnviroMatrix Analytical, Inc.

CORRECTIVE ACTION FORM

ISSUED TO: RESPONSE REQUIRED BY:

CORRECTIVE ACTION REQUESTED BY:
DATE:

____(ISSUER) WILL PROVIDE A BRIEF DESCRIPTION OF HOW PROCEDURE WAS DETERMINED TO BE OUT-OF-CONTROL:

OUT-OF-CONTROL PROCEDURE(s):

LIST SAMPLE I.D.(s) AFFECTED:

DESCRIBE IMMEDIATE ACTION TAKEN TO REMEDY SITUATION:

DESCRIBE FINAL PLANNED ACTION WHICH WILL CORRECT PROBLEM, EXPECTED DATE OF FINAL PLANNED ACTION, AND HOW YOU INTEND TO PREVENT RECURRENCE OF THE PROBLEM:

SIGNATURE:____ DATE:________________

REVIEWED BY:___________________________________ DATE:_______________

Appendix E
List of Analytical Services and Methods

Analytical Services and Methods

ANALYSIS	40 CFR	SW-846	OTHER
Oil & Grease			EPA 413.2, 1664A
Total Recoverable Petroleum Hydrocarbons (TRPH)			EPA 418.1
Purgeable Halocarbons	EPA 601		
Purgeable Aromatics	EPA 602		
Organochlorine Pesticides	EPA 608	EPA 8081A	
Organophosphorus Pesticides (OPP)		EPA 8141A	
Oxygenates		EPA 8260B	
Volatile Organics	EPA 624	EPA 8260B (8021B)	
Semi-Volatile Organics	EPA 625	EPA 8270C	
Benzene, Toluene, Xylenes Ethylbenzene, (MTBE)	mod EPA 602	EPA 8260B (8021B)	
Total Petroleum Hydrocarbons (TPH)			EPA 8015B, ASTMD 2887, LUFT
PCBs	EPA 608	EPA 8082	
Extraction Methods		EPA 3510,3520,3540C 3550,3580	
Clean-up Methods		EPA 3610,3620,3630, 3640A,3660,3665	
Multiple Extraction Procedure		EPA 1320	
SPLP		EPA 1312	
STLC (WET)			CCR Chapter 11, Article 5, Appendix II
TCLP		EPA 1311	
Title 22			Title 22
Organotin Compounds (Tributyltin - TBT)			GC-FPD

Analytical Services and Methods (continued)

ANALYSIS	40 CFR	SW-846	OTHER
Aluminum	EPA 200.7, 200.8	EPA 6010B, 6020	
Antimony	EPA 200.7, 200.8	EPA 6010B, 6020	
Arsenic	EPA 200.8	EPA 6020	
Barium	EPA 200.7, 200.8	EPA 6010B, 6020	
Beryllium	EPA 200.7, 200.8	EPA 6010B, 6020	
Boron	EPA 200.7	EPA 6010B	
Cadmium	EPA 200.7, 200.8	EPA 6010B, 6020	
Calcium	EPA 200.7	EPA 6010B	
Chromium	EPA 200.7, 200.8	EPA 6010B, 6020	
Cobalt	EPA 200.7, 200.8	EPA 6010B, 6020	
Copper	EPA 200.7, 200.8	EPA 6010B, 6020	
Gold	EPA 200.7	EPA 6010B	
Hardness	EPA 200.7		SM2340 B
Iron	EPA 200.7, 200.8	EPA 6010B, 6020	
Lead	EPA 200.7, 200.8	EPA 6010B, 6020	
Magnesium	EPA 200.7	EPA 6010B	
Manganese	EPA 200.7, 200.8	EPA 6010B, 6020	
Mercury	EPA 245.1	EPA 7470A, 7471A	
Molybdenum	EPA 200.7, 200.8	EPA 6010B, 6020	
Nickel	EPA 200.7, 200.8	EPA 6010B, 6020	
Potassium	EPA 200.7	EPA 6010B	
Selenium	EPA 200.7, 200.8	EPA 6010B, 6020	
Silver	EPA 200.7, 200.8	EPA 6010B, 6020	
Sodium	EPA 200.7	EPA 6010B	
Thallium	EPA 200.7, 200.8	EPA 6010B, 6020	
Tin	EPA 200.7	EPA 6010B	
Titanium	EPA 200.7	EPA 6010B	
Vanadium	EPA 200.7, 200.8	EPA 6010B, 6020	
Zinc	EPA 200.7, 200.8	EPA 6010B, 6020	
Digestion Methods	EPA 200.7, 200.8, 245.1	EPA 3010A,3020A 3050B,7470,7471	

Analytical Services and Methods (continued)

ANALYSIS	40 CFR	SW-846	OTHER
Acidity		SM2310 B	
Alkalinity-(Bi)Carbonate		SM2320 B	
Ammonia		SM4500-NH_3 B,C (18th)	
AVS-SEM			EPA 821R-91-100
BOD		SM5210 B	
Carbon Dioxide		SM4500 CO2 C	
cBOD		SM5210 B	
COD			EPA 410.4, HACH 8000
Chloride		SM4500-Cl C,D	
Chlorine, Residual		SM4500-Cl G	
Chromium VI		SM3500 Cr D (18th/19th)	EPA 7196A
Coliforms (Total and Fecal)		SM9221 A,B,C,E	
Coliforms (Total) and E. Coli by Colilert		SM9223	Colilert®
Color (True & Apparent)		SM2120 B	
Color (Solid)			Munsel Chart
Conductivity		SM2510 B	EPA 120.1
Cyanide (Reactive)		SM4500-CN C,E,G,I (Section 7.3 SW-846)	EPA 9014
Dissolved Oxygen		SM4500-O G	
Enterococcus		SM9230 C	Enterolert ®
Fecal Streptococcus		SM9230 C	
Flash Point (Ignitability)			EPA 1010,1030
Fluoride		SM4500-F C	EPA 9214
Heterotrophic Plate Count		SM9215 B	
Hexavalent Cr		SM3500 Cr D (18th/19th)	EPA 7196A
Langliers Index (Calc)		SM2330 B	
MBAS		SM5540 C	
Nitrate		SM4500-NO_3 E	
Nitrite		SM4500-NO_2 B	

