



*Ventura Countywide
Stormwater Quality
Management Program*

2020-2021
Permit Year

Ventura Countywide Stormwater Quality
Management Program Annual Report

Attachments D Monitoring Appendices H - L



December 15, 2021

Camarillo
County of Ventura
Fillmore
Moorpark
Ojai
Oxnard
Port Hueneme
Santa Paula
Simi Valley
Thousand Oaks
Ventura
Ventura County Watershed Protection District

Appendix H. RWQCB Permission of Toxicity Species Substitution



California Regional Water Quality Control Board

Los Angeles Region



Recipient of the 2001 *Environmental Leadership Award* from Keep California Beautiful

Linda S. Adams
Agency Secretary

320 W. 4th Street, Suite 200, Los Angeles, California 90013
Phone (213) 576-6600 FAX (213) 576-6640 - Internet Address: <http://www.waterboards.ca.gov/losangeles>

Arnold Schwarzenegger
Governor

October 28, 2009

Ms. Norma Camacho, Director
Ventura County Watershed Protection District
800 South Victoria Ave., L#1600
Ventura, CA 93009-1600

Certified Mail
Return Receipt Requested
Claim No. 7009 0820 0001 6811 7509

**SUBJECT: TOXICITY TEST SPECIES SUBSTITUTION, VENTURA COUNTY
MUNICIPAL SEPARATE STORM SEWER SYSTEM DISCHARGE (MS4)
PERMIT (BOARD ORDER No. 09-0057; NPDES No. CAS004002)**

Dear Ms. Camacho:

On October 14, 2009, the Regional Board staff received a request from the Ventura County Watershed Protection District (County) to substitute topsmelt, *Atherinops affinis*, with the inland silverside, *Menidia beryllina*, due to the unavailability of topsmelt from the supplier. After consultation with US EPA staff, Regional Board staff denied the request. On October 15, 2009, the Regional Board received an e-mail from the County, titled "Notification of toxicity exception - (species unavailable) Ventura County MS4 NPDES Permit Order No. 09-0057 (Monitoring Program)". The County's e-mail communication was submitted pursuant to requirements in subparts D.5 and D.8(b) of the Ventura County MS4 Permit's Monitoring Program (Monitoring Program), which requires an explanation of the circumstance with documentation when toxicity tests cannot be performed to comply with the requirements of this permit, and written authorization from the Regional Board Executive Officer to substitute test species.

In order to evaluate the appropriateness of substituting topsmelt, *Atherinops affinis*, with the inland silverside, *Menidia beryllina*, in toxicity testing at mass emissions stations in the future, the Regional Board requires the County to conduct comparative static renewal toxicity tests on both species as follows. During the next storm event of this permit year (2009-10) and the first storm event of next permit year (2010-11), the County shall conduct toxicity tests on both topsmelt, *Atherinops affinis*, and the inland silverside, *Menidia beryllina*, along with giant kelp, *Macrocystis pyrifera*, and the purple sea urchin, *Strongylocentrotus purpuratus*, pursuant to subpart D.8(a) of the Monitoring Program. The County shall submit the results of the comparative toxicity tests as part of its reporting requirements.

RECEIVED

NOV 5 2009

California Environmental Protection Agency

Ms. Norma Camacho, Director
Ventura County Watershed Protection District

- 2 of 2 -

October 28, 2009

In the event that topsmelt, *Atherinops affinis*, is unavailable for testing during future sampling events conducted under the Monitoring Program, the County shall follow the protocol set forth in subpart D.5 of the Monitoring Program. The County shall notify the Regional Board by phone and e-mail as soon as possible if a test species is unavailable. Notification shall be sent directly to me as well as Tracy Woods, Stormwater Permitting Unit, with a copy to Renee Purdy, Chief, Regional Programs Section. The County shall submit to the Regional Board documentation of species unavailability from both the County's contract lab and the contract lab's supplier at least 48 hours prior to the planned sampling event to provide adequate time for my staff to evaluate any request for species substitution. Any approval or denial of a request for species substitution must be authorized pursuant to subpart D.8(b) of the Monitoring Program.

If you have any questions, please contact me at (213) 576-6605, or Renee Purdy at (213) 576-6783.

Sincerely,



Tracy J. Egoscue,
Executive Officer

cc: Mr. Bruce Fujimoto, Division of Water Quality, State Water Resources Control Board
Mr. Gerhardt Hubner, Ventura County Watershed Protection District
Mr. Arne Anselm, Ventura County Watershed Protection District

California Environmental Protection Agency

Appendix I. Aquatic Toxicity Testing Lab Results



Toxicity Report for Ventura County Watershed Protection District

2020/21-1 (Wet)

PROJECT: 2020/21-1 (Wet)

PO: NA

CLIENT: Ms. Kelly Hahs
VCWPD
800 South Victoria Avenue, L#1670
Ventura, CA 93003-1670

SAMPLE I.D.: MO-OXN, MO-OJA, ME-CC, MO-VEN, ME-VR2, MO-OJA, MO-MEI, MO-FIL,
MO-SPA, ME-SCR, MO-THO, MO-MPK, MO-SIM, MO-CAM

DATE RECEIVED: 12/28/2020

DATE REPORTED: 1/20/2021

ABC LAB NO.: AMC1220.129-.142

29 North Olive Street Ventura, California 93001 (805) 643-5621

INTRODUCTION

Toxicity tests using fathead (*P. promelas*), Ceriodaphnia (*C. dubia*), green algae (*S.capricornutum*), Topsmelt (*A.affinis*), and purple urchin (*S.purpuratus*) were performed to evaluate the quality of stormwater samples for Ventura County Watershed Protection District. The samples were collected on December 28, 2020 and delivered the same day. Testing was conducted at Aquatic Bioassay and Consulting Labs, Inc. in Ventura California from December 28th, through January 6th, 2021.

MATERIALS AND METHODS

Test Material

Test material consisted of 14 grab samples collected by Ventura County Watershed Protection District (VCWPD) outfall sites. Sample collection was performed by VCWPD personnel under the direction of Ms. Kelly Hahs. The samples were collected in 5-gallon low-density polyethylene buckets and were delivered to Aquatic Bioassay immediately after sampling. Sample temperature was recorded upon acceptance at Aquatic Bioassay Laboratories and is included in the report for each station.

Samples were stored at 4°C. Upon arrival at Aquatic Bioassay, an aliquot of each sample was drawn and water quality parameters of pH, dissolved oxygen (DO), conductivity, temperature, salinity, alkalinity, and hardness were measured and recorded.

Bioassay Testing

The study was performed in accordance with the United States Environmental Protection Agency (USEPA) protocols:

Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, October 2002, US EPA-821-R-02-013.

Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms, Third Edition, October 2002, US EPA-821-R-02-014.

Summary of results for 100% sample concentration:

Sample ID	Test	Endpoint	Control	100% Sample	Statistically Different From Control	TST Result	*Percent Effect
MO-OXN	Chronic Fathead	Survival (%)	100	100	No	Pass	0.00
		Biomass (mg)	0.4213	0.4190	No	Pass	0.55
MO-HUE	Chronic Fathead	Survival (%)	100	95.0	No	Pass	5.00
		Biomass (mg)	0.4587	0.4712	No	Pass	-2.73
MO-MEI	Chronic Fathead	Survival (%)	100	98.33	No	Pass	1.67
		Biomass (mg)	0.3965	0.41.5	No	Pass	-4.29
MO-SPA	Chronic Fathead	Survival (%)	100	100	No	Pass	0.0
		Biomass (mg)	0.4213	0.4090	No	Pass	2.93
MO-CAM	Chronic Fathead	Survival (%)	100	98.33	No	Pass	1.67
		Biomass (mg)	0.3965	0.4242	No	Pass	-6.98
MO-OJA	Chronic Fathead	Survival (%)	100	100	No	Pass	0.00
		Biomass (mg)	0.3965	0.4113	No	Pass	-3.74
MO-VEN	Chronic Ceriodaphnia	Survival (%)	100	100	No	Pass	0.00
		Reproduction #-Neonates	22.3	28.6	No	Pass	-28.25
MO-FIL	Chronic Ceriodaphnia	Survival (%)	100	100	No	Pass	0.0
		Reproduction #-Neonates	22.3	24.7	No	Pass	-10.76
MO-THO	Chronic Ceriodaphnia	Survival (%)	100	100	No	Pass	0.0
		Reproduction #-Neonates	24.7	26.1	No	Pass	-5.67

*Percent Effect at IWC = (Mean Control Response – Mean IWC Response) * 100 / Mean Control Response.

Summary of results for 100% sample concentration: (Cont.)

Sample ID	Test	Endpoint	Control	100% Sample	Statistically Different From Control	TST Result	*Percent Effect
MO-SIM	Chronic Ceriodaphnia	Survival (%)	100	100	No	Pass	0.00
		Reproduction #-Neonates	23.5	21.1	No	Pass	10.21
MO-MPK	Selenastrum	Cell Density	1.246e+6	1.654e+6	No	Pass	-32.70
ME-CC	Chronic Topsmelt	Survival (%)	100	96.0	No	Pass	4.00
		Biomass (mg)	1.238	1.209	No	Pass	2.33
ME-VR2	Chronic Topsmelt	Survival (%)	100	100	No	Pass	0.00
		Biomass (mg)	1.238	1.271	No	Pass	-2.65
ME-SCR	Chronic Urchin	Fertilization (%)	93.25	95.25	No	Pass	-2.14

*Percent Effect at IWC = (Mean Control Response – Mean IWC Response) * 100 / Mean Control Response.

Quality Assurance

All samples were received in good condition at the appropriate temperatures, and all tests were initiated within 72 hours of sample collection. The natural seawater controls met the minimum test acceptability criterion of 80 percent mean survival. Variability among replicates was minimal, and the ability to detect a statistical difference was deemed appropriate.

Survival counts were recorded daily to ensure tests were progressing as expected. Counts were conducted daily on the control replicates. The temperatures in samples were within the recommended range for the entire test duration.

Reference Toxicant Test

A concurrent reference toxicant test using copper chloride was conducted to assess the health of the test organisms. Mean control survival met the test acceptability criterion. The median lethal concentration (LC50) calculated for this test was within two standard deviations of the internal control chart mean, indicating test organism sensitivity was typical. Reference toxicant test results are summarized in the report.

Results and Discussion

Mean survival and statistical differences from control for the tests, error bars, results summaries including individual replicate data, statistical summaries, and raw datasheets are located in in the appendix. Appropriate chain-of-custody (COC) procedures were followed during all phases of this study, and copies of the COC forms are provided in the appendix.

Data Analysis and Reporting

The response observed in this test includes survival of the test organism. Two statistical methods were employed to determine whether there was an effect between the control and test sample: 1) A standard t-test approach following the statistical analysis decision tree in EPA 2002; and 2) A more recent EPA-recommended Test of Significant Toxicity (TST) approach (EPA 2010).

References:

United States Environmental Protection Agency, 1995. Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA/R-95/136.

United States Environmental Protection Agency, 2002. Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA/821/R-02-014.

United States Environmental Protection Agency, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms EPA/821/R-02/012.

United States Environmental Protection Agency, 2010. National Pollutant Discharge Elimination System Test of Significant Toxicity Implementation Document. Office of Wastewater Management. EPA 833-R-10-003.

January 20, 2021

Mr. Arnie Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:


We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms, EPA-600/R95/136, 1995*. Results were as follows:

CLIENT:	County of Ventura
SAMPLE I.D.:	ME-SCR
DATE RECEIVED:	12/28/2020
ABC LAB. NO.:	VCF1220.135

CHRONIC SEA URCHIN FERTILIZATION BIOASSAY

NOEC	=	100.00 %
TU _c	=	1.00
IC ₂₅	=	>100.00 %
IC ₅₀	=	>100.00 %

Yours very truly,



Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 20 Jan-21 12:07 (p 1 of 1)
 Test Code/ID: VCF1220.135 / 12-3816-0103

Purple Sea Urchin Sperm Cell Fertilization Test				Aquatic Bioassay & Consulting Labs, Inc.			
Batch ID:	14-0647-3111	Test Type:	Fertilization	Analyst:	Joe Freas		
Start Date:	29 Dec-20 18:01	Protocol:	EPA/600/R-95/136 (1995)	Diluent:	Laboratory Seawater		
Ending Date:	29 Dec-20 18:41	Species:	Strongylocentrotus purpuratus	Brine:	Not Applicable		
Test Length:	40m	Taxon:	Echinoidea	Source:	Ventura Dive	Age:	
Sample ID:	11-8100-6934	Code:	VCF1220.135	Project:	2020/21-1 (Wet)		
Sample Date:	28 Dec-20 07:50	Material:	Sample Water	Source:	Bioassay Report		
Receipt Date:	28 Dec-20 09:22	CAS (PC):		Station:	ME-SCR		
Sample Age:	34h	Client:	Ventura County Watershed Protection District				

Multiple Comparison Summary									
Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
14-6505-2858	Fertilization Rate	Dunnett Multiple Comparison Test		100	>100	---	4.7%	1	1

Point Estimate Summary									
Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
17-7720-4275	Fertilization Rate	Linear Interpolation (ICPIN)		EC10	>100	---	---	<1	1
				EC15	>100	---	---	<1	
				EC20	>100	---	---	<1	
				EC25	>100	---	---	<1	
				EC40	>100	---	---	<1	
				EC50	>100	---	---	<1	

Test Acceptability								TAC Limits	
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision		
14-6505-2858	Fertilization Rate	Control Resp	0.9325	0.7	>>	Yes	Passes Criteria		
17-7720-4275	Fertilization Rate	Control Resp	0.9325	0.7	>>	Yes	Passes Criteria		
14-6505-2858	Fertilization Rate	PMSD	0.04695	<<	0.25	No	Passes Criteria		

Fertilization Rate Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.9325	0.8887	0.9763	0.9000	0.9600	0.0138	0.0275	2.95%	0.00%
6.25		4	0.9300	0.9040	0.9560	0.9100	0.9500	0.0082	0.0163	1.76%	0.27%
12.5		4	0.9275	0.9075	0.9475	0.9100	0.9400	0.0063	0.0126	1.36%	0.54%
25		4	0.9250	0.8829	0.9671	0.9000	0.9600	0.0132	0.0265	2.86%	0.80%
50		4	0.9475	0.9236	0.9714	0.9300	0.9600	0.0075	0.0150	1.58%	-1.61%
100		4	0.9525	0.9032	1.0020	0.9100	0.9800	0.0155	0.0310	3.25%	-2.14%

Fertilization Rate Detail						MD5: F139B430E66F14628720AF8BABA327A9					
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4						
0	N	0.9600	0.9500	0.9000	0.9200						
6.25		0.9300	0.9500	0.9100	0.9300						
12.5		0.9100	0.9300	0.9400	0.9300						
25		0.9000	0.9100	0.9600	0.9300						
50		0.9400	0.9300	0.9600	0.9600						
100		0.9800	0.9700	0.9100	0.9500						

Fertilization Rate Binomials					
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	96/100	95/100	90/100	92/100
6.25		93/100	95/100	91/100	93/100
12.5		91/100	93/100	94/100	93/100
25		90/100	91/100	96/100	93/100
50		94/100	93/100	96/100	96/100
100		98/100	97/100	91/100	95/100

CETIS Analytical Report

Report Date: 20 Jan-21 12:07 (p 1 of 2)
 Test Code/ID: VCF1220.135 / 12-3816-0103

Purple Sea Urchin Sperm Cell Fertilization Test				Aquatic Bioassay & Consulting Labs, Inc.			
Analysis ID: 14-6505-2858	Endpoint: Fertilization Rate	CETIS Version: CETISv1.9.7					
Analyzed: 20 Jan-21 12:07	Analysis: Parametric-Control vs Treatments	Status Level: 1					
Edit Date: 20 Jan-21 12:05	MD5 Hash: F139B430E66F14628720AF88BABA327A9	Editor ID: 007-979-628-1					
Batch ID: 14-0647-3111	Test Type: Fertilization	Analyst: Joe Freas					
Start Date: 29 Dec-20 18:01	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater					
Ending Date: 29 Dec-20 18:41	Species: Strongylocentrotus purpuratus	Brine: Not Applicable					
Test Length: 40m	Taxon: Echinoidea	Source: Ventura Dive	Age:				
Sample ID: 11-8100-6934	Code: VCF1220.135	Project: 2020/21-1 (Wet)					
Sample Date: 28 Dec-20 07:50	Material: Sample Water	Source: Bioassay Report					
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: ME-SCR					
Sample Age: 34h	Client: Ventura County Watershed Protection District						

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.04378	4.70%

Dunnett Multiple Comparison Test									
Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	0.2248	2.407	0.081	6	CDF	0.7587	Non-Significant Effect
		12.5	0.3873	2.407	0.081	6	CDF	0.6953	Non-Significant Effect
		25	0.4457	2.407	0.081	6	CDF	0.6709	Non-Significant Effect
		50	-0.8696	2.407	0.081	6	CDF	0.9756	Non-Significant Effect
		100	-1.401	2.407	0.081	6	CDF	0.9945	Non-Significant Effect

Test Acceptability Criteria					
Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.9325	0.7	>>	Yes	Passes Criteria
PMSD	0.04695	<<	0.25	No	Passes Criteria

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0130984	0.0026197	5	1.149	0.3713	Non-Significant Effect
Error	0.0410348	0.0022797	18			
Total	0.0541331		23			

ANOVA Assumptions Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variance	Bartlett Equality of Variance Test	4.161	15.09	0.5265	Equal Variances	
	Levene Equality of Variance Test	1.671	4.248	0.1926	Equal Variances	
	Mod Levene Equality of Variance Test	1.53	4.248	0.2300	Equal Variances	
Distribution	Anderson-Darling A2 Test	0.2023	3.878	0.9215	Normal Distribution	
	D'Agostino Kurtosis Test	0.249	2.576	0.8034	Normal Distribution	
	D'Agostino Skewness Test	0.3483	2.576	0.7276	Normal Distribution	
	D'Agostino-Pearson K2 Omnibus Test	0.1833	9.21	0.9124	Normal Distribution	
	Kolmogorov-Smirnov D Test	0.09369	0.2056	0.9521	Normal Distribution	
	Shapiro-Wilk W Normality Test	0.9809	0.884	0.9114	Normal Distribution	

Fertilization Rate Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.9325	0.8887	0.9763	0.9350	0.9000	0.9600	0.0138	2.95%	0.00%
6.25		4	0.9300	0.9040	0.9560	0.9300	0.9100	0.9500	0.0082	1.76%	0.27%
12.5		4	0.9275	0.9075	0.9475	0.9300	0.9100	0.9400	0.0063	1.36%	0.54%
25		4	0.9250	0.8829	0.9671	0.9200	0.9000	0.9600	0.0132	2.86%	0.80%
50		4	0.9475	0.9236	0.9714	0.9500	0.9300	0.9600	0.0075	1.58%	-1.61%
100		4	0.9525	0.9032	1.0000	0.9600	0.9100	0.9800	0.0155	3.25%	-2.14%

Purple Sea Urchin Sperm Cell Fertilization Test Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 14-6505-2858 Endpoint: Fertilization Rate CETIS Version: CETISv1.9.7
 Analyzed: 20 Jan-21 12:07 Analysis: Parametric-Control vs Treatments Status Level: 1
 Edit Date: 20 Jan-21 12:05 MD5 Hash: F139B430E66F14628720AF8BABA327A9 Editor ID: 007-979-628-1

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.3120	1.2240	1.4000	1.3150	1.2490	1.3690	0.0276	4.21%	0.00%
6.25		4	1.3040	1.2530	1.3560	1.3030	1.2660	1.3450	0.0162	2.48%	0.58%
12.5		4	1.2990	1.2610	1.3370	1.3030	1.2660	1.3230	0.0119	1.84%	1.00%
25		4	1.2970	1.2120	1.3820	1.2850	1.2490	1.3690	0.0267	4.11%	1.15%
50		4	1.3410	1.2880	1.3950	1.3460	1.3030	1.3690	0.0168	2.50%	-2.24%
100		4	1.3590	1.2460	1.4720	1.3710	1.2660	1.4290	0.0355	5.22%	-3.61%

Fertilization Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9600	0.9500	0.9000	0.9200
6.25		0.9300	0.9500	0.9100	0.9300
12.5		0.9100	0.9300	0.9400	0.9300
25		0.9000	0.9100	0.9600	0.9300
50		0.9400	0.9300	0.9600	0.9600
100		0.9800	0.9700	0.9100	0.9500

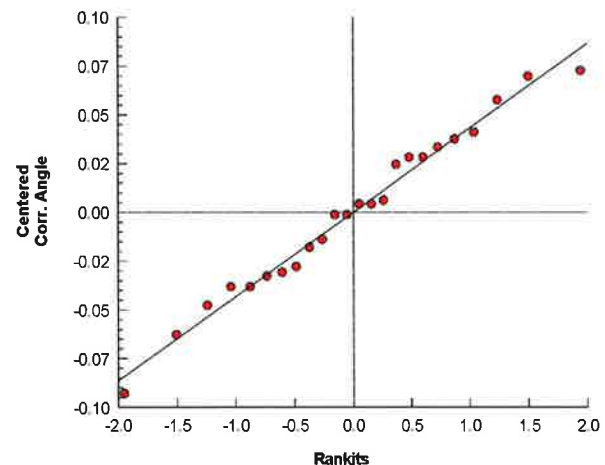
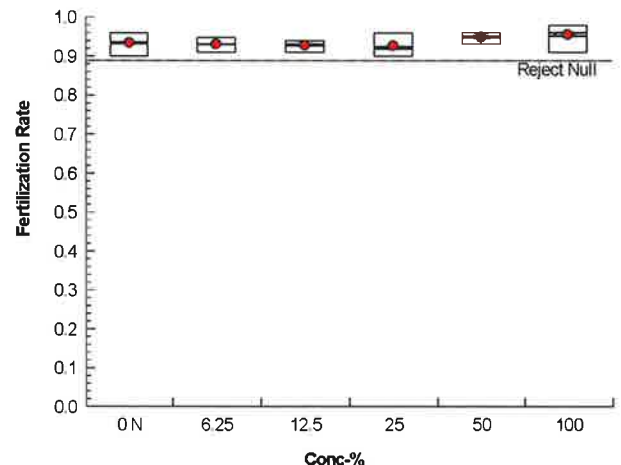
Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.3690	1.3450	1.2490	1.2840
6.25		1.3030	1.3450	1.2660	1.3030
12.5		1.2660	1.3030	1.3230	1.3030
25		1.2490	1.2660	1.3690	1.3030
50		1.3230	1.3030	1.3690	1.3690
100		1.4290	1.3970	1.2660	1.3450

Fertilization Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	96/100	95/100	90/100	92/100
6.25		93/100	95/100	91/100	93/100
12.5		91/100	93/100	94/100	93/100
25		90/100	91/100	96/100	93/100
50		94/100	93/100	96/100	96/100
100		98/100	97/100	91/100	95/100

Graphics



CETIS Analytical Report

Report Date: 20 Jan-21 12:07 (p 1 of 2)
Test Code/ID: VCF1220.135 / 12-3816-0103

Purple Sea Urchin Sperm Cell Fertilization Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 17-7720-4275	Endpoint: Fertilization Rate	CETIS Version: CETISv1.9.7
Analyzed: 20 Jan-21 12:07	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 20 Jan-21 12:05	MD5 Hash: F139B430E66F14628720AF8BABA327A9	Editor ID: 007-979-628-1
Batch ID: 14-0647-3111	Test Type: Fertilization	Analyst: Joe Freas
Start Date: 29 Dec-20 18:01	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 29 Dec-20 18:41	Species: Strongylocentrotus purpuratus	Brine: Not Applicable
Test Length: 40m	Taxon: Echinoidea	Source: Ventura Dive Age:
Sample ID: 11-8100-6934	Code: VCF1220.135	Project: 2020/21-1 (Wet)
Sample Date: 28 Dec-20 07:50	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: ME-SCR
Sample Age: 34h	Client: Ventura County Watershed Protection District	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.9325	0.7	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC10	>100	---	---	<1	---	---
EC15	>100	---	---	<1	---	---
EC20	>100	---	---	<1	---	---
EC25	>100	---	---	<1	---	---
EC40	>100	---	---	<1	---	---
EC50	>100	---	---	<1	---	---

Fertilization Rate Summary

Conc-%	Code	Count	Calculated Variate(A/B)						Isotonic Variate		
			Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	4	0.9325	0.9350	0.9000	0.9600	2.95%	0.00%	373/400	0.9358	0.00%
6.25		4	0.9300	0.9300	0.9100	0.9500	1.76%	0.27%	372/400	0.9358	0.00%
12.5		4	0.9275	0.9300	0.9100	0.9400	1.36%	0.54%	371/400	0.9358	0.00%
25		4	0.9250	0.9200	0.9000	0.9600	2.86%	0.80%	370/400	0.9358	0.00%
50		4	0.9475	0.9500	0.9300	0.9600	1.58%	-1.61%	379/400	0.9358	0.00%
100		4	0.9525	0.9600	0.9100	0.9800	3.25%	-2.14%	381/400	0.9358	0.00%

Fertilization Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9600	0.9500	0.9000	0.9200
6.25		0.9300	0.9500	0.9100	0.9300
12.5		0.9100	0.9300	0.9400	0.9300
25		0.9000	0.9100	0.9600	0.9300
50		0.9400	0.9300	0.9600	0.9600
100		0.9800	0.9700	0.9100	0.9500

Fertilization Rate Binomials

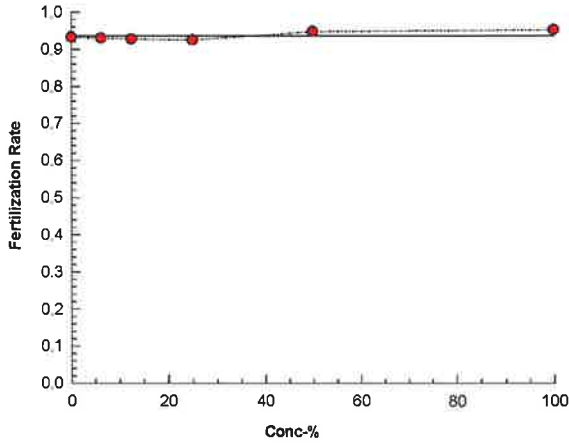
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	96/100	95/100	90/100	92/100
6.25		93/100	95/100	91/100	93/100
12.5		91/100	93/100	94/100	93/100
25		90/100	91/100	96/100	93/100
50		94/100	93/100	96/100	96/100
100		98/100	97/100	91/100	95/100

Purple Sea Urchin Sperm Cell Fertilization Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 17-7720-4275	Endpoint: Fertilization Rate	CETIS Version: CETISv1.9.7
Analyzed: 20 Jan-21 12:07	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 20 Jan-21 12:05	MD5 Hash: F139B430E66F14628720AF8BABA327A9	Editor ID: 007-979-628-1

Graphics



CETIS Measurement Report

Report Date: 20 Jan-21 12:07 (p 1 of 1)
 Test Code/ID: VCF1220.135 / 12-3816-0103

Purple Sea Urchin Sperm Cell Fertilization Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 14-0647-3111	Test Type: Fertilization	Analyst: Joe Freas
Start Date: 29 Dec-20 18:01	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 29 Dec-20 18:41	Species: Strongylocentrotus purpuratus	Brine: Not Applicable
Test Length: 40m	Taxon: Echinoidea	Source: Ventura Dive Age:
Sample ID: 11-8100-6934	Code: VCF1220.135	Project: 2020/21-1 (Wet)
Sample Date: 28 Dec-20 07:50	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: ME-SCR
Sample Age: 34h	Client: Ventura County Watershed Protection District	

Parameter Acceptability Criteria

Parameter	TAC Limits				Overlap	Decision
	Min	Max	Lower	Upper		
Salinity	34	34	32	36	Yes	Passes Criteria
Temperature	14.7	14.9	11	13	Yes	Above Criteria

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	6.4	3.859	8.941	6.2	6.6	0.1414	0.2828	4.42%	0
6.25		2	6.7	4.159	9.241	6.5	6.9	0.1414	0.2828	4.22%	0
12.5		2	6.55	3.373	9.727	6.3	6.8	0.1768	0.3536	5.40%	0
25		2	6.5	3.959	9.041	6.3	6.7	0.1414	0.2828	4.35%	0
50		2	6.4	3.859	8.941	6.2	6.6	0.1414	0.2828	4.42%	0
100		2	6.35	3.173	9.527	6.1	6.6	0.1768	0.3536	5.57%	0
Overall		12	6.483	6.319	6.648	6.1	6.9	0.0747	0.2588	3.99%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
6.25		2	7.95	7.315	8.585	7.9	8	0.03535	0.0707	0.89%	0
12.5		2	7.95	7.315	8.585	7.9	8	0.03535	0.0707	0.89%	0
25		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
50		2	7.85	7.215	8.485	7.8	7.9	0.03535	0.07071	0.90%	0
100		2	7.8	7.787	7.813	7.8	7.8	0	0	0.00%	0
Overall		12	7.892	7.849	7.934	7.8	8	0.0193	0.06686	0.85%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	34	34	34	34	34	0	0	0.00%	0
6.25		2	34	34	34	34	34	0	0	0.00%	0
12.5		2	34	34	34	34	34	0	0	0.00%	0
25		2	34	34	34	34	34	0	0	0.00%	0
50		2	34	34	34	34	34	0	0	0.00%	0
100		2	34	34	34	34	34	0	0	0.00%	0
Overall		12	34	34	34	34	34	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.8	13.53	16.07	14.7	14.9	0.07072	0.1414	0.96%	0
6.25		2	14.8	13.53	16.07	14.7	14.9	0.07072	0.1414	0.96%	0
12.5		2	14.8	13.53	16.07	14.7	14.9	0.07072	0.1414	0.96%	0
25		2	14.8	13.53	16.07	14.7	14.9	0.07072	0.1414	0.96%	0
50		2	14.8	13.53	16.07	14.7	14.9	0.07072	0.1414	0.96%	0
100		2	14.8	13.53	16.07	14.7	14.9	0.07072	0.1414	0.96%	0
Overall		12	14.8	14.73	14.87	14.7	14.9	0.03015	0.1044	0.71%	0 (0%)



January 15, 2021

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*" EPA-821-R-02-013. "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT: Ventura County Flood Control
SAMPLE I.D.: MO-OXN
DATE RECEIVED: 12/28/2020
ABC LAB. NO.: VCF1220.132

CHRONIC FATHEAD MINNOW SURVIVAL & GROWTH BIOASSAY

SURVIVAL NOEC = 100.00 %
 TUc = 1.00
 EC25 = >100.00 %
 EC50 = >100.00 %

BIOMASS NOEC = 100.00 %
 TUc = 1.00
 IC25 = >100.00 %
 IC50 = >100.00 %

Yours very truly,

mv Scott Johnson
Laboratory Director

29 north olive st. ventura, ca 93001 (805) 643 5621 aquabio.org

CETIS Summary Report

Report Date: 14 Jan-21 14:28 (p 1 of 2)
Test Code/ID: VCF1220.132fml / 06-6159-9521

Fathead Minnow 7-d Larval Survival and Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Batch ID: 14-0829-9364	Test Type: Growth-Survival (7d)	Analyst:			
Start Date: 30 Dec-20 13:27	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 06 Jan-21 13:14	Species: Pimephales promelas	Brine: Not Applicable			
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO	Age:		
Sample ID: 00-6115-6950	Code: VCF1220.132fml	Project: NPDES Stormwater Wet Season			
Sample Date: 28 Dec-20 06:50	Material: Sample Water	Source: Bioassay Report			
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-OXN			
Sample Age: 55h (7.3 °C)	Client: VCWPD				

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	PMSD	TU	S
20-0655-8427	7d Survival Rate	Steel Many-One Rank Sum Test	100	>100	---	3.72%	1	1
14-5018-6211	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	100	>100	---	9.66%	1	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	%	95% LCL	95% UCL	TU	S
02-0503-6370	7d Survival Rate	Linear Interpolation (ICPIN)	✓ EC10	>100	---	---	<1	1
			✓ EC15	>100	---	---	<1	
			✓ EC20	>100	---	---	<1	
			✓ EC25	>100	---	---	<1	
			✓ EC40	>100	---	---	<1	
			✓ EC50	>100	---	---	<1	
00-4515-3880	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	✓ IC10	>100	---	---	<1	1
			✓ IC15	>100	---	---	<1	
			✓ IC20	>100	---	---	<1	
			✓ IC25	>100	---	---	<1	
			✓ IC40	>100	---	---	<1	
			✓ IC50	>100	---	---	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Overlap	Decision
				Lower	Upper			
02-0503-6370	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
20-0655-8427	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
00-4515-3880	Mean Dry Biomass-mg	Control Resp	0.4213	0.25	>>	Yes	Passes Criteria	
14-5018-6211	Mean Dry Biomass-mg	Control Resp	0.4213	0.25	>>	Yes	Passes Criteria	
14-5018-6211	Mean Dry Biomass-mg	PMSD	0.0966	0.12	0.3	Yes	Below Criteria	

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
6.25		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
12.5		4	0.9833	0.9303	1.0360	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
25		4	0.9833	0.9303	1.0360	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
50		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
100		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.4213	0.3529	0.4898	0.384	0.4833	0.0215	0.043	10.21%	0.00%
6.25		4	0.4172	0.4005	0.4339	0.4027	0.4267	0.005252	0.0105	2.52%	0.99%
12.5		4	0.422	0.3767	0.4673	0.404	0.464	0.01424	0.02848	6.75%	-0.16%
25		4	0.4113	0.3783	0.4444	0.3853	0.434	0.01038	0.02076	5.05%	2.37%
50		4	0.41	0.3958	0.4242	0.402	0.4227	0.004447	0.008894	2.17%	2.69%
100		4	0.419	0.3995	0.4385	0.4053	0.434	0.006125	0.01225	2.92%	0.55%

EM *PASS*

CETIS Summary Report

Report Date: 14 Jan-21 14:28 (p 2 of 2)
 Test Code/ID: VCF1220.132fml / 06-6159-9521

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

7d Survival Rate Detail

MD5: B51DFCFA90E508A283A03CD22F66D142

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		0.9333	1.0000	1.0000	1.0000
25		1.0000	0.9333	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

Mean Dry Biomass-mg Detail

MD5: BD43E26C943F57C3FB3F078BA3E9E266

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.4107	0.4833	0.384	0.4073
6.25		0.4267	0.4167	0.4227	0.4027
12.5		0.4153	0.4047	0.404	0.464
25		0.434	0.42	0.3853	0.406
50		0.4227	0.402	0.4067	0.4087
100		0.414	0.434	0.4053	0.4227

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		15/15	15/15	15/15	15/15
12.5		14/15	15/15	15/15	15/15
25		15/15	14/15	15/15	15/15
50		15/15	15/15	15/15	15/15
100		15/15	15/15	15/15	15/15

CETIS Analytical Report

Report Date: 14 Jan-21 14:28 (p 1 of 4)
 Test Code/ID: VCF1220.132fml / 06-6159-9521

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 20-0655-8427	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:26	Analysis: Nonparametric-Control vs Treatments	Status Level: 1
Edit Date: 14 Jan-21 14:22	MD5 Hash: B51DFCFA90E508A283A03CD22F66D142	Editor ID: 000-189-126-0
Batch ID: 14-0829-9364	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:27	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:14	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 00-6115-6950	Code: VCF1220.132fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:50	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-OXN
Sample Age: 55h (7.3 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.03723	3.72%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	18	10	1	6	CDF	0.8333	Non-Significant Effect
		12.5	16	10	1	6	CDF	0.6105	Non-Significant Effect
		25	16	10	1	6	CDF	0.6105	Non-Significant Effect
		50	18	10	1	6	CDF	0.8333	Non-Significant Effect
		100	18	10	1	6	CDF	0.8333	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0057813	0.0011563	5	0.8	0.5640	Non-Significant Effect
Error	0.026016	0.0014453	18			
Total	0.0317973		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
	Levene Equality of Variance Test	7.2	4.248	0.0007	Unequal Variances
	Mod Levene Equality of Variance Test	0.8	4.248	0.5640	Equal Variances
Distribution	Anderson-Darling A2 Test	4.32	3.878	<1.0E-05	Non-Normal Distribution
	D'Agostino Kurtosis Test	3.005	2.576	0.0027	Non-Normal Distribution
	D'Agostino Skewness Test	3.704	2.576	0.0002	Non-Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	22.75	9.21	1.2E-05	Non-Normal Distribution
	Kolmogorov-Smirnov D Test	0.4167	0.2056	<1.0E-05	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.6154	0.884	<1.0E-05	Non-Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
12.5		4	0.9833	0.9303	1.0000	1.0000	0.9333	1.0000	0.0167	3.39%	1.67%
25		4	0.9833	0.9303	1.0000	1.0000	0.9333	1.0000	0.0167	3.39%	1.67%
50		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 20-0655-8427 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 14:26 Analysis: Nonparametric-Control vs Treatments Status Level: 1
 Edit Date: 14 Jan-21 14:22 MD5 Hash: B51DFCFA90E508A283A03CD22F66D142 Editor ID: 000-189-126-0

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
6.25		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
12.5		4	1.4080	1.3040	1.5130	1.4410	1.3100	1.4410	0.0329	4.68%	2.28%
25		4	1.4080	1.3040	1.5130	1.4410	1.3100	1.4410	0.0329	4.68%	2.28%
50		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
100		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		0.9333	1.0000	1.0000	1.0000
25		1.0000	0.9333	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

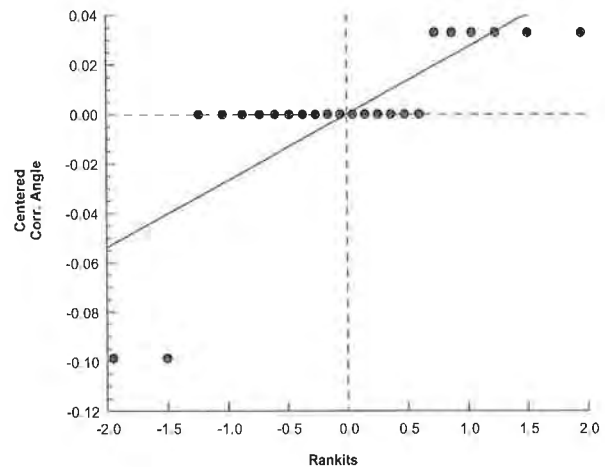
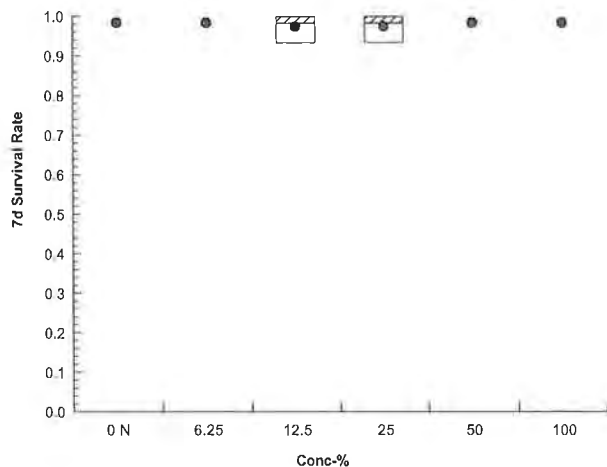
Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.4410	1.4410	1.4410	1.4410
6.25		1.4410	1.4410	1.4410	1.4410
12.5		1.3100	1.4410	1.4410	1.4410
25		1.4410	1.3100	1.4410	1.4410
50		1.4410	1.4410	1.4410	1.4410
100		1.4410	1.4410	1.4410	1.4410

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		15/15	15/15	15/15	15/15
12.5		14/15	15/15	15/15	15/15
25		15/15	14/15	15/15	15/15
50		15/15	15/15	15/15	15/15
100		15/15	15/15	15/15	15/15

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 14:28 (p 3 of 4)
 Test Code/ID: VCF1220.132fml / 06-6159-9521

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 14-5018-6211	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:26	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 14 Jan-21 14:22	MD5 Hash: BD43E26C943F57C3FB3F078BA3E9E266	Editor ID: 000-189-126-0
Batch ID: 14-0829-9364	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:27	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:14	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 00-6115-6950	Code: VCF1220.132fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:50	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-OXN
Sample Age: 55h (7.3 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	0.0407	9.66%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	0.2464	2.407	0.041	6	CDF	0.7507	Non-Significant Effect
		12.5	-0.03943	2.407	0.041	6	CDF	0.8447	Non-Significant Effect
		25	0.5914	2.407	0.041	6	CDF	0.6072	Non-Significant Effect
		50	0.6703	2.407	0.041	6	CDF	0.5716	Non-Significant Effect
		100	0.138	2.407	0.041	6	CDF	0.7895	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.4213	0.25	>>	Yes	Passes Criteria
PMSD	0.0966	0.12	0.3	Yes	Below Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0005148	0.000103	5	0.18	0.9666	Non-Significant Effect
Error	0.0102923	0.0005718	18			
Total	0.0108071		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	9.88	15.09	0.0787	Equal Variances
	Levene Equality of Variance Test	2.211	4.248	0.0982	Equal Variances
	Mod Levene Equality of Variance Test	0.687	4.248	0.6395	Equal Variances
Distribution	Anderson-Darling A2 Test	0.7533	3.878	0.0497	Normal Distribution
	D'Agostino Kurtosis Test	2.046	2.576	0.0408	Normal Distribution
	D'Agostino Skewness Test	2.414	2.576	0.0158	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	10.01	9.21	0.0067	Non-Normal Distribution
	Kolmogorov-Smirnov D Test	0.1344	0.2056	0.3126	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9191	0.884	0.0557	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.4213	0.3529	0.4898	0.409	0.384	0.4833	0.0215	10.21%	0.00%
6.25		4	0.4172	0.4005	0.4339	0.4197	0.4027	0.4267	0.005252	2.52%	0.99%
12.5		4	0.422	0.3767	0.4673	0.41	0.404	0.464	0.01424	6.75%	-0.16%
25		4	0.4113	0.3783	0.4444	0.413	0.3853	0.434	0.01038	5.05%	2.37%
50		4	0.41	0.3958	0.4242	0.4077	0.402	0.4227	0.004447	2.17%	2.69%
100		4	0.419	0.3995	0.4385	0.4183	0.4053	0.434	0.006125	2.92%	0.55%

Fathead Minnow 7-d Larval Survival and Growth Test

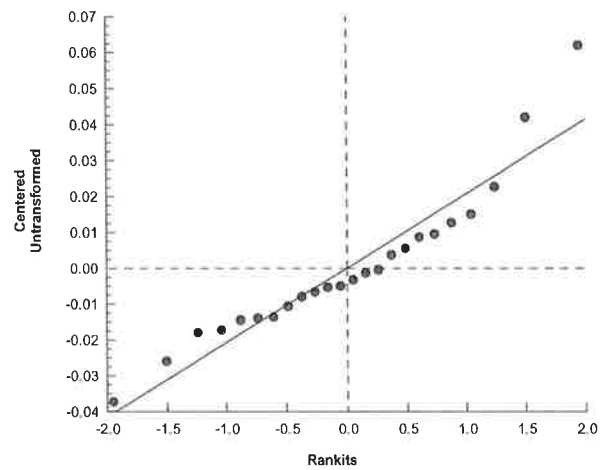
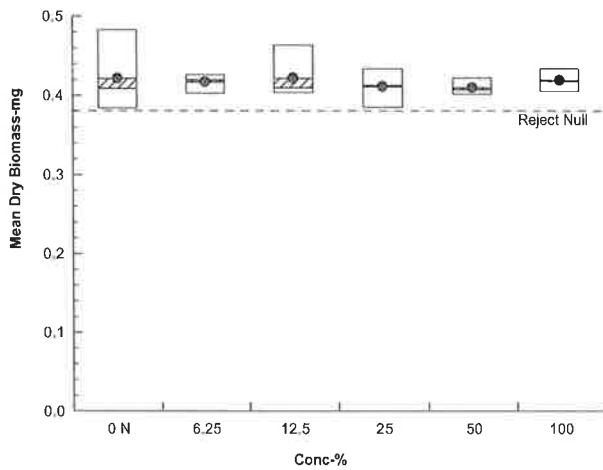
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 14-5018-6211 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 14:26 Analysis: Parametric-Control vs Treatments Status Level: 1
 Edit Date: 14 Jan-21 14:22 MD5 Hash: BD43E26C943F57C3FB3F078BA3E9E266 Editor ID: 000-189-126-0

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.4107	0.4833	0.384	0.4073
6.25		0.4267	0.4167	0.4227	0.4027
12.5		0.4153	0.4047	0.404	0.464
25		0.434	0.42	0.3853	0.406
50		0.4227	0.402	0.4067	0.4087
100		0.414	0.434	0.4053	0.4227

Graphics



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CETIS Analytical Report

Report Date: 14 Jan-21 14:28 (p 1 of 4)
Test Code/ID: VCF1220.132fml / 06-6159-9521

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 02-0503-6370	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:26	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 14:22	MD5 Hash: B51DFCFA90E508A283A03CD22F66D142	Editor ID: 000-189-126-0
Batch ID: 14-0829-9364	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:27	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:14	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 00-6115-6950	Code: VCF1220.132fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:50	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-OXN
Sample Age: 55h (7.3 °C)	Client: VCWPD	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC10	>100	---	---	<1	---	---
EC15	>100	---	---	<1	---	---
EC20	>100	---	---	<1	---	---
EC25	>100	---	---	<1	---	---
EC40	>100	---	---	<1	---	---
EC50	>100	---	---	<1	---	---

7d Survival Rate Summary

Conc-%	Code	Count	Calculated Variate(A/B)						Isotonic Variate		
			Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	60/60	1.0000	0.00%
6.25		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	60/60	1.0000	0.00%
12.5		4	0.9833	1.0000	0.9333	1.0000	3.39%	1.67%	59/60	0.9917	0.83%
25		4	0.9833	1.0000	0.9333	1.0000	3.39%	1.67%	59/60	0.9917	0.83%
50		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	60/60	0.9917	0.83%
100		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	60/60	0.9917	0.83%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		0.9333	1.0000	1.0000	1.0000
25		1.0000	0.9333	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

7d Survival Rate Binomials

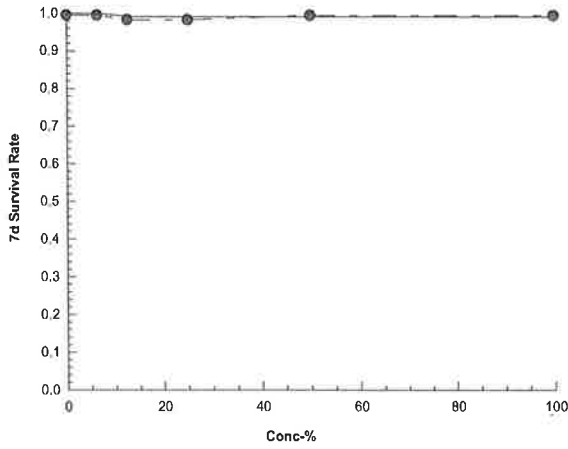
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		15/15	15/15	15/15	15/15
12.5		14/15	15/15	15/15	15/15
25		15/15	14/15	15/15	15/15
50		15/15	15/15	15/15	15/15
100		15/15	15/15	15/15	15/15

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 02-0503-6370 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:26 Analysis: Linear Interpolation (ICPIN) Status Level: 1
Edit Date: 14 Jan-21 14:22 MD5 Hash: B51DFCFA90E508A283A03CD22F66D142 Editor ID: 000-189-126-0

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 14:28 (p 3 of 4)
 Test Code/ID: VCF1220.132fml / 06-6159-9521

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 00-4515-3880	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:26	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 14:22	MD5 Hash: BD43E26C943F57C3FB3F078BA3E9E266	Editor ID: 000-189-126-0
Batch ID: 14-0829-9364	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:27	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:14	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 00-6115-6950	Code: VCF1220.132fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:50	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-OXN
Sample Age: 55h (7.3 °C)	Client: VCWPD	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	44797	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.4213	0.25	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	>100	---	---	<1	---	---
IC15	>100	---	---	<1	---	---
IC20	>100	---	---	<1	---	---
IC25	>100	---	---	<1	---	---
IC40	>100	---	---	<1	---	---
IC50	>100	---	---	<1	---	---

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Calculated Variate						Isotonic Variate	
			Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	N	4	0.4213	0.409	0.384	0.4833	10.21%	0.00%	0.4213	0.00%
6.25		4	0.4172	0.4197	0.4027	0.4267	2.52%	0.99%	0.4196	0.42%
12.5		4	0.422	0.41	0.404	0.464	6.75%	-0.16%	0.4196	0.42%
25		4	0.4113	0.413	0.3853	0.434	5.05%	2.37%	0.4134	1.87%
50		4	0.41	0.4077	0.402	0.4227	2.17%	2.69%	0.4134	1.87%
100		4	0.419	0.4183	0.4053	0.434	2.92%	0.55%	0.4134	1.87%

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.4107	0.4833	0.384	0.4073
6.25		0.4267	0.4167	0.4227	0.4027
12.5		0.4153	0.4047	0.404	0.464
25		0.434	0.42	0.3853	0.406
50		0.4227	0.402	0.4067	0.4087
100		0.414	0.434	0.4053	0.4227

CETIS Measurement Report

Report Date: 14 Jan-21 14:28 (p 1 of 8)
 Test Code/ID: VCF1220.132fml / 06-6159-9521

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 14-0829-9364	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:27	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:14	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 00-6115-6950	Code: VCF1220.132fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:50	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-OXN
Sample Age: 55h (7.3 °C)	Client: VCWPD	

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	60	60	60	60	60	0	0	0.00%	0
100		8	29	29	29	29	29	0	0	0.00%	0
Overall		16	44.5	35.97	53.03	29	60	4.002	16.01	35.97%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	338.6	335.9	341.3	332	342	0.4005	3.204	0.95%	0
6.25		8	371.4	368.8	374	368	377	0.3892	3.114	0.84%	0
12.5		8	337.1	335.3	339	333	340	0.279	2.232	0.66%	0
25		8	320.8	317.9	323.6	315	324	0.4265	3.412	1.06%	0
50		8	287	275.1	298.9	261	299	1.78	14.24	4.96%	0
100		8	224.5	194.2	254.8	204	312	4.534	36.27	16.16%	0
Overall		48	313.2	298.8	327.7	204	377	7.189	49.81	15.90%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.45	7.255	7.645	7.2	7.8	0.02912	0.233	3.13%	0
6.25		8	7.437	7.265	7.61	7.2	7.7	0.02582	0.2066	2.78%	0
12.5		8	7.475	7.292	7.658	7.1	7.8	0.02735	0.2188	2.93%	0
25		8	7.425	7.237	7.613	7.1	7.7	0.02815	0.2252	3.03%	0
50		8	7.387	7.25	7.525	7.1	7.6	0.02053	0.1642	2.22%	0
100		8	7.363	7.184	7.541	7	7.6	0.02667	0.2134	2.90%	0
Overall		48	7.423	7.364	7.482	7	7.8	0.02936	0.2034	2.74%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	91.25	89.31	93.19	90	95	0.2893	2.315	2.54%	0
100		8	70	70	70	70	70	0	0	0.00%	0
Overall		16	80.62	74.72	86.53	70	95	2.772	11.09	13.75%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.888	7.834	7.941	7.8	8	0.00801	0.06408	0.81%	0
6.25		8	7.913	7.791	8.034	7.8	8.2	0.01822	0.1458	1.84%	0
12.5		8	7.888	7.805	7.97	7.8	8	0.01239	0.0991	1.26%	0
25		8	7.863	7.819	7.906	7.8	7.9	0.006468	0.05175	0.66%	0
50		8	7.85	7.805	7.895	7.8	7.9	0.006681	0.05345	0.68%	0
100		8	7.85	7.805	7.895	7.8	7.9	0.006681	0.05345	0.68%	0
Overall		48	7.875	7.851	7.899	7.8	8.2	0.01209	0.08379	1.06%	0 (0%)

CETIS Measurement Report

Report Date: 14 Jan-21 14:28 (p 3 of 8)

Test Code/ID: VCF1220.132fml / 06-6159-9521

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		60					
100				29					
0	N	2		60					
100				29					
0	N	3		60					
100				29					
0	N	4		60					
100				29					
0	N	5		60					
100				29					
0	N	6		60					
100				29					
0	N	7		60					
100				29					
0	N	8		60					
100				29					

CETIS Measurement Report

Report Date: 14 Jan-21 14:28 (p 4 of 8)

Test Code/ID: VCF1220.132fml / 06-6159-9521

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Conductivity-µmhos

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		332					
6.25				375					
12.5				333					
25				317					
50				286					
100				229					
0	N	2		342					
6.25				377					
12.5				340					
25				320					
50				289					
100				312					
0	N	3		338					
6.25				372					
12.5				337					
25				315					
50				299					
100				215					
0	N	4		339					
6.25				370					
12.5				338					
25				320					
50				298					
100				215					
0	N	5		342					
6.25				370					
12.5				338					
25				322					
50				295					
100				208					
0	N	6		339					
6.25				368					
12.5				339					
25				324					
50				298					
100				204					
0	N	7		337					
6.25				370					
12.5				337					
25				324					
50				261					
100				209					
0	N	8		340					
6.25				369					
12.5				335					
25				324					
50				270					
100				204					

CETIS Measurement Report

Report Date: 14 Jan-21 14:28 (p 5 of 8)

Test Code/ID: VCF1220.132fml / 06-6159-9521

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.2					
6.25				7.4					
12.5				7.5					
25				7.2					
50				7.2					
100				7					
0	N	2		7.6					
6.25				7.2					
12.5				7.3					
25				7.3					
50				7.4					
100				7.4					
0	N	3		7.2					
6.25				7.3					
12.5				7.4					
25				7.4					
50				7.5					
100				7.6					
0	N	4		7.5					
6.25				7.6					
12.5				7.5					
25				7.4					
50				7.4					
100				7.4					
0	N	5		7.7					
6.25				7.7					
12.5				7.8					
25				7.7					
50				7.4					
100				7.4					
0	N	6		7.8					
6.25				7.7					
12.5				7.7					
25				7.7					
50				7.5					
100				7.4					
0	N	7		7.3					
6.25				7.4					
12.5				7.5					
25				7.6					
50				7.6					
100				7.6					
0	N	8		7.3					
6.25				7.2					
12.5				7.1					
25				7.1					
50				7.1					
100				7.1					

CETIS Measurement Report

Report Date: 14 Jan-21 14:28 (p 8 of 8)

Test Code/ID: VCF1220.132fml / 06-6159-9521

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	2		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	3		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	4		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	5		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	6		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	7		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	8		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					



January 15, 2021

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*" EPA-821-R-02-013. "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:


CLIENT: Ventura County Flood Control
SAMPLE I.D.: MO-SPA
DATE RECEIVED: 12/28/2020
ABC LAB. NO.: VCF1220.134

CHRONIC FATHEAD MINNOW SURVIVAL & GROWTH BIOASSAY

SURVIVAL NOEC = 100.00 %
 TU_c = 1.00
 EC25 = >100.00 %
 EC50 = >100.00 %

BIOMASS NOEC = 100.00 %
 TU_c = 1.00
 IC25 = >100.00 %
 IC50 = >100.00 %

Yours very truly,



in Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 14 Jan-21 14:17 (p 1 of 2)
 Test Code/ID: VCF1220.134 / 06-9490-0779

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 06-3201-3328	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:36	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:20	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 07-3839-8262	Code: VCF1220.134	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 04:45	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-SPA
Sample Age: 57h (4.8 °C)	Client: VCWPD	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	PMSD	TU	S
21-1247-2256	7d Survival Rate	Steel Many-One Rank Sum Test	100	>100	---	3.04%	1	1
14-1425-3590	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	100	>100	---	14.5%	1	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	%	95% LCL	95% UCL	TU	S
07-5227-7629	7d Survival Rate	Linear Interpolation (ICPIN)	✓ EC10	>100	---	---	<1	1
			✓ EC15	>100	---	---	<1	
			✓ EC20	>100	---	---	<1	
			✓ EC25	>100	---	---	<1	
			✓ EC40	>100	---	---	<1	
			✓ EC50	>100	---	---	<1	
06-6920-7548	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	✓ IC10	>100	---	---	<1	1
			✓ IC15	>100	---	---	<1	
			✓ IC20	>100	---	---	<1	
			✓ IC25	>100	---	---	<1	
			✓ IC40	>100	---	---	<1	
			✓ IC50	>100	---	---	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Overlap	Decision
				Lower	Upper			
07-5227-7629	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
21-1247-2256	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
06-6920-7548	Mean Dry Biomass-mg	Control Resp	0.4213	0.25	>>	Yes	Passes Criteria	
14-1425-3590	Mean Dry Biomass-mg	Control Resp	0.4213	0.25	>>	Yes	Passes Criteria	
14-1425-3590	Mean Dry Biomass-mg	PMSD	0.1454	0.12	0.3	Yes	Passes Criteria	

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
6.25		4	0.9833	0.9303	1.0360	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
25		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
50		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
100		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.4213	0.3529	0.4898	0.384	0.4833	0.0215	0.043	10.21%	0.00%
6.25		4	0.4355	0.3754	0.4956	0.404	0.486	0.01888	0.03776	8.67%	-3.36%
12.5		4	0.414	0.4009	0.4271	0.4067	0.4253	0.004128	0.008255	1.99%	1.74%
25		4	0.4045	0.3364	0.4726	0.342	0.4327	0.02141	0.04283	10.59%	4.00%
50		4	0.4063	0.3527	0.46	0.3653	0.4473	0.01686	0.03372	8.30%	3.56%
100		4	0.409	0.3483	0.4697	0.3527	0.4373	0.01908	0.03817	9.33%	2.93%

CETIS Summary Report

Report Date: 14 Jan-21 14:17 (p 2 of 2)

Test Code/ID: VCF1220.134 / 06-9490-0779

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

7d Survival Rate Detail

MD5: 01C5F704240C106C766AAACE7FE080994

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	0.9333	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

Mean Dry Biomass-mg Detail

MD5: 354E49FF7A5F3D81A62C65C709DFA7C7

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.4107	0.4833	0.384	0.4073
6.25		0.4093	0.4427	0.486	0.404
12.5		0.4253	0.4147	0.4093	0.4067
25		0.4113	0.4327	0.342	0.432
50		0.4013	0.4113	0.4473	0.3653
100		0.3527	0.424	0.422	0.4373

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		15/15	15/15	14/15	15/15
12.5		15/15	15/15	15/15	15/15
25		15/15	15/15	15/15	15/15
50		15/15	15/15	15/15	15/15
100		15/15	15/15	15/15	15/15

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 21-1247-2256 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 14:16 Analysis: Nonparametric-Control vs Treatments Status Level: 1
 Edit Date: 14 Jan-21 14:12 MD5 Hash: 01C5F704240C106C766AAACE7FE080994 Editor ID: 000-189-126-0

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
6.25		4	1.4080	1.3040	1.5130	1.4410	1.3100	1.4410	0.0329	4.68%	2.28%
12.5		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
25		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
50		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
100		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	0.9333	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

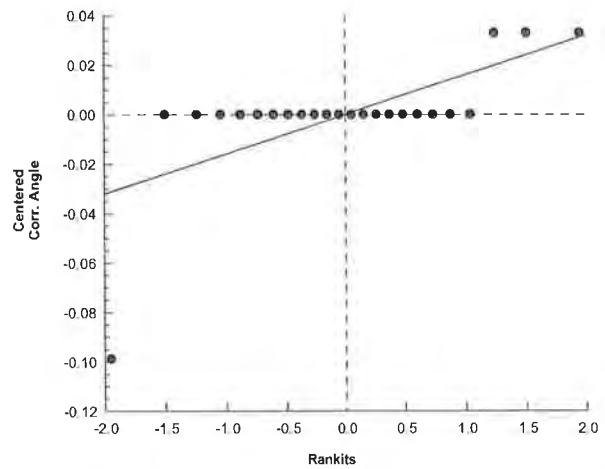
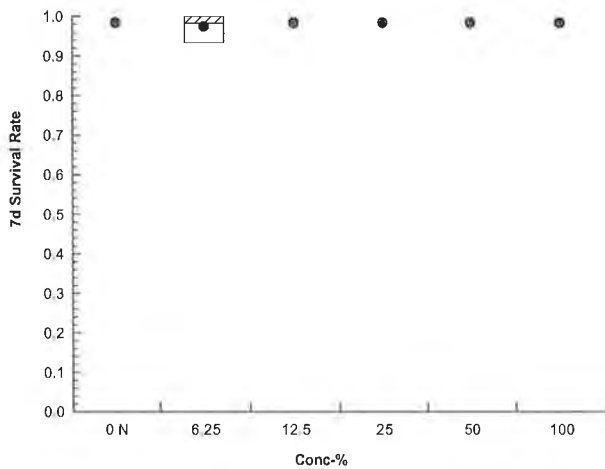
Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.4410	1.4410	1.4410	1.4410
6.25		1.4410	1.4410	1.3100	1.4410
12.5		1.4410	1.4410	1.4410	1.4410
25		1.4410	1.4410	1.4410	1.4410
50		1.4410	1.4410	1.4410	1.4410
100		1.4410	1.4410	1.4410	1.4410

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		15/15	15/15	14/15	15/15
12.5		15/15	15/15	15/15	15/15
25		15/15	15/15	15/15	15/15
50		15/15	15/15	15/15	15/15
100		15/15	15/15	15/15	15/15

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test

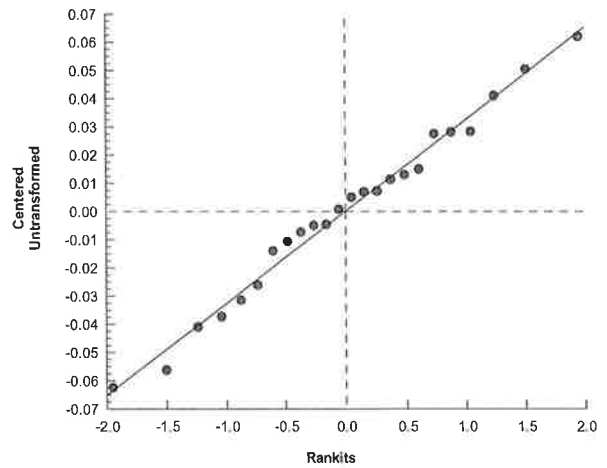
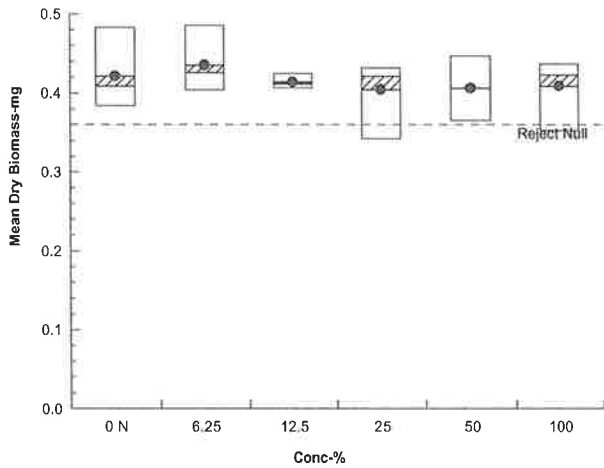
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 14-1425-3590 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 14:16 Analysis: Parametric-Control vs Treatments Status Level: 1
 Edit Date: 14 Jan-21 14:12 MD5 Hash: 354E49FF7A5F3D81A62C65C709DFA7C7 Editor ID: 000-189-126-0

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.4107	0.4833	0.384	0.4073
6.25		0.4093	0.4427	0.486	0.404
12.5		0.4253	0.4147	0.4093	0.4067
25		0.4113	0.4327	0.342	0.432
50		0.4013	0.4113	0.4473	0.3653
100		0.3527	0.424	0.422	0.4373

Graphics



CETIS Analytical Report

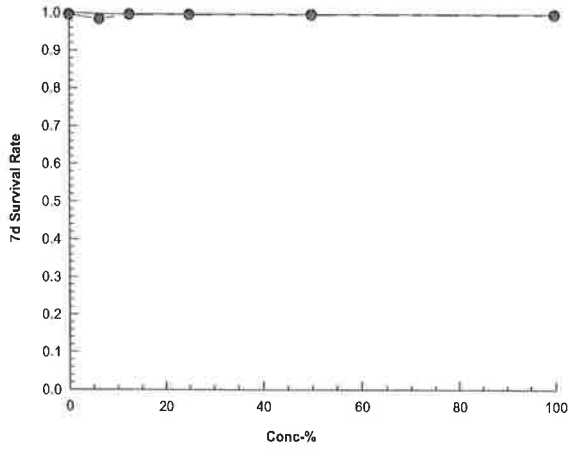
Report Date: 14 Jan-21 14:17 (p 2 of 4)
Test Code/ID: VCF1220.134 / 06-9490-0779

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 07-5227-7629	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:17	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 14:12	MD5 Hash: 01C5F704240C106C766AACE7FE080994	Editor ID: 000-189-126-0

Graphics



CETIS Measurement Report

Report Date: 14 Jan-21 14:17 (p 1 of 8)
 Test Code/ID: VCF1220.134 / 06-9490-0779

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 06-3201-3328	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:36	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:20	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 07-3839-8262	Code: VCF1220.134	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 04:45	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-SPA
Sample Age: 57h (4.8 °C)	Client: VCWPD	

