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MEMORANDUM

County Sanitation Districts of Los Angeles County

September 13, 2002

TO: Craig J. Wilson, State Water Resources Control Board

FROM: Heather Lamberson and Beth Bax, Sanitation Districts

SUBJECT: Supporting Information Regarding Toxicity Listing for Coyote Creek

Per your request of September 10, 2002, we have enclosed supporting information regarding the toxicity listing for Coyote Creek. This information was referenced in our comments dated June 14, 2002 to the SWRCB on the 2002 Update of the 303(d) List. To address the specific reference, we have included excerpts from the 2000 Annual Monitoring Reports for the Long Beach and Valencia Water Reclamation Plants (WRPs) and the supporting summary tables for the text (Attachment 1). To provide more detail, we have also included a summary of Toxicity Identification Evaluation (TIE) work that has been conducted for the Long Beach WRP and Coyote Creek upstream and downstream receiving water stations (Attachment 2) and the San Jose Creek Water Quality Laboratory Quality Assurance Plan for toxicity testing, which summarizes QA/QC procedures adhered to during TIEs (Attachment 3). To further illuminate the current conditions (after partial conversion to nitrification and denitrification (NDN) at some of our plants), we have included an excerpt from the 2001 Annual Monitoring Report for the Long Beach WRP, which summarizes the results of toxicity tests conducted on effluent and receiving water samples during 2001 (Attachment 4). Also included are two graphs comparing ammonia concentrations and effluent toxicity from the Long Beach WRP in 2000 and 2001 (Attachment 5). The locations of the Long Beach WRP and Coyote Creek receiving water stations (RA-1 and R-9E) are shown on Attachment 6. Hopefully, this information will assist you in evaluating the listing of Coyote Creek as impaired due to toxicity.

As we said in our June 14 comments, to the extent the observed toxicity in Coyote Creek is due to ammonia from the Long Beach WRP, the conversion of this plant to NDN will greatly reduce this toxicity. The information contained in the excerpts from the 2000 Annual Monitoring Reports and the TIE summary for the Long Beach WRP demonstrates that toxicity observed downstream of the Long Beach WRP has been attributed to ammonia toxicity on a consistent basis. (The discussion on Valencia WRP, which was referenced in our comments of June 14, also concludes that observed receiving water toxicity downstream of that plant was primarily caused by ammonia from the upstream plant effluent). Toxicity tests conducted on effluent samples from Long Beach WRP and downstream receiving water samples (from station R-9E) in 2001 further support this finding (see Attachment 4). Comparing the effluent ammonia levels in 2000 and 2001 and the observed toxicity in the effluent, it is obvious that the partial conversion of the Long Beach WRP to NDN mode in 2001 and the resulting reduction of effluent ammonia greatly reduced the toxicity of the effluent (see Attachment 5). We expect the full conversion of all five of our plants in the San Gabriel Watershed to nitrification and denitrification (which will occur in 2003) will virtually eliminate ammonia as a source of toxicity in the currently listed reaches of the San Gabriel River (Reach 1 and 3).

In the case of Coyote Creek, whereas the partial conversion of the plant reduced the effluent ammonia and the observed receiving water toxicity, chronic toxicity was observed at station R-9E during the second quarter of

2001 (as opposed to during three quarters in 2000). Effluent samples collected on the same dates did not show toxicity; therefore, the observed toxicity was probably due to some unknown contaminant from an upstream source. The TIE summary (Attachment 2) details the testing conducted in order to determine the cause of toxicity upstream of the Long Beach WRP (station RA-1). While TIE testing of upstream receiving water has shown some evidence of toxicity due to non-polar organic contamination, the testing has failed to conclusively determine the specific cause of the toxicity. The Sanitation Districts support the Watch-listing of toxicity for Coyote Creek until further study identifying the source of toxicity upstream of the Long Beach WRP can be determined.

All of this information should provide you with additional details on our original June 14, 2002 comments. Please let one of us know if you have any questions about the included material, or if you require any additional information regarding this issue. Heather can be reached by phone at (562) 699-7411, extension 2828, or by e-mail at hlamberson@lacsd.org. Beth can be reached at extension 2835, or by e-mail at bbax@lacsd.org.

Excerpt from 2000 Annual Monitoring Report for Long Beach Water Reclamation Plant

Long Beach WRP Receiving Water Chronic Toxicity

In 2000, chronic toxicity was observed on Coyote Creek at station R-9 East during three of the four tests conducted during the year.

Although toxicity has not been observed in the San Gabriel River estuary stations (R-6 and R-8) throughout the five-year permit cycle, toxicity was observed at station R-9 East in three of four bioassays conducted during the year. Two of the three samples (third and fourth quarters) exhibited toxicity on the reproduction endpoint only.

Chronic Toxicity Identification Evaluation (TIE) efforts using *Ceriodaphnia dubia* have focused on the Long Beach WRP effluent and upstream non-point sources. Flow estimations of Coyote Creek above the Long Beach WRP final effluent discharge indicate that non-point source discharges during dry weather periods represents between 30% and 60% of the flow at R-9 East. Bioassay testing of the dry weather flow upstream from the Long Beach WRP discharge at station R-A-1 found toxicity in the majority of samples evaluated from 1999 through 2000 (10 of 17 samples). All of the observed chronic toxicity in these samples was dominated by effects on the survival endpoint. TIE testing using pH control and zeolite filtration, as well as quantification of total ammonia concentrations, revealed that ammonia was not responsible for this toxicity. Limited Solid Phase Extraction (SPE) testing on three toxic R-A-1 samples eliminated all toxicity indicating non-polar organic contamination. However, organophosphorous pesticide and other trace organic quantification using GC/MS on concentrated samples only detected low levels of naphthalene and phenanthrene (2.6 ng/L and 3.5 ng/L respectively) in one sample, which would not account for the toxicity observed. Thus far, TIE testing of upstream Coyote Creek has not determined the constituents responsible for this toxicity.

TIE testing using *Ceriodaphnia dubia* on Long Beach WRP final effluent was conducted on 15 grab samples collected from 1999-2000. Toxicity was either absent or eliminated using pH control or zeolite filtration in nine of these bioassays, and nearly eliminated in another two tests, implicating ammonia as the main toxic constituent in the majority of samples tested. SPE was conducted on two of the four samples not responding to ammonia control, and toxicity was eliminated in one test and reduced in the other, indicating that the toxicity was due to non-polar organic contamination in these samples. Chemical specific testing for organophosphorous pesticides using GC/MS on concentrated samples detected elevated levels of diazinon in the sample collected on April 5, 2000 (1.57 ppb). This level of diazinon is sufficient to have caused the toxicity observed in that sample. Sequential methanol elutions to recover removed toxicity were conducted from the sample collected on August 22, 2000 and tested for chronic toxicity. Long Beach WRP toxicity was recovered in the 50%, 75%, and 95% methanol elutions. This would indicate multiple organics or lack of a clean separation and elution using this technique.

As a result of our TIE investigations, it was observed that toxicity only on the reproduction endpoint in Long Beach WRP effluent and R9-East receiving water samples was consistently determined to be due to ammonia. Toxicity on the survival endpoint was typical of non-polar organic effects and was controlled or reduced using SPE. In 2000, nine of the twelve *Ceriodaphnia dubia* chronic bioassay effluent monitoring tests submitted for Long Beach WRP exhibited toxicity on the reproduction endpoint only (19 of 24 going back to 1999). While much information is available on the acute response of *Ceriodaphnia dubia* to ammonia exposure, very little information could be found regarding the chronic endpoints, particularly for reproduction. In order to quantify this response, a total of 12 seven-day *Ceriodaphnia* tests were conducted using synthetic (moderately hard) dilution water and total ammonia concentrations ranging from 8 to 25 mg/L-N. In each test, survival responses across all tested concentrations were less than 25%, and a minimum of a 25% effect was observed in at least one tested concentration on the reproduction endpoint. The average IC25 of the reproduction endpoint for these tests was 0.63 mg/L-NH_3-N, and ranged from a low of 0.36 mg/L to a high of 0.83 mg/L-NH_3-N. These levels of unionized ammonia are consistent with those estimated in Long Beach WRP chronic bioassay samples. The U.S. EPA reports a Achronic value@ for *Pimephales promelas* of anywhere from 0.45 to 0.66 mg/L-NH_3-N depending on pH. This Achronic value@ was identified as Athe geometric mean between the NOEC and the LOEC or an IC25". Using this information, it appears that the chronic sensitivity to ammonia between *P. promelas* and *C. dubia* is at least very similar. Furthermore, examination of pH data recorded on split effluent samples tested concurrently using *P. promelas* and *C. dubia* revealed an average increase in pH between renewals of 0.5 in samples exposed to *C. dubia* as opposed to *P. promelas*. This same phenomena was also observed in data conducted by a contract laboratory, resulting in an average pH increase in *C. dubia* exposed samples of 0.2 above those observed in *P. promelas* tests. Factors which may be responsible for this differential increase in *Ceriodaphnia* pH relative to *Pimephales* may include: the addition of algae and bacteria as a food source in the *Ceriodaphnia* test and associated CO_2 stripping by the algae, lower organism density in the *Ceriodaphnia* test, and/or the larger test volumes (and lower gaseous exchange) in the *Pimephales* test. Regardless

of cause, this difference in relative pH between the *P. promelas* and *C. dubia* test results in an increase in unionized ammonia exposure in the *Ceriodaphnia* test from 50% to 100% (depending on lab) relative to identical samples tested using *Pimephales*. Assuming similar sensitivities to ammonia, this difference in exposure could explain why *Ceriodaphnia dubia* appear to be more sensitive than *Pimephales promelas* using samples in which ammonia is the only toxic constituent.

In summary, ammonia has been identified as the primary toxic constituent in the majority of Long Beach WRP samples and non-polar organics appear to be the primary toxic constituent in the upstream non-point source flow from Coyote Creek. The Districts will continue to conduct TIE analyses of the Long Beach WRP effluent, upstream R-A-1, and R9-East, using ammonia control and SPE in an attempt quantify the sporadic toxicity not controlled for with current ammonia control methods. This will include methanol elutions bioassays, ELISA testing for quantification of diazinon and chlorpyrifos, and GC/MS analyses.

TOXICITY OF LONG BEACH WRP EFFLUENT - 2000 (*Ceriodaphnia*)

SAMPLE *DATES*	ENDPOINT	TEST #	NOEC	TUc *(NOEC)*	EC/IC25 *(95% CI)*	TUc-EC/IC25 *(95% CI)*	OBSERVED *EFFECT IN 100%*	NH_3 *(in mg/L)*	COMMENTS
01/05, 01/07, 01/10	SURVIVAL REPRO.	1	>100 % 60%	<1.0 1.7	>100% (N/A) 56.3% (45.6-71.7)	<1.0 (N/A) 1.8 (2.2-1.4)	-10.0% 62.5%	13.0, 13.2, 14.1	Conducted in house, terminated after 3 broods.
02/01, 02/03, 02/06	SURVIVAL REPRO.	2	100% 80%	1.0 1.3	>100% (N/A) 51.8% (49.7-56.9)	1.0 (N/A) 1.9 (2.0-1.8)	-11.1% 53.1%	12.5, 13.0, 12.6	Conducted in house, terminated after 3 broods.
03/29, 03/31, 04/03	SURVIVAL REPRO.	3	40% 40%	2.5 2.5	46.3% (45.0-48.8) 45.7% (43.5-50.3)	2.2 (2.2-2.0) 2.2 (2.3-2.0	100% 100%	10.7, 10.7, 12.3	Conducted in house, terminated after 3 broods.
04/05, 04/07, 04/10	SURVIVAL REPRO.	4	60% 60%	1.7 1.7	65.6% (65.0-67.2) 66.1% (64.3-67.6)	1.5 (1.5-1.5) 1.5 (1.6-1.5)	100% 100%	11.5, 10.9, 11.5	Conducted in house, terminated after 3 broods.
05/10, 05/12, 05/15	SURVIVAL REPRO.	5	100% 80%	1.0 1.3	>100% (N/A) 88.8% (84.7-92.3)	<1.0 (N/A) 1.1 (1.2-1.1)	10.0% 44.7 %	6.75, 12.0, 12.2	Conducted in house, terminated after 3 broods.
06/07, 06/09, 06/12	SURVIVAL REPRO.	6	100% 60%	1.0 1.7	>100% (NA) 73.5% (68.1-80.4)	<1.0 (NA) 1.4 (1.5-1.2)	20.0% 65.3%	13.7, 13.9, 11.2	Conducted in house, terminated after 3 broods.
07/05, 07/07, 07/10	SURVIVAL REPRO.	7	80% 40%	1.3 2.5	84.5% (83.3-85.0) 63.4% (37.1-71.1)	1.2 (1.2-1.2) 1.6 (2.7-1.4)	100% 100%	6.57, 12.7, 9.44	Conducted in house, terminated after 3 broods, conducted as part of a three species screen.
08/02, 08/04, 08/07	SURVIVAL REPRO.	8	100% 100%	1.0 1.0	>100% (NA) 90.5% (NA)	<1.0 (NA) 1.1 (NA)	-11.1% 13.1%	11.8, 11.2, 10.0	Conducted in house, terminated after 3 broods, conducted as part of a three species screen.
09/20, 09/22, 09/25	SURVIVAL REPRO.	9	80% <20%	1.3 >5.0	76.7% (68.3 - 85.0) 17.0% (12.3 - 24.1)	1.3 (1.5 - 1.2) 5.9 (8.1 - 4.1)	100% 99.7%	11.5, 12.8, 10.9	Conducted in house, terminated after 3 broods, part of a three species screen.
10/25, 10/27, 10/30	SURVIVAL REPRO.	10	100% 80%	1.0 1.3	100% (NA) 74.8% (67.3-84.8)	1.0 (NA) 1.3 (1.5-1.2)	-12.5 63.5	10.7, 9.98, 11.1	Conducted in house, terminated after 3 broods.
11/29, 12/01, 12/04	SURVIVAL REPRO.	11	100% 100%	1.0 1.0	>100% (NA) 92.8% (NA)	<1.0 (NA) 1.1 (NA)	0.0% 3.9%	10.5, 14.3, 14.3	Conducted in house, terminated after 3 broods.
12/27, 12/29, 01/01	SURVIVAL REPRO.	12	100% 80%	1.0 1.3	>100% (NA) 84.8% (73.7-90.0)	<1.0 (NA) 1.2 (1.4-1.1)	10.0% 53.6%	16.9, 15.8, 11.7	Conducted in house, terminated after 3 broods.

STATION R9E - LONG BEACH (*Ceriodaphnia*)										
1ST QUARTER (JAN. - MARCH) 2000										
SAMPLE DATES	**SJ NUMBER**	**ENDPOINT**	**TEST #**	**NOEC**	**TUc (NOEC)**	**EC/IC25 (95% CI)**	**TUc-EC/IC25 (95% CI)**	**OBSERVED EFFECT IN 100%**	**NH_3 (in mg/L)**	**COMMENTS**
02/02, 02/04, 02/07	SJ21090	SURVIVAL REPRO.	1	100% 100%	1.0 1.0	>100% (N/A) >100% (N/A)	<1.0 <1.0	-11.1% -39.4%	5.69, 40.7, 5.37	Bioassay valid. Bioassay terminated after 3 broods.
2ND QUARTER (APRIL - JUNE) 2000										
04/05, 04/07, 04/10	SJ24552	SURVIVAL REPRO.	2	60% 60%	1.7 1.7	65.0% (65-65) 65.2% (63.3-65.5)	1.5 (1.5-1.5) 1.5 (1.5-1.5)	100% 100%	7.02, 10.3, 8.82	Bioassay valid. Bioassay terminated after 3 broods.
3RD QUARTER (JULY - SEPT.) 2000										
07/05, 07/07, 07/09	28436	SURVIVAL REPRO.	3	100% 80%	1.0 1.25	8% (N/A) 95.0% (N/A)	12.5 (N/A) 1.1 (N/A)	10.0% 25.7%	6.49, 12.3, 2.63	Bioassay valid. Bioassay terminated after 3 broods.
4TH QUARTER (OCT. - DEC.) 2000										
10/04, 10/06, 10/09	32100	SURVIVAL REPRO.	4	100% 20%	1.0 5.0	>100% (N/A) 39.1% (N/A)	<1.0 (N/A) 2.6 (N/A)	-11.1% 26.3%	8.85, 6.67, 4.70	Bioassay valid. Bioassay terminated after 3 broods.

Excerpt from 2000 Annual Monitoring Report for Valencia Water Reclamation Plant

Receiving Water Chronic Toxicity

Chronic toxicity was detected at station R-D on the Santa Clara River during the first, second, and third quarter monitoring period in 2000. Chronic toxicity was detected at station R-E only during the fourth quarter monitoring period of 2000.