Analytical Services and Methods (continued)

ANALYSIS	**40 CFR**	**SW-846**	**OTHER**
Nitrogen, TKN/Total Organic Nitrogen		SM4500 N C	
Odor		SM2150 B	
Oxygen Consumption Rate		SM2710 B	
Paint Filter			EPA 9095 A
pH		SM4500-H+ B	EPA 9045 C
Phenols			EPA 420.1, 9065
Phosphate , Ortho		SM4500-P E	HACH 8048
Phosphorus, Total		SM4500-P E	HACH 8190
Salinity		SM2520 B	
Settleable Solids		SM2540 F	
% Solids/Dry Weight		SM2540 G	
Solids, Total/Dissolved		SM2540 C	
Solids, Total Suspended		SM2540 D	
Sulfate		SM4500-SO_4 E	
Sulfide (Reactive)		SM4500-S D,F (Section 7.3 SW-846)	EPA 9034
Residue – Total/Filterable/Non-Filterable/Settleable		SM2540 B,C,D,F	
Temperature		SM2550 B	
Total Organic Carbon (TOC) – Dissolved Organic Carbon (DOC)		SM5310 B *Currently Sub-Contracted	EPA 9060 (TOC) *Currently Sub-Contracted
Turbidity		SM2130 B	
VSS, VDS		SM2540 E	

Appendix F
List of Instrumentation and Equipment

Instrumentation

To meet our needs for accurate analytical results, EMA uses sophisticated instruments. Our instruments are calibrated to comply with regulatory detection limits in the parts per billion (ppb) and parts per million (ppm) detection ranges. Listed below are the key instruments that we use for inorganic and organic analyses.

#	INORGANIC INSTRUMENTS	MAKE	MODEL
	Inductively Coupled Argon Plasma-Mass Spectrometry (ICP-MS)		
1	ICP-MS Spectrophotometer	Agilent	7500-cx
	Inductively Coupled Argon Plasma-Atomic Emission Spectrometry (ICP-AES)		
1	ICP-AES Spectrophotometer	Perkin-Elmer	5300-DV
1	Automated Mercury Analyzer (Cold Vapor/Atomic Absorption Spectrophotometer)	Teledyne Leeman Labs	Hydra II_{AA}
	Miscellaneous		
2	48-Well Block Digestor	CPI International	ModBlock
2	10-Position Distillation Block	Enviromental Express	

#	ORGANIC INSTRUMENTS	MAKE	MODEL
	Gas Chromatography/Mass Spectrometry		
1	GC/MS	Agilent	5973N
1	GC/MS	Agilent	5973
1	GC/MS	Hewlett Packard	5970S
6	GC	Hewlett Packard	5890A
2	GC	Hewlett Packard	6890
1	GC	Perkin Elmer	Claris 600
	Gas Chromatograph Detectors		
3	Mass Spectrometer Detectors		
4	Flame Ionization Detectors		
2	Electron Capture Detectors		
1	Photo Ionization Detectors		
1	Hall Detector (Electrolytic Conductivity)		
1	Flame Photometric Detector		
1	Nitrogen-Phosphorus Detector		

Instrumentation (continued)

#	ORGANIC INSTRUMENTS	MAKE	MODEL
	Sample Introduction		
3	Purge and Trap	OI	4460
1	Purge and Trap	OI	MPM-16
1	Purge and Trap	OI	Eclipse/4560
3	VOC Autosampler	OI	4552
	Spectrophotometers		
1	Infrared Spectrophotometer	Buck Scientific	404
1	UV/Visible Spectrophotometer	HACH	DR3000
	Miscellaneous		
1	Accelerated Solvent Extractor	Dionex	ASE 200
1	Accelerated Solvent Extractor	Dionex	ASE 300
1	GPC Cleanup System	Waters	717
1	Nitrogen Blowdown System	Zymark	TurboVap

In addition to the above listed organic chemistry and inorganic chemistry laboratory equipment, EMA maintains a full wet chemistry laboratory for performing spectrophotometric, titrimetric, and gravimetric analysis and a microbiology laboratory.

Appendix G
Professional Profiles of Key Personnel

Key Personnel

Leland Stanton Pitt, B.S., M.S.
President

Education: **Master's of Science in Chemistry, 1981**
Delta State University, Cleveland, Mississippi

Bachelor of Science Degree in Biology and Physics, minor in Mathematics, 1969
University of New Mexico, Albuquerque, New Mexico

Professional Experience:

Certified Industrial Hygienist: Southland Labs, Inc. #4303
Certified Marine Chemist: Pacific Chemical Labs, Inc. #654
Certified Asbestos Consultant: Southland Labs, Inc. #97-2209

President
EnviroMatrix Analytical, Inc., San Diego, CA
2002-Present

Responsible for overall business management, business development and strategic planning. As the President EnviroMatrix Analytical, Inc. he is responsible for directing the activities of the business. Responsible for the strategic direction of the laboratory and business development. He provides consultation and recommendation to various clients to determine the specifics of project requirements.