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	60	60	60	60	60	0	0	0.00%	0
100		8	29	29	29	29	29	0	0	0.00%	0
Overall		16	44.5	35.97	53.03	29	60	4.002	16.01	35.97%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	338.6	335.9	341.3	332	342	0.4005	3.204	0.95%	0
6.25		8	330.9	329	332.8	326	333	0.2869	2.295	0.69%	0
12.5		8	311.1	303.8	318.4	300	321	1.095	8.758	2.81%	0
25		8	292.8	284.7	300.8	270	299	1.202	9.618	3.29%	0
50		8	230.8	215.9	245.6	205	247	2.216	17.73	7.68%	0
100		8	131.9	125.7	138.1	122	141	0.9293	7.434	5.64%	0
Overall		48	272.7	251.3	294	122	342	10.6	73.44	26.93%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.45	7.255	7.645	7.2	7.8	0.02912	0.233	3.13%	0
6.25		8	7.375	7.181	7.569	7	7.7	0.02893	0.2315	3.14%	0
12.5		8	7.331	7.105	7.558	7	7.7	0.03389	0.2712	3.70%	0
25		8	7.325	7.081	7.569	6.9	7.7	0.03644	0.2915	3.98%	0
50		8	7.262	7.01	7.515	6.9	7.7	0.03776	0.3021	4.16%	0
100		8	7.25	6.982	7.518	6.8	7.7	0.04009	0.3207	4.42%	0
Overall		48	7.332	7.254	7.411	6.8	7.8	0.03906	0.2706	3.69%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	91.25	89.31	93.19	90	95	0.2893	2.315	2.54%	0
100		8	70	70	70	70	70	0	0	0.00%	0
Overall		16	80.62	74.72	86.53	70	95	2.772	11.09	13.75%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.888	7.834	7.941	7.8	8	0.00801	0.06408	0.81%	0
6.25		8	7.763	7.686	7.839	7.6	7.9	0.01145	0.09161	1.18%	0
12.5		8	7.75	7.673	7.827	7.6	7.9	0.01157	0.09258	1.19%	0
25		8	7.725	7.618	7.832	7.6	7.9	0.01602	0.1282	1.66%	0
50		8	7.7	7.574	7.826	7.5	7.9	0.0189	0.1512	1.96%	0
100		8	7.7	7.574	7.826	7.5	7.9	0.0189	0.1512	1.96%	0
Overall		48	7.754	7.717	7.792	7.5	8	0.01858	0.1288	1.66%	0 (0%)

CETIS Measurement Report

Report Date: 14 Jan-21 14:17 (p 2 of 8)
Test Code/ID: VCF1220.134 / 06-9490-0779

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.00%	0
6.25		8	24	24	24	24	24	0	0	0.00%	0
12.5		8	24	24	24	24	24	0	0	0.00%	0
25		8	24	24	24	24	24	0	0	0.00%	0
50		8	24	24	24	24	24	0	0	0.00%	0
100		8	24	24	24	24	24	0	0	0.00%	0
Overall		48	24	24	24	24	24	0	0	0.00%	0 (0%)

CETIS Measurement Report

Report Date: 14 Jan-21 14:17 (p 3 of 8)
Test Code/ID: VCF1220.134 / 06-9490-0779

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		60					
100				29					
0	N	2		60					
100				29					
0	N	3		60					
100				29					
0	N	4		60					
100				29					
0	N	5		60					
100				29					
0	N	6		60					
100				29					
0	N	7		60					
100				29					
0	N	8		60					
100				29					

CETIS Measurement Report

Report Date: 14 Jan-21 14:17 (p 5 of 8)
 Test Code/ID: VCF1220.134 / 06-9490-0779

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.2					
6.25				7.4					
12.5				7.6					
25				7.6					
50				7					
100				7					
0	N	2		7.6					
6.25				7.2					
12.5				7					
25				7					
50				7					
100				7					
0	N	3		7.2					
6.25				7					
12.5				7					
25				6.9					
50				6.9					
100				6.8					
0	N	4		7.5					
6.25				7.5					
12.5				7.5					
25				7.4					
50				7.4					
100				7.4					
0	N	5		7.7					
6.25				7.6					
12.5				7.35					
25				7.4					
50				7.4					
100				7.4					
0	N	6		7.8					
6.25				7.7					
12.5				7.7					
25				7.7					
50				7.7					
100				7.7					
0	N	7		7.3					
6.25				7.4					
12.5				7.4					
25				7.5					
50				7.6					
100				7.6					
0	N	8		7.3					
6.25				7.2					
12.5				7.1					
25				7.1					
50				7.1					
100				7.1					

CETIS Measurement Report

Report Date: 14 Jan-21 14:17 (p 6 of 8)
Test Code/ID: VCF1220.134 / 06-9490-0779

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Hardness (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		95					
100				70					
0	N	2		95					
100				70					
0	N	3		90					
100				70					
0	N	4		90					
100				70					
0	N	5		90					
100				70					
0	N	6		90					
100				70					
0	N	7		90					
100				70					
0	N	8		90					
100				70					

CETIS Measurement Report

Report Date: 14 Jan-21 14:17 (p 7 of 8)
 Test Code/ID: VCF1220.134 / 06-9490-0779

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

pH-Units

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
6.25				7.7					
12.5				7.7					
25				7.7					
50				7.7					
100				7.6					
0	N	2		7.9					
6.25				7.7					
12.5				7.7					
25				7.6					
50				7.6					
100				7.6					
0	N	3		7.9					
6.25				7.6					
12.5				7.6					
25				7.6					
50				7.6					
100				7.7					
0	N	4		7.9					
6.25				7.8					
12.5				7.7					
25				7.6					
50				7.5					
100				7.5					
0	N	5		7.8					
6.25				7.8					
12.5				7.8					
25				7.7					
50				7.6					
100				7.6					
0	N	6		8					
6.25				7.8					
12.5				7.8					
25				7.8					
50				7.8					
100				7.8					
0	N	7		7.9					
6.25				7.9					
12.5				7.9					
25				7.9					
50				7.9					
100				7.9					
0	N	8		7.8					
6.25				7.8					
12.5				7.8					
25				7.9					
50				7.9					
100				7.9					



January 15, 2021

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*" EPA-821-R-02-013. "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-CAM
DATE RECEIVED:	12/28/2020
ABC LAB. NO.:	VCF1220.138

CHRONIC FATHEAD MINNOW SURVIVAL & GROWTH BIOASSAY

SURVIVAL	NOEC =	100.00 %
	TU _c =	1.00
	EC25 =	>100.00 %
	EC50 =	>100.00 %

BIOMASS	NOEC =	100.00 %
	TU _c =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %

Yours very truly,



in Scott Johnson
Laboratory Director

29 north olive st. ventura, ca 93001 (805) 643 5621 aquabio.org

CETIS Summary Report

Report Date: 14 Jan-21 14:37 (p 1 of 2)
Test Code/ID: VCF1220.138fml / 14-5088-5242

Fathead Minnow 7-d Larval Survival and Growth Test **Aquatic Bioassay & Consulting Labs, Inc.**

Batch ID: 13-7475-1716	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:42	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:25	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 03-3370-6453	Code: VCF1220.138fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-CAM
Sample Age: 57h (9.8 °C)	Client: VCWPD	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	PMSD	TU	S
13-0400-9025	7d Survival Rate	Steel Many-One Rank Sum Test	100	>100	---	5.37%	1	1
15-8860-9436	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	100	>100	---	12.9%	1	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	%	95% LCL	95% UCL	TU	S
09-4946-1394	7d Survival Rate	Linear Interpolation (ICPIN)	✓ EC10	>100	---	---	<1	1
			✓ EC15	>100	---	---	<1	
			✓ EC20	>100	---	---	<1	
			✓ EC25	>100	---	---	<1	
			✓ EC40	>100	---	---	<1	
			✓ EC50	>100	---	---	<1	
12-7629-3552	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	✓ IC10	>100	---	---	<1	1
			✓ IC15	>100	---	---	<1	
			✓ IC20	>100	---	---	<1	
			✓ IC25	>100	---	---	<1	
			✓ IC40	>100	---	---	<1	
			✓ IC50	>100	---	---	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Overlap	Decision
				Lower	Upper			
09-4946-1394	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
13-0400-9025	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
12-7629-3552	Mean Dry Biomass-mg	Control Resp	0.3965	0.25	>>	Yes	Passes Criteria	
15-8860-9436	Mean Dry Biomass-mg	Control Resp	0.3965	0.25	>>	Yes	Passes Criteria	
15-8860-9436	Mean Dry Biomass-mg	PMSD	0.1293	0.12	0.3	Yes	Passes Criteria	

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
6.25		4	0.9500	0.8484	1.0520	0.8667	1.0000	0.0319	0.0638	6.72%	5.00%
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
25		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
50		4	0.9833	0.9303	1.0360	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
100		4	0.9833	0.9303	1.0360	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.3965	0.3629	0.4301	0.3653	0.412	0.01057	0.02113	5.33%	0.00%
6.25		4	0.4085	0.3957	0.4213	0.4007	0.4193	0.004022	0.008044	1.97%	-3.03%
12.5		4	0.4795	0.377	0.582	0.404	0.5567	0.03222	0.06444	13.44%	-20.93%
25		4	0.4083	0.3888	0.4278	0.3967	0.4253	0.006125	0.01225	3.00%	-2.98%
50		4	0.398	0.3782	0.4178	0.3833	0.4087	0.006224	0.01245	3.13%	-0.38%
100		4	0.4242	0.3896	0.4588	0.402	0.4493	0.01087	0.02173	5.12%	-6.98%

PASS

CETIS Summary Report

Report Date: 14 Jan-21 14:37 (p 2 of 2)

Test Code/ID: VCF1220.138fml / 14-5088-5242

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

7d Survival Rate Detail

MD5: 53BF99E36BA0B6EBA4DBC0F271573D02

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		0.8667	1.0000	0.9333	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		0.9333	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	0.9333

Mean Dry Biomass-mg Detail

MD5: 25C6734DF5CB0D45E5CD4336236D9743

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.412	0.406	0.3653	0.4027
6.25		0.4093	0.4007	0.4047	0.4193
12.5		0.5567	0.404	0.4987	0.4587
25		0.4253	0.4033	0.408	0.3967
50		0.392	0.4087	0.3833	0.408
100		0.402	0.4493	0.4107	0.4347

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		13/15	15/15	14/15	15/15
12.5		15/15	15/15	15/15	15/15
25		15/15	15/15	15/15	15/15
50		14/15	15/15	15/15	15/15
100		15/15	15/15	15/15	14/15

CETIS Analytical Report

Report Date: 14 Jan-21 14:37 (p 1 of 4)
 Test Code/ID: VCF1220.138fml / 14-5088-5242

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 13-0400-9025	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:34	Analysis: Nonparametric-Control vs Treatments	Status Level: 1
Edit Date: 14 Jan-21 14:30	MD5 Hash: 53BF99E36BA0B6EBA4DBC0F271573D02	Editor ID: 000-189-126-0
Batch ID: 13-7475-1716	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:42	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:25	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 03-3370-6453	Code: VCF1220.138fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-CAM
Sample Age: 57h (9.8 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.0537	5.37%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	14	10	1	6	CDF	0.3451	Non-Significant Effect
		12.5	18	10	1	6	CDF	0.8333	Non-Significant Effect
		25	18	10	1	6	CDF	0.8333	Non-Significant Effect
		50	16	10	1	6	CDF	0.6105	Non-Significant Effect
		100	16	10	1	6	CDF	0.6105	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0269855	0.0053971	5	1.435	0.2595	Non-Significant Effect
Error	0.0677086	0.0037616	18			
Total	0.094694		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
	Levene Equality of Variance Test	8.43	4.248	0.0003	Unequal Variances
	Mod Levene Equality of Variance Test	2.734	4.248	0.0523	Equal Variances
Distribution	Anderson-Darling A2 Test	2.236	3.878	<1.0E-05	Non-Normal Distribution
	D'Agostino Kurtosis Test	1.915	2.576	0.0555	Normal Distribution
	D'Agostino Skewness Test	2.14	2.576	0.0324	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	8.244	9.21	0.0162	Normal Distribution
	Kolmogorov-Smirnov D Test	0.3333	0.2056	<1.0E-05	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.8275	0.884	0.0009	Non-Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		4	0.9500	0.8484	1.0000	0.9667	0.8667	1.0000	0.0319	6.72%	5.00%
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		4	0.9833	0.9303	1.0000	1.0000	0.9333	1.0000	0.0167	3.39%	1.67%
100		4	0.9833	0.9303	1.0000	1.0000	0.9333	1.0000	0.0167	3.39%	1.67%

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 13-0400-9025 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 14:34 Analysis: Nonparametric-Control vs Treatments Status Level: 1
 Edit Date: 14 Jan-21 14:30 MD5 Hash: 53BF99E36BA0B6EBA4DBC0F271573D02 Editor ID: 000-189-126-0

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
6.25		4	1.3470	1.1600	1.5350	1.3750	1.1970	1.4410	0.0589	8.75%	6.52%
12.5		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
25		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
50		4	1.4080	1.3040	1.5130	1.4410	1.3100	1.4410	0.0329	4.68%	2.28%
100		4	1.4080	1.3040	1.5130	1.4410	1.3100	1.4410	0.0329	4.68%	2.28%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		0.8667	1.0000	0.9333	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		0.9333	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	0.9333

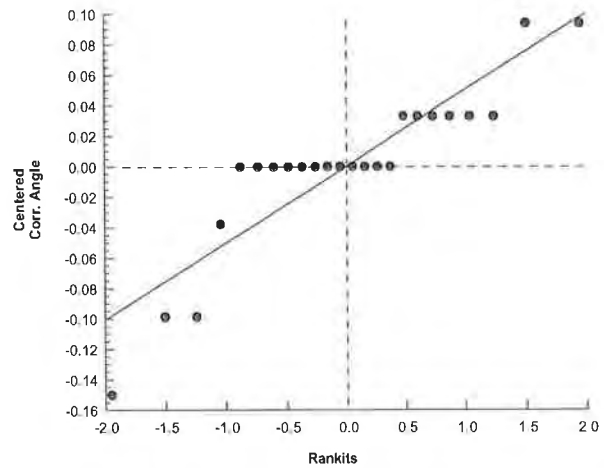
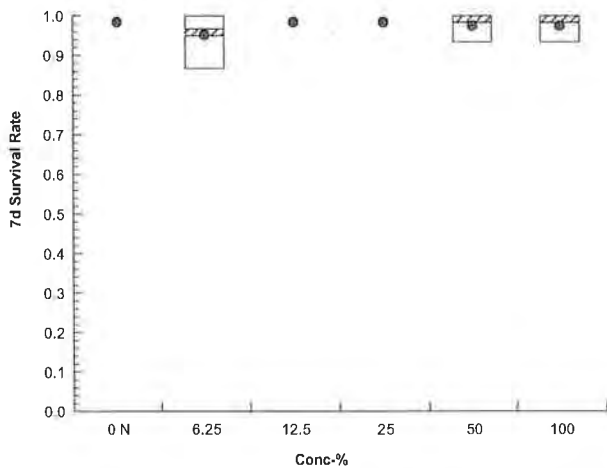
Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.4410	1.4410	1.4410	1.4410
6.25		1.1970	1.4410	1.3100	1.4410
12.5		1.4410	1.4410	1.4410	1.4410
25		1.4410	1.4410	1.4410	1.4410
50		1.3100	1.4410	1.4410	1.4410
100		1.4410	1.4410	1.4410	1.3100

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		13/15	15/15	14/15	15/15
12.5		15/15	15/15	15/15	15/15
25		15/15	15/15	15/15	15/15
50		14/15	15/15	15/15	15/15
100		15/15	15/15	15/15	14/15

Graphics



Fathead Minnow 7-d Larval Survival and Growth Test

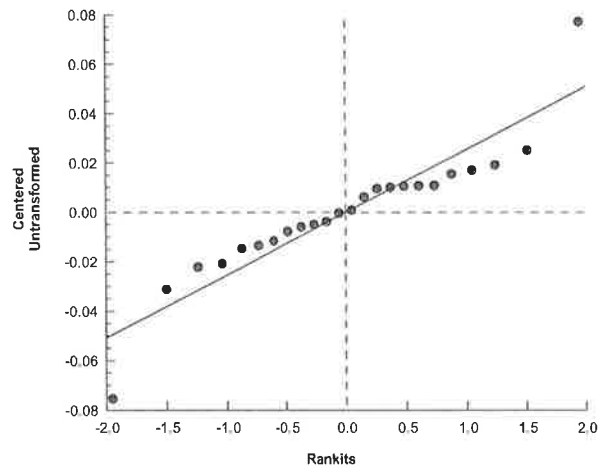
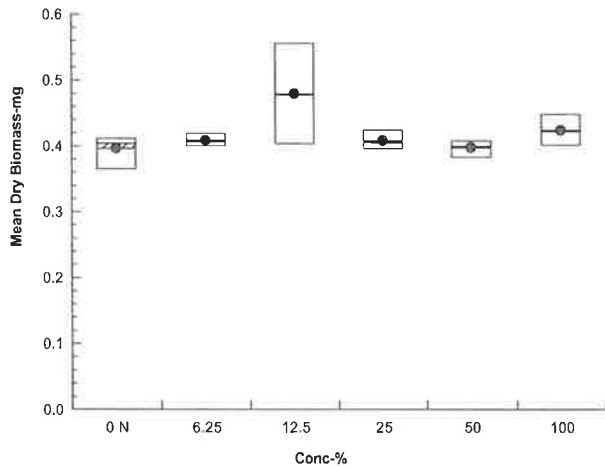
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 15-8860-9436 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.7
Analyzed: 14 Jan-21 14:34 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1
Edit Date: 14 Jan-21 14:30 **MD5 Hash:** 25C6734DF5CB0D45E5CD4336236D9743 **Editor ID:** 000-189-126-0

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.412	0.406	0.3653	0.4027
6.25		0.4093	0.4007	0.4047	0.4193
12.5		0.5567	0.404	0.4987	0.4587
25		0.4253	0.4033	0.408	0.3967
50		0.392	0.4087	0.3833	0.408
100		0.402	0.4493	0.4107	0.4347

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 14:37 (p 1 of 4)

Test Code/ID: VCF1220.138fml / 14-5088-5242

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 09-4946-1394	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:35	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 14:30	MD5 Hash: 53BF99E36BA0B6EBA4DBC0F271573D02	Editor ID: 000-189-126-0
Batch ID: 13-7475-1716	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:42	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:25	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 03-3370-6453	Code: VCF1220.138fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-CAM
Sample Age: 57h (9.8 °C)	Client: VCWPD	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC10	>100	---	---	<1	---	---
EC15	>100	---	---	<1	---	---
EC20	>100	---	---	<1	---	---
EC25	>100	---	---	<1	---	---
EC40	>100	---	---	<1	---	---
EC50	>100	---	---	<1	---	---

7d Survival Rate Summary

Conc-%	Code	Count	Calculated Variate(A/B)						Isotonic Variate		
			Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	60/60	1.0000	0.00%
6.25		4	0.9500	0.9667	0.8667	1.0000	6.72%	5.00%	57/60	0.9833	1.67%
12.5		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	60/60	0.9833	1.67%
25		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	60/60	0.9833	1.67%
50		4	0.9833	1.0000	0.9333	1.0000	3.39%	1.67%	59/60	0.9833	1.67%
100		4	0.9833	1.0000	0.9333	1.0000	3.39%	1.67%	59/60	0.9833	1.67%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		0.8667	1.0000	0.9333	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		0.9333	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	0.9333

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		13/15	15/15	14/15	15/15
12.5		15/15	15/15	15/15	15/15
25		15/15	15/15	15/15	15/15
50		14/15	15/15	15/15	15/15
100		15/15	15/15	15/15	14/15

CETIS Analytical Report

Report Date: 14 Jan-21 14:37 (p 3 of 4)
 Test Code/ID: VCF1220.138fml / 14-5088-5242

Fathead Minnow 7-d Larval Survival and Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 12-7629-3552	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7			
Analyzed: 14 Jan-21 14:35	Analysis: Linear Interpolation (ICPIN)	Status Level: 1			
Edit Date: 14 Jan-21 14:30	MD5 Hash: 25C6734DF5CB0D45E5CD4336236D9743	Editor ID: 000-189-126-0			
Batch ID: 13-7475-1716	Test Type: Growth-Survival (7d)	Analyst:			
Start Date: 30 Dec-20 13:42	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 06 Jan-21 13:25	Species: Pimephales promelas	Brine: Not Applicable			
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:			
Sample ID: 03-3370-6453	Code: VCF1220.138fml	Project: NPDES Stormwater Wet Season			
Sample Date: 28 Dec-20 05:00	Material: Sample Water	Source: Bioassay Report			
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-CAM			
Sample Age: 57h (9.8 °C)	Client: VCWPD				

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1444336	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.3965	0.25	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	>100	---	---	<1	---	---
IC15	>100	---	---	<1	---	---
IC20	>100	---	---	<1	---	---
IC25	>100	---	---	<1	---	---
IC40	>100	---	---	<1	---	---
IC50	>100	---	---	<1	---	---

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Calculated Variate						Isotonic Variate	
			Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	N	4	0.3965	0.4043	0.3653	0.412	5.33%	0.00%	0.4282	0.00%
6.25		4	0.4085	0.407	0.4007	0.4193	1.97%	-3.03%	0.4282	0.00%
12.5		4	0.4795	0.4787	0.404	0.5567	13.44%	-20.93%	0.4282	0.00%
25		4	0.4083	0.4057	0.3967	0.4253	3.00%	-2.98%	0.4102	4.20%
50		4	0.398	0.4	0.3833	0.4087	3.13%	-0.38%	0.4102	4.20%
100		4	0.4242	0.4227	0.402	0.4493	5.12%	-6.98%	0.4102	4.20%

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.412	0.406	0.3653	0.4027
6.25		0.4093	0.4007	0.4047	0.4193
12.5		0.5567	0.404	0.4987	0.4587
25		0.4253	0.4033	0.408	0.3967
50		0.392	0.4087	0.3833	0.408
100		0.402	0.4493	0.4107	0.4347

CETIS Measurement Report

Report Date: 14 Jan-21 14:37 (p 1 of 8)

Test Code/ID: VCF1220.138fml / 14-5088-5242

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 13-7475-1716	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:42	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:25	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 03-3370-6453	Code: VCF1220.138fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-CAM
Sample Age: 57h (9.8 °C)	Client: VCWPD	

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	60	60	60	60	60	0	0	0.00%	0
100		8	26	26	26	26	26	0	0	0.00%	0
Overall		16	43	33.64	52.36	26	60	4.389	17.56	40.83%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	338.6	335.9	341.3	332	342	0.4005	3.204	0.95%	0
6.25		8	333.5	328.9	338.1	324	339	0.6847	5.477	1.64%	0
12.5		8	334.8	332.4	337.1	331	338	0.3583	2.866	0.86%	0
25		8	322.5	318.6	326.4	316	329	0.5863	4.69	1.45%	0
50		8	300.8	295.6	305.9	298	316	0.7727	6.182	2.06%	0
100		8	254.4	250.9	257.8	248	260	0.5129	4.104	1.61%	0
Overall		48	314.1	305.3	322.8	248	342	4.347	30.12	9.59%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.45	7.255	7.645	7.2	7.8	0.02912	0.233	3.13%	0
6.25		8	7.45	7.302	7.598	7.2	7.8	0.02216	0.1773	2.38%	0
12.5		8	7.438	7.259	7.616	7.1	7.7	0.02667	0.2134	2.87%	0
25		8	7.387	7.196	7.579	7.1	7.7	0.02869	0.2295	3.11%	0
50		8	7.337	7.128	7.547	7	7.7	0.03129	0.2504	3.41%	0
100		8	7.312	7.083	7.542	6.9	7.7	0.03435	0.2748	3.76%	0
Overall		48	7.396	7.33	7.461	6.9	7.8	0.03261	0.2259	3.06%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	91.25	89.31	93.19	90	95	0.2893	2.315	2.54%	0
100		8	72	72	72	72	72	0	0	0.00%	0
Overall		16	81.62	76.26	86.99	72	95	2.516	10.07	12.33%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.888	7.834	7.941	7.8	8	0.00801	0.06408	0.81%	0
6.25		8	7.687	7.583	7.792	7.5	7.9	0.01558	0.1246	1.62%	0
12.5		8	7.662	7.563	7.762	7.5	7.8	0.01485	0.1188	1.55%	0
25		8	7.688	7.593	7.782	7.5	7.8	0.01408	0.1126	1.46%	0
50		8	7.625	7.493	7.757	7.4	7.8	0.01976	0.1581	2.07%	0
100		8	7.613	7.475	7.75	7.3	7.8	0.02053	0.1642	2.16%	0
Overall		48	7.694	7.65	7.738	7.3	8	0.02196	0.1522	1.98%	0 (0%)

P

CETIS Measurement Report

Report Date: 14 Jan-21 14:37 (p 3 of 8)

Test Code/ID: VCF1220.138fml / 14-5088-5242

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		60					
100				26					
0	N	2		60					
100				26					
0	N	3		60					
100				26					
0	N	4		60					
100				26					
0	N	5		60					
100				26					
0	N	6		60					
100				26					
0	N	7		60					
100				26					
0	N	8		60					
100				26					

CETIS Measurement Report

Report Date: 14 Jan-21 14:37 (p 4 of 8)
 Test Code/ID: VCF1220.138fml / 14-5088-5242

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Conductivity-µmhos

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		332					
6.25				337					
12.5				334					
25				322					
50				299					
100				255					
0	N	2		342					
6.25				331					
12.5				332					
25				316					
50				316					
100				260					
0	N	3		338					
6.25				333					
12.5				338					
25				322					
50				298					
100				255					
0	N	4		339					
6.25				338					
12.5				338					
25				325					
50				299					
100				252					
0	N	5		342					
6.25				339					
12.5				338					
25				328					
50				298					
100				250					
0	N	6		339					
6.25				338					
12.5				333					
25				329					
50				299					
100				248					
0	N	7		337					
6.25				324					
12.5				334					
25				317					
50				299					
100				257					
0	N	8		340					
6.25				328					
12.5				331					
25				321					
50				298					
100				258					

CETIS Measurement Report

Report Date: 14 Jan-21 14:37 (p 6 of 8)
Test Code/ID: VCF1220.138fml / 14-5088-5242

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Hardness (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		95					
100				72					
0	N	2		95					
100				72					
0	N	3		90					
100				72					
0	N	4		90					
100				72					
0	N	5		90					
100				72					
0	N	6		90					
100				72					
0	N	7		90					
100				72					
0	N	8		90					
100				72					

CETIS Measurement Report

Report Date: 14 Jan-21 14:37 (p 8 of 8)
 Test Code/ID: VCF1220.138fml / 14-5088-5242

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	2		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	3		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	4		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	5		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	6		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	7		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	8		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					

January 15, 2021

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms* EPA-821-R-02-013. "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:

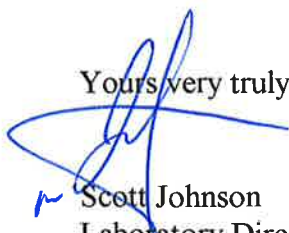
CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-OJA
DATE RECEIVED:	12/28/2020
ABC LAB. NO.:	VCF1220.139

CHRONIC FATHEAD MINNOW SURVIVAL & GROWTH BIOASSAY

SURVIVAL	NOEC =	100.00 %
	TU _c =	1.00
	EC25 =	>100.00 %
	EC50 =	>100.00 %

BIOMASS	NOEC =	100.00 %
	TU _c =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %

Yours very truly,



Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 14 Jan-21 14:47 (p 1 of 2)
 Test Code/ID: VCF1220.139fml / 00-9377-2528

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 02-2251-9959	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:51	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:30	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 13-7207-3770	Code: VCF1220.139fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-OJA
Sample Age: 57h (4.3 °C)	Client: VCWPD	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	PMSD	TU	S
01-4023-8411	7d Survival Rate	Steel Many-One Rank Sum Test	100	>100	---	---	1	1
16-1370-3400	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	100	>100	---	10.4%	1	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	%	95% LCL	95% UCL	TU	S
00-2926-7753	7d Survival Rate	Linear Interpolation (ICPIN)	✓ EC10	>100	---	---	<1	1
			✓ EC15	>100	---	---	<1	
			✓ EC20	>100	---	---	<1	
			✓ EC25	>100	---	---	<1	
			✓ EC40	>100	---	---	<1	
			✓ EC50	>100	---	---	<1	
20-1688-7110	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	✓ IC10	>100	---	---	<1	1
			✓ IC15	>100	---	---	<1	
			✓ IC20	>100	---	---	<1	
			✓ IC25	>100	---	---	<1	
			✓ IC40	>100	---	---	<1	
			✓ IC50	>100	---	---	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Overlap	Decision
				Lower	Upper			
00-2926-7753	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
01-4023-8411	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
16-1370-3400	Mean Dry Biomass-mg	Control Resp	0.3965	0.25	>>	Yes	Passes Criteria	
20-1688-7110	Mean Dry Biomass-mg	Control Resp	0.3965	0.25	>>	Yes	Passes Criteria	
16-1370-3400	Mean Dry Biomass-mg	PMSD	0.1039	0.12	0.3	Yes	Below Criteria	

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
6.25		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
25		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
50		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
100		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.3965	0.3629	0.4301	0.3653	0.412	0.01057	0.02113	5.33%	0.00%
6.25		4	0.4213	0.3708	0.4719	0.3947	0.4673	0.01588	0.03175	7.54%	-6.26%
12.5		4	0.4273	0.3604	0.4942	0.3787	0.466	0.02102	0.04203	9.84%	-7.78%
25		4	0.4375	0.4168	0.4582	0.426	0.4507	0.0065	0.013	2.97%	-10.34%
50		4	0.416	0.4044	0.4276	0.4053	0.4207	0.003641	0.007283	1.75%	-4.92%
100		4	0.4113	0.3976	0.4251	0.4047	0.424	0.004312	0.008624	2.10%	-3.74%

Handwritten signatures and initials: JMS, MS

CETIS Summary Report

Report Date: 14 Jan-21 14:47 (p 2 of 2)
 Test Code/ID: VCF1220.139fml / 00-9377-2528

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

7d Survival Rate Detail

MD5: E88740A7CB88EC46B4EC0A60E4B8AEB7

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

Mean Dry Biomass-mg Detail

MD5: 5BC56A49D1019F5F83F45A0712A51B35

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.412	0.406	0.3653	0.4027
6.25		0.4093	0.4673	0.414	0.3947
12.5		0.466	0.4587	0.406	0.3787
25		0.4467	0.426	0.4507	0.4267
50		0.4173	0.4053	0.4207	0.4207
100		0.4087	0.424	0.408	0.4047

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		15/15	15/15	15/15	15/15
12.5		15/15	15/15	15/15	15/15
25		15/15	15/15	15/15	15/15
50		15/15	15/15	15/15	15/15
100		15/15	15/15	15/15	15/15

CETIS Analytical Report

Report Date: 14 Jan-21 14:47 (p 1 of 4)
 Test Code/ID: VCF1220.139fml / 00-9377-2528

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 01-4023-8411	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:45	Analysis: Nonparametric-Control vs Treatments	Status Level: 1
Edit Date: 14 Jan-21 14:44	MD5 Hash: E88740A7CB88EC46B4EC0A60E4B8AEB	Editor ID: 000-189-126-0
Batch ID: 02-2251-9959	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:51	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:30	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 13-7207-3770	Code: VCF1220.139fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-OJA
Sample Age: 57h (4.3 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Angular (Corrected)	C > T	100	>100	---	1

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	18	10	1	6	CDF	0.8333	Non-Significant Effect
		12.5	18	10	1	6	CDF	0.8333	Non-Significant Effect
		25	18	10	1	6	CDF	0.8333	Non-Significant Effect
		50	18	10	1	6	CDF	0.8333	Non-Significant Effect
		100	18	10	1	6	CDF	0.8333	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.105E-15	1.421E-15	5			Indeterminate
Error	0	0	18			
Total	7.105E-15		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
Distribution	Shapiro-Wilk W Normality Test				Indeterminate

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
12.5		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
6.25		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
12.5		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
25		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
50		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
100		4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%

CETIS Analytical Report

Report Date: 14 Jan-21 14:47 (p 2 of 4)
 Test Code/ID: VCF1220.139fml / 00-9377-2528

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 01-4023-8411 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 14:45 Analysis: Nonparametric-Control vs Treatments Status Level: 1
 Edit Date: 14 Jan-21 14:44 MD5 Hash: E88740A7CB88EC46B4EC0A60E4B8AEB Editor ID: 000-189-126-0

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

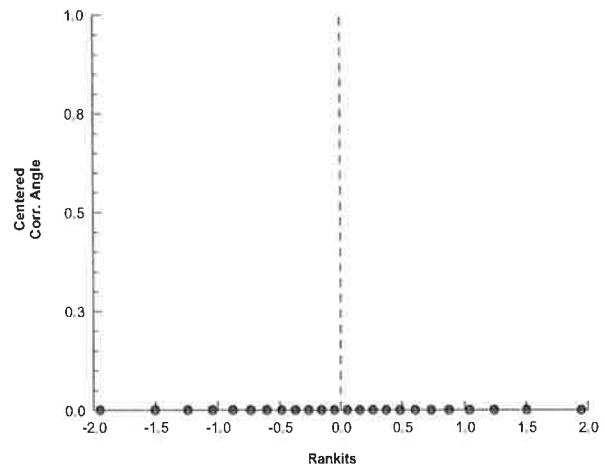
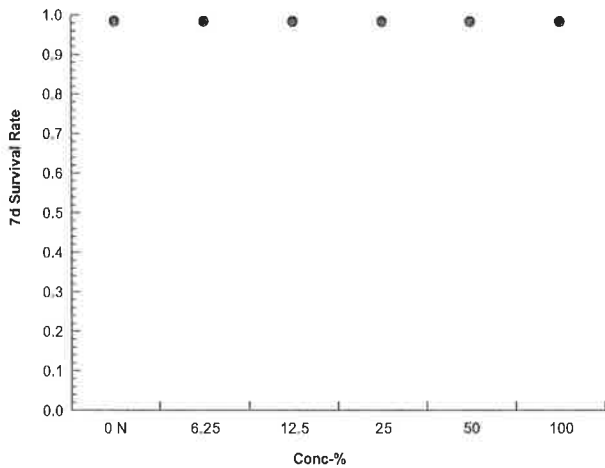
Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.4410	1.4410	1.4410	1.4410
6.25		1.4410	1.4410	1.4410	1.4410
12.5		1.4410	1.4410	1.4410	1.4410
25		1.4410	1.4410	1.4410	1.4410
50		1.4410	1.4410	1.4410	1.4410
100		1.4410	1.4410	1.4410	1.4410

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		15/15	15/15	15/15	15/15
12.5		15/15	15/15	15/15	15/15
25		15/15	15/15	15/15	15/15
50		15/15	15/15	15/15	15/15
100		15/15	15/15	15/15	15/15

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 14:47 (p 3 of 4)
Test Code/ID: VCF1220.139fml / 00-9377-2528

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 16-1370-3400	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:45	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 14 Jan-21 14:44	MD5 Hash: 5BC56A49D1019F5F83F45A0712A51B35	Editor ID: 000-189-126-0
Batch ID: 02-2251-9959	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:51	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:30	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 13-7207-3770	Code: VCF1220.139fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-OJA
Sample Age: 57h (4.3 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	0.04122	10.39%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	-1.45	2.407	0.041	6	CDF	0.9952	Non-Significant Effect
		12.5	-1.801	2.407	0.041	6	CDF	0.9983	Non-Significant Effect
		25	-2.395	2.407	0.041	6	CDF	0.9997	Non-Significant Effect
		50	-1.139	2.407	0.041	6	CDF	0.9882	Non-Significant Effect
		100	-0.8663	2.407	0.041	6	CDF	0.9754	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.3965	0.25	>>	Yes	Passes Criteria
PMSD	0.1039	0.12	0.3	Yes	Below Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003954	0.0007908	5	1.349	0.2893	Non-Significant Effect
Error	0.0105544	0.0005864	18			
Total	0.0145084		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	11.52	15.09	0.0419	Equal Variances
	Levene Equality of Variance Test	5.143	4.248	0.0042	Unequal Variances
	Mod Levene Equality of Variance Test	2.552	4.248	0.0649	Equal Variances
Distribution	Anderson-Darling A2 Test	0.3267	3.878	0.5365	Normal Distribution
	D'Agostino Kurtosis Test	0.8706	2.576	0.3840	Normal Distribution
	D'Agostino Skewness Test	0.1664	2.576	0.8679	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	0.7856	9.21	0.6752	Normal Distribution
	Kolmogorov-Smirnov D Test	0.121	0.2056	0.4833	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9772	0.884	0.8394	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.3965	0.3629	0.4301	0.4043	0.3653	0.412	0.01057	5.33%	0.00%
6.25		4	0.4213	0.3708	0.4719	0.4117	0.3947	0.4673	0.01588	7.54%	-6.26%
12.5		4	0.4273	0.3604	0.4942	0.4323	0.3787	0.466	0.02102	9.84%	-7.78%
25		4	0.4375	0.4168	0.4582	0.4367	0.426	0.4507	0.0065	2.97%	-10.34%
50		4	0.416	0.4044	0.4276	0.419	0.4053	0.4207	0.003641	1.75%	-4.92%
100		4	0.4113	0.3976	0.4251	0.4083	0.4047	0.424	0.004312	2.10%	-3.74%

Fathead Minnow 7-d Larval Survival and Growth Test

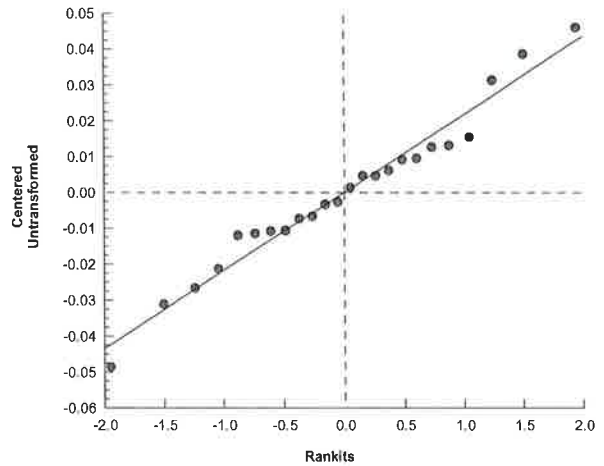
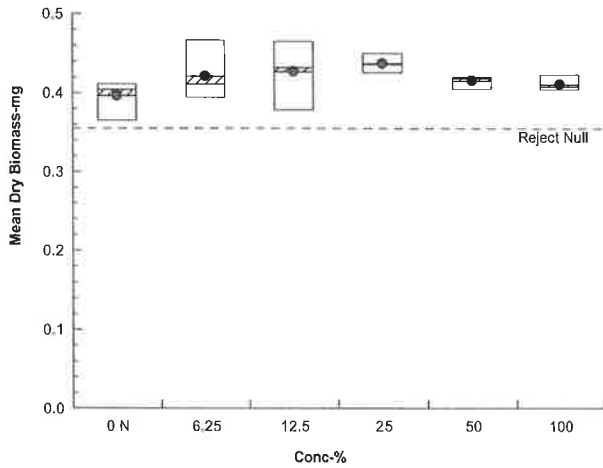
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 16-1370-3400 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 14:45 Analysis: Parametric-Control vs Treatments Status Level: 1
 Edit Date: 14 Jan-21 14:44 MD5 Hash: 5BC56A49D1019F5F83F45A0712A51B35 Editor ID: 000-189-126-0

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.412	0.406	0.3653	0.4027
6.25		0.4093	0.4673	0.414	0.3947
12.5		0.466	0.4587	0.406	0.3787
25		0.4467	0.426	0.4507	0.4267
50		0.4173	0.4053	0.4207	0.4207
100		0.4087	0.424	0.408	0.4047

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 14:47 (p 1 of 4)

Test Code/ID: VCF1220.139fml / 00-9377-2528

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 00-2926-7753	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:45	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 14:44	MD5 Hash: E88740A7CB88EC46B4EC0A60E4B8AEB	Editor ID: 000-189-126-0
Batch ID: 02-2251-9959	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:51	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:30	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 13-7207-3770	Code: VCF1220.139fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-OJA
Sample Age: 57h (4.3 °C)	Client: VCWPD	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1438859	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC10	>100	---	---	<1	---	---
EC15	>100	---	---	<1	---	---
EC20	>100	---	---	<1	---	---
EC25	>100	---	---	<1	---	---
EC40	>100	---	---	<1	---	---
EC50	>100	---	---	<1	---	---

7d Survival Rate Summary

Conc-%	Code	Count	Calculated Variate(A/B)							Isotonic Variate	
			Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	60/60	1.0000	0.00%
6.25		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	60/60	1.0000	0.00%
12.5		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	60/60	1.0000	0.00%
25		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	60/60	1.0000	0.00%
50		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	60/60	1.0000	0.00%
100		4	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	60/60	1.0000	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000

7d Survival Rate Binomials

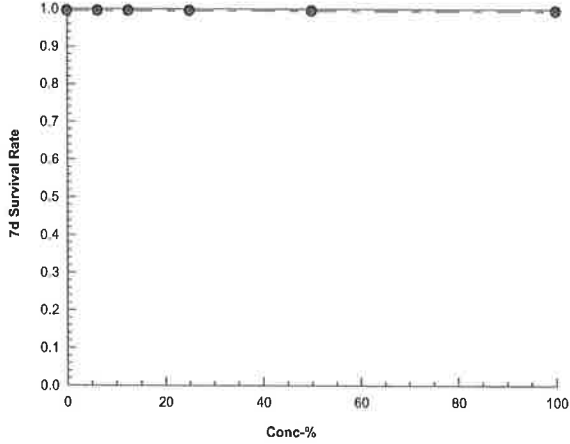
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		15/15	15/15	15/15	15/15
12.5		15/15	15/15	15/15	15/15
25		15/15	15/15	15/15	15/15
50		15/15	15/15	15/15	15/15
100		15/15	15/15	15/15	15/15

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 00-2926-7753 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:45 Analysis: Linear Interpolation (ICPIN) Status Level: 1
Edit Date: 14 Jan-21 14:44 MD5 Hash: E88740A7CB88EC46B4EC0A60E4B8AEB Editor ID: 000-189-126-0

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 14:47 (p 3 of 4)
 Test Code/ID: VCF1220.139fml / 00-9377-2528

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 20-1688-7110	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:45	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 14:44	MD5 Hash: 5BC56A49D1019F5F83F45A0712A51B35	Editor ID: 000-189-126-0
Batch ID: 02-2251-9959	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:51	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:30	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 13-7207-3770	Code: VCF1220.139fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-OJA
Sample Age: 57h (4.3 °C)	Client: VCWPD	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	450034	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.3965	0.25	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	>100	---	---	<1	---	---
IC15	>100	---	---	<1	---	---
IC20	>100	---	---	<1	---	---
IC25	>100	---	---	<1	---	---
IC40	>100	---	---	<1	---	---
IC50	>100	---	---	<1	---	---

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Calculated Variate						Isotonic Variate	
			Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	N	4	0.3965	0.4043	0.3653	0.412	5.33%	0.00%	0.4207	0.00%
6.25		4	0.4213	0.4117	0.3947	0.4673	7.54%	-6.26%	0.4207	0.00%
12.5		4	0.4273	0.4323	0.3787	0.466	9.84%	-7.78%	0.4207	0.00%
25		4	0.4375	0.4367	0.426	0.4507	2.97%	-10.34%	0.4207	0.00%
50		4	0.416	0.419	0.4053	0.4207	1.75%	-4.92%	0.416	1.11%
100		4	0.4113	0.4083	0.4047	0.424	2.10%	-3.74%	0.4113	2.22%

Mean Dry Biomass-mg Detail

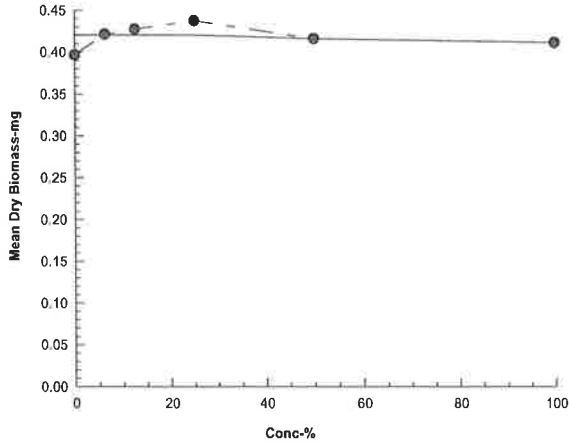
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.412	0.406	0.3653	0.4027
6.25		0.4093	0.4673	0.414	0.3947
12.5		0.466	0.4587	0.406	0.3787
25		0.4467	0.426	0.4507	0.4267
50		0.4173	0.4053	0.4207	0.4207
100		0.4087	0.424	0.408	0.4047

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 20-1688-7110 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:45 Analysis: Linear Interpolation (ICPIN) Status Level: 1
Edit Date: 14 Jan-21 14:44 MD5 Hash: 5BC56A49D1019F5F83F45A0712A51B35 Editor ID: 000-189-126-0

Graphics



CETIS Measurement Report

Report Date: 14 Jan-21 14:47 (p 5 of 8)

Test Code/ID: VCF1220.139fml / 00-9377-2528

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.2					
6.25				7.5					
12.5				7.7					
25				7.5					
50				7					
100				6.9					
0	N	2		7.6					
6.25				7.3					
12.5				7.4					
25				7.4					
50				7.5					
100				7.6					
0	N	3		7.2					
6.25				7.1					
12.5				7					
25				7					
50				6.9					
100				6.9					
0	N	4		7.5					
6.25				7.5					
12.5				7.4					
25				7.3					
50				7.2					
100				7.2					
0	N	5		7.7					
6.25				7.6					
12.5				7.5					
25				7.4					
50				7.4					
100				7.4					
0	N	6		7.8					
6.25				7.7					
12.5				7.8					
25				7.7					
50				7.7					
100				7.7					
0	N	7		7.3					
6.25				7.4					
12.5				7.5					
25				7.6					
50				7.6					
100				7.6					
0	N	8		7.3					
6.25				7.2					
12.5				7.1					
25				7.1					
50				7.1					
100				7.1					

CETIS Measurement Report

Report Date: 14 Jan-21 14:47 (p 6 of 8)
Test Code/ID: VCF1220.139fml / 00-9377-2528

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Hardness (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		95					
100				50					
0	N	2		95					
100				50					
0	N	3		90					
100				50					
0	N	4		90					
100				50					
0	N	5		90					
100				50					
0	N	6		90					
100				50					
0	N	7		90					
100				50					
0	N	8		90					
100				50					

CETIS Measurement Report

Report Date: 14 Jan-21 14:47 (p 8 of 8)

Test Code/ID: VCF1220.139fml / 00-9377-2528

Fathead Minnow 7-d Larval Survival and Growth Test**Aquatic Bioassay & Consulting Labs, Inc.****Temperature-°C**

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	2		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	3		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	4		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	5		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	6		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	7		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	8		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*" EPA-821-R-02-013. "All acceptability criteria were met and the concentration-response was normal. This is a valid test." Results were as follows:


CLIENT: Ventura County Flood Control
SAMPLE I.D.: MO-MEI
DATE RECEIVED: 12/28/2020
ABC LAB. NO.: VCF1220.140

CHRONIC FATHEAD MINNOW SURVIVAL & GROWTH BIOASSAY

SURVIVAL NOEC = 100.00 %
 TUc = 1.00
 EC25 = >100.00 %
 EC50 = >100.00 %

BIOMASS NOEC = 100.00 %
 TUc = 1.00
 IC25 = >100.00 %
 IC50 = >100.00 %

Yours very truly,


m Scott Johnson
Laboratory Director

CETIS Analytical Report

Report Date: 14 Jan-21 14:54 (p 1 of 4)
 Test Code/ID: VCF1220.140fml / 00-7713-8661

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 14-6001-8931	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:52	Analysis: Nonparametric-Control vs Treatments	Status Level: 1
Edit Date: 14 Jan-21 14:48	MD5 Hash: 9E0425A87E890FD5D4A8EC9B4E836AC0	Editor ID: 000-189-126-0
Batch ID: 04-6543-5396	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 14:05	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:35	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 6d 23h	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 16-6679-7371	Code: VCF1220.140fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-MEI
Sample Age: 56h (6.3 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.06502	6.50%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	16	10	1	6	CDF	0.6105	Non-Significant Effect
		12.5	14	10	1	6	CDF	0.3451	Non-Significant Effect
		25	14	10	1	6	CDF	0.3451	Non-Significant Effect
		50	14	10	1	6	CDF	0.3451	Non-Significant Effect
		100	16	10	1	6	CDF	0.6105	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0220409	0.0044082	5	0.7749	0.5803	Non-Significant Effect
Error	0.102397	0.0056887	18			
Total	0.124438		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
	Levene Equality of Variance Test	5.425	4.248	0.0032	Unequal Variances
	Mod Levene Equality of Variance Test	2.233	4.248	0.0955	Equal Variances
Distribution	Anderson-Darling A2 Test	0.7858	3.878	0.0412	Normal Distribution
	D'Agostino Kurtosis Test	0.519	2.576	0.6038	Normal Distribution
	D'Agostino Skewness Test	1.222	2.576	0.2217	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	1.763	9.21	0.4142	Normal Distribution
	Kolmogorov-Smirnov D Test	0.1891	0.2056	0.0263	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9301	0.884	0.0982	Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		4	0.9833	0.9303	1.0000	1.0000	0.9333	1.0000	0.0167	3.39%	1.67%
12.5		4	0.9667	0.9054	1.0000	0.9667	0.9333	1.0000	0.0192	3.98%	3.33%
25		4	0.9667	0.9054	1.0000	0.9667	0.9333	1.0000	0.0192	3.98%	3.33%
50		4	0.9500	0.8484	1.0000	0.9667	0.8667	1.0000	0.0319	6.72%	5.00%
100		4	0.9833	0.9303	1.0000	1.0000	0.9333	1.0000	0.0167	3.39%	1.67%

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 14-6001-8931 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 14:52 Analysis: Nonparametric-Control vs Treatments Status Level: 1
 Edit Date: 14 Jan-21 14:48 MD5 Hash: 9E0425A87E890FD5D4A8EC9B4E836AC0 Editor ID: 000-189-126-0

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.4410	1.4410	1.4420	1.4410	1.4410	1.4410	0.0000	0.00%	0.00%
6.25		4	1.4080	1.3040	1.5130	1.4410	1.3100	1.4410	0.0329	4.68%	2.28%
12.5		4	1.3750	1.2540	1.4960	1.3750	1.3100	1.4410	0.0380	5.53%	4.57%
25		4	1.3750	1.2540	1.4960	1.3750	1.3100	1.4410	0.0380	5.53%	4.57%
50		4	1.3470	1.1600	1.5350	1.3750	1.1970	1.4410	0.0589	8.75%	6.52%
100		4	1.4080	1.3040	1.5130	1.4410	1.3100	1.4410	0.0329	4.68%	2.28%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	0.9333
12.5		1.0000	0.9333	1.0000	0.9333
25		1.0000	0.9333	0.9333	1.0000
50		0.9333	0.8667	1.0000	1.0000
100		1.0000	1.0000	0.9333	1.0000

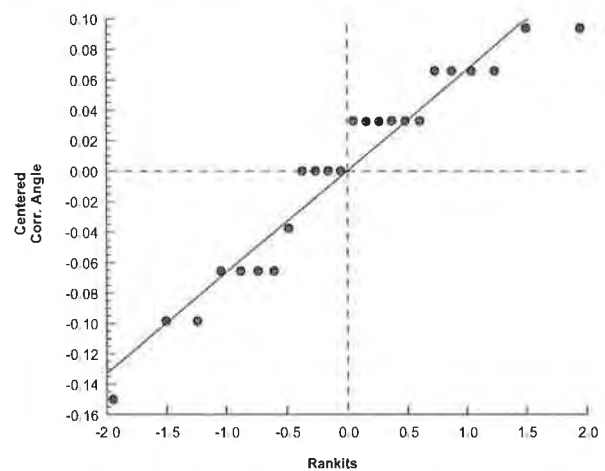
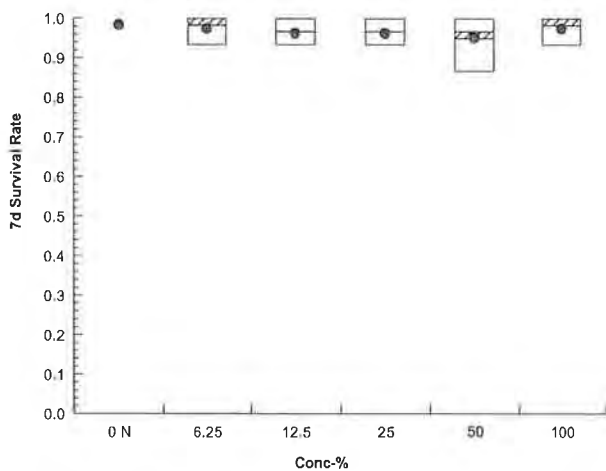
Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.4410	1.4410	1.4410	1.4410
6.25		1.4410	1.4410	1.4410	1.3100
12.5		1.4410	1.3100	1.4410	1.3100
25		1.4410	1.3100	1.3100	1.4410
50		1.3100	1.1970	1.4410	1.4410
100		1.4410	1.4410	1.3100	1.4410

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	15/15	15/15	15/15	15/15
6.25		15/15	15/15	15/15	14/15
12.5		15/15	14/15	15/15	14/15
25		15/15	14/15	14/15	15/15
50		14/15	13/15	15/15	15/15
100		15/15	15/15	14/15	15/15

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 14:54 (p 3 of 4)
 Test Code/ID: VCF1220.140fml / 00-7713-8661

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 17-4453-9340	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:52	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 14 Jan-21 14:48	MD5 Hash: 1692E385AFBDA5F9CACB4063D6E9AFF8	Editor ID: 000-189-126-0
Batch ID: 04-6543-5396	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 14:05	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:35	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 6d 23h	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 16-6679-7371	Code: VCF1220.140fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-MEI
Sample Age: 56h (6.3 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	0.03477	8.77%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	-0.8768	2.407	0.035	6	CDF	0.9760	Non-Significant Effect
		12.5	-0.5422	2.407	0.035	6	CDF	0.9452	Non-Significant Effect
		25	-2.642	2.407	0.035	6	CDF	0.9999	Non-Significant Effect
		50	-1.673	2.407	0.035	6	CDF	0.9976	Non-Significant Effect
		100	-1.177	2.407	0.035	6	CDF	0.9894	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.3965	0.25	>>	Yes	Passes Criteria
PMSD	0.0877	0.12	0.3	Yes	Below Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0035617	0.0007123	5	1.707	0.1841	Non-Significant Effect
Error	0.0075134	0.0004174	18			
Total	0.0110751		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	6.641	15.09	0.2487	Equal Variances
	Levene Equality of Variance Test	2.005	4.248	0.1267	Equal Variances
	Mod Levene Equality of Variance Test	1.351	4.248	0.2883	Equal Variances
Distribution	Anderson-Darling A2 Test	0.4704	3.878	0.2506	Normal Distribution
	D'Agostino Kurtosis Test	0.9975	2.576	0.3185	Normal Distribution
	D'Agostino Skewness Test	0.4238	2.576	0.6717	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	1.175	9.21	0.5558	Normal Distribution
	Kolmogorov-Smirnov D Test	0.1483	0.2056	0.1857	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9551	0.884	0.3488	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.3965	0.3629	0.4301	0.4043	0.3653	0.412	0.01057	5.33%	0.00%
6.25		4	0.4092	0.4022	0.4162	0.4097	0.4033	0.414	0.002201	1.08%	-3.19%
12.5		4	0.4043	0.3653	0.4434	0.399	0.382	0.4373	0.01227	6.07%	-1.98%
25		4	0.4347	0.3921	0.4772	0.4363	0.408	0.458	0.01336	6.15%	-9.63%
50		4	0.4207	0.3958	0.4455	0.4253	0.3987	0.4333	0.007808	3.71%	-6.09%
100		4	0.4135	0.3787	0.4483	0.416	0.3847	0.4373	0.01093	5.29%	-4.29%

Fathead Minnow 7-d Larval Survival and Growth Test

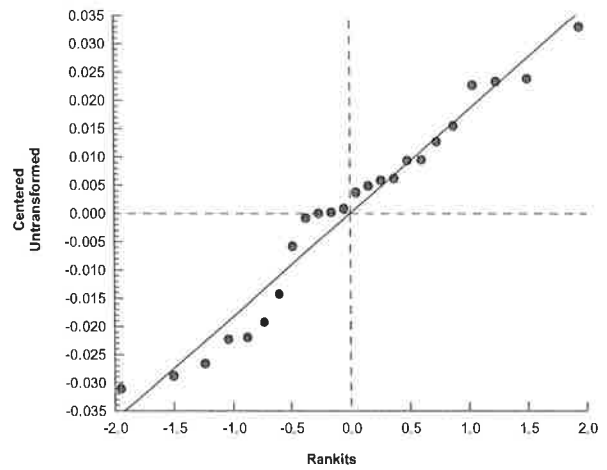
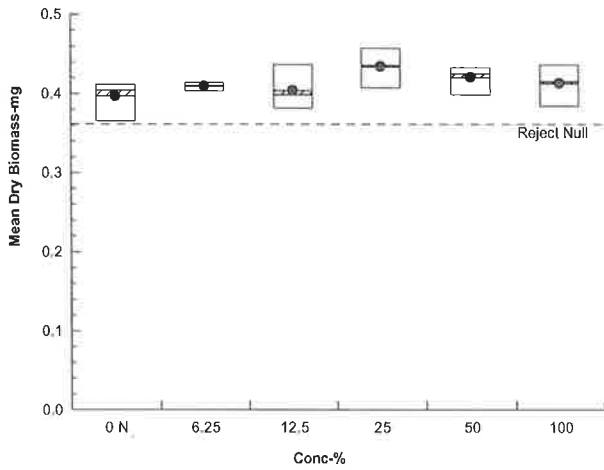
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 17-4453-9340 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 14:52 Analysis: Parametric-Control vs Treatments Status Level: 1
 Edit Date: 14 Jan-21 14:48 MD5 Hash: 1692E385AFBDA5F9CACB4063D6E9AFF8 Editor ID: 000-189-126-0

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.412	0.406	0.3653	0.4027
6.25		0.4093	0.41	0.414	0.4033
12.5		0.382	0.408	0.4373	0.39
25		0.4573	0.408	0.458	0.4153
50		0.4333	0.4207	0.3987	0.43
100		0.4373	0.4127	0.4193	0.3847

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 14:54 (p 3 of 4)

Test Code/ID: VCF1220.140fml / 00-7713-8661

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 18-9555-0781	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:53	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 14:48	MD5 Hash: 1692E385AFBDA5F9CACB4063D6E9AFF8	Editor ID: 000-189-126-0
Batch ID: 04-6543-5396	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 14:05	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:35	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 6d 23h	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 16-6679-7371	Code: VCF1220.140fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-MEI
Sample Age: 56h (6.3 °C)	Client: VCWPD	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	936751	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.3965	0.25	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	>100	---	---	<1	---	---
IC15	>100	---	---	<1	---	---
IC20	>100	---	---	<1	---	---
IC25	>100	---	---	<1	---	---
IC40	>100	---	---	<1	---	---
IC50	>100	---	---	<1	---	---

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Calculated Variate						Isotonic Variate	
			Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	N	4	0.3965	0.4043	0.3653	0.412	5.33%	0.00%	0.4131	0.00%
6.25		4	0.4092	0.4097	0.4033	0.414	1.08%	-3.19%	0.4131	0.00%
12.5		4	0.4043	0.399	0.382	0.4373	6.07%	-1.98%	0.4131	0.00%
25		4	0.4347	0.4363	0.408	0.458	6.15%	-9.63%	0.4131	0.00%
50		4	0.4207	0.4253	0.3987	0.4333	3.71%	-6.09%	0.4131	0.00%
100		4	0.4135	0.416	0.3847	0.4373	5.29%	-4.29%	0.4131	0.00%

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.412	0.406	0.3653	0.4027
6.25		0.4093	0.41	0.414	0.4033
12.5		0.382	0.408	0.4373	0.39
25		0.4573	0.408	0.458	0.4153
50		0.4333	0.4207	0.3987	0.43
100		0.4373	0.4127	0.4193	0.3847

CETIS Measurement Report

Report Date: 14 Jan-21 14:54 (p 1 of 8)
 Test Code/ID: VCF1220.140fml / 00-7713-8661

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 04-6543-5396	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 14:05	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:35	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 6d 23h	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 16-6679-7371	Code: VCF1220.140fml	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-MEI
Sample Age: 56h (6.3 °C)	Client: VCWPD	

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	60	60	60	60	60	0	0	0.00%	0
100		8	28	28	28	28	28	0	0	0.00%	0
Overall		16	44	35.19	52.81	28	60	4.131	16.52	37.56%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	338.6	335.9	341.3	332	342	0.4005	3.204	0.95%	0
6.25		8	322.4	317.2	327.6	312	329	0.7761	6.209	1.93%	0
12.5		8	317.8	305.8	329.7	300	330	1.784	14.27	4.49%	0
25		8	278.6	269.2	288	268	299	1.403	11.22	4.03%	0
50		8	257	249.7	264.3	244	266	1.092	8.734	3.40%	0
100		8	132.4	129.7	135.1	129	137	0.4005	3.204	2.42%	0
Overall		48	274.5	254	294.9	129	342	10.18	70.5	25.69%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.45	7.255	7.645	7.2	7.8	0.02912	0.233	3.13%	0
6.25		8	7.462	7.258	7.667	7.1	7.8	0.03057	0.2446	3.28%	0
12.5		8	7.4	7.21	7.59	7	7.7	0.02835	0.2268	3.06%	0
25		8	7.262	7.048	7.477	7	7.7	0.032	0.256	3.52%	0
50		8	7.225	7.003	7.447	7	7.7	0.03324	0.2659	3.68%	0
100		8	7.175	6.987	7.363	6.9	7.5	0.02815	0.2252	3.14%	0
Overall		48	7.329	7.255	7.403	6.9	7.8	0.03694	0.256	3.49%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	91.25	89.31	93.19	90	95	0.2893	2.315	2.54%	0
100		8	40	40	40	40	40	0	0	0.00%	0
Overall		16	65.62	51.5	79.75	40	95	6.628	26.51	40.40%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.888	7.834	7.941	7.8	8	0.00801	0.06408	0.81%	0
6.25		8	7.6	7.445	7.755	7.3	7.8	0.02315	0.1852	2.44%	0
12.5		8	7.587	7.474	7.701	7.3	7.7	0.01695	0.1356	1.79%	0
25		8	7.587	7.474	7.701	7.3	7.7	0.01695	0.1356	1.79%	0
50		8	7.562	7.437	7.688	7.3	7.7	0.01882	0.1506	1.99%	0
100		8	7.525	7.372	7.678	7.2	7.7	0.0229	0.1832	2.43%	0
Overall		48	7.625	7.571	7.679	7.2	8	0.02671	0.1851	2.43%	0 (0%)

Handwritten initials and a large 'P' in the bottom right corner.