Initial Toxicity Identification Evaluation (TIE) efforts conducted in 1997 utilizing *Pimephales promelas* focused on pH control, and identified ammonia as the primary toxicant. Since that time, the most sensitive species changed to *Ceriodaphnia dubia* and investigations have continued through 2000 using this species. Following a period of intermittent survival toxicity, a pattern emerged demonstrating a predominant reproductive effect which has continued through 2000 at station R-D. In 2000, toxicity was observed on the reproduction endpoint only in 2 of 4 samples at station R-D. As a result of other TIE investigations, it has been observed that toxicity only on the reproduction endpoint was consistently determined to be due to low levels of ammonia, while higher ammonia concentrations typically affected the survival endpoint. In order to quantify the reproduction effect in response to low levels of ammonia, a total of 12 seven-day *Ceriodaphnia* tests were conducted using synthetic (moderately hard) dilution water and total ammonia concentrations ranging from 8 to 25 mg/L-N. In each test, survival responses across all tested concentrations were less than 25%, and a minimum of a 25% effect was observed in at least one tested concentration on the reproduction endpoint. The average IC25 of the reproduction endpoint for these tests was 0.63 mg/L-NH_3-N, and ranged from a low of 0.36 mg/L to a high of 0.83 mg/L-NH_3-N. The U.S. EPA reports a Achronic value@ for *Pimephales promelas* of anywhere from 0.45 to 0.66 mg/L-NH_3-N depending on pH. This Achronic value@ was identified as Athe geometric mean between the NOEC and the LOEC or an IC25". Using this information, it appears that the chronic sensitivity to ammonia between *P. promelas* and *C. dubia* is at least very similar. Furthermore, examination of pH data recorded on split effluent samples tested concurrently using *P. promelas* and *C. dubia* revealed an average increase in pH between renewals of 0.5 in samples exposed to *C. dubia* as opposed to *P. promelas*. This same phenomena was also observed from tests conducted by a contract laboratory. Factors which may be responsible for this differential increase in *Ceriodaphnia* pH relative to *Pimephales* may include: the addition of algae and bacteria as a food source in the *Ceriodaphnia* test and associated CO_2 stripping by the algae, lower organism density in the *Ceriodaphnia* test, and/or the larger test volumes (and lower gaseous exchange) in the *Pimephales* test. Regardless of cause, this difference in relative pH between the *P. promelas* and *C. dubia* test results in an increase in unionized ammonia exposure in the *Ceriodaphnia* test from 50% to 100% (depending on lab) relative to identical samples tested using *Pimephales*. Assuming similar sensitivities to ammonia, this difference in exposure could explain why *Ceriodaphnia dubia* appear to be more sensitive than *Pimephales promelas* using ammonia reference standards and effluent in which ammonia is the only identifiable toxicant.

Adapting pH control to *Ceriodaphnia* tests continued to be problematic. Although this method of minimizing unionized ammonia levels has been used successfully in the past for *Pimephales promelas* chronic tests, some difficulties were encountered with its use with the *C. dubia* chronic test. Elevated CO_2 level causes inhibition of reproduction, and at higher levels, mortality in *C. dubia*. Modifications, such as increasing control of water hardness and pH-conditioning the samples by bubbling CO_2 directly prior to exposure, improved but did not entirely eliminate the problems. Furthermore, some difficulties were encountered regarding the exposure duration of these tests. NPDES protocol testing requires that tests be terminated when 60% of the surviving controls release their third brood. This has resulted in a range of exposures in our laboratory from 5 to 8 days. This often resulted in terminating the pH-controlled treatments at a different exposure than the no-manipulation treatments. Eventually it was determined that the most appropriate and successful procedure for the TIE tests was to fix the exposure at seven days regardless of brood production, and utilize zeolite filtration to control ammonia toxicity. In two tests conducted in 2000 using zeolite filtration, all observed toxicity at stations RD and RE was eliminated, indicating ammonia was the principle cause of toxicity. Considering the apparent sensitivity of *Ceriodaphnia dubia* to ammonia, the results of previously conducted TIEs using *Pimephales* at these sites, the most recent zeolite filtration experiments, the lack of survival effect, and the reduction in toxicity observed downstream at station R-E, it appears that ammonia was the predominant toxicant at stations RD and RE in 2000. However, some results in previous years using pH control failed to eliminate survival toxicity, indicating that some other toxicant may have been present on various occasions. The Districts was never able to eliminate the possibility of pesticide toxicity in these effluent and ambient samples.

The Districts will continue to conduct TIE analyses of the Valencia WRP effluent and R-D and R-E stations using ammonia control. SPE, methanol elutions bioassays, ELISA testing for quantification of diazinon and chlorpyrifos, and GC/MS analyses will also be utilized to quantify any observed toxicity not controlled with current ammonia control methods.

TOXICITY OF VALENCIA WRP EFFLUENT - 2000 (*Ceriodaphnia*)

SAMPLE DATES	ENDPOINT	TEST #	NOEC	TUc (NOEC)	EC/IC25 (95% CI)	TUc-EC/IC25 (95% CI)	OBSERVED EFFECT IN 100%	NH_3 (in mg/L)	COMMENTS
01/19, 01/21, 01/24	SURVIVAL REPRO.	1	60% 40%	1.7 2.5	57.6% (N/A) 41.4% (29.8-50.0)	1.7 (N/A) 2.4 (3.4-2.0)	100% 100%	23.8, 18.5, 19.6	Conducted in house, terminated after 3 broods.
02/09, 02/11, 02/14	SURVIVAL REPRO.	2	80% 60%	1.3 1.7	84.6% (78.7-85.0) 65.0% (36.8-70.4)	1.2 (1.3 - 1.2) 1.6 (2.7-1.4)	100.0% 99.3%	13.7, 0.0, 11.6	Conducted in house, terminated after 3 broods.
03/02, 03/03, 03/06	SURVIVAL REPRO.	3	100% 40%	1.0 2.5	96.7% (N/A) 57.9% (48.2-63.7)	1.0 (N/A) 1.7 (2.1-1.6)	30.0% 89.7%	17.1, 18.1, 12.9	Conducted in house, terminated after 3 broods.
04/26, 04/28, 05/01	SURVIVAL REPRO.	4	60% 20%	1.7 5.0	67.1% (65.0-72.5) 47.7% (40.0-53.6)	1.5 (1.5-1.4) 2.1 (2.5-1.9)	100% 100%	21.8, 26.4, 29.0	Conducted in house, terminated after 3 broods.
05/24, 05/26, 05/29	SURVIVAL REPRO.	5	80% 60%	1.3 1.7	85.8% (83.0-90.0) 45.0% (15.1-80.6)	1.2 (1.2-1.1) 2.2 (6.6-1.2)	70.0% 92.7%	19.2, 17.1, 18.9	Conducted in house, terminated after 3 broods.
06/21, 06/23, 06/26	SURVIVAL REPRO.	6	60% 20%	1.7 5.0	63.3% (56.7-65.0) 34.1% (22.3-43.6)	1.6 (1.8-1.5) 2.9 (4.5-2.3)	100% 100%	23.6, 25.4, 19.5	Conducted in house, terminated after 3 broods.
07/26, 07/28, 07/31	SURVIVAL REPRO.	7	60% <20%	1.7 >5.0	63.3% (56.7-65.0) 10.3% (8.9-14.5)	1.6 (1.8-1.5) 9.7 (11.2-6.9)	100% 100%	31.5, 23.6, 17.6	Conducted in house, terminated after 3 broods.
08/16, 08/18, 08/21	SURVIVAL REPRO.	8	60% 40%	1.7 2.5	66.3% (63.3-68.8) 48.7% (38.2-51.7)	1.5 (1.6-1.5) 2.1 (2.6-1.9)	100% 100%	27.0, 25.0, 18.1	Conducted in house, terminated aftrer 3 broods.
09/13, 09/15, 09/18	SURVIVAL REPRO.	9	80% 60%	1.3 1.7	85.6% (85.0-87.3) 65.5% (60.3-68.7)	1.2 (1.2-1.1) 1.5 (1.7-1.5)	88.9% 92.8%	14.2, 17.3, 9.68	Test conducted in house, terminated after 3 broods.
10/18, 10/20, 10/23	SURVIVAL REPRO.	10	100% 80%	1.0 1.3	>100% (NA) 76.1% (63.6-84.5)	<1.0 (NA) 1.3 (1.6-1.2)	0.0% 54.3%	13.9, 11.7, 10.6	Part of a 3 species screen conducted in house, terminated after 3 broods
11/01, 11/03, 11/06	SURVIVAL REPRO.	11	80% 20%	1.3 5.0	59.0% (N/A) 26.6% (12.9-41.5)	1.7 (N/A) 3.8 (7.8-2.4)	70.0% 96.6%	15.6, 13.0, 18.1	Part of a 3 species screen conducted in house, terminated after 3 broods
12/06, 12/08, 12/11	SURVIVAL REPRO.	12	80% 40%	1.3 2.5	81.3% (70.0-85.0) 43.8% (16.6-49.4)	1.2 (1.4-1.2) 2.3 (6.0-2.0)	100.0% 98.9%	20.0, 19.1, 14.9	Part of a 3 species screen conducted in house, terminated after 3 broods

STATION RD - VALENCIA (*Ceriodaphnia*)										
1ST QUARTER (JAN. - MARCH) 2000										
SAMPLE DATES	**SJ NUMBER**	**ENDPOINT**	**TEST #**	**NOEC**	**TUc (NOEC)**	**EC/IC25 (95% CI)**	**TUc-EC/IC25 (95% CI)**	**OBSERVED EFFECT IN 100%**	**NH_3 (in mg/L)**	**COMMENTS**
01/19, 01/21, 01/24	SJ20570	SURVIVAL REPRO.	1	100% 80%	1.0 1.3	>100% (N/A) 68.3% (55.8-81.2)	<1.0 (N/A) 1.5 (1.8-1.2)	10.0% 68.1%	13.5, 10.4, 9.78	Bioassay valid. Bioassay terminated after 3 broods.
2ND QUARTER (APRIL - JUNE) 2000										
04/26, 04/28, 05/01	SJ25419	SURVIVAL REPRO.	2	80% 60%	1.3 1.7	87.1% (N/A) 69.0% (61.8-75.7)	1.1 (N/A) 1.4 (1.6-1.3)	70.0% 81.5%	12.1, 7.62, 14.7	Bioassay valid. Bioassay terminated after 3 broods.
3RD QUARTER (JULY - SEPT.) 2000 (*Ceriodaphnia*)										
07/26, 07/28, 07/31	29244	SURVIVAL REPRO.	3	100% 60%	1.0 1.7	>100% (N/A) 34.7% (31.0-81.0)	<1.0 (N/A) 2.9 (3.2-1.2)	0% 42.7%	14.2, 15.7, 8.70	Bioassay valid. Bioassay terminated after 3 broods.
4TH QUARTER (OCT. - DEC.) 2000										
10/18, 10/20, 10/23	32598	SURVIVAL REPRO.	4	100% 100%	1.0 1.0	>100% (N/A) 77.8% (N/A)	<1.0 (N/A) 1.3 (N/A)	0% 27.7%	6.09, 6.19, 6.20	Bioassay valid. Bioassay terminated after 3 broods.

STATION RE - VALENCIA (*Ceriodaphnia*)										
1ST QUARTER (JAN. - MARCH) 2000										
SAMPLE DATES	**SJ NUMBER**	**ENDPOINT**	**TEST #**	**NOEC**	**TUc (NOEC)**	**EC/IC25 (95% CI)**	**TUc-EC/IC25 (95% CI)**	**OBSERVED EFFECT IN 100%**	**NH_3 (in mg/L)**	**COMMENTS**
02/09, 02/11,02/14	SJ21364	SURVIVAL REPRO.	1	100% 100%	1.0 1.0	>100% (N/A) >100% (N/A4)	<1.0 (N/A) <1.0 (N/A)	-11.1% -21.9%	1.8	Bioassay valid. Bioassay terminated after 3 broods. Last 2 samples not collected due to rain.
2ND QUARTER (APRIL - JUNE) 2000										
04/26, 04/28, 05/01	SJ25420	SURVIVAL REPRO.	2	100% 100%	1.0 1.0	>100% (N/A) >100% (N/A4)	<1.0 (N/A) <1.0 (N/A)	0% 4.6%	6.80, 8.00, 10.8	Bioassay valid. Bioassay terminated after 3 broods.
3RD QUARTER (JULY - SEPT.) 2000 (*Ceriodaphnia*)										
07/26, 07/28, 07/31	29245	SURVIVAL REPRO.	3	100% 100%	1.0 1.0	>100% (N/A) 92.6% (N/A4)	<1.0 (N/A) 1.1 (N/A)	0% 18.4%	10.3, 9.45, 6.71	Bioassay valid. Bioassay terminated after 3 broods.
4TH QUARTER (OCT. - DEC.) 2000										
10/18, 10/20, 10/23	32599	SURVIVAL REPRO.	4	100% 40%	1.0 2.5	>100% (N/A) 33.3% (27.5-44.7)	<1.0 (N/A) 3.0 (3.6-2.2)	20% 47.9%	3.67, 2.93, 3.95	Bioassay valid. Bioassay terminated after 3 broods.

SUMMARY OF TOXICITY IDENTIFICATION EVALUATION EFFORTS FOR LONG BEACH WRP AND ASSOCIATED COYOTE CREEK RECEIVING WATERS

In response to narrative toxicity objective exceedances occurring in the receiving water station below Long Beach WRP at station R-9E on Coyote Creek, toxicity identification evaluation (TIE) tests were conducted from 05/06/1996 through 2000. These tests were all conducted using *Ceriodaphnia dubia* following EPA Method 1002 (EPA/600/4-91/002, Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, *Ceriodaphnia dubia* Survival and Reproduction Test). A total of 13 comparisons were made between receiving water stations RA-1 (above the Long Beach WRP discharge), R-9E (below the Long Beach WRP discharge), and Long Beach WRP effluent. Initial investigations examined possible ammonia toxicity using pH control. An elevated CO_2 atmosphere using a CO_2 chamber was used for the pH controlled manipulations to maintain pH at 7.00 (±0.2). Eventually, zeolite filtration was incorporated to remove ammonia in conjunction with solid phase extraction manipulations to examine possible non-polar organic toxicity.

Characterization of Toxicity in Upstream Coyote Creek Flows – Station RA-1

Flow estimations of Coyote Creek indicate that non-point discharges above the Long Beach WRP discharge (RA-1) during dry weather periods represent between 30% and 60% of the volume of flow at station R-9E, depending on discharge from Long Beach WRP and upstream flow. A total of 17 chronic toxicity tests using *Ceriodaphnia dubia* were conducted on upstream Coyote Creek grab samples (RA-1) from 5/6/99 through 01/02/01. Survival toxicity was observed in 10 of these tests (59%). Toxicity on only the reproduction endpoint was not observed in any test. Total ammonia (Table 1) measurements on these samples ranged from a high of 1.16 to <0.1 mg/L-N. The vast majority of samples (77%) had total ammonia values of <0.5 mg/L-N (see Table 12).

Three toxic samples were passed through a solid phase extraction (SPE) column and the pass through water was tested for chronic toxicity using *C. dubia*. Solid phase extraction removed all toxicity in the three samples analyzed. Methanol elutions were conducted on one of the SPE samples and toxicity was recovered in the 75% methanol elution.

Toxicity Identification Evaluation Results

Station RA-1

Five of the thirteen samples were non-toxic when tested (Fig. 1, 7, 11, 12, 13). Controlling pH (pH=7.00) eliminated toxicity in one of the eight "toxic" samples (Fig. 6). Although this would indicate likely ammonia toxicity, solid phase extraction was not conducted on this sample and total ammonia quantified in the sample did not indicate elevated levels (Table 1). Four of the other "toxic" samples were tested with and without pH control only (pH=7.00) and pH control did not eliminate the toxicity (Fig. 2 through 5). Three of the "toxic" samples were tested using zeolite filtration and SPE and SPE eliminated the observed toxicity (Fig. 8-10). Methanol elution tests were conducted on one of these samples (08/22/2000, Fig 10) and toxicity was recovered in only the 75% methanol elution. Removal of toxicity using SPE and recovery in only 75% methanol is consistent with organophosphorous pesticide toxicity. While SPE eliminated the toxicity in these samples, chemical quantification for organophosphorous pesticides using GC/MS failed to detect anything.

Long Beach WRP Effluent

Three of the thirteen samples were non-toxic when tested (Fig. 4, 5, 13). Controlling pH (pH=7.00) eliminated toxicity in six of the ten "toxic" samples (Fig. 2, 3, 6, 8, 9). These results and the elevated total ammonia levels observed in the samples indicate likely ammonia toxicity. Two of the other "toxic" samples were tested with and without pH control (only at pH=7.00) and pH control did not eliminate the toxicity (Fig. 1, 12). One of the "toxic" samples was tested using zeolite filtration and SPE and SPE eliminated the observed toxicity (Fig. 10). Sequential methanol elutions to recover removed toxicity were conducted on samples collected on 08/22/00 and tested for chronic toxicity. Long Beach WRP toxicity was recovered in the 50%, 75%, and 95% methanol elutions. This would be indicative of multiple non-polar organic and/or surfactant toxicity. One sample tested using pH control and SPE did not eliminate the toxicity in either manipulation (Fig. 7). Chemical quantification for organophosphorous pesticides using GC/MS revealed diazinon concentrations of 1.57 ppb. However, SPE did not eliminate this toxicity as would be expected for diazinon toxicity.

