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COUNTY OF ORANGE
PUBLIC FACILITIES & RESOURCES DEPARTMENT

NPDES ANNUAL PROGRESS REPORT

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*Ch. 5
and related
Appendices only.*

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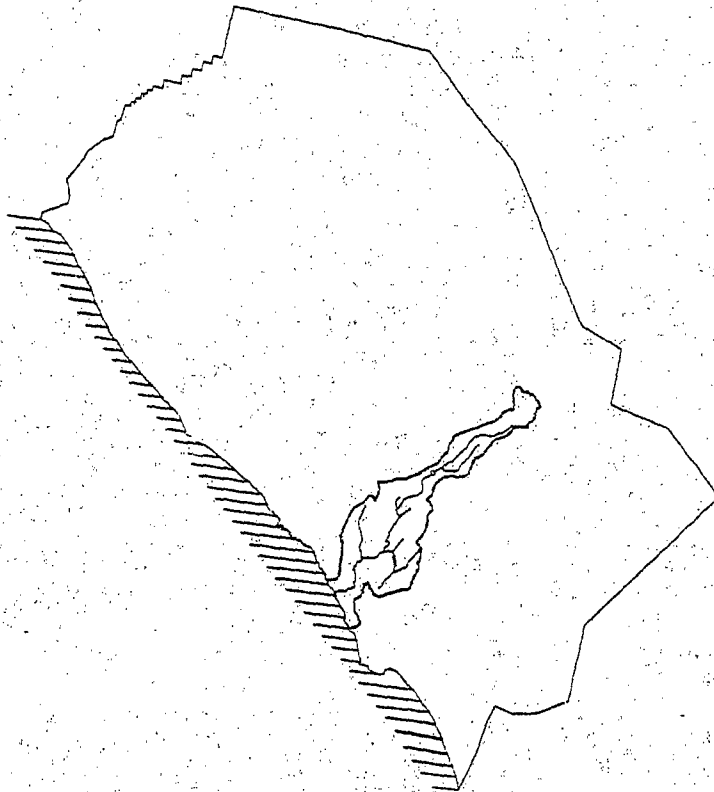
JR

Aliso Creek Water Quality Planning Study

(Full Report w/ J. Haas)

DRAFT FINAL REPORT ALISO CREEK 205(j) WATER QUALITY PLANNING STUDY

Agreement No. 7-042-250-0
June 2000



9.5 Toxicity Data Analysis

The initial water quality investigation included dry weather and stormwater toxicity testing at four and five locations along Aliso Creek, respectively (Figure 9.2 and Table 9.11). A 7-day chronic fathead minnow survival and growth test was run on the low flow samples that were collected on September 29, 1998. Ten juvenile fathead minnow individuals were placed in the respective samples and their growth and survival was measured at the end of seven days. A total of four, undiluted duplicates were run along with four duplicates of a control sample for each of the stations. The results of the low flow sampling showed no inhibition of growth or survival for the juvenile fathead minnow test organism at any of the stations. *Rosells?*

Two storm events were monitored for aquatic toxicity. The same configuration of duplicate samples and controls described for the low flow phase bioassays above were used in each of the two storm events. Samples were collected at each of the five locations including the Pacific Coast Highway site. Two separate bioassays were conducted on each sample: 1) acute 96-hour fathead minnow survival and, 2) acute 48-hour Ceriodaphnia survival.

The first storm event toxicity sampling was conducted on November 8, 1998 at the onset of storm runoff. For the acute 96-hour fathead minnow bioassay all sampling locations exhibited a 90% - 100% survival. For the acute 48-hour Ceriodaphnia bioassay, the Cook's Corner location exhibited 5% survival, and the remaining four sites exhibited 0% survival.

The second storm flow sampling was conducted on January 20, 1999 during a low-intensity drizzle that produced moderate runoff along Aliso Creek. For the 96-hour fathead minnow bioassay, survival ranged from 45% to 80%. Survival of Ceriodaphnia during the 48-hour bioassay was 100% at the Cook's Corner and downstream Dairy Fork/Aliso Hills Channel stations and ranged from 0% to 15% at the remaining locations (Table 9.11 and Figure 9.10).

The Basin Plan (Page 3-15, 16) guidelines for toxic pollutants state that, 'All waters should be maintained free of toxic substances in concentrations that are toxic to, or that produce detrimental physiological responses in human, plant, animal, or aquatic life. Compliance with this objective will be determined by the use of indicator organisms, analyses of species diversity, population density, growth anomalies, bioassays of appropriate duration, or other appropriate methods as specified by the Regional Board'.

The Basin Plan also cites the numerical objectives for toxic pollutants given in 40 CFR, Part 131.36 as specific guidelines.

Possible sources of aquatic toxicity include trace metals, polynuclear aromatic hydrocarbons (PAHs), pesticides, herbicides, polychlorinated biphenyls (PCBs), and ammonia. While no confirming tests have been completed, based on studies in other

parts of Orange County it is expected that organophosphate pesticides are a significant component of the aquatic toxicity in the storm samples in Aliso Creek. → ^{is NPDES}
_{catching?}

9.6 Bacteriological Water Quality Data Analysis

9.6.1 Water Quality Objectives for Bacteria

Aliso Creek is designated as having REC-1 (contact recreation) and REC-2 (non-contact recreation) beneficial uses at the creek mouth, and a REC-2 beneficial use upstream in the creek and in the Sulphur Creek, Wood Canyon, and English Canyon tributaries (with a potential REC-1 beneficial use in the creek and the same tributaries). The lower mile of Aliso Creek is listed as impaired (303(d)) because of bacteria (1996 Water Quality Assessment) and there is ongoing community concern related to periodic high bacteriological levels at Aliso Beach.