CETIS Measurement Report

Report Date: 14 Jan-21 14:54 (p 2 of 8)

Test Code/ID: VCF1220.140fml / 00-7713-8661

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.00%	0
6.25		8	24	24	24	24	24	0	0	0.00%	0
12.5		8	24	24	24	24	24	0	0	0.00%	0
25		8	24	24	24	24	24	0	0	0.00%	0
50		8	24	24	24	24	24	0	0	0.00%	0
100		8	24	24	24	24	24	0	0	0.00%	0
Overall		48	24	24	24	24	24	0	0	0.00%	0 (0%)

CETIS Measurement Report

Report Date: 14 Jan-21 14:54 (p 4 of 8)

Test Code/ID: VCF1220.140fml / 00-7713-8661

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Conductivity-µmhos

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		332					
6.25				329					
12.5				320					
25				293					
50				244					
100				129					
0	N	2		342					
6.25				324					
12.5				329					
25				275					
50				266					
100				136					
0	N	3		338					
6.25				322					
12.5				330					
25				272					
50				265					
100				130					
0	N	4		339					
6.25				325					
12.5				330					
25				275					
50				264					
100				132					
0	N	5		342					
6.25				328					
12.5				330					
25				277					
50				264					
100				135					
0	N	6		339					
6.25				325					
12.5				301					
25				299					
50				254					
100				137					
0	N	7		337					
6.25				312					
12.5				302					
25				268					
50				250					
100				129					
0	N	8		340					
6.25				314					
12.5				300					
25				270					
50				249					
100				131					

CETIS Measurement Report

Report Date: 14 Jan-21 14:54 (p 5 of 8)

Test Code/ID: VCF1220.140fml / 00-7713-8661

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.2					
6.25				7.8					
12.5				7.6					
25				7					
50				7					
100				6.9					
0	N	2		7.6					
6.25				7.2					
12.5				7.2					
25				7					
50				7					
100				7					
0	N	3		7.2					
6.25				7.3					
12.5				7.3					
25				7.2					
50				7					
100				7					
0	N	4		7.5					
6.25				7.5					
12.5				7.4					
25				7.4					
50				7.3					
100				7.3					
0	N	5		7.7					
6.25				7.6					
12.5				7.5					
25				7.4					
50				7.4					
100				7.4					
0	N	6		7.8					
6.25				7.7					
12.5				7.7					
25				7.7					
50				7.7					
100				7.5					
0	N	7		7.3					
6.25				7.5					
12.5				7.5					
25				7.4					
50				7.4					
100				7.3					
0	N	8		7.3					
6.25				7.1					
12.5				7					
25				7					
50				7					
100				7					

CETIS Measurement Report

Report Date: 14 Jan-21 14:54 (p 6 of 8)

Test Code/ID: VCF1220.140fml / 00-7713-8661

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Hardness (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		95				
100				40				
0	N	2		95				
100				40				
0	N	3		90				
100				40				
0	N	4		90				
100				40				
0	N	5		90				
100				40				
0	N	6		90				
100				40				
0	N	7		90				
100				40				
0	N	8		90				
100				40				

P

CETIS Measurement Report

Report Date: 14 Jan-21 14:54 (p 7 of 8)

Test Code/ID: VCF1220.140fml / 00-7713-8661

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

pH-Units

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
6.25				7.3					
12.5				7.3					
25				7.3					
50				7.3					
100				7.2					
0	N	2		7.9					
6.25				7.4					
12.5				7.5					
25				7.6					
50				7.6					
100				7.5					
0	N	3		7.9					
6.25				7.6					
12.5				7.6					
25				7.6					
50				7.6					
100				7.6					
0	N	4		7.9					
6.25				7.7					
12.5				7.6					
25				7.5					
50				7.4					
100				7.4					
0	N	5		7.8					
6.25				7.8					
12.5				7.7					
25				7.6					
50				7.5					
100				7.4					
0	N	6		8					
6.25				7.8					
12.5				7.7					
25				7.7					
50				7.7					
100				7.7					
0	N	7		7.9					
6.25				7.5					
12.5				7.6					
25				7.7					
50				7.7					
100				7.7					
0	N	8		7.8					
6.25				7.7					
12.5				7.7					
25				7.7					
50				7.7					
100				7.7					

CA P

CETIS Measurement Report

Report Date: 14 Jan-21 14:54 (p 8 of 8)
Test Code/ID: VCF1220.140fml / 00-7713-8661

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	2		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	3		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	4		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	5		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	6		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	7		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	8		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					

January 16, 2021

Mr. Arne Anselm
 Ventura County Watershed Protection District
 800 South Victoria Ave
 Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*" EPA-821-R-02-013. Results were as follows:

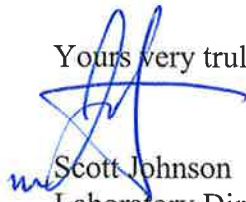
CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-THO
DATE RECEIVED:	12/28/2020
ABC LAB. NO.:	VCF1220.129

CHRONIC CERIODAPHNIA SURVIVAL & REPRODUCTION BIOASSAY

SURVIVAL	NOEC =	100.00 %
	TU _c =	1.00
	EC25 =	>100.00 %
	EC50 =	>100.00 %

REPRODUCTION	NOEC =	100.00 %
	TU _c =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %

Yours very truly,



Scott Johnson
 Laboratory Director

CETIS Summary Report

Report Date: 14 Jan-21 15:09 (p 1 of 2)
 Test Code/ID: VCF1220.129cer / 10-0967-9953

Ceriodaphnia 7-d Survival and Reproduction Test				Aquatic Bioassay & Consulting Labs, Inc.			
Batch ID: 16-1881-9149	Test Type: Reproduction-Survival (7d)	Analyst:					
Start Date: 29 Dec-20 13:05	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water					
Ending Date: 05 Jan-21 13:17	Species: Ceriodaphnia dubia	Brine: Not Applicable					
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO	Age:				
Sample ID: 07-6499-1890	Code: VCF1220.129cer	Project: NPDES Stormwater Wet Season					
Sample Date: 28 Dec-20 06:50	Material: Sample Water	Source: Bioassay Report					
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-THO					
Sample Age: 30h (3.5 °C)	Client: VCWPD						

Multiple Comparison Summary								
Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	PMSD	TU	S
19-2136-9301	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	100	>100	---	---	1	1
08-9946-7293	Reproduction	Dunnett Multiple Comparison Test	100	>100	---	15.8%	1	1

Point Estimate Summary								
Analysis ID	Endpoint	Point Estimate Method	✓ Level	%	95% LCL	95% UCL	TU	S
15-1657-1047	7d Survival Rate	Linear Interpolation (ICPIN)	✓ EC10	>100	---	---	<1	1
			✓ EC15	>100	---	---	<1	
			✓ EC20	>100	---	---	<1	
			✓ EC25	>100	---	---	<1	
			✓ EC40	>100	---	---	<1	
			✓ EC50	>100	---	---	<1	
17-6663-4454	Reproduction	Linear Interpolation (ICPIN)	✓ IC10	>100	---	---	<1	1
			✓ IC15	>100	---	---	<1	
			✓ IC20	>100	---	---	<1	
			✓ IC25	>100	---	---	<1	
			✓ IC40	>100	---	---	<1	
			✓ IC50	>100	---	---	<1	

Test Acceptability								TAC Limits		
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision			
15-1657-1047	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria			
19-2136-9301	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria			
08-9946-7293	Reproduction	Control Resp	24.7	15	>>	Yes	Passes Criteria			
17-6663-4454	Reproduction	Control Resp	24.7	15	>>	Yes	Passes Criteria			
08-9946-7293	Reproduction	PMSD	0.1576	0.13	0.47	Yes	Passes Criteria			

7d Survival Rate Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%

Reproduction Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	24.7	21.66	27.74	17	30	1.342	4.244	17.18%	0.00%
6.25		10	23.3	20.17	26.43	16	28	1.383	4.373	18.77%	5.67%
12.5		10	26.9	25.07	28.73	22	30	0.809	2.558	9.51%	-8.91%
25		10	26	22.89	29.11	18	32	1.374	4.346	16.72%	-5.26%
50		10	26.6	25.29	27.91	23	29	0.5812	1.838	6.91%	-7.69%
100		10	26.1	22.84	29.36	20	35	1.441	4.557	17.46%	-5.67%

CETIS Summary Report

Report Date: 14 Jan-21 15:09 (p 2 of 2)
Test Code/ID: VCF1220.129cer / 10-0967-9953

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

7d Survival Rate Detail

MD5: 6DFFCF255519977902535414E38EA216

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

MD5: 6FBBC3DA701C47030F7109DB89446753

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	28	27	24	17	22	22	26	21	30	30
6.25		25	23	24	28	26	27	27	21	16	16
12.5		30	29	29	28	28	24	26	28	25	22
25		29	26	23	21	25	30	18	29	27	32
50		23	29	29	25	26	26	27	26	28	27
100		24	27	28	21	20	26	28	35	30	22

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Report Date: 14 Jan-21 15:09 (p 1 of 2)
Test Code/ID: VCF1220.129cer / 10-0967-9953

Ceriodaphnia 7-d Survival and Reproduction Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 08-9946-7293	Endpoint: Reproduction	CETIS Version: CETISv1.9.7			
Analyzed: 14 Jan-21 15:08	Analysis: Parametric-Control vs Treatments	Status Level: 1			
Edit Date: 14 Jan-21 15:01	MD5 Hash: 8E5A2BB8DC24100718A74F34806FD76B	Editor ID: 000-189-126-0			
Batch ID: 16-1881-9149	Test Type: Reproduction-Survival (7d)	Analyst:			
Start Date: 29 Dec-20 13:05	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 05 Jan-21 13:17	Species: Ceriodaphnia dubia	Brine: Not Applicable			
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:			
Sample ID: 07-6499-1890	Code: VCF1220.129cer	Project: NPDES Stormwater Wet Season			
Sample Date: 28 Dec-20 06:50	Material: Sample Water	Source: Bioassay Report			
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-THO			
Sample Age: 30h (3.5 °C)	Client: VCWPD				

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	3.892	15.76%

Dunnnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	0.8235	2.289	3.892	18	CDF	0.4979	Non-Significant Effect
		12.5	-1.294	2.289	3.892	18	CDF	0.9937	Non-Significant Effect
		25	-0.7647	2.289	3.892	18	CDF	0.9696	Non-Significant Effect
		50	-1.118	2.289	3.892	18	CDF	0.9890	Non-Significant Effect
		100	-0.8235	2.289	3.892	18	CDF	0.9741	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	24.7	15	>>	Yes	Passes Criteria
PMSD	0.1576	0.13	0.47	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	92	18.4	5	1.273	0.2889	Non-Significant Effect
Error	780.4	14.4519	54			
Total	872.4		59			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	9.622	15.09	0.0867	Equal Variances
	Levene Equality of Variance Test	1.878	3.377	0.1134	Equal Variances
	Mod Levene Equality of Variance Test	1.639	3.377	0.1654	Equal Variances
Distribution	Anderson-Darling A2 Test	0.4834	3.878	0.2332	Normal Distribution
	D'Agostino Kurtosis Test	0.04964	2.576	0.9604	Normal Distribution
	D'Agostino Skewness Test	1.053	2.576	0.2925	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	1.11	9.21	0.5740	Normal Distribution
	Kolmogorov-Smirnov D Test	0.08106	0.1331	0.3919	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9786	0.9459	0.3723	Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	24.7	21.66	27.74	25	17	30	1.342	17.18%	0.00%
6.25		10	23.3	20.17	26.43	24.5	16	28	1.383	18.77%	5.67%
12.5		10	26.9	25.07	28.73	28	22	30	0.809	9.51%	-8.91%
25		10	26	22.89	29.11	26.5	18	32	1.374	16.72%	-5.26%
50		10	26.6	25.29	27.91	26.5	23	29	0.5812	6.91%	-7.69%
100		10	26.1	22.84	29.36	26.5	20	35	1.441	17.46%	-5.67%

Ceriodaphnia 7-d Survival and Reproduction Test

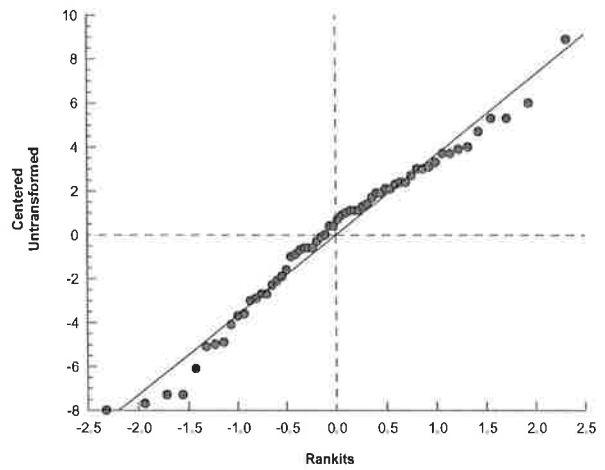
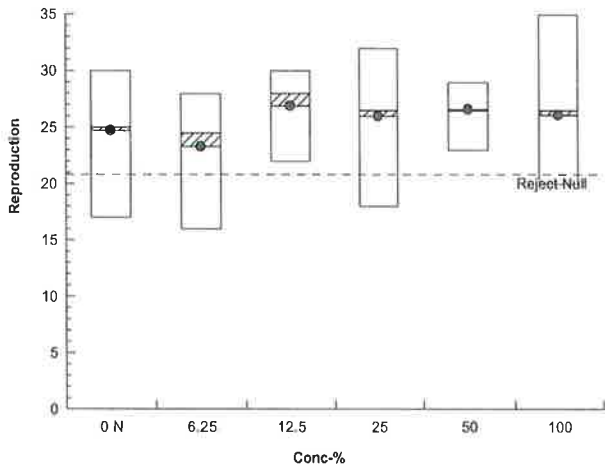
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 08-9946-7293 Endpoint: Reproduction CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 15:08 Analysis: Parametric-Control vs Treatments Status Level: 1
 Edit Date: 14 Jan-21 15:01 MD5 Hash: 8E5A2BB8DC24100718A74F34806FD76B Editor ID: 000-189-126-0

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	28	27	24	17	22	22	26	21	30	30
6.25		25	23	24	28	26	27	27	21	16	16
12.5		30	29	29	28	28	24	26	28	25	22
25		29	26	23	21	25	30	18	29	27	32
50		23	29	29	25	26	26	27	26	28	27
100		24	27	28	21	20	26	28	35	30	22

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 15:09 (p 1 of 4)
 Test Code/ID: VCF1220.129cer / 10-0967-9953

Ceriodaphnia 7-d Survival and Reproduction Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 15-1657-1047	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7			
Analyzed: 14 Jan-21 15:08	Analysis: Linear Interpolation (ICPIN)	Status Level: 1			
Edit Date: 14 Jan-21 15:01	MD5 Hash: 6DFFCF255519977902535414E38EA216	Editor ID: 000-189-126-0			
Batch ID: 16-1881-9149	Test Type: Reproduction-Survival (7d)	Analyst:			
Start Date: 29 Dec-20 13:05	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 05 Jan-21 13:17	Species: Ceriodaphnia dubia	Brine: Not Applicable			
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:			
Sample ID: 07-6499-1890	Code: VCF1220.129cer	Project: NPDES Stormwater Wet Season			
Sample Date: 28 Dec-20 06:50	Material: Sample Water	Source: Bioassay Report			
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-THO			
Sample Age: 30h (3.5 °C)	Client: VCWPD				

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria		TAC Limits			
Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC10	>100	---	---	<1	---	---
EC15	>100	---	---	<1	---	---
EC20	>100	---	---	<1	---	---
EC25	>100	---	---	<1	---	---
EC40	>100	---	---	<1	---	---
EC50	>100	---	---	<1	---	---

7d Survival Rate Summary			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%

7d Survival Rate Detail											
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

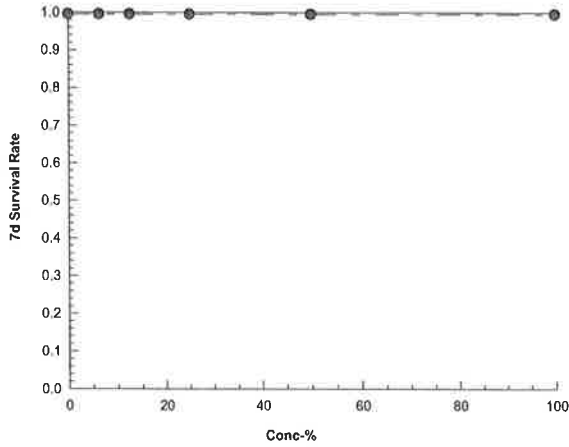
7d Survival Rate Binomials											
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID:	15-1657-1047	Endpoint:	7d Survival Rate	CETIS Version:	CETISv1.9.7
Analyzed:	14 Jan-21 15:08	Analysis:	Linear Interpolation (ICPIN)	Status Level:	1
Edit Date:	14 Jan-21 15:01	MD5 Hash:	6DFFCF255519977902535414E38EA216	Editor ID:	000-189-126-0

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 15:09 (p 3 of 4)
Test Code/ID: VCF1220.129cer / 10-0967-9953

Ceriodaphnia 7-d Survival and Reproduction Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 17-6663-4454	Endpoint: Reproduction	CETIS Version: CETISv1.9.7			
Analyzed: 14 Jan-21 15:08	Analysis: Linear Interpolation (ICPIN)	Status Level: 1			
Edit Date: 14 Jan-21 15:01	MD5 Hash: 8E5A2BB8DC24100718A74F34806FD76B	Editor ID: 000-189-126-0			
Batch ID: 16-1881-9149	Test Type: Reproduction-Survival (7d)	Analyst:			
Start Date: 29 Dec-20 13:05	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 05 Jan-21 13:17	Species: Ceriodaphnia dubia	Brine: Not Applicable			
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:			
Sample ID: 07-6499-1890	Code: VCF1220.129cer	Project: NPDES Stormwater Wet Season			
Sample Date: 28 Dec-20 06:50	Material: Sample Water	Source: Bioassay Report			
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-THO			
Sample Age: 30h (3.5 °C)	Client: VCWPD				

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	721326	280	Yes	Two-Point Interpolation

Test Acceptability Criteria		TAC Limits			
Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	24.7	15	>>	Yes	Passes Criteria

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	>100	---	---	<1	---	---
IC15	>100	---	---	<1	---	---
IC20	>100	---	---	<1	---	---
IC25	>100	---	---	<1	---	---
IC40	>100	---	---	<1	---	---
IC50	>100	---	---	<1	---	---

Reproduction Summary			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	N	10	24.7	25	17	30	17.18%	0.00%	25.6	0.00%
6.25		10	23.3	24.5	16	28	18.77%	5.67%	25.6	0.00%
12.5		10	26.9	28	22	30	9.51%	-8.91%	25.6	0.00%
25		10	26	26.5	18	32	16.72%	-5.26%	25.6	0.00%
50		10	26.6	26.5	23	29	6.91%	-7.69%	25.6	0.00%
100		10	26.1	26.5	20	35	17.46%	-5.67%	25.6	0.00%

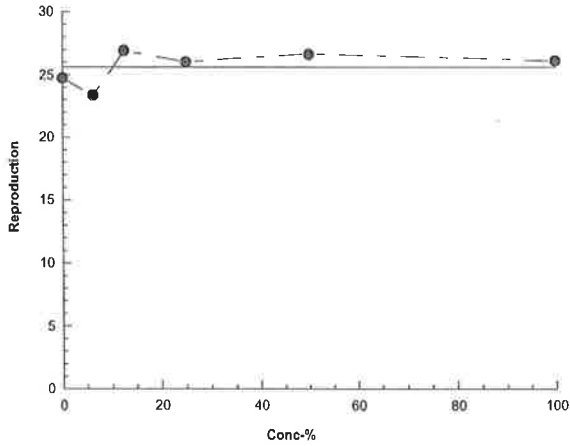
Reproduction Detail											
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	28	27	24	17	22	22	26	21	30	30
6.25		25	23	24	28	26	27	27	21	16	16
12.5		30	29	29	28	28	24	26	28	25	22
25		29	26	23	21	25	30	18	29	27	32
50		23	29	29	25	26	26	27	26	28	27
100		24	27	28	21	20	26	28	35	30	22

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 17-6663-4454	Endpoint: Reproduction	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:08	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 15:01	MD5 Hash: 8E5A2BB8DC24100718A74F34806FD76B	Editor ID: 000-189-126-0

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 15:09 (p 1 of 2)
 Test Code/ID: VCF1220.129cer / 10-0967-9953

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 19-2136-9301	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:08	Analysis: STP 2xK Contingency Tables	Status Level: 1
Edit Date: 14 Jan-21 15:01	MD5 Hash: 6DFFCF255519977902535414E38EA216	Editor ID: 000-189-126-0
Batch ID: 16-1881-9149	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:05	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:17	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 07-6499-1890	Code: VCF1220.129cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:50	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-THO
Sample Age: 30h (3.5 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	100	>100	---	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	Conc-%	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	1.0000	Exact	1.0000	Non-Significant Effect
		12.5	1.0000	Exact	1.0000	Non-Significant Effect
		25	1.0000	Exact	1.0000	Non-Significant Effect
		50	1.0000	Exact	1.0000	Non-Significant Effect
		100	1.0000	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

7d Survival Rate Frequencies

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	N	10	0	10	1.0000	0.0000	0.00%
6.25		10	0	10	1.0000	0.0000	0.00%
12.5		10	0	10	1.0000	0.0000	0.00%
25		10	0	10	1.0000	0.0000	0.00%
50		10	0	10	1.0000	0.0000	0.00%
100		10	0	10	1.0000	0.0000	0.00%

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Ceriodaphnia 7-d Survival and Reproduction Test

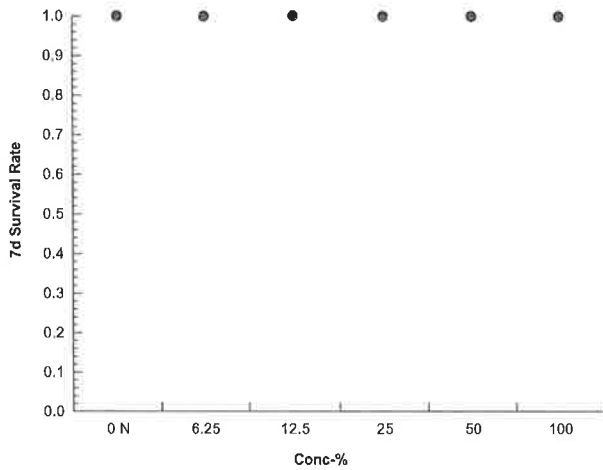
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 19-2136-9301 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.7
Analyzed: 14 Jan-21 15:08 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1
Edit Date: 14 Jan-21 15:01 **MD5 Hash:** 6DFFCF255519977902535414E38EA216 **Editor ID:** 000-189-126-0

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Measurement Report

Report Date: 14 Jan-21 15:09 (p 1 of 8)
 Test Code/ID: VCF1220.129cer / 10-0967-9953

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 16-1881-9149	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:05	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:17	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 07-6499-1890	Code: VCF1220.129cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:50	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-THO
Sample Age: 30h (3.5 °C)	Client: VCWPD	

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	60	60	60	60	60	0	0	0.00%	0
100		8	60	60	60	60	60	0	0	0.00%	0
Overall		16	60	60	60	60	60	0	0	0.00%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	338.6	335.9	341.3	332	342	0.4005	3.204	0.95%	0
6.25		8	363.6	360.8	366.4	360	368	0.4222	3.378	0.93%	0
12.5		8	371.1	368.7	373.5	367	377	0.3563	2.85	0.77%	0
25		8	383.6	380.2	387.1	380	390	0.5173	4.138	1.08%	0
50		8	424	417	431	413	438	1.039	8.315	1.96%	0
100		8	523.9	517.2	530.6	507	533	1.005	8.043	1.54%	0
Overall		48	400.8	382.9	418.7	332	533	8.886	61.56	15.36%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.525	7.342	7.708	7.2	7.8	0.02735	0.2188	2.91%	0
6.25		8	7.375	7.123	7.627	6.8	7.7	0.03765	0.3012	4.08%	0
12.5		8	7.412	7.206	7.619	7	7.7	0.03094	0.2475	3.34%	0
25		8	7.413	7.255	7.57	7.2	7.7	0.02356	0.1885	2.54%	0
50		8	7.387	7.236	7.539	7.2	7.7	0.0226	0.1808	2.45%	0
100		8	7.3	7.159	7.441	7	7.5	0.02113	0.169	2.32%	0
Overall		48	7.402	7.338	7.466	6.8	7.8	0.03186	0.2207	2.98%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	91.25	89.31	93.19	90	95	0.2893	2.315	2.54%	0
100		8	135	135	135	135	135	0	0	0.00%	0
Overall		16	113.1	101.1	125.2	90	135	5.662	22.65	20.02%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.913	7.859	7.966	7.8	8	0.00801	0.06408	0.81%	0
6.25		8	7.588	7.424	7.751	7.3	7.8	0.02449	0.1959	2.58%	0
12.5		8	7.55	7.416	7.684	7.3	7.7	0.02004	0.1604	2.12%	0
25		8	7.512	7.399	7.626	7.3	7.7	0.01695	0.1356	1.81%	0
50		8	7.5	7.391	7.609	7.3	7.7	0.01637	0.1309	1.75%	0
100		8	7.463	7.354	7.571	7.3	7.7	0.01628	0.1302	1.75%	0
Overall		48	7.588	7.529	7.646	7.3	8	0.02927	0.2028	2.67%	0 (0%)

CETIS Measurement Report

Report Date: 14 Jan-21 15:09 (p 2 of 8)
Test Code/ID: VCF1220.129cer / 10-0967-9953

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.00%	0
6.25		8	24.03	23.97	24.08	24	24.2	0.008836	0.07069	0.29%	0
12.5		8	24.08	23.9	24.25	24	24.6	0.02652	0.2121	0.88%	0
25		8	24.05	23.93	24.17	24	24.4	0.01768	0.1414	0.59%	0
50		8	24.03	23.97	24.08	24	24.2	0.008836	0.07069	0.29%	0
100		8	24	24	24	24	24	0	0	0.00%	0
Overall		48	24.03	24	24.06	24	24.6	0.01574	0.1091	0.45%	0 (0%)

CETIS Measurement Report

Report Date: 14 Jan-21 15:09 (p 3 of 8)
Test Code/ID: VCF1220.129cer / 10-0967-9953

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		60					
100				60					
0	N	2		60					
100				60					
0	N	3		60					
100				60					
0	N	4		60					
100				60					
0	N	5		60					
100				60					
0	N	6		60					
100				60					
0	N	7		60					
100				60					
0	N	8		60					
100				60					

CETIS Measurement Report

Report Date: 14 Jan-21 15:09 (p 4 of 8)
 Test Code/ID: VCF1220.129cer / 10-0967-9953

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Conductivity-µmhos

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		337					
6.25				360					
12.5				367					
25				390					
50				434					
100				520					
0	N	2		332					
6.25				368					
12.5				372					
25				380					
50				421					
100				507					
0	N	3		342					
6.25				360					
12.5				377					
25				380					
50				413					
100				529					
0	N	4		338					
6.25				366					
12.5				370					
25				381					
50				417					
100				522					
0	N	5		339					
6.25				364					
12.5				371					
25				384					
50				422					
100				525					
0	N	6		342					
6.25				368					
12.5				370					
25				382					
50				425					
100				533					
0	N	7		339					
6.25				361					
12.5				372					
25				390					
50				438					
100				525					
0	N	8		340					
6.25				362					
12.5				370					
25				382					
50				422					
100				530					

P

CETIS Measurement Report

Report Date: 14 Jan-21 15:09 (p 5 of 8)

Test Code/ID: VCF1220.129cer / 10-0967-9953

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.6					
6.25				6.8					
12.5				7					
25				7.2					
50				7.4					
100				7.4					
0	N	2		7.2					
6.25				7.5					
12.5				7.6					
25				7.4					
50				7.2					
100				7					
0	N	3		7.6					
6.25				7.2					
12.5				7.2					
25				7.3					
50				7.3					
100				7.3					
0	N	4		7.2					
6.25				7.2					
12.5				7.3					
25				7.4					
50				7.4					
100				7.5					
0	N	5		7.5					
6.25				7.4					
12.5				7.4					
25				7.3					
50				7.2					
100				7.2					
0	N	6		7.7					
6.25				7.7					
12.5				7.7					
25				7.7					
50				7.6					
100				7.5					
0	N	7		7.8					
6.25				7.7					
12.5				7.7					
25				7.7					
50				7.7					
100				7.3					
0	N	8		7.6					
6.25				7.5					
12.5				7.4					
25				7.3					
50				7.3					
100				7.2					

CETIS Measurement Report

Report Date: 14 Jan-21 15:09 (p 6 of 8)

Test Code/ID: VCF1220.129cer / 10-0967-9953

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Hardness (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		95					
100				135					
0	N	2		95					
100				135					
0	N	3		90					
100				135					
0	N	4		90					
100				135					
0	N	5		90					
100				135					
0	N	6		90					
100				135					
0	N	7		90					
100				135					
0	N	8		90					
100				135					

CETIS Measurement Report

Report Date: 14 Jan-21 15:09 (p 7 of 8)

Test Code/ID: VCF1220.129cer / 10-0967-9953

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

pH-Units									
Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		8					
6.25				7.4					
12.5				7.4					
25				7.4					
50				7.4					
100				7.3					
0	N	2		7.9					
6.25				7.3					
12.5				7.3					
25				7.3					
50				7.3					
100				7.3					
0	N	3		7.9					
6.25				7.4					
12.5				7.4					
25				7.4					
50				7.4					
100				7.4					
0	N	4		7.9					
6.25				7.6					
12.5				7.6					
25				7.5					
50				7.5					
100				7.5					
0	N	5		7.9					
6.25				7.7					
12.5				7.7					
25				7.6					
50				7.5					
100				7.5					
0	N	6		7.8					
6.25				7.8					
12.5				7.7					
25				7.7					
50				7.7					
100				7.7					
0	N	7		8					
6.25				7.8					
12.5				7.6					
25				7.6					
50				7.6					
100				7.5					
0	N	8		7.9					
6.25				7.7					
12.5				7.7					
25				7.6					
50				7.6					
100				7.5					

January 15, 2021

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*" EPA-821-R-02-013. Results were as follows:

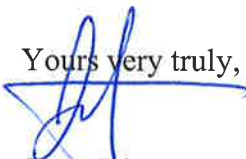
CLIENT: Ventura County Flood Control
SAMPLE I.D.: MO-SIM
DATE RECEIVED: 12/28/2020
ABC LAB. NO.: VCF1220.131

CHRONIC CERIODAPHNIA SURVIVAL & REPRODUCTION BIOASSAY

SURVIVAL NOEC = 100.00 %
TU_c = 1.00
EC25 = >100.00 %
EC50 = >100.00 %

REPRODUCTION NOEC = 100.00 %
TU_c = 1.00
IC25 = >100.00 %
IC50 = >100.00 %

Yours very truly,


Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 14 Jan-21 15:16 (p 1 of 2)
 Test Code/ID: VCF1220.131cer / 07-1538-0918

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 03-5873-2177	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:08	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:20	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 08-3164-0829	Code: VCF1220.131cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:50	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-SIM
Sample Age: 31h (2 °C)	Client: VCWPD	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	PMSD	TU	S
15-7383-6179	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	100	>100	---	---	1	1
16-8510-7466	Reproduction	Steel Many-One Rank Sum Test	100	>100	---	16.5%	1	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	%	95% LCL	95% UCL	TU	S
09-1899-4154	7d Survival Rate	Linear Interpolation (ICPIN)	EC10	>100	---	---	<1	1
			EC15	>100	---	---	<1	
			✓ EC20	>100	---	---	<1	
			✓ EC25	>100	---	---	<1	
			✓ EC40	>100	---	---	<1	
			✓ EC50	>100	---	---	<1	
17-9446-9664	Reproduction	Linear Interpolation (ICPIN)	✓ IC10	64.66	15.31	85.87	1.546	1
			✓ IC15	82.47	31.4	---	1.213	
			✓ IC20	>100	---	---	<1	
			✓ IC25	>100	---	---	<1	
			✓ IC40	>100	---	---	<1	
			✓ IC50	>100	---	---	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Overlap	Decision
				Lower	Upper			
09-1899-4154	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
15-7383-6179	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
16-8510-7466	Reproduction	Control Resp	23.5	15	>>	Yes	Passes Criteria	
17-9446-9664	Reproduction	Control Resp	23.5	15	>>	Yes	Passes Criteria	
16-8510-7466	Reproduction	PMSD	0.1649	0.13	0.47	Yes	Passes Criteria	

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	23.5	22.32	24.68	21	26	0.5217	1.65	7.02%	0.00%
6.25		10	29.2	27.07	31.33	23	34	0.9404	2.974	10.18%	-24.26%
12.5		10	25.6	22.94	28.26	21	32	1.176	3.718	14.52%	-8.94%
25		10	23.4	20.16	26.64	16	29	1.431	4.526	19.34%	0.43%
50		10	26.2	22.33	30.07	12	30	1.711	5.412	20.66%	-11.49%
100		10	21.1	18.75	23.45	17	26	1.038	3.281	15.55%	10.21%

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CETIS Summary Report

Report Date: 14 Jan-21 15:16 (p 2 of 2)
Test Code/ID: VCF1220.131cer / 07-1538-0918

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

7d Survival Rate Detail

MD5: 6DFFCF255519977902535414E38EA216

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

MD5: 4880AC2954F15CC44EF9E2D4A6961349

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	26	22	22	23	21	23	23	25	25	25
6.25		23	29	34	29	31	31	26	29	30	30
12.5		29	22	27	23	21	27	28	21	32	26
25		16	16	24	25	28	22	29	25	27	22
50		12	28	28	29	27	30	30	26	23	29
100		24	22	17	17	26	25	22	18	21	19

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

WSP

CETIS Analytical Report

Report Date: 14 Jan-21 15:16 (p 1 of 2)
Test Code/ID: VCF1220.131cer / 07-1538-0918

Ceriodaphnia 7-d Survival and Reproduction Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 16-8510-7466	Endpoint: Reproduction	CETIS Version: CETISv1.9.7			
Analyzed: 14 Jan-21 15:15	Analysis: Nonparametric-Control vs Treatments	Status Level: 1			
Edit Date: 14 Jan-21 15:11	MD5 Hash: 6A52DE891768CBEF7E7B573DF16EDB84	Editor ID: 000-189-126-0			
Batch ID: 03-5873-2177	Test Type: Reproduction-Survival (7d)	Analyst:			
Start Date: 29 Dec-20 13:08	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 05 Jan-21 13:20	Species: Ceriodaphnia dubia	Brine: Not Applicable			
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:			
Sample ID: 08-3164-0829	Code: VCF1220.131cer	Project: NPDES Stormwater Wet Season			
Sample Date: 28 Dec-20 05:50	Material: Sample Water	Source: Bioassay Report			
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-SIM			
Sample Age: 31h (2 °C)	Client: VCWPD				

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	3.874	16.49%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	149	75	2	18	CDF	1.0000	Non-Significant Effect
		12.5	122	75	4	18	CDF	0.9941	Non-Significant Effect
		25	110	75	2	18	CDF	0.9223	Non-Significant Effect
		50	139	75	2	18	CDF	1.0000	Non-Significant Effect
		100	82.5	75	4	18	CDF	0.1507	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	23.5	15	>>	Yes	Passes Criteria
PMSD	0.1649	0.13	0.47	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	392.933	78.5867	5	5.487	0.0004	Significant Effect
Error	773.4	14.3222	54			
Total	1166.33		59			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	11.99	15.09	0.0349	Equal Variances
	Levene Equality of Variance Test	1.329	3.377	0.2661	Equal Variances
	Mod Levene Equality of Variance Test	0.8024	3.377	0.5529	Equal Variances
Distribution	Anderson-Darling A2 Test	0.9465	3.878	0.0167	Normal Distribution
	D'Agostino Kurtosis Test	2.838	2.576	0.0045	Non-Normal Distribution
	D'Agostino Skewness Test	3.457	2.576	0.0005	Non-Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	20	9.21	4.5E-05	Non-Normal Distribution
	Kolmogorov-Smirnov D Test	0.1284	0.1331	0.0153	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9311	0.9459	0.0022	Non-Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	23.5	22.32	24.68	23	21	26	0.5217	7.02%	0.00%
6.25		10	29.2	27.07	31.33	29.5	23	34	0.9404	10.18%	-24.26%
12.5		10	25.6	22.94	28.26	26.5	21	32	1.176	14.52%	-8.94%
25		10	23.4	20.16	26.64	24.5	16	29	1.431	19.34%	0.43%
50		10	26.2	22.33	30.07	28	12	30	1.711	20.66%	-11.49%
100		10	21.1	18.75	23.45	21.5	17	26	1.038	15.55%	10.21%

Ceriodaphnia 7-d Survival and Reproduction Test

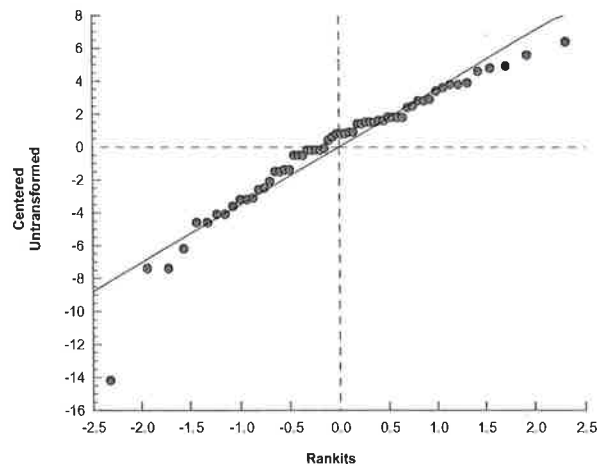
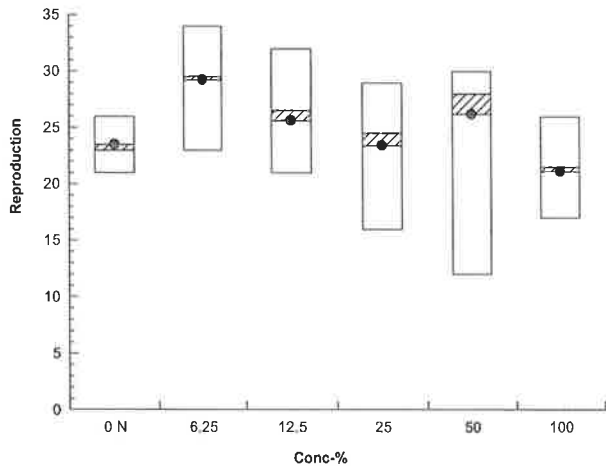
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 16-8510-7466	Endpoint: Reproduction	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:15	Analysis: Nonparametric-Control vs Treatments	Status Level: 1
Edit Date: 14 Jan-21 15:11	MD5 Hash: 6A52DE891768CBEF7E7B573DF16EDB84	Editor ID: 000-189-126-0

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	26	22	22	23	21	23	23	25	25	25
6.25		23	29	34	29	31	31	26	29	30	30
12.5		29	22	27	23	21	27	28	21	32	26
25		16	16	24	25	28	22	29	25	27	22
50		12	28	28	29	27	30	30	26	23	29
100		24	22	17	17	26	25	22	18	21	19

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 15:16 (p 1 of 4)
 Test Code/ID: VCF1220.131cer / 07-1538-0918

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 09-1899-4154	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:15	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 15:11	MD5 Hash: 6DFFCF255519977902535414E38EA216	Editor ID: 000-189-126-0
Batch ID: 03-5873-2177	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:08	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:20	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 08-3164-0829	Code: VCF1220.131cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:50	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-SIM
Sample Age: 31h (2 °C)	Client: VCWPD	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC10	>100	---	---	<1	---	---
EC15	>100	---	---	<1	---	---
EC20	>100	---	---	<1	---	---
EC25	>100	---	---	<1	---	---
EC40	>100	---	---	<1	---	---
EC50	>100	---	---	<1	---	---

7d Survival Rate Summary

Conc-%	Code	Count	Calculated Variate(A/B)							Isotonic Variate	
			Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

P

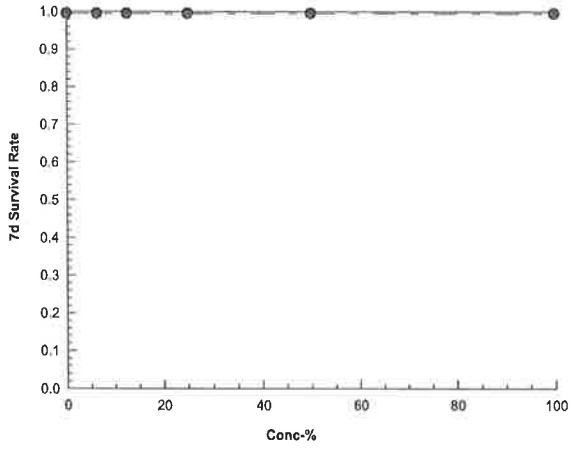
Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 09-1899-4154 Endpoint: 7d Survival Rate
Analyzed: 14 Jan-21 15:15 Analysis: Linear Interpolation (ICPIN)
Edit Date: 14 Jan-21 15:11 MD5 Hash: 6DFFCF255519977902535414E38EA216

CETIS Version: CETISv1.9.7
Status Level: 1
Editor ID: 000-189-126-0

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 15:16 (p 3 of 4)
 Test Code/ID: VCF1220.131cer / 07-1538-0918

Ceriodaphnia 7-d Survival and Reproduction Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 17-9446-9664	Endpoint: Reproduction	CETIS Version: CETISv1.9.7	Analyzed: 14 Jan-21 15:15	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 15:11	MD5 Hash: 6A52DE891768CBEF7E7B573DF16EDB84	Editor ID: 000-189-126-0	Batch ID: 03-5873-2177	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:08	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water	Ending Date: 05 Jan-21 13:20	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO	Sample ID: 08-3164-0829	Code: VCF1220.131cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:50	Material: Sample Water	Source: Bioassay Report	Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-SIM
Sample Age: 31h (2 °C)	Client: VCWPD				

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	759659	280	Yes	Two-Point Interpolation

Test Acceptability Criteria					
Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	23.5	15	>>	Yes	Passes Criteria

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	64.66	15.31	85.87	1.546	1.165	6.531
IC15	82.47	31.4	---	1.213	---	3.184
IC20	>100	---	---	<1	---	---
IC25	>100	---	---	<1	---	---
IC40	>100	---	---	<1	---	---
IC50	>100	---	---	<1	---	---

Reproduction Summary			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	N	10	23.5	23	21	26	7.02%	0.00%	26.35	0.00%
6.25		10	29.2	29.5	23	34	10.18%	-24.26%	26.35	0.00%
12.5		10	25.6	26.5	21	32	14.52%	-8.94%	25.6	2.85%
25		10	23.4	24.5	16	29	19.34%	0.43%	24.8	5.88%
50		10	26.2	28	12	30	20.66%	-11.49%	24.8	5.88%
100		10	21.1	21.5	17	26	15.55%	10.21%	21.1	19.92%

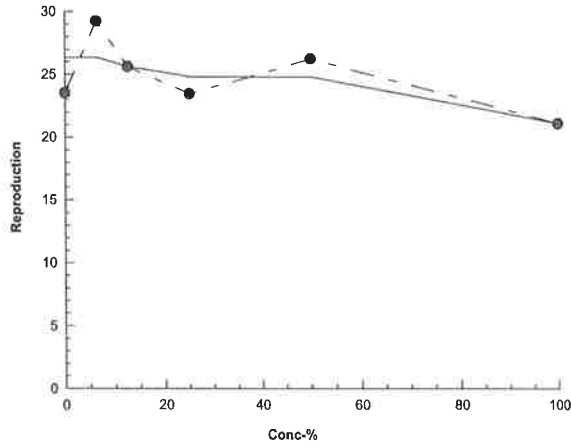
Reproduction Detail											
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	26	22	22	23	21	23	23	25	25	25
6.25		23	29	34	29	31	31	26	29	30	30
12.5		29	22	27	23	21	27	28	21	32	26
25		16	16	24	25	28	22	29	25	27	22
50		12	28	28	29	27	30	30	26	23	29
100		24	22	17	17	26	25	22	18	21	19

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 17-9446-9664	Endpoint: Reproduction	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:15	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 15:11	MD5 Hash: 6A52DE891768CBEF7E7B573DF16EDB84	Editor ID: 000-189-126-0

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 15:16 (p 1 of 2)
Test Code/ID: VCF1220.131cer / 07-1538-0918

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 15-7383-6179	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:15	Analysis: STP 2xK Contingency Tables	Status Level: 1
Edit Date: 14 Jan-21 15:11	MD5 Hash: 6DFFCF255519977902535414E38EA216	Editor ID: 000-189-126-0
Batch ID: 03-5873-2177	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:08	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:20	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 08-3164-0829	Code: VCF1220.131cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:50	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-SIM
Sample Age: 31h (2 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	100	>100	---	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	Conc-%	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	1.0000	Exact	1.0000	Non-Significant Effect
		12.5	1.0000	Exact	1.0000	Non-Significant Effect
		25	1.0000	Exact	1.0000	Non-Significant Effect
		50	1.0000	Exact	1.0000	Non-Significant Effect
		100	1.0000	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

TAC Limits

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	1	0.8	>>	Yes	Passes Criteria

7d Survival Rate Frequencies

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	N	10	0	10	1.0000	0.0000	0.00%
6.25		10	0	10	1.0000	0.0000	0.00%
12.5		10	0	10	1.0000	0.0000	0.00%
25		10	0	10	1.0000	0.0000	0.00%
50		10	0	10	1.0000	0.0000	0.00%
100		10	0	10	1.0000	0.0000	0.00%

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Ceriodaphnia 7-d Survival and Reproduction Test

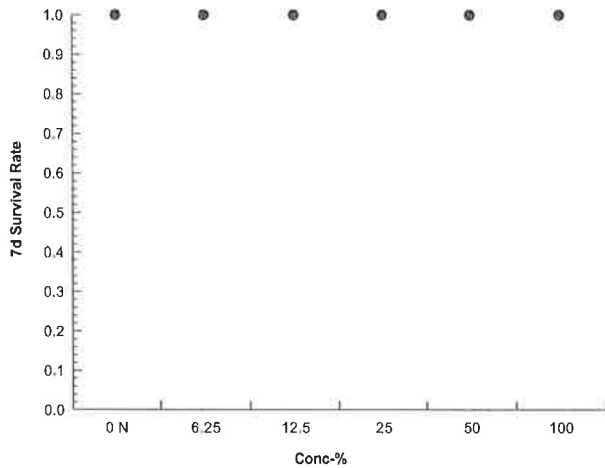
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 15-7383-6179 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 15:15 Analysis: STP 2xK Contingency Tables Status Level: 1
 Edit Date: 14 Jan-21 15:11 MD5 Hash: 6DFFCF255519977902535414E38EA216 Editor ID: 000-189-126-0

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Measurement Report

Report Date: 14 Jan-21 15:16 (p 1 of 8)
 Test Code/ID: VCF1220.131cer / 07-1538-0918

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 03-5873-2177	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:08	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:20	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 08-3164-0829	Code: VCF1220.131cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:50	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-SIM
Sample Age: 31h (2 °C)	Client: VCWPD	

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	60	60	60	60	60	0	0	0.00%	0
100		8	49	49	49	49	49	0	0	0.00%	0
Overall		16	54.5	51.47	57.53	49	60	1.42	5.68	10.42%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	338.6	335.9	341.3	332	342	0.4005	3.204	0.95%	0
6.25		8	359.8	357.1	362.4	354	363	0.3939	3.151	0.88%	0
12.5		8	354.2	351.9	356.6	350	358	0.3583	2.866	0.81%	0
25		8	359.4	356.9	361.8	353	362	0.3656	2.925	0.81%	0
50		8	370.2	367.4	373.1	365	377	0.4265	3.412	0.92%	0
100		8	408.8	404.1	413.4	401	417	0.7	5.6	1.37%	0
Overall		48	365.2	358.7	371.6	332	417	3.197	22.15	6.07%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.525	7.342	7.708	7.2	7.8	0.02735	0.2188	2.91%	0
6.25		8	7.412	7.154	7.671	7	7.7	0.03864	0.3091	4.17%	0
12.5		8	7.362	7.091	7.634	7	7.7	0.04061	0.3249	4.41%	0
25		8	7.4	7.114	7.686	6.9	7.8	0.04278	0.3423	4.63%	0
50		8	7.337	7.045	7.63	6.7	7.7	0.04378	0.3503	4.77%	0
100		8	7.3	7.025	7.575	6.7	7.7	0.04119	0.3295	4.51%	0
Overall		48	7.39	7.3	7.479	6.7	7.8	0.04429	0.3068	4.15%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	91.25	89.31	93.19	90	95	0.2893	2.315	2.54%	0
100		8	115	115	115	115	115	0	0	0.00%	0
Overall		16	103.1	96.54	109.7	90	115	3.091	12.37	11.99%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.913	7.859	7.966	7.8	8	0.00801	0.06408	0.81%	0
6.25		8	7.675	7.498	7.852	7.3	7.9	0.02652	0.2121	2.76%	0
12.5		8	7.625	7.431	7.819	7.2	7.9	0.02893	0.2315	3.04%	0
25		8	7.612	7.455	7.77	7.3	7.9	0.02356	0.1885	2.48%	0
50		8	7.587	7.45	7.725	7.3	7.8	0.02053	0.1642	2.16%	0
100		8	7.575	7.415	7.735	7.2	7.8	0.02386	0.1909	2.52%	0
Overall		48	7.665	7.604	7.725	7.2	8	0.03014	0.2088	2.73%	0 (0%)

CETIS Measurement Report

Report Date: 14 Jan-21 15:16 (p 4 of 8)

Test Code/ID: VCF1220.131cer / 07-1538-0918

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Conductivity-µmhos

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		337					
6.25				354					
12.5				352					
25				359					
50				372					
100				401					
0	N	2		332					
6.25				363					
12.5				352					
25				353					
50				368					
100				408					
0	N	3		342					
6.25				356					
12.5				350					
25				358					
50				370					
100				407					
0	N	4		338					
6.25				361					
12.5				355					
25				361					
50				370					
100				402					
0	N	5		339					
6.25				362					
12.5				358					
25				360					
50				365					
100				410					
0	N	6		342					
6.25				360					
12.5				358					
25				362					
50				370					
100				415					
0	N	7		339					
6.25				360					
12.5				354					
25				362					
50				370					
100				417					
0	N	8		340					
6.25				362					
12.5				355					
25				360					
50				377					
100				410					

CETIS Measurement Report

Report Date: 14 Jan-21 15:16 (p 5 of 8)

Test Code/ID: VCF1220.131cer / 07-1538-0918

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.6					
6.25				7.6					
12.5				7.7					
25				7.7					
50				7.6					
100				7.4					
0	N	2		7.2					
6.25				7					
12.5				7					
25				6.9					
50				6.7					
100				6.7					
0	N	3		7.6					
6.25				7.2					
12.5				7					
25				6.9					
50				6.9					
100				6.9					
0	N	4		7.2					
6.25				7					
12.5				7.3					
25				7.3					
50				7.4					
100				7.4					
0	N	5		7.5					
6.25				7.4					
12.5				7					
25				7.5					
50				7.5					
100				7.5					
0	N	6		7.7					
6.25				7.7					
12.5				7.7					
25				7.8					
50				7.7					
100				7.7					
0	N	7		7.8					
6.25				7.7					
12.5				7.6					
25				7.5					
50				7.4					
100				7.4					
0	N	8		7.6					
6.25				7.7					
12.5				7.6					
25				7.6					
50				7.5					
100				7.4					

CETIS Measurement Report

Report Date: 14 Jan-21 15:16 (p 6 of 8)

Test Code/ID: VCF1220.131cer / 07-1538-0918

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Hardness (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		95					
100				115					
0	N	2		95					
100				115					
0	N	3		90					
100				115					
0	N	4		90					
100				115					
0	N	5		90					
100				115					
0	N	6		90					
100				115					
0	N	7		90					
100				115					
0	N	8		90					
100				115					

CETIS Measurement Report

Report Date: 14 Jan-21 15:16 (p 7 of 8)
Test Code/ID: VCF1220.131cer / 07-1538-0918

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

pH-Units

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		8					
6.25				7.4					
12.5				7.4					
25				7.4					
50				7.4					
100				7.4					
0	N	2		7.9					
6.25				7.3					
12.5				7.2					
25				7.3					
50				7.3					
100				7.2					
0	N	3		7.9					
6.25				7.9					
12.5				7.9					
25				7.9					
50				7.8					
100				7.8					
0	N	4		7.9					
6.25				7.7					
12.5				7.6					
25				7.6					
50				7.6					
100				7.6					
0	N	5		7.9					
6.25				7.8					
12.5				7.7					
25				7.7					
50				7.6					
100				7.6					
0	N	6		7.8					
6.25				7.8					
12.5				7.8					
25				7.7					
50				7.7					
100				7.7					
0	N	7		8					
6.25				7.8					
12.5				7.8					
25				7.7					
50				7.7					
100				7.7					
0	N	8		7.9					
6.25				7.7					
12.5				7.6					
25				7.6					
50				7.6					
100				7.6					

CETIS Measurement Report

Report Date: 14 Jan-21 15:16 (p 8 of 8)
 Test Code/ID: VCF1220.131cer / 07-1538-0918

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		24					
6.25				24.2					
12.5				24.6					
25				24.7					
50				24.9					
100				24					
0	N	2		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	3		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	4		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	5		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	6		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	7		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	8		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					



January 15, 2021

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*" EPA-821-R-02-013. Results were as follows:

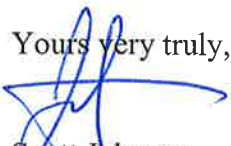
CLIENT: Ventura County Flood Control
SAMPLE I.D.: MO-FIL
DATE RECEIVED: 12/28/2020
ABC LAB. NO.: VCF1220.133

CHRONIC CERIODAPHNIA SURVIVAL & REPRODUCTION BIOASSAY

SURVIVAL NOEC = 100.00 %
TU_c = 1.00
EC25 = >100.00 %
EC50 = >100.00 %

REPRODUCTION NOEC = 100.00 %
TU_c = 1.00
IC25 = >100.00 %
IC50 = >100.00 %

Yours very truly,



Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 14 Jan-21 15:29 (p 1 of 2)
 Test Code/ID: VCF1220.133cer / 17-1224-5690

Ceriodaphnia 7-d Survival and Reproduction Test				Aquatic Bioassay & Consulting Labs, Inc.			
Batch ID: 20-9972-7112	Test Type: Reproduction-Survival (7d)			Analyst:			
Start Date: 29 Dec-20 13:19	Protocol: EPA/821/R-02-013 (2002)			Diluent: Laboratory Water			
Ending Date: 05 Jan-21 13:25	Species: Ceriodaphnia dubia			Brine: Not Applicable			
Test Length: 7d 0h	Taxon: Branchiopoda			Source: Aquatic Biosystems, CO	Age:		
Sample ID: 16-1602-7782	Code: VCF1220.133cer			Project: NPDES Stormwater Wet Season			
Sample Date: 28 Dec-20 05:45	Material: Sample Water			Source: Bioassay Report			
Receipt Date: 28 Dec-20 09:22	CAS (PC):			Station: MO-FIL			
Sample Age: 32h (7.3 °C)	Client: VCWPD						

Multiple Comparison Summary									
Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	TU	S
15-6331-1988	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	100	>100	---	---	---	1	1
20-0775-2630	Reproduction	Steel Many-One Rank Sum Test	100	>100	---	---	13.5%	1	1

Point Estimate Summary									
Analysis ID	Endpoint	Point Estimate Method	✓	Level	%	95% LCL	95% UCL	TU	S
06-0274-9279	7d Survival Rate	Linear Interpolation (ICPIN)	✓	EC10	>100	---	---	<1	1
			✓	EC15	>100	---	---	<1	
			✓	EC20	>100	---	---	<1	
			✓	EC25	>100	---	---	<1	
			✓	EC40	>100	---	---	<1	
			✓	EC50	>100	---	---	<1	
04-4289-3115	Reproduction	Linear Interpolation (ICPIN)	✓	IC10	>100	---	---	<1	1
			✓	IC15	>100	---	---	<1	
			✓	IC20	>100	---	---	<1	
			✓	IC25	>100	---	---	<1	
			✓	IC40	>100	---	---	<1	
			✓	IC50	>100	---	---	<1	

Test Acceptability								TAC Limits		
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision			
06-0274-9279	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria			
15-6331-1988	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria			
04-4289-3115	Reproduction	Control Resp	22.3	15	>>	Yes	Passes Criteria			
20-0775-2630	Reproduction	Control Resp	22.3	15	>>	Yes	Passes Criteria			
20-0775-2630	Reproduction	PMSD	0.1352	0.13	0.47	Yes	Passes Criteria			

7d Survival Rate Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%

Reproduction Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	22.3	19.78	24.82	15	27	1.116	3.529	15.83%	0.00%
6.25		10	26.4	25.27	27.53	24	29	0.4989	1.578	5.98%	-18.39%
12.5		10	26.9	25.38	28.42	24	30	0.6741	2.132	7.92%	-20.63%
25		10	23.5	21.23	25.77	16	27	1.003	3.171	13.49%	-5.38%
50		10	24.6	21.38	27.82	18	30	1.424	4.502	18.30%	-10.31%
100		10	24.7	23.63	25.77	22	27	0.4726	1.494	6.05%	-10.76%

MBS

CETIS Analytical Report

Report Date: 14 Jan-21 15:29 (p 1 of 2)
Test Code/ID: VCF1220.133cer / 17-1224-5690

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 20-0775-2630	Endpoint: Reproduction	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:28	Analysis: Nonparametric-Control vs Treatments	Status Level: 1
Edit Date: 14 Jan-21 15:18	MD5 Hash: F2AADB3E4B30797BA229C7813073DFD9	Editor ID: 000-189-126-0
Batch ID: 20-9972-7112	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:19	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:25	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 16-1602-7782	Code: VCF1220.133cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:45	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-FIL
Sample Age: 32h (7.3 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	3.015	13.52%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	143.5	75	2	18	CDF	1.0000	Non-Significant Effect
		12.5	144	75	3	18	CDF	1.0000	Non-Significant Effect
		25	117.5	75	4	18	CDF	0.9824	Non-Significant Effect
		50	120.5	75	4	18	CDF	0.9913	Non-Significant Effect
		100	128.5	75	5	18	CDF	0.9991	Non-Significant Effect

Test Acceptability Criteria

TAC Limits

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	22.3	15	>>	Yes	Passes Criteria
PMSD	0.1352	0.13	0.47	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	149.333	29.8667	5	3.443	0.0090	Significant Effect
Error	468.4	8.67407	54			
Total	617.733		59			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	16.34	15.09	0.0059	Unequal Variances
	Levene Equality of Variance Test	2.148	3.377	0.0735	Equal Variances
	Mod Levene Equality of Variance Test	2.084	3.377	0.0816	Equal Variances
Distribution	Anderson-Darling A2 Test	1.137	3.878	0.0057	Non-Normal Distribution
	D'Agostino Kurtosis Test	1.559	2.576	0.1189	Normal Distribution
	D'Agostino Skewness Test	2.052	2.576	0.0402	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	6.642	9.21	0.0361	Normal Distribution
	Kolmogorov-Smirnov D Test	0.1519	0.1331	0.0015	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.9439	0.9459	0.0081	Non-Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	22.3	19.78	24.82	22.5	15	27	1.116	15.83%	0.00%
6.25		10	26.4	25.27	27.53	26.5	24	29	0.4989	5.98%	-18.39%
12.5		10	26.9	25.38	28.42	27	24	30	0.6741	7.92%	-20.63%
25		10	23.5	21.23	25.77	24	16	27	1.003	13.49%	-5.38%
50		10	24.6	21.38	27.82	24.5	18	30	1.424	18.30%	-10.31%
100		10	24.7	23.63	25.77	25	22	27	0.4726	6.05%	-10.76%

Ceriodaphnia 7-d Survival and Reproduction Test

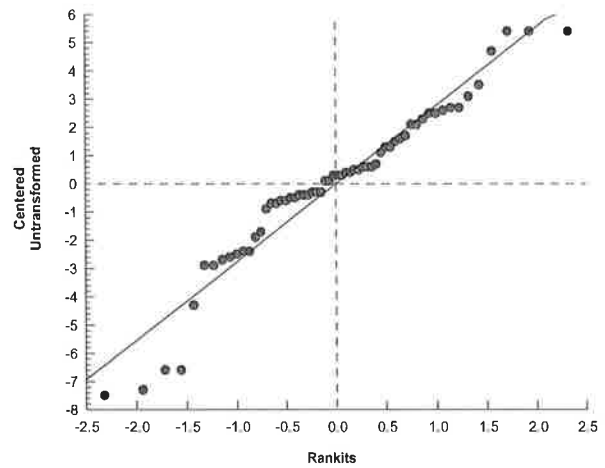
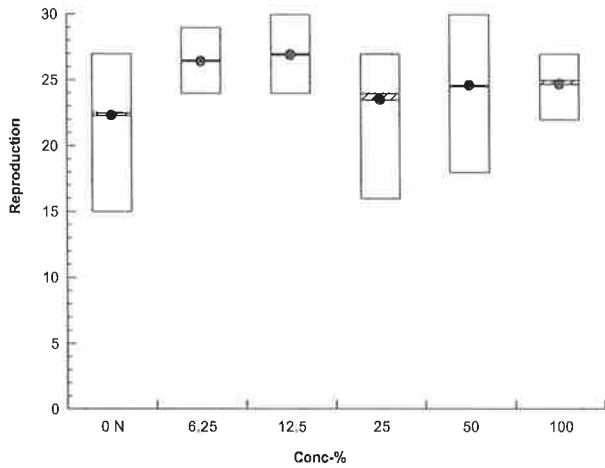
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 20-0775-2630 Endpoint: Reproduction CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 15:28 Analysis: Nonparametric-Control vs Treatments Status Level: 1
 Edit Date: 14 Jan-21 15:18 MD5 Hash: F2AADB3E4B30797BA229C7813073DFD9 Editor ID: 000-189-126-0

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	25	22	22	27	25	23	24	18	22	15
6.25		29	26	27	26	24	27	27	28	26	24
12.5		27	24	24	29	25	30	26	27	29	28
25		21	23	16	23	24	26	25	24	26	27
50		30	30	24	25	25	18	18	30	24	22
100		26	25	24	22	25	23	24	25	27	26

Graphics



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CETIS Analytical Report

Report Date: 14 Jan-21 15:29 (p 1 of 4)
 Test Code/ID: VCF1220.133cer / 17-1224-5690

Ceriodaphnia 7-d Survival and Reproduction Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 06-0274-9279	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7			
Analyzed: 14 Jan-21 15:28	Analysis: Linear Interpolation (ICPIN)	Status Level: 1			
Edit Date: 14 Jan-21 15:18	MD5 Hash: 6DFFCF255519977902535414E38EA216	Editor ID: 000-189-126-0			
Batch ID: 20-9972-7112	Test Type: Reproduction-Survival (7d)	Analyst:			
Start Date: 29 Dec-20 13:19	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 05 Jan-21 13:25	Species: Ceriodaphnia dubia	Brine: Not Applicable			
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:			
Sample ID: 16-1602-7782	Code: VCF1220.133cer	Project: NPDES Stormwater Wet Season			
Sample Date: 28 Dec-20 05:45	Material: Sample Water	Source: Bioassay Report			
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-FIL			
Sample Age: 32h (7.3 °C)	Client: VCWPD				

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC10	>100	---	---	<1	---	---
EC15	>100	---	---	<1	---	---
EC20	>100	---	---	<1	---	---
EC25	>100	---	---	<1	---	---
EC40	>100	---	---	<1	---	---
EC50	>100	---	---	<1	---	---

7d Survival Rate Summary

Conc-%	Code	Count	Calculated Variate(A/B)							Isotonic Variate	
			Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Report Date: 14 Jan-21 15:29 (p 3 of 4)
 Test Code/ID: VCF1220.133cer / 17-1224-5690

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 04-4289-3115	Endpoint: Reproduction	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:28	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 15:18	MD5 Hash: F2AADB3E4B30797BA229C7813073DFD9	Editor ID: 000-189-126-0
Batch ID: 20-9972-7112	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:19	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:25	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 16-1602-7782	Code: VCF1220.133cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:45	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-FIL
Sample Age: 32h (7.3 °C)	Client: VCWPD	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1775213	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	22.3	15	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	>100	---	---	<1	---	---
IC15	>100	---	---	<1	---	---
IC20	>100	---	---	<1	---	---
IC25	>100	---	---	<1	---	---
IC40	>100	---	---	<1	---	---
IC50	>100	---	---	<1	---	---

Reproduction Summary

Conc-%	Code	Count	Calculated Variate						Isotonic Variate	
			Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	N	10	22.3	22.5	15	27	15.83%	0.00%	25.2	0.00%
6.25		10	26.4	26.5	24	29	5.98%	-18.39%	25.2	0.00%
12.5		10	26.9	27	24	30	7.92%	-20.63%	25.2	0.00%
25		10	23.5	24	16	27	13.49%	-5.38%	24.27	3.70%
50		10	24.6	24.5	18	30	18.30%	-10.31%	24.27	3.70%
100		10	24.7	25	22	27	6.05%	-10.76%	24.27	3.70%

Reproduction Detail

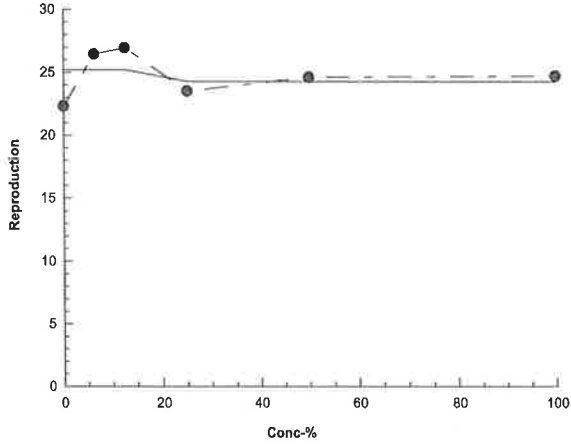
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	25	22	22	27	25	23	24	18	22	15
6.25		29	26	27	26	24	27	27	28	26	24
12.5		27	24	24	29	25	30	26	27	29	28
25		21	23	16	23	24	26	25	24	26	27
50		30	30	24	25	25	18	18	30	24	22
100		26	25	24	22	25	23	24	25	27	26

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 04-4289-3115	Endpoint: Reproduction	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:28	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 15:18	MD5 Hash: F2AADB3E4B30797BA229C7813073DFD9	Editor ID: 000-189-126-0

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 15:29 (p 1 of 2)

Test Code/ID: VCF1220.133cer / 17-1224-5690

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 15-6331-1988	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:28	Analysis: STP 2xK Contingency Tables	Status Level: 1
Edit Date: 14 Jan-21 15:18	MD5 Hash: 6DFFCF255519977902535414E38EA216	Editor ID: 000-189-126-0
Batch ID: 20-9972-7112	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:19	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:25	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 16-1602-7782	Code: VCF1220.133cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:45	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-FIL
Sample Age: 32h (7.3 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	100	>100	---	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	Conc-%	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	1.0000	Exact	1.0000	Non-Significant Effect
		12.5	1.0000	Exact	1.0000	Non-Significant Effect
		25	1.0000	Exact	1.0000	Non-Significant Effect
		50	1.0000	Exact	1.0000	Non-Significant Effect
		100	1.0000	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

7d Survival Rate Frequencies

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	N	10	0	10	1.0000	0.0000	0.00%
6.25		10	0	10	1.0000	0.0000	0.00%
12.5		10	0	10	1.0000	0.0000	0.00%
25		10	0	10	1.0000	0.0000	0.00%
50		10	0	10	1.0000	0.0000	0.00%
100		10	0	10	1.0000	0.0000	0.00%

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Ceriodaphnia 7-d Survival and Reproduction Test

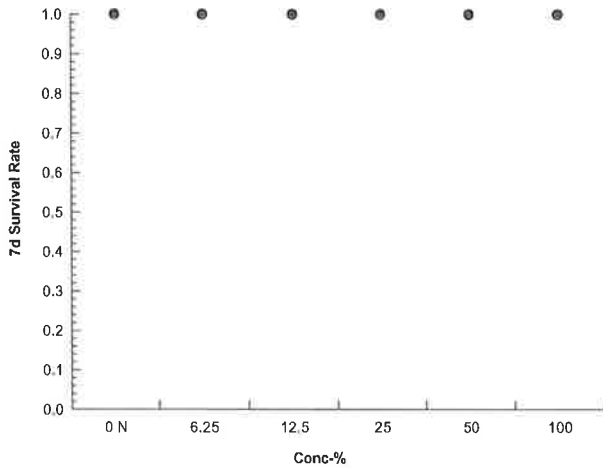
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 15-6331-1988 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 15:28 Analysis: STP 2xK Contingency Tables Status Level: 1
 Edit Date: 14 Jan-21 15:18 MD5 Hash: 6DFFCF255519977902535414E38EA216 Editor ID: 000-189-126-0

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Measurement Report

Report Date: 14 Jan-21 15:29 (p 1 of 8)
 Test Code/ID: VCF1220.133cer / 17-1224-5690

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 20-9972-7112	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:19	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:25	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 16-1602-7782	Code: VCF1220.133cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 05:45	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:22	CAS (PC):	Station: MO-FIL
Sample Age: 32h (7.3 °C)	Client: VCWPD	