President and Manager
H.M. Pitt Labs, Inc., San Diego, CA
1986-Present

H.M. Pitt Labs, Inc. is an analytical lab specializing in environmental studies and industrial hygiene. Mr. Pitt is currently the consulting CIH for The Port of San Diego, Ninyo & Moore, an environmental and geotechnical science group, and Westair Technologies. As the consulting CIH, Mr. Pitt typically reviews and approves abatement plans (both asbestos and lead, as well as other programs), and is responsible for monitoring and inspections. H.M.Pitt Labs does the monitoring and abatement review for Pacific Ship Repair and Southwest Marine, which removes insulation and asbestos on Navy ships. As a Marine Chemist, he certifies Navy ships and land tanks in the San Diego area and elsewhere when requested. He was the primary Marine Chemist and CIH on the Exxon Valdez ship repair.

Leland Stanton Pitt, B.S., M.S.
President (Continued)

Chemist and Gas Free Engineer
Long Beach Naval Shipyard, Long Beach, CA
1983-1986

Program Manager responsible for certifying spaces and shipboard as safe for production work in shipbuilding and repair. Work required knowledge of general safety and health regulations of CFR 1910, 1915, and 1926, as well as the pertinent Federal, State and D.O.D. regulations. Responsible for technical supervision of 15-25 technicians. Required knowledge of instrumentation associated with analytical chemistry. Civilian equivalent of this position is a Marine Chemist. Required to sample, identify, and quantify typical work place stressors associated with the industrial hygiene-monitoring program. Worked in the chemistry department at the shipyard doing analytical viscosity determinations, flashpoint, fire point, pH, water concentration, particle count, etc. Performed environmental analysis of industrial hygiene samples, i.e., asbestos, lead, organic solvents, etc., utilizing gas chromatography (GC), atomic absorption spectrometry (AA), and infrared spectrophotometers (IR).

Chemist
Office of Safety and Health, Mare Island Naval Shipyard, Vallejo, CA
1981-1983

Responsibilities included monitoring ships and industrial areas for potentially hazardous environments, and enforcing federal safety regulations. Use of various detection equipment: gas chromatography, infrared spectrophotometer analysis (qualitative and quantitative), as well as other methods. Functioned as an assistant gas free engineer and was responsible for certifying confined spaces on ships, fuel tanks, cofferdams and other voids. Began work in industrial hygiene department assisting CIH, IH and IH technicians in survey work on various shipyard stressors: asbestos, lead, solvents, ventilation, noise, etc.

Research Biologist
Stauffer Chemical Company, Greenville, MS
1975-1981

Assigned to Stauffer's experimental research station. Responsible for insecticide, fungicide, plant growth regulators, antidote and insect growth regulators.

Leland Stanton Pitt, B.S., M.S.
President (Continued)

AREAS OF SPECIALTY:

Effects of insecticide, fungicide, plant growth regulators, etc. on soybeans, milo, corn, with some work on barley and wheat. Soybean work has been centered on Verman and other related thiocarbamate herbicides. Corn research responsibilities included varietal testing with Stauffer's proprietary herbicides Sutan, Eptam and Vernam. Also basic antidote work on experimental corn antidotes and herbicides were performed.

Small plot techniques for insecticide screening. These techniques for insecticide screening were developed in order to cope with small technical samples.

Cotton insecticide work with pesticide interaction in both the antidote and insecticide field program.

Research efforts with Imidan on cotton, vegetable crops and fruit trees.

Soybean fungicide work with Captan and other coded experimental biocides.

Paint biocide screening of coded materials for use in commercial paints. Interest in these tests is centered on fungal discoloration and chemical compatibility. Both weathered and new wood surfaces are used.

ADDITIONAL DUTIES:

Respirator coordinator, 1980-81. Solely responsible for Stauffer's respirator program at the Mississippi field station. This included selecting the appropriate DOT and NIOSH certified respirators in accordance with federal regulations and Stauffer's own respirator program.

In January 1981 I attended and graduated from the Occupational Health Services respirator course given by John Pritchard and was certified.

Safety coordinator at the Mississippi field station 1975-78. Responsibilities included respirator monitoring and insuring the compliance to Stauffer's safety program (chemical exposures and handling machinery safety; EPA and OSHA regulations, etc.).

Head of Stauffer's synergist program January 1973 to September 1975. Responsible for developing new and sophisticated bioassay techniques which opened new leads in search of broad spectrum (field crop) synergists beyond household use. Developed ovicide program in two diverse areas: insect growth regulators and formamidine insecticides.

Assigned to Stauffer's Western Research Center Mt. View, Ca. Helped improve screening techniques, which lead to new classes of selective slow acting insecticides. Developed statistical interpretation of joint action.

Leland Stanton Pitt, B.S., M.S.
President (Continued)

Screened experimental compounds for insecticidal/miticidal activity, October 1969 to January 1973. Following this initial testing, more extensive testing was initiated on those leads which seemed both novel and potentially profitable.

Worked as a technician from1968-1969 in rearing insects and functioned as a lab technician in the biochemistry lab.

RELATED EXPERIENCE:

Master's Thesis work done in "Insecticidal Activity of several benzamides and nicotinamides on the Tobacco Budworm (Heliothis virescens).

Graduate work in Chemistry in synthesizing analogs of Dimilin to determine structure/activity relationships and possible new chemical properties of related ureides.

General laboratory experience including radioactive tracing techniques (TLC and liquid scintillation work).