The water quality objectives for REC-1 and REC-2 are based on fecal coliform levels. They are specified in the Basin Plan as follows:

1. **REC-1:** 'fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, shall not exceed a log (geometric) mean of 200 MPN/100 ml, nor shall more than 10 percent of total samples during any 30-day period exceed 400 MPN/100 ml' (Basin Plan, page 3-5).
2. **REC-2:** 'in waters designated for non-contact recreation (REC-2) and not designated for contact recreation (REC-1), the average fecal coliform concentrations for any 30-day period, shall not exceed 2,000 MPN/ 100 ml nor shall more than 10 percent of samples collected during any 30-day period exceed 4,000 MPN/100 ml' (Basin Plan, page 3-5).

The water quality objectives for non-contact recreation (REC-2) are based on arithmetic rather than geometric means.

The Basin Plan also indicates that *E. coli* and enterococcus criteria may be employed in special studies to differentiate between pollution sources or to supplement the current coliform objectives for water contact recreation. The objectives for infrequently used freshwater contact recreation waters are 151 colonies per 100 ml (CFU/ 100 ml) for enterococcus and 576 MPN/ 100 ml for *E. coli*. The objectives for designated beach recreation use are 61 CFU/ 100 ml for enterococcus and 235 MPN/ 100 ml for *E. coli*.

During the initial water quality investigation (September – December 1998), the County of Orange Health Care Agency (HCA) Public Health Laboratory analyzed all of the samples for total and fecal coliform. Subsequent to the initial water quality investigation and prior to the intensive watershed and J03P02 subwatershed studies, the HCA laboratory revised their testing procedures to produce results that were consistent with new ocean water contact standards (AB 411). This meant that instead of analyzing

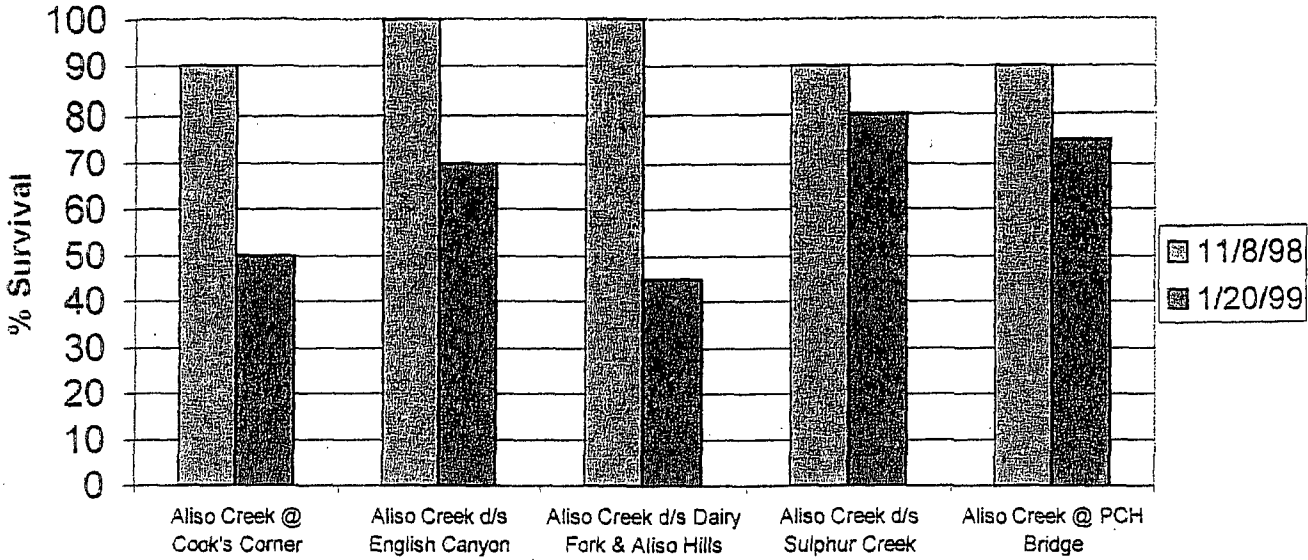
Table 9.11 - Toxicity Results in Aliso Creek During Low Flow and Storm Conditions

<u>Sampling Location</u>	<u>Date</u>	<u>Time</u>	<u>Low Flow Sampling</u>	<u>Storm Sampling</u>	
			<u>Chronic 7-day fathead minnow % survival/ growth</u>	<u>Acute 96-hour fathead minnow % survival</u>	<u>Acute 48-hour Cerioda % survival</u>
Aliso Creek @ Cook's Corner	9/29/98	1245	100/ 100		
	11/8/98	622		90	5
	1/20/99	1145		50	100
Aliso Creek d/s English Canyon	9/29/98	1220	100/ 100		
	11/8/98	646		100	0
	1/20/99	1205		70	0
Aliso Creek d/s Dairy Fork & Aliso Hills Ch.	9/29/98	1145	100/ 100		
	11/8/98	706		100	0
	1/20/99	1220		45	100
Aliso Creek d/s Sulphur Creek	9/29/98	1055	100/ 100		
	11/8/98	721		90	0
	1/20/99	1235		80	0
Aliso Creek @ PCH Bridge	9/29/98		N/A		
	11/8/98	746		90	0
	1/20/99	1300		75	15

N/A not analyzed because electrical conductivity of creek at that location was outside of the physiological tolerance of the test organism

Figure 9.10 - Toxicity Sampling of Stormwater Runoff in Aliso Creek

Acute 96-hr Fathead Minnow Toxicity Test



Acute 48-hr Ceriodaphnia Toxicity Test