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	60	60	60	60	60	0	0	0.00%	0
100		8	47	47	47	47	47	0	0	0.00%	0
Overall		16	53.5	49.92	57.08	47	60	1.678	6.713	12.55%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	338.6	335.9	341.3	332	342	0.4005	3.204	0.95%	0
6.25		8	346.1	342.1	350.2	340	356	0.6067	4.853	1.40%	0
12.5		8	348.9	344.8	352.9	343	359	0.603	4.824	1.38%	0
25		8	356.6	349.3	363.9	339	367	1.092	8.733	2.45%	0
50		8	336.1	333.9	338.4	332	339	0.337	2.696	0.80%	0
100		8	325.9	321	330.8	319	333	0.7363	5.89	1.81%	0
Overall		48	342	338.8	345.3	319	367	1.617	11.2	3.28%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.525	7.342	7.708	7.2	7.8	0.02735	0.2188	2.91%	0
6.25		8	7.512	7.321	7.704	7	7.7	0.02869	0.2295	3.06%	0
12.5		8	7.475	7.267	7.683	7	7.8	0.03116	0.2493	3.33%	0
25		8	7.437	7.297	7.578	7.2	7.6	0.02106	0.1685	2.27%	0
50		8	7.325	7.142	7.508	7	7.6	0.02735	0.2188	2.99%	0
100		8	7.275	7.081	7.469	7	7.5	0.02893	0.2315	3.18%	0
Overall		48	7.425	7.358	7.492	7	7.8	0.03309	0.2292	3.09%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	91.25	89.31	93.19	90	95	0.2893	2.315	2.54%	0
100		8	105	105	105	105	105	0	0	0.00%	0
Overall		16	98.12	94.25	102	90	105	1.819	7.274	7.41%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.913	7.859	7.966	7.8	8	0.00801	0.06408	0.81%	0
6.25		8	7.575	7.392	7.758	7.2	7.8	0.02735	0.2188	2.89%	0
12.5		8	7.55	7.389	7.711	7.2	7.7	0.02409	0.1927	2.55%	0
25		8	7.537	7.365	7.71	7.2	7.7	0.02582	0.2066	2.74%	0
50		8	7.5	7.327	7.673	7.2	7.7	0.02588	0.207	2.76%	0
100		8	7.487	7.324	7.651	7.2	7.7	0.02449	0.1959	2.62%	0
Overall		48	7.594	7.527	7.661	7.2	8	0.03334	0.231	3.04%	0 (0%)

CETIS Measurement Report

Report Date: 14 Jan-21 15:29 (p 2 of 8)

Test Code/ID: VCF1220.133cer / 17-1224-5690

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.00%	0
6.25		8	24.08	23.9	24.25	24	24.6	0.02652	0.2121	0.88%	0
12.5		8	24.06	23.91	24.21	24	24.5	0.0221	0.1768	0.73%	0
25		8	24.03	23.97	24.08	24	24.2	0.008836	0.07069	0.29%	0
50		8	24	24	24	24	24	0	0	0.00%	0
100		8	24.04	23.95	24.13	24	24.3	0.01326	0.1061	0.44%	0
Overall		48	24.03	24	24.07	24	24.6	0.01745	0.1209	0.50%	0 (0%)

CETIS Measurement Report

Report Date: 14 Jan-21 15:29 (p 3 of 8)

Test Code/ID: VCF1220.133cer / 17-1224-5690

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		60					
100				47					
0	N	2		60					
100				47					
0	N	3		60					
100				47					
0	N	4		60					
100				47					
0	N	5		60					
100				47					
0	N	6		60					
100				47					
0	N	7		60					
100				47					
0	N	8		60					
100				47					

CETIS Measurement Report

Report Date: 14 Jan-21 15:29 (p 4 of 8)

Test Code/ID: VCF1220.133cer / 17-1224-5690

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Conductivity-µmhos

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		337					
6.25				346					
12.5				343					
25				339					
50				333					
100				320					
0	N	2		332					
6.25				356					
12.5				359					
25				367					
50				339					
100				326					
0	N	3		342					
6.25				344					
12.5				344					
25				360					
50				332					
100				319					
0	N	4		338					
6.25				340					
12.5				350					
25				363					
50				334					
100				320					
0	N	5		339					
6.25				345					
12.5				348					
25				360					
50				338					
100				325					
0	N	6		342					
6.25				348					
12.5				349					
25				359					
50				338					
100				332					
0	N	7		339					
6.25				348					
12.5				349					
25				355					
50				338					
100				333					
0	N	8		340					
6.25				342					
12.5				349					
25				350					
50				337					
100				332					

CETIS Measurement Report

Report Date: 14 Jan-21 15:29 (p 5 of 8)

Test Code/ID: VCF1220.133cer / 17-1224-5690

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.6					
6.25				7.7					
12.5				7.8					
25				7.6					
50				7.4					
100				7					
0	N	2		7.2					
6.25				7.4					
12.5				7.3					
25				7.2					
50				7					
100				7					
0	N	3		7.6					
6.25				7.6					
12.5				7.5					
25				7.5					
50				7					
100				7					
0	N	4		7.2					
6.25				7					
12.5				7					
25				7.2					
50				7.3					
100				7.4					
0	N	5		7.5					
6.25				7.5					
12.5				7.4					
25				7.4					
50				7.4					
100				7.4					
0	N	6		7.7					
6.25				7.6					
12.5				7.5					
25				7.4					
50				7.4					
100				7.4					
0	N	7		7.8					
6.25				7.7					
12.5				7.7					
25				7.6					
50				7.5					
100				7.5					
0	N	8		7.6					
6.25				7.6					
12.5				7.6					
25				7.6					
50				7.6					
100				7.5					

CETIS Measurement Report

Report Date: 14 Jan-21 15:29 (p 6 of 8)

Test Code/ID: VCF1220.133cer / 17-1224-5690

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Hardness (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		95					
100				105					
0	N	2		95					
100				105					
0	N	3		90					
100				105					
0	N	4		90					
100				105					
0	N	5		90					
100				105					
0	N	6		90					
100				105					
0	N	7		90					
100				105					
0	N	8		90					
100				105					

CETIS Measurement Report

Report Date: 14 Jan-21 15:29 (p 7 of 8)

Test Code/ID: VCF1220.133cer / 17-1224-5690

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

pH-Units

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		8					
6.25				7.4					
12.5				7.4					
25				7.4					
50				7.3					
100				7.3					
0	N	2		7.9					
6.25				7.2					
12.5				7.2					
25				7.2					
50				7.2					
100				7.2					
0	N	3		7.9					
6.25				7.4					
12.5				7.4					
25				7.3					
50				7.3					
100				7.3					
0	N	4		7.9					
6.25				7.6					
12.5				7.6					
25				7.6					
50				7.5					
100				7.5					
0	N	5		7.9					
6.25				7.7					
12.5				7.7					
25				7.7					
50				7.6					
100				7.6					
0	N	6		7.8					
6.25				7.8					
12.5				7.7					
25				7.7					
50				7.7					
100				7.6					
0	N	7		8					
6.25				7.8					
12.5				7.7					
25				7.7					
50				7.7					
100				7.7					
0	N	8		7.9					
6.25				7.7					
12.5				7.7					
25				7.7					
50				7.7					
100				7.7					



January 15, 2021

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*" EPA-821-R-02-013. Results were as follows:


CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-VEN
DATE RECEIVED:	12/28/2020
ABC LAB. NO.:	VCF1220.141

CHRONIC CERIODAPHNIA SURVIVAL & REPRODUCTION BIOASSAY

SURVIVAL	NOEC =	100.00 %
	TU _c =	1.00
	EC25 =	>100.00 %
	EC50 =	>100.00 %

REPRODUCTION	NOEC =	100.00 %
	TU _c =	1.00
	IC25 =	>100.00 %
	IC50 =	>100.00 %

Yours very truly,



Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 14 Jan-21 15:54 (p 1 of 2)
 Test Code/ID: VCF1220.141cer / 09-3184-3870

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 06-2637-4084	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:22	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:30	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 12-9616-2484	Code: VCF1220.141cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 08:15	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-VEN
Sample Age: 29h (7.8 °C)	Client: VCWPD	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	PMSD	TU	S
02-3659-5071	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	100	>100	---	---	1	1
13-8328-2006	Reproduction	Steel Many-One Rank Sum Test	100	>100	---	12.0%	1	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	%	95% LCL	95% UCL	TU	S
07-4952-2278	7d Survival Rate	Linear Interpolation (ICPIN)	✓ EC10	>100	---	---	<1	1
			✓ EC15	>100	---	---	<1	
			✓ EC20	>100	---	---	<1	
			✓ EC25	>100	---	---	<1	
			✓ EC40	>100	---	---	<1	
			✓ EC50	>100	---	---	<1	
16-2499-3507	Reproduction	Linear Interpolation (ICPIN)	✓ IC10	>100	---	---	<1	1
			✓ IC15	>100	---	---	<1	
			✓ IC20	>100	---	---	<1	
			✓ IC25	>100	---	---	<1	
			✓ IC40	>100	---	---	<1	
			✓ IC50	>100	---	---	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Overlap	Decision
				Lower	Upper			
02-3659-5071	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
07-4952-2278	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
13-8328-2006	Reproduction	Control Resp	22.3	15	>>	Yes	Passes Criteria	
16-2499-3507	Reproduction	Control Resp	22.3	15	>>	Yes	Passes Criteria	
13-8328-2006	Reproduction	PMSD	0.1201	0.13	0.47	Yes	Below Criteria	

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	22.3	20.45	24.15	19	26	0.8172	2.584	11.59%	0.00%
6.25		10	29.8	27.9	31.7	26	34	0.8406	2.658	8.92%	-33.63%
12.5		10	25.2	22.7	27.7	21	33	1.104	3.49	13.85%	-13.00%
25		10	26.7	24.24	29.16	22	32	1.086	3.433	12.86%	-19.73%
50		10	27	25.93	28.07	25	29	0.4714	1.491	5.52%	-21.08%
100		10	28.6	27.83	29.37	26	30	0.3399	1.075	3.76%	-28.25%

CETIS Analytical Report

Report Date: 14 Jan-21 15:54 (p 1 of 2)
 Test Code/ID: VCF1220.141cer / 09-3184-3870

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 13-8328-2006	Endpoint: Reproduction	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:53	Analysis: Nonparametric-Control vs Treatments	Status Level: 1
Edit Date: 14 Jan-21 15:48	MD5 Hash: D295FA35D2F0C9E79690A971BDD7E6E4	Editor ID: 000-189-126-0
Batch ID: 06-2637-4084	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:22	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:30	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 12-9616-2484	Code: VCF1220.141cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 08:15	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-VEN
Sample Age: 29h (7.8 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	2.679	12.01%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	154.5	75	1	18	CDF	1.0000	Non-Significant Effect
		12.5	131.5	75	4	18	CDF	0.9996	Non-Significant Effect
		25	138.5	75	2	18	CDF	1.0000	Non-Significant Effect
		50	151	75	2	18	CDF	1.0000	Non-Significant Effect
		100	154.5	75	1	18	CDF	1.0000	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	22.3	15	>>	Yes	Passes Criteria
PMSD	0.1201	0.13	0.47	Yes	Below Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	348.6	69.72	5	10.18	<1.0E-05	Significant Effect
Error	369.8	6.84815	54			
Total	718.4		59			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	15.36	15.09	0.0089	Unequal Variances
	Levene Equality of Variance Test	3.409	3.377	0.0095	Unequal Variances
	Mod Levene Equality of Variance Test	3.391	3.377	0.0098	Unequal Variances
Distribution	Anderson-Darling A2 Test	0.295	3.878	0.6272	Normal Distribution
	D'Agostino Kurtosis Test	0.9137	2.576	0.3609	Normal Distribution
	D'Agostino Skewness Test	1.512	2.576	0.1306	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	3.12	9.21	0.2101	Normal Distribution
	Kolmogorov-Smirnov D Test	0.06986	0.1331	0.6321	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9778	0.9459	0.3425	Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	22.3	20.45	24.15	22.5	19	26	0.8172	11.59%	0.00%
6.25		10	29.8	27.9	31.7	29.5	26	34	0.8406	8.92%	-33.63%
12.5		10	25.2	22.7	27.7	25	21	33	1.104	13.85%	-13.00%
25		10	26.7	24.24	29.16	26	22	32	1.086	12.86%	-19.73%
50		10	27	25.93	28.07	27	25	29	0.4714	5.52%	-21.08%
100		10	28.6	27.83	29.37	29	26	30	0.3399	3.76%	-28.25%

CETIS Analytical Report

Report Date: 14 Jan-21 15:54 (p 1 of 4)
 Test Code/ID: VCF1220.141cer / 09-3184-3870

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 07-4952-2278	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:53	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 15:48	MD5 Hash: 6DFFCF255519977902535414E38EA216	Editor ID: 000-189-126-0
Batch ID: 06-2637-4084	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:22	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:30	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 12-9616-2484	Code: VCF1220.141cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 08:15	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-VEN
Sample Age: 29h (7.8 °C)	Client: VCWPD	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC10	>100	---	---	<1	---	---
EC15	>100	---	---	<1	---	---
EC20	>100	---	---	<1	---	---
EC25	>100	---	---	<1	---	---
EC40	>100	---	---	<1	---	---
EC50	>100	---	---	<1	---	---

7d Survival Rate Summary

Conc-%	Code	Count	Calculated Variate(A/B)						Isotonic Variate		
			Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

7d Survival Rate Binomials

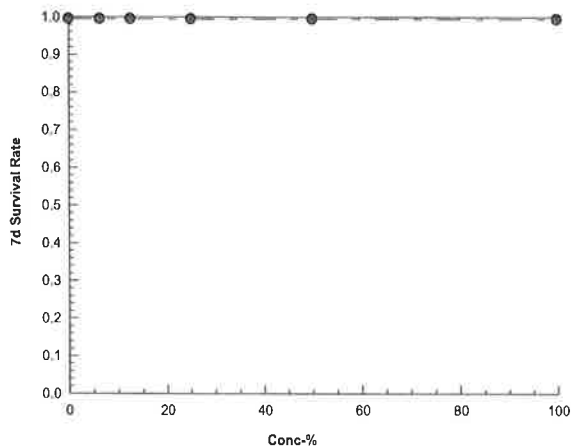
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 07-4952-2278	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:53	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 15:48	MD5 Hash: 6DFFCF255519977902535414E38EA216	Editor ID: 000-189-126-0

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 15:54 (p 3 of 4)
 Test Code/ID: VCF1220.141cer / 09-3184-3870

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 16-2499-3507 Endpoint: Reproduction CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 15:53 Analysis: Linear Interpolation (ICPIN) Status Level: 1
 Edit Date: 14 Jan-21 15:48 MD5 Hash: D295FA35D2F0C9E79690A971BDD7E6E4 Editor ID: 000-189-126-0

Batch ID: 06-2637-4084 Test Type: Reproduction-Survival (7d) Analyst:
 Start Date: 29 Dec-20 13:22 Protocol: EPA/821/R-02-013 (2002) Diluent: Laboratory Water
 Ending Date: 05 Jan-21 13:30 Species: Ceriodaphnia dubia Brine: Not Applicable
 Test Length: 7d 0h Taxon: Branchiopoda Source: Aquatic Biosystems, CO Age:

Sample ID: 12-9616-2484 Code: VCF1220.141cer Project: NPDES Stormwater Wet Season
 Sample Date: 28 Dec-20 08:15 Material: Sample Water Source: Bioassay Report
 Receipt Date: 28 Dec-20 09:34 CAS (PC): Station: MO-VEN
 Sample Age: 29h (7.8 °C) Client: VCWPD

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	832630	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	22.3	15	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	>100	---	---	<1	---	---
IC15	>100	---	---	<1	---	---
IC20	>100	---	---	<1	---	---
IC25	>100	---	---	<1	---	---
IC40	>100	---	---	<1	---	---
IC50	>100	---	---	<1	---	---

Reproduction Summary

Conc-%	Code	Count	Calculated Variate						Isotonic Variate	
			Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	N	10	22.3	22.5	19	26	11.59%	0.00%	26.6	0.00%
6.25		10	29.8	29.5	26	34	8.92%	-33.63%	26.6	0.00%
12.5		10	25.2	25	21	33	13.85%	-13.00%	26.6	0.00%
25		10	26.7	26	22	32	12.86%	-19.73%	26.6	0.00%
50		10	27	27	25	29	5.52%	-21.08%	26.6	0.00%
100		10	28.6	29	26	30	3.76%	-28.25%	26.6	0.00%

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	24	26	24	21	24	25	19	19	20	21
6.25		30	29	26	32	32	27	32	34	29	27
12.5		33	28	21	24	22	25	25	26	26	22
25		22	29	25	23	24	29	31	25	27	32
50		25	26	27	29	28	28	25	26	27	29
100		30	29	29	29	29	28	29	26	29	28

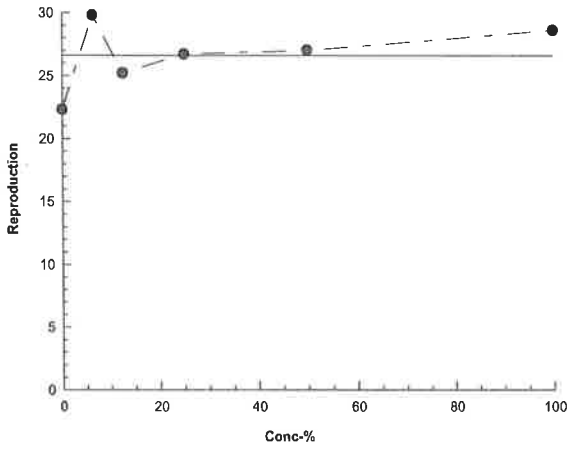
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Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 16-2499-3507 Endpoint: Reproduction CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:53 Analysis: Linear Interpolation (ICPIN) Status Level: 1
Edit Date: 14 Jan-21 15:48 MD5 Hash: D295FA35D2F0C9E79690A971BDD7E6E4 Editor ID: 000-189-126-0

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 15:54 (p 1 of 2)
 Test Code/ID: VCF1220.141cer / 09-3184-3870

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 02-3659-5071	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 15:53	Analysis: STP 2xK Contingency Tables	Status Level: 1
Edit Date: 14 Jan-21 15:48	MD5 Hash: 6DFFCF255519977902535414E38EA216	Editor ID: 000-189-126-0
Batch ID: 06-2637-4084	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:22	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:30	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 12-9616-2484	Code: VCF1220.141cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 08:15	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-VEN
Sample Age: 29h (7.8 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	100	>100	---	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	Conc-%	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	1.0000	Exact	1.0000	Non-Significant Effect
		12.5	1.0000	Exact	1.0000	Non-Significant Effect
		25	1.0000	Exact	1.0000	Non-Significant Effect
		50	1.0000	Exact	1.0000	Non-Significant Effect
		100	1.0000	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

7d Survival Rate Frequencies

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	N	10	0	10	1.0000	0.0000	0.00%
6.25		10	0	10	1.0000	0.0000	0.00%
12.5		10	0	10	1.0000	0.0000	0.00%
25		10	0	10	1.0000	0.0000	0.00%
50		10	0	10	1.0000	0.0000	0.00%
100		10	0	10	1.0000	0.0000	0.00%

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

CETIS Analytical Report

Report Date: 14 Jan-21 15:54 (p 2 of 2)
 Test Code/ID: VCF1220.141cer / 09-3184-3870

Ceriodaphnia 7-d Survival and Reproduction Test

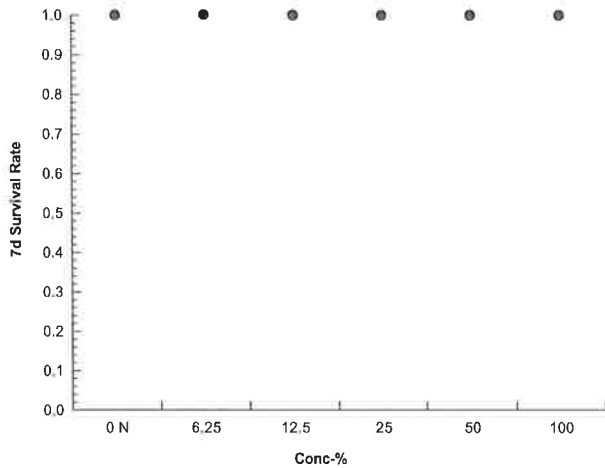
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 02-3659-5071 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 15:53 Analysis: STP 2xK Contingency Tables Status Level: 1
 Edit Date: 14 Jan-21 15:48 MD5 Hash: 6DFFCF255519977902535414E38EA216 Editor ID: 000-189-126-0

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Measurement Report

Report Date: 14 Jan-21 15:54 (p 2 of 8)
 Test Code/ID: VCF1220.141cer / 09-3184-3870

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.00%	0
6.25		8	24.03	23.97	24.08	24	24.2	0.008836	0.07069	0.29%	0
12.5		8	24.04	23.95	24.13	24	24.3	0.01326	0.1061	0.44%	0
25		8	24.04	23.95	24.13	24	24.3	0.01326	0.1061	0.44%	0
50		8	24.03	23.97	24.08	24	24.2	0.008836	0.07069	0.29%	0
100		8	24	24	24	24	24	0	0	0.00%	0
Overall		48	24.02	24	24.04	24	24.3	0.0103	0.07133	0.30%	0 (0%)

CETIS Measurement Report

Report Date: 14 Jan-21 15:54 (p 3 of 8)
Test Code/ID: VCF1220.141cer / 09-3184-3870

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		60					
100				33					
0	N	2		60					
100				33					
0	N	3		60					
100				33					
0	N	4		60					
100				33					
0	N	5		60					
100				33					
0	N	6		60					
100				33					
0	N	7		60					
100				33					
0	N	8		60					
100				33					

CETIS Measurement Report

Report Date: 14 Jan-21 15:54 (p 6 of 8)
Test Code/ID: VCF1220.141cer / 09-3184-3870

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Hardness (CaCO3)-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		95					
100				87					
0	N	2		95					
100				87					
0	N	3		90					
100				87					
0	N	4		90					
100				87					
0	N	5		90					
100				87					
0	N	6		90					
100				87					
0	N	7		90					
100				87					
0	N	8		90					
100				87					

CETIS Measurement Report

Report Date: 14 Jan-21 15:54 (p 7 of 8)
 Test Code/ID: VCF1220.141cer / 09-3184-3870

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

pH-Units

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		8					
6.25				7.3					
12.5				7.3					
25				7.3					
50				7.3					
100				7.2					
0	N	2		7.9					
6.25				7.3					
12.5				7.2					
25				7.2					
50				7.2					
100				7.2					
0	N	3		7.9					
6.25				7.9					
12.5				7.9					
25				7.8					
50				7.8					
100				7.7					
0	N	4		7.9					
6.25				8					
12.5				7.9					
25				7.8					
50				7.8					
100				7.9					
0	N	5		7.9					
6.25				7.8					
12.5				7.8					
25				7.8					
50				7.8					
100				7.8					
0	N	6		7.8					
6.25				7.8					
12.5				7.8					
25				7.8					
50				7.7					
100				7.7					
0	N	7		8					
6.25				7.8					
12.5				7.8					
25				7.8					
50				7.7					
100				7.7					
0	N	8		7.9					
6.25				7.7					
12.5				7.7					
25				7.7					
50				7.7					
100				7.6					

CETIS Measurement Report

Report Date: 14 Jan-21 15:54 (p 8 of 8)
 Test Code/ID: VCF1220.141cer / 09-3184-3870

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		24					
6.25				24.2					
12.5				24.3					
25				24.3					
50				24.2					
100				24					
0	N	2		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	3		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	4		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	5		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	6		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	7		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	8		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					



January 15, 2021

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed revised bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*" EPA-821-R-02-013. Results were as follows:


CLIENT: Ventura County Flood Control
SAMPLE I.D.: MO-HUE
DATE RECEIVED: 12/28/2020
ABC LAB. NO.: VCF1220.142

CHRONIC CERIODAPHNIA SURVIVAL & REPRODUCTION BIOASSAY

SURVIVAL NOEC = 100.00 %
TU_c = 1.00
EC25 = >100.00 %
EC50 = >100.00 %

REPRODUCTION NOEC = 100.00 %
TU_c = 1.00
IC25 = >100.00 %
IC50 = >100.00 %

Yours very truly,



Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 15 Jan-21 09:03 (p 1 of 2)
 Test Code/ID: VCF1220.142cer / 04-5570-6315

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 03-6833-4338	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:26	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:35	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 12-9928-9684	Code: VCF1220.142cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 07:15	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-HUE
Sample Age: 30h (9.8 °C)	Client: VCWPD	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	PMSD	TU	S
14-5976-0113	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	100	>100	---	---	1	1
17-6545-3678	Reproduction	Dunnett Multiple Comparison Test	100	>100	---	16.6%	1	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	%	95% LCL	95% UCL	TU	S
02-1334-4086	7d Survival Rate	Linear Interpolation (ICPIN)	✓ EC10	>100	---	---	<1	1
			✓ EC15	>100	---	---	<1	
			✓ EC20	>100	---	---	<1	
			✓ EC25	>100	---	---	<1	
			✓ EC40	>100	---	---	<1	
			✓ EC50	>100	---	---	<1	
00-5348-3475	Reproduction	Linear Interpolation (ICPIN)	✓ IC10	>100	---	---	<1	1
			✓ IC15	>100	---	---	<1	
			✓ IC20	>100	---	---	<1	
			✓ IC25	>100	---	---	<1	
			✓ IC40	>100	---	---	<1	
			✓ IC50	>100	---	---	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Overlap	Decision
				Lower	Upper			
02-1334-4086	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
14-5976-0113	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
00-5348-3475	Reproduction	Control Resp	23.2	15	>>	Yes	Passes Criteria	
17-6545-3678	Reproduction	Control Resp	23.2	15	>>	Yes	Passes Criteria	
17-6545-3678	Reproduction	PMSD	0.1662	0.13	0.47	Yes	Passes Criteria	

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	10	23.2	20.61	25.79	15	29	1.143	3.615	15.58%	0.00%
6.25		10	28	26.22	29.78	23	32	0.7888	2.494	8.91%	-20.69%
12.5		10	24.2	20.9	27.5	15	30	1.459	4.614	19.07%	-4.31%
25		10	25	22.57	27.43	19	30	1.075	3.399	13.60%	-7.76%
50		10	23.1	20.73	25.47	19	28	1.048	3.315	14.35%	0.43%
100		10	23.7	20.34	27.06	16	29	1.484	4.692	19.80%	-2.16%

PASS

CETIS Analytical Report

Report Date: 15 Jan-21 09:02 (p 1 of 2)
 Test Code/ID: VCF1220.142cer / 04-5570-6315

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 17-6545-3678 Endpoint: Reproduction CETIS Version: CETISv1.9.7
 Analyzed: 15 Jan-21 9:02 Analysis: Parametric-Control vs Treatments Status Level: 1
 Edit Date: 15 Jan-21 8:58 MD5 Hash: E37DABB673AA85A4E9C54BCFDE42A0C Editor ID: 000-189-126-0

Batch ID: 03-6833-4338 Test Type: Reproduction-Survival (7d) Analyst:
 Start Date: 29 Dec-20 13:26 Protocol: EPA/821/R-02-013 (2002) Diluent: Laboratory Water
 Ending Date: 05 Jan-21 13:35 Species: Ceriodaphnia dubia Brine: Not Applicable
 Test Length: 7d 0h Taxon: Branchiopoda Source: Aquatic Biosystems, CO Age:

Sample ID: 12-9928-9684 Code: VCF1220.142cer Project: NPDES Stormwater Wet Season
 Sample Date: 28 Dec-20 07:15 Material: Sample Water Source: Bioassay Report
 Receipt Date: 28 Dec-20 09:34 CAS (PC): Station: MO-HUE
 Sample Age: 30h (9.8 °C) Client: VCWPD

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	3.856	16.62%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	-2.849	2.289	3.856	18	CDF	1.0000	Non-Significant Effect
		12.5	-0.5936	2.289	3.856	18	CDF	0.9528	Non-Significant Effect
		25	-1.069	2.289	3.856	18	CDF	0.9872	Non-Significant Effect
		50	0.05936	2.289	3.856	18	CDF	0.8151	Non-Significant Effect
		100	-0.2968	2.289	3.856	18	CDF	0.9067	Non-Significant Effect

Test Acceptability Criteria

TAC Limits

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	23.2	15	>>	Yes	Passes Criteria
PMSD	0.1662	0.13	0.47	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	168.733	33.7467	5	2.378	0.0506	Non-Significant Effect
Error	766.2	14.1889	54			
Total	934.933		59			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	4.51	15.09	0.4785	Equal Variances
	Levene Equality of Variance Test	1.818	3.377	0.1248	Equal Variances
	Mod Levene Equality of Variance Test	1.453	3.377	0.2207	Equal Variances
Distribution	Anderson-Darling A2 Test	0.4888	3.878	0.2263	Normal Distribution
	D'Agostino Kurtosis Test	0.1074	2.576	0.9145	Normal Distribution
	D'Agostino Skewness Test	1.605	2.576	0.1085	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	2.587	9.21	0.2743	Normal Distribution
	Kolmogorov-Smirnov D Test	0.08142	0.1331	0.3852	Normal Distribution
	Shapiro-Wilk W Normality Test	0.968	0.9459	0.1160	Normal Distribution

Reproduction Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	23.2	20.61	25.79	23	15	29	1.143	15.58%	0.00%
6.25		10	28	26.22	29.78	27.5	23	32	0.7888	8.91%	-20.69%
12.5		10	24.2	20.9	27.5	25.5	15	30	1.459	19.07%	-4.31%
25		10	25	22.57	27.43	25	19	30	1.075	13.60%	-7.76%
50		10	23.1	20.73	25.47	22.5	19	28	1.048	14.35%	0.43%
100		10	23.7	20.34	27.06	24.5	16	29	1.484	19.80%	-2.16%

CETIS Analytical Report

Report Date: 15 Jan-21 09:02 (p 1 of 4)
 Test Code/ID: VCF1220.142cer / 04-5570-6315

Ceriodaphnia 7-d Survival and Reproduction Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 02-1334-4086	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7			
Analyzed: 15 Jan-21 9:02	Analysis: Linear Interpolation (ICPIN)	Status Level: 1			
Edit Date: 15 Jan-21 8:58	MD5 Hash: 6DFFCF255519977902535414E38EA216	Editor ID: 000-189-126-0			
Batch ID: 03-6833-4338	Test Type: Reproduction-Survival (7d)	Analyst:			
Start Date: 29 Dec-20 13:26	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 05 Jan-21 13:35	Species: Ceriodaphnia dubia	Brine: Not Applicable			
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:			
Sample ID: 12-9928-9684	Code: VCF1220.142cer	Project: NPDES Stormwater Wet Season			
Sample Date: 28 Dec-20 07:15	Material: Sample Water	Source: Bioassay Report			
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-HUE			
Sample Age: 30h (9.8 °C)	Client: VCWPD				

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria		TAC Limits			
Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC10	>100	---	---	<1	---	---
EC15	>100	---	---	<1	---	---
EC20	>100	---	---	<1	---	---
EC25	>100	---	---	<1	---	---
EC40	>100	---	---	<1	---	---
EC50	>100	---	---	<1	---	---

7d Survival Rate Summary			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	10/10	1.0000	0.00%

7d Survival Rate Detail											
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

7d Survival Rate Binomials											
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Report Date: 15 Jan-21 09:02 (p 3 of 4)
 Test Code/ID: VCF1220.142cer / 04-5570-6315

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 00-5348-3475	Endpoint: Reproduction	CETIS Version: CETISv1.9.7
Analyzed: 15 Jan-21 9:02	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 15 Jan-21 8:58	MD5 Hash: E37DABB673AA85A4E9C54BCFDE42A0C	Editor ID: 000-189-126-0
Batch ID: 03-6833-4338	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:26	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:35	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 12-9928-9684	Code: VCF1220.142cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 07:15	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-HUE
Sample Age: 30h (9.8 °C)	Client: VCWPD	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	508115	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	23.2	15	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	>100	---	---	<1	---	---
IC15	>100	---	---	<1	---	---
IC20	>100	---	---	<1	---	---
IC25	>100	---	---	<1	---	---
IC40	>100	---	---	<1	---	---
IC50	>100	---	---	<1	---	---

Reproduction Summary

Conc-%	Code	Count	Calculated Variate						Isotonic Variate	
			Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	N	10	23.2	23	15	29	15.58%	0.00%	25.6	0.00%
6.25		10	28	27.5	23	32	8.91%	-20.69%	25.6	0.00%
12.5		10	24.2	25.5	15	30	19.07%	-4.31%	24.6	3.91%
25		10	25	25	19	30	13.60%	-7.76%	24.6	3.91%
50		10	23.1	22.5	19	28	14.35%	0.43%	23.4	8.59%
100		10	23.7	24.5	16	29	19.80%	-2.16%	23.4	8.59%

Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	29	26	23	23	23	21	25	24	15	23
6.25		29	27	31	28	29	32	27	23	27	27
12.5		15	25	20	22	28	21	27	28	26	30
25		30	25	27	24	25	27	25	28	20	19
50		27	19	19	28	21	24	27	23	22	21
100		29	21	27	27	29	27	16	21	18	22

CETIS Analytical Report

Report Date: 15 Jan-21 09:03 (p 1 of 2)
 Test Code/ID: VCF1220.142cer / 04-5570-6315

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 14-5976-0113	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 15 Jan-21 9:02	Analysis: STP 2xK Contingency Tables	Status Level: 1
Edit Date: 15 Jan-21 8:58	MD5 Hash: 6DFFCF255519977902535414E38EA216	Editor ID: 000-189-126-0
Batch ID: 03-6833-4338	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:26	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:35	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 12-9928-9684	Code: VCF1220.142cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 07:15	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-HUE
Sample Age: 30h (9.8 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU
Untransformed	C > T	100	>100	---	1

Fisher Exact/Bonferroni-Holm Test

Control	vs	Conc-%	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	1.0000	Exact	1.0000	Non-Significant Effect
		12.5	1.0000	Exact	1.0000	Non-Significant Effect
		25	1.0000	Exact	1.0000	Non-Significant Effect
		50	1.0000	Exact	1.0000	Non-Significant Effect
		100	1.0000	Exact	1.0000	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

7d Survival Rate Frequencies

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
0	N	10	0	10	1.0000	0.0000	0.00%
6.25		10	0	10	1.0000	0.0000	0.00%
12.5		10	0	10	1.0000	0.0000	0.00%
25		10	0	10	1.0000	0.0000	0.00%
50		10	0	10	1.0000	0.0000	0.00%
100		10	0	10	1.0000	0.0000	0.00%

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
12.5		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

CETIS Analytical Report

Report Date: 15 Jan-21 09:03 (p 2 of 2)
 Test Code/ID: VCF1220.142cer / 04-5570-6315

Ceriodaphnia 7-d Survival and Reproduction Test

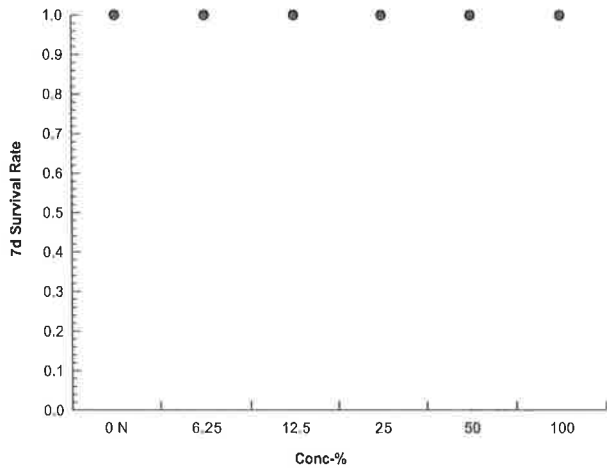
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 14-5976-0113 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
 Analyzed: 15 Jan-21 9:02 Analysis: STP 2xK Contingency Tables Status Level: 1
 Edit Date: 15 Jan-21 8:58 MD5 Hash: 6DFFCF255519977902535414E38EA216 Editor ID: 000-189-126-0

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Measurement Report

Report Date: 15 Jan-21 09:03 (p 1 of 8)
 Test Code/ID: VCF1220.142cer / 04-5570-6315

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 03-6833-4338	Test Type: Reproduction-Survival (7d)	Analyst:
Start Date: 29 Dec-20 13:26	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 05 Jan-21 13:35	Species: Ceriodaphnia dubia	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Branchiopoda	Source: Aquatic Biosystems, CO Age:
Sample ID: 12-9928-9684	Code: VCF1220.142cer	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 07:15	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: MO-HUE
Sample Age: 30h (9.8 °C)	Client: VCWPD	

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	60	60	60	60	60	0	0	0.00%	0
100		8	80	80	80	80	80	0	0	0.00%	0
Overall		16	70	64.5	75.5	60	80	2.582	10.33	14.75%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	338.6	335.9	341.3	332	342	0.4005	3.204	0.95%	0
6.25		8	412.1	404.7	419.6	402	430	1.111	8.887	2.16%	0
12.5		8	497.1	494	500.2	490	502	0.465	3.72	0.75%	0
25		8	610.4	604.4	616.3	603	620	0.8913	7.13	1.17%	0
50		8	882	879.9	884.1	877	885	0.3204	2.563	0.29%	0
100		8	1370	1367	1373	1362	1374	0.4479	3.583	0.26%	0
Overall		48	685	581.7	788.2	332	1374	51.33	355.6	51.92%	0 (0%)

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.525	7.342	7.708	7.2	7.8	0.02735	0.2188	2.91%	0
6.25		8	7.375	7.104	7.646	6.9	7.7	0.0405	0.324	4.39%	0
12.5		8	7.337	6.989	7.686	6.7	7.8	0.05216	0.4173	5.69%	0
25		8	7.275	6.93	7.62	6.7	7.7	0.05165	0.4132	5.68%	0
50		8	7.262	6.908	7.617	6.6	7.7	0.05301	0.4241	5.84%	0
100		8	7.2	6.774	7.626	6.4	7.6	0.06374	0.5099	7.08%	0
Overall		48	7.329	7.216	7.442	6.4	7.8	0.05602	0.3881	5.30%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	91.25	89.31	93.19	90	95	0.2893	2.315	2.54%	0
100		8	230	230	230	230	230	0	0	0.00%	0
Overall		16	160.6	122.4	198.8	90	230	17.92	71.67	44.62%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.913	7.859	7.966	7.8	8	0.00801	0.06408	0.81%	0
6.25		8	7.637	7.406	7.869	7.2	7.9	0.03468	0.2774	3.63%	0
12.5		8	7.562	7.368	7.757	7.2	7.8	0.02908	0.2326	3.08%	0
25		8	7.537	7.354	7.721	7.2	7.7	0.0275	0.22	2.92%	0
50		8	7.487	7.276	7.699	7	7.7	0.03165	0.2532	3.38%	0
100		8	7.475	7.24	7.71	7	7.8	0.0352	0.2816	3.77%	0
Overall		48	7.602	7.525	7.68	7	8	0.03853	0.267	3.51%	0 (0%)

P

CETIS Measurement Report

Report Date: 15 Jan-21 09:03 (p 4 of 8)
 Test Code/ID: VCF1220.142cer / 04-5570-6315

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Conductivity-µmhos

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		337					
6.25				407					
12.5				490					
25				603					
50				882					
100				1362					
0	N	2		332					
6.25				417					
12.5				494					
25				605					
50				883					
100				1369					
0	N	3		342					
6.25				430					
12.5				496					
25				603					
50				882					
100				1370					
0	N	4		338					
6.25				402					
12.5				499					
25				607					
50				881					
100				1370					
0	N	5		339					
6.25				410					
12.5				498					
25				610					
50				885					
100				1374					
0	N	6		342					
6.25				417					
12.5				499					
25				615					
50				885					
100				1369					
0	N	7		339					
6.25				407					
12.5				499					
25				620					
50				877					
100				1373					
0	N	8		340					
6.25				407					
12.5				502					
25				620					
50				881					
100				1370					

P

CETIS Measurement Report

Report Date: 15 Jan-21 09:03 (p 8 of 8)
 Test Code/ID: VCF1220.142cer / 04-5570-6315

Ceriodaphnia 7-d Survival and Reproduction Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		24					
6.25				24.3					
12.5				24.2					
25				24.6					
50				24.6					
100				24					
0	N	2		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	3		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	4		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	5		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	6		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	7		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					
0	N	8		24					
6.25				24					
12.5				24					
25				24					
50				24					
100				24					

January 15, 2021

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:


We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms EPA-821-R-02-013*. Results were as follows:

CLIENT:	Ventura County Flood Control
SAMPLE I.D.:	MO-MPK
DATE RECEIVED:	12/28/2020
ABC LAB. NO.:	VCF1220.130

CHRONIC SELENASTRUM ALGAE GROWTH BIOASSAY

NOEC =	100.00 %
TU _c =	1.00
IC ₂₅ =	>100.00 %
IC ₅₀ =	>100.00 %

Yours very truly,



Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 15 Jan-21 10:17 (p 1 of 1)
 Test Code/ID: VCF1220.130sel / 07-8786-0987

Selenastrum Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Batch ID: 15-1339-9177	Test Type: Cell Growth	Analyst:			
Start Date: 29 Dec-20 11:29	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 02 Jan-21 12:40	Species: Selenastrum capricornutum	Brine: Not Applicable			
Test Length: 4d 1h	Taxon: Chlorophyta	Source: Aquatic Biosystems, CO	Age:		
Sample ID: 06-2198-5442	Code: VCF1220.130sel	Project: NPDES Stormwater Wet Season			
Sample Date: 28 Dec-20 04:45	Material: Sample Water	Source: Bioassay Report			
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-MPK			
Sample Age: 31h (1 °C)	Client: VCWPD				

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	PMSD	TU	S
14-8923-2394	Cell Density	Dunnett Multiple Comparison Test	100	>100	---	10.6%	1	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	%	95% LCL	95% UCL	TU	S
08-8359-5152	Cell Density	Linear Interpolation (ICPIN)	IC10	>100	---	---	<1	1
			IC15	>100	---	---	<1	
			IC20	>100	---	---	<1	
			IC25	>100	---	---	<1	
			IC40	>100	---	---	<1	
			IC50	>100	---	---	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Overlap	Decision
				Lower	Upper		
08-8359-5152	Cell Density	Control CV	0.03531	<<	0.2	Yes	Passes Criteria
14-8923-2394	Cell Density	Control CV	0.03531	<<	0.2	Yes	Passes Criteria
08-8359-5152	Cell Density	Control Resp	1.25E+6	1000000	>>	Yes	Passes Criteria
14-8923-2394	Cell Density	Control Resp	1.25E+6	1000000	>>	Yes	Passes Criteria

Cell Density Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	1.246E+6	1.176E+6	1.316E+6	1.186E+6	1.288E+6	2.200E+4	4.400E+4	3.53%	0.00%
6.25		4	1.484E+6	1.342E+6	1.626E+6	1.363E+6	1.555E+6	4.467E+4	8.934E+4	6.02%	-19.10%
12.5		4	1.478E+6	1.412E+6	1.545E+6	1.431E+6	1.533E+6	2.094E+4	4.188E+4	2.83%	-18.62%
25		4	1.561E+6	1.376E+6	1.745E+6	1.442E+6	1.713E+6	5.805E+4	1.161E+5	7.44%	-25.24%
50		4	1.701E+6	1.545E+6	1.857E+6	1.638E+6	1.847E+6	4.896E+4	9.793E+4	5.76%	-36.49%
100		4	1.654E+6	1.594E+6	1.713E+6	1.608E+6	1.699E+6	1.874E+4	3.747E+4	2.27%	-32.70%

Cell Density Detail MD5: F173B9BE896BD27784E1B602530DBCDC

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.244E+6	1.288E+6	1.186E+6	1.267E+6
6.25		1.363E+6	1.548E+6	1.555E+6	1.471E+6
12.5		1.431E+6	1.533E+6	1.473E+6	1.476E+6
25		1.580E+6	1.442E+6	1.713E+6	1.508E+6
50		1.655E+6	1.847E+6	1.664E+6	1.638E+6
100		1.699E+6	1.660E+6	1.608E+6	1.648E+6

CETIS Analytical Report

Report Date: 15 Jan-21 10:17 (p 1 of 2)
 Test Code/ID: VCF1220.130sel / 07-8786-0987

Selenastrum Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 14-8923-2394	Endpoint: Cell Density	CETIS Version: CETISv1.9.7			
Analyzed: 15 Jan-21 10:16	Analysis: Parametric-Control vs Treatments	Status Level: 1			
Edit Date: 15 Jan-21 10:12	MD5 Hash: 93ED860123004EB6098AB8B0CF85DA2D	Editor ID: 000-189-126-0			
Batch ID: 15-1339-9177	Test Type: Cell Growth	Analyst:			
Start Date: 29 Dec-20 11:29	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 02 Jan-21 12:40	Species: Selenastrum capricornutum	Brine: Not Applicable			
Test Length: 4d 1h	Taxon: Chlorophyta	Source: Aquatic Biosystems, CO Age:			
Sample ID: 06-2198-5442	Code: VCF1220.130sel	Project: NPDES Stormwater Wet Season			
Sample Date: 28 Dec-20 04:45	Material: Sample Water	Source: Bioassay Report			
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-MPK			
Sample Age: 31h (1 °C)	Client: VCWPD				

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	132100	10.60%

Dunnnett Multiple Comparison Test									
Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	-4.337	2.407	1E+05	6	CDF	1.0000	Non-Significant Effect
		12.5	-4.227	2.407	1E+05	6	CDF	1.0000	Non-Significant Effect
		25	-5.73	2.407	1E+05	6	CDF	1.0000	Non-Significant Effect
		50	-8.286	2.407	1E+05	6	CDF	1.0000	Non-Significant Effect
		100	-7.425	2.407	1E+05	6	CDF	1.0000	Non-Significant Effect

Test Acceptability Criteria					
Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control CV	0.03531	<<	0.2	Yes	Passes Criteria
Control Resp	1.25E+6	1000000	>>	Yes	Passes Criteria

ANOVA Table							
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)	
Between	5.211E+11	1.042E+11	5	17.3	<1.0E-05	Significant Effect	
Error	1.084E+11	6.024E+09	18				
Total	6.295E+11		23				

ANOVA Assumptions Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variance	Bartlett Equality of Variance Test	6.038	15.09	0.3026	Equal Variances	
	Levene Equality of Variance Test	1.695	4.248	0.1868	Equal Variances	
	Mod Levene Equality of Variance Test	0.8763	4.248	0.5164	Equal Variances	
Distribution	Anderson-Darling A2 Test	0.3946	3.878	0.3778	Normal Distribution	
	D'Agostino Kurtosis Test	0.6813	2.576	0.4957	Normal Distribution	
	D'Agostino Skewness Test	1.026	2.576	0.3050	Normal Distribution	
	D'Agostino-Pearson K2 Omnibus Test	1.516	9.21	0.4685	Normal Distribution	
	Kolmogorov-Smirnov D Test	0.0964	0.2056	0.9013	Normal Distribution	
	Shapiro-Wilk W Normality Test	0.9585	0.884	0.4092	Normal Distribution	

Cell Density Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.246E+6	1.176E+6	1.316E+6	1.256E+6	1.186E+6	1.288E+6	2.200E+4	3.53%	0.00%
6.25		4	1.484E+6	1.342E+6	1.626E+6	1.510E+6	1.363E+6	1.555E+6	4.467E+4	6.02%	-19.10%
12.5		4	1.478E+6	1.412E+6	1.545E+6	1.474E+6	1.431E+6	1.533E+6	2.094E+4	2.83%	-18.62%
25		4	1.561E+6	1.376E+6	1.745E+6	1.544E+6	1.442E+6	1.713E+6	5.805E+4	7.44%	-25.24%
50		4	1.701E+6	1.545E+6	1.857E+6	1.660E+6	1.638E+6	1.847E+6	4.896E+4	5.76%	-36.49%
100		4	1.654E+6	1.594E+6	1.713E+6	1.654E+6	1.608E+6	1.699E+6	1.874E+4	2.27%	-32.70%

CETIS Analytical Report

Report Date: 15 Jan-21 10:17 (p 1 of 2)
 Test Code/ID: VCF1220.130sel / 07-8786-0987

Selenastrum Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 08-8359-5152	Endpoint: Cell Density	CETIS Version: CETISv1.9.7			
Analyzed: 15 Jan-21 10:16	Analysis: Linear Interpolation (ICPIN)	Status Level: 1			
Edit Date: 15 Jan-21 10:12	MD5 Hash: 93ED860123004EB6098AB8B0CF85DA2D	Editor ID: 000-189-126-0			
Batch ID: 15-1339-9177	Test Type: Cell Growth	Analyst:			
Start Date: 29 Dec-20 11:29	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water			
Ending Date: 02 Jan-21 12:40	Species: Selenastrum capricornutum	Brine: Not Applicable			
Test Length: 4d 1h	Taxon: Chlorophyta	Source: Aquatic Biosystems, CO Age:			
Sample ID: 06-2198-5442	Code: VCF1220.130sel	Project: NPDES Stormwater Wet Season			
Sample Date: 28 Dec-20 04:45	Material: Sample Water	Source: Bioassay Report			
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-MPK			
Sample Age: 31h (1 °C)	Client: VCWPD				

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria		TAC Limits			
Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control CV	0.03531	<<	0.2	Yes	Passes Criteria
Control Resp	1.25E+6	1000000	>>	Yes	Passes Criteria

Point Estimates						
Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	>100	---	---	<1	---	---
IC15	>100	---	---	<1	---	---
IC20	>100	---	---	<1	---	---
IC25	>100	---	---	<1	---	---
IC40	>100	---	---	<1	---	---
IC50	>100	---	---	<1	---	---

Cell Density Summary			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	N	4	1.246E+6	1.256E+6	1.186E+6	1.288E+6	3.53%	0.00%	1.521E+6	0.00%
6.25		4	1.484E+6	1.510E+6	1.363E+6	1.555E+6	6.02%	-19.10%	1.521E+6	0.00%
12.5		4	1.478E+6	1.474E+6	1.431E+6	1.533E+6	2.83%	-18.62%	1.521E+6	0.00%
25		4	1.561E+6	1.544E+6	1.442E+6	1.713E+6	7.44%	-25.24%	1.521E+6	0.00%
50		4	1.701E+6	1.660E+6	1.638E+6	1.847E+6	5.76%	-36.49%	1.521E+6	0.00%
100		4	1.654E+6	1.654E+6	1.608E+6	1.699E+6	2.27%	-32.70%	1.521E+6	0.00%

Cell Density Detail					
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.244E+6	1.288E+6	1.186E+6	1.267E+6
6.25		1.363E+6	1.548E+6	1.555E+6	1.471E+6
12.5		1.431E+6	1.533E+6	1.473E+6	1.476E+6
25		1.580E+6	1.442E+6	1.713E+6	1.508E+6
50		1.655E+6	1.847E+6	1.664E+6	1.638E+6
100		1.699E+6	1.660E+6	1.608E+6	1.648E+6

CETIS Measurement Report

Report Date: 15 Jan-21 10:17 (p 1 of 4)
Test Code/ID: VCF1220.130sel / 07-8786-0987

Selenastrum Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 15-1339-9177	Test Type: Cell Growth	Analyst:
Start Date: 29 Dec-20 11:29	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 02 Jan-21 12:40	Species: Selenastrum capricornutum	Brine: Not Applicable
Test Length: 4d 1h	Taxon: Chlorophyta	Source: Aquatic Biosystems, CO Age:
Sample ID: 06-2198-5442	Code: VCF1220.130sel	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 04:45	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 07:50	CAS (PC):	Station: MO-MPK
Sample Age: 31h (1 °C)	Client: VCWPD	

Alkalinity (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	63	---	---	63	63	---	0	---	0
6.25		1	60	---	---	60	60	---	0	---	0
12.5		1	57	---	---	57	57	---	0	---	0
25		1	56	---	---	56	56	---	0	---	0
50		1	58	---	---	58	58	---	0	---	0
100		1	59	---	---	59	59	---	0	---	0
Overall		6	58.83	56.23	61.44	56	63	1.014	2.483	4.22%	0 (0%)

Conductivity-µmhos

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	460.8	441.5	480.1	447	487	3.103	15.51	3.37%	0
6.25		5	466.4	449.2	483.6	449	485	2.777	13.89	2.98%	0
12.5		5	463.4	446.6	480.2	451	484	2.704	13.52	2.92%	0
25		5	474.6	456.5	492.7	459	494	2.921	14.6	3.08%	0
50		5	491.6	472.2	511	474	512	3.126	15.63	3.18%	0
100		5	519.6	495	544.2	507	554	3.961	19.81	3.81%	0
Overall		30	479.4	469.9	488.9	447	554	4.631	25.37	5.29%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	1	115	---	---	115	115	---	0	---	0
6.25		1	113	---	---	113	113	---	0	---	0
12.5		1	101	---	---	101	101	---	0	---	0
25		1	102	---	---	102	102	---	0	---	0
50		1	112	---	---	112	112	---	0	---	0
100		1	119	---	---	119	119	---	0	---	0
Overall		6	110.3	102.7	117.9	101	119	2.963	7.257	6.58%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	7.62	7.436	7.804	7.4	7.8	0.02967	0.1483	1.95%	0
6.25		5	7.6	7.512	7.688	7.5	7.7	0.01414	0.07071	0.93%	0
12.5		5	7.6	7.512	7.688	7.5	7.7	0.01414	0.07071	0.93%	0
25		5	7.6	7.512	7.688	7.5	7.7	0.01414	0.07071	0.93%	0
50		5	7.6	7.512	7.688	7.5	7.7	0.01414	0.07071	0.93%	0
100		5	7.56	7.449	7.671	7.4	7.6	0.01789	0.08944	1.18%	0
Overall		30	7.597	7.565	7.628	7.4	7.8	0.01552	0.08503	1.12%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	5	24.92	24.78	25.06	24.8	25	0.02192	0.1096	0.44%	0
6.25		5	24.92	24.78	25.06	24.8	25	0.02192	0.1096	0.44%	0
12.5		5	24.92	24.78	25.06	24.8	25	0.02192	0.1096	0.44%	0
25		5	24.92	24.78	25.06	24.8	25	0.02192	0.1096	0.44%	0
50		5	24.92	24.78	25.06	24.8	25	0.02192	0.1096	0.44%	0
100		5	24.92	24.78	25.06	24.8	25	0.02192	0.1096	0.44%	0
Overall		30	24.92	24.88	24.96	24.8	25	0.01819	0.09965	0.40%	0 (0%)

CETIS Measurement Report

Report Date: 15 Jan-21 10:17 (p 4 of 4)
 Test Code/ID: VCF1220.130sel / 07-8786-0987

Selenastrum Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		25					
6.25				25					
12.5				25					
25				25					
50				25					
100				25					
0	N	2		24.8					
6.25				24.8					
12.5				24.8					
25				24.8					
50				24.8					
100				24.8					
0	N	3		24.8					
6.25				24.8					
12.5				24.8					
25				24.8					
50				24.8					
100				24.8					
0	N	4		25					
6.25				25					
12.5				25					
25				25					
50				25					
100				25					
0	N	5		25					
6.25				25					
12.5				25					
25				25					
50				25					
100				25					



January 15, 2021

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Estuarine Organisms, EPA/821/R-02-014*. Results were as follows:

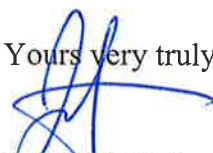
CLIENT: Ventura County Flood Control
SAMPLE I.D.: ME-CC
DATE RECEIVED: 12/28/2020
ABC LAB. NO.: VCF1220.136

CHRONIC TOPSMELT SURVIVAL AND GROWTH BIOASSAY

Survival NOEC = 100.00
 TUc = 1.00
 EC25 = >100.00 %
 EC50 = >100.00 %

Biomass NOEC = 100.00 %
 TUc = 1.00
 IC25 = >100.00 %
 IC50 = >100.00 %

Yours very truly,


Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 15 Jan-21 11:03 (p 1 of 2)
Test Code/ID: VCF1220.136tops / 19-2606-8728

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 19-9937-0771	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:10	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 06 Jan-21 13:07	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 06-4269-8078	Code: VCF1220.136tops	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:10	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: ME-CC
Sample Age: 55h (10.8 °C)	Client: VCWPD	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	PMSD	TU	S
07-7890-7287	7d Survival Rate	Steel Many-One Rank Sum Test	100	>100	---	8.2%	1	1
11-4024-3202	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	100	>100	---	6.45%	1	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	%	95% LCL	95% UCL	TU	S
03-3954-0906	7d Survival Rate	Linear Interpolation (ICPIN)	✓ EC10	>100	---	---	<1	1
			✓ EC15	>100	---	---	<1	
			✓ EC20	>100	---	---	<1	
			✓ EC25	>100	---	---	<1	
			✓ EC40	>100	---	---	<1	
			✓ EC50	>100	---	---	<1	
16-2498-8610	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	✓ IC10	>100	---	---	<1	1
			✓ IC15	>100	---	---	<1	
			✓ IC20	>100	---	---	<1	
			✓ IC25	>100	---	---	<1	
			✓ IC40	>100	---	---	<1	
			✓ IC50	>100	---	---	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Overlap	Decision
				Lower	Upper			
03-3954-0906	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
07-7890-7287	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria	
11-4024-3202	Mean Dry Biomass-mg	Control Resp	1.238	0.85	>>	Yes	Passes Criteria	
16-2498-8610	Mean Dry Biomass-mg	Control Resp	1.238	0.85	>>	Yes	Passes Criteria	
07-7890-7287	7d Survival Rate	PMSD	0.08202	<<	0.25	No	Passes Criteria	

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
6.25		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
12.5		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
25		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
50		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
100		5	0.9600	0.8489	1.0710	0.8000	1.0000	0.0400	0.0894	9.32%	4.00%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	1.238	1.209	1.267	1.204	1.268	0.01035	0.02315	1.87%	0.00%
6.25		5	1.227	1.206	1.249	1.204	1.246	0.007736	0.0173	1.41%	0.87%
12.5		5	1.27	1.186	1.353	1.204	1.346	0.03007	0.06724	5.30%	-2.55%
25		5	1.265	1.216	1.314	1.218	1.316	0.01772	0.03961	3.13%	-2.20%
50		5	1.303	1.198	1.409	1.236	1.424	0.03807	0.08512	6.53%	-5.27%
100		5	1.209	1.141	1.277	1.13	1.262	0.02445	0.05467	4.52%	2.33%

CETIS Analytical Report

Report Date: 15 Jan-21 11:02 (p 1 of 4)
 Test Code/ID: VCF1220.136tops / 19-2606-8728

Pacific Topsmelt 7-d Survival and Growth Test				Aquatic Bioassay & Consulting Labs, Inc.			
Analysis ID: 07-7890-7287	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7					
Analyzed: 15 Jan-21 11:02	Analysis: Nonparametric-Control vs Treatments	Status Level: 1					
Edit Date: 15 Jan-21 11:01	MD5 Hash: F5B853E1E2BC2EAA0130BD9B392217E1	Editor ID: 000-189-126-0					
Batch ID: 19-9937-0771	Test Type: Growth-Survival (7d)	Analyst:					
Start Date: 30 Dec-20 13:10	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater					
Ending Date: 06 Jan-21 13:07	Species: Atherinops affinis	Brine: Not Applicable					
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO	Age:				
Sample ID: 06-4269-8078	Code: VCF1220.136tops	Project: NPDES Stormwater Wet Season					
Sample Date: 28 Dec-20 06:10	Material: Sample Water	Source: Bioassay Report					
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: ME-CC					
Sample Age: 55h (10.8 °C)	Client: VCWPD						

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.08202	8.20%

Steel Many-One Rank Sum Test									
Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	27.5	16	1	8	CDF	0.8333	Non-Significant Effect
		12.5	27.5	16	1	8	CDF	0.8333	Non-Significant Effect
		25	27.5	16	1	8	CDF	0.8333	Non-Significant Effect
		50	27.5	16	1	8	CDF	0.8333	Non-Significant Effect
		100	25	16	1	8	CDF	0.6353	Non-Significant Effect

Test Acceptability Criteria					
Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria
PMSD	0.08202	<<	0.25	No	Passes Criteria

ANOVA Table							
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)	
Between	0.0094513	0.0018903	5	1	0.4389	Non-Significant Effect	
Error	0.0453663	0.0018903	24				
Total	0.0548176		29				

ANOVA Assumptions Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variance	Bartlett Equality of Variance Test				Indeterminate	
	Levene Equality of Variance Test	7.111	3.895	0.0003	Unequal Variances	
	Mod Levene Equality of Variance Test	1	4.248	0.4457	Equal Variances	
Distribution	Anderson-Darling A2 Test	7.95	3.878	<1.0E-05	Non-Normal Distribution	
	D'Agostino Kurtosis Test	4.912	2.576	<1.0E-05	Non-Normal Distribution	
	D'Agostino Skewness Test	5.58	2.576	<1.0E-05	Non-Normal Distribution	
	D'Agostino-Pearson K2 Omnibus Test	55.27	9.21	<1.0E-05	Non-Normal Distribution	
	Kolmogorov-Smirnov D Test	0.4667	0.1853	<1.0E-05	Non-Normal Distribution	
	Shapiro-Wilk W Normality Test	0.4063	0.9031	<1.0E-05	Non-Normal Distribution	

7d Survival Rate Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
12.5		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		5	0.9600	0.8489	1.0000	1.0000	0.8000	1.0000	0.0400	9.32%	4.00%

CETIS Analytical Report

Report Date: 15 Jan-21 11:02 (p 2 of 4)
 Test Code/ID: VCF1220.136tops / 19-2606-8728

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 07-7890-7287 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
 Analyzed: 15 Jan-21 11:02 Analysis: Nonparametric-Control vs Treatments Status Level: 1
 Edit Date: 15 Jan-21 11:01 MD5 Hash: F5B853E1E2BC2EAA0130BD9B392217E1 Editor ID: 000-189-126-0

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.3450	1.3450	1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
6.25		5	1.3450	1.3450	1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
12.5		5	1.3450	1.3450	1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
25		5	1.3450	1.3450	1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
50		5	1.3450	1.3450	1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
100		5	1.2980	1.1650	1.4300	1.3450	1.1070	1.3450	0.0476	8.21%	3.54%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	0.8000	1.0000	1.0000

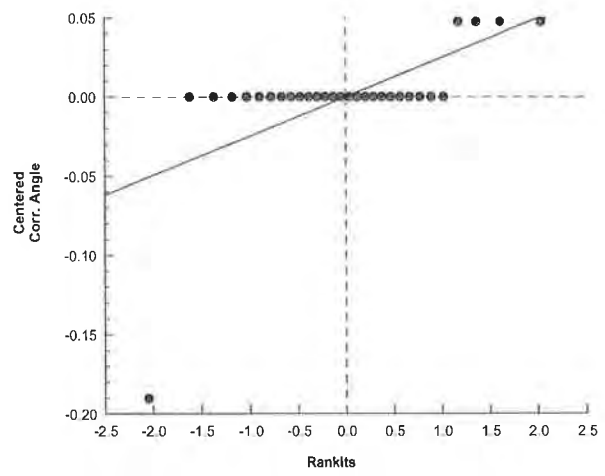
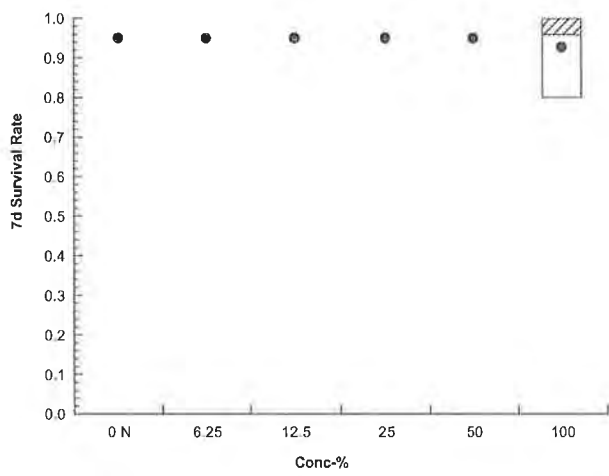
Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.3450	1.3450	1.3450	1.3450	1.3450
6.25		1.3450	1.3450	1.3450	1.3450	1.3450
12.5		1.3450	1.3450	1.3450	1.3450	1.3450
25		1.3450	1.3450	1.3450	1.3450	1.3450
50		1.3450	1.3450	1.3450	1.3450	1.3450
100		1.3450	1.3450	1.1070	1.3450	1.3450

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	5/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	4/5	5/5	5/5

Graphics



CETIS Analytical Report

Report Date: 15 Jan-21 11:02 (p 3 of 4)
 Test Code/ID: VCF1220.136tops / 19-2606-8728

Pacific Topsmelt 7-d Survival and Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 11-4024-3202	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7			
Analyzed: 15 Jan-21 11:02	Analysis: Parametric-Control vs Treatments	Status Level: 1			
Edit Date: 15 Jan-21 11:01	MD5 Hash: D53EB8904549C76F27CB379CE361AE94	Editor ID: 000-189-126-0			
Batch ID: 19-9937-0771	Test Type: Growth-Survival (7d)	Analyst:			
Start Date: 30 Dec-20 13:10	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater			
Ending Date: 06 Jan-21 13:07	Species: Atherinops affinis	Brine: Not Applicable			
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:			
Sample ID: 06-4269-8078	Code: VCF1220.136tops	Project: NPDES Stormwater Wet Season			
Sample Date: 28 Dec-20 06:10	Material: Sample Water	Source: Bioassay Report			
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: ME-CC			
Sample Age: 55h (10.8 °C)	Client: VCWPD				

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	0.07988	6.45%

Dunnnett Multiple Comparison Test									
Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	0.3193	2.362	0.08	8	CDF	0.7223	Non-Significant Effect
		12.5	-0.9343	2.362	0.08	8	CDF	0.9800	Non-Significant Effect
		25	-0.8042	2.362	0.08	8	CDF	0.9717	Non-Significant Effect
		50	-1.928	2.362	0.08	8	CDF	0.9991	Non-Significant Effect
		100	0.8515	2.362	0.08	8	CDF	0.4872	Non-Significant Effect