Station R-9E

Seven of the thirteen samples were non-toxic when tested (Fig.3, 4, 5, 6, 11, 12, and 13). Controlling pH (pH=7.00) eliminated toxicity in two of the six "toxic" samples (Fig. 9, 10). These results and the elevated total ammonia levels observed in the samples indicate likely ammonia toxicity. Two of the other "toxic" samples were tested with and without pH control only (pH=7.00) and pH control did not eliminate the toxicity (Fig. 1, 2). Toxicity was eliminated using SPE in the two of the samples tested using zeolite filtration and SPE (Fig. 7, 8). Chemical quantification for organophosphorous pesticides using GC/MS on the sample collected on 04/06/2000 (Fig. 7) revealed diazinon concentrations of 0.46 ppb. Chemical quantification for organophosphorous pesticides using GC/MS on the sample collected on 05/16/2000 (Fig. 8) failed to detect anything. Sequential methanol elutions to recover removed toxicity were conducted on samples collected on 08/22/00 (Fig. 10) and tested for chronic toxicity. Toxicity in the R-9E sample was partially recovered in the 75% and 95% methanol elutions. This would be indicative of multiple non-polar organic and/or surfactant toxicity.

Summary of TIE Efforts

Toxicity was observed upstream from the Long Beach WRP discharge at station RA-1 in 10 of the 17 samples (58.8%) evaluated from May 6, 1999 through 01/02/01. SPE removed this toxicity in three of the samples that exhibited toxicity. Total ammonia concentrations from samples collected ranged from 1.16 to <0.1 mg/L-N and would not be expected to contribute to this toxicity. Furthermore, the observed toxicity at this site was on the survival endpoint in each instance. For these reasons it appears that the observed toxicity upstream is due to non-polar organic contamination.

Toxicity was observed from the Long Beach effluent in 10 of the 13 samples evaluated from 05/06/99 through 2000. Ammonia control eliminated the toxicity in 6 of these 10 tests and significantly reduced the toxicity in two other tests. With eight of the 10 toxic tests exhibiting significant ammonia toxicity it is apparent that the majority of toxicity coming from this discharge is due to ammonia. Infrequent and sporadic toxicity, most likely due to a non-polar organic, has also been observed.

Toxicity at R-9E was observed in six of the 13 samples tested from 05/06/99 through 2000. This toxicity appeared to be dominated by either the toxicity from the Long Beach WRP discharge or that found in the upstream flow at RA-1 but not a combination of the two. R-9E toxicity mimicked that of the Long Beach WRP discharge in 2 of the six tests and RA-1 in three of the six tests (in one test it was impossible to distinguish). Ammonia control eliminated toxicity in two tests.

Table 1. - Toxicity and ammonia quantification of upstream Coyote Creek water (RA-1).

SAMPLE DATE	TOTAL AMMONIA (mg/L-N)	SURVIVAL IN 100% SAMPLE
05/06/99	<0.2	100%
10/20, 10/22, 10/25/99	0.14, 0.11, 0.14	0%
11/16/99	<0.1	30%
11/17, 11/19, 11/22/99	<0.1, <0.1, <0.1	30%
01/05/00	0.28	50%
01/05, 01/07, 01/10/00	0.28, 0.25, 0.4	100%
02/02, 02/04, 02/07/00	0.72, 0.4, <0.1	0%
02/29/00	1.16	100%
03/22/00	0.75	0%
04/05, 04/07, 04/10/00	0.61, 0.52, <0.1	100%
05/16/00[a]	<0.1	0%
07/05/00[a]	0.57	0%
08/22/00[a]	<0.1	0%
09/19/00	<0.1	80%
10/02/00	0.34	30%
11/01/00	<0.1	100%
01/02/01	<0.1	90%

a - SPE manipulation also conducted and toxicity removed.

Table 2. - Seven-day *Ceriodaphnia dubia* chronic toxicity testing results using ammonia dosed moderately hard dilution water. All results in ppm unionized ammonia (mg/L NH_3-N) calculated using the average initial and final pH of test solutions and total ammonia.

TEST	EC25 (Survival)	IC25 (Repro.)	LOEC (Repro.)	% REPRO. EFFECT IN HIGH CONC.
1	>1.01 ppm	0.65 ppm	0.72 ppm	72.4% / 1.01 ppm
2	>1.01 ppm	0.36 ppm	0.39 ppm	80.3 % / 1.01 ppm
3	>1.03 ppm	0.58 ppm	0.40 ppm	64.1% / 1.03 ppm
4	>1.10 ppm	0.78 ppm	0.76 ppm	63.2% / 1.10 ppm
5	>1.10 ppm	0.64 ppm	0.74 ppm	77.4% / 1.10 ppm
6	>1.10 ppm	0.70 ppm	0.76 ppm	84.8% / 1.10 ppm
7	>1.10 ppm	0.66 ppm	0.74 ppm	72.4% / 1.10 ppm
8	>1.01 ppm	0.83 ppm	0.90 ppm	25.5% / 1.01 ppm
9	>1.03 ppm	0.77 ppm	0.88 ppm	52.3% / 1.03 ppm
10	>0.90 ppm	0.44 ppm	0.65 ppm	83.0% / 0.90 ppm
11	>1.16 ppm	0.56 ppm	0.59 ppm	88.4% / 1.16 ppm
12	>0.83 ppm	0.61 ppm	0.68 ppm	73.8% / 0.83 ppm

Figure 1. – Coyote Creek Toxicity Comparison. Reproduction results using single samples collected on 05/06/1999 with and without pH control.

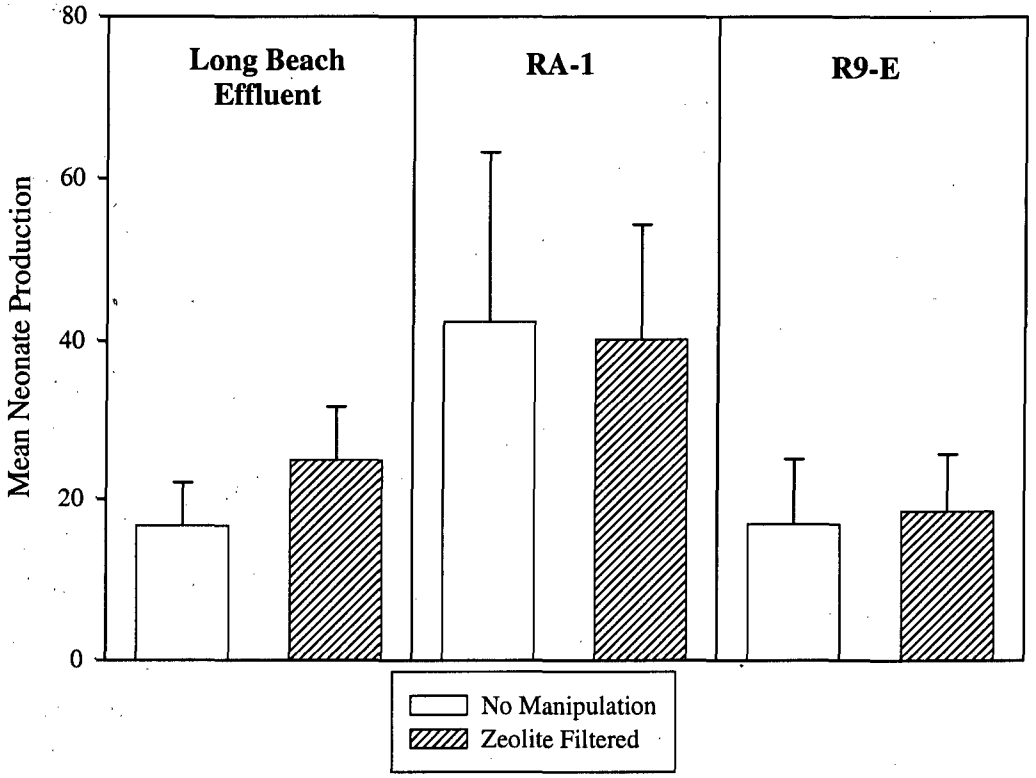


Figure 2. – Coyote Creek Toxicity Comparison. Reproduction results using single samples collected on 10/21/1999 with and without pH control.

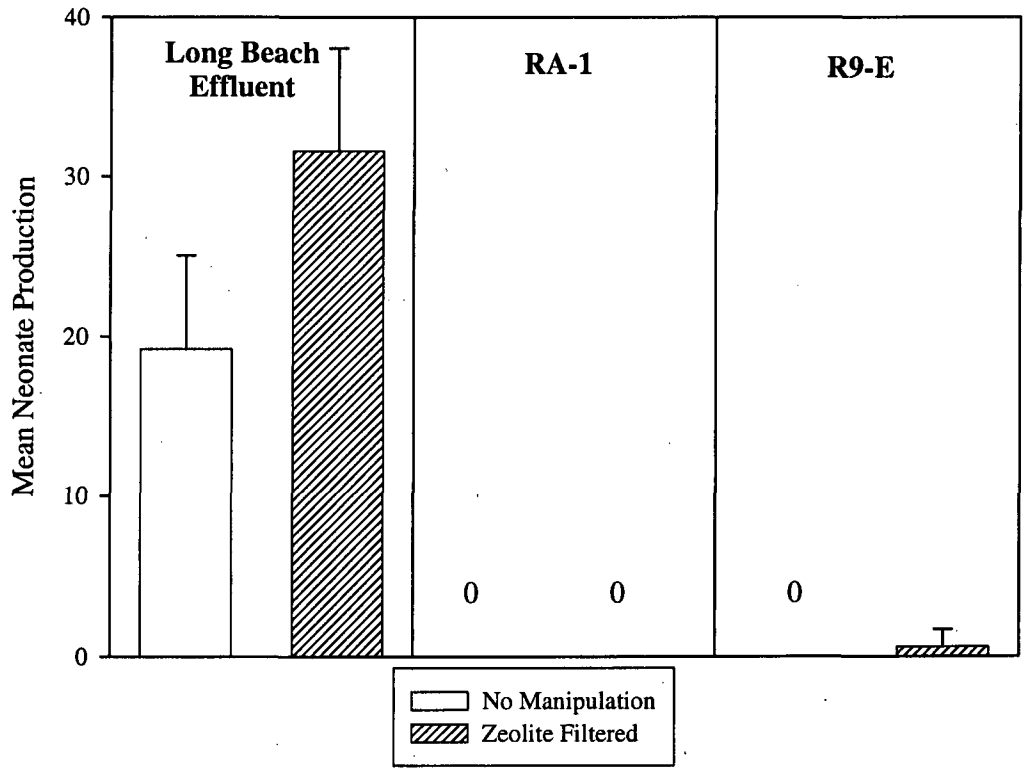


Figure 3. – Coyote Creek Toxicity Comparison. Reproduction results using single samples collected on 11/17/1999 with and without pH control.

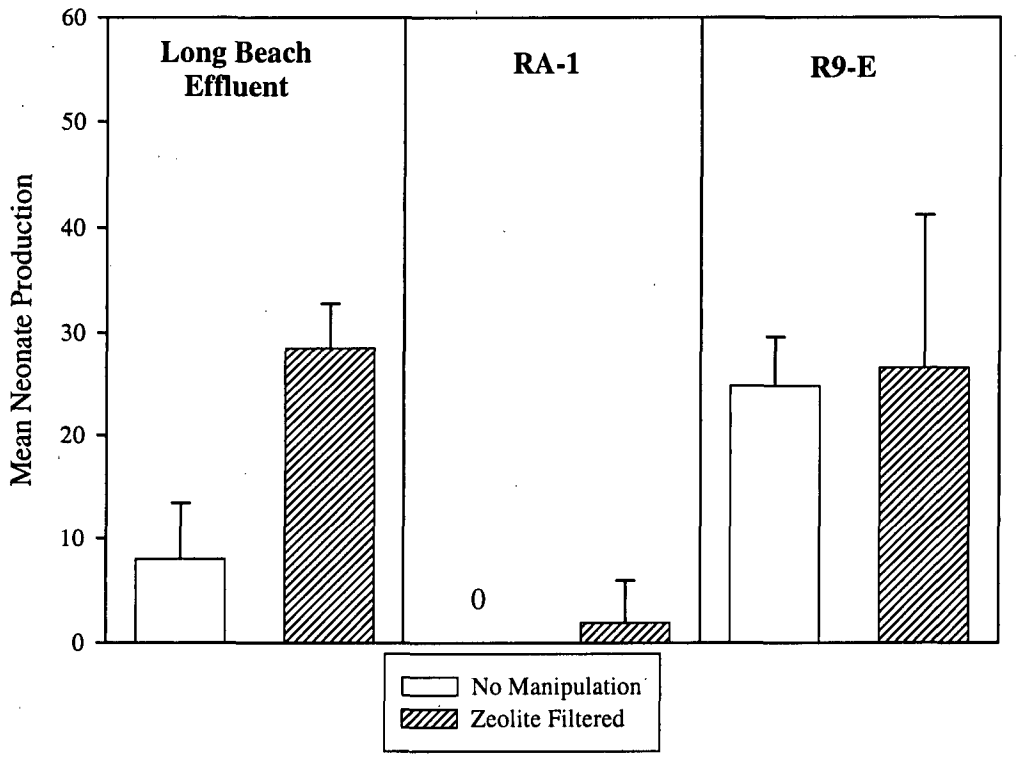


Figure 4. – Coyote Creek Toxicity Comparison. Reproduction results using single samples collected on 01/05/2000 with and without pH control.

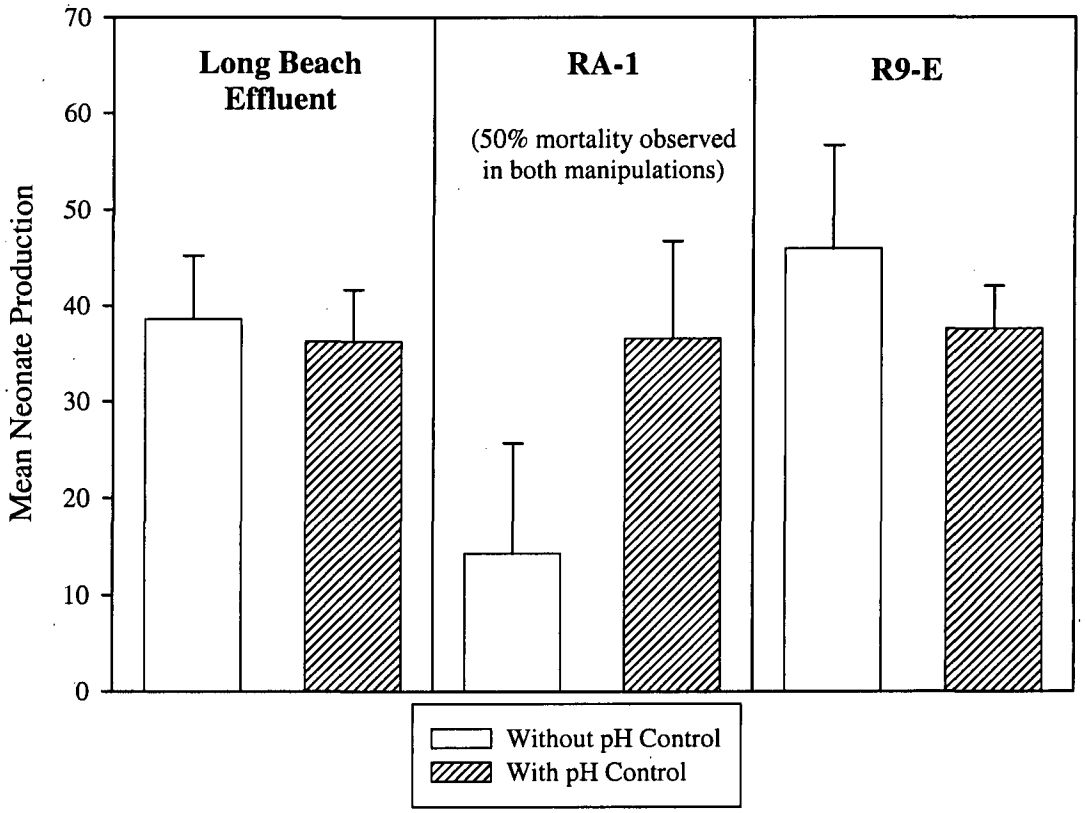


Figure 5. – Coyote Creek Toxicity Comparison. Reproduction results using single samples collected on 02/02/2000 with and without pH control.