UNITED STATES PATENTS:

#4,123,526

Patented October 31, 1978

THIONOPHOSPHATE INSECTICIDE ACTIVATORS

Assignors Stauffer Chemical Company

George B. Large and Leland S. Pitt

#4,096,251

Patented June 20, 1978

DIETHYL 2-PYRIDINE THIONOPHOSPHONATE AS AN INSECTICIDE ACTIVATOR

Assignors, Stauffer Chemical Company

Leland S. Pitt, George B. Large, Alan MacDonald

#4,083,970

Patented April 11, 1978

ACTIVATED INSECTICIDE COMPOSITION EMPLOYING A CERTAIN PHOSPHORODITIOATE AND AN ACTIVATOR

Assignors Stauffer Chemical Company

George B. Large And Leland S. Pitt

Leland Stanton Pitt, B.S., M.S.
President (Continued)

#4,072,745

Patented July 12, 1977

SUBSTITUTED VINYL THIOPHOSPHATE ACTIVATORS

Assignors Stauffer Chemical Company

Leland S. Pitt and George B. Large

#4,035,490

Patented July 12, 1977

INSECTICIDAL PHTHALIMIDOTHIOPHOSPHATES ACTIVATED WITH CERTAIN PHOSPHOROTHIONATES

Assignors Stauffer Chemical Company

George B. Large and Leland S. Pitt

#3,830,887

Patented August 20, 1974

O,) –DILOWERALKYL-O-(1-METHYL-2-PHENYL VINYL) THIOPHOSPHATES

Assignors Stauffer Chemical Company

George B. Large and Leland S. Pitt

PROFESSIONAL ORGANIZATIONS:

Marine Chemists Association

Industrial Hygiene Association

American Chemical Society

Daniel Verdon, B.S.
Laboratory Director

Education: **Bachelor of Science in Chemistry, minor in Computer Science, 1990**
Westmont College, Santa Barbara, California

Professional Experience:

Laboratory Director
EnviroMatrix Analytical, Inc., San Diego, CA
2003 – Present

Responsible for overall management of analytical laboratory production. Selection, training, and directing activities of chemistry laboratory personnel including compensation and termination. Extensive experience with current state, local and federal regulations. Oversees laboratory operations to ensure quality data reduction and review, and ensures that project specifications are met. Holds weekly status meetings to discuss current project status, analyses schedule, and any potential problems or irregularities with laboratory operations.

Senior Chemist
EnviroMatrix Analytical, Inc., San Diego, CA
1993 - 2003

Responsible for all volatile organic compound analyses by Gas Chromatography (GC) and Gas Chromatography Mass Spectrometry (GC/MS), following methods EPA 601, EPA 8010, EPA 624, EPA 8240 and EPA 8260 . Performs all systems maintenance and method development. Responsible for data review and systems management. Ensures that all volatile GC and GC/MS work is performed in compliance with all local, state and federal regulations, and quality assurance program requirements. Additionally, responsible for method and procedure development, and training other analysts.

Environmental Specialist
IT Corporation, Irvine, CA
1992 - 1993

Responsible for operation of mobile chemistry laboratory. Perform field Gas Chromatography analysis. Management and tracking of all CLP data validation projects. Performed CLP data validation (Levels C and D) for HAZWRAP and Comprehensive Long-Term Environmental Action Navy (CLEAN) projects.

Field Analytical Specialist
IT Corporation, Irvine, CA
1990 - 1992

Responsible for sampling and monitoring of ground-water wells, soils, and air at potentially contaminated sites. Performed on-site physical and chemical analyses. Sampled and monitored ground-water wells, industrial discharge, and contaminated soils at various commercial and military facilities.

Daniel Verdon, B.S.
Laboratory Director (Continued)

Consultant
G.V. Industries, Santa Barbara, CA
1990

Development of hazardous waste conformance plan to meet local, state and federal regulations. Development and implementation of emergency response program for G.V. facilities that met local and state regulatory requirements.

Research Assistant
Chemistry Department at Westmont College, Santa Barbara, CA
1989

Development and testing of microprocessor controlled pulse train generator and photon counter for application in optically detected magnetic resonance spectroscopy.

Laboratory Technician
Whittaker Corporation Research Laboratory, Colton, CA
1987 - 1988

Development, testing and formulation of industrial coil coatings (paint) for new product lines.

Training and Certificates:
OSHA 40 Hour 29 CFR 1910.120, November 1990
OSHA 8 Hour 29 CFR 1910.120 Refresher, (Annually)
Chemical Hygiene & Laboratory Safety OSHA and 29 CFR 1910.145C, February 1993

Jennifer Beyer, M.S.
Q.A. Director

Education: **Master of Science in Physical Chemistry, 2007**
San Diego State University, San Diego, CA

Bachelor of Arts in Chemistry, 1997
University of Northern Iowa, Cedar Falls, IA

Professional Experience:

Q.A. Director
EnviroMatrix Analytical, Inc., San Diego, CA
2005 – Present

Responsible for establishing and maintaining the laboratories working budget and approving all purchases and expenditures. Acts as liaison for all regulatory agencies. Responsible for maintaining and implementing the Quality Assurance Manual, QA/QC policies, Standard Operating Procedures, and corrective action documents. Performs data validation and review for adherence to QA requirements. Conducts internal quality audits. Reviews all project and/or contract specific QA requirements for laboratory implementation.

Senior Metals Chemist-Department Supervisor
EnviroMatrix Analytical, Inc., San Diego, CA
2003 - 2005

Responsible for performing ICP and ICP-MS metals analyses following method EPA 6010/6020 and EPA 200.7/200.8 and atomic absorption spectrophotometric analysis using cold vapor generation on a variety of matrices using method EPA 245.1, EPA 7470, and EPA 7471 for mercury. Ensures that analytical data complies with Quality Assurance Program requirements. Performs all aspects of analysis including those relating to troubleshooting instrument problems, detecting analytical interferences due to complex sample matrices, performing system maintenance and method development. Supervises the metals digestion department and the metals extraction department.

Independent Contractor
SDSUF/SPAWAR Systems Center, San Diego,CA
2002 – 2003

Provided technical and analytical support in the field of materials science for the Film Implementation of a Nuetron Detector (FIND) Project.

Teachers Assistant (Masters Candidate)
San Diego State University, San Diego, CA
2000-2002

Organized and taught laboratory classes for SDSU Chemistry Department.