Test Acceptability Criteria					
Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1.238	0.85	>>	Yes	Passes Criteria

ANOVA Table						
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0287415	0.0057483	5	2.01	0.1135	Non-Significant Effect
Error	0.0686384	0.0028599	24			
Total	0.0973799		29			

ANOVA Assumptions Tests					
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	11.3	15.09	0.0457	Equal Variances
	Levene Equality of Variance Test	6.47	3.895	0.0006	Unequal Variances
	Mod Levene Equality of Variance Test	1.712	4.248	0.1829	Equal Variances
Distribution	Anderson-Darling A2 Test	0.2048	3.878	0.9146	Normal Distribution
	D'Agostino Kurtosis Test	0.03933	2.576	0.9686	Normal Distribution
	D'Agostino Skewness Test	0.9288	2.576	0.3530	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	0.8642	9.21	0.6492	Normal Distribution
	Kolmogorov-Smirnov D Test	0.06736	0.1853	1.0000	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9756	0.9031	0.7011	Normal Distribution

Mean Dry Biomass-mg Summary											
Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.238	1.209	1.267	1.242	1.204	1.268	0.01035	1.87%	0.00%
6.25		5	1.227	1.206	1.249	1.226	1.204	1.246	0.007735	1.41%	0.87%
12.5		5	1.27	1.186	1.353	1.254	1.204	1.346	0.03007	5.30%	-2.55%
25		5	1.265	1.216	1.314	1.262	1.218	1.316	0.01772	3.13%	-2.20%
50		5	1.303	1.198	1.409	1.254	1.236	1.424	0.03807	6.53%	-5.27%
100		5	1.209	1.141	1.277	1.236	1.13	1.262	0.02445	4.52%	2.33%

CETIS Analytical Report

Report Date: 15 Jan-21 11:02 (p 1 of 4)
 Test Code/ID: VCF1220.136tops / 19-2606-8728

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 03-3954-0906	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 15 Jan-21 11:02	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 15 Jan-21 11:01	MD5 Hash: F5B853E1E2BC2EAA0130BD9B392217E1	Editor ID: 000-189-126-0
Batch ID: 19-9937-0771	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:10	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 06 Jan-21 13:07	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 06-4269-8078	Code: VCF1220.136tops	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:10	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: ME-CC
Sample Age: 55h (10.8 °C)	Client: VCWPD	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC10	>100	---	---	<1	---	---
EC15	>100	---	---	<1	---	---
EC20	>100	---	---	<1	---	---
EC25	>100	---	---	<1	---	---
EC40	>100	---	---	<1	---	---
EC50	>100	---	---	<1	---	---

7d Survival Rate Summary

Conc-%	Code	Count	Calculated Variate(A/B)						Isotonic Variate		
			Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	25/25	1.0000	0.00%
6.25		5	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	25/25	1.0000	0.00%
12.5		5	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	25/25	1.0000	0.00%
25		5	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	25/25	1.0000	0.00%
50		5	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	25/25	1.0000	0.00%
100		5	0.9600	1.0000	0.8000	1.0000	9.32%	4.00%	24/25	0.9600	4.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	0.8000	1.0000	1.0000

7d Survival Rate Binomials

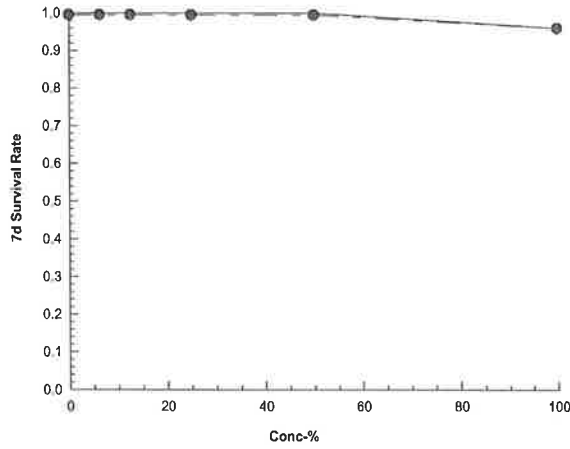
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	5/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	5/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	4/5	5/5	5/5

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 03-3954-0906 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
Analyzed: 15 Jan-21 11:02 Analysis: Linear Interpolation (ICPIN) Status Level: 1
Edit Date: 15 Jan-21 11:01 MD5 Hash: F5B853E1E2BC2EAA0130BD9B392217E1 Editor ID: 000-189-126-0

Graphics



CETIS Analytical Report

Report Date: 15 Jan-21 11:02 (p 3 of 4)
 Test Code/ID: VCF1220.136tops / 19-2606-8728

Pacific Topsmelt 7-d Survival and Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 16-2498-8610	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7	Analyzed: 15 Jan-21 11:02	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 15 Jan-21 11:01	MD5 Hash: D53EB8904549C76F27CB379CE361AE94	Editor ID: 000-189-126-0	Batch ID: 19-9937-0771	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:10	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater	Ending Date: 06 Jan-21 13:07	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO	Age:	Sample ID: 06-4269-8078	Code: VCF1220.136tops
Sample Date: 28 Dec-20 06:10	Material: Sample Water	Project: NPDES Stormwater Wet Season	Receipt Date: 28 Dec-20 09:34	CAS (PC):	Source: Bioassay Report
Sample Age: 55h (10.8 °C)	Client: VCWPD	Station: ME-CC			

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1808797	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1.238	0.85	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	>100	---	---	<1	---	---
IC15	>100	---	---	<1	---	---
IC20	>100	---	---	<1	---	---
IC25	>100	---	---	<1	---	---
IC40	>100	---	---	<1	---	---
IC50	>100	---	---	<1	---	---

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Calculated Variate						Isotonic Variate	
			Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	N	5	1.238	1.242	1.204	1.268	1.87%	0.00%	1.261	0.00%
6.25		5	1.227	1.226	1.204	1.246	1.41%	0.87%	1.261	0.00%
12.5		5	1.27	1.254	1.204	1.346	5.30%	-2.55%	1.261	0.00%
25		5	1.265	1.262	1.218	1.316	3.13%	-2.20%	1.261	0.00%
50		5	1.303	1.254	1.236	1.424	6.53%	-5.27%	1.261	0.00%
100		5	1.209	1.236	1.13	1.262	4.52%	2.33%	1.209	4.08%

Mean Dry Biomass-mg Detail

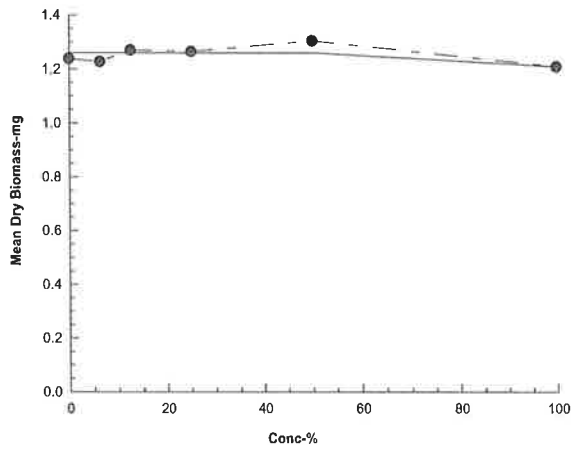
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.242	1.204	1.244	1.232	1.268
6.25		1.246	1.218	1.226	1.242	1.204
12.5		1.21	1.254	1.204	1.334	1.346
25		1.262	1.316	1.292	1.238	1.218
50		1.24	1.424	1.254	1.236	1.362
100		1.236	1.262	1.242	1.176	1.13

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 16-2498-8610 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.7
Analyzed: 15 Jan-21 11:02 Analysis: Linear Interpolation (ICPIN) Status Level: 1
Edit Date: 15 Jan-21 11:01 MD5 Hash: D53EB8904549C76F27CB379CE361AE94 Editor ID: 000-189-126-0

Graphics



CETIS Measurement Report

Report Date: 15 Jan-21 11:03 (p 1 of 5)
 Test Code/ID: VCF1220.136tops / 19-2606-8728

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 19-9937-0771	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:10	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 06 Jan-21 13:07	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 06-4269-8078	Code: VCF1220.136tops	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 06:10	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: ME-CC
Sample Age: 55h (10.8 °C)	Client: VCWPD	

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	6.65	6.445	6.855	6.2	6.9	0.03062	0.2449	3.68%	0
6.25		8	6.537	6.343	6.732	6.2	6.8	0.02908	0.2326	3.56%	0
12.5		8	6.475	6.276	6.674	6.1	6.7	0.02969	0.2375	3.67%	0
25		8	6.438	6.259	6.616	6.1	6.7	0.02667	0.2134	3.31%	0
50		8	6.413	6.221	6.604	6	6.7	0.02869	0.2295	3.58%	0
100		8	6.375	6.157	6.593	6	6.7	0.03256	0.2605	4.09%	0
Overall		48	6.481	6.411	6.552	6	6.9	0.03493	0.242	3.73%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.375	7.301	7.449	7.3	7.5	0.01108	0.08864	1.20%	0
6.25		8	7.388	7.293	7.482	7.2	7.5	0.01407	0.1126	1.52%	0
12.5		8	7.4	7.311	7.489	7.2	7.5	0.01336	0.1069	1.44%	0
25		8	7.45	7.387	7.513	7.3	7.5	0.009449	0.07559	1.01%	0
50		8	7.45	7.387	7.513	7.3	7.5	0.009449	0.07559	1.01%	0
100		8	7.475	7.436	7.514	7.4	7.5	0.005787	0.04629	0.62%	0
Overall		48	7.423	7.397	7.449	7.2	7.5	0.01306	0.09048	1.22%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	25	25	25	25	25	0	0	0.00%	0
6.25		8	25	25	25	25	25	0	0	0.00%	0
12.5		8	25	25	25	25	25	0	0	0.00%	0
25		8	25	25	25	25	25	0	0	0.00%	0
50		8	25	25	25	25	25	0	0	0.00%	0
100		8	25	25	25	25	25	0	0	0.00%	0
Overall		48	25	25	25	25	25	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	21	21	21	21	21	0	0	0.00%	0
6.25		8	21	21	21	21	21	0	0	0.00%	0
12.5		8	21	21	21	21	21	0	0	0.00%	0
25		8	21	21	21	21	21	0	0	0.00%	0
50		8	21	21	21	21	21	0	0	0.00%	0
100		8	21	21	21	21	21	0	0	0.00%	0
Overall		48	21	21	21	21	21	0	0	0.00%	0 (0%)

CETIS Measurement Report

Report Date: 15 Jan-21 11:03 (p 2 of 5)

Test Code/ID: VCF1220.136tops / 19-2606-8728

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		6.9					
6.25				6.5					
12.5				6.4					
25				6.4					
50				6.3					
100				6.2					
0	N	2		6.9					
6.25				6.2					
12.5				6.2					
25				6.3					
50				6.4					
100				6.5					
0	N	3		6.6					
6.25				6.5					
12.5				6.4					
25				6.3					
50				6.3					
100				6.2					
0	N	4		6.7					
6.25				6.7					
12.5				6.7					
25				6.4					
50				6.5					
100				6.5					
0	N	5		6.8					
6.25				6.7					
12.5				6.7					
25				6.7					
50				6.7					
100				6.7					
0	N	6		6.7					
6.25				6.8					
12.5				6.7					
25				6.7					
50				6.7					
100				6.7					
0	N	7		6.4					
6.25				6.7					
12.5				6.6					
25				6.6					
50				6.4					
100				6.2					
0	N	8		6.2					
6.25				6.2					
12.5				6.1					
25				6.1					
50				6					
100				6					

CETIS Measurement Report

Report Date: 15 Jan-21 11:03 (p 3 of 5)

Test Code/ID: VCF1220.136tops / 19-2606-8728

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

pH-Units

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.3					
6.25				7.4					
12.5				7.4					
25				7.4					
50				7.4					
100				7.4					
0	N	2		7.3					
6.25				7.2					
12.5				7.2					
25				7.3					
50				7.3					
100				7.4					
0	N	3		7.3					
6.25				7.3					
12.5				7.3					
25				7.4					
50				7.4					
100				7.5					
0	N	4		7.3					
6.25				7.3					
12.5				7.4					
25				7.5					
50				7.5					
100				7.5					
0	N	5		7.4					
6.25				7.4					
12.5				7.4					
25				7.5					
50				7.5					
100				7.5					
0	N	6		7.5					
6.25				7.5					
12.5				7.5					
25				7.5					
50				7.5					
100				7.5					
0	N	7		7.4					
6.25				7.5					
12.5				7.5					
25				7.5					
50				7.5					
100				7.5					
0	N	8		7.5					
6.25				7.5					
12.5				7.5					
25				7.5					
50				7.5					
100				7.5					

CETIS Measurement Report

Report Date: 15 Jan-21 11:03 (p 4 of 5)

Test Code/ID: VCF1220.136tops / 19-2606-8728

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Salinity-ppt

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		25					
6.25				25					
12.5				25					
25				25					
50				25					
100				25					
0	N	2		25					
6.25				25					
12.5				25					
25				25					
50				25					
100				25					
0	N	3		25					
6.25				25					
12.5				25					
25				25					
50				25					
100				25					
0	N	4		25					
6.25				25					
12.5				25					
25				25					
50				25					
100				25					
0	N	5		25					
6.25				25					
12.5				25					
25				25					
50				25					
100				25					
0	N	6		25					
6.25				25					
12.5				25					
25				25					
50				25					
100				25					
0	N	7		25					
6.25				25					
12.5				25					
25				25					
50				25					
100				25					
0	N	8		25					
6.25				25					
12.5				25					
25				25					
50				25					
100				25					



January 15, 2021

Mr. Arne Anselm
Ventura County Watershed Protection District
800 South Victoria Ave
Ventura, CA 93009

Dear Mr. Anselm:

We are pleased to present the enclosed bioassay report. The test was conducted under guidelines prescribed in *Short-Term Methods for Measuring the Chronic Toxicity of Effluents and Receiving Waters to West Coast Estuarine Organisms, EPA/821/R-02-014*. Results were as follows:


CLIENT: Ventura County Flood Control
SAMPLE I.D.: ME-VR2
DATE RECEIVED: 12/28/2020
ABC LAB. NO.: VCF1220.137

CHRONIC TOPSMELT SURVIVAL AND GROWTH BIOASSAY

Survival NOEC = 100.00
 TU_c = 1.00
 EC25 = >100.00 %
 EC50 = >100.00 %

Biomass NOEC = 100.00 %
 TU_c = 1.00
 IC25 = >100.00 %
 IC50 = >100.00 %

Yours very truly,



Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 15 Jan-21 10:11 (p 1 of 2)
 Test Code/ID: VCF1220.137tops / 17-7226-7033

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 07-8295-1157	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:12	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 06 Jan-21 13:10	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 17-6912-6360	Code: VCF1220.137tops	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 07:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: ME-VR2
Sample Age: 54h (7.3 °C)	Client: VCWPD	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	PMSD	TU	S
04-9467-4403	7d Survival Rate	Steel Many-One Rank Sum Test	100	>100	---	8.2%	1	1
21-0685-8084	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	100	>100	---	4.78%	1	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	%	95% LCL	95% UCL	TU	S
13-6183-0644	7d Survival Rate	Linear Interpolation (ICPIN)	✓ EC10	>100	---	---	<1	1
			✓ EC15	>100	---	---	<1	
			✓ EC20	>100	---	---	<1	
			✓ EC25	>100	---	---	<1	
			✓ EC40	>100	---	---	<1	
			✓ EC50	>100	---	---	<1	
00-8986-4008	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)	✓ IC10	>100	---	---	<1	1
			✓ IC15	>100	---	---	<1	
			✓ IC20	>100	---	---	<1	
			✓ IC25	>100	---	---	<1	
			✓ IC40	>100	---	---	<1	
			✓ IC50	>100	---	---	<1	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Overlap	Decision
				Lower	Upper		
04-9467-4403	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
13-6183-0644	7d Survival Rate	Control Resp	1	0.8	>>	Yes	Passes Criteria
00-8986-4008	Mean Dry Biomass-mg	Control Resp	1.238	0.85	>>	Yes	Passes Criteria
21-0685-8084	Mean Dry Biomass-mg	Control Resp	1.238	0.85	>>	Yes	Passes Criteria
04-9467-4403	7d Survival Rate	PMSD	0.08202	<<	0.25	No	Passes Criteria

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
6.25		5	0.9600	0.8489	1.0710	0.8000	1.0000	0.0400	0.0894	9.32%	4.00%
12.5		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
25		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
50		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	---	0.00%

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	1.238	1.209	1.267	1.204	1.268	0.01035	0.02315	1.87%	0.00%
6.25		5	1.249	1.195	1.303	1.216	1.324	0.01936	0.04328	3.47%	-0.87%
12.5		5	1.287	1.248	1.326	1.25	1.334	0.01395	0.0312	2.42%	-3.97%
25		5	1.269	1.218	1.319	1.218	1.308	0.01821	0.04071	3.21%	-2.49%
50		5	1.284	1.217	1.35	1.21	1.344	0.02383	0.05328	4.15%	-3.68%
100		5	1.271	1.222	1.319	1.236	1.334	0.01749	0.0391	3.08%	-2.65%

CETIS Summary Report

Report Date: 15 Jan-21 10:11 (p 2 of 2)

Test Code/ID: VCF1220.137tops / 17-7226-7033

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

7d Survival Rate Detail

MD5: 2052A1BEC5768DB6406244942034DF5B

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	0.8000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

Mean Dry Biomass-mg Detail

MD5: F2C113C36D9E2478AA08C32F6A9959B0

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.242	1.204	1.244	1.232	1.268
6.25		1.216	1.244	1.324	1.234	1.226
12.5		1.25	1.334	1.284	1.296	1.272
25		1.236	1.308	1.218	1.276	1.306
50		1.252	1.344	1.318	1.294	1.21
100		1.282	1.25	1.252	1.334	1.236

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	5/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	4/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5

CETIS Analytical Report

Report Date: 15 Jan-21 10:11 (p 1 of 4)
 Test Code/ID: VCF1220.137tops / 17-7226-7033

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 04-9467-4403	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 15 Jan-21 10:10	Analysis: Nonparametric-Control vs Treatments	Status Level: 1
Edit Date: 15 Jan-21 9:34	MD5 Hash: 2052A1BEC5768DB6406244942034DF5B	Editor ID: 000-189-126-0
Batch ID: 07-8295-1157	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:12	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 06 Jan-21 13:10	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 17-6912-6360	Code: VCF1220.137tops	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 07:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: ME-VR2
Sample Age: 54h (7.3 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	100	>100	---	1	0.08202	8.20%

Steel Many-One Rank Sum Test

Control	vs	Conc-%	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	25	16	1	8	CDF	0.6353	Non-Significant Effect
		12.5	27.5	16	1	8	CDF	0.8333	Non-Significant Effect
		25	27.5	16	1	8	CDF	0.8333	Non-Significant Effect
		50	27.5	16	1	8	CDF	0.8333	Non-Significant Effect
		100	27.5	16	1	8	CDF	0.8333	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria
PMSD	0.08202	<<	0.25	No	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0094513	0.0018903	5	1	0.4389	Non-Significant Effect
Error	0.0453663	0.0018903	24			
Total	0.0548176		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test				Indeterminate
	Levene Equality of Variance Test	7.111	3.895	0.0003	Unequal Variances
	Mod Levene Equality of Variance Test	1	4.248	0.4457	Equal Variances
Distribution	Anderson-Darling A2 Test	7.95	3.878	<1.0E-05	Non-Normal Distribution
	D'Agostino Kurtosis Test	4.912	2.576	<1.0E-05	Non-Normal Distribution
	D'Agostino Skewness Test	5.58	2.576	<1.0E-05	Non-Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	55.27	9.21	<1.0E-05	Non-Normal Distribution
	Kolmogorov-Smirnov D Test	0.4667	0.1853	<1.0E-05	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.4063	0.9031	<1.0E-05	Non-Normal Distribution

7d Survival Rate Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
6.25		5	0.9600	0.8489	1.0000	1.0000	0.8000	1.0000	0.0400	9.32%	4.00%
12.5		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
25		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
50		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
100		5	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

CETIS Analytical Report

Report Date: 15 Jan-21 10:11 (p 2 of 4)
 Test Code/ID: VCF1220.137tops / 17-7226-7033

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 04-9467-4403 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
 Analyzed: 15 Jan-21 10:10 Analysis: Nonparametric-Control vs Treatments Status Level: 1
 Edit Date: 15 Jan-21 9:34 MD5 Hash: 2052A1BEC5768DB6406244942034DF5B Editor ID: 000-189-126-0

Angular (Corrected) Transformed Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.3450	1.3450	1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
6.25		5	1.2980	1.1650	1.4300	1.3450	1.1070	1.3450	0.0476	8.21%	3.54%
12.5		5	1.3450	1.3450	1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
25		5	1.3450	1.3450	1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
50		5	1.3450	1.3450	1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%
100		5	1.3450	1.3450	1.3460	1.3450	1.3450	1.3450	0.0000	0.00%	0.00%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	0.8000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

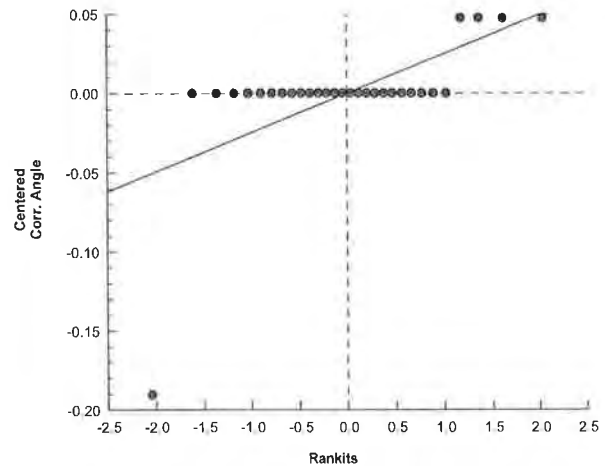
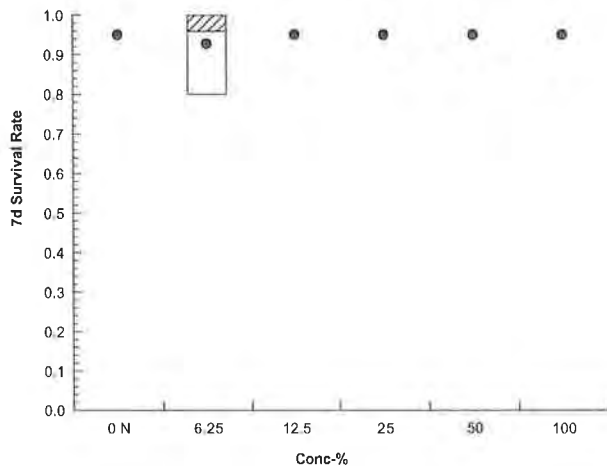
Angular (Corrected) Transformed Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.3450	1.3450	1.3450	1.3450	1.3450
6.25		1.3450	1.3450	1.3450	1.1070	1.3450
12.5		1.3450	1.3450	1.3450	1.3450	1.3450
25		1.3450	1.3450	1.3450	1.3450	1.3450
50		1.3450	1.3450	1.3450	1.3450	1.3450
100		1.3450	1.3450	1.3450	1.3450	1.3450

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	5/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	4/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5

Graphics



CETIS Analytical Report

Report Date: 15 Jan-21 10:11 (p 3 of 4)
 Test Code/ID: VCF1220.137tops / 17-7226-7033

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 21-0685-8084	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 15 Jan-21 10:10	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 15 Jan-21 9:34	MD5 Hash: F2C113C36D9E2478AA08C32F6A9959B0	Editor ID: 000-189-126-0
Batch ID: 07-8295-1157	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:12	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 06 Jan-21 13:10	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 17-6912-6360	Code: VCF1220.137tops	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 07:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: ME-VR2
Sample Age: 54h (7.3 °C)	Client: VCWPD	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	>100	---	1	0.05915	4.78%

Dunnett Multiple Comparison Test

Control	vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		6.25	-0.4313	2.362	0.059	8	CDF	0.9299	Non-Significant Effect
		12.5	-1.965	2.362	0.059	8	CDF	0.9992	Non-Significant Effect
		25	-1.23	2.362	0.059	8	CDF	0.9914	Non-Significant Effect
		50	-1.821	2.362	0.059	8	CDF	0.9987	Non-Significant Effect
		100	-1.31	2.362	0.059	8	CDF	0.9932	Non-Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1.238	0.85	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0093484	0.0018697	5	1.192	0.3424	Non-Significant Effect
Error	0.0376304	0.0015679	24			
Total	0.0469788		29			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	2.728	15.09	0.7418	Equal Variances
	Levene Equality of Variance Test	0.9325	3.895	0.4776	Equal Variances
	Mod Levene Equality of Variance Test	0.6603	4.248	0.6580	Equal Variances
Distribution	Anderson-Darling A2 Test	0.3976	3.878	0.3719	Normal Distribution
	D'Agostino Kurtosis Test	0.3332	2.576	0.7390	Normal Distribution
	D'Agostino Skewness Test	0.7471	2.576	0.4550	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	0.6692	9.21	0.7156	Normal Distribution
	Kolmogorov-Smirnov D Test	0.1113	0.1853	0.4380	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9726	0.9031	0.6113	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.238	1.209	1.267	1.242	1.204	1.268	0.01035	1.87%	0.00%
6.25		5	1.249	1.195	1.303	1.234	1.216	1.324	0.01936	3.47%	-0.87%
12.5		5	1.287	1.248	1.326	1.284	1.25	1.334	0.01395	2.42%	-3.97%
25		5	1.269	1.218	1.319	1.276	1.218	1.308	0.01821	3.21%	-2.49%
50		5	1.284	1.217	1.35	1.294	1.21	1.344	0.02383	4.15%	-3.68%
100		5	1.271	1.222	1.319	1.252	1.236	1.334	0.01749	3.08%	-2.65%

CETIS Analytical Report

Report Date: 15 Jan-21 10:11 (p 1 of 4)
 Test Code/ID: VCF1220.137tops / 17-7226-7033

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 13-6183-0644	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 15 Jan-21 10:10	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 15 Jan-21 9:34	MD5 Hash: 2052A1BEC5768DB6406244942034DF5B	Editor ID: 000-189-126-0
Batch ID: 07-8295-1157	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:12	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 06 Jan-21 13:10	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 17-6912-6360	Code: VCF1220.137tops	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 07:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: ME-VR2
Sample Age: 54h (7.3 °C)	Client: VCWPD	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	1	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC10	>100	---	---	<1	---	---
EC15	>100	---	---	<1	---	---
EC20	>100	---	---	<1	---	---
EC25	>100	---	---	<1	---	---
EC40	>100	---	---	<1	---	---
EC50	>100	---	---	<1	---	---

7d Survival Rate Summary

Conc-%	Code	Count	Calculated Variate(A/B)						Isotonic Variate		
			Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	5	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	25/25	1.0000	0.00%
6.25		5	0.9600	1.0000	0.8000	1.0000	9.32%	4.00%	24/25	0.9920	0.80%
12.5		5	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	25/25	0.9920	0.80%
25		5	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	25/25	0.9920	0.80%
50		5	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	25/25	0.9920	0.80%
100		5	1.0000	1.0000	1.0000	1.0000	0.00%	0.00%	25/25	0.9920	0.80%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.0000	1.0000	1.0000	1.0000	1.0000
6.25		1.0000	1.0000	1.0000	0.8000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	5/5	5/5	5/5	5/5	5/5
6.25		5/5	5/5	5/5	4/5	5/5
12.5		5/5	5/5	5/5	5/5	5/5
25		5/5	5/5	5/5	5/5	5/5
50		5/5	5/5	5/5	5/5	5/5
100		5/5	5/5	5/5	5/5	5/5

CETIS Analytical Report

Report Date: 15 Jan-21 10:11 (p 3 of 4)
 Test Code/ID: VCF1220.137tops / 17-7226-7033

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 00-8986-4008	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 15 Jan-21 10:10	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 15 Jan-21 9:34	MD5 Hash: F2C113C36D9E2478AA08C32F6A9959B0	Editor ID: 000-189-126-0
Batch ID: 07-8295-1157	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:12	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 06 Jan-21 13:10	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 17-6912-6360	Code: VCF1220.137tops	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 07:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: ME-VR2
Sample Age: 54h (7.3 °C)	Client: VCWPD	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	1774087	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

TAC Limits

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	1.238	0.85	>>	Yes	Passes Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC10	>100	---	---	<1	---	---
IC15	>100	---	---	<1	---	---
IC20	>100	---	---	<1	---	---
IC25	>100	---	---	<1	---	---
IC40	>100	---	---	<1	---	---
IC50	>100	---	---	<1	---	---

Mean Dry Biomass-mg Summary

Calculated Variate

Isotonic Variate

Conc-%	Code	Count	Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	N	5	1.238	1.242	1.204	1.268	1.87%	0.00%	1.266	0.00%
6.25		5	1.249	1.234	1.216	1.324	3.47%	-0.87%	1.266	0.00%
12.5		5	1.287	1.284	1.25	1.334	2.42%	-3.97%	1.266	0.00%
25		5	1.269	1.276	1.218	1.308	3.21%	-2.49%	1.266	0.00%
50		5	1.284	1.294	1.21	1.344	4.15%	-3.68%	1.266	0.00%
100		5	1.271	1.252	1.236	1.334	3.08%	-2.65%	1.266	0.00%

Mean Dry Biomass-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.242	1.204	1.244	1.232	1.268
6.25		1.216	1.244	1.324	1.234	1.226
12.5		1.25	1.334	1.284	1.296	1.272
25		1.236	1.308	1.218	1.276	1.306
50		1.252	1.344	1.318	1.294	1.21
100		1.282	1.25	1.252	1.334	1.236

CETIS Measurement Report

Report Date: 15 Jan-21 10:11 (p 1 of 5)
 Test Code/ID: VCF1220.137tops / 17-7226-7033

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 07-8295-1157	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:12	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 06 Jan-21 13:10	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 17-6912-6360	Code: VCF1220.137tops	Project: NPDES Stormwater Wet Season
Sample Date: 28 Dec-20 07:00	Material: Sample Water	Source: Bioassay Report
Receipt Date: 28 Dec-20 09:34	CAS (PC):	Station: ME-VR2
Sample Age: 54h (7.3 °C)	Client: VCWPD	

Dissolved Oxygen-mg/L

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	6.65	6.445	6.855	6.2	6.9	0.03062	0.2449	3.68%	0
6.25		8	6.7	6.428	6.972	6.2	7	0.04064	0.3251	4.85%	0
12.5		8	6.75	6.444	7.056	6.1	7.2	0.04581	0.3664	5.43%	0
25		8	6.738	6.431	7.044	6.1	7.2	0.04578	0.3662	5.44%	0
50		8	6.738	6.459	7.016	6.1	7.1	0.04169	0.3335	4.95%	0
100		8	6.688	6.425	6.95	6.1	7	0.03921	0.3137	4.69%	0
Overall		48	6.71	6.62	6.801	6.1	7.2	0.04498	0.3116	4.64%	0 (0%)

pH-Units

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.375	7.301	7.449	7.3	7.5	0.01108	0.08864	1.20%	0
6.25		8	7.463	7.4	7.525	7.4	7.6	0.009301	0.0744	1.00%	0
12.5		8	7.463	7.386	7.539	7.3	7.6	0.01145	0.09161	1.23%	0
25		8	7.488	7.418	7.557	7.3	7.6	0.01043	0.08345	1.11%	0
50		8	7.5	7.437	7.563	7.4	7.6	0.009449	0.07559	1.01%	0
100		8	7.537	7.475	7.6	7.4	7.6	0.0093	0.0744	0.99%	0
Overall		48	7.471	7.444	7.498	7.3	7.6	0.0133	0.09216	1.23%	0 (0%)

Salinity-ppt

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	25	25	25	25	25	0	0	0.00%	0
6.25		8	25	25	25	25	25	0	0	0.00%	0
12.5		8	25	25	25	25	25	0	0	0.00%	0
25		8	25	25	25	25	25	0	0	0.00%	0
50		8	25	25	25	25	25	0	0	0.00%	0
100		8	25	25	25	25	25	0	0	0.00%	0
Overall		48	25	25	25	25	25	0	0	0.00%	0 (0%)

Temperature-°C

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	21	21	21	21	21	0	0	0.00%	0
6.25		8	21	21	21	21	21	0	0	0.00%	0
12.5		8	21	21	21	21	21	0	0	0.00%	0
25		8	21	21	21	21	21	0	0	0.00%	0
50		8	21	21	21	21	21	0	0	0.00%	0
100		8	21	21	21	21	21	0	0	0.00%	0
Overall		48	21	21	21	21	21	0	0	0.00%	0 (0%)

CETIS Measurement Report

Report Date: 15 Jan-21 10:11 (p 5 of 5)
 Test Code/ID: VCF1220.137tops / 17-7226-7033

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-%	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		21					
6.25				21					
12.5				21					
25				21					
50				21					
100				21					
0	N	2		21					
6.25				21					
12.5				21					
25				21					
50				21					
100				21					
0	N	3		21					
6.25				21					
12.5				21					
25				21					
50				21					
100				21					
0	N	4		21					
6.25				21					
12.5				21					
25				21					
50				21					
100				21					
0	N	5		21					
6.25				21					
12.5				21					
25				21					
50				21					
100				21					
0	N	6		21					
6.25				21					
12.5				21					
25				21					
50				21					
100				21					
0	N	7		21					
6.25				21					
12.5				21					
25				21					
50				21					
100				21					
0	N	8		21					
6.25				21					
12.5				21					
25				21					
50				21					
100				21					



Chain of Custody Record
Ventura County Watershed Protection District
NPDES Stormwater Monitoring Program
Project: NPDES Stormwater Wet Season (Contract AE20-007)
Toxicity - ABC Laboratories

Side 1 of 2

Sampling Date: _____ Project Number: 2020/21-1 (Wet)
 Sampling Team: _____

SAMPLE ID	DATE/TIME COLLECTED	Chronic toxicity - topsmelt (<i>Atherinops affinis</i>)	Chronic toxicity - inland silverside (<i>Menidia beryllina</i>)	Chronic toxicity - giant kelp (<i>Macrocystis pyrifera</i>)	Chronic toxicity - purple sea urchin (<i>Strongylocentrotus purpuratus</i>)	Chronic toxicity - fathead minnow (<i>Pimephales promelas</i>)	Chronic toxicity - daphnid (<i>Ceriodaphnia dubia</i>)	Chronic toxicity - green alga (<i>Raphidocelis subcapitata</i>)	Number of 5-Gallon Buckets	NOTES
ME-CC		X							2	Note 1, Note 2, Note 3
135 ME-SCR	12/27/20 07:50		9.0		X				1	Note 1, Note 2, Note 3 COJ = COJ
ME-VR2		X							2	Note 1, Note 2, Note 3
MO-CAM						X			2	Note 1, Note 2, Note 3
MO-OJA						X			2	Note 1, Note 2, Note 3
MO-MEI						X			2	Note 1, Note 2, Note 3
MO-VEN							X		2	Note 1, Note 2, Note 3

Relinquished Printed Name _____
 Signature ← SEE OTHER SIDE →
 Affiliation _____ Date/Time _____

Received Printed Name _____
 Signature _____
 Affiliation _____ Date/Time _____

Other Notes: Note 1: Dilutions - 6.25%, 12.5%, 25%, 50%, 100% Note 2: Please execute TIE if mortality > 50%
Note 3: Notify District within 24 hours if significant toxicity is observed.



Chain of Custody Record
Ventura County Watershed Protection District
NPDES Stormwater Monitoring Program
Project: NPDES Stormwater Wet Season (Contract AE20-007)
Toxicity - ABC Laboratories

Side 2 of 2

Sampling Date: 12/28/20

Project Number: 2020/21-1 (Wet)

Sampling Team: PD, MD

SAMPLE ID	DATE/TIME COLLECTED	Chronic toxicity - topsmelt (<i>Atherinops affinis</i>)	Chronic toxicity - inland silverside (<i>Menidia beryllina</i>)	Chronic toxicity - giant kelp (<i>Macrocystis pyrifera</i>)	Chronic toxicity - purple sea urchin (<i>Strongylocentrotus purpuratus</i>)	Chronic toxicity - fathead minnow (<i>Pimephales promelas</i>)	Chronic toxicity - daphnid (<i>Ceriodaphnia dubia</i>)	Chronic toxicity - green alga (<i>Raphidocelis subcapitata</i>)	Number of 5-Gallon Buckets	NOTES
MO-OXN						X			2	Note 1, Note 2, Note 3
MO-HUE	12-28-20/0715		9.8°C				X		3	Note 1, Note 2, Note 3, Note 4
MO-THO							X		2	Note 1, Note 2, Note 3
MO-MPK								X	2	Note 1, Note 2, Note 3
MO-SIM							X		2	Note 1, Note 2, Note 3
MO-FIL							X		2	Note 1, Note 2, Note 3
MO-SPA						X			2	Note 1, Note 2, Note 3

Relinquished Printed Name Peter Doran

Signature [Signature]

Affiliation Bicon Date/Time 12-28-20 / 0934

Received Printed Name [Signature]

Signature [Signature]

Affiliation AQUATIC BIOMASS Date/Time 12/28/20 0934

Other Notes: Note 1: Dilutions - 6.25%, 12.5%, 25%, 50%, 100% Note 2: Please execute TIE if mortality > 50%

Note 3: Notify District within 24 hours if significant toxicity is observed.

Note 4: If salinity >2 ppt then also run topsmelt for comparison. If topsmelt unavailable, use *Hyalella*



Chain of Custody Record
Ventura County Watershed Protection District
NPDES Stormwater Monitoring Program
Project: NPDES Stormwater Wet Season (Contract AE20-007)
Toxicity - ABC Laboratories

Side 1 of 2

Sampling Date: 12/28/20

Project Number: 2020/21-1 (Wet)

Sampling Team: JM / JG

SAMPLE ID	DATE/TIME COLLECTED	Chronic toxicity - topsmelt (<i>Atherinops affinis</i>)	Chronic toxicity - inland silverside (<i>Menidia beryllina</i>)	Chronic toxicity - giant kelp (<i>Macrocystis pyrifera</i>)	Chronic toxicity - purple sea urchin (<i>Strongylocentrotus purpuratus</i>)	Chronic toxicity - fathead minnow (<i>Pimephales promelas</i>)	Chronic toxicity - daphnid (<i>Ceriodaphnia dubia</i>)	Chronic toxicity - green alga (<i>Raphidocelis subcapitata</i>)	Number of 5-Gallon Buckets	NOTES
ME-CC		X							2	Note 1, Note 2, Note 3
ME-SCR					X				1	Note 1, Note 2, Note 3
ME-VR2		X							2	Note 1, Note 2, Note 3
MO-CAM						X			2	Note 1, Note 2, Note 3
MO-OJA						X			2	Note 1, Note 2, Note 3
MO-MEI						X			2	Note 1, Note 2, Note 3
MO-VEN							X		2	Note 1, Note 2, Note 3

Relinquished Printed Name _____
 Signature _____
 Affiliation _____ Date/Time _____

Received Printed Name _____
 Signature _____
 Affiliation _____ Date/Time _____

Other Notes: Note 1: Dilutions - 6.25%, 12.5%, 25%, 50%, 100% Note 2: Please execute TIE if mortality > 50%
Note 3: Notify District within 24 hours if significant toxicity is observed.



Chain of Custody Record
Ventura County Watershed Protection District
NPDES Stormwater Monitoring Program
Project: NPDES Stormwater Wet Season (Contract AE20-007)
Toxicity - ABC Laboratories

Side 2 of 2

Sampling Date: 12/28/20 Project Number: 2020/21-1 (Wet)
 Sampling Team: JM/JG

SAMPLE ID	DATE/TIME COLLECTED	Chronic toxicity - topsmelt (<i>Atherinops affinis</i>)	Chronic toxicity - inland silverside (<i>Menidia beryllina</i>)	Chronic toxicity - giant kelp (<i>Macrocystis pyrifera</i>)	Chronic toxicity - purple sea urchin (<i>Strongylocentrotus purpuratus</i>)	Chronic toxicity - fathead minnow (<i>Pimephales promelas</i>)	Chronic toxicity - daphnid (<i>Ceriodaphnia dubia</i>)	Chronic toxicity - green alga (<i>Raphidocelis subcapitata</i>)	Number of 5-Gallon Buckets	NOTES
MO-OXN						X			2	Note 1, Note 2, Note 3
MO-HUE							X		3	Note 1, Note 2, Note 3, Note 4
MO-THO	12/28/20 0650		3.5°C				X		2	Note 1, Note 2, Note 3
MO-MPK	12/28/20 0445		1.0°C					X	2	Note 1, Note 2, Note 3
MO-SIM	12/28/20 0550		2.0°C				X		2	Note 1, Note 2, Note 3
MO-FIL							X		2	Note 1, Note 2, Note 3
MO-SPA						X			2	Note 1, Note 2, Note 3

129
150
151

conducted by
COA = COA
COA = COA
COA = COA

Relinquished Printed Name Jaime McLain
 Signature [Signature]
 Affiliation Rincon Consulting Date/Time 12/28/20 0750

Received Printed Name Michael Machuzak
 Signature [Signature]
 Affiliation Aquatic Biodiversity Date/Time 12/28/2020 0750

Other Notes: Note 1: Dilutions - 6.25%, 12.5%, 25%, 50%, 100% Note 2: Please execute TIE if mortality > 50%
Note 3: Notify District within 24 hours if significant toxicity is observed.
Note 4: If salinity >2 ppt then also run topsmelt for comparison. If topsmelt unavailable, use *Hyalella*



Chain of Custody Record
Ventura County Watershed Protection District
NPDES Stormwater Monitoring Program
Project: NPDES Stormwater Wet Season (Contract AE20-007)
Toxicity - ABC Laboratories

Side 1 of 2

Sampling Date: 12/28/20 Project Number: 2020/21-1 (Wet)

Sampling Team: PD, MD

SAMPLE ID	DATE/TIME COLLECTED	Chronic toxicity - topsmelt (<i>Atherinops affinis</i>)	Chronic toxicity - inland silverside (<i>Menidia beryllina</i>)	Chronic toxicity - giant kelp (<i>Macrocystis pyrifera</i>)	Chronic toxicity - purple sea urchin (<i>Strongylocentrotus purpuratus</i>)	Chronic toxicity - fathead minnow (<i>Pimephales promelas</i>)	Chronic toxicity - daphnid (<i>Ceriodaphnia dubia</i>)	Chronic toxicity - green alga (<i>Raphidocelis subcapitata</i>)	Number of 5-Gallon Buckets	NOTES
ME-CC	12-28-20/0610	X	10.8°C						2	Note 1, Note 2, Note 3
ME-SCR					X				1	Note 1, Note 2, Note 3
ME-VR2	12-28-20 7:00	X	7.3°C						2	Note 1, Note 2, Note 3
MO-CAM	12-28-20/0500		9.8°C			X			2	Note 1, Note 2, Note 3
MO-OJA	12-28-20 0500		4.3°C			X			2	Note 1, Note 2, Note 3
MO-MEI	12-28-20 06100		6.8°C			X			2	Note 1, Note 2, Note 3
MO-VEN	12-28-20 08:5		7.8°C				X		2	Note 1, Note 2, Note 3

132
137
138
139
140
141

CO1 = CO1
CO1 = CO1
CO1 = CO1
CO1 = CO1
CO1 = CO1
CO1 = CO1

Relinquished Printed Name Peter Doran

Signature [Signature]

Affiliation Rincon Date/Time 12-28-20 0934

Received Printed Name [Signature]

Signature [Signature]

Affiliation AQUATIC BIOSYSTEMS Date/Time 12/28/20 0934

Other Notes: Note 1: Dilutions - 6.25%, 12.5%, 25%, 50%, 100% Note 2: Please execute TIE if mortality > 50%
 Note 3: Notify District within 24 hours if significant toxicity is observed.



Chain of Custody Record
Ventura County Watershed Protection District
NPDES Stormwater Monitoring Program
Project: NPDES Stormwater Wet Season (Contract AE20-007)
Toxicity - ABC Laboratories

Side 2 of 2

Sampling Date: _____

Project Number: 2020/21-1 (Wet)

Sampling Team: _____

SAMPLE ID	DATE/TIME COLLECTED	Chronic toxicity - topsmelt (<i>Atherinops affinis</i>)	Chronic toxicity - inland silverside (<i>Menidia beryllina</i>)	Chronic toxicity - giant kelp (<i>Macrocystis pyrifera</i>)	Chronic toxicity - purple sea urchin (<i>Strongylocentrotus purpuratus</i>)	Chronic toxicity - fathead minnow (<i>Pimephales promelas</i>)	Chronic toxicity - daphnid (<i>Ceriodaphnia dubia</i>)	Chronic toxicity - green alga (<i>Raphidocelis subcapitata</i>)	Number of 5-Gallon Buckets	NOTES
132 MO-OXN	12/28/20 06:50	7.8				X			2	Note 1, Note 2, Note 3
MO-HUE	_____						X		3	Note 1, Note 2, Note 3, Note 4
MO-THO	_____						X		2	Note 1, Note 2, Note 3
MO-MPK	_____							X	2	Note 1, Note 2, Note 3
MO-SIM	_____						X		2	Note 1, Note 2, Note 3
133 MO-FIL	12/28/20 05:45	7.8					X		2	Note 1, Note 2, Note 3
134 MO-SPA	12/28/20 04:45	4.8				X			2	Note 1, Note 2, Note 3

Relinquished

Printed Name

David Leak

Signature

[Signature]

Affiliation

VCWPO

Date/Time

12/28/2020 09:22

Received

Printed Name

E. MARSHALL

Signature

[Signature]

Affiliation

ABC LABS

Date/Time

12-28-20 09:22

Other Notes:

Note 1: Dilutions - 6.25%, 12.5%, 25%, 50%, 100% Note 2: Please execute TIE if mortality > 50%

Note 3: Notify District within 24 hours if significant toxicity is observed.

Note 4: If salinity >2 ppt then also run topsmelt for comparison. If topsmelt unavailable, use *Hyalella*

CHRONIC SEA URCHIN FERTILIZATION BIOASSAY

DATE: 29 December 2020

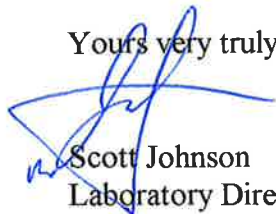
STANDARD TOXICANT: Copper Chloride

NOEC = 18.00 ug/l

EC25 = 35.85 ug/l

EC50 = 46.09 ug/l

Yours very truly,



Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 20 Jan-21 12:08 (p 1 of 1)
 Test Code/ID: URCF122920 / 14-2814-3164

Purple Sea Urchin Sperm Cell Fertilization Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 09-8624-1363	Test Type: Fertilization	Analyst: Joe Freas
Start Date: 29 Dec-20 18:00	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 29 Dec-20 18:40	Species: Strongylocentrotus purpuratus	Brine: Not Applicable
Test Length: 40m	Taxon: Echinoidea	Source: David Gutoff Age:
Sample ID: 03-8597-8692	Code: URCF122920	Project:
Sample Date: 29 Dec-20	Material: Copper chloride	Source: Reference Toxicant
Receipt Date: 29 Dec-20	CAS (PC):	Station: REF TOX
Sample Age: 18h	Client: Internal Lab	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓ NOEL	LOEL	TOEL	PMSD	S
02-2853-1223	Fertilization Rate	Dunnett Multiple Comparison Test	18	32	24	4.23%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓ Level	µg/L	95% LCL	95% UCL	S
10-4068-5332	Fertilization Rate	Linear Interpolation (ICPIN)	EC10	26.98	25.86	28.08	1
			EC15	31.47	29.79	32.65	
			EC20	33.81	32.95	34.48	
			EC25	35.85	35.01	36.5	
			EC40	42	41.19	42.7	
			EC50	46.09	45.14	47.03	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits		Overlap	Decision
				Lower	Upper		
02-2853-1223	Fertilization Rate	Control Resp	0.92	0.7	>>	Yes	Passes Criteria
10-4068-5332	Fertilization Rate	Control Resp	0.92	0.7	>>	Yes	Passes Criteria
02-2853-1223	Fertilization Rate	PMSD	0.04231	<<	0.25	No	Passes Criteria

Fertilization Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.9200	0.8975	0.9425	0.9100	0.9400	0.0071	0.0141	1.54%	0.00%
18		4	0.9400	0.9056	0.9744	0.9100	0.9600	0.0108	0.0216	2.30%	-2.17%
32		4	0.7850	0.7691	0.8009	0.7700	0.7900	0.0050	0.0100	1.27%	14.67%
56		4	0.2400	0.2010	0.2790	0.2100	0.2600	0.0123	0.0245	10.21%	73.91%
100		4	0.0550	0.0091	0.1009	0.0300	0.0800	0.0144	0.0289	52.49%	94.02%
180		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Fertilization Rate Detail

MD5: 1F776FE2942C685EAE5F4E9C3114FAE1

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9100	0.9200	0.9400	0.9100
18		0.9600	0.9500	0.9400	0.9100
32		0.7900	0.7900	0.7700	0.7900
56		0.2600	0.2300	0.2600	0.2100
100		0.0300	0.0800	0.0300	0.0800
180		0.0000	0.0000	0.0000	0.0000

Fertilization Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	91/100	92/100	94/100	91/100
18		96/100	95/100	94/100	91/100
32		79/100	79/100	77/100	79/100
56		26/100	23/100	26/100	21/100
100		3/100	8/100	3/100	8/100
180		0/100	0/100	0/100	0/100

CETIS Analytical Report

Report Date: 20 Jan-21 12:08 (p 1 of 2)
Test Code/ID: URCF122920 / 14-2814-3164

Purple Sea Urchin Sperm Cell Fertilization Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 02-2853-1223	Endpoint: Fertilization Rate	CETIS Version: CETISv1.9.7			
Analyzed: 20 Jan-21 11:58	Analysis: Parametric-Control vs Treatments	Status Level: 1			
Edit Date: 20 Jan-21 11:55	MD5 Hash: 1F776FE2942C685EAE5F4E9C3114FAE1	Editor ID: 007-979-628-1			
Batch ID: 09-8624-1363	Test Type: Fertilization	Analyst: Joe Freas			
Start Date: 29 Dec-20 18:00	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater			
Ending Date: 29 Dec-20 18:40	Species: Strongylocentrotus purpuratus	Brine: Not Applicable			
Test Length: 40m	Taxon: Echinoidea	Source: David Guttoff	Age:		
Sample ID: 03-8597-8692	Code: URCF122920	Project:			
Sample Date: 29 Dec-20	Material: Copper chloride	Source: Reference Toxicant			
Receipt Date: 29 Dec-20	CAS (PC):	Station: REF TOX			
Sample Age: 18h	Client: Internal Lab				

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	18	32	24	---	0.03892	4.23%

Dunnnett Multiple Comparison Test									
Control	vs	Conc-µg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		18	-1.465	2.356	0.066	6	CDF	0.9926	Non-Significant Effect
		32*	6.984	2.356	0.066	6	CDF	<1.0E-05	Significant Effect
		56*	27.53	2.356	0.066	6	CDF	<1.0E-05	Significant Effect
		100*	37.54	2.356	0.066	6	CDF	<1.0E-05	Significant Effect

Test Acceptability Criteria					
Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.92	0.7	>>	Yes	Passes Criteria
PMSD	0.04231	<<	0.25	No	Passes Criteria

ANOVA Table							
Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)	
Between	3.85516	0.96379	4	610.8	<1.0E-05	Significant Effect	
Error	0.0236673	0.0015778	15				
Total	3.87883		19				

ANOVA Assumptions Tests						
Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)	
Variance	Bartlett Equality of Variance Test	6.871	13.28	0.1428	Equal Variances	
	Levene Equality of Variance Test	6.275	4.893	0.0036	Unequal Variances	
	Mod Levene Equality of Variance Test	4.953	4.893	0.0095	Unequal Variances	
Distribution	Anderson-Darling A2 Test	0.2823	3.878	0.6661	Normal Distribution	
	D'Agostino Kurtosis Test	0.6546	2.576	0.5127	Normal Distribution	
	D'Agostino Skewness Test	0.2997	2.576	0.7644	Normal Distribution	
	D'Agostino-Pearson K2 Omnibus Test	0.5183	9.21	0.7717	Normal Distribution	
	Kolmogorov-Smirnov D Test	0.09722	0.2235	1.0000	Normal Distribution	
	Shapiro-Wilk W Normality Test	0.9568	0.866	0.4813	Normal Distribution	

Fertilization Rate Summary											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.9200	0.8975	0.9425		0.9100	0.9400	0.0071	1.54%	0.00%
18		4	0.9400	0.9056	0.9744		0.9100	0.9600	0.0108	2.30%	-2.17%
32		4	0.7850	0.7691	0.8009		0.7700	0.7900	0.0050	1.27%	14.67%
56		4	0.2400	0.2010	0.2790		0.2100	0.2600	0.0123	10.21%	73.91%
100		4	0.0550	0.0091	0.1009		0.0300	0.0800	0.0144	52.49%	94.02%
180		4	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000	---	100.00%

Purple Sea Urchin Sperm Cell Fertilization Test				Aquatic Bioassay & Consulting Labs, Inc.			
Analysis ID: 02-2853-1223	Endpoint: Fertilization Rate	CETIS Version: CETISv1.9.7					
Analyzed: 20 Jan-21 11:58	Analysis: Parametric-Control vs Treatments	Status Level: 1					
Edit Date: 20 Jan-21 11:55	MD5 Hash: 1F776FE2942C685EAE5F4E9C3114FAE1	Editor ID: 007-979-628-1					

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	1.2850	1.2420	1.3280		1.2660	1.3230	0.0135	2.10%	0.00%
18		4	1.3260	1.2560	1.3960		1.2660	1.3690	0.0221	3.33%	-3.20%
32		4	1.0890	1.0700	1.1080		1.0710	1.0950	0.0060	1.11%	15.27%
56		4	0.5116	0.4657	0.5575		0.4760	0.5351	0.0144	5.64%	60.18%
100		4	0.2304	0.1269	0.3339		0.1741	0.2868	0.0325	28.23%	82.07%
180		4	0.0500	0.0500	0.0500		0.0500	0.0500	0.0000	0.00%	96.11%

Fertilization Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9100	0.9200	0.9400	0.9100
18		0.9600	0.9500	0.9400	0.9100
32		0.7900	0.7900	0.7700	0.7900
56		0.2600	0.2300	0.2600	0.2100
100		0.0300	0.0800	0.0300	0.0800
180		0.0000	0.0000	0.0000	0.0000

Angular (Corrected) Transformed Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.2660	1.2840	1.3230	1.2660
18		1.3690	1.3450	1.3230	1.2660
32		1.0950	1.0950	1.0710	1.0950
56		0.5351	0.5002	0.5351	0.4760
100		0.1741	0.2868	0.1741	0.2868
180		0.0500	0.0500	0.0500	0.0500

CETIS Analytical Report

Report Date: 20 Jan-21 12:08 (p 1 of 2)
Test Code/ID: URCF122920 / 14-2814-3164

Purple Sea Urchin Sperm Cell Fertilization Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 10-4068-5332	Endpoint: Fertilization Rate	CETIS Version: CETISv1.9.7
Analyzed: 20 Jan-21 11:58	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 20 Jan-21 11:55	MD5 Hash: 1F77FE2942C685EAE5F4E9C3114FAE1	Editor ID: 007-979-628-1
Batch ID: 09-8624-1363	Test Type: Fertilization	Analyst: Joe Freas
Start Date: 29 Dec-20 18:00	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 29 Dec-20 18:40	Species: Strongylocentrotus purpuratus	Brine: Not Applicable
Test Length: 40m	Taxon: Echinoidea	Source: David Gutoff Age:
Sample ID: 03-8597-8692	Code: URCF122920	Project:
Sample Date: 29 Dec-20	Material: Copper chloride	Source: Reference Toxicant
Receipt Date: 29 Dec-20	CAS (PC):	Station: REF TOX
Sample Age: 18h	Client: Internal Lab	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.92	0.7	>>	Yes	Passes Criteria

Point Estimates

Level	µg/L	95% LCL	95% UCL
EC10	26.98	25.86	28.08
EC15	31.47	29.79	32.65
EC20	33.81	32.95	34.48
EC25	35.85	35.01	36.5
EC40	42	41.19	42.7
EC50	46.09	45.14	47.03

Fertilization Rate Summary

Conc-µg/L	Code	Count	Calculated Variate(A/B)						Isotonic Variate		
			Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	4	0.9200	0.9150	0.9100	0.9400	1.54%	0.00%	368/400	0.9300	0.00%
18		4	0.9400	0.9450	0.9100	0.9600	2.30%	-2.17%	376/400	0.9300	0.00%
32		4	0.7850	0.7900	0.7700	0.7900	1.27%	14.67%	314/400	0.7850	15.59%
56		4	0.2400	0.2450	0.2100	0.2600	10.21%	73.91%	96/400	0.2400	74.19%
100		4	0.0550	0.0550	0.0300	0.0800	52.49%	94.02%	22/400	0.0550	94.09%
180		4	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/400	0.0000	100.00%

Fertilization Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9100	0.9200	0.9400	0.9100
18		0.9600	0.9500	0.9400	0.9100
32		0.7900	0.7900	0.7700	0.7900
56		0.2600	0.2300	0.2600	0.2100
100		0.0300	0.0800	0.0300	0.0800
180		0.0000	0.0000	0.0000	0.0000

Fertilization Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	91/100	92/100	94/100	91/100
18		96/100	95/100	94/100	91/100
32		79/100	79/100	77/100	79/100
56		26/100	23/100	26/100	21/100
100		3/100	8/100	3/100	8/100
180		0/100	0/100	0/100	0/100

CETIS Measurement Report

Report Date: 20 Jan-21 12:08 (p 1 of 1)
Test Code/ID: URCF122920 / 14-2814-3164

Purple Sea Urchin Sperm Cell Fertilization Test				Aquatic Bioassay & Consulting Labs, Inc.			
Batch ID: 09-8624-1363	Test Type: Fertilization	Analyst: Joe Freas					
Start Date: 29 Dec-20 18:00	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater					
Ending Date: 29 Dec-20 18:40	Species: Strongylocentrotus purpuratus	Brine: Not Applicable					
Test Length: 40m	Taxon: Echinoidea	Source: David Gutoff	Age:				
Sample ID: 03-8597-8692	Code: URCF122920	Project:					
Sample Date: 29 Dec-20	Material: Copper chloride	Source: Reference Toxicant					
Receipt Date: 29 Dec-20	CAS (PC):	Station: REF TOX					
Sample Age: 18h	Client: Internal Lab						

Parameter	TAC Limits				Overlap	Decision
	Min	Max	Lower	Upper		
Salinity	34	34	32	36	Yes	Passes Criteria
Temperature	14.7	14.9	11	13	Yes	Above Criteria

Dissolved Oxygen-mg/L											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	6.4	3.859	8.941	6.2	6.6	0.1414	0.2828	4.42%	0
18		2	6.55	3.373	9.727	6.3	6.8	0.1768	0.3536	5.40%	0
32		2	6.45	3.273	9.627	6.2	6.7	0.1768	0.3536	5.48%	0
56		2	6.45	4.544	8.356	6.3	6.6	0.1061	0.2121	3.29%	0
100		2	6.5	2.688	10.31	6.2	6.8	0.2121	0.4243	6.53%	0
180		2	6.45	4.544	8.356	6.3	6.6	0.1061	0.2121	3.29%	0
Overall		12	6.467	6.315	6.618	6.2	6.8	0.0689	0.2387	3.69%	0 (0%)

pH-Units											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
18		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
32		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
56		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
100		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
180		2	7.9	7.884	7.916	7.9	7.9	0	0	0.00%	0
Overall		12	7.9	7.9	7.9	7.9	7.9	0	0	0.00%	0 (0%)

Salinity-ppt											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	34	34	34	34	34	0	0	0.00%	0
18		2	34	34	34	34	34	0	0	0.00%	0
32		2	34	34	34	34	34	0	0	0.00%	0
56		2	34	34	34	34	34	0	0	0.00%	0
100		2	34	34	34	34	34	0	0	0.00%	0
180		2	34	34	34	34	34	0	0	0.00%	0
Overall		12	34	34	34	34	34	0	0	0.00%	0 (0%)

Temperature-°C											
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	2	14.8	13.53	16.07	14.7	14.9	0.07072	0.1414	0.96%	0
18		2	14.8	13.53	16.07	14.7	14.9	0.07072	0.1414	0.96%	0
32		2	14.8	13.53	16.07	14.7	14.9	0.07072	0.1414	0.96%	0
56		2	14.8	13.53	16.07	14.7	14.9	0.07072	0.1414	0.96%	0
100		2	14.8	13.53	16.07	14.7	14.9	0.07072	0.1414	0.96%	0
180		2	14.8	13.53	16.07	14.7	14.9	0.07072	0.1414	0.96%	0
Overall		12	14.8	14.73	14.87	14.7	14.9	0.03015	0.1044	0.71%	0 (0%)

Purple Sea Urchin Sperm Cell Fertilization Test

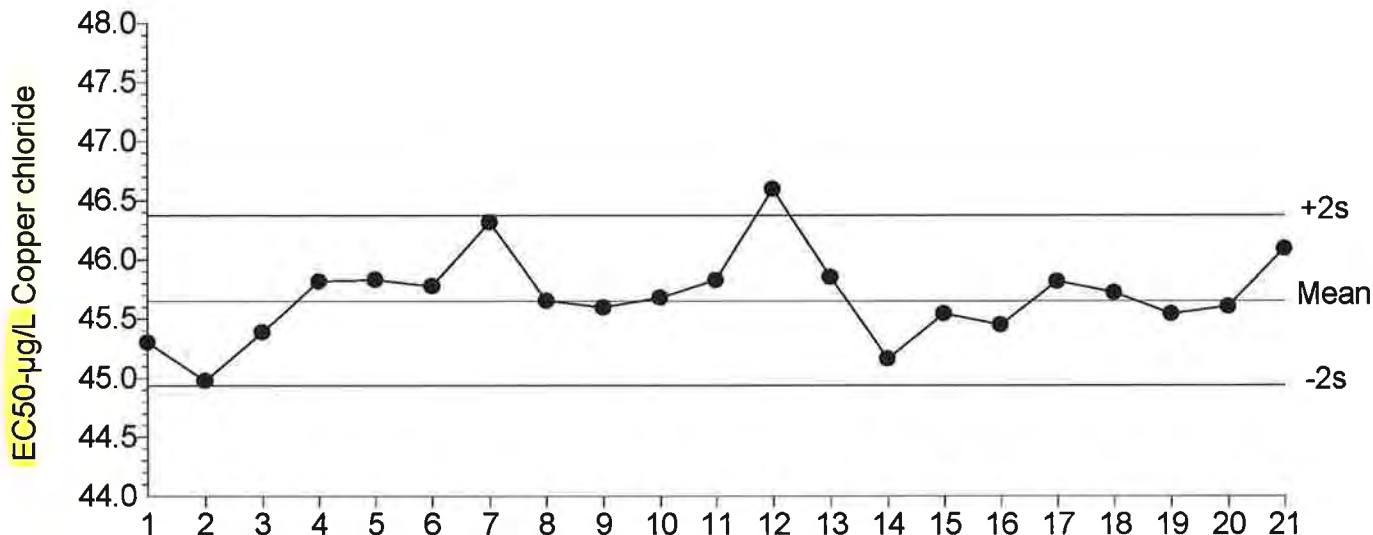
Aquatic Bioassay & Consulting Labs, Inc.