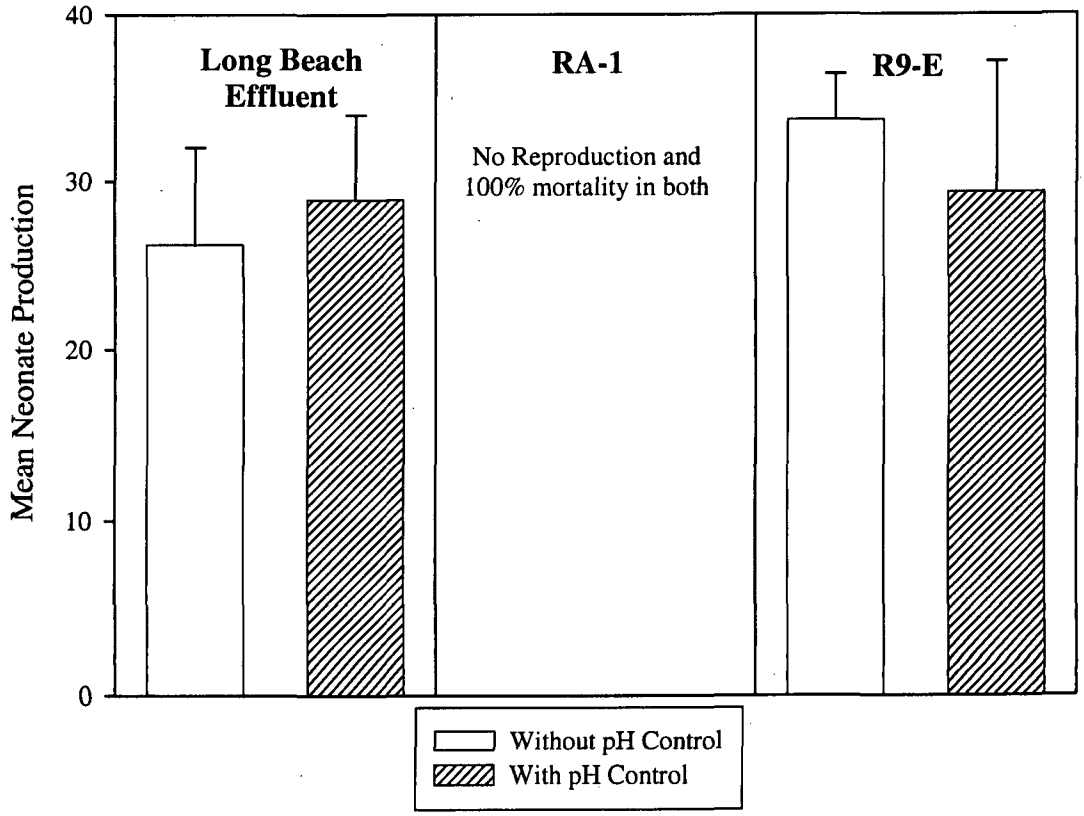


Figure 6. – Coyote Creek Toxicity Comparison. Reproduction results using single samples collected on 03/22/2000 with and without pH control.

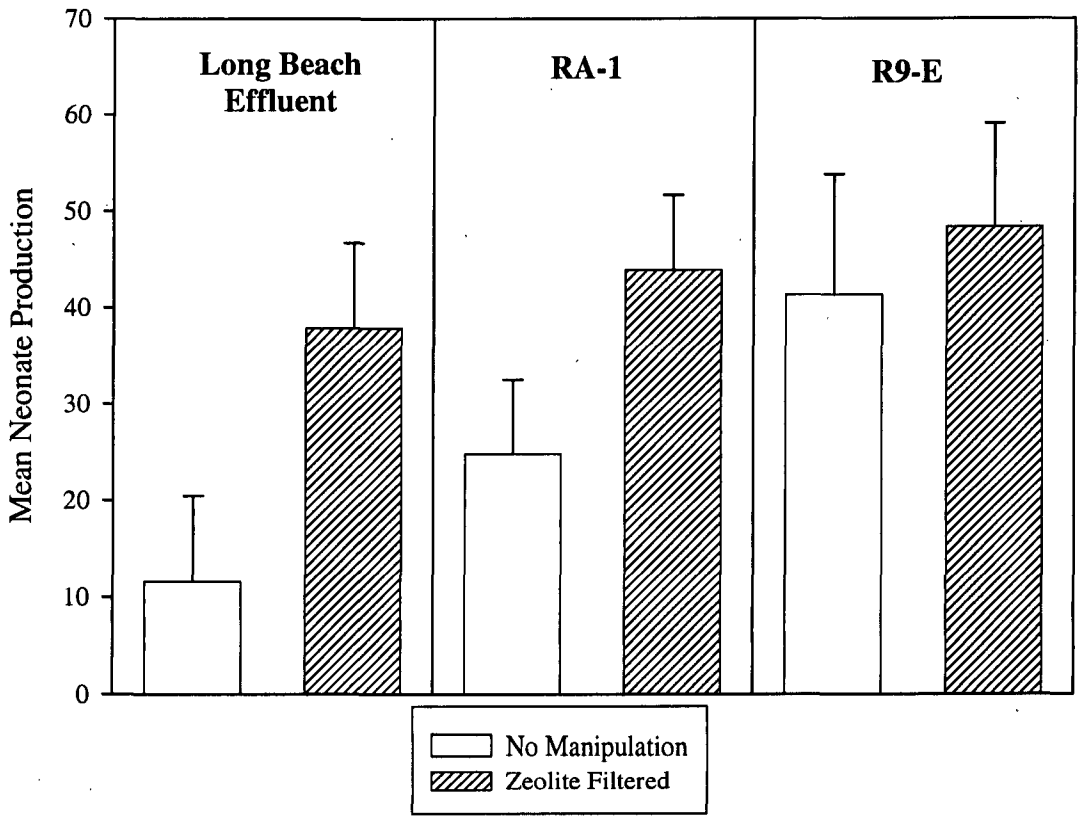


Figure 7. – Coyote Creek Toxicity Comparison. Reproduction results using single samples collected on 04/06/2000 with and without pH control and with and without SPE.

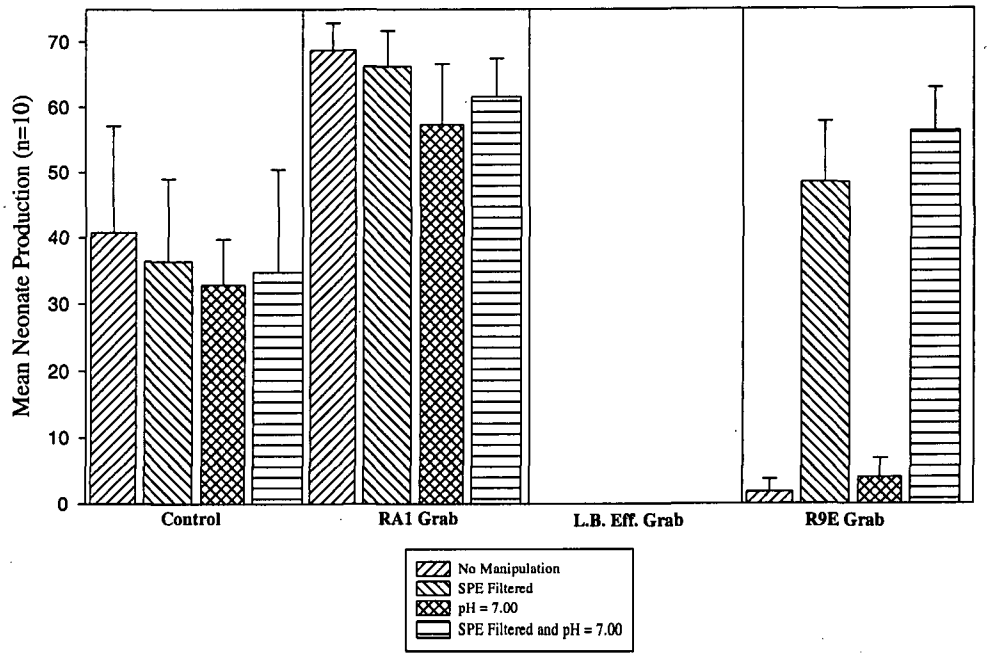


Figure 8. – Coyote Creek Toxicity Comparison. Reproduction results using single samples collected on 05/16/2000. Sample manipulations included no manipulation, zeolite filtration, and solid phase extraction.

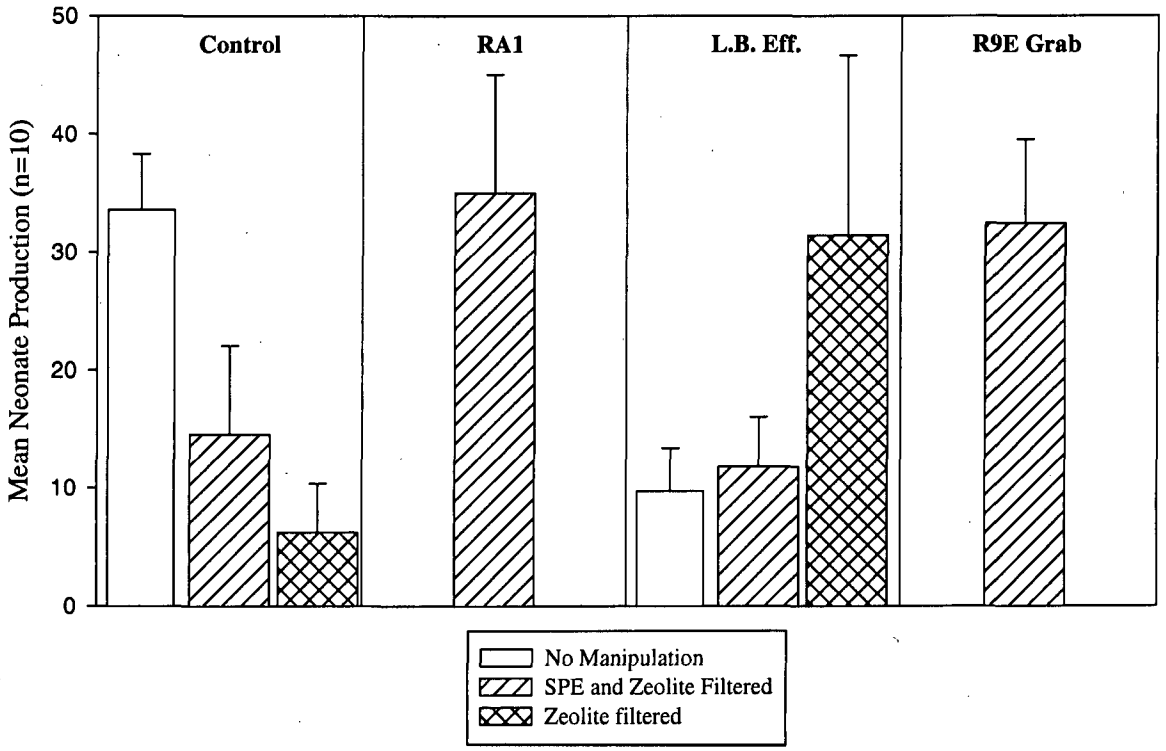


Figure 9. – Coyote Creek Toxicity Comparison. Reproduction results using single samples collected on 07/05/2000. Sample manipulations included no manipulation, zeolite filtration, and solid phase extraction.

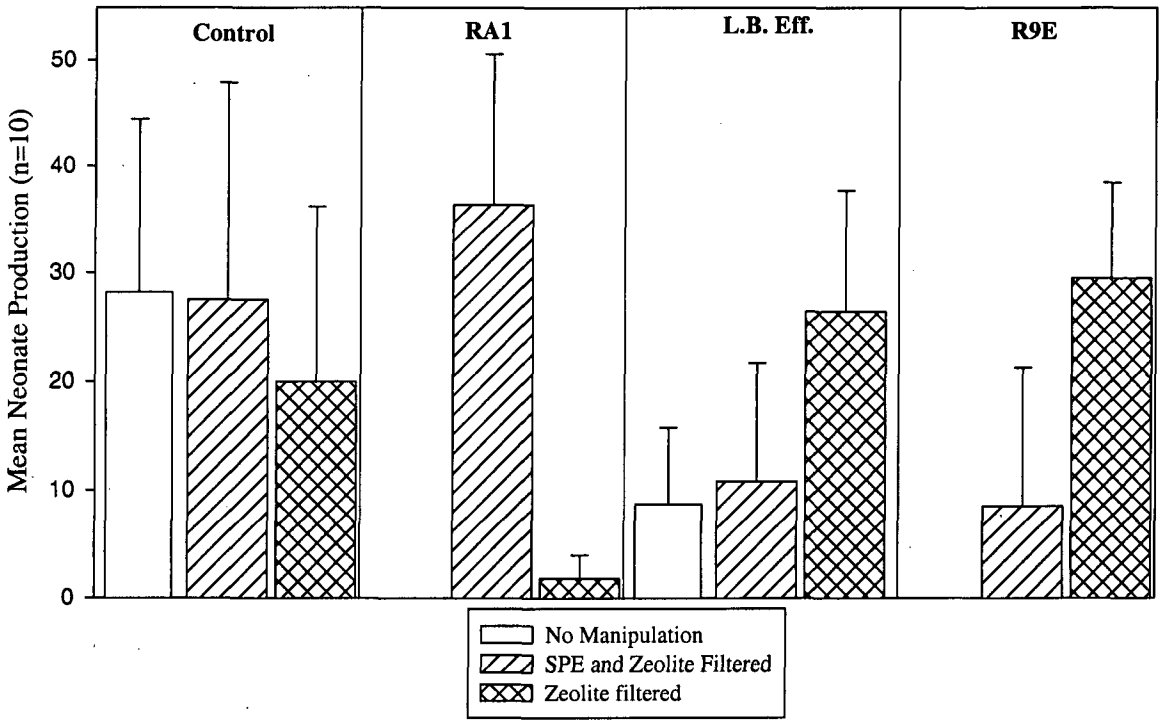


Figure 10. – Coyote Creek Toxicity Comparison. Reproduction results using single samples collected on 08/22/2000. Sample manipulations included no manipulation, zeolite filtration, and solid phase extraction.

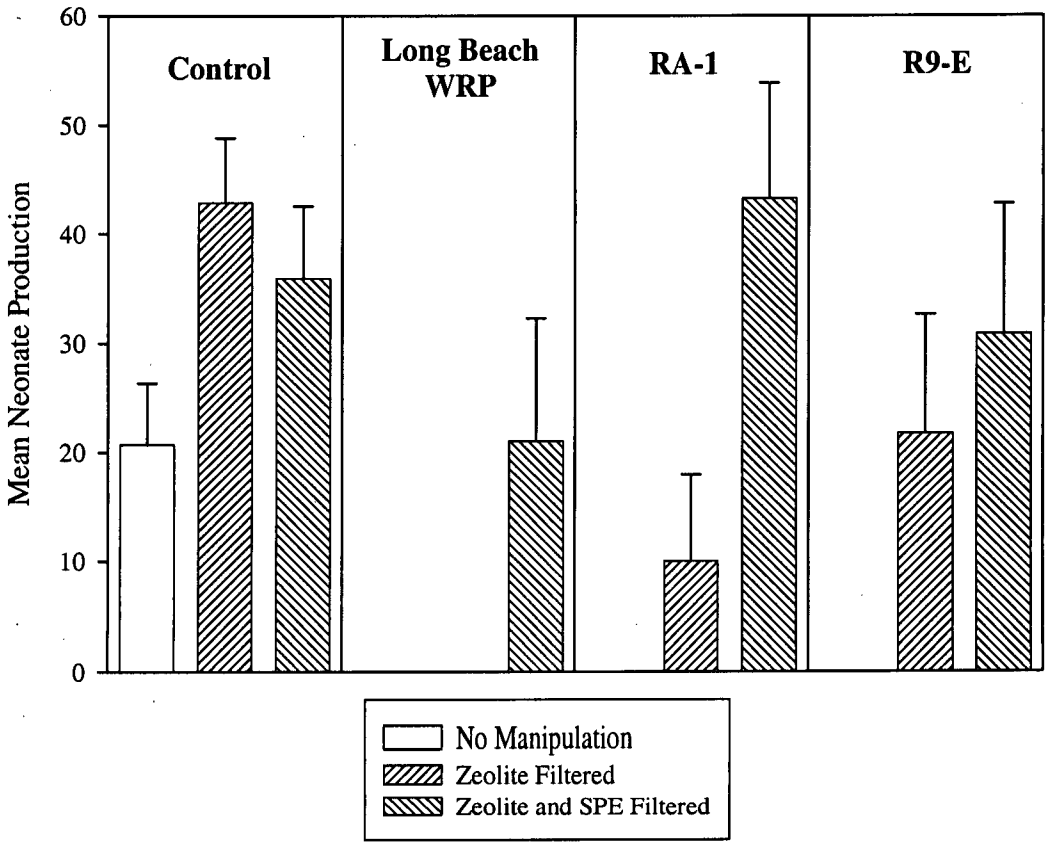


Figure 11. – Coyote Creek Toxicity Comparison. Reproduction results using single samples collected on 09/19/2000. Sample manipulations included no manipulation and zeolite filtration.

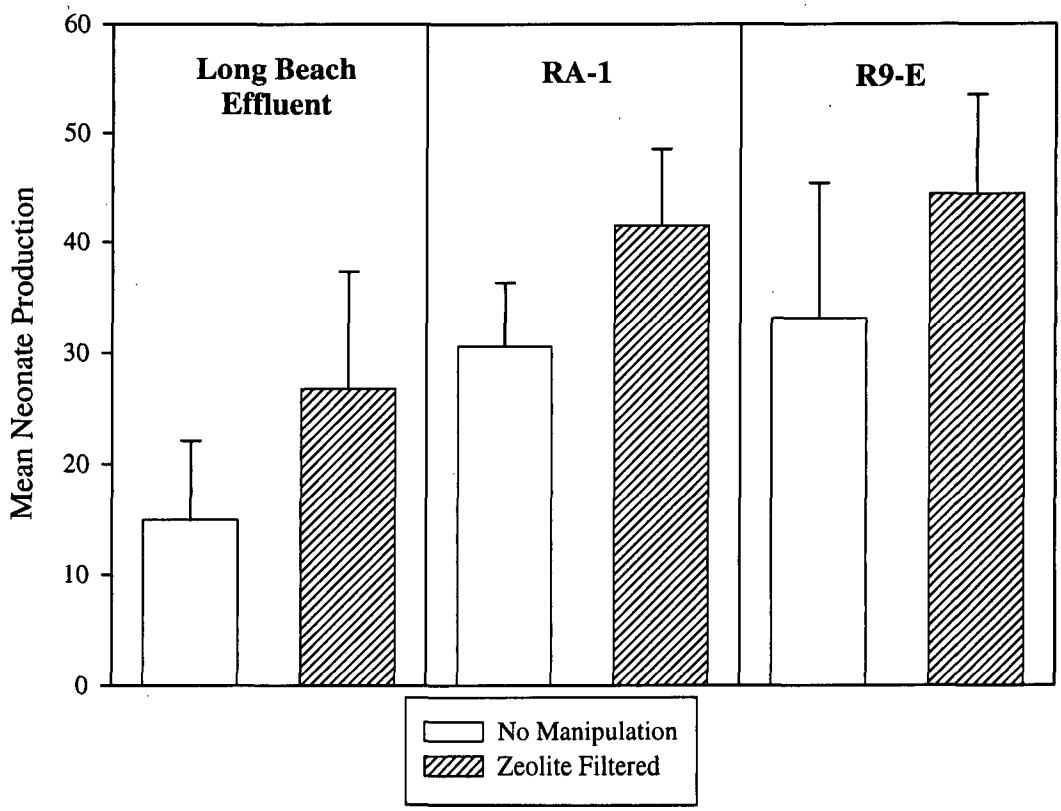


Figure 12. – Coyote Creek Toxicity Comparison. Reproduction results using single samples collected on 10/02/2000. Sample manipulations included no manipulation and zeolite filtration.