Organic Laboratory Technician
TestAmerica (NET, Inc.), Cedar Falls, IA
1997-1999

Performed laboratory extractions and analyses of environmental contaminants in water and soil samples utilizing EPA test protocols. Performed daily quality control procedures.

Laboratory Technician
AG Processing, Inc., Manning, IA
1997

Perofrmed extensive work on NIR. Wet lab analyses included crude fiber determination, residual oil testing, urease activity, pH, moisture and volatiles testing.

Mike Giangiordano
Wet Chemistry/ Microbiology Supervisor

Education: **Bachelor of Science in Exercise Nutritional Sciences, 2001**
San Diego State University, San Diego, CA

Professional Experience:

Wet Chemistry/ Microbiology Supervisor
Enviromatrix Analytical, Inc., San Diego, CA
2003 – Present

Responsible for overall management of WET Chemistry and Microbiology Departments. Involved in selection and training of personnel in both departments as well as overseeing and performing analytical work designated to such departments. Responsible of for reviewing all data to ensure results are in control and project specifications are met for the above departments. Involved in creating and editing departments S.O.P.'s. Project manager to specific microbiology clients. Responsible for method development and implementation.

Head Microbiologist
Enviromatrix Analytical, Inc., San Diego, CA
2002 – 2003

Responsible for scheduling and executing work load for entire microbiology department. Creating and editing department S.O.P.'s including total and fecal coliform for both drinking and waste waters, Colilert®, Enterolert®, fecal streptococcus, enterococus, and heterotrophic plate count (HPC). Ensures that all quality controls and assurance procedures are followed and meet requirements dictated by government regulations. Additionally, responsible for method development and training other microbiological personnel. As well as, performing all aspects of analysis including those relating to troubleshooting equipment problems, detecting analytical interferences, and conducting department wide maintenance.

Microbiologist
Enviromatrix Analytical, Inc., San Diego, CA
2001 – 2002

Involved in daily analysis and scheduling of microbiological work including total and fecal coliform for both drinking and waste waters, enterococus, and fecal streptococcus using multiple tube fermentation (MTF). Also, setting up and executing procedures for Colilert® and heterotrophic plate count (HPC). Carrying out numerous daily quality assurance procedures including the use of control organisms, sterility checks and controls, and surveillance and maintenance of equipment set temperatures and other necessary functions.

Dennis Hickey , B.A.
Senior Organics Chemist

Education: **Bachelor of Arts in Biology, Minor in Organic Chemistry and Sociology, 1985**
University of California, San Diego, CA

Professional Experience:

Senior Organics Chemist
EnviroMatrix Analytical, Inc., San Diego, CA
02/2003 – Present

Responsible for semi-volatile organic compound analyses by Gas Chromatography (GC) and Gas Chromatography Mass Spectrometry (GC/MS), following methods EPA 608, EPA 8015, EPA 625, EPA 8270, EPA 8141, and EPA 8081/8082. Performs systems maintenance and method development. Responsible for data review and systems management. Ensures that semi-volatile GC and GC/MS work is performed in compliance with all local, state and federal regulations, and quality assurance program requirements. Additionally, responsible for method and procedure development, and training other analysts.

Staff Research Associate II
UCSD, San Diego, CA
01/1999 – Present

Provides technical support for undergraduate teaching laboratories. Maintains and troubleshoots laboratory equipment. Supervises pre-runs of experiments and works with faculty to revise and update experiment protocols. Maintains computers in the teaching laboratories. Establishes financial needs of classes and keeps records of financial expenditures.

Staff Scientist & Project Manager
Ceimic Corporation / S-Cubed (A Division of Maxwell Laboratories), San Diego, CA
1986-1998

Operated and maintained automated gas chromatography instrumentation for high precision measurement of volatile and semi-volatile compounds operating in a contract laboratory setting. Was responsible for GC/MS training and troubleshooting. Performed EPA Methods 8270, 8260, 8080, 625, 525, PAH by SIMS, and Isotope Dilution by EPA Method 1625c. Assited in the validation of method EPA 8141 for the EPAs Office of Research and Development, Las Vegas, Nevada. Assited in the validation of a multianalyte methodology for human adipose tissue for the EPAs Office of Research and Development, Las Vegas, Nevada. Performed beta testing of the Hewlett-Packard Enviroquant Chemstation Software. Assited the software developers with recommendations for improvements and quality related functions as it related to GC/MS analyses.

Dennis Hickey, B.A.
Senior Organics Chemist (continued)

Extraction Chemist
Analytical Technologies, Inc., San Diego, CA
1985-1986

> Prepared samples in the extraction laboratory for determination of a variety of pollutants including pesticides, herbicides, dioxins, PCBs, and BNAs. Responsible for sample receiving and sample log-in.

Publications:

Hatcher, M.D.; Hickey, D.M.; Marsden, P.J.; and Betowski, L.D.; "Development of a GC/MS Module for RCRA Method 8141"; final report to the U.S. EPA Environmental Protection Agency on Contract 68-03-1958; S-Cubed, San Diego, CA, 1988.

Taylor, V.; Hickey, D.M.; Marsden, P.J. "Single Laboratory Validation of EPA Method 8140"; U.S. Environmental Protection Agency, Environmental Monitoring Systems Laboratory, Office of Research and Development, Las Vegas, NV, 1987; EPA-600/4-87-009.

Mona Hanna, PhD
Senior Organics Chemist

Education: **Doctor of Philosophy in Inorganic Chemistry, 1986**
Ain Shams University, Cairo, Egypt

Masters of Arts in Inorganic and Analytical Chemistry, 1982
Ain Shams University, Cairo, Egypt

Bachelor of Arts in General Chemistry, 1978
Ain Shams University, Cairo, Egypt

Professional Experience:

Senior Organic Chemist
EnviroMatrix Analytical, Inc., San Diego, CA
2003-Present

Perform ICP metals analysis following EPA 6010 methods. Also analysis of volatile organic compound following EPA 8260, 8021 methods by using GC and GC/MS. Perform all aspects of analysis including troubleshooting instrument problems, detecting analytical interferences, system maintenance, and method development.