Test Type: Fertilization
Protocol: EPA/600/R-95/136 (1995)

Organism: Strongylocentrotus purpuratus
Endpoint: Fertilization Rate

Material: Copper chloride
Source: Reference Toxicant-REF

Purple Sea Urchin Sperm Cell Fertilization Test



Mean: 45.65 Count: 20 -2s Action Limit: 44.94
Sigma: n/a CV: 0.79% +2s Action Limit: 46.37

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2020	Jul	9	14:00	45.3	-0.3479	-0.9718			10-5769-3123	00-3021-0896
2			14	16:00	44.98	-0.6738	-1.889			13-7665-4481	11-0692-2017
3			21	14:00	45.39	-0.263	-0.734			01-1064-4726	04-2925-5162
4		Aug	11	14:00	45.82	0.1667	0.4629			15-9358-2650	20-2751-6447
5			19	13:00	45.83	0.1812	0.503			06-6668-9579	07-1678-0111
6		Sep	1	16:00	45.78	0.1279	0.3555			16-0206-5319	01-3483-5022
7			16	13:40	46.32	0.667	1.842			11-2641-8291	16-7399-7729
8			17	13:00	45.65	0.002335	0.006502			14-2661-9119	10-4936-7243
9			22	14:00	45.6	-0.05351	-0.149			06-3703-0312	08-1516-0362
10		Oct	7	15:00	45.68	0.02906	0.08084			21-1690-3809	10-8175-1895
11			8	15:00	45.83	0.1774	0.4927			12-0206-9048	02-8519-7715
12			20	14:00	46.6	0.9476	2.61		(+)	20-1594-1855	16-8099-2002
13		Nov	10	16:10	45.85	0.2027	0.5627			07-7738-5153	06-1255-5182
14			18	16:00	45.16	-0.4885	-1.367			15-8257-5343	05-8670-4810
15		Dec	7	14:00	45.54	-0.107	-0.298			15-5484-7136	19-5200-5508
16			8	14:00	45.45	-0.2006	-0.5593			07-2606-6038	05-3014-2781
17			9	15:00	45.82	0.1667	0.4629			20-5962-5848	05-7430-3044
18			11	14:10	45.72	0.07238	0.2012			17-9150-9027	08-1109-7956
19			14	14:00	45.54	-0.1086	-0.3024			11-9166-4931	19-3699-5836
20			15	13:00	45.6	-0.04615	-0.1285			17-2144-6184	07-5305-8601
21			29	18:00	46.09	0.4419	1.224			14-2814-3164	10-4068-5332

CHRONIC TOPSMELT SURVIVAL AND GROWTH BIOASSAY

DATE: 30 December - 2020

STANDARD TOXICANT: Copper Chloride

ENDPOINT: SURVIVAL

NOEC = 100.00 ug/l

EC25 = 118.50 ug/l

EC50 = 155.40 ug/l

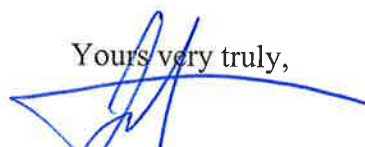
ENDPOINT: GROWTH

NOEC = 100.00 ug/l

IC25 = 125.60 ug/l

IC50 = 151.20 ug/l

Yours very truly,



Scott Johnson
Laboratory Director

*25ppt

CETIS Summary Report

Report Date: 20 Jan-21 12:42 (p 1 of 2)
 Test Code/ID: TOPS123020 / 00-4828-9651

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 19-4912-5371	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:00	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 06 Jan-21 13:02	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 04-0901-2859	Code: TOPS123020	Project: REF TOX
Sample Date: 30 Dec-20 13:00	Material: Copper chloride	Source: Reference Toxicant
Receipt Date:	CAS (PC):	Station: REF TOX
Sample Age: ---	Client: Internal Lab	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	S
15-5734-1214	7d Survival Rate	Dunnett Multiple Comparison Test	✓	100	180	134.2	19.0%	1
10-9887-8880	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	✓	100	180	134.2	11.8%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	µg/L	95% LCL	95% UCL	S
11-3912-0710	7d Survival Rate	Linear Interpolation (ICPIN)	✓	EC10	91.2	46.65	122.4	1
			✓	EC15	103.7	61.03	125.2	
			✓	EC20	111.1	72.46	131.4	
			✓	EC25	118.5	81.34	138.8	
			✓	EC40	140.6	110.9	165.9	
13-8916-5814	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)		IC10	110.2	105.6	111.8	1
				IC15	115.4	111.2	117.8	
				IC20	120.5	116.6	123.7	
				IC25	125.6	121.8	129.7	
			✓	IC50	151.2	144.7	159.7	

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Overlap	Decision
				Lower	Upper			
11-3912-0710	7d Survival Rate	Control Resp	0.96	0.8	>>	Yes	Passes Criteria	
15-5734-1214	7d Survival Rate	Control Resp	0.96	0.8	>>	Yes	Passes Criteria	
10-9887-8880	Mean Dry Biomass-mg	Control Resp	1.168	0.85	>>	Yes	Passes Criteria	
13-8916-5814	Mean Dry Biomass-mg	Control Resp	1.168	0.85	>>	Yes	Passes Criteria	
15-5734-1214	7d Survival Rate	PMSD	0.1903	<<	0.25	No	Passes Criteria	

7d Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	0.9600	0.8489	1.0710	0.8000	1.0000	0.0400	0.0894	9.32%	0.00%
56		5	0.9600	0.8489	1.0710	0.8000	1.0000	0.0400	0.0894	9.32%	0.00%
100		5	0.8400	0.6322	1.0480	0.6000	1.0000	0.0748	0.1673	19.92%	12.50%
180		5	0.3200	0.0979	0.5421	0.2000	0.6000	0.0800	0.1789	55.90%	66.67%
320		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
560		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Mean Dry Biomass-mg Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	5	1.168	1.097	1.238	1.122	1.26	0.02529	0.05656	4.84%	0.00%
56		5	1.218	1.062	1.374	1.086	1.418	0.05613	0.1255	10.31%	-4.32%
100		5	1.242	1.147	1.337	1.176	1.368	0.03411	0.07626	6.14%	-6.37%
180		5	0.2652	0.1212	0.4092	0.132	0.418	0.05186	0.116	43.72%	77.29%
320		5	0	0	0	0	0	0	0	---	100.00%
560		5	0	0	0	0	0	0	0	---	100.00%

PASS

CETIS Analytical Report

Report Date: 20 Jan-21 12:42 (p 1 of 4)
Test Code/ID: TOPS123020 / 00-4828-9651

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 15-5734-1214	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 20 Jan-21 12:41	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 20 Jan-21 12:41	MD5 Hash: DF81347568767357871F7A102C473B22	Editor ID: 000-189-126-0
Batch ID: 19-4912-5371	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:00	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 06 Jan-21 13:02	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 04-0901-2859	Code: TOPS123020	Project: REF TOX
Sample Date: 30 Dec-20 13:00	Material: Copper chloride	Source: Reference Toxicant
Receipt Date:	CAS (PC):	Station: REF TOX
Sample Age: ---	Client: Internal Lab	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Angular (Corrected)	C > T	100	180	134.2	---	0.1827	19.03%

Dunnnett Multiple Comparison Test

Control	vs	Conc-µg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		56	0	2.227	0.218	8	CDF	0.7500	Non-Significant Effect
		100	1.423	2.227	0.218	8	CDF	0.1904	Non-Significant Effect
		180*	7.194	2.227	0.218	8	CDF	<1.0E-05	Significant Effect

Test Acceptability Criteria

TAC Limits

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	0.96	0.8	>>	Yes	Passes Criteria
PMSD	0.1903	<<	0.25	No	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.6925	0.564166	3	23.48	<1.0E-05	Significant Effect
Error	0.384497	0.024031	16			
Total	2.07699		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	2.369	11.34	0.4994	Equal Variances
	Levene Equality of Variance Test	1.616	5.292	0.2251	Equal Variances
	Mod Levene Equality of Variance Test	0.7546	5.953	0.5407	Equal Variances
Distribution	Anderson-Darling A2 Test	0.7556	3.878	0.0490	Normal Distribution
	D'Agostino Kurtosis Test	0.008906	2.576	0.9929	Normal Distribution
	D'Agostino Skewness Test	0.02297	2.576	0.9817	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	0.000607	9.21	0.9997	Normal Distribution
	Kolmogorov-Smirnov D Test	0.2311	0.2235	0.0064	Non-Normal Distribution
	Shapiro-Wilk W Normality Test	0.9434	0.866	0.2775	Normal Distribution

7d Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	0.9600	0.8489	1.0000	1.0000	0.8000	1.0000	0.0400	9.32%	0.00%
56		5	0.9600	0.8489	1.0000	1.0000	0.8000	1.0000	0.0400	9.32%	0.00%
100		5	0.8400	0.6322	1.0000	0.8000	0.6000	1.0000	0.0748	19.92%	12.50%
180		5	0.3200	0.0979	0.5421	0.2000	0.2000	0.6000	0.0800	55.90%	66.67%
320		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%
560		5	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	100.00%

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 15-5734-1214 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.7
 Analyzed: 20 Jan-21 12:41 Analysis: Parametric-Control vs Treatments Status Level: 1
 Edit Date: 20 Jan-21 12:41 MD5 Hash: DF81347568767357871F7A102C473B22 Editor ID: 000-189-126-0

Angular (Corrected) Transformed Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.2980	1.1650	1.4300	1.3450	1.1070	1.3450	0.0476	8.21%	0.00%
56		5	1.2980	1.1650	1.4300	1.3450	1.1070	1.3450	0.0476	8.21%	0.00%
100		5	1.1580	0.9183	1.3980	1.1070	0.8861	1.3450	0.0864	16.68%	10.75%
180		5	0.5923	0.3563	0.8283	0.4636	0.4636	0.8861	0.0850	32.09%	54.35%
320		5	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0.0000	0.00%	82.62%
560		5	0.2255	0.2255	0.2256	0.2255	0.2255	0.2255	0.0000	0.00%	82.62%

7d Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.8000	1.0000	1.0000	1.0000	1.0000
56		1.0000	1.0000	0.8000	1.0000	1.0000
100		0.6000	0.8000	0.8000	1.0000	1.0000
180		0.4000	0.2000	0.2000	0.2000	0.6000
320		0.0000	0.0000	0.0000	0.0000	0.0000
560		0.0000	0.0000	0.0000	0.0000	0.0000

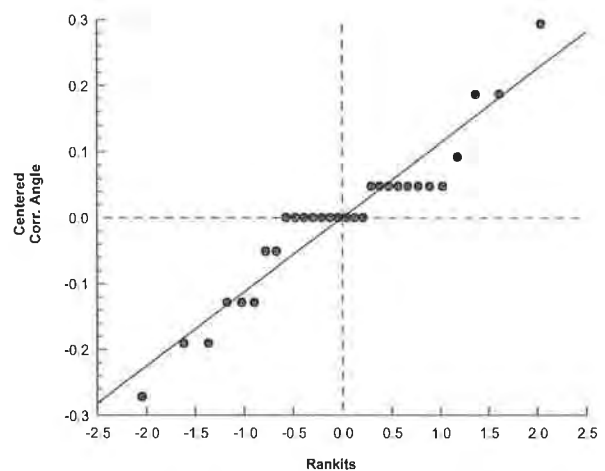
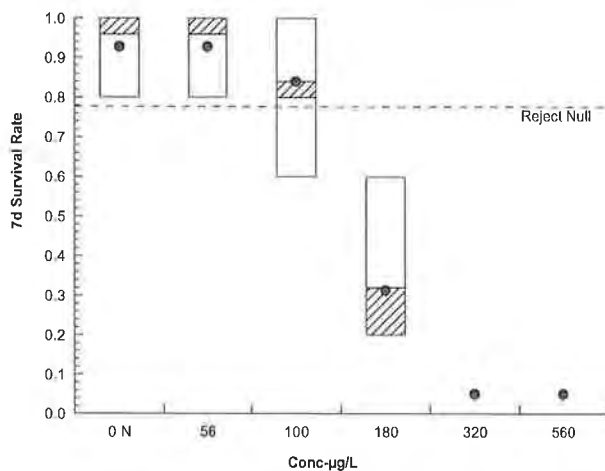
Angular (Corrected) Transformed Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.1070	1.3450	1.3450	1.3450	1.3450
56		1.3450	1.3450	1.1070	1.3450	1.3450
100		0.8861	1.1070	1.1070	1.3450	1.3450
180		0.6847	0.4636	0.4636	0.4636	0.8861
320		0.2255	0.2255	0.2255	0.2255	0.2255
560		0.2255	0.2255	0.2255	0.2255	0.2255

7d Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	4/5	5/5	5/5	5/5	5/5
56		5/5	5/5	4/5	5/5	5/5
100		3/5	4/5	4/5	5/5	5/5
180		2/5	1/5	1/5	1/5	3/5
320		0/5	0/5	0/5	0/5	0/5
560		0/5	0/5	0/5	0/5	0/5

Graphics



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CETIS Analytical Report

Report Date: 20 Jan-21 12:42 (p 3 of 4)
 Test Code/ID: TOPS123020 / 00-4828-9651

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 10-9887-8880	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 20 Jan-21 12:41	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 20 Jan-21 12:41	MD5 Hash: 45E3C88F438734BAD10CC8FA0F79A5DA	Editor ID: 000-189-126-0
Batch ID: 19-4912-5371	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:00	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 06 Jan-21 13:02	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 04-0901-2859	Code: TOPS123020	Project: REF TOX
Sample Date: 30 Dec-20 13:00	Material: Copper chloride	Source: Reference Toxicant
Receipt Date:	CAS (PC):	Station: REF TOX
Sample Age: ---	Client: Internal Lab	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	100	180	134.2	---	0.1377	11.79%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		56	-0.8153	2.227	0.138	8	CDF	0.9427	Non-Significant Effect
		100	-1.204	2.227	0.138	8	CDF	0.9764	Non-Significant Effect
		180*	14.6	2.227	0.138	8	CDF	<1.0E-05	Significant Effect

Test Acceptability Criteria

TAC Limits

Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	1.168	0.85	>>	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.35618	1.11873	3	117.1	<1.0E-05	Significant Effect
Error	0.152856	0.0095535	16			
Total	3.50904		19			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	2.712	11.34	0.4383	Equal Variances
	Levene Equality of Variance Test	1.177	5.292	0.3494	Equal Variances
	Mod Levene Equality of Variance Test	0.7465	5.953	0.5449	Equal Variances
Distribution	Anderson-Darling A2 Test	0.7702	3.878	0.0451	Normal Distribution
	D'Agostino Kurtosis Test	0.2779	2.576	0.7811	Normal Distribution
	D'Agostino Skewness Test	1.473	2.576	0.1407	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	2.247	9.21	0.3251	Normal Distribution
	Kolmogorov-Smirnov D Test	0.1969	0.2235	0.0409	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9255	0.866	0.1263	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	5	1.168	1.097	1.238	1.144	1.122	1.26	0.02529	4.84%	0.00%
56		5	1.218	1.062	1.374	1.196	1.086	1.418	0.05613	10.31%	-4.32%
100		5	1.242	1.147	1.337	1.212	1.176	1.368	0.03411	6.14%	-6.37%
180		5	0.2652	0.1212	0.4092	0.218	0.132	0.418	0.05186	43.72%	77.29%
320		5	0	0	0	0	0	0	0	---	100.00%
560		5	0	0	0	0	0	0	0	---	100.00%

Pacific Topsmelt 7-d Survival and Growth Test

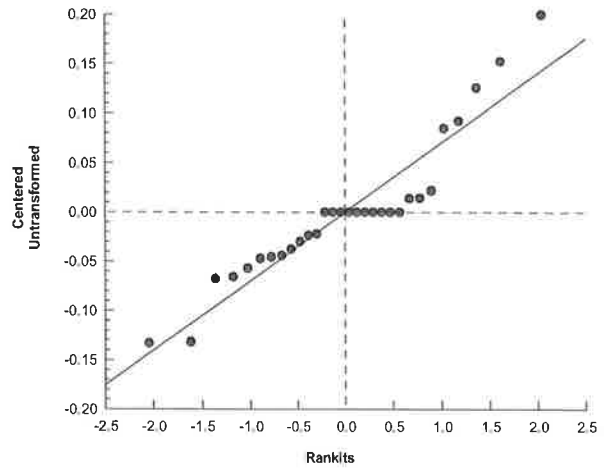
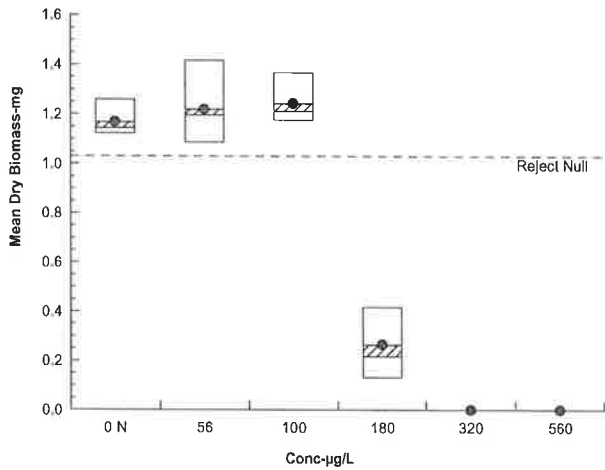
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 10-9887-8880 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.7
 Analyzed: 20 Jan-21 12:41 Analysis: Parametric-Control vs Treatments Status Level: 1
 Edit Date: 20 Jan-21 12:41 MD5 Hash: 45E3C88F438734BAD10CC8FA0F79A5DA Editor ID: 000-189-126-0

Mean Dry Biomass-mg Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.144	1.122	1.13	1.26	1.182
56		1.086	1.418	1.15	1.196	1.24
100		1.176	1.198	1.256	1.212	1.368
180		0.418	0.132	0.208	0.218	0.35
320		0	0	0	0	0
560		0	0	0	0	0

Graphics



CETIS Analytical Report

Report Date: 20 Jan-21 12:42 (p 1 of 4)
 Test Code/ID: TOPS123020 / 00-4828-9651

Pacific Topsmelt 7-d Survival and Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 11-3912-0710	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7	Analyst:		
Analyzed: 20 Jan-21 12:41	Analysis: Linear Interpolation (ICPIN)	Status Level: 1	Diluent: Laboratory Seawater		
Edit Date: 20 Jan-21 12:41	MD5 Hash: DF81347568767357871F7A102C473B22	Editor ID: 000-189-126-0	Brine: Not Applicable		
Batch ID: 19-4912-5371	Test Type: Growth-Survival (7d)		Source: Aquatic Biosystems, CO	Age:	
Start Date: 30 Dec-20 13:00	Protocol: EPA/600/R-95/136 (1995)				
Ending Date: 06 Jan-21 13:02	Species: Atherinops affinis				
Test Length: 7d 0h	Taxon: Actinopterygii				
Sample ID: 04-0901-2859	Code: TOPS123020	Project: REF TOX			
Sample Date: 30 Dec-20 13:00	Material: Copper chloride	Source: Reference Toxicant			
Receipt Date:	CAS (PC):	Station: REF TOX			
Sample Age: ---	Client: Internal Lab				

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria					
Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.96	0.8	>>	Yes	Passes Criteria

Point Estimates			
Level	µg/L	95% LCL	95% UCL
EC10	91.2	46.65	122.4
EC15	103.7	61.03	125.2
EC20	111.1	72.46	131.4
EC25	118.5	81.34	138.8
EC40	140.6	110.9	165.9
EC50	155.4	132.3	186.3

7d Survival Rate Summary			Calculated Variate(A/B)						Isotonic Variate		
Conc-µg/L	Code	Count	Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	5	0.9600	1.0000	0.8000	1.0000	9.32%	0.00%	24/25	0.9600	0.00%
56		5	0.9600	1.0000	0.8000	1.0000	9.32%	0.00%	24/25	0.9600	0.00%
100		5	0.8400	0.8000	0.6000	1.0000	19.92%	12.50%	21/25	0.8400	12.50%
180		5	0.3200	0.2000	0.2000	0.6000	55.90%	66.67%	8/25	0.3200	66.67%
320		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/25	0.0000	100.00%
560		5	0.0000	0.0000	0.0000	0.0000	---	100.00%	0/25	0.0000	100.00%

7d Survival Rate Detail						
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	0.8000	1.0000	1.0000	1.0000	1.0000
56		1.0000	1.0000	0.8000	1.0000	1.0000
100		0.6000	0.8000	0.8000	1.0000	1.0000
180		0.4000	0.2000	0.2000	0.2000	0.6000
320		0.0000	0.0000	0.0000	0.0000	0.0000
560		0.0000	0.0000	0.0000	0.0000	0.0000

7d Survival Rate Binomials						
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	4/5	5/5	5/5	5/5	5/5
56		5/5	5/5	4/5	5/5	5/5
100		3/5	4/5	4/5	5/5	5/5
180		2/5	1/5	1/5	1/5	3/5
320		0/5	0/5	0/5	0/5	0/5
560		0/5	0/5	0/5	0/5	0/5

CETIS Analytical Report

Report Date: 20 Jan-21 12:42 (p 3 of 4)
 Test Code/ID: TOPS123020 / 00-4828-9651

Pacific Topsmelt 7-d Survival and Growth Test			Aquatic Bioassay & Consulting Labs, Inc.		
Analysis ID: 13-8916-5814	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7			
Analyzed: 20 Jan-21 12:41	Analysis: Linear Interpolation (ICPIN)	Status Level: 1			
Edit Date: 20 Jan-21 12:41	MD5 Hash: 45E3C88F438734BAD10CC8FA0F79A5DA	Editor ID: 000-189-126-0			
Batch ID: 19-4912-5371	Test Type: Growth-Survival (7d)	Analyst:			
Start Date: 30 Dec-20 13:00	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater			
Ending Date: 06 Jan-21 13:02	Species: Atherinops affinis	Brine: Not Applicable			
Test Length: 7d 0h	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:			
Sample ID: 04-0901-2859	Code: TOPS123020	Project: REF TOX			
Sample Date: 30 Dec-20 13:00	Material: Copper chloride	Source: Reference Toxicant			
Receipt Date:	CAS (PC):	Station: REF TOX			
Sample Age: ---	Client: Internal Lab				

Linear Interpolation Options					
X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	952817	280	Yes	Two-Point Interpolation

Test Acceptability Criteria		TAC Limits			
Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	1.168	0.85	>>	Yes	Passes Criteria

Point Estimates			
Level	µg/L	95% LCL	95% UCL
IC10	110.2	105.6	111.8
IC15	115.4	111.2	117.8
IC20	120.5	116.6	123.7
IC25	125.6	121.8	129.7
IC40	141	135.4	147.6
IC50	151.2	144.7	159.7

Mean Dry Biomass-mg Summary			Calculated Variate						Isotonic Variate	
Conc-µg/L	Code	Count	Mean	Median	Min	Max	CV%	%Effect	Mean	%Effect
0	N	5	1.168	1.144	1.122	1.26	4.84%	0.00%	1.209	0.00%
56		5	1.218	1.196	1.086	1.418	10.31%	-4.32%	1.209	0.00%
100		5	1.242	1.212	1.176	1.368	6.14%	-6.37%	1.209	0.00%
180		5	0.2652	0.218	0.132	0.418	43.72%	77.29%	0.2652	78.07%
320		5	0	0	0	0	---	100.00%	0	100.00%
560		5	0	0	0	0	---	100.00%	0	100.00%

Mean Dry Biomass-mg Detail						
Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	N	1.144	1.122	1.13	1.26	1.182
56		1.086	1.418	1.15	1.196	1.24
100		1.176	1.198	1.256	1.212	1.368
180		0.418	0.132	0.208	0.218	0.35
320		0	0	0	0	0
560		0	0	0	0	0

CETIS Analytical Report

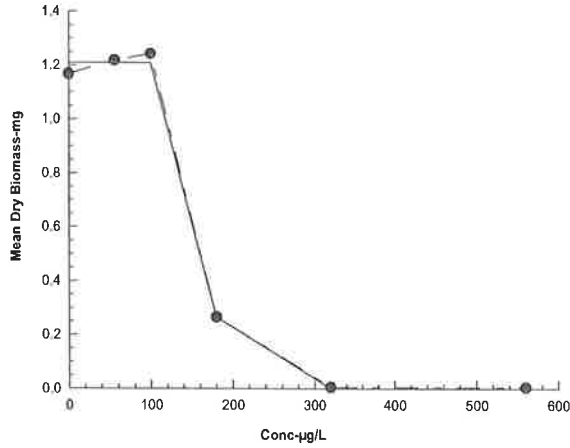
Report Date: 20 Jan-21 12:42 (p 4 of 4)
Test Code/ID: TOPS123020 / 00-4828-9651

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 13-8916-5814	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 20 Jan-21 12:41	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 20 Jan-21 12:41	MD5 Hash: 45E3C88F438734BAD10CC8FA0F79A5DA	Editor ID: 000-189-126-0

Graphics



CETIS Measurement Report

Report Date: 20 Jan-21 12:42 (p 1 of 5)
 Test Code/ID: TOPS123020 / 00-4828-9651

Pacific Topsmelt 7-d Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 19-4912-5371	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:00	Protocol: EPA/600/R-95/136 (1995)	Diluent: Laboratory Seawater
Ending Date: 06 Jan-21 13:02	Species: Atherinops affinis	Brine: Not Applicable
Test Length: 7d 0h	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 04-0901-2859	Code: TOPS123020	Project: REF TOX
Sample Date: 30 Dec-20 13:00	Material: Copper chloride	Source: Reference Toxicant
Receipt Date:	CAS (PC):	Station: REF TOX
Sample Age: ---	Client: Internal Lab	

Dissolved Oxygen-mg/L

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	6.65	6.445	6.855	6.2	6.9	0.03062	0.2449	3.68%	0
56		8	6.4	6.11	6.69	6	6.8	0.0433	0.3464	5.41%	0
100		8	6.462	6.218	6.707	6.1	6.8	0.03656	0.2925	4.53%	0
180		8	6.462	6.218	6.707	6.1	6.8	0.03656	0.2925	4.53%	0
320		8	6.488	6.245	6.73	6.1	6.8	0.03625	0.29	4.47%	0
560		2	6.45	3.273	9.627	6.2	6.7	0.1768	0.3536	5.48%	0
Overall		42	6.49	6.4	6.581	6	6.9	0.0448	0.2903	4.47%	0 (0%)

pH-Units

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.375	7.301	7.449	7.3	7.5	0.01108	0.08864	1.20%	0
56		8	7.413	7.33	7.495	7.2	7.5	0.01239	0.0991	1.34%	0
100		8	7.45	7.332	7.568	7.2	7.7	0.01768	0.1414	1.90%	0
180		8	7.4	7.311	7.489	7.2	7.5	0.01336	0.1069	1.44%	0
320		8	7.4	7.311	7.489	7.2	7.5	0.01336	0.1069	1.44%	0
560		2	7.55	6.915	8.185	7.5	7.6	0.03535	0.07071	0.94%	0
Overall		42	7.414	7.38	7.448	7.2	7.7	0.01689	0.1095	1.48%	0 (0%)

Salinity-ppt

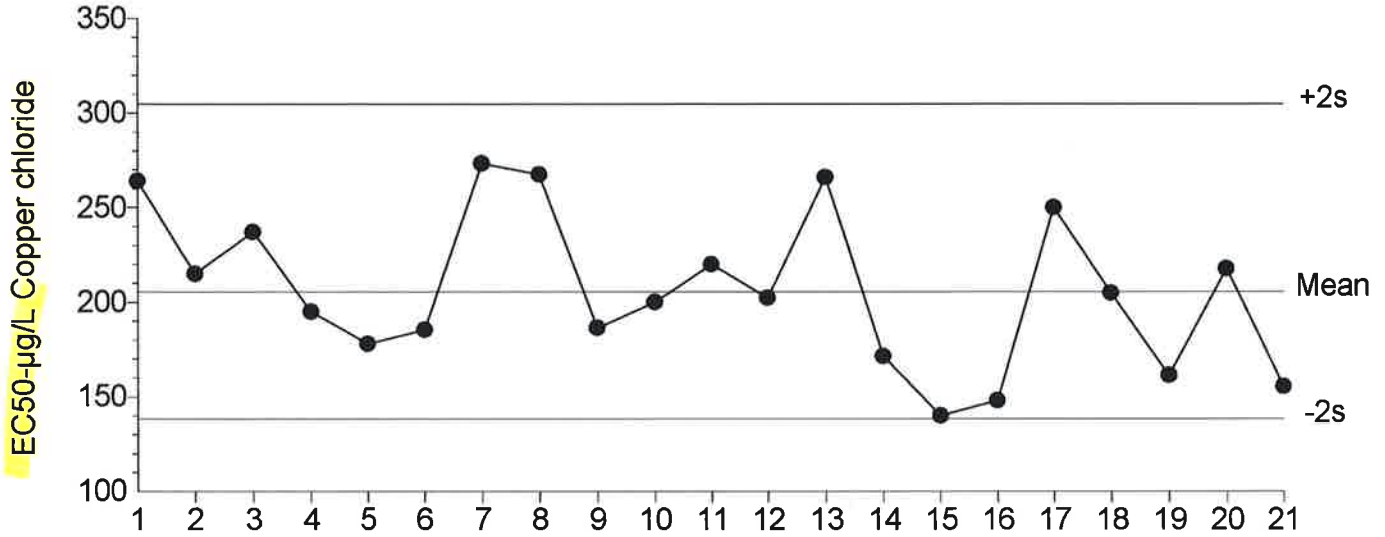
Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	25	25	25	25	25	0	0	0.00%	0
56		8	25	25	25	25	25	0	0	0.00%	0
100		8	25	25	25	25	25	0	0	0.00%	0
180		8	25	25	25	25	25	0	0	0.00%	0
320		8	25	25	25	25	25	0	0	0.00%	0
560		2	25	25	25	25	25	0	0	0.00%	0
Overall		42	25	25	25	25	25	0	0	0.00%	0 (0%)

Temperature-°C

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	21	21	21	21	21	0	0	0.00%	0
56		8	21	21	21	21	21	0	0	0.00%	0
100		8	21	21	21	21	21	0	0	0.00%	0
180		8	21	21	21	21	21	0	0	0.00%	0
320		8	21	21	21	21	21	0	0	0.00%	0
560		2	21	21	21	21	21	0	0	0.00%	0
Overall		42	21	21	21	21	21	0	0	0.00%	0 (0%)

Pacific Topsmelt 7-d Survival and Growth Test		Aquatic Bioassay & Consulting Labs, Inc.	
Test Type: Growth-Survival (7d)	Organism: Atherinops affinis	Material: Copper chloride	
Protocol: EPA/600/R-95/136 (1995)	Endpoint: 7d Survival Rate	Source: Reference Toxicant-REF	

Pacific Topsmelt 7-d Survival and Growth Test



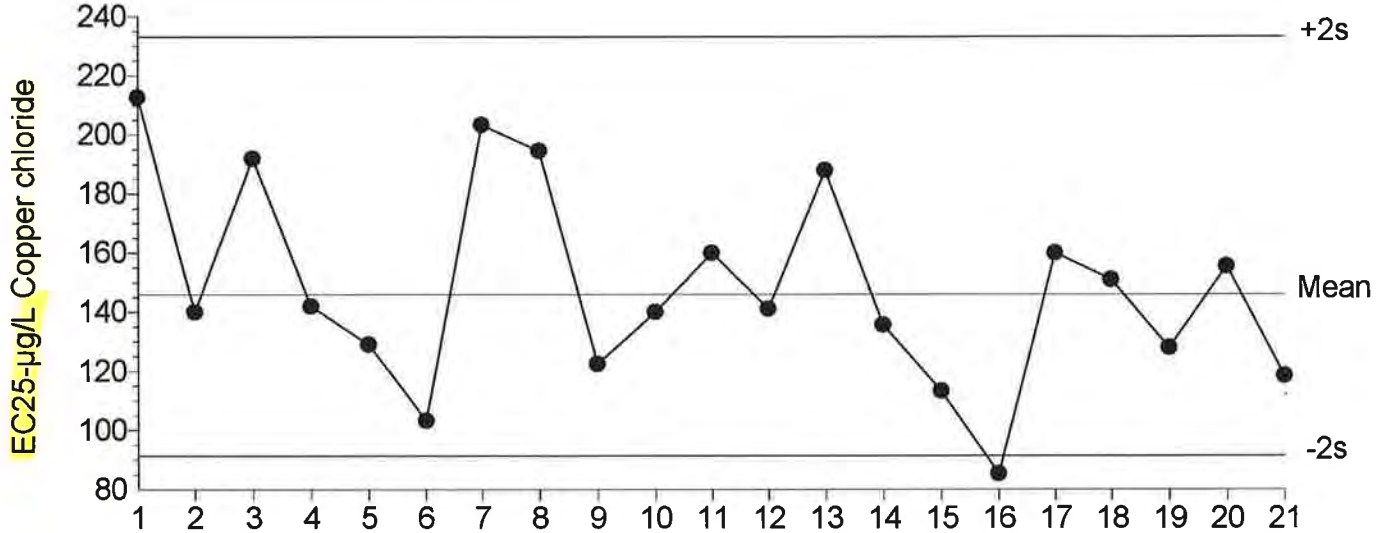
Mean: 205.4 **Count:** 20 **-2s Action Limit:** 138.4
Sigma: n/a **CV:** 19.90% **+2s Action Limit:** 304.8

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2020	Jun	9	13:20	264	58.59	1.272			04-4585-0655	07-6087-8338
2			11	14:40	215	9.592	0.2313			12-8505-4033	15-3648-8575
3		Jul	7	14:30	237.1	31.7	0.7273			15-3357-8890	16-5127-0200
4			14	12:30	195	-10.41	-0.2636			13-8095-2737	05-0601-1528
5			14	12:40	178	-27.41	-0.7259			03-9221-7939	21-2751-1909
6			21	14:30	185.4	-20.02	-0.5199			06-2270-0206	21-4060-9568
7		Aug	6	13:50	273.3	67.92	1.448			02-5808-6336	09-2598-1201
8			11	12:10	267.5	62.09	1.339			17-4460-0250	00-2188-3417
9		Sep	1	14:00	186.4	-19.04	-0.4932			17-0145-5619	05-8980-9304
10			9	13:55	200	-5.408	-0.1352			06-3450-0378	19-9962-0087
11			15	14:30	220	14.59	0.3478			15-0852-7127	14-4810-9476
12		Oct	6	11:30	202.3	-3.136	-0.07797			17-6119-4953	10-9898-1202
13			13	14:45	265.9	60.5	1.308			12-6142-5953	02-9343-8871
14			20	14:00	171.4	-33.98	-0.9165			14-9603-8388	19-4261-7726
15			28	14:10	140	-65.41	-1.943			02-1944-2031	20-1845-0161
16		Nov	3	14:45	148	-57.41	-1.661			13-6750-9271	15-2435-5879
17			10	14:55	250	44.59	0.9957			12-1018-1228	02-7099-3024
18			17	13:00	204.9	-0.5195	-0.01283			13-9958-8626	12-2524-4641
19		Dec	8	14:45	161.3	-44.08	-1.224			13-1104-5137	19-9075-9922
20			15	15:10	217.7	12.28	0.2944			03-5893-3497	08-3342-2088
21			30	13:00	155.4	-50.02	-1.415			00-4828-9651	11-3912-0710

Pacific Topsmelt 7-d Survival and Growth Test		Aquatic Bioassay & Consulting Labs, Inc.	
Test Type: Growth-Survival (7d)	Organism: Atherinops affinis	Material: Copper chloride	
Protocol: EPA/600/R-95/136 (1995)	Endpoint: 7d Survival Rate	Source: Reference Toxicant-REF	

Pacific Topsmelt 7-d Survival and Growth Test



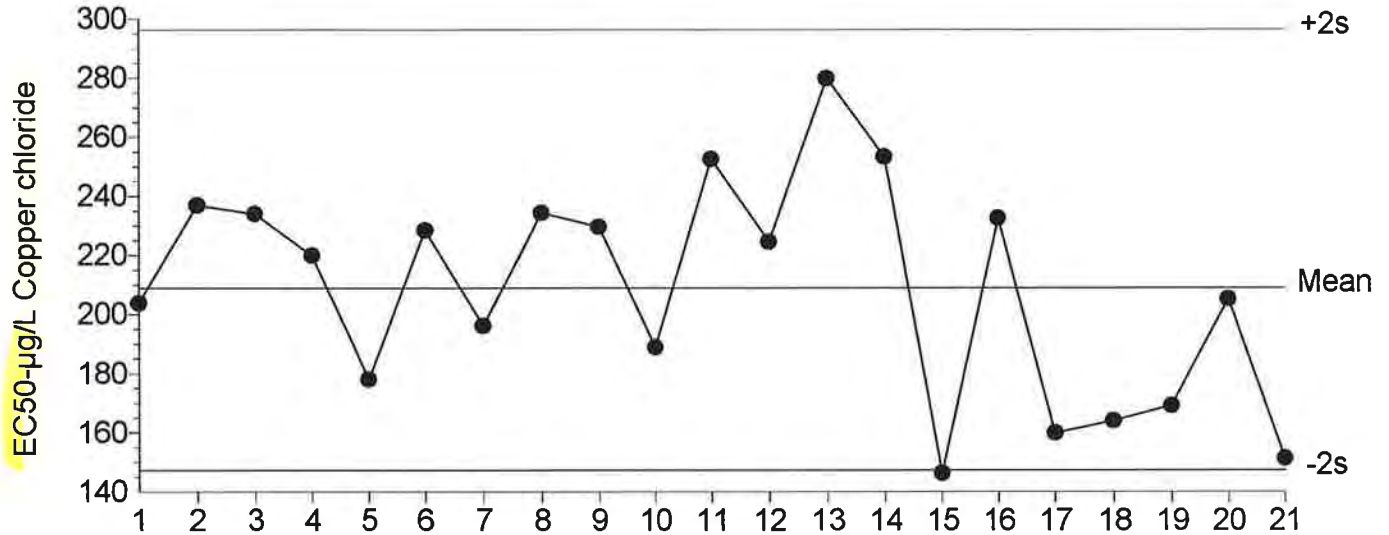
Mean: 146.1 **Count:** 20 **-2s Action Limit:** 91.47
Sigma: n/a **CV:** 23.70% **+2s Action Limit:** 233.2

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2020	Jun	9	13:20	212.7	66.61	1.606			04-4585-0655	07-6087-8338
2			11	14:40	140	-6.057	-0.181			12-8505-4033	15-3648-8575
3		Jul	7	14:30	192	45.92	1.168			15-3357-8890	16-5127-0200
4			14	12:30	142	-4.057	-0.1204			13-8095-2737	05-0601-1528
5			14	12:40	129	-17.06	-0.5307			03-9221-7939	21-2751-1909
6			21	14:30	103.3	-42.72	-1.479			06-2270-0206	21-4060-9568
7		Aug	6	13:50	203.3	57.28	1.414			02-5808-6336	09-2598-1201
8			11	12:10	194.6	48.53	1.226			17-4460-0250	00-2188-3417
9		Sep	1	14:00	122.5	-23.56	-0.7517			17-0145-5619	05-8980-9304
10			9	13:55	140	-6.057	-0.181			06-3450-0378	19-9962-0087
11			15	14:30	160	13.94	0.3896			15-0852-7127	14-4810-9476
12		Oct	6	11:30	141.1	-4.946	-0.1472			17-6119-4953	10-9898-1202
13			13	14:45	188	41.9	1.078			12-6142-5953	02-9343-8871
14			20	14:00	135.7	-10.34	-0.3139			14-9603-8388	19-4261-7726
15			28	14:10	113.3	-32.72	-1.084			02-1944-2031	20-1845-0161
16		Nov	3	14:45	85.33	-60.72	-2.297		(-)	13-6750-9271	15-2435-5879
17			10	14:55	160	13.94	0.3896			12-1018-1228	02-7099-3024
18			17	13:00	151	4.977	0.1432			13-9958-8626	12-2524-4641
19		Dec	8	14:45	128	-18.06	-0.564			13-1104-5137	19-9075-9922
20			15	15:10	155.6	9.498	0.2692			03-5893-3497	08-3342-2088
21			30	13:00	118.5	-27.6	-0.8949			00-4828-9651	11-3912-0710

Pacific Topsmelt 7-d Survival and Growth Test		Aquatic Bioassay & Consulting Labs, Inc.	
Test Type: Growth-Survival (7d)	Organism: Atherinops affinis	Material: Copper chloride	
Protocol: EPA/600/R-95/136 (1995)	Endpoint: Mean Dry Biomass-mg	Source: Reference Toxicant-REF	

Pacific Topsmelt 7-d Survival and Growth Test



Mean: 208.9 **Count:** 20 **-2s Action Limit:** 147.3
Sigma: n/a **CV:** 17.60% **+2s Action Limit:** 296.2

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2020	Jun	9	13:20	203.8	-5.095	-0.1414			04-4585-0655	05-3068-4852
2			11	14:40	236.9	27.99	0.7201			12-8505-4033	02-6717-6273
3		Jul	7	14:30	234	25.05	0.6484			15-3357-8890	18-4899-0867
4			14	12:30	219.9	10.98	0.2935			13-8095-2737	19-4564-7032
5			14	12:40	178	-30.91	-0.9169			03-9221-7939	08-1774-1104
6			21	14:30	228.4	19.47	0.5104			06-2270-0206	08-6856-4806
7		Aug	6	13:50	196.2	-12.78	-0.3615			02-5808-6336	00-6386-2700
8			11	12:10	234.3	25.39	0.6569			17-4460-0250	09-7410-9355
9		Sep	1	14:00	229.6	20.63	0.5393			17-0145-5619	11-3216-8607
10			9	13:55	188.9	-20.06	-0.578			06-3450-0378	18-3975-9374
11			15	14:30	252.5	43.56	1.085			15-0852-7127	12-8825-6889
12		Oct	6	11:30	224.6	15.67	0.4142			17-6119-4953	05-2920-2454
13			13	14:45	279.8	70.86	1.673			12-6142-5953	01-3357-7237
14			20	14:00	253.3	44.35	1.103			14-9603-8388	00-4517-2131
15			28	14:10	146.2	-62.71	-2.044		(-)	02-1944-2031	00-4428-6593
16		Nov	3	14:45	232.6	23.65	0.6142			13-6750-9271	02-5238-1121
17			10	14:55	159.8	-49.08	-1.534			12-1018-1228	16-3315-2277
18			17	13:00	164	-44.91	-1.386			13-9958-8626	10-6537-2529
19		Dec	8	14:45	169.1	-39.8	-1.21			13-1104-5137	12-0545-5907
20			15	15:10	205.2	-3.723	-0.103			03-5893-3497	06-7354-6499
21			30	13:00	151.2	-57.69	-1.851			00-4828-9651	13-8916-5814

CHRONIC FATHEAD MINNOW SURVIVAL AND GROWTH BIOASSAY

DATE: 30 December 2020

STANDARD TOXICANT: Copper Chloride

ENDPOINT: SURVIVAL

NOEC = 19.00 ug/l

EC25 = 42.24 ug/l

EC50 = 64.98 ug/l


ENDPOINT: GROWTH

NOEC = 19.00 ug/l

IC25 = 42.59 ug/l

IC50 = 61.08 ug/l

Yours very truly,



Scott Johnson
Laboratory Director

CETIS Summary Report

Report Date: 14 Jan-21 14:12 (p 1 of 2)
Test Code/ID: FML123020 / 05-5975-7861

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 06-0346-4566	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:57	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:40	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 13-4774-0750	Code: FML123020	Project: REF TOX
Sample Date: 30 Dec-20 13:57	Material: Copper chloride	Source: Reference Toxicant
Receipt Date:	CAS (PC):	Station: REF TOX
Sample Age: ---	Client: ABC Labs	

Multiple Comparison Summary

Analysis ID	Endpoint	Comparison Method	✓	NOEL	LOEL	TOEL	PMSD	S
05-3999-4274	7d Survival Rate	Dunnett Multiple Comparison Test	✓	19	38	26.87	11.8%	1
00-6038-3708	Mean Dry Biomass-mg	Dunnett Multiple Comparison Test	✓	19	38	26.87	14.7%	1

Point Estimate Summary

Analysis ID	Endpoint	Point Estimate Method	✓	Level	µg/L	95% LCL	95% UCL	S
09-2278-1337	7d Survival Rate	Linear Interpolation (ICPIN)	✓	EC10	27.46	20.7	46.17	1
			✓	EC15	32.56	23.53	48.66	
			✓	EC20	37.65	25.41	51.16	
			✓	EC25	42.24	27.86	53.96	
				EC40	55.88	43.29	63.28	
11-7283-4365	Mean Dry Biomass-mg	Linear Interpolation (ICPIN)		IC10	29.09	17.91	43.33	1
				IC15	34.15	22.35	45.17	
				IC20	38.89	26.78	48.11	
				IC25	42.59	29.52	50.92	
			✓	IC40	53.68	42.51	60.81	
	IC50	61.08	52.5	67.99				

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits			Overlap	Decision
				Lower	Upper			
05-3999-4274	7d Survival Rate	Control Resp	0.9833	0.8	>>	Yes	Passes Criteria	
09-2278-1337	7d Survival Rate	Control Resp	0.9833	0.8	>>	Yes	Passes Criteria	
00-6038-3708	Mean Dry Biomass-mg	Control Resp	0.3972	0.25	>>	Yes	Passes Criteria	
11-7283-4365	Mean Dry Biomass-mg	Control Resp	0.3972	0.25	>>	Yes	Passes Criteria	
00-6038-3708	Mean Dry Biomass-mg	PMSD	0.1469	0.12	0.3	Yes	Passes Criteria	

7d Survival Rate Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.9833	0.9303	1.0360	0.9333	1.0000	0.0167	0.0333	3.39%	0.00%
10		4	0.9833	0.9303	1.0360	0.9333	1.0000	0.0167	0.0333	3.39%	0.00%
19		4	0.9667	0.9054	1.0280	0.9333	1.0000	0.0193	0.0385	3.98%	1.69%
38		4	0.7833	0.5646	1.0020	0.6667	0.9333	0.0687	0.1374	17.55%	20.34%
75		4	0.3833	0.2818	0.4849	0.3333	0.4667	0.0319	0.0638	16.65%	61.02%
150		4	0.1667	-0.0542	0.3875	0.0000	0.3333	0.0694	0.1388	83.27%	83.05%

Mean Dry Biomass-mg Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	N	4	0.3972	0.3464	0.4479	0.35	0.418	0.01596	0.03191	8.04%	0.00%
10		4	0.379	0.3175	0.4405	0.3413	0.4207	0.01932	0.03865	10.20%	4.57%
19		4	0.415	0.3711	0.4589	0.3907	0.4547	0.0138	0.02761	6.65%	-4.49%
38		4	0.3225	0.2512	0.3938	0.2793	0.3693	0.02241	0.04482	13.90%	18.80%
75		4	0.1238	0.0722	0.1755	0.09467	0.1593	0.01622	0.03245	26.20%	68.82%
150		4	0.02167	-0.02095	0.06428	0	0.06067	0.01339	0.02678	123.60%	94.54%

CETIS Summary Report

Report Date: 14 Jan-21 14:12 (p 2 of 2)
 Test Code/ID: FML123020 / 05-5975-7861

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

7d Survival Rate Detail

MD5: 7B494F7106FCAFDA6E4EFE23723AE5A1

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9333	1.0000	1.0000	1.0000
10		0.9333	1.0000	1.0000	1.0000
19		1.0000	0.9333	1.0000	0.9333
38		0.8667	0.9333	0.6667	0.6667
75		0.4000	0.3333	0.4667	0.3333
150		0.2000	0.0000	0.3333	0.1333

Mean Dry Biomass-mg Detail

MD5: 8D0AC4D0E58CDE6944EB9366F59BED11

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.35	0.4053	0.418	0.4153
10		0.3413	0.4207	0.4027	0.3513
19		0.4547	0.4087	0.406	0.3907
38		0.3693	0.352	0.2793	0.2893
75		0.1433	0.09467	0.1593	0.098
150		0.01533	0	0.06067	0.01067

7d Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	14/15	15/15	15/15	15/15
10		14/15	15/15	15/15	15/15
19		15/15	14/15	15/15	14/15
38		13/15	14/15	10/15	10/15
75		6/15	5/15	7/15	5/15
150		3/15	0/15	5/15	2/15

CETIS Analytical Report

Report Date: 14 Jan-21 14:12 (p 3 of 4)
 Test Code/ID: FML123020 / 05-5975-7861

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 00-6038-3708	Endpoint: Mean Dry Biomass-mg	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:11	Analysis: Parametric-Control vs Treatments	Status Level: 1
Edit Date: 14 Jan-21 14:06	MD5 Hash: 8D0AC4D0E58CDE6944EB9366F59BED1	Editor ID: 000-189-126-0
Batch ID: 06-0346-4566	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:57	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:40	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 13-4774-0750	Code: FML123020	Project: REF TOX
Sample Date: 30 Dec-20 13:57	Material: Copper chloride	Source: Reference Toxicant
Receipt Date:	CAS (PC):	Station: REF TOX
Sample Age: ---	Client: ABC Labs	

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	MSDu	PMSD
Untransformed	C > T	19	38	26.87	---	0.05836	14.69%

Dunnett Multiple Comparison Test

Control	vs	Conc-µg/L	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		10	0.7493	2.407	0.058	6	CDF	0.5354	Non-Significant Effect
		19	-0.7356	2.407	0.058	6	CDF	0.9656	Non-Significant Effect
		38*	3.08	2.407	0.058	6	CDF	0.0131	Significant Effect
		75*	11.27	2.407	0.058	6	CDF	2.7E-05	Significant Effect
		150*	15.49	2.407	0.058	6	CDF	2.7E-05	Significant Effect

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.3972	0.25	>>	Yes	Passes Criteria
PMSD	0.1469	0.12	0.3	Yes	Passes Criteria

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.538448	0.10769	5	91.61	<1.0E-05	Significant Effect
Error	0.0211597	0.0011755	18			
Total	0.559608		23			

ANOVA Assumptions Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variance	Bartlett Equality of Variance Test	1.078	15.09	0.9561	Equal Variances
	Levene Equality of Variance Test	1.462	4.248	0.2507	Equal Variances
	Mod Levene Equality of Variance Test	1.055	4.248	0.4169	Equal Variances
Distribution	Anderson-Darling A2 Test	0.6926	3.878	0.0705	Normal Distribution
	D'Agostino Kurtosis Test	2.819	2.576	0.0048	Non-Normal Distribution
	D'Agostino Skewness Test	0.1445	2.576	0.8851	Normal Distribution
	D'Agostino-Pearson K2 Omnibus Test	7.968	9.21	0.0186	Normal Distribution
	Kolmogorov-Smirnov D Test	0.1421	0.2056	0.2368	Normal Distribution
	Shapiro-Wilk W Normality Test	0.9271	0.884	0.0840	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	4	0.3972	0.3464	0.4479	0.4103	0.35	0.418	0.01596	8.04%	0.00%
10		4	0.379	0.3175	0.4405	0.377	0.3413	0.4207	0.01932	10.20%	4.57%
19		4	0.415	0.3711	0.4589	0.4073	0.3907	0.4547	0.0138	6.65%	-4.49%
38		4	0.3225	0.2512	0.3938	0.3207	0.2793	0.3693	0.02241	13.90%	18.80%
75		4	0.1238	0.0722	0.1755	0.1207	0.09467	0.1593	0.01622	26.20%	68.82%
150		4	0.02167	-0.02095	0.06428	0.013	0	0.06067	0.01339	123.60%	94.54%

Fathead Minnow 7-d Larval Survival and Growth Test

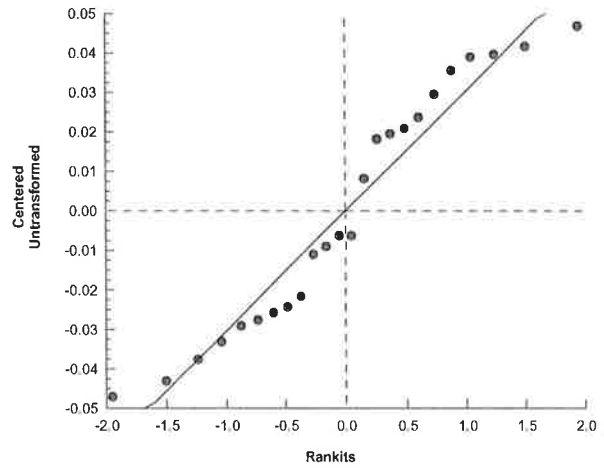
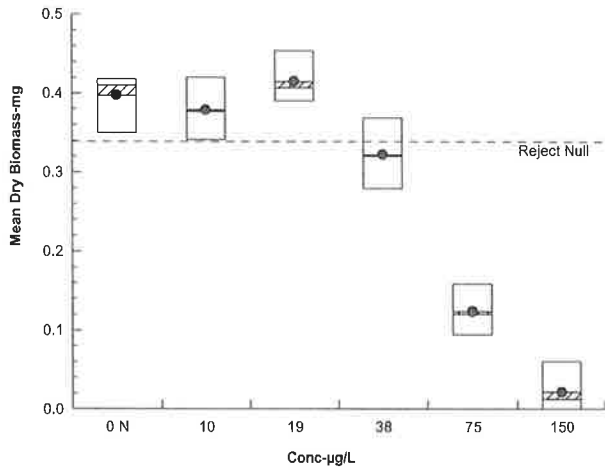
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 00-6038-3708 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.7
 Analyzed: 14 Jan-21 14:11 Analysis: Parametric-Control vs Treatments Status Level: 1
 Edit Date: 14 Jan-21 14:06 MD5 Hash: 8D0AC4D0E58CDE6944EB9366F59BED1 Editor ID: 000-189-126-0

Mean Dry Biomass-mg Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.35	0.4053	0.418	0.4153
10		0.3413	0.4207	0.4027	0.3513
19		0.4547	0.4087	0.406	0.3907
38		0.3693	0.352	0.2793	0.2893
75		0.1433	0.09467	0.1593	0.098
150		0.01533	0	0.06067	0.01067

Graphics



CETIS Analytical Report

Report Date: 14 Jan-21 14:12 (p 1 of 4)
 Test Code/ID: FML123020 / 05-5975-7861

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 09-2278-1337	Endpoint: 7d Survival Rate	CETIS Version: CETISv1.9.7
Analyzed: 14 Jan-21 14:11	Analysis: Linear Interpolation (ICPIN)	Status Level: 1
Edit Date: 14 Jan-21 14:06	MD5 Hash: 7B494F7106FCAFDA6E4EFE23723AE5A1	Editor ID: 000-189-126-0
Batch ID: 06-0346-4566	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:57	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:40	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 13-4774-0750	Code: FML123020	Project: REF TOX
Sample Date: 30 Dec-20 13:57	Material: Copper chloride	Source: Reference Toxicant
Receipt Date:	CAS (PC):	Station: REF TOX
Sample Age: ---	Client: ABC Labs	

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Linear	Linear	0	280	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits		Overlap	Decision
		Lower	Upper		
Control Resp	0.9833	0.8	>>	Yes	Passes Criteria

Point Estimates

Level	µg/L	95% LCL	95% UCL
EC10	27.46	20.7	46.17
EC15	32.56	23.53	48.66
EC20	37.65	25.41	51.16
EC25	42.24	27.86	53.96
EC40	55.88	43.29	63.28
EC50	64.98	56.35	72.13

7d Survival Rate Summary

Conc-µg/L	Code	Count	Calculated Variate(A/B)						Isotonic Variate		
			Mean	Median	Min	Max	CV%	%Effect	A/B	Mean	%Effect
0	N	4	0.9833	1.0000	0.9333	1.0000	3.39%	0.00%	59/60	0.9833	0.00%
10		4	0.9833	1.0000	0.9333	1.0000	3.39%	0.00%	59/60	0.9833	0.00%
19		4	0.9667	0.9667	0.9333	1.0000	3.98%	1.69%	58/60	0.9667	1.69%
38		4	0.7833	0.7667	0.6667	0.9333	17.55%	20.34%	47/60	0.7833	20.34%
75		4	0.3833	0.3667	0.3333	0.4667	16.65%	61.02%	23/60	0.3833	61.02%
150		4	0.1667	0.1667	0.0000	0.3333	83.27%	83.05%	10/60	0.1667	83.05%

7d Survival Rate Detail

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9333	1.0000	1.0000	1.0000
10		0.9333	1.0000	1.0000	1.0000
19		1.0000	0.9333	1.0000	0.9333
38		0.8667	0.9333	0.6667	0.6667
75		0.4000	0.3333	0.4667	0.3333
150		0.2000	0.0000	0.3333	0.1333

7d Survival Rate Binomials

Conc-µg/L	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	14/15	15/15	15/15	15/15
10		14/15	15/15	15/15	15/15
19		15/15	14/15	15/15	14/15
38		13/15	14/15	10/15	10/15
75		6/15	5/15	7/15	5/15
150		3/15	0/15	5/15	2/15

Fathead Minnow 7-d Larval Survival and Growth Test

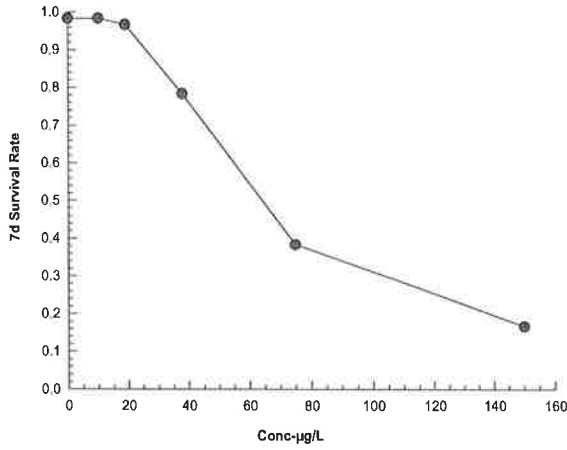
Aquatic Bioassay & Consulting Labs, Inc.

Analysis ID: 09-2278-1337
Analyzed: 14 Jan-21 14:11
Edit Date: 14 Jan-21 14:06

Endpoint: 7d Survival Rate
Analysis: Linear Interpolation (ICPIN)
MD5 Hash: 7B494F7106FCAFDA6E4EFE23723AE5A1

CETIS Version: CETISv1.9.7
Status Level: 1
Editor ID: 000-189-126-0

Graphics



CETIS Measurement Report

Report Date: 14 Jan-21 14:12 (p 1 of 8)

Test Code/ID: FML123020 / 05-5975-7861

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Batch ID: 06-0346-4566	Test Type: Growth-Survival (7d)	Analyst:
Start Date: 30 Dec-20 13:57	Protocol: EPA/821/R-02-013 (2002)	Diluent: Laboratory Water
Ending Date: 06 Jan-21 13:40	Species: Pimephales promelas	Brine: Not Applicable
Test Length: 7d	Taxon: Actinopterygii	Source: Aquatic Biosystems, CO Age:
Sample ID: 13-4774-0750	Code: FML123020	Project: REF TOX
Sample Date: 30 Dec-20 13:57	Material: Copper chloride	Source: Reference Toxicant
Receipt Date:	CAS (PC):	Station: REF TOX
Sample Age: ---	Client: ABC Labs	

Alkalinity (CaCO3)-mg/L

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	60	60	60	60	60	0	0	0.00%	0
150		8	61	61	61	61	61	0	0	0.00%	0
Overall		16	60.5	60.22	60.78	60	61	0.1291	0.5164	0.85%	0 (0%)

Conductivity-µmhos

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	338.6	335.9	341.3	332	342	0.4005	3.204	0.95%	0
10		8	337.8	335.5	340	332	341	0.3391	2.712	0.80%	0
19		8	336.8	334.3	339.2	332	340	0.3644	2.915	0.87%	0
38		8	338.8	336	341.5	332	342	0.405	3.24	0.96%	0
75		8	339.8	338.3	341.2	339	344	0.2191	1.753	0.52%	0
150		8	340.8	337.5	344	338	350	0.4807	3.845	1.13%	0
Overall		48	338.7	337.8	339.6	332	350	0.4523	3.133	0.93%	0 (0%)

Dissolved Oxygen-mg/L

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.45	7.255	7.645	7.2	7.8	0.02912	0.233	3.13%	0
10		8	7.35	7.105	7.595	7	7.7	0.0366	0.2928	3.98%	0
19		8	7.362	7.168	7.557	7.1	7.7	0.02908	0.2326	3.16%	0
38		8	7.35	7.16	7.54	7	7.7	0.02835	0.2268	3.09%	0
75		8	7.3	7.1	7.5	7	7.7	0.02988	0.239	3.27%	0
150		8	7.3	7.086	7.514	7	7.7	0.03204	0.2563	3.51%	0
Overall		48	7.352	7.282	7.422	7	7.8	0.03459	0.2397	3.26%	0 (0%)

Hardness (CaCO3)-mg/L

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	91.25	89.31	93.19	90	95	0.2893	2.315	2.54%	0
150		8	107	107	107	107	107	0	0	0.00%	0
Overall		16	99.12	94.71	103.5	90	107	2.071	8.286	8.36%	0 (0%)

pH-Units

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	7.888	7.834	7.941	7.8	8	0.00801	0.06408	0.81%	0
10		8	7.863	7.774	7.951	7.7	8	0.01326	0.1061	1.35%	0
19		8	7.875	7.768	7.982	7.7	8	0.01602	0.1282	1.63%	0
38		8	7.888	7.805	7.97	7.7	8	0.01239	0.0991	1.26%	0
75		8	7.9	7.837	7.963	7.8	8	0.009449	0.07559	0.96%	0
150		8	7.9	7.837	7.963	7.8	8	0.009449	0.07559	0.96%	0
Overall		48	7.885	7.859	7.912	7.7	8	0.01297	0.08989	1.14%	0 (0%)

CETIS Measurement Report

Report Date: 14 Jan-21 14:12 (p 2 of 8)

Test Code/ID: FML123020 / 05-5975-7861

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-µg/L	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	QA Count
0	N	8	24	24	24	24	24	0	0	0.00%	0
10		8	24	24	24	24	24	0	0	0.00%	0
19		8	24	24	24	24	24	0	0	0.00%	0
38		8	24	24	24	24	24	0	0	0.00%	0
75		8	24	24	24	24	24	0	0	0.00%	0
150		8	24	24	24	24	24	0	0	0.00%	0
Overall		48	24	24	24	24	24	0	0	0.00%	0 (0%)

CETIS Measurement Report

Report Date: 14 Jan-21 14:12 (p 4 of 8)

Test Code/ID: FML123020 / 05-5975-7861

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Conductivity-µmhos

Conc-µg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		332					
10				332					
19				333					
38				342					
75				344					
150				350					
0	N	2		342					
10				337					
19				336					
38				332					
75				339					
150				340					
0	N	3		338					
10				337					
19				340					
38				342					
75				339					
150				338					
0	N	4		339					
10				338					
19				339					
38				340					
75				339					
150				339					
0	N	5		342					
10				339					
19				339					
38				340					
75				339					
150				339					
0	N	6		339					
10				338					
19				337					
38				339					
75				339					
150				339					
0	N	7		337					
10				340					
19				332					
38				337					
75				339					
150				340					
0	N	8		340					
10				341					
19				338					
38				338					
75				340					
150				341					

CETIS Measurement Report

Report Date: 14 Jan-21 14:12 (p 5 of 8)

Test Code/ID: FML123020 / 05-5975-7861

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Dissolved Oxygen-mg/L

Conc-µg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.2					
10				7.6					
19				7.6					
38				7.4					
75				7.3					
150				7.2					
0	N	2		7.6					
10				7					
19				7.2					
38				7.3					
75				7.2					
150				7.2					
0	N	3		7.2					
10				7					
19				7.2					
38				7.3					
75				7.3					
150				7.3					
0	N	4		7.5					
10				7.4					
19				7.3					
38				7.5					
75				7.5					
150				7.6					
0	N	5		7.7					
10				7.7					
19				7.6					
38				7.5					
75				7.4					
150				7.4					
0	N	6		7.8					
10				7.7					
19				7.7					
38				7.7					
75				7.7					
150				7.7					
0	N	7		7.3					
10				7.2					
19				7.2					
38				7					
75				7					
150				7					
0	N	8		7.3					
10				7.2					
19				7.1					
38				7.1					
75				7					
150				7					

CETIS Measurement Report

Report Date: 14 Jan-21 14:12 (p 6 of 8)
Test Code/ID: FML123020 / 05-5975-7861

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Hardness (CaCO3)-mg/L

Conc-µg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		95					
150				107					
0	N	2		95					
150				107					
0	N	3		90					
150				107					
0	N	4		90					
150				107					
0	N	5		90					
150				107					
0	N	6		90					
150				107					
0	N	7		90					
150				107					
0	N	8		90					
150				107					

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CETIS Measurement Report

Report Date: 14 Jan-21 14:12 (p 7 of 8)
 Test Code/ID: FML123020 / 05-5975-7861

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

pH-Units

Conc-µg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		7.9					
10				8					
19				8					
38				7.9					
75				7.9					
150				7.9					
0	N	2		7.9					
10				7.9					
19				7.9					
38				7.9					
75				7.9					
150				7.9					
0	N	3		7.9					
10				8					
19				8					
38				8					
75				8					
150				8					
0	N	4		7.9					
10				7.9					
19				8					
38				8					
75				8					
150				8					
0	N	5		7.8					
10				7.8					
19				7.8					
38				7.9					
75				7.9					
150				7.9					
0	N	6		8					
10				7.8					
19				7.9					
38				7.9					
75				7.9					
150				7.9					
0	N	7		7.9					
10				7.7					
19				7.7					
38				7.8					
75				7.8					
150				7.8					
0	N	8		7.8					
10				7.8					
19				7.7					
38				7.7					
75				7.8					
150				7.8					

CETIS Measurement Report

Report Date: 14 Jan-21 14:12 (p 8 of 8)

Test Code/ID: FML123020 / 05-5975-7861

Fathead Minnow 7-d Larval Survival and Growth Test

Aquatic Bioassay & Consulting Labs, Inc.

Temperature-°C

Conc-µg/L	Code	Read	Time	Measure	QA	Diff-%	Inst ID	Analyst	Notes
0	N	1		24					
10				24					
19				24					
38				24					
75				24					
150				24					
0	N	2		24					
10				24					
19				24					
38				24					
75				24					
150				24					
0	N	3		24					
10				24					
19				24					
38				24					
75				24					
150				24					
0	N	4		24					
10				24					
19				24					
38				24					
75				24					
150				24					
0	N	5		24					
10				24					
19				24					
38				24					
75				24					
150				24					
0	N	6		24					
10				24					
19				24					
38				24					
75				24					
150				24					
0	N	7		24					
10				24					
19				24					
38				24					
75				24					
150				24					
0	N	8		24					
10				24					
19				24					
38				24					
75				24					
150				24					

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Fathead Minnow 7-d Larval Survival and Growth Test

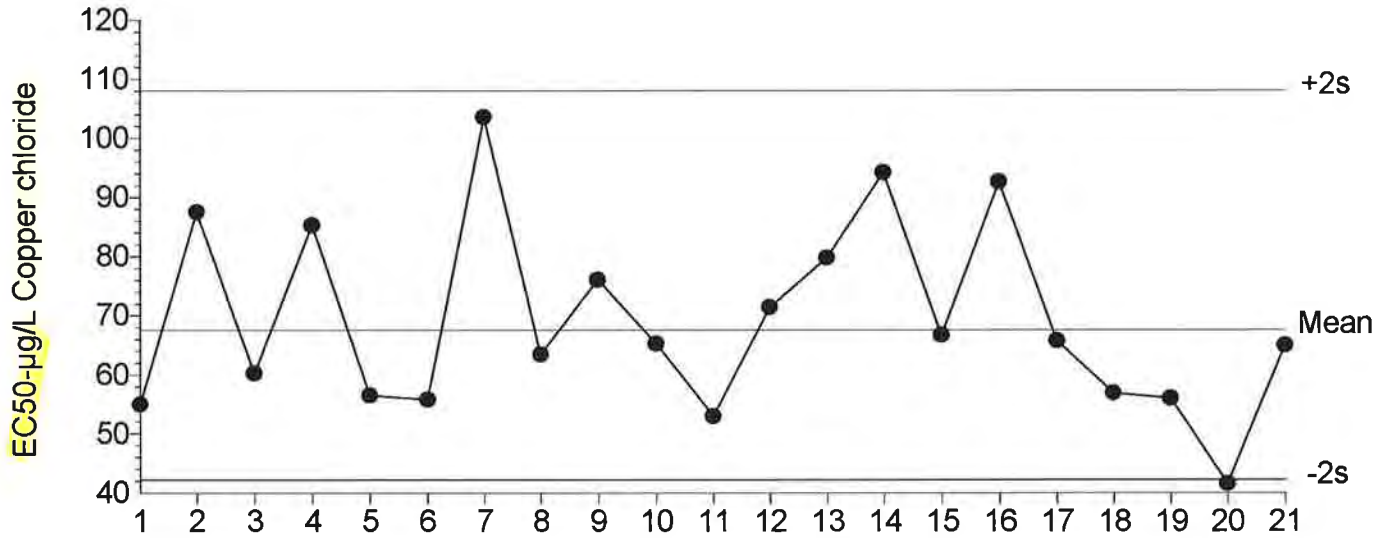
Aquatic Bioassay & Consulting Labs, Inc.