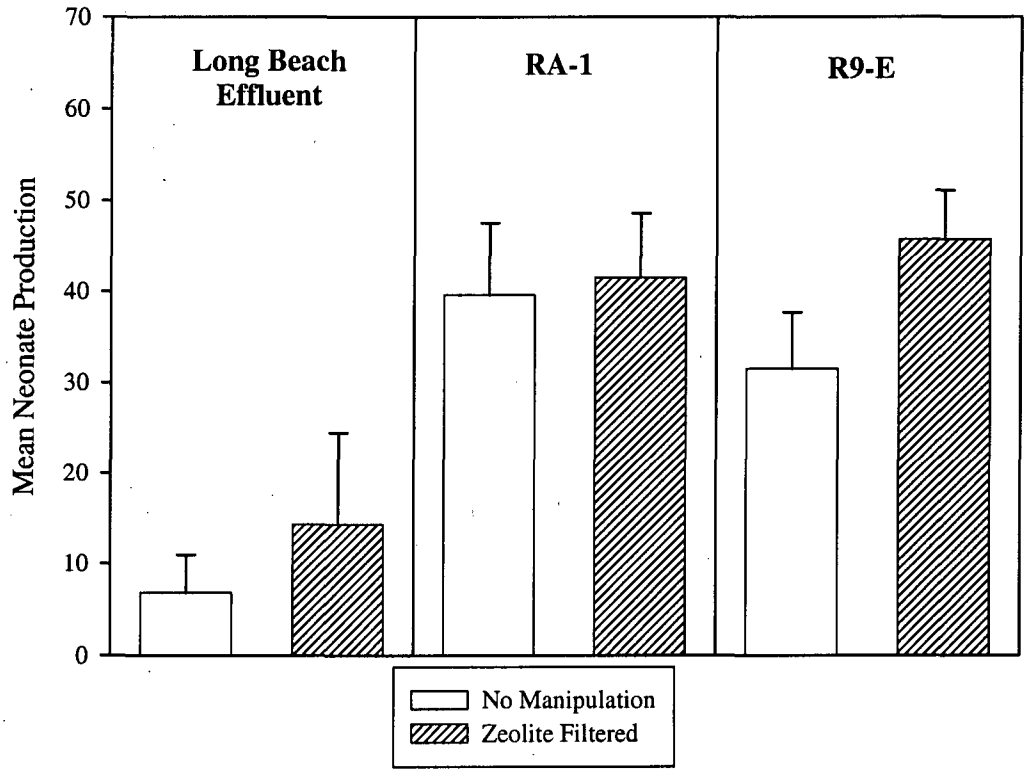
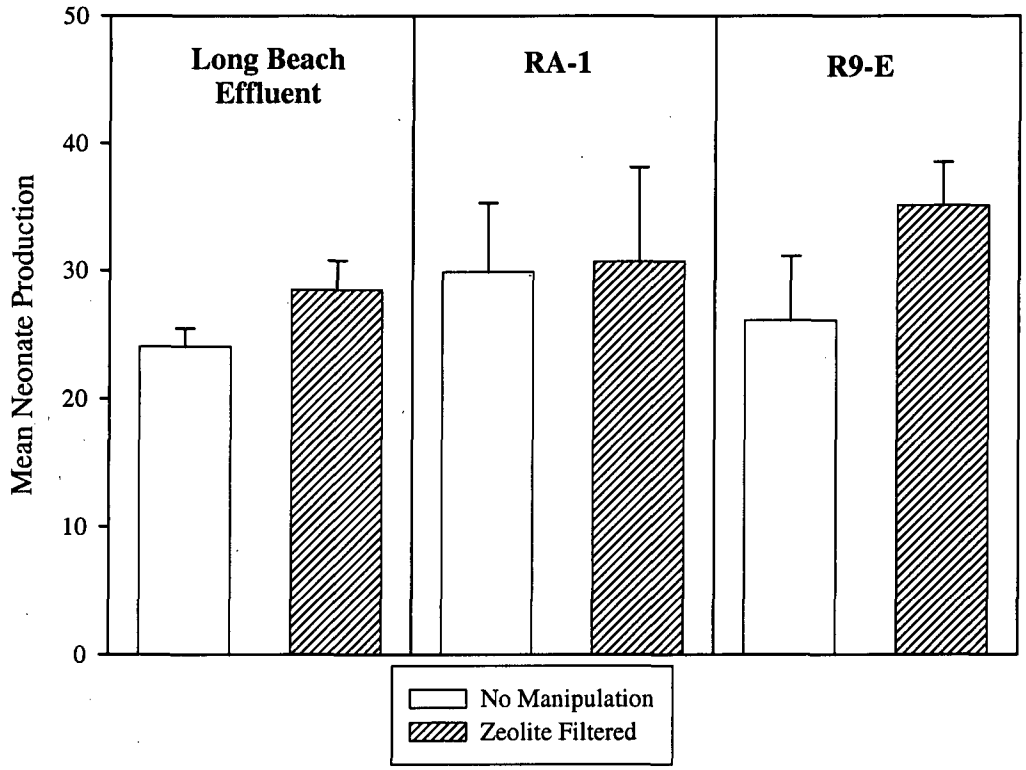


Figure 13. – Coyote Creek Toxicity Comparison. Reproduction results using single samples collected on 11/01/2000. Sample manipulations included no manipulation and zeolite filtration.



SJC WATER QUALITY LABORATORY

METHOD APPROVAL FORM

Method Number	NA
Method Name	Biology Section Quality Assurance Plan
Version	02.1.0
Date	March 11, 2002
Reasons for Method Revision	Standardize format and update method changes

	SIGNATURE	DATE
Written by:		
Philip J. Markle Biologist II SJCWQL Biology	_____	_____
Approved by:		
Jay P. Bottomley Laboratory Supervisor SJCWQL Biology	_____	_____
Final Approval:		
Elly Gabrielian Superintendent of SJCWQL	_____	_____

Laboratory Qualifications

FACILITIES - The Biology Laboratory is part of the San Jose Creek Water Quality Laboratory (SJC-WQL). This is a secure facility with limited and restricted access. The Biology Laboratory also maintains a secure refrigeration unit with access further restricted to Biology personnel. The bioassay testing facility contains several environmental rooms maintained at 25^{O}, 20^{O}, or 15^{O} C. Separate culturing/holding and sample preparation areas are also present.

EQUIPMENT - Equipment necessary to conduct certified bioassays are maintained in the Laboratory. Each piece of equipment is maintained and calibrated according to the standard operating procedures (SOP=s) developed from the manufacturer=s instructions. See Standard Operating Procedures section for a summary of the contents of these SOP=s.

STAFF - Records of all past and present employees are maintained in the Personnel Notebook. This record also contains employee specific information regarding qualifications, training, and responsibilities. All new staff are trained, and periodically reevaluated, by senior staff according to our training SOP=s prior to utilization in any NPDES related activity. See the Quality Control section for a summary of these training procedures.

Sample Custody

NPDES BIOASSAYS - All samples are collected and transported to the San Jose Creek Water Quality Laboratory by LACSD personnel. Each test is assigned a unique "log-in" number, commonly referred to as an SJ#, by the Sample Receiving and Control section using the Biology Laboratory Sample Log-In Form. This number is recorded on the Biology Sample Chain Of Custody sheet - identifying the sample type, location, container, and analysis to be performed. Pertinent information including temperature at collection and after transport is recorded on this chain of custody. Samples are stored in a secured refrigerated storage facility with temperature maintained at 4^{O}C until analysis. Any unused sample is returned to refrigerated storage until all analyses are completed or sample holding time is expired. Used cubitainers are discarded. Carboys used for collection of large volumes of samples are cleaned according to established procedures. Samples which are being sent to outside laboratories for testing include the Chain of Custody which is completed by the laboratory staff receiving the sample and returned to the Biology Laboratory.

TITLE 22 / HAZARDOUS WASTES BIOASSAYS - A suitable chain of custody has been developed with the assistance of the L.A. District Attorney=s office for use in Title 22 bioassay testing that provides suitable and legally defensible custody requirements. Sample receipt, distribution, storage, and disposal (in post adjudicated instances only) is maintained by the laboratory Strike Force Coordinator, Steve Carr Ph.D.

Standard Operating Procedures

TOXICITY TESTS - SOP=s have been prepared for all toxicity tests performed in the laboratory and these SOP=s are accessible to all analysts conducting the procedures. The bioassay SOP=s have been prepared using the following basic format:

Introduction

1. Scope and Application
2. Summary of Method
3. Sample Handling and Preservation
4. Interferences
5. Apparatus and Equipment
6. Reagents and Consumable Materials
7. Procedures
8. Calculations
9. Quality Assurance Guidelines
10. Method Performance
11. Reference

EMPLOYEE TRAINING - SOP=s which describe the procedures used to train and reevaluate employees in the various procedures used in the laboratory have been developed. The employee training SOP=s have the following basic components:

Read and study the appropriate SOP and protocol
Observation of trained personnel
Performance of the procedure under the guidance of senior (initial) and other staff
Independent performance of the procedure and comparison with lab standards
Periodic reevaluation of employee performance

LABORATORY EQUIPMENT - SOP=s have been prepared for all equipment routinely used in the laboratory and are accessible to all analysts using the equipment. These SOP=s are kept with the calibration and maintenance log books and contain the following information:

Maintenance Procedures and Frequencies
Calibration Procedures and Frequencies
Error Resolution Procedures

OTHER - Additional SOP=s have been developed for sample collection, sample and test result tracking, test initiation and data entry in ToxCalc, and data analysis, report generation, and result verification. These SOP=s are available to all staff performing these activities.

Data Validation

All toxicity test data generated by the San Jose Creek Biology Laboratory are checked for accuracy and completeness. This process consists of data generation and three levels of review.

1) The analyst generating the data has the responsibility to review the data to ensure that:

   a) The appropriate SOP has been followed and any deviations are noted.
   b) Sample preparation information is correct and complete.
   c) All instruments used during the analysis have been properly calibrated and are operating within limits.

d) All biological observations are accurate and recorded.
e) All raw data generated are entered into ToxCalc.
f) All documentation appropriate for the analysis is complete.

2) The level two review is conducted by a senior staff member and it is that individual=s responsibility to:

a) Double enter all biological data into ToxCalc to ensure accuracy.
b) Conduct all statistical analyses using the correct procedures.
c) Ensure that the test meets the test acceptability criteria established in the protocol.
d) Ensure that QC standards were quantified and within established guidelines including, but not limited to, whether reference toxicant results are within established guidelines
e) Assemble and review all documentation associated with the test for completeness, accuracy, and acceptability.
f) Enter final toxicity test result into the Districts= mainframe system.
g) Prepare a final report for submission to Monitoring Section. This report must include, but not be limited to, the following items:

COVER SHEET - Agency, facility, test type, test requirement, NPDES permit number, SJ#, and signatures and dates of the preparer of the report and the laboratory supervisor.

INTRODUCTION - Effluent or receiving water tested, date samples collected, and test(s) being performed.

MATERIALS AND METHODS - Protocol used, dilution water and organism source, test design, reference toxicant, and description of statistical analyses performed.

RESULTS - Appropriate statistical endpoint result(s) for the sample and reference toxicant tests (NOEC, LC50, TUa, TUc, etc.).

3) Third level review is conducted by the Laboratory Supervisor and it is their responsibility to:

a) Review the test data, documentation, and statistical analysis for completeness and accuracy.
b) Verify final result in the District=s mainframe.
c) Review final report for accuracy and completeness
d) Confirm that the data/report package is complete and ready for submission to Monitoring and archiving.

Laboratory Quality Control

QA/QC within the laboratory is monitored with internal QC checks which are used to determine if all laboratory activities are operating within acceptable QC guidelines.

1) Employee Training - All employees are trained, evaluated, and periodically reevaluated as described in the respective employee training SOP=s prior to conducting any NPDES bioassays:

2) Instrument QC Checks - All instruments are calibrated prior to use as indicated in their respective SOP kept in the Biology Laboratory. Any instrument which cannot be calibrated or one in which standard measurement is out of specified limits will be repaired or replaced prior to use in any NPDES testing. Also, unknown check samples for pH, hardness, and chlorine residual analysis are routinely supplied by our QA Coordinator to evaluate the performance of each meter and/or analyst.

3) Physical and Chemical Monitoring of Dilution Waters - Freshwater dilution waters are monitored for hardness prior to use in any NPDES bioassay. Alkalinity and conductivity are also measured in every batch of dilution water. Results of such analyses are recorded on the data sheets and laboratory prepared waters are recorded in the reagent log book. Marine dilution waters are monitored for salinity prior to use in any NPDES bioassay. All dilution waters are used within 14 days of preparation or collection.

4) Chemical Monitoring of Reference Toxicant Stocks - All reference toxicant stocks used for NPDES bioassay testing are quantified monthly. Stocks where the measured results are more than 10 % different from the nominal concentrations will be discarded and test concentrations made with this stock will be adjusted to reflect the measured value.

5) Test Validity Requirements - Due to the wide variety of test acceptability guidelines used in the various protocols, test specific requirements for any given protocol are contained in the appropriate SOP and the referenced protocol. All tests used for NPDES monitoring purposes must meet the protocol defined test acceptability criteria to be valid and reported.

6) Reference Toxicant Monitoring Program - Reference toxicant bioassays are conducted con-currently with each NPDES / title 22 bioassay or series of NPDES / title 22 bioassays. These reference toxicant bioassays are of the same duration, measure the same endpoints, and use the same dilution water / species combination as the NPDES / title 22 bioassays with which they are associated.

Unless the test method or NPDES permit has specific test acceptability criteria related to reference toxicant tests, reference toxicant tests associated with effluent and/or ambient water tests which have a compliance limit must be valid. An invalid reference toxicant test will normally prompt repeating the reference toxicant and the associated effluent or ambient water tests.

Invalid reference toxicant tests associated with effluent or ambient water tests used for monitoring purposes only (no compliance limit) may not need to be repeated based upon the professional judgement of one or more senior laboratory staff members (Biologist level or higher).

7) Control Charts - Control charts are established with five successfully completed reference toxicant bioassays for each organism and protocol conducted by the San Jose Creek Water Quality Laboratory (SJC-WQL) Biology group. Subsequent data are added to the control chart as they are generated during reference toxicant testing performed concurrently with all NPDES compliance monitoring tests. Although many data points may be generated over years of testing, the control chart is maintained using the 20 most recent bioassays. The control charts monitor the an LC50 for acute bioassays and the EC/IC25 for chronic bioassay endpoints. The mean and upper and lower control limits (+/- 2 standard deviations) are recalculated with each successive bioassay.

Unless the test method or NPDES permit has specific test acceptability criteria related to control charts, reference toxicant tests associated with effluent and/or ambient water tests which have a compliance limit will use the following decision criteria regarding control chart exceedances.

a) If the result falls below the lower control limit (test was more sensitive than usual) the concurrently conducted effluent/ receiving water bioassay(s) will be invalidated if a permit limit was exceeded and the bioassay(s) repeated. If no permit limit was exceeded, the bioassay will be reported.

b) If the result falls above the upper control limit (test was less sensitive than usual) the concurrently conducted effluent/ receiving water bioassay(s) will be invalidated if a permit limit was not exceeded and the bioassay(s) repeated. If the permit limit was exceeded, the bioassay will be reported.

Control chart exceedances associated with effluent or ambient water tests used for monitoring purposes only (no compliance limit) may not need to follow the decision criteria above based upon the professional judgement of one or more senior laboratory staff members (Biologist level or higher).

A percent MSD control chart is also maintained for all methods and endpoints which report NOEC results as part of an NPDES permit, with the exception of *Ceriodaphnia* survival. This endpoint uses Fisher's exact test rather than ANOVA and multiple comparison tests to determine the NOEC. The decision to use data from reference toxicant tests and associated effluent and/or ambient water bioassays where the percent MSD's exceed the control chart will be based upon the professional judgement of one or more senior laboratory staff members (Biologist level or higher).