Chemistry Lab Instructor
Mesa College, San Diego, CA
2002 – Present

Teaching fundamental principles, laws of chemical behavior, and the properties of matter. Topics included: techniques of data analysis, auto titrators, UV/Vis spectrophotometer, HPLC, atomic theory, molecular geometry, and gaseous behavior.

Assistant Professor of Inorganic Chemistry
Ain Shams University, Cairo, Egypt
1996-2001

Carried out new research on the complexation and thermal properties of uric acid with some divalent and trivalent metal ions of biological interest. Characterization by FTIR, UV/VIS, and HPLC. Taught analytical, electroanalytical, and inorganic chemistry.

Research Assistant II
SDSU Foundation, San Diego, CA
1994-1996

Responsible for coordinating and analyzing water, soil, and plant tissue samples. Used a Lachat auto-analyzer to measure nutrient content, and a Dorman Organic Carbon Analyzer to assess organic matter content of estuarine waters.

Organic Chemist/Group Leader
Analytical Technologies Inc., San Diego, CA
1991-1994

Performed environmental analysis on soil, water, and air samples using separator funnel extraction, continuous liquid-liquid extraction, soxhlet extraction, and sonication. Extractions were cleaned using gel permeation chromatography, and alumina, florisal columns.

Appendix H
External Certification

CDPH
California Department of PublicHealth

CALIFORNIA STATE

ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM BRANCH

CERTIFICATE OF ENVIRONMENTAL ACCREDITATION

Is hereby granted to

EnviroMatrix Analytical, Inc.

4340 Viewridge Avenue., Suite A

San Diego, CA 92123

Scope of the certificate is limited to the
"Fields of Testing"
which accompany this Certificate.

Continued accredited status depends on successful completion of on-site, proficiency testing studies, and payment of applicable fees.

This Certificate is granted in accordance with provisions of Section 100825, et seq. of the Health and Safety Code.

Certificate No.: **2564**

Expiration Date: **09/30/2014**

Effective Date: **10/01/2012**

Richmond, California
subject to forfeiture or revocation

David Mazzera, Ph.D., Assistant Division Chief
Division of Drinking Water and Environmental Management

NOTICE

The "List of Approved Fields of Testing and Analytes", as stated on this certificate will be sent to your laboratory upon completion of the <u>entire</u> certification process, which <u>includes</u> an on-site inspection and participation in the appropriate PT studies.

CALIFORNIA DEPARTMENT OF PUBLIC HEALTH
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing

EnviroMatrix Analytical, Inc.
4340 Viewridge Avenue., Suite A
San Diego, CA 92123
Phone: (858) 560-7717

Certificate No.: 2564
Renew Date: 9/30/2012

Field of Testing: 101 - Microbiology of Drinking Water

101.010	001	Heterotrophic Bacteria	SM9215B
101.020	001	Total Coliform	SM9221A,B
101.021	001	Fecal Coliform	SM9221E (MTF/EC)
101.060	002	Total Coliform	SM9223
101.060	003	E. coli	SM9223
101.120	001	Total Coliform (Enumeration)	SM9221A,B,C
101.130	001	Fecal Coliform (Enumeration)	SM9221E (MTF/EC)
101.160	001	Total Coliform (Enumeration)	SM9223

Field of Testing: 102 - Inorganic Chemistry of Drinking Water

102.100	001	Alkalinity	SM2320B
102.120	001	Hardness	SM2340B
102.130	001	Conductivity	SM2510B
102.140	001	Total Dissolved Solids	SM2540C
102.163	001	Chlorine, Free and Total	SM4500-Cl G
102.171	001	Chloride	SM4500-Cl- D
102.190	001	Cyanide, Total	SM4500-CN E
102.192	001	Cyanide, amenable	SM4500-CN G
102.200	001	Fluoride	SM4500-F C
102.220	001	Nitrite	SM4500-NO2 B
102.231	001	Nitrate calc.	SM4500-NO3 E
102.240	001	Phosphate, Ortho	SM4500-P E
102.251	001	Sulfate	SM4500-SO4 E
102.260	001	Total Organic Carbon	SM5310B
102.261	001	DOC	SM5310B
102.270	001	Surfactants	SM5540C
102.520	001	Calcium	EPA 200.7
102.520	002	Magnesium	EPA 200.7
102.520	003	Potassium	EPA 200.7
102.520	005	Sodium	EPA 200.7
102.520	006	Hardness (calc.)	EPA 200.7

Field of Testing: 103 - Toxic Chemical Elements of Drinking Water

103.130	001	Aluminum	EPA 200.7
103.130	003	Barium	EPA 200.7
103.130	004	Beryllium	EPA 200.7
103.130	005	Cadmium	EPA 200.7

103.130	007	Chromium	EPA 200.7
103.130	008	Copper	EPA 200.7
103.130	009	Iron	EPA 200.7
103.130	011	Manganese	EPA 200.7
103.130	012	Nickel	EPA 200.7
103.130	015	Silver	EPA 200.7
103.130	017	Zinc	EPA 200.7
103.130	018	Boron	EPA 200.7
103.140	001	Aluminum	EPA 200.8
103.140	002	Antimony	EPA 200.8
103.140	003	Arsenic	EPA 200.8
103.140	004	Barium	EPA 200.8
103.140	005	Beryllium	EPA 200.8
103.140	006	Cadmium	EPA 200.8
103.140	007	Chromium	EPA 200.8
103.140	008	Copper	EPA 200.8
103.140	009	Lead	EPA 200.8
103.140	010	Manganese	EPA 200.8
103.140	012	Nickel	EPA 200.8
103.140	013	Selenium	EPA 200.8
103.140	014	Silver	EPA 200.8
103.140	015	Thallium	EPA 200.8
103.140	016	Zinc	EPA 200.8
103.140	017	Boron	EPA 200.8
103.140	018	Vanadium	EPA 200.8
103.160	001	Mercury	EPA 245.1