Test Type: Growth-Survival (7d)
 Protocol: EPA/821/R-02-013 (2002)

Organism: Pimephales promelas
 Endpoint: 7d Survival Rate

Material: Copper chloride
 Source: Reference Toxicant-REF

Fathead Minnow 7-d Larval Survival and Growth Test



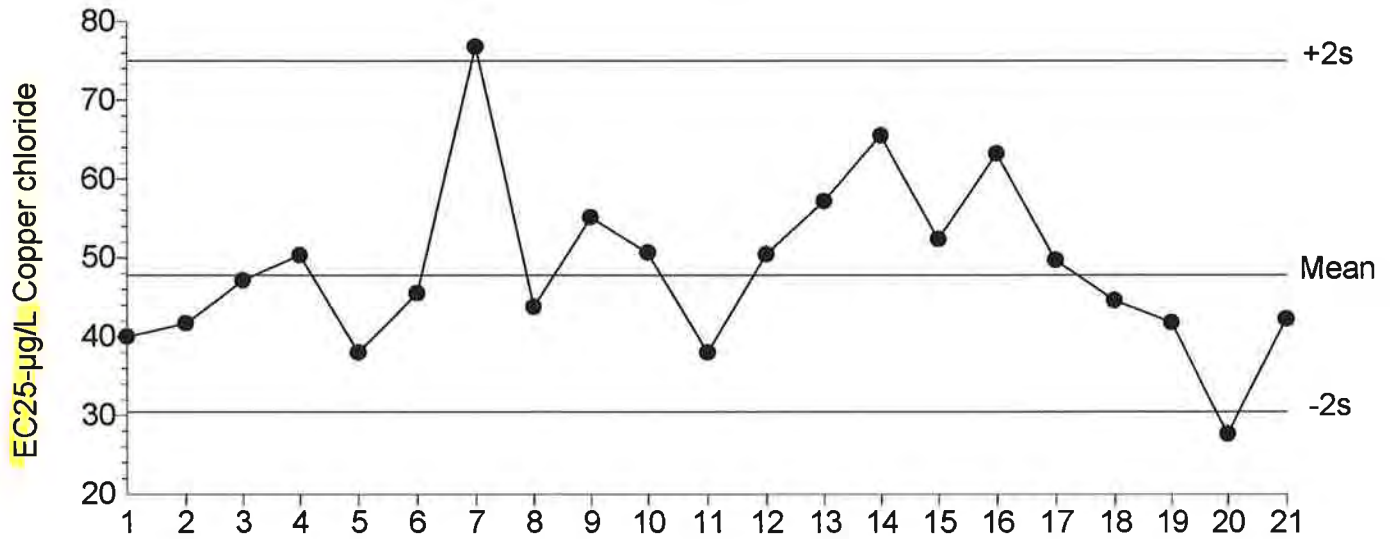
Mean: 67.56 Count: 20 -2s Action Limit: 42.23
 Sigma: n/a CV: 23.80% +2s Action Limit: 108.1

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2020	Jul	7	14:30	55	-12.56	-0.8756			18-2717-3365	12-7945-4786
2			16	14:15	87.5	19.94	1.101			04-8104-4731	03-5212-3261
3			28	13:00	60.24	-7.315	-0.4879			15-3301-1460	09-5489-8089
4			30	13:20	85.29	17.74	0.9924			00-7598-5032	09-9228-5719
5		Aug	4	13:00	56.5	-11.06	-0.761			08-8126-0993	11-9185-4257
6			11	12:35	55.8	-11.76	-0.8139			06-2153-1198	03-5853-4290
7			25	13:30	103.6	36.01	1.819			02-6071-5237	09-9663-0802
8		Sep	1	12:49	63.44	-4.121	-0.268			13-0952-8308	04-8002-7070
9			15	13:55	76.09	8.528	0.5061			06-5555-6903	01-7061-2976
10			22	13:48	65.26	-2.296	-0.1472			02-1942-1436	00-8650-6938
11			25	10:40	53	-14.56	-1.033			08-1951-8506	04-0998-9969
12			29	14:32	71.44	3.883	0.2379			17-3563-9521	04-5734-1179
13		Oct	7	11:00	79.84	12.28	0.711			08-6099-2215	11-2527-6955
14			28	13:51	94.22	26.66	1.416			05-7312-3701	06-5861-7622
15		Nov	3	15:00	66.72	-0.8352	-0.05296			18-0993-2220	09-1747-2332
16			10	14:45	92.65	25.09	1.344			17-4100-9803	12-5449-8014
17			17	13:45	65.75	-1.809	-0.1155			17-7761-3630	02-6256-5867
18		Dec	1	13:30	56.91	-10.65	-0.7301			15-0803-0920	04-5230-3028
19			8	15:00	56.03	-11.53	-0.7969			15-8457-5711	08-1762-4380
20			15	14:10	41.58	-25.98	-2.066		(-)	05-4873-2337	16-8696-6104
21			30	13:57	64.98	-2.58	-0.1657			05-5975-7861	09-2278-1337

Fathead Minnow 7-d Larval Survival and Growth Test		Aquatic Bioassay & Consulting Labs, Inc.	
Test Type: Growth-Survival (7d)	Organism: Pimephales promelas	Material: Copper chloride	
Protocol: EPA/821/R-02-013 (2002)	Endpoint: 7d Survival Rate	Source: Reference Toxicant-REF	

Fathead Minnow 7-d Larval Survival and Growth Test



Mean: 47.8 **Count:** 20 **-2s Action Limit:** 30.47
Sigma: n/a **CV:** 22.80% **+2s Action Limit:** 74.98

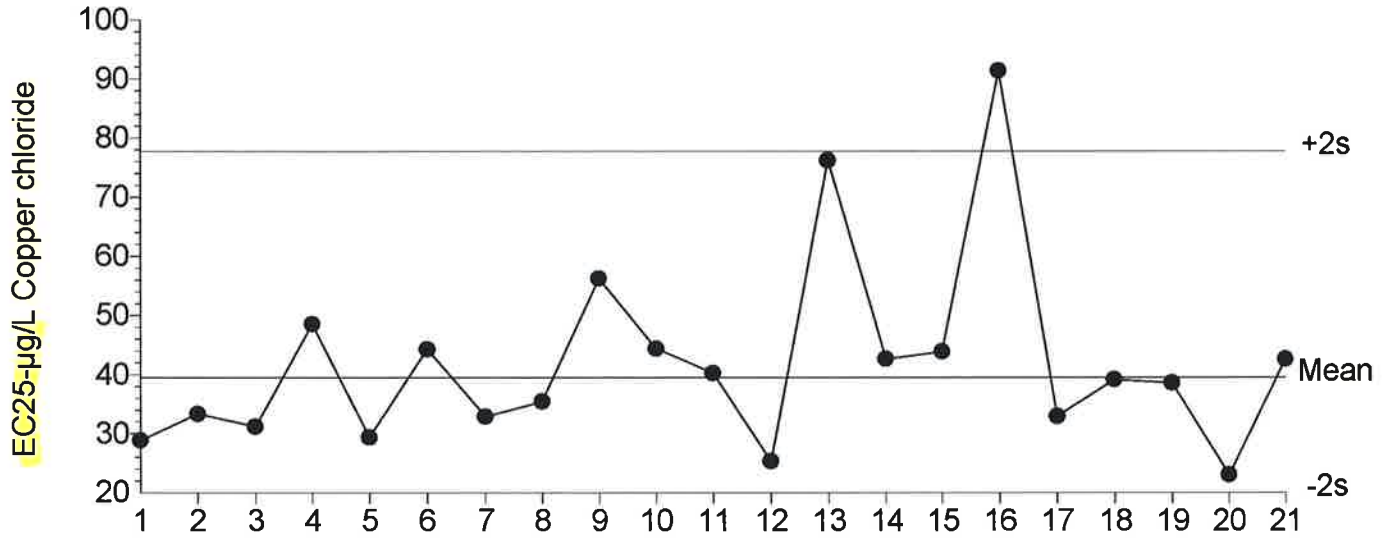
Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2020	Jul	7	14:30	40	-7.799	-0.7913			18-2717-3365	12-7945-4786
2			16	14:15	41.7	-6.099	-0.6064			04-8104-4731	03-5212-3261
3			28	13:00	47.14	-0.6589	-0.06166			15-3301-1460	09-5489-8089
4			30	13:20	50.33	2.535	0.2295			00-7598-5032	09-9228-5719
5		Aug	4	13:00	38	-9.799	-1.019			08-8126-0993	11-9185-4257
6			11	12:35	45.5	-2.294	-0.2185			06-2153-1198	03-5853-4290
7			25	13:30	76.79	28.99	2.106	(+)		02-6071-5237	09-9663-0802
8		Sep	1	12:49	43.78	-4.018	-0.39			13-0952-8308	04-8002-7070
9			15	13:55	55.13	7.331	0.6339			06-5555-6903	01-7061-2976
10			22	13:48	50.66	2.859	0.2581			02-1942-1436	00-8650-6938
11			25	10:40	38	-9.799	-1.019			08-1951-8506	04-0998-9969
12			29	14:32	50.45	2.653	0.24			17-3563-9521	04-5734-1179
13		Oct	7	11:00	57.19	9.386	0.7965			08-6099-2215	11-2527-6955
14			28	13:51	65.49	17.69	1.399			05-7312-3701	06-5861-7622
15		Nov	3	15:00	52.36	4.563	0.4051			18-0993-2220	09-1747-2332
16			10	14:45	63.23	15.43	1.243			17-4100-9803	12-5449-8014
17			17	13:45	49.7	1.9	0.1731			17-7761-3630	02-6256-5867
18		Dec	1	13:30	44.58	-3.221	-0.3099			15-0803-0920	04-5230-3028
19			8	15:00	41.79	-6.004	-0.5963			15-8457-5711	08-1762-4380
20			15	14:10	27.64	-20.16	-2.434	(-)		05-4873-2337	16-8696-6104
21			30	13:57	42.24	-5.559	-0.5493			05-5975-7861	09-2278-1337

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Fathead Minnow 7-d Larval Survival and Growth Test		Aquatic Bioassay & Consulting Labs, Inc.	
Test Type: Growth-Survival (7d)	Organism: Pimephales promelas	Material: Copper chloride	
Protocol: EPA/821/R-02-013 (2002)	Endpoint: Mean Dry Biomass-mg	Source: Reference Toxicant-REF	

Fathead Minnow 7-d Larval Survival and Growth Test



Mean: 39.45 **Count:** 20 **-2s Action Limit:** 20.02
Sigma: n/a **CV:** 34.90% **+2s Action Limit:** 77.74

Quality Control Data											
Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2020	Jul	7	14:30	28.86	-10.59	-0.921			18-2717-3365	14-9828-0747
2			16	14:15	33.34	-6.114	-0.4964			04-8104-4731	02-6901-3079
3			28	13:00	31.18	-8.267	-0.6933			15-3301-1460	03-8512-8385
4			30	13:20	48.54	9.095	0.6116			00-7598-5032	12-4235-0347
5		Aug	4	13:00	29.4	-10.05	-0.8669			08-8126-0993	10-3202-3747
6			11	12:35	44.27	4.817	0.3397			06-2153-1198	01-2188-3249
7			25	13:30	32.88	-6.572	-0.5372			02-6071-5237	02-1137-2834
8		Sep	1	12:49	35.43	-4.023	-0.3171			13-0952-8308	07-3006-9619
9			15	13:55	56.24	16.79	1.045			06-5555-6903	10-4614-9411
10			22	13:48	44.39	4.94	0.3478			02-1942-1436	13-7192-1642
11			25	10:40	40.22	0.7756	0.0574			08-1951-8506	16-9535-5114
12			29	14:32	25.31	-14.14	-1.309			17-3563-9521	13-3276-9685
13		Oct	7	11:00	76.19	36.74	1.941			08-6099-2215	15-9082-9846
14			28	13:51	42.61	3.163	0.2274			05-7312-3701	00-8878-5017
15		Nov	3	15:00	43.84	4.395	0.3114			18-0993-2220	07-5761-0701
16			10	14:45	91.39	51.94	2.477		(+)	17-4100-9803	15-0452-8043
17			17	13:45	32.94	-6.511	-0.5318			17-7761-3630	16-2470-0898
18		Dec	1	13:30	39.12	-0.3327	-0.02497			15-0803-0920	13-2780-1539
19			8	15:00	38.56	-0.8915	-0.06739			15-8457-5711	03-6541-6094
20			15	14:10	23	-16.45	-1.591			05-4873-2337	15-2709-0617
21			30	13:57	42.59	3.138	0.2256			05-5975-7861	11-7283-4365

Fathead Minnow 7-d Larval Survival and Growth Test

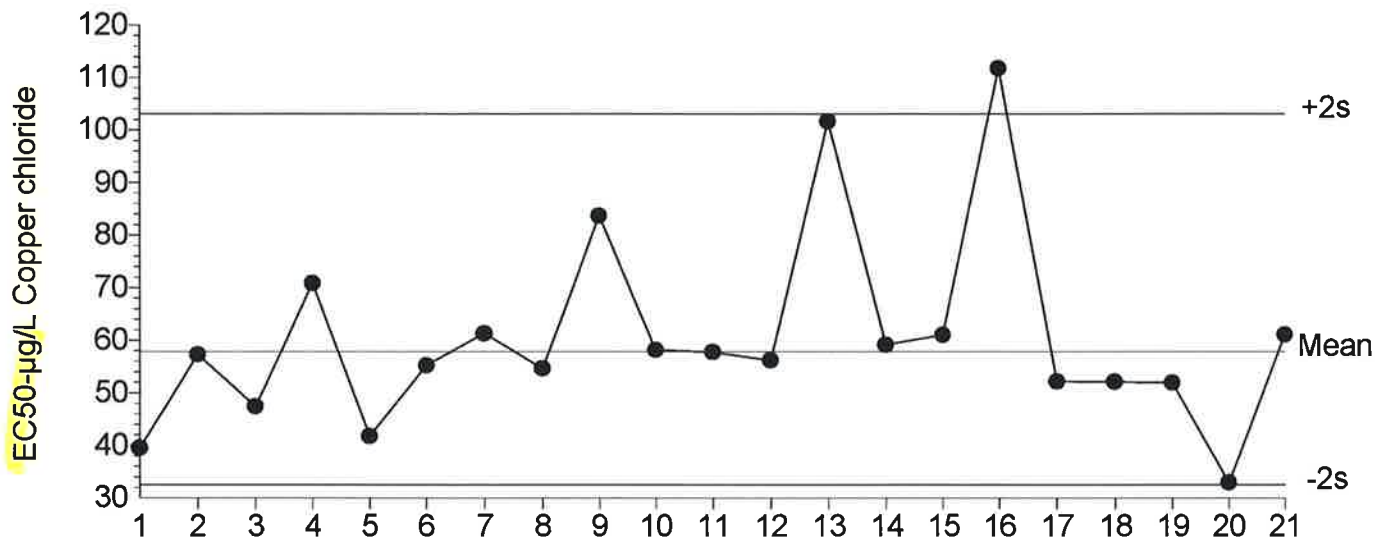
Aquatic Bioassay & Consulting Labs, Inc.

Test Type: Growth-Survival (7d)
Protocol: EPA/821/R-02-013 (2002)

Organism: Pimephales promelas
Endpoint: Mean Dry Biomass-mg

Material: Copper chloride
Source: Reference Toxicant-REF

Fathead Minnow 7-d Larval Survival and Growth Test



Mean: 57.86 Count: 20 -2s Action Limit: 32.48
Sigma: n/a CV: 29.50% +2s Action Limit: 103.1

Quality Control Data

Point	Year	Month	Day	Time	QC Data	Delta	Sigma	Warning	Action	Test ID	Analysis ID
1	2020	Jul	7	14:30	39.5	-18.36	-1.322			18-2717-3365	14-9828-0747
2			16	14:15	57.3	-0.5587	-0.03361			04-8104-4731	02-6901-3079
3			28	13:00	47.41	-10.45	-0.6901			15-3301-1460	03-8512-8385
4			30	13:20	70.88	13.02	0.7032			00-7598-5032	12-4235-0347
5		Aug	4	13:00	41.79	-16.07	-1.127			08-8126-0993	10-3202-3747
6			11	12:35	55.23	-2.624	-0.1608			06-2153-1198	01-2188-3249
7			25	13:30	61.3	3.442	0.2002			02-6071-5237	02-1137-2834
8		Sep	1	12:49	54.63	-3.224	-0.1986			13-0952-8308	07-3006-9619
9			15	13:55	83.7	25.85	1.279			06-5555-6903	10-4614-9411
10			22	13:48	58.19	0.33	0.0197			02-1942-1436	13-7192-1642
11			25	10:40	57.75	-0.111	-0.006653			08-1951-8506	16-9535-5114
12			29	14:32	56.17	-1.688	-0.1026			17-3563-9521	13-3276-9685
13		Oct	7	11:00	101.7	43.79	1.952			08-6099-2215	15-9082-9846
14			28	13:51	59.16	1.297	0.07682			05-7312-3701	00-8878-5017
15		Nov	3	15:00	61.03	3.167	0.1846			18-0993-2220	07-5761-0701
16			10	14:45	111.8	53.89	2.28		(+)	17-4100-9803	15-0452-8043
17			17	13:45	52.18	-5.676	-0.3576			17-7761-3630	16-2470-0898
18		Dec	1	13:30	52.09	-5.767	-0.3637			15-0803-0920	13-2780-1539
19			8	15:00	51.93	-5.924	-0.3741			15-8457-5711	03-6541-6094
20			15	14:10	32.93	-24.93	-1.953			05-4873-2337	15-2709-0617
21			30	13:57	61.08	3.22	0.1876			05-5975-7861	11-7283-4365

PURPLE URCHIN FERTILIZATION TEST DATA SHEET

Test Start Date: 12/29/20 1800
 Test End Date: 12/29/20 1840
 Microscope: 1
 Urchin Source: Ventura Dis
 Analyst: [Signature]

Company: STANDARD TOX.
 Sample Rec'd: 12/29
 Lab No.: NA
 Sample I.D.: URCF122920
 Dilution Water: Can 5 ml

NOEC: _____

Test Cont. No.	Nominal Conc.	Number of FERTILIZED Larvae	Number of UNFERTILIZED Larvae	Proportion of Normal Larvae
1	32	79	21	
2	CON	91	9	
3	56	26	74	
4	32	77	23	
5	100	3	97	
6	56	23	77	
7	CON	92	8	
8	100	8	92	
9	CON	94	6	
10	100	3	97	
11	CON	91	9	
12	18	96	4	
13	18	95	5	
14	18	94	6	
15	32	79	21	
16	18	91	9	
17	56	26	74	
18	180	0	100	
19	180	0	100	
20	32	77	23	
21	100	8	92	
22	180	0	100	
23	180	0	100	
24	56	21	79	

PURPLE URCHIN FERTILIZATION TEST DATA SHEET

Test Start Date: 12/29/2018
 Test End Date: 12/21/2018
 Microscope: 1
 Urchin Source: Ventura Co.
 Analyst: JF

Company: VCF
 Sample Rec'd: 12/29
 Lab No.: NA
 Sample I.D.: VCF1220.135
 Dilution Water: CON 34 ml

NOEC: _____

Test Cont. No.	Nominal Conc.	Number of FERTILIZED Larvae	Number of UNFERTILIZED Larvae	Proportion of Normal Larvae
1	12.5	91	9	
2	CON	96	4	
3	25	90	10	
4	12.5	93	7	
5	50	94	6	
6	25	91	9	
7	CON	95	5	
8	50	93	7	
9	CON	90	10	
10	50	96	4	
11	CON	92	8	
12	6.25	93	7	
13	6.25	95	5	
14	6.25	91	9	
15	12.5	94	6	
16	6.25	93	7	
17	25	96	4	
18	100	98	2	
19	100	97	3	
20	12.5	93	7	
21	50	96	4	
22	100	91	9	
23	100	95	5	
24	25	93	7	

CHEMICAL ANALYSIS DATA SHEET

VCF 1

Start Date: 12/30/20 1327

Lab #: VCF 1220.132

End Date: 1/6/21 1314

Date Rec'd: 1/28

YSI Used: B B B

Renewal Sample Used: B B B B B B B

DAY	12/30	12/31	1	1/1	2	1/2	3	1/3	4	1/4	5	1/5	6	1/6	7
Initials	TP	TP	1039	EA	12:31	0045	NR	1210	NR	TP	1150	TP	1800	TP	

DISSOLVED OXYGEN (mg/L)

Control	7.2	7.0	7.0	7.3	7.2	7.1	7.5	6.9	7.2	6.8	7.8	7.0	7.3	7.3
6.25%	7.4	7.2	7.2	7.2	7.3	7.0	7.6	6.8	7.2	6.7	7.7	7.2	7.4	7.2
12.5%	7.5	7.2	7.3	7.3	7.4	7.0	7.5	6.7	7.2	6.5	7.7	7.3	7.5	7.1
25%	7.2	7.2	7.3	7.4	7.4	6.9	7.4	6.7	7.2	6.7	7.7	7.3	7.6	7.1
50%	7.2	7.3	7.4	7.4	7.5	6.8	7.4	6.7	7.4	6.3	7.5	7.4	7.0	7.1
100%	7.0	7.3	7.4	7.4	7.0	6.7	7.4	6.7	7.4	6.2	7.4	7.4	7.0	7.1

TEMPERATURE (°C)

Control	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
6.25%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
12.5%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
25%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
50%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
100%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0

pH

Control	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.7	8.0	7.9	7.9	7.8
6.25%	8.2	8.0	8.0	7.9	8.0	7.9	7.9	7.9	7.8	7.7	7.8	7.7	7.8	7.8
12.5%	8.0	8.0	8.0	7.9	8.0	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8
25%	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.8	7.8	7.8	7.8	7.8	7.8
50%	7.8	7.9	7.9	8.0	7.9	7.8	7.9	7.8	7.9	7.8	7.8	7.8	7.8	7.8
100%	7.8	7.8	7.9	8.0	7.9	7.9	7.9	7.8	7.9	7.8	7.8	7.8	7.8	7.8

CONDUCTIVITY (uS/cm)

Control	332	334	338	339	342	339	337	340
6.25%	335	337	332	320	320	368	370	369
12.5%	333	340	337	338	338	339	337	335
25%	317	320	315	320	322	324	324	324
50%	286	289	299	298	295	298	291	270
100%	229	312	215	215	208	204	209	204

ALKALINITY

Control	60	60	60	60	60	60	60	60
100%	29	29	29	29	29	29	29	29

HARDNESS

Control	95	95	90	90	90	90	90	90
100%	70	70	70	70	70	70	70	70

Residual Chlorine 1st Sample: 2.01 2nd Sample: 3rd Sample:

Chronic juvenile Fathead minnow (*Pimephales promelas*) toxicity test - Survival

Aquatic Bioassay & Consulting Laboratories, Inc.

Company: VCF

Lab #: VCF 12 20, 132



Sample I.D.:

Date & Time Start: 12/30/20

Date & Time End: 1/6/21

Conc.	Rep.#	INITIAL TO	1 TO	2 FA	3 PR	4 R	5 TO	6 TO	FINAL TO
CONTROL	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
6.25%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
12.5%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
25%	1	15	15	15	15	15	15	15	15
	2	15	14	14	14	14	14	14	14
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
50%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
100%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15

CHAMBER NUMBER	EFF. CONC.	REPL. #	NUMBER FISH	BOAT TARE	BOAT + FISH	FISH WEIGHT (g)	AVG. WT. PER FISH (g)
BB 1	CONTROL	1		1.10248	1.10864	.00616	
2		2		1.09737	1.10462	.00725	
3		3		1.10981	1.11557	.00576	
4		4		1.12505	1.13116	.00611	
BB 5	6.25%	1		1.09420	1.10060	.00640	
6		2		1.09453	1.10078	.00625	
7		3		1.09775	1.11409	.00634	
8		4		1.09337	1.09941	.00604	
BB 9	12.5%	1		1.10007	1.10630	.00623	
10		2		1.08797	1.09404	.00607	
11		3		1.08721	1.09327	.00606	
12		4		1.09518	1.10214	.00696	
BB 13	25%	1		1.09765	1.10416	.00651	
14		2		1.11010	1.11640	.00630	
15		3		1.09328	1.09906	.00578	
16		4		1.08014	1.08623	.00609	
AK 17	50%	1		1.09126	1.09760	.00634	
18		2		1.08644	1.09247	.00603	
19		3		1.04563	1.05173	.00610	
20		4		1.06850	1.07463	.00613	
BB 21	100%	1		1.08931	1.09552	.00621	
22		2		1.08599	1.09280	.00651	
23		3		1.09585	1.10193	.00608	
24		4		1.08752	1.09366	.00634	

cc: em d

CHEMICAL ANALYSIS DATA SHEET

VCF 2

Start Date: 12/30/20 1336

Lab #: VCF 12 20. 134

End Date: 1/6/21 1320

Date Rec'd: 12/28

YSI Used: B B B

Renewal Sample Used: B B B B B B B

DAY	12/30/20	12/31	1	1/1	2	1/2	3	1/3	4	1/4	5	1/5	6	1/6	7
Initials	TR	TR	1044	EA	12:52	1030	TR	1215	TR	TR	1201	TR	0803	TR	

DISSOLVED OXYGEN (mg/L)

Control	7.2	7.0	7.0	7.3	7.2	7.1	7.5	6.5	7.7	6.8	7.8	7.0	7.3	7.3
6.25%	7.4	7.2	7.2	7.0	7.0	7.0	7.5	6.8	7.6	6.7	7.7	7.5	7.4	7.2
12.5%	7.0	7.2	7.0	7.2	7.0	7.0	7.5	6.7	7.5	6.7	7.7	7.4	7.4	7.1
25%	7.0	7.0	7.0	7.2	6.9	6.9	7.4	6.7	7.4	6.5	7.7	7.4	7.5	7.1
50%	7.0	7.0	7.0	7.3	6.9	6.8	7.4	6.7	7.4	6.4	7.7	7.3	7.6	7.1
100%	7.0	7.0	7.0	7.3	6.8	6.7	7.4	6.7	7.4	6.4	7.7	7.2	7.0	7.1

TEMPERATURE (°C)

Control	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
6.25%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
12.5%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
25%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
50%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
100%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0

pH

Control	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
6.25%	7.7	7.7	7.7	7.7	7.4	7.0	7.9	7.8	7.7	7.8	7.7	7.7	7.9	7.8
12.5%	7.7	7.7	7.7	7.7	7.5	7.0	7.8	7.7	7.8	7.8	7.8	7.7	7.9	7.8
25%	7.7	7.7	7.6	7.5	7.0	7.0	7.7	7.7	7.7	7.8	7.8	7.7	7.9	7.9
50%	7.7	7.6	7.6	7.6	7.0	7.0	7.7	7.5	7.6	7.6	7.7	7.7	7.9	7.9
100%	7.6	7.6	7.6	7.6	7.7	7.7	7.5	7.6	7.6	7.7	7.8	7.7	7.9	7.9

CONDUCTIVITY (uS/cm)

Control	332	340	338	339	342	339	337	340
6.25%	331	316	332	333	333	330	330	332
12.5%	317	310	317	320	321	300	302	302
25%	293	270	291	298	295	298	299	298
50%	240	230	244	247	247	247	206	205
100%	127	132	122	124	130	139	140	141

ALKALINITY

Control	60	60	60	60	60	60	60	60
100%	29	29	29	29	29	29	29	29

HARDNESS

Control	95	95	90	90	90	90	90	90
100%	70	70	70	70	70	70	70	70

Residual Chlorine 1st Sample: 1.21 2nd Sample: _____ 3rd Sample: _____

QC: _____

Chronic juvenile Fathead minnow (*Pimephales promelas*) toxicity test - Survival

Aquatic Bioassay & Consulting Laboratories, Inc.

Company: VCF 2

Lab #: VCF 1220. 139



Sample I.D.:

Date & Time Start: 12/30/20

Date & Time End: 1/6/21

Conc.	Rep.#	INITIAL TD	1 TD	2 EA	3 *	4 h	5 TD	6 TD	FINAL TD
USE CONTROL of VCF 1220.033	1								
	2								
	3								
	4								
6.25%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
12.5%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
25%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
50%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
100%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15

CHAMBER NUMBER	EFF. CONC.	REPL. #	NUMBER FISH	BOAT TARE	BOAT + FISH	FISH WEIGHT (g)	AVG. WT. PER FISH (g)
/	CONTROL	1					
		2					
		3					
		4					
BC 1-4	6.25%	1		1.09088	1.09702	.00614	
		2		1.12727	1.13392	.00665	
		3		1.13887	1.14616	.00729	
		4		1.09642	1.03248	.00606	
BC 5-8	12.5%	1		1.13946	1.14584	.00638	
		2		1.14690	1.15312	.00692	
		3		1.09559	1.10173	.00614	
		4		1.08947	1.09557	.00610	
BC 9-12	25%	1		1.06785	1.07402	.00617	
		2		1.09139	1.09788	.00649	
		3		1.08461	1.09474	.00513	
		4		1.09502	1.10150	.00648	
BC 13-16	50%	1		1.06137	1.06739	.00602	
		2		1.07915	1.08529	.00614	
		3		1.09729	1.10400	.00671	
		4		1.07856	1.08404	.00548	
BC 17-20	100%	1		1.09826	1.10355	.00529	
		2		1.09901	1.10337	.00636	
		3		1.07076	1.07709	.00633	
		4		1.10220	1.10876	.00656	

CC: [Signature]

CHEMICAL ANALYSIS DATA SHEET

VCF 3

Start Date: 12/30/20 1342

Lab #: VCF 20. 138

End Date: 11/01/21 1325

Date Rec'd: 12/14

YSI Used: B B B

Renewal Sample Used: B B B B B B B

DAY	<u>12/30</u>	<u>12/31</u>	<u>1</u>	<u>1/1</u>	<u>2</u>	<u>1/2</u>	<u>3</u>	<u>1/3</u>	<u>4</u>	<u>1/4</u>	<u>5</u>	<u>1/5</u>	<u>6</u>	<u>1/6</u>	<u>7</u>
Initials	<u>m</u>	<u>TD</u>	<u>1057</u>	<u>EA</u>	<u>13:11</u>	<u>mm</u>	<u>m</u>	<u>mm</u>	<u>mm</u>	<u>TD</u>	<u>1215</u>	<u>TD</u>	<u>1816</u>	<u>TD</u>	

DISSOLVED OXYGEN (mg/L)

Control	<u>7.2</u>	<u>7.6</u>	<u>7.6</u>	<u>7.3</u>	<u>7.2</u>	<u>7.1</u>	<u>7.5</u>	<u>6.9</u>	<u>7.7</u>	<u>6.8</u>	<u>7.8</u>	<u>7.6</u>	<u>7.3</u>	<u>7.3</u>
6.25%	<u>7.5</u>	<u>7.5</u>	<u>7.4</u>	<u>7.2</u>	<u>7.4</u>	<u>7.1</u>	<u>7.5</u>	<u>6.8</u>	<u>7.5</u>	<u>6.7</u>	<u>7.8</u>	<u>7.2</u>	<u>7.3</u>	<u>7.2</u>
12.5%	<u>7.7</u>	<u>7.4</u>	<u>7.3</u>	<u>7.2</u>	<u>7.3</u>	<u>7.1</u>	<u>7.6</u>	<u>6.7</u>	<u>7.4</u>	<u>6.7</u>	<u>7.7</u>	<u>7.2</u>	<u>7.4</u>	<u>7.1</u>
25%	<u>7.7</u>	<u>7.3</u>	<u>7.2</u>	<u>7.3</u>	<u>7.2</u>	<u>7.1</u>	<u>7.5</u>	<u>6.7</u>	<u>7.3</u>	<u>6.7</u>	<u>7.7</u>	<u>7.3</u>	<u>7.4</u>	<u>7.1</u>
50%	<u>7.0</u>	<u>7.3</u>	<u>7.2</u>	<u>7.4</u>	<u>7.0</u>	<u>7.1</u>	<u>7.4</u>	<u>6.7</u>	<u>7.2</u>	<u>6.7</u>	<u>7.7</u>	<u>7.4</u>	<u>7.5</u>	<u>7.1</u>
100%	<u>7.5</u>	<u>7.2</u>	<u>7.1</u>	<u>7.5</u>	<u>6.9</u>	<u>7.1</u>	<u>7.3</u>	<u>6.7</u>	<u>7.3</u>	<u>6.5</u>	<u>7.7</u>	<u>7.5</u>	<u>7.0</u>	<u>7.1</u>

TEMPERATURE (°C)

Control	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
6.25%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
12.5%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
25%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
50%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
100%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>

pH

Control	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.8</u>	<u>7.7</u>	<u>8.0</u>	<u>7.9</u>	<u>7.9</u>	<u>7.8</u>
6.25%	<u>7.5</u>	<u>7.6</u>	<u>7.6</u>	<u>7.6</u>	<u>7.6</u>	<u>7.7</u>	<u>7.7</u>	<u>7.8</u>	<u>7.7</u>	<u>7.7</u>	<u>7.9</u>	<u>7.7</u>	<u>7.7</u>	<u>7.8</u>
12.5%	<u>7.5</u>	<u>7.6</u>	<u>7.5</u>	<u>7.6</u>	<u>7.6</u>	<u>7.7</u>	<u>7.7</u>	<u>7.8</u>	<u>7.7</u>	<u>7.8</u>	<u>7.8</u>	<u>7.7</u>	<u>7.7</u>	<u>7.8</u>
25%	<u>7.6</u>	<u>7.4</u>	<u>7.5</u>	<u>7.5</u>	<u>7.6</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.8</u>	<u>7.6</u>	<u>7.8</u>	<u>7.8</u>
50%	<u>7.5</u>	<u>7.4</u>	<u>7.4</u>	<u>7.5</u>	<u>7.5</u>	<u>7.6</u>	<u>7.6</u>	<u>7.7</u>	<u>7.6</u>	<u>7.7</u>	<u>7.8</u>	<u>7.6</u>	<u>7.8</u>	<u>7.8</u>
100%	<u>7.6</u>	<u>7.4</u>	<u>7.3</u>	<u>7.4</u>	<u>7.5</u>	<u>7.5</u>	<u>7.6</u>	<u>7.7</u>	<u>7.6</u>	<u>7.7</u>	<u>7.7</u>	<u>7.6</u>	<u>7.8</u>	<u>7.8</u>

CONDUCTIVITY (uS/cm)

Control	<u>332</u>	<u>342</u>	<u>338</u>	<u>337</u>	<u>342</u>	<u>339</u>	<u>337</u>	<u>340</u>
6.25%	<u>337</u>	<u>331</u>	<u>335</u>	<u>338</u>	<u>339</u>	<u>338</u>	<u>324</u>	<u>328</u>
12.5%	<u>334</u>	<u>332</u>	<u>338</u>	<u>338</u>	<u>338</u>	<u>333</u>	<u>334</u>	<u>331</u>
25%	<u>322</u>	<u>310</u>	<u>322</u>	<u>325</u>	<u>328</u>	<u>329</u>	<u>317</u>	<u>321</u>
50%	<u>299</u>	<u>316</u>	<u>298</u>	<u>295</u>	<u>298</u>	<u>299</u>	<u>299</u>	<u>298</u>
100%	<u>255</u>	<u>240</u>	<u>255</u>	<u>252</u>	<u>250</u>	<u>248</u>	<u>257</u>	<u>258</u>

ALKALINITY

Control	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>
100%	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>	<u>26</u>

HARDNESS

Control	<u>95</u>	<u>95</u>	<u>90</u>	<u>90</u>	<u>90</u>	<u>90</u>	<u>90</u>	<u>90</u>
100%	<u>72</u>	<u>72</u>	<u>72</u>	<u>72</u>	<u>72</u>	<u>72</u>	<u>72</u>	<u>72</u>

Residual Chlorine 1st Sample: 101 2nd Sample: _____ 3rd Sample: _____

Chronic juvenile Fathead minnow (*Pimephales promelas*) toxicity test - Survival

Aquatic Bioassay & Consulting Laboratories, Inc.

Company: VCF 3

Lab #: VCF 12 20. 138



Sample I.D.:

Date & Time Start: 12/20/10

Date & Time End: 1/10/11

Conc.	Rep.#	INITIAL TD	1 TD	2 EA	3 m	4 m	5 TD	6 TD	FINAL TD
CONTROL	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
6.25%	1	15	15	15	15	15	14	13	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
12.5%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
25%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
50%	1	15	15	15	15	15	14	10	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
100%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	14	14	14	14	14	14

CHAMBER NUMBER	EFF. CONC.	REPL. #	NUMBER FISH	BOAT TARE	BOAT + FISH	FISH WEIGHT (g)	AVG. WT. PER FISH (g)
BD 1	CONTROL	1		1.11054	1.111672	.00618	
2		2		1.10833	1.11442	.00609	
3		3		1.10990	1.11538	.00548	
4		4		1.08528	1.09132	.00604	
BD 5	6.25%	1		1.08706	1.09320	.00614	
6		2		1.09666	1.10267	.00601	
7		3		1.07965	1.08572	.00607	
8		4		1.10701	1.11330	.00629	
BD 9	12.5%	1		1.10286	1.10921	.00835	
10		2		1.08718	1.09324	.00606	
11		3		1.11208	1.11956	.00748	
12		4		1.10064	1.10752	.00688	
BD 13	25%	1		1.08500	1.09138	.00638	
14		2		1.08920	1.09525	.00605	
15		3		1.10120	1.10732	.00612	
16		4		1.09784	1.10379	.00595	
BD 17	50%	1		1.10475	1.11063	.00588	
18		2		1.09447	1.10060	.00613	
19		3		1.09383	1.09958	.00575	
20		4		1.08247	1.08859	.00612	
BD 21	100%	1		1.10187	1.10790	.00608 (0.003 TD)	
22		2		1.08315	1.08989	.00674	
23		3		1.10183	1.10799	.00616	
24		4		1.09114	1.09766	.00652	

CHEMICAL ANALYSIS DATA SHEET

VCF 4

Start Date: 12/30/20 1351

Lab #: VCF 12 20.139

End Date: 1/06/21 1330

Date Rec'd: 1/28

YSI Used: B B B

Renewal Sample Used:

B B B B B

DAY	<u>12/30</u>	<u>12/31</u>	<u>1</u>	<u>1/01</u>	<u>2</u>	<u>1/2</u>	<u>3</u>	<u>1/3</u>	<u>4</u>	<u>1/4</u>	<u>5</u>	<u>1/5</u>	<u>6</u>	<u>1/6</u>	<u>7</u>
Initials	<u>re</u>	<u>TD</u>	<u>1106</u>	<u>TD</u>	<u>1285</u>	<u>1285</u>	<u>1285</u>	<u>1300</u>	<u>1300</u>	<u>TD</u>	<u>1220</u>	<u>TD</u>	<u>0819</u>	<u>TD</u>	<u>TD</u>

DISSOLVED OXYGEN (mg/L)

Control	<u>7.2</u>	<u>7.0</u>	<u>7.0</u>	<u>7.3</u>	<u>7.0</u>	<u>7.1</u>	<u>7.5</u>	<u>6.9</u>	<u>7.7</u>	<u>6.8</u>	<u>7.8</u>	<u>7.0</u>	<u>7.3</u>	<u>7.3</u>
6.25%	<u>7.5</u>	<u>7.4</u>	<u>7.3</u>	<u>7.2</u>	<u>7.1</u>	<u>7.1</u>	<u>7.5</u>	<u>6.9</u>	<u>7.6</u>	<u>6.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.4</u>	<u>7.2</u>
12.5%	<u>7.7</u>	<u>7.5</u>	<u>7.4</u>	<u>7.3</u>	<u>7.0</u>	<u>7.1</u>	<u>7.4</u>	<u>6.7</u>	<u>7.5</u>	<u>6.7</u>	<u>7.8</u>	<u>7.7</u>	<u>7.5</u>	<u>7.1</u>
25%	<u>7.5</u>	<u>7.5</u>	<u>7.4</u>	<u>7.3</u>	<u>7.0</u>	<u>7.1</u>	<u>7.3</u>	<u>6.7</u>	<u>7.4</u>	<u>6.5</u>	<u>7.7</u>	<u>7.6</u>	<u>7.0</u>	<u>7.1</u>
50%	<u>7.0</u>	<u>7.0</u>	<u>7.5</u>	<u>7.0</u>	<u>6.9</u>	<u>7.0</u>	<u>7.2</u>	<u>6.7</u>	<u>7.4</u>	<u>6.9</u>	<u>7.7</u>	<u>7.4</u>	<u>7.0</u>	<u>7.1</u>
100%	<u>6.9</u>	<u>7.0</u>	<u>7.0</u>	<u>7.0</u>	<u>6.9</u>	<u>7.0</u>	<u>7.2</u>	<u>6.7</u>	<u>7.4</u>	<u>6.4</u>	<u>7.7</u>	<u>7.4</u>	<u>7.0</u>	<u>7.1</u>

TEMPERATURE (°C)

Control	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
6.25%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
12.5%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
25%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
50%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
100%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>

pH

Control	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.8</u>	<u>7.7</u>	<u>8.0</u>	<u>7.9</u>	<u>7.9</u>	<u>7.8</u>
6.25%	<u>7.4</u>	<u>7.2</u>	<u>7.4</u>	<u>7.2</u>	<u>7.5</u>	<u>7.8</u>	<u>7.6</u>	<u>7.8</u>	<u>7.7</u>	<u>7.7</u>	<u>7.8</u>	<u>7.7</u>	<u>7.7</u>	<u>7.8</u>
12.5%	<u>7.5</u>	<u>7.4</u>	<u>7.4</u>	<u>7.2</u>	<u>7.5</u>	<u>7.7</u>	<u>7.5</u>	<u>7.8</u>	<u>7.6</u>	<u>7.8</u>	<u>7.8</u>	<u>7.7</u>	<u>7.8</u>	<u>7.7</u>
25%	<u>7.5</u>	<u>7.4</u>	<u>7.4</u>	<u>7.3</u>	<u>7.5</u>	<u>7.6</u>	<u>7.5</u>	<u>7.7</u>	<u>7.5</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.8</u>	<u>7.8</u>
50%	<u>7.4</u>	<u>7.4</u>	<u>7.5</u>	<u>7.3</u>	<u>7.5</u>	<u>7.5</u>	<u>7.5</u>	<u>7.7</u>	<u>7.5</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.9</u>	<u>7.8</u>
100%	<u>7.4</u>	<u>7.5</u>	<u>7.0</u>	<u>7.3</u>	<u>7.5</u>	<u>7.5</u>	<u>7.5</u>	<u>7.6</u>	<u>7.4</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.9</u>	<u>7.8</u>

CONDUCTIVITY (uS/cm)

Control	<u>332</u>	<u>342</u>	<u>338</u>	<u>337</u>	<u>342</u>	<u>339</u>	<u>337</u>	<u>340</u>
6.25%	<u>331</u>	<u>330</u>	<u>325</u>	<u>324</u>	<u>328</u>	<u>329</u>	<u>320</u>	<u>328</u>
12.5%	<u>318</u>	<u>330</u>	<u>320</u>	<u>320</u>	<u>320</u>	<u>320</u>	<u>320</u>	<u>321</u>
25%	<u>288</u>	<u>248</u>	<u>252</u>	<u>255</u>	<u>258</u>	<u>255</u>	<u>259</u>	<u>259</u>
50%	<u>229</u>	<u>255</u>	<u>233</u>	<u>234</u>	<u>237</u>	<u>230</u>	<u>230</u>	<u>231</u>
100%	<u>107</u>	<u>119</u>	<u>102</u>	<u>108</u>	<u>105</u>	<u>120</u>	<u>110</u>	<u>112</u>

ALKALINITY

Control	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>
100%	<u>22</u>	<u>22</u>	<u>22</u>	<u>22</u>	<u>22</u>	<u>22</u>	<u>22</u>	<u>22</u>

HARDNESS

Control	<u>95</u>	<u>95</u>	<u>90</u>	<u>90</u>	<u>90</u>	<u>90</u>	<u>90</u>	<u>90</u>
100%	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>	<u>50</u>

Residual Chlorine _____ 1st Sample: 60.1 2nd Sample: _____ 3rd Sample: _____

Chronic juvenile Fathead minnow (*Pimephales promelas*) toxicity test - Survival

Aquatic Bioassay & Consulting Laboratories, Inc.

Company: VCF 4

Lab #: VCF 12 20. 135

Sample I.D.: _____

Date & Time Start: 12/3/20

Date & Time End: 1/6/21



Conc.	Rep.#	INITIAL	1 TD	2 TD	3 TD	4 TD	5 TD	6 TD	FINAL
CONTROL USE OF VCF 120.138	1								
	2								
	3								
	4								
6.25%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
12.5%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
25%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
50%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
100%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15

CHAMBER NUMBER	EFF. CONC.	REPL. #	NUMBER FISH	BOAT TARE	BOAT + FISH	FISH WEIGHT (g)	AVG. WT. PER FISH (g)
CONTROL	CONTROL	1					
		2					
		3					
		4					
BE 1	6.25%	1		1.11063	1.11077	.00614	
2			1.07400	1.08101	.00701		
3			1.09359	1.09980	.00621		
4			1.08990	1.09882	.00592		
BE 5	12.5%	1		1.09145	1.09844	.00699	
6			1.15299	1.15987	.00688		
7			1.08174	1.08783	.00609		
8			1.09688	1.10286	.00568		
BE 9	25%	1		1.09394	1.10064	.00670	
10			1.09228	1.09867	.00629		
11			1.10801	1.11483	.00670		
12			1.06953	1.07593	.00640		
BE 13	50%	1		1.06973	1.07599	.00626	
14			1.08901	1.09509	.00608		
15			1.10106	1.10737	.00631		
16			1.09498	1.10129	.00631		
BE 17	100%	1		1.09255	1.09898	.00643	
18			1.10071	1.10707	.00636		
19			1.09207	1.09879	.00612		
20			1.09710	1.10373	.00607		

CHEMICAL ANALYSIS DATA SHEET

VCF 5

Start Date: 12/30/20 1405

Lab #: VCF 20. 170

End Date: 11/06/21 1335

Date Rec'd: 12/28

YSI Used: B B B

Renewal Sample Used:

DAY	<u>12/30</u>	<u>12/31</u>	<u>1</u>	<u>1/1</u>	<u>2</u>	<u>1/2</u>	<u>3</u>	<u>1/3</u>	<u>4</u>	<u>1/4</u>	<u>5</u>	<u>1/5</u>	<u>6</u>	<u>1/6</u>	<u>7</u>
Initials	<u>TD</u>	<u>TD</u>	<u>TD</u>	<u>TD</u>	<u>TD</u>	<u>TD</u>	<u>TD</u>	<u>TD</u>	<u>TD</u>	<u>TD</u>	<u>TD</u>	<u>TD</u>	<u>TD</u>	<u>TD</u>	<u>TD</u>

DISSOLVED OXYGEN (mg/L)

Control	<u>7.2</u>	<u>7.0</u>	<u>7.0</u>	<u>7.3</u>	<u>7.2</u>	<u>7.1</u>	<u>7.5</u>	<u>6.9</u>	<u>7.7</u>	<u>6.8</u>	<u>7.8</u>	<u>7.0</u>	<u>7.3</u>	<u>7.3</u>
6.25%	<u>7.8</u>	<u>7.4</u>	<u>7.2</u>	<u>7.4</u>	<u>7.3</u>	<u>7.0</u>	<u>7.5</u>	<u>6.8</u>	<u>7.6</u>	<u>6.7</u>	<u>7.7</u>	<u>7.5</u>	<u>7.5</u>	<u>7.1</u>
12.5%	<u>7.6</u>	<u>7.3</u>	<u>7.2</u>	<u>7.4</u>	<u>7.3</u>	<u>7.0</u>	<u>7.4</u>	<u>6.7</u>	<u>7.5</u>	<u>6.5</u>	<u>7.7</u>	<u>7.4</u>	<u>7.5</u>	<u>7.0</u>
25%	<u>7.0</u>	<u>7.3</u>	<u>7.0</u>	<u>7.5</u>	<u>7.2</u>	<u>7.0</u>	<u>7.4</u>	<u>6.7</u>	<u>7.4</u>	<u>6.4</u>	<u>7.7</u>	<u>7.4</u>	<u>7.4</u>	<u>7.0</u>
50%	<u>7.0</u>	<u>7.2</u>	<u>7.0</u>	<u>7.0</u>	<u>7.0</u>	<u>7.0</u>	<u>7.3</u>	<u>6.7</u>	<u>7.4</u>	<u>6.3</u>	<u>7.7</u>	<u>7.4</u>	<u>7.4</u>	<u>7.0</u>
100%	<u>6.9</u>	<u>7.2</u>	<u>7.0</u>	<u>7.0</u>	<u>7.0</u>	<u>7.0</u>	<u>7.3</u>	<u>6.7</u>	<u>7.4</u>	<u>6.2</u>	<u>7.5</u>	<u>7.3</u>	<u>7.3</u>	<u>7.0</u>

TEMPERATURE (°C)

Control	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
6.25%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
12.5%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
25%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
50%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
100%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>

pH

Control	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.8</u>	<u>7.7</u>	<u>8.0</u>	<u>7.9</u>	<u>7.6</u>	<u>7.8</u>
6.25%	<u>7.3</u>	<u>7.3</u>	<u>7.4</u>	<u>7.5</u>	<u>7.6</u>	<u>7.8</u>	<u>7.7</u>	<u>7.8</u>	<u>7.8</u>	<u>7.7</u>	<u>7.8</u>	<u>7.7</u>	<u>7.5</u>	<u>7.7</u>
12.5%	<u>7.3</u>	<u>7.3</u>	<u>7.5</u>	<u>7.5</u>	<u>7.6</u>	<u>7.7</u>	<u>7.6</u>	<u>7.8</u>	<u>7.7</u>	<u>7.8</u>	<u>7.7</u>	<u>7.7</u>	<u>7.6</u>	<u>7.7</u>
25%	<u>7.3</u>	<u>7.3</u>	<u>7.6</u>	<u>7.5</u>	<u>7.6</u>	<u>7.7</u>	<u>7.5</u>	<u>7.7</u>	<u>7.6</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>
50%	<u>7.3</u>	<u>7.4</u>	<u>7.6</u>	<u>7.5</u>	<u>7.6</u>	<u>7.6</u>	<u>7.4</u>	<u>7.7</u>	<u>7.5</u>	<u>7.7</u>	<u>7.7</u>	<u>7.6</u>	<u>7.7</u>	<u>7.7</u>
100%	<u>7.2</u>	<u>7.4</u>	<u>7.5</u>	<u>7.5</u>	<u>7.6</u>	<u>7.6</u>	<u>7.4</u>	<u>7.7</u>	<u>7.4</u>	<u>7.7</u>	<u>7.7</u>	<u>7.6</u>	<u>7.7</u>	<u>7.7</u>

CONDUCTIVITY (uS/cm)

Control	<u>332</u>	<u>342</u>	<u>338</u>	<u>339</u>	<u>342</u>	<u>339</u>	<u>337</u>	<u>340</u>
6.25%	<u>329</u>	<u>324</u>	<u>322</u>	<u>325</u>	<u>328</u>	<u>326</u>	<u>312</u>	<u>314</u>
12.5%	<u>320</u>	<u>319</u>	<u>330</u>	<u>330</u>	<u>330</u>	<u>301</u>	<u>302</u>	<u>300</u>
25%	<u>293</u>	<u>275</u>	<u>272</u>	<u>275</u>	<u>277</u>	<u>299</u>	<u>268</u>	<u>270</u>
50%	<u>244</u>	<u>266</u>	<u>265</u>	<u>264</u>	<u>264</u>	<u>254</u>	<u>250</u>	<u>249</u>
100%	<u>179</u>	<u>136</u>	<u>130</u>	<u>132</u>	<u>135</u>	<u>137</u>	<u>124</u>	<u>131</u>

ALKALINITY

Control	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>
100%	<u>28</u>	<u>28</u>	<u>28</u>	<u>28</u>	<u>28</u>	<u>28</u>	<u>28</u>	<u>28</u>

HARDNESS

Control	<u>95</u>	<u>95</u>	<u>90</u>	<u>90</u>	<u>90</u>	<u>90</u>	<u>90</u>	<u>90</u>
100%	<u>40</u>	<u>40</u>	<u>40</u>	<u>40</u>	<u>40</u>	<u>40</u>	<u>40</u>	<u>40</u>

Residual Chlorine 1st Sample: LO1 2nd Sample: _____ 3rd Sample: _____

Chronic juvenile Fathead minnow (*Pimephales promelas*) toxicity test - Survival

Aquatic Bioassay & Consulting Laboratories, Inc.

Company: VCF 5

Lab #: VCF 12 20. 140

Sample I.D.:

Date & Time Start: 12/20/20

Date & Time End: 1/10/21



Conc.	Rep.#	INITIAL TD	1 TD	2 TD	3 M	4 M	5 TD	6 TD	FINAL TD
CONTROL W2 VCF 122-138	1								
	2								
	3								
	4								
6.25%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	15	15	15	15	15	15
	4	15	15	14	15	15	14	14	14
12.5%	1	15	15	15	15	15	15	15	15
	2	15	15	14	15	15	14	14	14
	3	15	15	15	15	15	15	15	15
	4	15	15	14	15	15	14	14	14
25%	1	15	15	15	15	15	15	15	15
	2	15	15	14	15	15	14	14	14
	3	15	15	14	15	15	14	14	14
	4	15	15	15	15	15	15	15	15
50%	1	15	15	14	15	15	15	15	15
	2	15	15	14	13	13	13	13	13
	3	15	15	15	15	15	15	15	15
	4	15	15	15	15	15	15	15	15
100%	1	15	15	15	15	15	15	15	15
	2	15	15	15	15	15	15	15	15
	3	15	15	14	15	15	14	14	14
	4	15	15	15	15	15	15	15	15

CHAMBER NUMBER	EFF. CONC.	REPL. #	NUMBER FISH	BOAT TARE	BOAT + FISH	FISH WEIGHT (g)	AVG. WT. PER FISH (g)
/	CONTROL	1					
		2					
		3					
		4					
BF 1-4	6.25%	1		1.10319	1.10933	.00614	
		2		1.08301	1.08916	.00615	
		3		1.09074	1.09645	.00621	
		4		1.08952	1.09557	.00605	
BF 5-8	12.5%	1		1.09387	1.09960	.00573	
		2		1.06259	1.06851	.00612	
		3		1.07337	1.07993	.00656	
		4		1.06425	1.07010	.00585	
BF 9-12	25%	1		1.08693	1.09379	.00686	
		2		1.0985	1.11597	.00612	
		3		1.0608	1.1295	.00687	
		4		1.07771	1.08394	.00623	
BF 13-16	50%	1		1.10409	1.11089	.00650	
		2		1.09331	1.09962	.00631	
		3		1.13760	1.14358	.00598	
		4		1.11457	1.12102	.00645	
BF 17-20	100%	1		1.09227	1.09883	.00656	
		2		1.08403	1.09022	.00619	
		3		1.10641	1.11270	.00629	
		4		1.11079	1.12256	.00577	

CHEMICAL ANALYSIS DATA SHEET

VCF 6

Start Date: 12/29/20 1305

Lab #: VCF 12.20.129

End Date: 1/05/21 1317

Date Rec'd: 12/28

YSI Used: B B B

Renewal Sample Used:

B B B B B

DAY	12/29	12/30	1	12/31	2	1/01	3	1/2	4	1/3	5	1/4	6	1/5	7
Initials	TD	0800 M		TD 0818		TD 0839	0630 AL		0830 M		0845 M			TD	

DISSOLVED OXYGEN (mg/L)

Control	7.0	7.2	7.2	7.0	7.0	7.3	7.2	7.1	7.5	6.9	7.7	6.8	7.8	7.0
6.25%	6.8	6.9	7.5	7.2	7.2	7.0	7.2	7.0	7.4	6.8	7.7	6.7	7.7	7.5
12.5%	7.0	6.7	7.0	7.2	7.2	7.0	7.3	7.0	7.4	6.7	7.7	6.7	7.7	7.4
25%	7.2	6.4	7.4	7.3	7.3	7.2	7.4	7.0	7.3	6.7	7.7	6.5	7.7	7.3
50%	7.4	6.3	7.2	7.4	7.3	7.3	7.4	7.0	7.2	6.7	7.6	6.5	7.7	7.3
100%	7.4	6.2	7.0	7.5	7.3	7.4	7.5	7.0	7.2	6.7	7.5	6.5	7.3	7.2

TEMPERATURE (°C)

Control	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
6.25%	24.2	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
12.5%	24.6	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
25%	24.4	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
50%	24.2	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
100%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0

pH

Control	8.0	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.7	8.0	7.9
6.25%	7.4	7.5	7.3	7.4	7.4	7.2	7.0	7.8	7.7	7.8	7.8	7.7	7.8	7.7
12.5%	7.4	7.8	7.3	7.5	7.4	7.2	7.0	7.7	7.7	7.7	7.7	7.8	7.6	7.7
25%	7.4	7.5	7.3	7.5	7.4	7.3	7.5	7.7	7.6	7.7	7.7	7.7	7.6	7.0
50%	7.4	7.9	7.3	7.5	7.4	7.4	7.5	7.6	7.5	7.6	7.7	7.7	7.6	7.0
100%	7.3	7.5	7.3	7.5	7.4	7.4	7.5	7.6	7.5	7.5	7.7	7.7	7.5	7.5

CONDUCTIVITY (uS/cm)

Control	337	332	342	338	339	342	339	340
6.25%	360	368	360	366	364	368	361	362
12.5%	367	372	377	370	371	370	372	370
25%	390	380	380	381	384	382	390	382
50%	434	421	413	417	422	425	438	422
100%	520	507	529	522	525	533	525	530

ALKALINITY

Control	60	60	60	60	60	60	60	60
100%	60	60	60	60	60	60	60	60

HARDNESS

Control	95	95	90	90	90	90	90	90
100%	135	135	135	135	135	135	135	135

Residual Chlorine 1st Sample: 60.1 2nd Sample: 3rd Sample:

Chronic *Ceriodaphnia dubia* survival and reproduction - VCF 6

Aquatic Bioassay & Consulting Laboratories, Inc.

Start Date: 12/29/20

End Date: 1/5/21

Lab #: VCF 12 20.129

Conc.	Day#	Initial	# YOUNG / REPLICATE										
			1	2	3	4	5	6	7	8	9	10	
CON	3	TD	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	✓	2	3	2	1	2	2	1	1	3	3	
	5	✓	8	6	7	9	8	7	8	10	7	8	
	6	✓	3	3	3	7	5	3	7	8	10	9	
	7	✓	15	15	12	✓	7	10	10	2	10	10	
	Total			28	27	24	17	22	22	26	21	30	30
6.25%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	4	-	1	2	1	2	1	2	1	2	1	1	
	5	-	9	9	8	8	8	8	7	7	3	3	
	6	-	8	9	7	8	7	7	9	5	7	7	
	7	-	7	3	8	10	10	8	10	7	5	5	
	Total	-		25	23	24	28	26	27	27	21	16	16
12.5%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	4	-	2	1	1	2	1	1	1	2	1	1	
	5	-	10	8	9	8	7	8	8	9	8	9	
	6	-	10	8	9	8	9	9	10	10	9	8	
	7	-	8	12	10	10	11	6	7	7	7	9	
	Total	-		30	29	29	28	28	24	26	28	25	22
25%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	4	-	2	1	2	1	2	1	1	1	5	2	
	5	-	10	8	8	9	8	7	5	8	9	10	
	6	-	8	9	8	8	8	10	10	10	10	10	
	7	-	9	8	5	3	7	12	4	10	5	10	
	Total	-		29	26	23	21	25	30	18	29	27	32
50%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	4	-	2	1	2	1	2	1	3	2	2	2	
	5	-	10	8	9	8	9	8	7	8	8	9	
	6	-	3	8	9	8	8	9	9	8	8	7	
	7	-	8	10	9	8	7	8	8	8	10	9	
	Total	-		23	29	29	25	26	26	27	26	28	27
100%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	4	-	2	1	2	1	1	2	1	1	2	1	
	5	-	8	7	8	7	8	8	8	7	8	9	
	6	-	6	7	8	8	7	8	8	9	8	7	
	7	-	8	10	10	8	9	8	9	18	12	5	
	Total	-		24	27	28	21	20	26	28	35	30	22

CHEMICAL ANALYSIS DATA SHEET

VCF ✓

Start Date: 12/29/20 1308

Lab #: VCF 1220.131

End Date: 1/05/21 1320

Date Rec'd: 12/28,

YSI Used: B B B

Renewal Sample Used: B B B B B B B

DAY	<u>12/29</u>	<u>12/30</u>	<u>1</u>	<u>12/31</u>	<u>2</u>	<u>1/01</u>	<u>3</u>	<u>1/2</u>	<u>4</u>	<u>1/3</u>	<u>5</u>	<u>1/4</u>	<u>6</u>	<u>1/5</u>	<u>7</u>
Initials	<u>TD</u>	<u>MD</u>	<u>MD</u>	<u>TD</u>	<u>DBS</u>	<u>TD</u>	<u>DBD</u>	<u>DBD</u>	<u>MD</u>	<u>DBD</u>	<u>MD</u>	<u>MD</u>	<u>MD</u>	<u>TD</u>	<u>TD</u>

DISSOLVED OXYGEN (mg/L)

Control	<u>7.0</u>	<u>7.2</u>	<u>7.2</u>	<u>7.0</u>	<u>7.0</u>	<u>7.3</u>	<u>7.2</u>	<u>7.1</u>	<u>7.5</u>	<u>6.9</u>	<u>7.7</u>	<u>6.8</u>	<u>7.8</u>	<u>7.0</u>
6.25%	<u>7.0</u>	<u>7.1</u>	<u>7.0</u>	<u>7.2</u>	<u>7.2</u>	<u>7.2</u>	<u>7.0</u>	<u>7.1</u>	<u>7.4</u>	<u>6.8</u>	<u>7.7</u>	<u>6.7</u>	<u>7.7</u>	<u>7.7</u>
12.5%	<u>7.7</u>	<u>7.0</u>	<u>7.0</u>	<u>7.0</u>	<u>7.0</u>	<u>7.2</u>	<u>7.3</u>	<u>7.1</u>	<u>7.3</u>	<u>6.7</u>	<u>7.7</u>	<u>6.7</u>	<u>7.6</u>	<u>7.0</u>
25%	<u>7.7</u>	<u>7.0</u>	<u>6.9</u>	<u>7.0</u>	<u>6.9</u>	<u>7.0</u>	<u>7.3</u>	<u>7.1</u>	<u>7.5</u>	<u>6.7</u>	<u>7.8</u>	<u>6.6</u>	<u>7.5</u>	<u>7.0</u>
50%	<u>7.0</u>	<u>7.0</u>	<u>6.7</u>	<u>7.0</u>	<u>6.9</u>	<u>7.0</u>	<u>7.4</u>	<u>7.1</u>	<u>7.5</u>	<u>6.7</u>	<u>7.7</u>	<u>6.5</u>	<u>7.4</u>	<u>7.5</u>
100%	<u>7.4</u>	<u>7.0</u>	<u>6.7</u>	<u>7.0</u>	<u>6.9</u>	<u>6.9</u>	<u>7.4</u>	<u>7.1</u>	<u>7.5</u>	<u>6.7</u>	<u>7.7</u>	<u>6.7</u>	<u>7.4</u>	<u>7.4</u>

TEMPERATURE (°C)

Control	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
6.25%	<u>24.2</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
12.5%	<u>24.6</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
25%	<u>24.7</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
50%	<u>24.9</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>
100%	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>	<u>24.0</u>

pH

Control	<u>8.0</u>	<u>7.8</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.9</u>	<u>7.8</u>	<u>7.7</u>	<u>8.0</u>	<u>7.9</u>
6.25%	<u>7.4</u>	<u>7.7</u>	<u>7.3</u>	<u>7.9</u>	<u>7.9</u>	<u>7.8</u>	<u>7.7</u>	<u>7.8</u>	<u>7.8</u>	<u>7.8</u>	<u>7.8</u>	<u>7.7</u>	<u>7.8</u>	<u>7.7</u>
12.5%	<u>7.4</u>	<u>7.6</u>	<u>7.2</u>	<u>7.9</u>	<u>7.9</u>	<u>7.8</u>	<u>7.6</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.8</u>	<u>7.8</u>	<u>7.8</u>	<u>7.6</u>
25%	<u>7.4</u>	<u>7.5</u>	<u>7.3</u>	<u>7.9</u>	<u>7.9</u>	<u>7.8</u>	<u>7.6</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.6</u>
50%	<u>7.4</u>	<u>7.4</u>	<u>7.3</u>	<u>7.8</u>	<u>7.8</u>	<u>7.8</u>	<u>7.6</u>	<u>7.7</u>	<u>7.6</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.6</u>
100%	<u>7.4</u>	<u>7.3</u>	<u>7.2</u>	<u>7.7</u>	<u>7.8</u>	<u>7.8</u>	<u>7.6</u>	<u>7.7</u>	<u>7.6</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.7</u>	<u>7.6</u>

CONDUCTIVITY (uS/cm)

Control	<u>337</u>	<u>332</u>	<u>342</u>	<u>338</u>	<u>335</u>	<u>342</u>	<u>339</u>	<u>340</u>
6.25%	<u>354</u>	<u>363</u>	<u>386</u>	<u>361</u>	<u>362</u>	<u>360</u>	<u>362</u>	<u>362</u>
12.5%	<u>352</u>	<u>357</u>	<u>350</u>	<u>355</u>	<u>358</u>	<u>358</u>	<u>354</u>	<u>355</u>
25%	<u>359</u>	<u>353</u>	<u>358</u>	<u>361</u>	<u>360</u>	<u>362</u>	<u>362</u>	<u>360</u>
50%	<u>372</u>	<u>368</u>	<u>367</u>	<u>370</u>	<u>365</u>	<u>370</u>	<u>370</u>	<u>377</u>
100%	<u>401</u>	<u>408</u>	<u>407</u>	<u>402</u>	<u>416</u>	<u>415</u>	<u>417</u>	<u>410</u>

ALKALINITY

Control	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>	<u>60</u>
100%	<u>49</u>	<u>49</u>	<u>49</u>	<u>49</u>	<u>49</u>	<u>49</u>	<u>49</u>	<u>49</u>

HARDNESS

Control	<u>95</u>	<u>95</u>	<u>97</u>	<u>90</u>	<u>90</u>	<u>90</u>	<u>90</u>	<u>97</u>
100%	<u>115</u>	<u>115</u>	<u>115</u>	<u>115</u>	<u>115</u>	<u>115</u>	<u>115</u>	<u>115</u>

Residual Chlorine 1st Sample: 6.01 2nd Sample: _____ 3rd Sample: _____

Chronic *Ceriodaphnia dubia* survival and reproduction - VCF 7

Aquatic Bioassay & Consulting Laboratories, Inc.