8) Performance Audits

a.) Periodic internal audit - Periodically, usually every two years, an internal QA/QC audit is conducted by laboratory personnel. This audit ensures that all current QA/QC practices are in place and performed on a regular basis. Deficiencies are reported and a pro-active course of action is outlined and instituted, if necessary, to take care of the problem.

b) Periodic Audit of Trained Employees - All trained technicians are re-evaluated on a periodic basis. This evaluation consists of the analyst independently conducting a single reference toxicant bioassay and at least one sample toxicity test. Results of these bioassays are evaluated by a senior staff member. This evaluation is conducted on each analyst using each protocol / species combination at approximately five year intervals.

c) EPA DMRQA - The laboratory participates in the EPA=s DMRQA study. This study consists of an annual performance audit to successfully identify appropriate levels of toxicity in an unknown sample provided by the regulating agency.

d) CA ELAP Certification - Our laboratory is certified by the California Environmental Laboratory Accreditation Program in the performance of whole effluent toxicity tests. This certification requires an on-site audit conducted by Department of Health Services Staff approximately every two years and participation and successful completion of the EPA DMRQA study yearly.

Laboratory Performance Records

Records are kept and maintained on all aspects of this QA/QC program. in the Biology Laboratory for at least 5 years. Records more than 5 years old are stored offsite and, in some cases, electronically in database and image formats.

Excerpt from 2001 Annual Monitoring Report for Long Beach Water Reclamation Plant

Receiving Water Chronic Toxicity

Chronic toxicity was observed at station R9E only during the second quarter monitoring period during 2001.

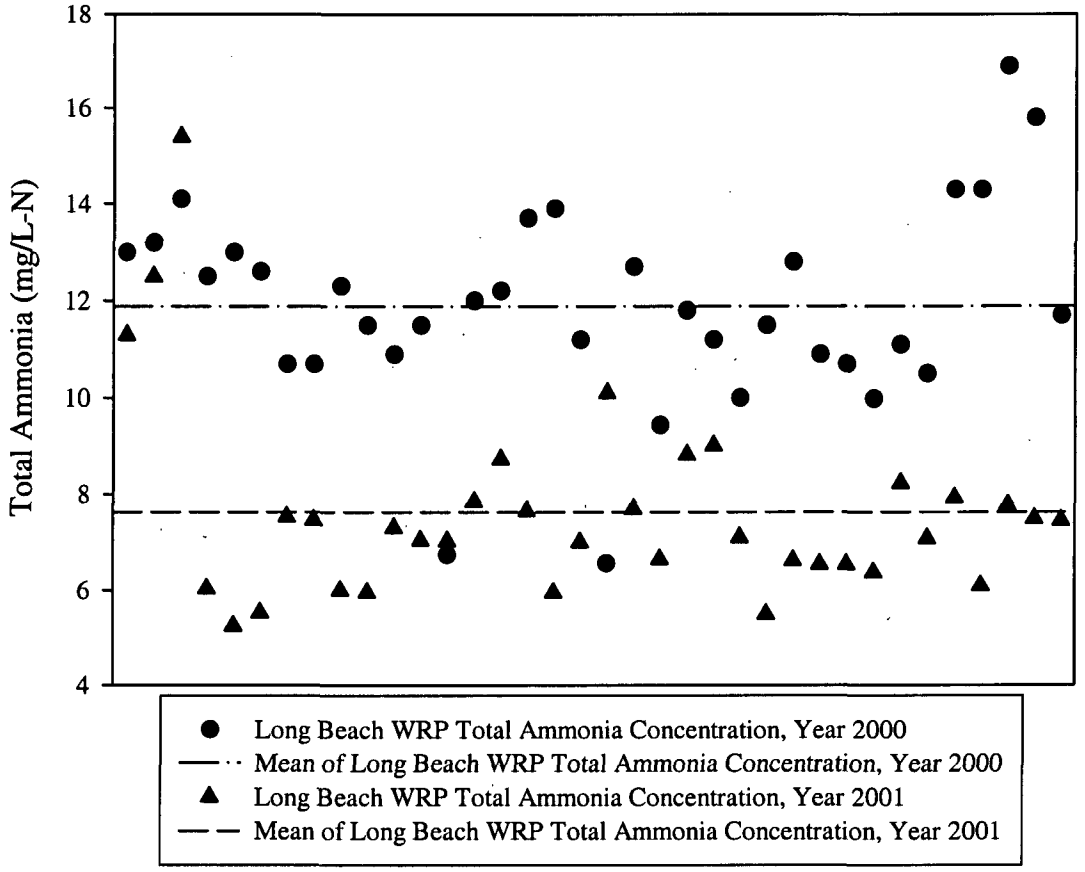
The lack of consistent toxicity at station R9E prevented any direct Toxicity Identification Evaluation (TIE) of samples in 2001. However, TIE efforts conducted in 2001 included the development and evaluation of test methods using Enzyme-Linked Immunosorbent Assay (ELISA) to quantify solid phase extraction (SPE) efficiency and quantification of the pesticides diazinon and chlorpyrifos.

The Districts will resume TIE analyses of the Long Beach WRP effluent, upstream RA1, and R9E using SPE, methanol elutions bioassays, ELISA testing for quantification of diazinon and chlorpyrifos, and Gas Chromatography/ Mass Spectrometry (GC/MS) analyses in the event that consistent toxicity is observed at station R9E.

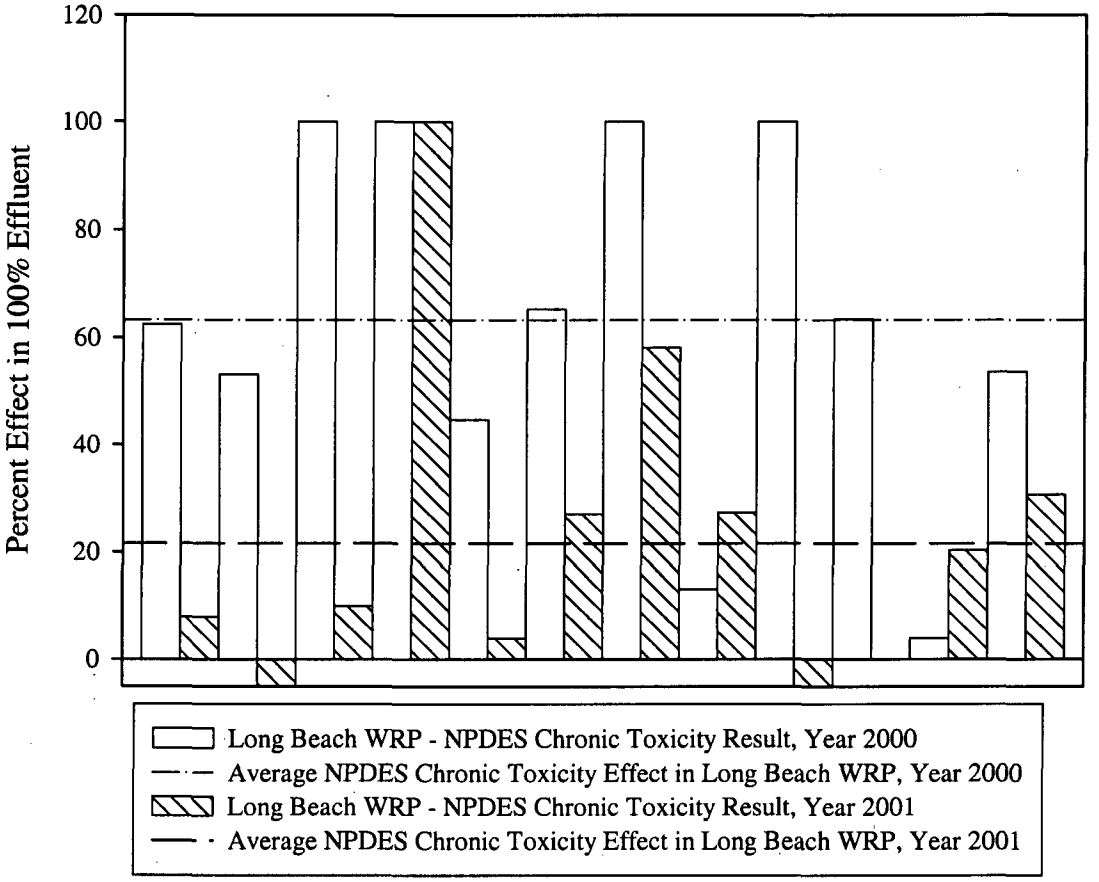
TOXICITY OF LONG BEACH WRP EFFLUENT - 2001 (Ceriodaphnia)									
SAMPLE DATES	ENDPOINT	TEST #	NOEC	TUc (NOEC)	EC/IC25 (95% CI)	TUc-EC/IC25 (95% CI)	OBSERVED EFFECT IN 100%	NH3 (in mg/L)	COMMENTS
01/03, 01/05, 01/08	SURVIVAL REPRO.	1	100% 100%	1.0 1.0	>100% (N/A) 96.1% (N/A)	<1.0 (N/A) 1.0 (N/A)	0.0% 7.9%	11.3, 12.5, 15.4	Valid Bioassay. Test conducted in house and terminated after 3 broods.
02/07, 02/09, 02/12	SURVIVAL REPRO.	2	100% 100%	1.0 1.0	>100% (N/A) >100% (N/A)	<1.0 (N/A) <1.0 (N/A)	0.0% -15.6%	6.04, 5.26, 5.53	Valid Bioassay. Test conducted in house, terminated after 3 broods.
03/21, 03/23, 03/26	SURVIVAL REPRO.	3	100% 100%	1.0 1.0	>100% (N/A) >100% (N/A)	<1.0 (N/A) <1.0 (N/A)	10% 2.1%	7.54, 7.47, 6.00	Valid Bioassay. Test conducted in house and terminated after 3 broods. Hard water used for first time and subsequent tests.
04/11, 04/13, 04/16	SURVIVAL REPRO.		NA	NA	NA	NA	NA	5.00, 5.75, 5.74	Bioassay invalid. Three brood reprod not achieved in controls.
04/25, 04/27, 04/30	SURVIVAL REPRO.	4	20% 20%	5.0 5.0	25% (25.0-25.0) 42.2% (30.3-50.2)	4.0 (4.0-4.0) 2.4 (3.3-2.0)	100% 67.6%	5.96, 7.31, 7.05	Valid Bioassay. Test conducted in house, terminated after 3 broods.
05/02, 05/04, 05/07	SURVIVAL REPRO.	5	100% 100%	1.0 1.0	>100% (N/A) >100% (N/A)	<1.0 (N/A) <1.0 (N/A)	0.0% 3.9%	7.04, 7.85, 8.74	Valid Bioassay. Test contracted to ATL, terminated after 3 broods.
06/13, 06/15, 06/18	SURVIVAL REPRO.	6	100% 60%	1.0 1.7	>100% (N/A) 82.5% (N/A)	<1.0 (N/A) 1.2 (N/A)	-11.1% 27.1%	7.66,	Valid Bioassay. Test contracted to ATL, terminated after 3 broods.
07/25, 07/27, 07/30	SURVIVAL REPRO.	7	100% 80%	1.0 1.3	>100% (NA) 14.1% (10.6-83.8)	<1.0 (NA) 7.1 (9.4-1.2)	10.0% 58.1%	10.1, 7.70,	Valid Bioassay. Test conducted in house, terminated after 3 broods.
08/01, 08/03, 08/06	SURVIVAL REPRO.	8	100% 60%	1.0 1.7	>100% (N/A) 92.9% (N/A)	<1.0 (N/A) 1.1 (N/A)	1.2% 27.4%	8.83, 9.02, 7.11	Valid Bioassay. Test conducted in house, terminated after 3 broods.
09/12, 09/14, 09/17	SURVIVAL REPRO.	9	100% 100%	1.0 1.0	>100% (N/A) >100% (N/A)	<1.0 (N/A) <1.0 (N/A)	-11.1% -17.7%	5.50, 6.63, 6.55	Valid Bioassay. Test conducted in house, terminated after 3 broods.
10/24, 10/26, 10/29	SURVIVAL REPRO.	10	100% 100%	1.0 1.0	>100% (N/A) >100% (N/A)	<1.0 (N/A) <1.0 (N/A)	0.0% -2.7%	6.55, 6.38, 8.24	Valid Bioassay. Test conducted in house, terminated after 3 broods.
11/26, 11/28, 11/30	SURVIVAL REPRO.	11	100% 80%	1.0 1.3	>100% (NA) >100% (NA)	<1.0 (NA) <1.0 (NA)	0% 20.3%	7.09, 7.93, 6.10	Valid Bioassay. Test conducted in house, terminated after 3 broods.
12/05, 12/07, 12/10	SURVIVAL REPRO.	12	100% 40%	1.0 2.5	>100% (N/A) 70.9% (N/A)	<1.0 (N/A) 1.4 (N/A)	20.0% 30.8%	7.78, 7.50, 7.46	Valid Bioassay. Test conducted in house, terminated after 3 broods.

STATION R-9E - LONG BEACH (*Ceriodaphnia*)										
1ST QUARTER (JAN. - MARCH) 2001										
SAMPLE DATES	*SJ NUMBER*	*ENDPOINT*	*TEST #*	*NOEC*	*TUc (NOEC)*	*EC/IC25 (95% CI)*	*TUc-EC/IC25 (95% CI)*	*OBSERVED EFFECT IN 100%*	*NH3 (in mg/L)*	*COMMENTS*
01/03, 01/05	*40094*	*SURVIVAL REPRO.*	*1*	*100% 100%*	*1.0 1.0*	*>100% (N/A) >100% (N/A)*	*<1.0 (N/A) <1.0 (N/A)*	*0.0% -47.2%*	*7.91, 8.50*	*Bioassay valid. Bioassay terminated after 3 broods.*
2ND QUARTER (APRIL - JUNE) 2001										
05/02, 05/04, 05/07	*45962*	*SURVIVAL REPRO.*	*2*	*60% 60%*	*1.7 1.7*	*61.3% (50.0-65.0) 63..3% (54.1-66.0)*	*1.6 (2.0-1.5) 1.6 (1.8-1.5)*	*100% 96.4%*	*1.80, 3.18, 3.75*	*Bioassay valid. Conducted at Aquatic Testing Lab (ATL) using Moderally Hard Water. Bioassay terminated after 3 broods.*
3rd QUARTER (JULY – SEPT.) 2001										
07/25, 07/27, 07/30	*49382*	*SURVIVAL REPRO.*	*3*	*100% 100%*	*1.0 1.0*	*>100% (N/A) 14.2% (N/A)*	*<1.0 (N/A) 7.0 (N/A)*	*10.0% 22.8%*	*3.60, 1.92, 3.03*	*Bioassay valid. Bioassay terminated after 3 broods.*
4rth QUARTER (OCT. – DEC.) 2001										
10/24, 10/26, 10/29	*55129*	*SURVIVAL REPRO.*	*4*	*100% 100%*	*1.0 1.0*	*>100% (N/A) >100% (N/A)*	*<1.0 (N/A) <1.0 (N/A)*	*0.0% 3.6%*	*2.94, 3.70, 2.64*	*Bioassay valid. Bioassay terminated after 3 broods.*

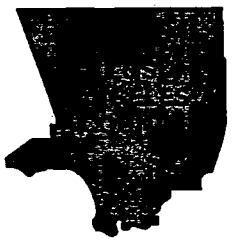
SUMMARY OF 2000 AND 2001 TOTAL AMMONIA CONCENTRATION
LONG BEACH WRP - SAMPLES USED FOR NPDES CHRONIC TOXICITY TESTING

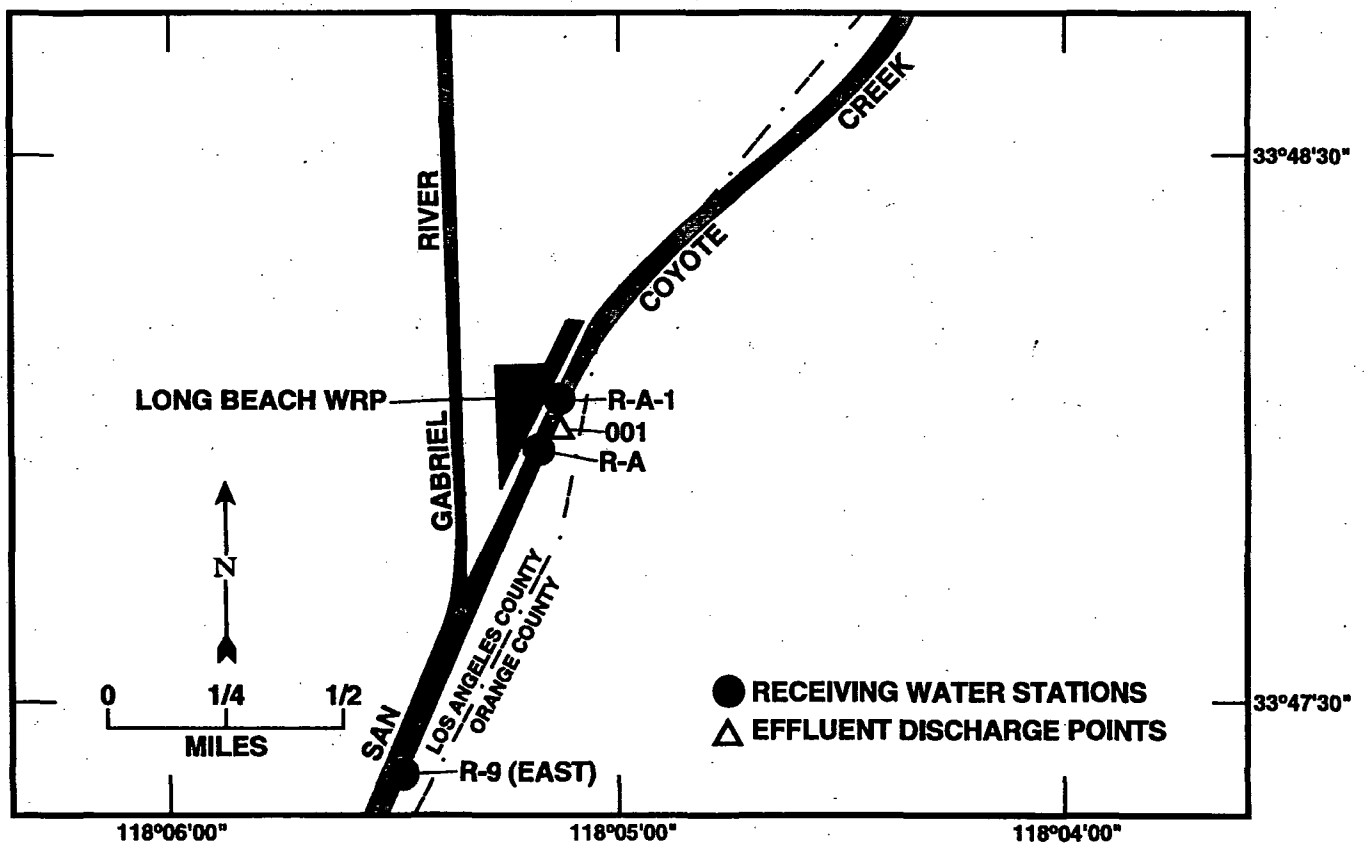


SUMMARY OF 2000 AND 2001 NPDES CHRONIC TOXICITY RESULTS
LONG BEACH WRP



LONG BEACH WRP
Effluent Discharge Points and Receiving Water Stations





R4

Region 4.