Field of Testing: 107 - Microbiology of Wastewater

107.010	001	Heterotrophic Bacteria	SM9215B
107.020	001	Total Coliform	SM9221B
107.040	001	Fecal Coliform	SM9221C,E (MTF/EC)
107.041	001	Fecal Coliform	SM9221C,E (A-1)
107.100	001	Fecal Streptococci	SM9230B
107.100	002	Enterococci	SM9230B
107.245	001	E. coli	SM9223

Field of Testing: 108 - Inorganic Chemistry of Wastewater

108.112	001	Boron	EPA 200.7
108.112	002	Calcium	EPA 200.7
108.112	003	Hardness (calc.)	EPA 200.7
108.112	004	Magnesium	EPA 200.7
108.112	005	Potassium	EPA 200.7
108.112	007	Sodium	EPA 200.7
108.323	001	Chemical Oxygen Demand	EPA 410.4
108.350	001	Total Recoverable Petroleum Hydrocarbons	EPA 418.1

108.360	001	Phenols, Total	EPA 420.1
108.381	001	Oil and Grease	EPA 1664A
108.390	001	Turbidity	SM2130B
108.400	001	Acidity	SM2310B
108.410	001	Alkalinity	SM2320B
108.430	001	Conductivity	SM2510B
108.440	001	Residue, Total	SM2540B
108.441	001	Residue, Filterable	SM2540C
108.442	001	Residue, Non-filterable	SM2540D
108.443	001	Residue, Settleable	SM2540F
108.451	001	Chloride	SM4500-Cl- C
108.465	001	Chlorine	SM4500-Cl G
108.470	001	Cyanide, Manual Distillation	SM4500-CN C
108.472	001	Cyanide, Total	SM4500-CN E
108.480	001	Fluoride	SM4500-F C
108.490	001	pH	SM4500-H+ B
108.491	001	Ammonia	SM4500-NH3 C (18th)
108.510	001	Nitrite	SM4500-NO2 B
108.520	001	Nitrate-nitrite, Total	SM4500-NO3 E
108.531	001	Dissolved Oxygen	SM4500-O G
108.540	001	Phosphate, Ortho	SM4500-P E
108.541	001	Phosphorus, Total	SM4500-P E
108.590	001	Biochemical Oxygen Demand	SM5210B
108.591	001	Carbonaceous BOD	SM5210B
108.610	001	Total Organic Carbon	SM5310B
108.640	001	Surfactants	SM5540C
108.660	001	Chemical Oxygen Demand	HACH8000
108.672	001	Phosphate, Ortho	HACH8048
108.675	001	Phosphorus, Total	HACH8190

Field of Testing: 109 - Toxic Chemical Elements of Wastewater

109.010	001	Aluminum	EPA 200.7
109.010	002	Antimony	EPA 200.7
109.010	003	Arsenic	EPA 200.7
109.010	004	Barium	EPA 200.7
109.010	005	Beryllium	EPA 200.7
109.010	007	Cadmium	EPA 200.7
109.010	009	Chromium	EPA 200.7
109.010	010	Cobalt	EPA 200.7
109.010	011	Copper	EPA 200.7
109.010	012	Iron	EPA 200.7
109.010	013	Lead	EPA 200.7
109.010	015	Manganese	EPA 200.7
109.010	016	Molybdenum	EPA 200.7

109.010	017	Nickel	EPA 200.7
109.010	019	Selenium	EPA 200.7
109.010	021	Silver	EPA 200.7
109.010	023	Thallium	EPA 200.7
109.010	024	Tin	EPA 200.7
109.010	025	Titanium	EPA 200.7
109.010	026	Vanadium	EPA 200.7
109.010	027	Zinc	EPA 200.7
109.020	001	Aluminum	EPA 200.8
109.020	002	Antimony	EPA 200.8
109.020	003	Arsenic	EPA 200.8
109.020	004	Barium	EPA 200.8
109.020	005	Beryllium	EPA 200.8
109.020	006	Cadmium	EPA 200.8
109.020	007	Chromium	EPA 200.8
109.020	008	Cobalt	EPA 200.8
109.020	009	Copper	EPA 200.8
109.020	010	Lead	EPA 200.8
109.020	011	Manganese	EPA 200.8
109.020	012	Molybdenum	EPA 200.8
109.020	013	Nickel	EPA 200.8
109.020	014	Selenium	EPA 200.8
109.020	015	Silver	EPA 200.8
109.020	016	Thallium	EPA 200.8
109.020	017	Vanadium	EPA 200.8
109.020	018	Zinc	EPA 200.8
109.190	001	Mercury	EPA 245.1
109.811	001	Chromium (VI)	SM3500-Cr D (18th/19th)

Field of Testing: 110 - Volatile Organic Chemistry of Wastewater

110.040	040	Halogenated Hydrocarbons	EPA 624
110.040	041	Aromatic Compounds	EPA 624
110.040	042	Oxygenates	EPA 624

Field of Testing: 111 - Semi-volatile Organic Chemistry of Wastewater

111.101	032	Polynuclear Aromatic Hydrocarbons	EPA 625
111.101	034	Phthalates	EPA 625
111.101	036	Other Extractables	EPA 625
111.170	030	Organochlorine Pesticides	EPA 608
111.170	031	PCBs	EPA 608

Field of Testing: 114 - Inorganic Chemistry of Hazardous Waste

114.010	001	Antimony	EPA 6010B
114.010	002	Arsenic	EPA 6010B
114.010	003	Barium	EPA 6010B
114.010	004	Beryllium	EPA 6010B

