

L A R R Y
W A L K E R



ASSOCIATES

Transmittal

DATE: August 27, 2008

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ITEM: Report "An Evaluation of Sediment
Toxicity for the City of Elk Grove"

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Amittoj:

Enclosed please find one unbound copy of the report "An Evaluation of Sediment Toxicity for the City of Elk Grove", generated for our stormwater monitoring project. You are allowed to make copies for others, if needed.

Please contact me with any questions you may have.

An Evaluation of Sediment Toxicity for the City of Elk Grove

Sample collected July 14, 2008

Prepared For:

Larry Walker Associates
707 Fourth Street, Suite 200
Davis, CA 95616

Prepared By:

Pacific EcoRisk
2250 Cordelia Road
Fairfield, CA 94534

August 2008



PACIFIC ECORISK
ENVIRONMENTAL CONSULTING & TESTING

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- Appendix B Test Data and Summary of Statistics for the Evaluation of the Toxicity of the Stone Lake National Wildlife Refuge Sediment Sample to *Hyalella azteca*
- Appendix C Analytical Laboratory Report for Grain Size and TOC Analyses of the Stone Lake National Wildlife Refuge Sediment Sample

1. INTRODUCTION

Under contract to the Larry Walker Associates, Pacific EcoRisk (PER) performed a toxicity evaluation of a sediment sample collected on July 14, 2008, for the City of Elk Grove. This sediment toxicity evaluation consisted of performing the US EPA 10-day survival test with the amphipod *Hyaella azteca*. In addition, physical and chemical analyses were also performed on the sample.

This report describes the performance and results of this test and analyses.

2. SAMPLE COLLECTION and HANDLING

On July 14, Pacific EcoRisk staff collected a sediment sample from one station in the Stone Lake National Wildlife Refuge (Table 1). Briefly, the sediment sample was collected into appropriately-cleaned 2-L glass amber jars using stainless steel sampling equipment. The sediment sample was transported, on ice and under chain-of-custody, to the PER laboratory facility in Fairfield. Upon receipt at the testing laboratory, the sediment sample was logged in and the sediment was composited and homogenized. Sub-samples of the composited homogenized sediment were collected and delivered to a contract lab for physical and chemical analyses. The remaining sediment sample was stored at 0-6°C until being used to initiate toxicity test within 14 days of collection. The chain-of-custody record for the collection and delivery of this sample is provided in Appendix A.

Sample Station	Sample ID	Date Collected	Date Received
Stone Lake National Wildlife Refuge	C-SLNWR	7/14/08	7/14/08

3. TOXICITY TEST PROCEDURES

The Stone Lake National Wildlife Refuge sediment was tested for toxicity using the US EPA 10-day survival test with the amphipod *Hyaella azteca*. The methods used in conducting this test followed the guidelines established by the EPA manual "Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates, Second Edition" (EPA/600/R-99/064), with the exception that the growth endpoint was excluded at the request of the client [i.e., so as to be consistent with testing requirements for other regulatory programs (e.g., Irrigated Lands Regulatory Program) in the Central Valley].

3.1 Sediment Toxicity Testing with *Hyalella azteca*

The freshwater sediment toxicity test with *Hyalella azteca* consists of exposing the amphipods to the sediment for 10 days, after which effects on survival are evaluated. The specific procedures used in this test are described below.

The *Hyalella azteca* used in these tests were obtained from a commercial supplier (Aquatic Indicators, St. Augustine, FL). Upon receipt at the laboratory, the amphipods were placed into HDPE tanks containing US EPA synthetic moderately-hard water (modified for use with *Hyalella azteca*) at 23°C, and were fed a commercial Yeast-Cerophyll®-trout chow (YCT) food and *Selenastrum*.

The Stone Lake National Wildlife Refuge sediment sample was tested at the 100% concentration only. The Control treatment sediment consisted of a composite of reference site sediments that has been maintained under culture at the PER lab for >3 months. There were 8 replicates for each test treatment. Each replicate container consisted of a 300 mL tall-form glass beaker with a 3 cm ribbon of 540 µm mesh NITEX attached to the top of the beaker with silicone sealant. Each sediment sample was re-homogenized immediately prior to introduction of the sediments into the test replicates. Approximately 100 mL of sediment was then loaded into each of the test replicate containers. Each of the test replicates was carefully filled with clean overlying water (synthetic Moderately Hard water, modified for use with *Hyalella* as per the EPA test guidelines). The test replicates with sediments and clean overlying water were established ~24 hrs prior to the introduction of the amphipods, and were placed into a temperature-controlled room at 23°C under a 16L:8D photoperiod.

After this initial ~24 hr period, the overlying water in each replicate was flushed with one volume of fresh control water (approximately 150 mL). For each test treatment, a small aliquot of the renewed overlying water was then collected from each of the 8 replicates and composited for measurement of “initial” water quality characteristics (pH, dissolved oxygen [D.O.], conductivity, alkalinity, hardness, and total ammonia). Then, ten 11 day-old amphipods were randomly allocated into each replicate, followed by the addition of 1.5 mL of YCT food. The test replicates were then returned to the temperature-controlled rooms.

Each day, for the following 9 days, each test replicate was examined for the presence of any dead amphipods. A small aliquot of the overlying water in each of the 8 replicates was then collected and composited as before for measurement of “old” D.O., after which each replicate was flushed with one volume of fresh water. Another small aliquot of the overlying water in each of the 8 replicates was then collected and composited as before for measurement of “new” D.O., after which each replicate was fed 1.5 mL of YCT, and then replaced within the temperature-controlled room.