Santa Monica Bay Nearshore and Offshore (Arsenic)

Water Body	Santa Monica Bay
Stressor/Media/Beneficial Use	Arsenic/Sediment/Marine Habitat Arsenic/Fish Tissue/Commercial and sport fishing
Data Quality Assessment	High quality for sediment data (See QAPP for SCBPP and Bight '98) High quality fish tissue data (See QAPP for Hyperion permit)
Linkage between endpoint and beneficial use	Habitat quality is related to contaminant concentration (No toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (No toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging attainment	Use of sediment guidelines from literature alone is somewhat controversial. However use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000)
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data.
Spatial representation	Regional surveys entire bay. Point Dume to PV Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey 5 years data on fish tissue
Data type	Numerical
Use of standard method	Performance based
Potential sources of pollutant	Point and non-point sources
Recommendation	Delist Arsenic concentrations are low relative to sediment thresholds Sediment arsenic data % of Area >ER-L (8.2 mg/l) %of Area >ER-M (70 mg/l) Average concentration 1994 (n=55) 7% 0% 5.6 mg/l 1998 (n = 23) 35% 0% 6.9 mg/l

	There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23). Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index. Arsenic concentrations fish muscle tissue concentrations in approximately 250 samples were low relative to human-health based screening values of 1.0 mg/kg ww for organic arsenic (OEHHA, 1999). These comparisons were made assuming that organic arsenic comprises 10% of the total arsenic measured in fish tissue.

Region 4.

Santa Monica Bay Nearshore and Offshore (Cadmium)

Water Body	Santa Monica Bay
Stressor/Media/Beneficial Use	Cadmium/Sediment/Marine Habitat Cadmium/Fish Tissue/Commercial and sport fishing
Data Quality Assessment	High quality for sediment data (See QAPP for SCBPP and Bight '98) High quality for fish tissue data (See QAPP for Hyperion permit)
Linkage between endpoint and beneficial use	Habitat quality is related to contaminant concentration (No toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (No toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging attainment	Use of sediment guidelines from literature alone is somewhat controversial. However use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000)
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data.
Spatial representation	Regional surveys entire bay. Point Dume to PV Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey 5 years data on fish tissue
Data type	Numerical
Use of standard method	Performance based
Potential sources of pollutant	Point and non-point sources
Recommendation	Delist Cadmium are concentrations low relative to thresholds Sediment cadmium concentration % of Area >ER-L (1.2 mg/l) %of Area >ER-M (9.6 mg/l) Average concentration 1994 (n=55) 9% 0% 0.66 mg/l 1998 (n = 23) 17% 0% 0.72 mg/l There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23).

	Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index. Cadmium concentrations fish muscle tissue from approximately 250 fish samples were low relative to human-health based screening value of 3.0 mg/kg ww (OEHHA, 1998)

Region 4.

Santa Monica Bay Nearshore and Offshore (Chromium)

Water Body	Santa Monica Bay
Stressor/Media/Beneficial Use	Chromium/Sediment/Marine Habitat Chromium/Tissue/commercial and Sport Fishing
Data Quality Assessment	High quality for sediment data (See QAPP for SCBPP and Bight '98) High quality fish tissue data (See QAPP for Hyperion permit)
Linkage between endpoint and beneficial use	Habitat quality is related to contaminant concentration (No toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (No toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging attainment	Use of sediment guidelines from literature alone is somewhat controversial. However use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000)
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data.
Spatial representation	Regional surveys entire bay. Point Dume to PV Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey 5 years data on fish tissue
Data type	Numerical
Use of standard method	Performance based
Potential sources of pollutant	Point and non-point sources
Recommendation	Delist Chromium concentrations are low relative to sediment thresholds Sediment silver data % of Area >ER-L (1.0 mg/l) %of Area >ER-M (3.7 mg/l) Average concentration 1994 (n=55) 45% 0% 85 mg/l 1998 (n = 23) 4% 0% 45 mg/l

	There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23). Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index. Chromium concentrations in fish muscle tissue from approximately 250 samples were low relative to State Mussel Watch screening values (MTRL of 1.0 mg/kg ww for total chromium).

Region 4.

Santa Monica Bay Nearshore and Offshore (Copper)

Water Body	Santa Monica Bay
Stressor/Media/Beneficial Use	Copper/Sediment/Marine Habitat Copper/Fish Tissue/Commercial and sport fishing
Data Quality Assessment	QAPP for SCBPP and Bight '98
Linkage between endpoint and beneficial use	High quality for sediment data (See QAPP for SCBPP and Bight '98) High quality fish tissue data (See QAPP for Hyperion permit)
Utility of measure for judging attainment	Habitat quality is related to contaminant concentration (No toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (No toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Water Body-specific information	Use of sediment guidelines from literature alone is somewhat controversial. However use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Data used to assess water quality	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000)
Spatial representation	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data.
Temporal representation	Regional surveys entire bay. Point Dume to PV Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Data type	2 years data from Regional Survey 5 years data on fish tissue
Use of standard method	Performance based
Potential sources of pollutant	Point and non-point sources
Recommendation	Delist Copper are concentrations low relative to thresholds Sediment copper concentration % of Area >ER-L (34 mg/l) %of Area >ER-M (270 mg/l) Average concentration 1994 (n=55) 44% 0% 30 mg/l 1998 (n = 23) 13% 0% 12 mg/l There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23).

	Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index. Copper concentrations in fish muscle tissue from approximately 250 samples collected in Santa Monica Bay were below US Fish and Wildlife (1998) screening value of 15 mg/kg ww.

Region 4.

Santa Monica Bay Nearshore and Offshore (Lead)

Water Body	Santa Monica Bay
Stressor/Media/Beneficial Use	Lead/Sediment/Marine Habitat Lead/Tissue/Commercial and sport fishing
Data Quality Assessment	High quality for sediment data (See QAPP for SCBPP and Bight '98) High quality fish tissue data (See QAPP for Hyperion permit)
Linkage between endpoint and beneficial use	Habitat quality is related to contaminant concentration (No toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (No toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging attainment	Use of sediment guidelines from literature alone is somewhat controversial. However use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000)
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data.
Spatial representation	Regional surveys entire bay. Point Dume to PV Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey 5 years data on fish tissue
Data type	Numerical
Use of standard method	Performance based
Potential sources of pollutant	Point and non-point sources
Recommendation	Delist Lead are concentrations low relative to thresholds Sediment lead concentration % of Area >ER-L (81 mg/l) %of Area >ER-M (370 mg/l) Average concentration 1994 (n=55) 7% 0% 22 mg/l 1998 (n = 23) 22% 0% 40 mg/l

	There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23). Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index. Lead concentrations in fish muscle tissue concentrations from approximately 250 samples were low relative to State Mussel Watch screening values (MTRL of 2.0 mg/kg ww). There is no lead-based consumption advisory for commercial or sport fishing in fish from Santa Monica Bay (OEHHA, 2001)

Region 4.

Santa Monica Bay Nearshore and Offshore (Mercury)

Water Body	Santa Monica Bay
Stressor/Media/Beneficial Use	Mercury/Sediment/Marine Habitat Mercury/Fish Tissue/Commercial and sport fishing
Data Quality Assessment	High quality for sediment data (See QAPP for SCBPP and Bight '98) High quality fish tissue data (See QAPP for Hyperion permit)
Linkage between endpoint and beneficial use	Habitat quality is related to contaminant concentration (No toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (No toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging attainment	Use of sediment guidelines from literature alone is somewhat controversial. However use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000)
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data.
Spatial representation	Regional surveys entire bay. Point Dume to PV Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey 5 years data on fish tissue
Data type	Numerical
Use of standard method	Performance based
Potential sources of pollutant	Point and non-point sources
Recommendation	Delist Mercury concentrations are low relative to thresholds Sediment mercury concentration % of Area >ER-L (0.15 mg/l) %of Area >ER-M (0.71 mg/l) Average concentration 1994 (n=55) 45% 0% 0.14 mg/l 1998 (n = 23) 48% 0% 0.16 mg/l There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23).

	Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index. The average mercury concentrations in fish muscle tissue from approximately 250 samples collected in Santa Monica Bay were close to the human-health based screening values (OEHHA, 0.3 mg/kg ww). There is no mercury-based consumption advisory for commercial or sport fishing in fish from Santa Monica Bay (OEHHA, 2001).

Region 4.

Santa Monica Bay Nearshore and Offshore (Nickel)

Water Body	Santa Monica Bay
Stressor/Media/Beneficial Use	Nickel/Sediment/Marine Habitat Nickel/Fish Tissue/Commercial and sport fishing
Data Quality Assessment	High quality for sediment data (See QAPP for SCBPP and Bight '98) High quality fish tissue data (See QAPP for Hyperion permit)
Linkage between endpoint and beneficial use	Habitat quality is related to contaminant concentration (No toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (No toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging attainment	Use of sediment guidelines from literature alone is somewhat controversial. However use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000)
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data.
Spatial representation	Regional surveys entire bay. Point Dume to PV Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey 5 years data on fish tissue
Data type	Numerical
Use of standard method	Performance based
Potential sources of pollutant	Point and non-point sources
Recommendation	Delist Nickel concentrations are low relative to thresholds Sediment nickel concentration % of Area >ER-L (21 mg/l) %of Area >ER-M (52 mg/l) Average concentration 1994 (n=55) 40% 2% 24 mg/l 1998 (n = 23) 30% 0% 20 mg/l There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23).

	Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index. There are no human-health based or wildlife based screening values for evaluating nickel concentrations in fish tissue.

Region 4.

Santa Monica Bay Nearshore and Offshore (Silver)

Water Body	Santa Monica Bay
Stressor/Media/Beneficial Use	Silver/Sediment/Marine Habitat Silver/Tissue/commercial and Sport Fishing
Data Quality Assessment	High quality for sediment data (See QAPP for SCBPP and Bight '98) High quality fish tissue data (See QAPP for Hyperion permit)
Linkage between endpoint and beneficial use	Habitat quality is related to contaminant concentration (No toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (No toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging attainment	Use of sediment guidelines from literature alone is somewhat controversial. However use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000)
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data.
Spatial representation	Regional surveys entire bay. Point Dume to PV Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey 5 years data on fish tissue
Data type	Numerical
Use of standard method	Performance based
Potential sources of pollutant	Point and non-point sources
Recommendation	Delist Silver concentrations are slightly elevated relative to sediment thresholds. The majority of these elevated values are within the zone of influence of the Hyperion outfall. Sediment silver data % of Area >ER-L (1.0 mg/l) %of Area >ER-M (3.7 mg/l) Average concentration 1994 (n=55) 71% 13% 1.58 mg/l 1998 (n = 23) 65% 26% 2.06 mg/l

	There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23). Benthic community structure good in 98% of area. There are no human-health based or wildlife based screening values for evaluating silver concentrations in fish tissue. There is no silver-based consumption advisory for commercial or sport fishing in fish from Santa Monica Bay (OEHHA, 2001).

Region 4.

Santa Monica Bay Nearshore and Offshore (Zinc)

Water Body	Santa Monica Bay
Stressor/Media/Beneficial Use	Zinc/Sediment/Marine Habitat Zinc/Fish Tissue/Commercial and sport fishing
Data Quality Assessment	High quality for sediment data (See QAPP for SCBPP and Bight '98) High quality fish tissue data (See QAPP for Hyperion permit)
Linkage between endpoint and beneficial use	Habitat quality is related to contaminant concentration (No toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (No toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging attainment	Use of sediment guidelines from literature alone is somewhat controversial. However use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach. Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Water Body-specific information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000)
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data.
Spatial representation	Regional surveys entire bay. Point Dume to PV Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey 5 years data on fish tissue
Data type	Numerical
Use of standard method	Performance based
Potential sources of pollutant	Point and non-point sources
Recommendation	Delist Zinc concentrations are low relative to thresholds Sediment Zinc concentration % of Area >ER-L (150 mg/l) %of Area >ER-M (410 mg/l) Average concentration 1994 (n=55) 7% 0% 84 mg/l 1998 (n = 23) 0% 0% 61 mg/l

	There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23). Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index. Zinc concentrations in fish muscle tissue from approximately 250 samples were low relative to the Mean International Standard for freshwater fish of 45 mg/kg ww (United Nations, 1983).

New metals eval.
Tony Flores
9/15/00
Cmt. 4.3(.1

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Water Body	NEW: Santa Monica Bay Nearshore and Offshore
Stressor/Media/Beneficial Use	Copper/Sediment/Marine Habitat Copper/Fish Tissue/Commercial and sport fishing
Data quality assessment. Extent to which data quality requirements met.	High quality for sediment data (See QAPP for SCBPP and Bight '98). High quality fish tissue data (See QAPP for Hyperion permit).
Linkage between measurement endpoint and benefical use or standard	Habitat quality is related to pollutant concentration (no toxics in toxic amounts). Fish tissue data can be compared to risk-based values for the protection of human health (no toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging if standards or uses are not attained	Use of sediment guidelines from literature alone is somewhat controversial. However, use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific Information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000).
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data. Copper are concentrations low relative to thresholds.

	1994 (n=55)	1998 (n=23)
% of Area > ER-L (34 mg/l)	44%	13%
%of Area >ER-M (270 mg/l)	0%	0%
Average concentration	30 mg/l	12 mg/l

There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23).

Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index.

Copper concentrations in fish muscle tissue from approximately 250 samples collected in Santa Monica Bay were below US Fish and Wildlife (1998) screening value of 15 mg/kg ww.

Spatial representation	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data. Copper are concentrations low relative to thresholds.

	1994 (n=55)	1998 (n=23)
% of Area >ER-L (34 mg/kg)	44%	13%
%of Area >ER-M (270 mg/kg)	0%	0%
Average concentration	30 mg/kg	12 mg/kg

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

	There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23). Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index. Copper concentrations in fish muscle tissue from approximately 250 samples collected in Santa Monica Bay were below US Fish and Wildlife (1998) screening value of 15 mg/kg ww.
Temporal representation	Regional surveys entire bay. Point Dume to Palos verdes Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Data type	2 years data from Regional Survey. 5 years data on fish tissue.
Use of standard method	Performance-based.
Potential Source(s) of Pollutant	Point and nonpoint sources.
Alternative Enforceable Program	Not applicable.
RWQCB Recommendation	None.
SWRCB Staff Recommendation	In the review of the available data and information and the RWQCB documentation for this recommendation, SWRCB staff conclude that the water body should be removed from the section 303(d) list because applicable water quality standards are not exceeded. This conclusion is based on the staff findings that: 1. The data is considered to be of adequate quality. 2. The data exhibited sufficient spatial and temporal coverage. 3. The evaluation guideline used to interpret narrative water quality standards is adequate. 4. Data are numerical. 5. Standard methods were used. 8. Other water body- or site-specific information including the effects of age of the data were considered. Most of the water quality measurements do not exceed the water quality standard. The staff confidence that standards are not exceeded is high.

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Water Body	NEW: Santa Monica Bay Nearshore and Offshore
Stressor/Media/Beneficial Use	Chromium/Sediment/Marine Habitat Chromium/Tissue/commercial and Sport Fishing
Data quality assessment. Extent to which data quality requirements met.	High quality for sediment data (See QAPP for SCBPP and Bight '98). High quality fish tissue data (See QAPP for Hyperion permit).
Linkage between measurement endpoint and benefical use or standard	Habitat quality is related to pollutant concentration (no toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (no toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging if standards or uses are not attained	Use of sediment guidelines from literature alone is somewhat controversial. However, use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific Information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000).
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data. Chromium concentrations are low relative to sediment thresholds.