114.010	005	Cadmium	EPA 6010B
114.010	006	Chromium	EPA 6010B
114.010	007	Cobalt	EPA 6010B
114.010	008	Copper	EPA 6010B
114.010	009	Lead	EPA 6010B
114.010	010	Molybdenum	EPA 6010B
114.010	011	Nickel	EPA 6010B
114.010	012	Selenium	EPA 6010B
114.010	013	Silver	EPA 6010B
114.010	014	Thallium	EPA 6010B
114.010	015	Vanadium	EPA 6010B
114.010	016	Zinc	EPA 6010B
114.020	001	Antimony	EPA 6020
114.020	002	Arsenic	EPA 6020
114.020	003	Barium	EPA 6020
114.020	004	Beryllium	EPA 6020
114.020	005	Cadmium	EPA 6020
114.020	006	Chromium	EPA 6020
114.020	007	Cobalt	EPA 6020
114.020	008	Copper	EPA 6020
114.020	009	Lead	EPA 6020
114.020	010	Molybdenum	EPA 6020
114.020	011	Nickel	EPA 6020
114.020	012	Selenium	EPA 6020
114.020	013	Silver	EPA 6020
114.020	014	Thallium	EPA 6020
114.020	015	Vanadium	EPA 6020
114.020	016	Zinc	EPA 6020
114.103	001	Chromium (VI)	EPA 7196A
114.140	001	Mercury	EPA 7470A
114.141	001	Mercury	EPA 7471A
114.222	001	Cyanide	EPA 9014
114.230	001	Sulfides, Total	EPA 9034
114.241	001	Corrosivity - pH Determination	EPA 9045C
114.270	001	Fluoride	EPA 9214

Field of Testing: 115 - Extraction Test of Hazardous Waste

115.020	001	Toxicity Characteristic Leaching Procedure (TCLP)	EPA 1311
115.030	001	Waste Extraction Test (WET)	CCR Chapter11, Article 5, Appendix II
115.040	001	Synthetic Precipitation Leaching Procedure (SPLP)	EPA 1312

Field of Testing: 116 - Volatile Organic Chemistry of Hazardous Waste

116.030	001	Gasoline-range Organics	EPA 8015B
116.040	062	BTEX	EPA 8021B
116.080	000	Volatile Organic Compounds	EPA 8260B

116.080	120	Oxygenates	EPA 8260B
116.110	001	Total Petroleum Hydrocarbons - Gasoline	LUFT

Field of Testing: 117 - Semi-volatile Organic Chemistry of Hazardous Waste

117.010	001	Diesel-range Total Petroleum Hydrocarbons	EPA 8015B
117.016	001	Diesel-range Total Petroleum Hydrocarbons	LUFT
117.017	001	TRPH Screening	EPA 418.1
117.110	000	Extractable Organics	EPA 8270C
117.210	000	Organochlorine Pesticides	EPA 8081A
117.220	000	PCBs	EPA 8082
117.240	000	Organophosphorus Pesticides	EPA 8141A

Field of Testing: 120 - Physical Properties of Hazardous Waste

120.010	001	Ignitability	EPA 1010
120.022	001	Ignitability	EPA 1030
120.040	001	Reactive Cyanide	Section 7.3 SW-846
120.050	001	Reactive Sulfide	Section 7.3 SW-846
120.080	001	Corrosivity - pH Determination	EPA 9045C

Field of Testing: 126 - Microbiology of Recreational Water

126.010	001	Total Coliform (Enumeration)	SM9221A,B,C
126.030	001	Fecal Coliform (Enumeration)	SM9221E
126.061	001	Enterococci	SM9230B
126.080	001	Enterococci	IDEXX

City of National City
Selenium Monitoring Field Datasheet

Site ID				**Latitude**	
Location				**Longitude**	
Date		**Time**		**Observer**	

ATMOSPHERIC / FLOW CONDITIONS

Weather Clear Partly Cloudy Overcast Fog **Amount of Rainfall** > 0.1" **<** 0.1"

Tide Low High **Tide Height:** _________ ft.

Last Rain > 72 hours < 72 hours **Water Flow** Dry Ponded Flowing **Flow rate:** __________ gpm

Field Screening Samples Collected? Yes No **Analytical Lab Samples Collected?** Yes No

Water Temp (°C)		Salinity (ppm CaCO3) (optional)	
Specific Conductance (mS/cm)			

COMMENTS:____

____

Site ID				**Latitude**	
Location				**Longitude**	
Date		**Time**		**Observer**	

ATMOSPHERIC / FLOW CONDITIONS

Weather Clear Partly Cloudy Overcast Fog **Amount of Rainfall** > 0.1" **<** 0.1"

Tide Low High **Tide Height:** _________ ft.

Last Rain > 72 hours < 72 hours **Water Flow** Dry Ponded Flowing **Flow rate:** __________ gpm

Field Screening Samples Collected? Yes No **Analytical Lab Samples Collected?** Yes No

Water Temp (°C)		Salinity (ppm CaCO3) (optional)	
Specific Conductance (mS/cm)			

COMMENTS:____

____

D-MAX Engineering, Inc.
Quality Assurance/Quality Control

Daily Field Meter Calibration Log

		Pre-field							Post-field			
Constituent		pH meter 1			pH meter 2			EC	pH meter 1		pH meter 2	
Standard value		4.0	7.0	10.0	4.0	7.0	10.0	12.88 (mS/cm)	7.0	10.0	7.0	10.0
Acceptable range		± 0.2	± 0.2	± 0.2	± 0.2	± 0.2	± 0.2	± 2% (±0.2576)	± 0.2	± 0.2	± 0.2	± 0.2
Date	Staff											

Notes: ____

____

____