	1994 (n=55)	1998 (n=23)
% of Area >ER-L (1.0 mg/kg)	45%	4%
%of Area >ER-M (3.7 mg/kg)	0%	0%
Average concentration	85 mg/kg	45 mg/kgl

There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23).

Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index.

Chromium concentrations in fish muscle tissue from approximately 250 samples were low relative to MTRL of 1.0 mg/kg ww for total chromium.

Spatial representation	Regional surveys entire bay. Point Dume to Palos Verdes Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey. 5 years data on fish tissue.
Data type	Numerical data.
Use of standard method	Performance-based.

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Potential Source(s) of Pollutant	Point and non-point sources.
Alternative Enforceable Program	Not applicable.
RWQCB Recommendation	None.
SWRCB Staff Recommendation	In the review of the available data and information and the RWQCB documentation for this recommendation, SWRCB staff conclude that the water body should be removed from the section 303(d) list because applicable water quality standards are not exceeded. This conclusion is based on the staff findings that: 1. The data is considered to be of adequate quality. 2. The data exhibited sufficient spatial and temporal coverage. 3. The evaluation guideline used to interpret narrative water quality standards is adequate. 4. Data are numerical. 5. Standard methods were used. 8. Other water body- or site-specific information including the effects of age of the data were considered. Most of the water quality measurements do not exceed the water quality standard. The staff confidence that standards are not exceeded is high.

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Water Body	NEW: Santa Monica Bay Nearshore and Offshore
Stressor/Media/Beneficial Use	Cadmium/Sediment/Marine Habitat Cadmium/Fish Tissue/Commercial and sport fishing
Data quality assessment. Extent to which data quality requirements met.	High quality for sediment data (See QAPP for SCBPP and Bight '98). High quality for fish tissue data (See QAPP for Hyperion permit).
Linkage between measurement endpoint and benefical use or standard	Habitat quality is related to pollutant concentration (no toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (no toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging if standards or uses are not attained	Use of sediment guidelines from literature alone is somewhat controversial. However, use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific Information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000).
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data. Cadmium are concentrations low relative to thresholds.

	1994 (n=55)	1998 (n=23)
% of Area >ER-L (1.2 mg/kg)	9%	17%
%of Area >ER-M (9.6 mg/kg)	0%	0%
Average concentration	0.66 mg/kg	0.72 mg/kg

There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23).

Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index.

Cadmium concentrations fish muscle tissue from approximately 250 fish samples were low relative to human-health based screening value of 3.0 mg/kg ww (OEHHA, 1998).

Spatial representation	Regional surveys entire bay. Point Dume to Palos Verdes Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey. 5 years data on fish tissue.
Data type	Numerical data.

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Use of standard method	Performance-based.
Potential Source(s) of Pollutant	Point and non-point sources.
Alternative Enforceable Program	Not applicable.
RWQCB Recommendation	None.
SWRCB Staff Recommendation	In the review of the available data and information and the RWQCB documentation for this recommendation, SWRCB staff conclude that the water body should be removed from the section 303(d) list because applicable water quality standards are not exceeded. This conclusion is based on the staff findings that: 1. The data is considered to be of adequate quality. 2. The data exhibited sufficient spatial and temporal coverage. 3. The evaluation guideline used to interpret narrative water quality standards is adequate. 4. Data are numerical. 5. Standard methods were used. 8. Other water body- or site-specific information including the effects of age of the data were considered. Most of the water quality measurements do not exceed the water quality standard. The staff confidence that standards are not exceeded is high.

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Water Body	NEW: Santa Monica Bay Nearshore and Offshore
Stressor/Media/Beneficial Use	Zinc/Sediment/Marine Habitat Zinc/Fish Tissue/Commercial and sport fishing
Data quality assessment. Extent to which data quality requirements met.	High quality for sediment data (See QAPP for SCBPP and Bight '98). High quality fish tissue data (See QAPP for Hyperion permit).
Linkage between measurement endpoint and benefical use or standard	Habitat quality is related to pollutant concentration (no toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (no toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging if standards or uses are not attained	Use of sediment guidelines from literature alone is somewhat controversial. However, use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach. Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Water Body-specific Information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000).
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data. Zinc concentrations are low relative to thresholds.

	1994 (n=55)	1998 (n=23)
% of Area >ER-L (150 mg/kg)	7%	0%
%of Area >ER-M (410 mg/kg)	0%	0%
Average concentration	84 mg/kg	61 mg/kg

There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23).

Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index.

Zinc concentrations in fish muscle tissue from approximately 250 samples were low relative to the Mean International Standard for freshwater fish of 45 mg/kg ww (United Nations, 1983).

Spatial representation	Regional surveys entire bay. Point Dume to Palos Verdes Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey. 5 years data on fish tissue.
Data type	Numerical data.

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Use of standard method	Performance-based.
Potential Source(s) of Pollutant	Point and nonpoint sources.
Alternative Enforceable Program	Not applicable.
RWQCB Recommendation	None.
SWRCB Staff Recommendation	In the review of the available data and information and the RWQCB documentation for this recommendation, SWRCB staff conclude that the water body should be removed from the section 303(d) list because applicable water quality standards are not exceeded. This conclusion is based on the staff findings that: 1. The data is considered to be of adequate quality. 2. The data exhibited sufficient spatial and temporal coverage. 3. The evaluation guideline used to interpret narrative water quality standards is adequate. 4. Data are numerical. 5. Standard methods were used. 8. Other water body- or site-specific information including the effects of age of the data were considered. Most of the water quality measurements do not exceed the water quality standard. The staff confidence that standards are not exceeded is high.

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Water Body	NEW: Santa Monica Bay Nearshore and Offshore
Stressor/Media/Beneficial Use	Silver/Sediment/Marine Habitat Silver/Tissue/commercial and Sport Fishing
Data quality assessment. Extent to which data quality requirements met.	High quality for sediment data (See QAPP for SCBPP and Bight '98). High quality fish tissue data (See QAPP for Hyperion permit).
Linkage between measurement endpoint and benefical use or standard	Habitat quality is related to pollutant concentration (no toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (no toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging if standards or uses are not attained	Use of sediment guidelines from literature alone is somewhat controversial. However, use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific Information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000).
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data. Silver concentrations are slightly elevated relative to sediment thresholds. The majority of these elevated values are within the zone of influence of the Hyperion outfall.

	1994 (n=55)	1998 (n=23)
% of Area >ER-L (1.0 mg/kg)	71%	65%
%of Area >ER-M (3.7 mg/kg)	13%	26%
Average concentration	1.58 mg/kg	2.06 mg/kg

There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23).

Benthic community structure good in 98% of area.

There are no human-health based or wildlife based screening values for evaluating silver concentrations in fish tissue. There is no silver-based consumption advisory for commercial or sport fishing in fish from Santa Monica Bay (OEHHA, 2001).

Spatial representation	Regional surveys entire bay. Point Dume to PV Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey. 5 years data on fish tissue.
Data type	Numerical data.

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Use of standard method	Performance-based.
Potential Source(s) of Pollutant	Point and nonpoint sources.
Alternative Enforceable Program	Not applicable.
RWQCB Recommendation	None.
SWRCB Staff Recommendation	In the review of the available data and information and the RWQCB documentation for this recommendation, SWRCB staff conclude that the water body should be removed from the section 303(d) list because applicable water quality standards are not exceeded. This conclusion is based on the staff findings that: 1. The data is considered to be of adequate quality. 2. The data exhibited sufficient spatial and temporal coverage. 3. The evaluation guideline used to interpret narrative water quality standards is adequate. 4. Data are numerical. 5. Standard methods were used. 8. Other water body- or site-specific information including the effects of age of the data were considered. Most of the water quality measurements do not exceed the water quality standard. The staff confidence that standards are not exceeded is high.

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Water Body	NEW: Santa Monica Bay Nearshore and Offshore
Stressor/Media/Beneficial Use	Nickel/Sediment/Marine Habitat Nickel/Fish Tissue/Commercial and sport fishing
Data quality assessment. Extent to which data quality requirements met.	High quality for sediment data (See QAPP for SCBPP and Bight '98). High quality fish tissue data (See QAPP for Hyperion permit).
Linkage between measurement endpoint and benefical use or standard	*Habitat quality is related to pollutant concentration (no toxics in* toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (no toxics in toxic amounts). Linkages between fish tissue data and uses associated *with the protection of fish and wildlife are weak.*
Utility of measure for judging if standards or uses are not attained	Use of sediment guidelines from literature alone is somewhat controversial. However, use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific Information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000).
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data. Nickel concentrations are low relative to thresholds.

	1994 (n=55)	1998 (n=23)
% of Area >ER-L (21 mg/kg)	40%	30%
%of Area >ER-M (52 mg/kg)	2%	0%
Average concentration	24 mg/kg	20 mg/kg

There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23).

Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index.

There are no human-health based or wildlife based screening values for evaluating nickel concentrations in fish tissue.

Spatial representation	Regional surveys entire bay. Point Dume to Palos Verdes Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey. 5 years data on fish tissue.
Data type	Numerical data.
Use of standard method	Performance based.

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Potential Source(s) of Pollutant	Point and nonpoint sources.
Alternative Enforceable Program	Not applicable.
RWQCB Recommendation	None.
SWRCB Staff Recommendation	In the review of the available data and information and the RWQCB documentation for this recommendation, SWRCB staff conclude that the water body should be removed from the section 303(d) list because applicable water quality standards are not exceeded. This conclusion is based on the staff findings that: 1. The data is considered to be of adequate quality. 2. The data exhibited sufficient spatial and temporal coverage. 3. The evaluation guideline used to interpret narrative water quality standards is adequate. 4. Data are numerical. 5. Standard methods were used. 8. Other water body- or site-specific information including the effects of age of the data were considered. Most of the water quality measurements do not exceed the water quality standard. The staff confidence that standards are not exceeded is high.

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Water Body	NEW: Santa Monica Bay Nearshore and Offshore
Stressor/Media/Beneficial Use	Mercury/Sediment/Marine Habitat Mercury/Fish Tissue/Commercial and sport fishing
Data quality assessment. Extent to which data quality requirements met.	High quality for sediment data (See QAPP for SCBPP and Bight '98). High quality fish tissue data (See QAPP for Hyperion permit).
***Linkage between measurement endpoint* and benefical use or standard**	*Habitat quality is related to pollutant concentration (no toxics in* toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (no toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging if standards or uses are not attained	Use of sediment guidelines from literature alone is somewhat controversial. However, use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific Information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000).
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data. Mercury concentrations are low relative to thresholds.

	1994 (n = 55)	1998 (n=23)
% of Area >ER-L (0.15 mg/kg)	45%	48%
%of Area >ER-M (0.71 mg/kg)	0%	0%
Average concentration	0.14 mg/kg	0.16 mg/kg

There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23).

Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index.

The average mercury concentrations in fish muscle tissue from approximately 250 samples collected in Santa Monica Bay were close to the human-health based screening values (OEHHA, 0.3 mg/kg ww). There is no mercury-based consumption advisory for commercial or sport fishing in fish from Santa Monica Bay (OEHHA, 2001).

Spatial representation	Regional surveys entire bay. Point Dume to Palos Verdes Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.

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NEW: Santa Monica Bay Nearshore and Offshore

Temporal representation	2 years data from Regional Survey. 5 years data on fish tissue.
Data type	Numerical data.
Use of standard method	Performance-based.
Potential Source(s) of Pollutant	Point and nonpoint sources.
Alternative Enforceable Program	Not applicable.
RWQCB Recommendation	None.
SWRCB Staff Recommendation	In the review of the available data and information and the RWQCB documentation for this recommendation, SWRCB staff conclude that the water body should be removed from the section 303(d) list because applicable water quality standards are not exceeded. This conclusion is based on the staff findings that: 1. The data is considered to be of adequate quality. 2. The data exhibited sufficient spatial and temporal coverage. 3. The evaluation guideline used to interpret narrative water quality standards is adequate. 4. Data are numerical. 5. Standard methods were used. 8. Other water body- or site-specific information including the effects of age of the data were considered. Most of the water quality measurements do not exceed the water quality standard. The staff confidence that standards are not exceeded is high.

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Water Body	NEW: Santa Monica Bay Nearshore and Offshore
Stressor/Media/Beneficial Use	Lead/Sediment/Marine Habitat Lead/Tissue/Commercial and sport fishing
Data quality assessment. Extent to which data quality requirements met.	High quality for sediment data (See QAPP for SCBPP and Bight '98). High quality fish tissue data (See QAPP for Hyperion permit).
Linkage between measurement endpoint and benefical use or standard	Habitat quality is related to pollutant concentration (no toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (no toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging if standards or uses are not attained	Use of sediment guidelines from literature alone is somewhat controversial. However, use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific Information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000).
Data used to assess water quality	Sediment contaminant concentration, benthic community structure, whole-sediment toxicity tests, fish muscle tissue data. Lead are concentrations low relative to thresholds.

	1994 (n=55)	1998 (n=23)
% of Area >ER-L (81 mg/kg)	7%	22%
%of Area >ER-M (370 mg/kg)	0%	0%
Average concentration	22 mg/kg	40 mg/kg

There is no evidence of acute toxicity in sediments in 1994 (n = 55) or 1998 (n = 23).

Benthic community structure assessed as good in 98% to 100% of area in 1994 and 1998 using the Benthic Response Index.

Lead concentrations in fish muscle tissue concentrations from approximately 250 samples were low relative to MTRL of 2.0 mg/kg ww.

There is no lead-based consumption advisory for commercial or sport fishing in fish from Santa Monica Bay (OEHHA, 2001).

Spatial representation	Regional surveys entire bay. Point Dume to PV Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

	5 years data on fish tissue.
Data type	Numerical data.
Use of standard method	Performance based.
Potential Source(s) of Pollutant	Point and nonpoint sources.
Alternative Enforceable Program	Not applicable.
RWQCB Recommendation	None.
SWRCB Staff Recommendation	In the review of the available data and information and the RWQCB documentation for this recommendation, SWRCB staff conclude that the water body should be removed from the section 303(d) list because applicable water quality standards are not exceeded. This conclusion is based on the staff findings that: 1. The data is considered to be of adequate quality. 2. The data exhibited sufficient spatial and temporal coverage. 3. The evaluation guideline used to interpret narrative water quality standards is adequate. 4. Data are numerical. 5. Standard methods were used. 8. Other water body- or site-specific information including the effects of age of the data were considered. Most of the water quality measurements do not exceed the water quality standard. The staff confidence that standards are not exceeded is high.

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

Water Body	NEW: Santa Monica Bay Nearshore and Offshore
Stressor/Media/Beneficial Use	Arsenic/Sediment/Marine Habitat *Arsenic/Fish Tissue/Commercial and sport fishing*
Data quality assessment. Extent to which data quality requirements met.	High quality for sediment data (See QAPP for SCBPP and Bight '98). High quality fish tissue data (See QAPP for Hyperion permit).
Linkage between measurement endpoint and benefical use or standard	Habitat quality is related to pollutant concentration (No toxics in toxic amounts). Fish tissue data can be compared to risked based numbers for the protection of human health (No toxics in toxic amounts). Linkages between fish tissue data and uses associated with the protection of fish and wildlife are weak.
Utility of measure for judging if standards or uses are not attained	Use of sediment guidelines from literature alone is somewhat controversial. However, use of sediment triad (chemistry, benthos, and acute toxicity) in a weight of evidence approach is well established. Fish tissue data provides an additional screen in overall weight of evidence approach.
Water Body-specific Information	Regional surveys conducted in 1994 and 1998. Rig-fishing in Santa Monica Bay collected by Hyperion (1995-2000).
Data used to assess water quality	Arsenic concentrations fish muscle tissue concentrations in approximately 250 samples were low relative to human-health based screening values of 1.0 mg/kg ww for organic arsenic (OEHHA, 1999). These comparisons were made assuming that organic arsenic comprises 10% of the total arsenic measured in fish tissue.
Spatial representation	Regional surveys entire bay. Point Dume to Palos verdes Shelf (55 samples in 1994 and 23 samples in 1998). Rig-fishing sites (9) representative of offshore conditions in the Bay.
Temporal representation	2 years data from Regional Survey. 5 years data on fish tissue.
Data type	Numerical data.
Use of standard method	Performance-based.
Potential Source(s) of Pollutant	Point and nonpoint sources.
Alternative Enforceable Program	Not applicable.
RWQCB Recommendation	None.
SWRCB Staff Recommendation	In the review of the available data and information and the RWQCB documentation for this recommendation, SWRCB staff conclude that the water body should be removed from the section 303(d) list because applicable water quality standards are not exceeded. This conclusion is based on the staff findings that:

Region 4

NEW: Santa Monica Bay Nearshore and Offshore

1. The data is considered to be of adequate quality.
2. The data exhibited sufficient spatial and temporal coverage.
3. The evaluation guideline used to interpret narrative water quality standards is adequate.
4. Data are numerical.
5. Standard methods were used.
8. Other water body- or site-specific information including the effects of age of the data were considered.

Most of the water quality measurements do not exceed the water quality standard. The staff confidence that standards are not exceeded is high.