Start Date: 12/29/20

End Date: 1/5/21

Lab #: VCF 12.20.131

Conc.	Day#	Initial	# YOUNG / REPLICATE										
			1	2	3	4	5	6	7	8	9	10	
CON	3	TD	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	M	3	2	3	1	2	1	4	2	✓	3	
	5	M	7	5	7	9	8	8	7	7	9	8	
	6	M	11	12	10	3	3	8	9	8	7	7	
	7	12	5	3	2	10	8	6	3	8	9	7	
	Total			26	22	22	23	21	23	23	25	25	25
6.25%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	4	-	2	1	2	1	2	1	2	1	1	2	
	5	-	8	10	9	8	8	10	10	10	9	8	
	6	-	10	10	12	10	11	10	11	10	10	10	
	7	-	3	8	11	10	10	10	3	8	10	8	
	Total	-		23	29	34	29	31	31	26	29	30	30
12.5%	3	-	2	✓	✓	✓	✓	✓	2	✓	✓	✓	
	4	-	1	2	1	2	1	2	1	2	2	2	
	5	-	9	8	9	8	10	9	9	8	10	9	
	6	-	8	4	7	10	7	5	8	9	8	7	
	7	-	9	8	10	3	3	9	10	2	12	8	
	Total	-		29	22	27	23	21	27	28	21	31 ^m	26
25%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
	4	-	2	1	2	2	1	2	2	1	3	2	
	5	-	4	6	7	7	8	8	10	8	9	9	
	6	-	5	5	7	8	9	8	9	7	7	3	
	7	-	5	4	8	8	10	3	8	8	8	8	
	Total	-		16	16	24	25	28	22	29	25 ^m	27	22
50%	3	-	✓	2	✓	✓	1	✓	✓	✓	✓	✓	
	4	-	2	2	1	2	1	3	2	✓	✓	2	
	5	-	✓	7	7	8	8	7	8	8	7	8	
	6	-	4	8	9	8	7	8	8	9	8	9	
	7	-	8	9	10	11	10	12	12	9	8	10	
	Total	-		12	28	28	29	27	30	30	26	23	29
100%	3	-	✓	✓	2	✓	2	2	✓	✓	✓	✓	
	4	-	2	1	2	2	1	1	✓	✓	2	✓	
	5	-	7	4	3	4	3	4	4	3	5	2	
	6	-	10	9	8	7	7	8	8	5	4	8	
	7	-	5	8	2	4	13	12	10	10	10	9	
	Total	-		24	22	17	17	26	25	22	18	21	19

CHEMICAL ANALYSIS DATA SHEET

VCF 8

Start Date: 12/29/20 1319

Lab #: VCF 12 20. 133

End Date: 11/05/21 1325

Date Rec'd: 12/28

YSI Used: B B B

Renewal Sample Used: B B B B B B B

DAY	12/29	01/01	1	12/31	2	11/01	3	1/2	4	1/3	5	1/4	6	1/5	7
Initials	TD	0714 M		TD 0848		TD 0917	0615 R		0610 R		1010 R			TD	

DISSOLVED OXYGEN (mg/L)

Control	7.0	7.2	7.2	7.0	7.0	7.3	7.2	7.1	7.5	6.9	7.0	6.8	7.8	7.0
6.25%	7.7	6.9	7.4	7.2	7.0	7.2	7.0	7.1	7.5	7.0	7.6	6.7	7.7	7.0
12.5%	7.8	6.8	7.3	7.0	7.5	7.2	7.0	7.0	7.4	7.0	7.5	6.5	7.7	7.0
25%	7.6	6.7	7.2	7.0	7.5	7.3	7.2	7.0	7.4	6.9	7.4	6.9	7.6	7.0
50%	7.4	6.5	7.0	7.0	7.0	7.4	7.3	7.0	7.4	6.9	7.4	6.3	7.5	7.0
100%	7.0	6.4	7.0	6.9	7.0	7.4	7.4	7.1	7.4	7.0	7.4	6.2	7.5	7.5

TEMPERATURE (°C)

Control	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
6.25%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
12.5%	24.5	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
25%	24.2	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
50%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
100%	24.3	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0

pH

Control	8.0	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.7	8.0	7.9
6.25%	7.9	7.5	7.2	7.5	7.4	7.5	7.6	7.8	7.7	7.9	7.8	7.7	7.8	7.7
12.5%	7.4	7.5	7.2	7.5	7.4	7.5	7.6	7.7	7.7	7.8	7.7	7.8	7.7	7.7
25%	7.4	7.5	7.2	7.6	7.3	7.4	7.6	7.6	7.7	7.7	7.7	7.7	7.7	7.7
50%	7.3	7.4	7.2	7.6	7.3	7.4	7.5	7.5	7.6	7.6	7.7	7.7	7.7	7.7
100%	7.3	7.4	7.2	7.6	7.3	7.3	7.5	7.4	7.6	7.5	7.6	7.7	7.7	7.7

CONDUCTIVITY (uS/cm)

Control	337	332	342	338	339	342	339	342	339	340
6.25%	346	356	344	340	345	348	348	348	348	342
12.5%	343	359	344	350	348	349	349	349	349	349
25%	339	367	360	363	360	359	355	355	355	350
50%	333	339	332	334	338	338	338	338	338	337
100%	320	326	319	320	325	332	333	333	333	332

ALKALINITY

Control	60	60	60	60	60	60	60	60	60	60
100%	47	47	47	47	47	47	47	47	47	47

HARDNESS

Control	95	95	90	90	90	90	90	90	90	90
100%	105	105	105	105	105	105	105	105	105	105

Residual Chlorine 1st Sample: LO1 2nd Sample: _____ 3rd Sample: _____

Chronic *Ceriodaphnia dubia* survival and reproduction - VCF 8

Aquatic Bioassay & Consulting Laboratories, Inc.

Start Date: 12/29/20

Lab #: VCF 12.20.133

End Date: 1/5/21



Conc.	Day#	Initial	# YOUNG / REPLICATE									
			1	2	3	4	5	6	7	8	9	10
CON	3	10	✓	✓	2	3	✓	✓	✓	✓	✓	✓
	4	12	1	2	3	3	2	2	2	1	3	3
	5	12	9	8	8	8	9	10	10	7	9	5
	6	12	6	5	9	5	7	6	5	5	3	2
	7	12	9	7	5	8	7	5	7	5	7	5
	Total			25	22	22	27	25	23	24	18	22
6.25%	3	-	✓	✓	2	✓	✓	✓	✓	3	✓	✓
	4	-	2	1	2	1	2	1	✓	2	1	✓
	5	-	10	9	8	8	8	9	9	7	8	7
	6	-	5	8	8	8	7	8	8	8	5	7
	7	-	12	8	7	9	7	9	10	8	8	10
	Total	-		29	26	27	26	24	27	27	28	26
12.5%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	-	2	1	2	2	1	2	1	3	2	2
	5	-	7	7	7	9	8	10	8	8	8	7
	6	-	10	8	7	8	7	8	9	8	7	8
	7	-	8	8	8	10	9	10	8	8	12	11
	Total	-		27	29	24	29	25	30	26	27	29
25%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	-	1	2	1	2	2	1	2	2	1	2
	5	-	9	9	2	8	9	8	8	8	9	8
	6	-	6	5	5	5	5	8	7	7	8	8
	7	-	5	7	8	8	8	9	8	7	8	5
	Total	-		21	23	16	23	24	26	25	24	26
50%	3	-	✓	2	✓	✓	✓	✓	✓	1	✓	✓
	4	-	2	1	2	1	2	1	2	2	2	1
	5	-	8	9	8	7	8	7	8	10	8	9
	6	-	8	7	6	7	5	3	7	7	5	2
	7	-	12	11	8	10	10	7	1	10	9	10
	Total	-		30	30	24	25	25	18	18	30	24
100%	3	-	✓	2	✓	✓	1	✓	✓	✓	✓	✓
	4	-	2	1	2	1	2	1	2	1	1	2
	5	-	9	8	9	8	7	7	3	7	8	7
	6	-	5	5	5	3	4	5	7	8	7	5
	7	-	10	9	8	10	11	10	12	9	11	12
	Total	-		26	25	24	22	25	23	24	25	27

CC: [Signature]

CHEMICAL ANALYSIS DATA SHEET

VCF 9

Start Date: 12/29/20 1322

Lab #: VCF 12 20. 141

End Date: 1/05/21 1330

Date Rec'd: 12/28

YSI Used: B B B B

Renewal Sample Used: B B B B B

DAY	12/29	12/30	1	12/31	2	1/01	3	1/2	4	1/3	5	1/4	6	1/5	7
Initials	TD	0220 M		TD	0858	TD	0935	0650 M		0205 M		1015 M		TD	

DISSOLVED OXYGEN (mg/L)	
Control	7.0 22 7.2 7.0 7.0 7.3 7.2 7.1 7.5 6.9 7.7 6.8 2.8 7.0
6.25%	7.4 21 7.0 7.0 7.0 7.2 7.0 2.0 2.5 6.8 7.4 6.7 7.0 7.7
12.5%	7.3 20 7.0 7.0 7.2 7.2 7.2 7.0 7.4 6.7 7.7 6.7 7.7 7.7
25%	7.6 20 6.9 7.0 7.0 7.3 7.3 7.0 7.4 6.7 7.8 6.8 7.7 7.0
50%	7.2 6.9 6.8 7.1 7.0 7.4 7.4 7.0 7.4 6.7 7.7 6.7 7.8 7.0
100%	7.0 6.9 6.7 7.2 7.0 7.4 7.4 2.0 7.3 6.8 7.7 6.7 7.7 7.5

TEMPERATURE (°C)	
Control	24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0
6.25%	24.2 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0
12.5%	24.3 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0
25%	24.3 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0
50%	24.2 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0
100%	24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0 24.0

pH	
Control	8.0 7.8 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.8 7.7 8.0 7.9
6.25%	7.3 7.5 7.3 7.9 7.9 8.0 8.0 7.8 7.8 7.9 7.8 7.7 7.8 7.7
12.5%	7.3 7.4 7.2 7.9 7.9 8.0 7.9 7.8 7.8 7.8 7.8 7.8 7.8 7.7
25%	7.3 7.4 7.2 7.8 7.8 7.9 7.8 7.8 7.8 7.8 7.7 7.8 7.7 7.7
50%	7.3 7.3 7.2 7.7 7.8 7.9 7.8 7.7 7.8 7.8 7.7 7.7 7.7 7.7
100%	7.2 7.2 7.2 7.7 7.7 7.9 7.9 7.7 7.8 7.8 7.7 7.7 7.7 7.6

CONDUCTIVITY (uS/cm)	
Control	337 332 342 338 339 342 339 340
6.25%	348 344 344 340 346 348 345 342
12.5%	340 346 347 343 340 340 343 343
25%	380 356 350 360 358 352 361 340
50%	354 360 362 360 359 355 361 361
100%	364 369 367 364 364 362 367 367

ALKALINITY	
Control	60 60 60 60 60 60 60 60
100%	33 33 33 33 33 33 33 33

HARDNESS	
Control	95 95 90 90 90 90 90 90
100%	87 87 87 87 87 87 87 87

Residual Chlorine 1st Sample: 6.0 2nd Sample: 3rd Sample:

Chronic *Ceriodaphnia dubia* survival and reproduction - VCF 9

Aquatic Bioassay & Consulting Laboratories, Inc.

Start Date: 12/19/20

Lab #: VCF 12 20. 141 ✓

End Date: 1/5/21

Conc.	Day#	Initial	# YOUNG / REPLICATE									
			1	2	3	4	5	6	7	8	9	10
CON	3	TD	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	Ac	1	2	2	1	2	1	2	1	2	1
	5	ac	8	7	8	7	7	8	7	8	9	8
	6	ac	6	7	4	3	5	5	5	5	5	3
	7	ac	9	10	10	10	10	11	5	5	4	5
	Total			24	26	24	21	24	25	19	19	20
6.25%	3	-	✓	✓	✓	✓	✓	✓	✓	4	✓	✓
	4	-	2	1	2	1	2	1	3	1	2	✓
	5	-	8	8	8	10	9	8	10	10	9	9
	6	-	11	10	9	10	9	8	8	9	7	8
	7	-	9	10	7	11	12	10	11	12	11	10
	Total	-		30	29	26	32	32	27	32	34	29
12.5%	3	-	✓	✓	2	✓	✓	✓	✓	✓	✓	✓
	4	-	✓	2	1	✓	2	1	2	1	2	1
	5	-	9	8	8	7	9	7	8	8	9	9
	6	-	10	8	8	7	3	7	7	5	5	4
	7	-	14	10	2	10	8	10	8	12	10	8
	Total	-		33	28	21	24	22	25	25	26	26
25%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	-	2	1	1	2	1	1	2	1	1	2
	5	-	8	9	8	3	7	8	10	7	8	9
	6	-	2	7	8	7	8	8	8	7	8	7
	7	-	10	12	8	11	8	12	11	10	10	14
	Total	-		22	29	25	23	24	29	31	25	27
50%	3	-	✓	✓	✓	✓	2	✓	✓	✓	✓	✓
	4	-	1	2	1	2	1	2		2	2	2
	5	-	10	8	8	9	8	9	8	9	8	9
	6	-	6	4	8	8	8	8	8	7	8	8
	7	-	8	12	10	10	9	9	9	8	9	10
	Total	-		25	26	27	29	28	28	25	26	27
100%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	-	1	2	1	✓	2	1	2	1	2	1
	5	-	10	9	8	10	9	8	10	8	9	10
	6	-	9	8	8	8	8	8	7	8	8	7
	7	-	10	10	12	11	10	11	10	9	10	10
	Total	-		30	29	29	29	29	28	29	26	29

QC: dmf

CHEMICAL ANALYSIS DATA SHEET

VCF 10



Start Date: 12/29/20 1320

Lab #: VCF 12 20. 142

End Date: 11/05/21 1335

Date Rec'd: 12/28

YSI Used:

B B B

Renewal Sample Used:

B B B B B

DAY	12/29	12/30	1	12/31	2	1/1	3	1/2	4	1/3	5	1/4	6	1/5	7
Initials	TD	0730 M		TD	0912	TD	0949	0700 M		0700 M		1030 M		TD	

DISSOLVED OXYGEN (mg/L)

Control	7.0	7.2	7.2	7.0	7.0	7.3	7.2	7.1	7.5	6.9	7.7	6.8	7.8	7.6
6.25%	7.0	7.1	6.9	7.2	7.2	7.2	7.3	7.0	7.5	6.9	7.7	6.7	7.7	7.7
12.5%	6.9	6.8	6.7	7.0	7.0	7.2	7.4	7.0	7.5	6.9	7.8	6.5	7.7	7.7
25%	6.7	6.7	6.7	7.0	7.0	7.3	7.4	7.0	7.5	7.0	7.7	6.4	7.6	7.6
50%	6.8	6.7	6.6	6.8	6.9	7.4	7.5	7.0	7.5	7.0	7.7	6.4	7.5	7.6
100%	6.6	6.7	6.4	6.8	6.8	7.5	7.6	7.0	7.5	7.0	7.6	6.4	7.5	7.6

TEMPERATURE (°C)

Control	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
6.25%	24.3	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
12.5%	24.2	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
25%	24.6	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
50%	24.6	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
100%	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0

pH

Control	8.0	7.8	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.8	7.7	8.0	7.9
6.25%	7.2	7.5	7.2	7.0	7.9	7.8	7.8	7.9	7.8	7.9	7.8	7.7	7.7	7.7
12.5%	7.2	7.4	7.2	7.2	7.0	7.8	7.7	7.9	7.7	7.9	7.8	7.7	7.6	7.7
25%	7.2	7.3	7.2	7.2	7.0	7.7	7.7	7.8	7.7	7.8	7.7	7.7	7.5	7.7
50%	7.2	7.2	7.0	7.3	7.0	7.7	7.6	7.7	7.7	7.7	7.7	7.7	7.5	7.6
100%	7.1	7.2	7.0	7.4	7.5	7.7	7.6	7.7	7.7	7.7	7.8	7.7	7.5	7.6

CONDUCTIVITY (uS/cm)

Control	387	352	342	338	339	342	339	342	339	342	339	340
6.25%	407	417	430	402	410	417	407	407	417	407	407	407
12.5%	490	494	496	499	498	499	499	499	498	499	499	502
25%	603	605	603	607	610	615	620	615	615	620	620	620
50%	882	883	882	881	885	885	877	885	885	885	877	881
100%	1362	1369	1370	1370	1374	1369	1373	1369	1369	1369	1373	1370

ALKALINITY

Control	60	60	60	60	60	60	60	60	60	60	60	60
100%	80	80	80	80	80	80	80	80	80	80	80	80

HARDNESS

Control	95	95	90	90	90	90	90	90	90	90	90	90
100%	230	230	230	230	230	230	230	230	230	230	230	230

Residual Chlorine 1st Sample: 20.1 2nd Sample: 3rd Sample:

Chronic *Ceriodaphnia dubia* survival and reproduction - VCF 10

Aquatic Bioassay & Consulting Laboratories, Inc.

Start Date: 12/19/20

Lab #: VCF 12 20. 142

End Date: 1/5/21



Conc.	Day#	Initial	# YOUNG / REPLICATE									
			1	2	3	4	5	6	7	8	9	10
CON	3	TD	✓	3	✓	2	✓	✓	3	✓	✓	✓
	4	TD	2	1	2	1	2	1	2	1	2	✓
	5	TD	8	7	8	7	8	7	8	7	8	10
	6	TD	7	7	3	5	4	5	3	7	5	3
	7	TD	12	11	10	8	9	8	9	9	✓	10
	Total			29	26	23	23	28	21	25	24	15
6.25%	3	-	✓	✓	✓	✓	✓	3	✓	✓	✓	✓
	4	-	1	2	1	2	1	2	1	2	1	1
	5	-	9	8	7	8	9	8	9	8	9	8
	6	-	9	7	9	3	7	8	9	8	7	8
	7	-	10	10	11	15	12	11	8	5	10	10
	Total	-		29	27	31	28	29	32	27	23	27
12.5%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	-	✓	2	1	2	1	2	1	2	1	1
	5	-	9	9	8	9	10	9	8	9	8	9
	6	-	6	7	8	7	8	8	7	8	8	10
	7	-	✓	7	3	4	9	2	11	9	9	10
	Total	-		15	25	20	22	28	21	27	28	26
25%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	-	1	2	1	2	1	2	1	✓	✓	✓
	5	-	9	8	7	8	9	7	8	9	8	9
	6	-	8	7	7	4	5	8	8	7	5	5
	7	-	12	8	12	10	10	10	8	12	7	5
	Total	-		30	25	27	24	28	27	25	28	20
50%	3	-	✓	✓	✓	✓	✓	✓	2	✓	✓	✓
	4	-	2	1	2	1	3	4	2	1	3	✓
	5	-	8	4	4	12	4	5	5	6	7	9
	6	-	7	4	5	8	7	7	9	8	7	8
	7	-	10	10	8	7	7	8	9	8	5	4
	Total	-		27	19	19	28	21	24	27	23	22
100%	3	-	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	4	-	2	✓	2	1	3	2	2	1	✓	4
	5	-	7	8	9	8	9	8	4	4	4	5
	6	-	8	9	7	8	8	7	5	8	7	8
	7	-	12	9	9	10	9	10	5	8	7	5
	Total	-		209	21	27	27	29	27	16	21	18

CHEMICAL ANALYSIS

VCF - Topsmelt 11

Start Date: 12/30/20 1310
 End Date: 01/06/21 1307
 YSI Used: B B B
 Sample used for renewal:

Lab #: VCF 12 19. 136
 Date Rec'd: 12/29

Day	12/30	12/31	1/1	1/2	1/3	1/4	1/5	1/6	1/7
Analyst Int.	To	EA 11:17	100502	EA 12:45	100502	120802	PM 1150	To	To

DISSOLVED OXYGEN (mg/L)														
CONTROL	6.9	6.9	6.9	6.6	6.6	6.2	6.7	6.2	6.8	6.1	6.7	6.9	6.4	6.2
6.25%	6.5	6.4	6.2	6.3	6.5	6.1	6.7	6.1	6.7	6.0	6.8	6.7	6.7	6.2
12.5%	6.4	6.4	6.2	6.3	6.4	6.1	6.7	6.0	6.7	6.0	6.7	6.7	6.4	6.1
25%	6.4	6.3	6.3	6.4	6.3	6.1	6.4	6.0	6.7	6.1	6.7	6.6	6.6	6.1
50%	6.3	6.2	6.4	6.5	6.3	6.1	6.8	6.0	6.7	6.1	6.7	6.5	6.4	6.0
100%	6.2	6.0	6.5	6.6	6.2	6.0	6.5	6.1	6.7	6.1	6.7	6.4	6.2	6.0

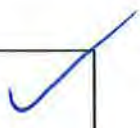
TEMPERATURE (°C)														
CONTROL	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
6.25%	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
12.5%	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
25%	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
50%	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
100%	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0

pH														
CONTROL	7.3	7.6	7.3	7.4	7.3	7.4	7.3	7.4	7.4	7.5	7.5	7.4	7.4	7.5
6.25%	7.4	7.6	7.2	7.2	7.3	7.4	7.3	7.4	7.4	7.5	7.5	7.5	7.5	7.5
12.5%	7.4	7.6	7.2	7.2	7.3	7.4	7.3	7.4	7.4	7.5	7.5	7.5	7.5	7.5
25%	7.4	7.6	7.3	7.2	7.4	7.4	7.3	7.4	7.4	7.5	7.5	7.5	7.5	7.5
50%	7.4	7.6	7.3	7.2	7.4	7.3	7.3	7.4	7.4	7.5	7.5	7.5	7.5	7.5
100%	7.4	7.6	7.4	7.2	7.5	7.2	7.5	7.5	7.5	7.5	7.5	7.5	7.5	7.5

SALINITY (ppt)														
CONTROL	25	25	25	25	25	25	25	25	25	25	25	25	25	25
6.25%	25	25	25	25	25	25	25	25	25	25	25	25	25	25
12.5%	25	25	25	25	25	25	25	25	25	25	25	25	25	25
25%	25	25	25	25	25	25	25	25	25	25	25	25	25	25
50%	25	25	25	25	25	25	25	25	25	25	25	25	25	25
100%	25	25	25	25	25	25	25	25	25	25	25	25	25	25

NOTES: ¹³⁶ ~~25~~ → 25 ppt

TOPSMELT SURVIVAL



Company: VCF 11

Sample ID: _____

Lab#: VCF 12 20. 136

Start Date: 12/30/20

End Date: 1/6/21

Daily # of Surviving Fish									
Concentration	Rep. #	Initial	1 EA	2 ^	3 EA	4 m	5 EA	6 PM	Final
SUM RW CON	1	5	5	5	5	5	5	5	5
	2	5	5	5	5	5	5	5	5
	3	5	5	5	5	5	5	5	5
	4	5	5	5	5	5	5	5	5
	5	5	5	5	5	5	5	5	5
6.25%	1	5	5	5	5	5	5	5	5
	2	5	5	5	5	5	5	5	5
	3	5	5	5	5	5	5	5	5
	4	5	5	5	5	5	5	5	5
	5	5	5	5	5	5	5	5	5
12.5%	1	5	5	5	5	5	5	5	5
	2	5	5	5	5	5	5	5	5
	3	5	5	5	5	5	5	5	5
	4	5	5	5	5	5	5	5	5
	5	5	5	5	5	5	5	5	5
25%	1	5	5	5	5	5	5	5	5
	2	5	5	5	5	5	5	5	5
	3	5	5	5	5	5	5	5	5
	4	5	5	5	5	5	5	5	5
	5	5	5	5	5	5	5	5	5
50%	1	5	5	5	5	5	5	5	5
	2	5	5	5	5	5	5	5	5
	3	5	5	5	5	5	5	5	5
	4	5	5	5	5	5	5	5	5
	5	5	5	5	5	5	5	5	5
100%	1	5	5	5	5	5	5 PM	5	5
	2	5	5	5	5	5	5 PM	5	5
	3	5	5	5	5	5	4	4	5
	4	5	5	5	5	5	5	5	5
	5	5	5	5	5	5	5	5	5

Aquatic Bioassay & Consulting Laboratories, Inc.

OC: 12/27



TOPSMELT GROWTH

Company: VCF 11 12/30/20

Lab#: VCF 1220. 136

Sample ID:

Chamber #	Eff Conc.	Rep. #	Number Fish	Boat Tare	Boat + Fish	Fish Wt. (mg)	Average Weight Per Fish (mg)
BR 1	CON	1		1.10080	1.10701	.00621	
2		2		1.10924	1.11526	.00602	
3		3		1.09540	1.10162	.00622	
4		4		1.09687	1.10303	.00616	
5		5		1.09581	1.10215	.00634	
BR 6	6.25%	1		1.09970	1.10593	.00623	
7		2		1.09793	1.10402	.00609	
8		3		1.08699	1.09312	.00613	
9		4		1.10041	1.10662	.00621	
10		5		1.07995	1.08597	.00602	
BR 11	12.5%	1		1.09479	1.10084	.00605	
12		2		1.09728	1.10355	.00627	
13		3		1.09310	1.09912	.00602	
14		4		1.08902	1.09569	.00667	
15		5		1.08166	1.09289	.00673	
BR 16	25%	1		1.09401	1.10032	.00631	
17		2		1.10031	1.11289	.00658	
18		3		1.08305	1.08951	.00646	
19		4		1.09132	1.09750	.00618	
20		5		1.09182	1.09741	.00609	
BR 21	50%	1		1.10339	1.11159	.00620	
22		2		1.08440	1.09182	.00712	
23		3		1.09023	1.09650	.00627	
24		4		1.08820	1.09438	.00618	
25		5		1.09775	1.10396	.00681	
BR 26	100%	1		1.09964	1.10582	.00618	
27		2		1.10019	1.10650	.00631	
28		3		1.10034	1.10655	.00621	
29		4		1.09361	1.09944	.00588	
30		5		1.09984	1.10544	.00565	

Aquatic Bioassay & Consulting Laboratories, Inc.

OC: [signature]

CHEMICAL ANALYSIS

VCF - Topsmelt 12

Start Date: 12/30/20 1310 1312 12
 End Date: 01/06/21 1310

Lab #: VCF 12 19. 137
 Date Rec'd: 12/24

YSI Used: B B B
 Sample used for renewal: B B B B B B

Day	12/30	12/31	1/1/21	1/2	1/3	1/4	1/5	1/6
Analyst Int.	TP	EA 11:50	11:50	EA 1:21	1420	1215	1215	TD

DISSOLVED OXYGEN (mg/L)														
CONTROL	6.9	6.9	6.9	6.1	6.6	6.2	6.7	6.2	6.8	6.1	6.7	6.9	6.4	6.2
6.25%	7.0	7.0	7.0	7.0	6.8	6.2	6.7	6.2	6.8	6.1	6.9	6.7	6.2	6.2
12.5%	7.2	7.0	6.9	7.0	6.8	6.1	6.8	6.1	6.9	6.1	7.0	6.0	6.3	6.1
25%	7.2	7.2	6.9	6.9	6.7	6.1	6.8	6.1	6.9	6.1	7.0	6.6	6.3	6.1
50%	7.1	7.2	6.8	6.8	6.7	6.1	6.9	6.1	6.9	6.1	7.0	6.5	6.4	6.1
100%	7.0	7.0	6.7	6.8	6.6	6.1	6.9	6.1	6.8	6.0	7.0	6.7	6.4	6.1

TEMPERATURE (°C)														
CONTROL	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
6.25%	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
12.5%	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
25%	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
50%	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
100%	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0

pH														
CONTROL	7.3	7.6	7.3	7.4	7.3	7.4	7.3	7.4	7.4	7.5	7.5	7.4	7.4	7.5
6.25%	7.4	7.6	7.5	7.5	7.4	7.4	7.4	7.4	7.4	7.5	7.5	7.5	7.6	7.5
12.5%	7.5	7.6	7.5	7.5	7.3	7.5	7.4	7.4	7.4	7.5	7.5	7.5	7.6	7.5
25%	7.5	7.6	7.5	7.6	7.3	7.5	7.4	7.5	7.5	7.5	7.5	7.5	7.6	7.5
50%	7.5	7.6	7.4	7.6	7.4	7.5	7.4	7.5	7.5	7.5	7.5	7.5	7.6	7.6
100%	7.5	7.6	7.4	7.6	7.6	7.5	7.5	7.4	7.5	7.5	7.5	7.5	7.6	7.6

SALINITY (ppt)														
CONTROL	25	25	25	25	25	25	25	25	25	25	25	25	25	25
6.25%	25	25	25	25	25	25	25	25	25	25	25	25	25	25
12.5%	25	25	25	25	25	25	25	25	25	25	25	25	25	25
25%	25	25	25	25	25	25	25	25	25	25	25	25	25	25
50%	25	25	25	25	25	25	25	25	25	25	25	25	25	25
100%	25	25	25	25	25	25	25	25	25	25	25	25	25	25

NOTES: .137 ppt → 25 ppt

TOPSMELT SURVIVAL

Company: VCF *12*

Sample ID: _____

Lab#: VCF *12* 20. *137*

Start Date: *12/30/20*

End Date: *1/6/21*

Daily # of Surviving Fish									
Concentration	Rep. #	Initial	1 <i>EA</i>	2 <i>M</i>	3 <i>EA</i>	4 <i>M</i>	5 <i>N</i>	6 <i>PM</i>	Final <i>K</i>
SUM RW <i>USE CON of</i> <i>VCF 20.137</i>	1								
	2								
	3								
	4								
	5								
6.25%	1	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	2	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	3	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	4	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	5	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
12.5%	1	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	2	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	3	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	4	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	5	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
25%	1	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	2	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	3	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	4	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	5	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
50%	1	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	2	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	3	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	4	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	5	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
100%	1	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	2	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	3	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	4	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>
	5	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>	<i>5</i>

Aquatic Bioassay & Consulting Laboratories, Inc.

QC: *GM*

TOPSMELT GROWTH

Company: VCF *12/30/20*

Lab#: VCF *12* 20*187*

Sample ID:

Chamber #	Eff Conc.	Rep. #	Number Fish	Boat Tare	Boat + Fish	Fish Wt. (mg)	Average Weight Per Fish (mg)
<i>WJ</i> <i>VCF 200-127</i>	CON <i>of</i>	1					
		2					
		3					
		4					
		5					
<i>BS</i> 1	6.25%	1		<i>1.09272</i>	<i>1.09880</i>	<i>.00408</i>	
2			<i>1.09995</i>	<i>1.10617</i>	<i>.00622</i>		
3			<i>1.09531</i>	<i>1.10193</i>	<i>.00662</i>		
4			<i>1.12382</i>	<i>1.12999</i>	<i>.00617</i>		
5			<i>1.10179</i>	<i>1.10792</i>	<i>.00613</i>		
<i>BS</i> 6	12.5%	1		<i>1.09197</i>	<i>1.09822</i>	<i>.00625</i>	
7			<i>1.09514</i>	<i>1.10181</i>	<i>.00667</i>		
8			<i>1.08755</i>	<i>1.09397</i>	<i>.00642</i>		
9			<i>1.10914</i>	<i>1.11562</i>	<i>.00648</i>		
10			<i>1.10066</i>	<i>1.10702</i>	<i>.00636</i>		
<i>BS</i> 11	25%	1		<i>1.10143</i>	<i>1.10761</i>	<i>.00618</i>	
12			<i>1.10025</i>	<i>1.10679</i>	<i>.00654</i>		
13			<i>1.10360</i>	<i>1.10969</i>	<i>.00609</i>		
14			<i>1.09900</i>	<i>1.10538</i>	<i>.00638</i>		
15			<i>1.09407</i>	<i>1.10060</i>	<i>.00653</i>		
<i>BS</i> 16	50%	1		<i>1.09352</i>	<i>1.09978</i>	<i>.00626</i>	
17			<i>1.08200</i>	<i>1.08872</i>	<i>.00672</i>		
18			<i>1.08826</i>	<i>1.09485</i>	<i>.00659</i>		
19			<i>1.10238</i>	<i>1.10885</i>	<i>.00647</i>		
20			<i>1.09520</i>	<i>1.10125</i>	<i>.00605</i>		
<i>BS</i> 21	100%	1		<i>1.10414</i>	<i>1.11055</i>	<i>.00641</i>	
22			<i>1.09442</i>	<i>1.10067</i>	<i>.00625</i>		
23			<i>1.09207</i>	<i>1.09833</i>	<i>.00626</i>		
24			<i>1.10138</i>	<i>1.10805</i>	<i>.00607</i>		
25			<i>1.09807</i>	<i>1.10425</i>	<i>.00618</i>		

Aquatic Bioassay & Consulting Laboratories, Inc.

OC: [Signature]

CHEMICAL ANALYSIS - Selenastrum Growth

- VCF



Start Date: 12-29-20 1129
 End Date: 1-2-21 1120

Lab#: VCF 1220-132
 Date Rec'd: 12-28-20

YSI used: B B B B B

DAY	12-29-20	12-30-20	1	12-31-20	2	1-1-21	3	1-2-21	4
Analyst Int.	~	~	1221	~	1120	TO 1400	~	~	~

TEMPERATURE °C

CONTROL	25.0		M. 2		M. 2	25.0		25.0
6.25	25.0		M. 2		M. 2	25.0		25.0
12.5	25.0		M. 2		M. 2	25.0		25.0
25	25.0		M. 2		M. 2	25.0		25.0
50	25.0		M. 2		M. 2	25.0		25.0
100	25.0		M. 2		M. 2	25.0		25.0

pH

CONTROL	7.4		7.8		7.4	7.0		7.6
6.25	7.6		7.7		7.5	7.0		7.6
12.5	7.6		7.7		7.5	7.0		7.6
25	7.6		7.7		7.5	7.0		7.6
50	7.6		7.7		7.5	7.0		7.6
100	7.6		7.6		7.4	7.0		7.6

CONDUCTIVITY umohs

CONTROL	447		437		452	460		458
6.25	449		485		457	470		471
12.5	451		484		452	462		462
25	439		464		466	479		450
50	474		512		472	499		495
100	503		554		519	507		510

SELANASTRUM GROWTH TOXICITY TEST



COMPANY: VCF
 SAMPLE I.D.: _____
 START DATE: 12-29-20
 END DATE: 1-2-21

LAB NO. VCF 1240.130
 REC'D DATE: 12-28-20

TREATMENT	EFFLUENT CONCENTRATION						REMARKS
	CON	6.25	12.5	25	50	100	
Temp. °C.							
pH							
Alkalinity mg/L	63	60	57	56	58	59	
Hardness mg/L (CaCO3)	115	113	101	102	112	119	
Salinity (ppt)							
Chlorine mg/L							

Test Chamber	Concentration	Cell Density Measurement Number of Cells Per mL Sample Replicate Per Test Chamber			Average Per Replicate
		1	2	3	
Control	1	1.246	1.248	1.238	1.244
Control	2	1.281	1.288	1.286	1.288
Control	3	1.192	1.198	1.164	1.186
Control	4	1.295	1.260	1.247	1.267
6.25	1	1.341	1.394	1.333	1.363
	2	1.534	1.531	1.536	1.548
	3	1.579	1.549	1.536	1.555
	4	1.484	1.459	1.469	1.471
12.5	1	1.437	1.482	1.437	1.431
	2	1.565	1.575	1.579	1.533
	3	1.493	1.464	1.458	1.473
	4	1.483	1.467	1.478	1.476
25	1	1.615	1.546	1.570	1.580
	2	1.453	1.442	1.431	1.442
	3	1.713	1.706	1.721	1.713
	4	1.504	1.498	1.522	1.508
50	1	1.667	1.653	1.644	1.655
	2	1.857	1.846	1.833	1.847
	3	1.703	1.639	1.649	1.664
	4	1.648	1.635	1.631	1.638
100	1	1.705	1.706	1.686	1.699
	2	1.634	1.702	1.649	1.660
	3	1.628	1.599	1.598	1.608
	4	1.637	1.624	1.683	1.648

Hemocytometer Conversion Formula: Selenastrum / mL - $\frac{\text{(Total Algae Counted)} (4,000,000)}{\text{Number of Squares Counted}}$

AC=DM-P

Appendix J. Dry-Weather Analytical Monitoring Results

	Site ID	Port Hueneme-3	Unincorporated-4	Camarillo-1	Fillmore-1
		DRY-HUE3	DRY-UNI4	MO-CAM	MO-FIL
	At Major Outfall?	No	No	Yes	Yes
	Location	Bubbling Springs @ RR xing	Arroyo Santa Rosa at Box Canyon confluence	Camarillo Hills Drain	North Fillmore Drain
	Date	08/10/21	08/11/21	08/11/21	08/10/21
	Time	12:45	9:30	7:30	9:30
Site Description	Conveyence Type	Natural channel	Box culvert	Box culvert	Box culvert
	Dimensions	N/A	N/A	8' x 24'	N/A
	Dominant Land Use	Commercial & residential	Residential & rural	Commercial & residential	Residential
	Site Elevation	0	257	104	430
Weather	Weather	Clear	Partly Cloudy	Partly cloudy	Clear
	Wind Condtion	Calm	Slight Breeze	Slight breeze	Calm
	Air Temp. (°C)	26	21	18.5	23
Trash	Trash (general area)	None	Light	Light	Light
	Trash (stream banks)	Light	None	Light	Light
Observations	Water Clarity	Cloudy	Clear	Clear	Clear
	Water Color	Gray	Clear	Clear	Clear
	Odors	None	None	None	None
	Floatables	Other	Oily sheen	None	None
	Foam	None	None	None	None
	Stains/ deposits	None	None	Orange/brown (tannins?)	None
	Structural condition	Natural channel	Concrete channel	Concrete channel	Rip rap with concrete bottom
	Vegetation Condition	Grass on banks	Duckweed on ponded area downstream	Sparse clumps dead grasses	Willow weed in wet portion of channel
	Biology	Many ducks (>60) in area and at sample site	Aquatic snails	None	Aquatic snails, small bugs on water
	Algae (suspended)	Dark green 5%	None	None	None
	Algae (substrate)	None	None	Green 5%	Green 70%
	Water Chemistry (Field)	Dissolved Oxygen (%)	15.2	77.4	115.3
Dissolved Oxygen (mg/L)		1.24	6.55	10.37	11.77
Conductivity (µS)		5960	1255	993	1721
Specific Conductance (µS)		6350	1350	1084	1826
Salinity (ppt)		3.5	0.7	0.5	0.9
Water Temp. (°C)		22.7	21.3	20.4	21.9
Water Temp. (°F)		72.9	70.3	68.7	71.4
pH		7.28	8.67	8.09	8.29
Turbidity (NTU)		43.4	2.90	5.55	3.09
Water Chemistry (Lab)	Total Organic Carbon (mg/L)	6.8	11	16	5.0
	Total Hardness as CaCO ₃ (mg/L)	1,510	539	309	758
	Total Calcium (mg/L)	321	80.0	81.3	203
	Total Magnesium (mg/L)	173	82.4	25.7	60.9
	Dissolved Copper (µg/L)	<0.50	4.8	15	6.2
	Dissolved Lead (µg/L)	<0.083	<0.083	0.25	<0.083
	Dissolved Zinc (µg/L)	1.4 (DNQ)	3.9 (DNQ)	7.6 (DNQ)	5.5 (DNQ)
	Total Coliform (MPN/100 mL)	129,970	488,400	1,119,900	15,531
	<i>E. coli</i> (MPN/100 mL)	64,880	8,664	19,863	199
Estimated Flow	Flow Status	Flowing	Flowing	Flowing	Flowing
	Water Width (ft.)	12.0	4.0	2.0	12.0
	Water Depth (ft.)	Unknown	0.01	0.02	0.15
	Flow Velocity (ft/s)	Unmeasurable (upstream from wind)	1.00	1.00	0.00
	Flow Rate (ft ³ /s)	<0.1	0.04	0.04	0.02
	Comments	Floatables oily sheen, solids (bird feathers/sloughed algae/biofilm?)	pH avg (8.66, 8.67)		

	Site ID	Moorpark-1	Ojai-7	Oxnard-2	Santa Paula-4	
	MO-MPK	DRY-OJA7	DRY-OXN2	DRY-SPA4		
	At Major Outfall?	Yes	No	No	No	
	Location	Walnut Canyon	San Antonio Creek below Stewart Cyn	Stroube Drain	Richmond Rd Drain	
	Date	08/11/21	08/10/21	08/10/21	08/11/21	
	Time	8:15	11:00	7:50	11:35	
Site Description	Conveyence Type	Box culvert	Natural channel	Natural channel	Epoxy coated metal pipe	
	Dimensions	5' x 12'	N/A	N/A	1'6"	
	Dominant Land Use	Commercial & residential	Residential	Commercial & residential	Residential	
	Site Elevation	460	617	70	343	
Weather	Weather	Partly cloudy	Clear	Overcast	Partly Cloudy	
	Wind Condition	Calm	Calm	Calm	Calm	
	Air Temp. (°C)	19.5	25	17.5	33.7	
Trash	Trash (general area)	Light	None	Moderate	Light	
	Trash (stream banks)	Light	Light	Moderate	Light	
Observations	Water Clarity	Clear	Clear	Clear	Clear	
	Water Color	Yellow	Clear	Clear	Clear	
	Odors	None	None	None	None	
	Floatables	None	Other	None	None	
	Foam	None	None	None	None	
	Stains/ deposits	Reddish in channel (algae?) Brown water edges (algae?)	None	None	None	
	Structural condition	Concrete channel	Natural channel	Concrete channel to rip rap	Pipe to concreted rip rap	
	Vegetation Condition	None	Willow, arundo, mint, herbaceous growth	Watercress	None	
	Biology	None	Small fish, large waterbugs	None	None	
	Algae (suspended)	None	Green 10%	None	None	
	Algae (substrate)	Reddish-brown 60%	Green 90%	Green 30%	Brown 100%	
	Water Chemistry (Field)	Dissolved Oxygen (%)	Flow too low	116.6	101.6	Flow too low
		Dissolved Oxygen (mg/L)	Flow too low	10.36	9.34	Flow too low
Conductivity (µS)		1957	1405	1033	1774	
Specific Conductance (µS)		2189	1516	1163	1594	
Salinity (ppt)		1.1	0.8	0.6	0.8	
Water Temp. (°C)		19.5	21.1	18.3	30.2	
Water Temp. (°F)		67.1	70.0	64.9	86.4	
pH		8.40	7.9	8.34	8.2	
Turbidity (NTU)		2.89	0.50	3.91	4.90	
Water Chemistry (Lab)		Total Organic Carbon (mg/L)	28	1.3	7.9	24
	Total Hardness as CaCO ₃ (mg/L)	439	680	650	691	
	Total Calcium (mg/L)	98.3	197	169	185	
	Total Magnesium (mg/L)	47.1	45.9	55.2	55.9	
	Dissolved Copper (µg/L)	7.6	<0.23	3.6	11	
	Dissolved Lead (µg/L)	0.086 (DNQ)	<0.083	<0.083	<0.083	
	Dissolved Zinc (µg/L)	1.9 (DNQ)	0.80 (DNQ)	5.7 (DNQ)	26	
	Total Coliform (MPN/100 mL)	104,620	11,199	129,970	261,300	
<i>E. coli</i> (MPN/100 mL)	1,050	146	5,172	359		
Estimated Flow	Flow Status	Flowing	Flowing	Flowing	Flowing	
	Water Width (ft.)	2.0	6.0	8.0	0.25	
	Water Depth (ft.)	0.01	1.50	0.05	0.01	
	Flow Velocity (ft/s)	0.80	0.00	0.50	0.25	
	Flow Rate (ft ³ /s)	0.02	0.01	0.20	<0.01	
	Comments	Flow too low for YSI 85 meter to read DO	Floatables pollen		Flow too low for YSI 85 meter to read DO	

	Site ID	Simi Valley-1	Thousand Oaks-1	Ventura-5
	MO-SIM	MO-THO	MO-THO	DRY-VEN5
	At Major Outfall?	Yes	Yes	No
	Location	Bus Canyon Drain	North Fork Arroyo Conejo at Hill Canyon WWTP	Dent Drain
	Date	08/11/21	08/11/21	08/10/21
	Time	9:00	10:10	11:40
Site Description	Conveyence Type	Box culvert	Natural channel	Natural channel
	Dimensions	7' x 16'	N/A	7.5' x 20'(toe) x 35'(top)
	Dominant Land Use	Commercial & residential	Commercial, residential & rural	Residential & rural
	Site Elevation	757	283	66
Weather	Weather	Partly cloudy	Clear	Clear
	Wind Condition	Calm	Calm	Moderate breeze
	Air Temp. (°C)	20.5	24.5	26
Trash	Trash (general area)	Light	None	Light
	Trash (stream banks)	High	Light	Light
Observations	Water Clarity	Clear	Clear	Cloudy
	Water Color	Clear	Clear	Clear
	Odors	None	None	None
	Floatables	None	Other	Other
	Foam	None	None	None
	Stains/ deposits	None	None	None
	Structural condition	Concrete channel	Rip-rap with natural bottom	Flap gate RCP to natural channel
	Vegetation Condition	None	Duckweed 50%	Heavy growth river primrose
	Biology	Aquatic snails	None	Waterbugs, 0.75" fish
	Algae (suspended)	Green 50%	Green 90%	Green 5%
	Algae (substrate)	Brown	None	None
	Water Chemistry (Field)	Dissolved Oxygen (%)	103.5	65.5
Dissolved Oxygen (mg/L)		9.15	5.24	1.83
Conductivity (µS)		2726	1476	842
Specific Conductance (µS)		2943	1600	935
Salinity (ppt)		1.5	0.8	0.5
Water Temp. (°C)		21.1	23.8	19.8
Water Temp. (°F)		70.0	74.8	67.6
pH		7.90	8.15	7.01
Turbidity (NTU)		1.45	1.98	72.7
Water Chemistry (Lab)		Total Organic Carbon (mg/L)	3.6	8.2
	Total Hardness as CaCO ₃ (mg/L)	1,340	308	391
	Total Calcium (mg/L)	340	63.6	96.5
	Total Magnesium (mg/L)	119	36.3	36.5
	Dissolved Copper (µg/L)	0.43 (DNQ)	1.6	0.75
	Dissolved Lead (µg/L)	<0.083	0.13 (DNQ)	<0.083
	Dissolved Zinc (µg/L)	0.87 (DNQ)	99	3.2 (DNQ)
	Total Coliform (MPN/100 mL)	54,750	10,462	81,640
	<i>E. coli</i> (MPN/100 mL)	197	30	14,136
Estimated Flow	Flow Status	Flowing	Flowing	Flowing
	Water Width (ft.)	4.0	4.0	12.0
	Water Depth (ft.)	0.08	0.05	1.00
	Flow Velocity (ft/s)	2.00	1	0.001
	Flow Rate (ft ³ /s)	0.64	0.20	0.01
	Comments		Floatables algae and duckweed. Tree down in channel causing slow flow	Floatables pollen/film

Appendix K. Formulas for WQO determination

BASIN PLAN and CALIFORNIA TOXICS RULE OBJECTIVES: FORMULAS

AMMONIA (BASIN PLAN)

Basin Plan Ammonia Objective formula selection is based on wet or dry event, COLD/MIGR designation status, early life stages (ELS) status, and salinity.

See the flow charts below to determine which formula to use:

Basin Plan NH3-N Objectives for Wet Weather

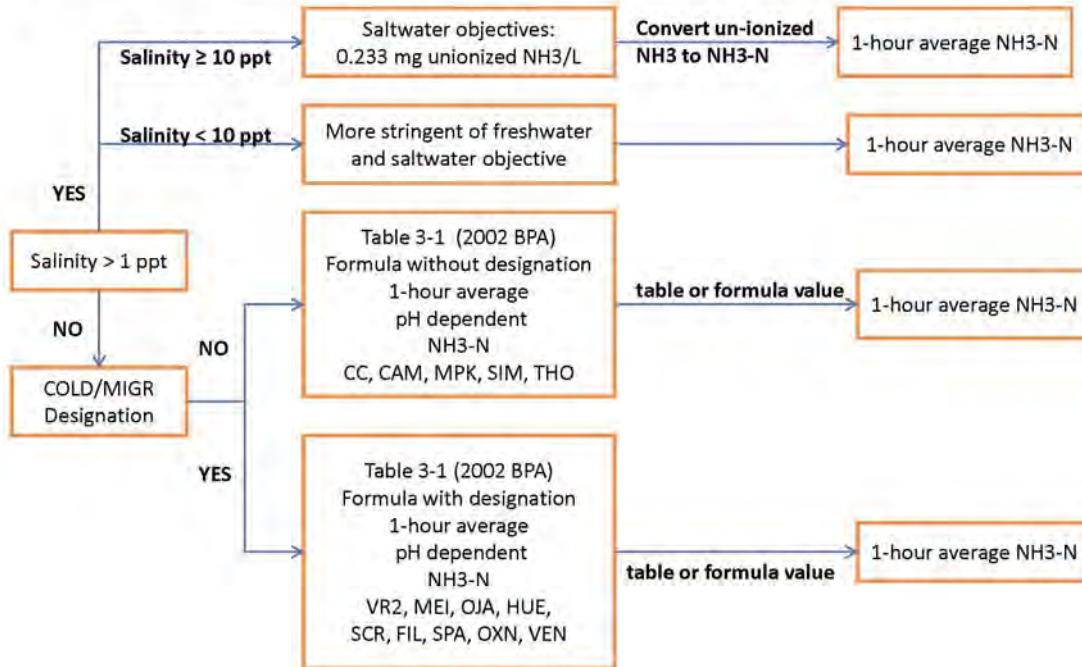


Table 3-1: One hour Average Objective for Ammonia-N for Freshwaters (mg N/L)

COLD and/or MIGR:

$$= \frac{0.275}{1 + 10^{7.204 - pH}} + \frac{39.0}{1 + 10^{pH - 7.204}}$$

NOT COLD and/or MIGR:

$$= \frac{0.411}{1 + 10^{7.204 - pH}} + \frac{58.4}{1 + 10^{pH - 7.204}}$$

Saltwater 1-hour objective for Ammonia-N

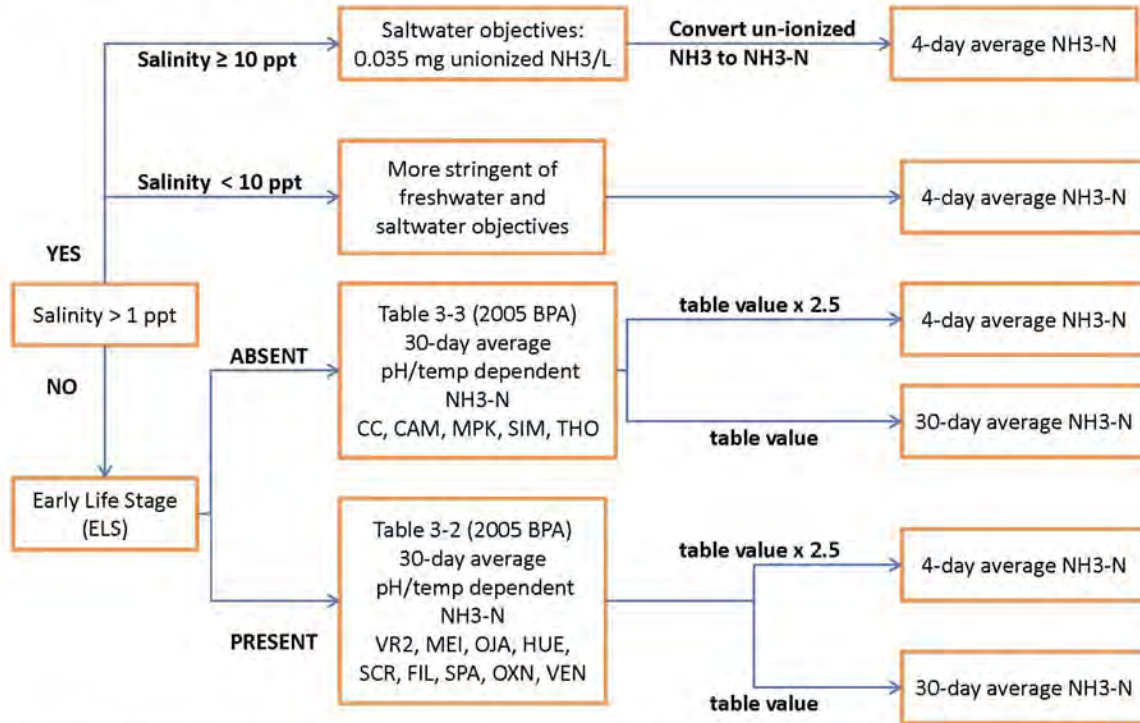
$$= 0.233 * \left(1 + 10^{\left[\left(9.245 + 0.116 * \frac{19.9273 * S}{1000 - 1.005109 * S} \right) + 0.0324(298 - T) + \frac{(0.0415)P}{T} - pH \right]} \right)$$

Where T= temperature expressed in °K (Note: Kelvin = Celsius + 273)

S = salinity (ppt)

P = pressure (assumed to be 1 atm)

Basin Plan NH3-N Objectives for Dry Weather



BPA 2005 p15-11 "Implementation actions to achieve applicable ammonia objectives must implement downstream objectives."
 NH3-N = NH3 x 0.822 4 day average objective = 2.5 x 30-day average objective

Table 3-2: 30-Day Average Objective for Ammonia-N for Freshwaters Applicable to Waters Subject to the “Early Life Stage Present” Condition (mg N/L)

$$= \left(\frac{0.0577}{1 + 10^{7.688-pH}} + \frac{2.487}{1 + 10^{pH-7.688}} \right) * \text{MIN}(2.85, 1.45 * 10^{0.028*(25-T)})$$

Where T= temperature expressed in °C.

Highest four-day average within the 30-day period shall not exceed 2.5 times the 30-day average objective as calculated above.

Table 3-3: 30-Day Average Objective for Ammonia-N for Freshwaters Applicable to Waters Subject to the “Early Life Stage Absent” Condition (mg N/L)

$$= \left(\frac{0.0577}{1 + 10^{7.688-pH}} + \frac{2.487}{1 + 10^{pH-7.688}} \right) * 1.45 * 10^{0.028*(25-\text{MAX}(T,7))}$$

Where T= temperature expressed in °C.

Highest four-day average within the 30-day period shall not exceed 2.5 times the 30-day average objective as calculated above.

Saltwater 4-day objective for Ammonia-N

$$= 0.035 * (1 + 10^{[(9.245 + 0.116 * \frac{19.9273 * S}{1000 - 1.005109 * S}) + 0.0324(298 - T) + \frac{(0.0415)P}{T} - pH]})$$

Where T= temperature expressed in °K (Note: Kelvin = Celsius + 273)

S = salinity (ppt)

P = pressure (assumed to be 1 atm)

PENTACHLOROPHENOL (CTR)

$$CMC = \exp(1.005(pH) - 4.869)$$

$$CCC = \exp(1.005(pH) - 5.134)$$

METALS (CTR)

[cadmium, chromium, copper, lead, nickel, silver, zinc]

$$CMC = WER * (Acute Conversion Factor) * (\exp\{m_A[\ln(hardness)] + b_A\})$$

$$CCC = WER * (Chronic Conversion Factor) * (\exp\{m_C[\ln(hardness)] + b_C\})$$

Note1: CCC formula contains error in CTR (says “Acute” not “Chronic” for Conversion Factor).

Note2: see note to Table 2 of Paragraph (b)(2) in the CTR, “The term conversion factor represents the recommended conversion factor for converting a metal criterion expressed as the total recoverable fraction in the water column to a criterion expressed as the dissolved fraction in the water column.”

Note3: Conversion factors (CF) are provided as values in a table for chromium, copper, nickel, silver, and zinc. CF for cadmium and lead are calculated based on hardness, i.e.

$$Cadmium Acute CF = 1.136672 - [(\ln\{hardness\}) (0.041838)]$$

$$Cadmium Chronic CF = 1.101672 - [(\ln\{hardness\}) (0.041838)]$$

$$Lead Acute and Chronic CF = 1.46203 - [(\ln\{hardness\}) (0.145712)]$$

Note4: Only two WER in Ventura County and no stations discharge within the applicable reaches - Lower Calleguas Creek (Reach 2 which is Portrero Rd south to Mugu Lagoon) has a WER for copper of 3.69 and Mugu Lagoon copper WER is 1.51.

Appendix L. Pyrethroid Insecticides Study 2012-2021



Ventura Countywide Stormwater Quality Management Program

PYRETHROID INSECTICIDES STUDY

2012 - 2021 FINAL REPORT

PREPARED BY THE:

VENTURA COUNTY WATERSHED PROTECTION DISTRICT

SUBMITTED ON BEHALF OF:

VENTURA COUNTY WATERSHED PROTECTION DISTRICT

COUNTY OF VENTURA

CITY OF CAMARILLO

CITY OF FILLMORE

CITY OF MOORPARK

CITY OF OJAI

CITY OF OXNARD

CITY OF PORT HUENEME

CITY OF SANTA PAULA

CITY OF SIMI VALLEY

CITY OF THOUSAND OAKS

CITY OF VENTURA

December 15, 2021

EXECUTIVE SUMMARY

Monitoring of sediment for pyrethroids, total organic carbon (TOC), and toxicity to the amphipod, *Hyalella azteca*, was conducted at two sites in the Calleguas Creek (CC), Ventura River (VR), and Santa Clara River (SCR) watersheds in 2012, 2015, 2018, and 2021, as required by Monitoring Program No. CI 7388, as part of the Ventura County Municipal Separate Storm Sewer System National Pollutant Discharge Elimination System Permit, Order No. R4-2010-0108 (Permit).

The 2020/21 water year was exceptionally dry, and Ventura County received only 20-30% of normal rainfall, with most of the rain falling in December, January, and March. Sampling was conducted on March 23 and 24, 2021, one to two weeks after the March storm. Two of the usual sites were dry with no evidence of seasonal flow: CC Up and SCR Down. A replacement site with similar land use approximately 5.5 miles upstream was sampled for SCR Down (SCR Down-a), but an appropriate replacement site was not found for CC Up. Pyrethroids were not detected in the 2021 round of the Study, however the laboratory's reporting levels for 2021 were higher than previous years, which could have obscured detection of some pyrethroids at previously detected levels. All 2021 samples displayed significant toxicity and a toxicity identification evaluation (TIE) was conducted, which determined that the toxicity was likely caused by the naturally occurring chironomids in the sample preying on the *H. azteca* organisms used for the test. The removal of the chironomids eliminated the toxicity in the samples.

There was no toxicity or detections of pyrethroids in 2018. In 2012 and 2015, the most detected pyrethroids were bifenthrin and permethrin. The hypothetical contribution to toxicity (TU_H) was calculated for each detection based on the sample's pyrethroid concentration, TOC amount, and a pyrethroid reference concentration known to cause significant toxicity to *H. azteca* in sediment samples. The hypothetical and observed toxicity agreed that the pyrethroid concentrations should not result in significant toxicity for all samples, although WOOD 2012, a predominately agricultural site, showed bifenthrin near the TU_H threshold for toxicity. In two samples, SCR Up 2015 and VR Down 2015, significant toxicity was observed but TU_H was low, indicating that the cause of the toxicity was a pollutant not part of this study. These two sites are associated with multiple land uses, including urban and agriculture.

Bifenthrin and permethrin are both used in significant quantities for regulated applications for structural and agricultural pest control in Ventura County but are also known to have unregulated applications for residential and industrial uses, which are not tracked. The lack of correlation between pyrethroid TU_H and corresponding observed toxicity for samples collected over four study terms, except at the agricultural-dominated WOOD site in 2012, suggests that the current approach to mitigate urban contributions of pyrethroids by targeting pesticide use in the Ventura Countywide Stormwater Management Program's (Program) education and outreach campaigns is effective and should be continued. The agricultural contributions are not under the jurisdiction of the Program and would need to be addressed through other avenues.

No trends in pyrethroid detections were apparent over the Permit term, however the lack of correlation between observed toxicity and detections of pyrethroids indicates that pyrethroid insecticide concentrations are not at or approaching levels known to be toxic to sediment-dwelling aquatic organisms.

INTRODUCTION

Pyrethroid insecticide monitoring of sediments is required by Monitoring Program No. CI 7388, as part of the Ventura County Municipal Separate Storm Sewer System National Pollutant Discharge Elimination System Permit, Order No. R4-2010-0108 (Permit). The Permit specifies that the Principal Permittee (Ventura County Watershed Protection District (District)) shall perform a Pyrethroid Insecticides Study (Study) to accomplish the following objectives:

- i. Establish baseline data for major watersheds;
- ii. Evaluate whether pyrethroid insecticide concentrations are at or approaching levels known to be toxic to sediment-dwelling aquatic organisms;
- iii. Determine if pyrethroids discovered are from urban sources; and
- iv. Assess any trends over the permit term.

The first round of sediment monitoring for the Study was conducted in April 2012 by the District at two locations in both the Ventura River and Santa Clara River watersheds. Data from the Calleguas Creek Watershed Toxicity Total Maximum Daily Load (TMDL) monitoring program was used to meet the requirements for that watershed, as allowed by the Permit. However, the 2012 TMDL data were unavailable in time for the 2012 report, so 2008-2010 data were included in that report and the 2011 and 2012 data were included in the 2015 report. Two sites in the Calleguas Creek Watershed were added to the District monitoring in 2015 to increase comparability and avoid issues with different detection levels, sampling strategies, and reporting cycles between the TMDL and this Study. Therefore, only TMDL data from 2012 is included in these reports. The second, third, and fourth rounds of the Study were conducted in April 2015, May 2018, and March 2021, respectively, by the District at two sites each in the Ventura River, Santa Clara River, and Calleguas Creek¹ watersheds.

The samples were analyzed for total organic carbon (TOC) and eight specific pyrethroid pesticides required by the Permit (bifenthrin, cyfluthrin, cypermethrin, deltamethrin (co-elutes with tralomethrin, which is listed in the Permit if the laboratory is capable of analyzing for it), esfenvalerate (co-elutes with the non-required fenvalerate), lambda-cyhalothrin, and permethrin, as well as several pyrethroid and non-pyrethroid pesticides that are not required by the permit but are standard outputs of the analytical method. All sediment samples were tested for toxicity through a 10-day survival bioassay using 7–10-day old *Hyaella azteca*.

Hypothetical toxicity units (TU_H) were calculated to compare the expected relative toxicity of different samples and pyrethroids. TU_H are calculated by normalizing the sediment pyrethroid concentrations to TOC concentration (to account for hydrophobicity) and then dividing by the *H. azteca* 10-day median lethal concentration (LC50²) for each detected pyrethroid, if available. TU_H cannot be calculated for detected analytes without LC50s in the reference documents (e.g. non-pyrethroids such as pendimethalin and dichloran) or for analytes that may be present at levels below the method detection limit (i.e. non-

¹ Only one site in Calleguas Creek Watershed in 2021 due to a very dry year (20-30% normal rainfall).

² LC50 is the lethal concentration required to kill 50% of the population.

detects), so their hypothetical contributions to toxicity are unknown. Pollutants other than those analyzed may also be contributing to toxicity, however this study was focused on pyrethroid pollutants.

In 2012, two pyrethroids were detected in the Study samples: bifenthrin (three sites) and permethrin (one site); and one pyrethroid (bifenthrin) was detected in the TMDL samples (two sites). All TU_H were less than one indicating the samples were non-toxic. This was supported by the lack of toxicity seen in the analysis of the sediment samples, except for the two TMDL sites, which had significant toxicity. Two non-pyrethroid pesticides were also detected in the Study samples: pendimethalin (two sites) and dichloran (one site) but were not tested in the TMDL.

In 2015, two of the eight Permit-required pyrethroid pesticides were detected: bifenthrin (three sites) and permethrin (one site). One non-required pyrethroid (fenpropathrin at one site) and two non-pyrethroid pesticides (dichloran at one site and pendimethalin at three sites) were also detected. All TU_H were less than one except for bifenthrin in the CC Down duplicate, however there was not significant toxicity in the measured sample. Some toxicity was observed in 2015 at SCR Up and VR Down. None of the Permit required pyrethroids were detected at SCR up. Bifenthrin was detected in VR Down, however other sites with higher concentrations exhibited no toxicity, and the calculated hypothetical toxicity for VR Down based on the bifenthrin concentration was not toxic.

In 2018, the third round of the study was conducted and pyrethroids were not detected in any of the Study samples. One non-pyrethroid pesticide (Dichloran) was detected at one site. Significant toxicity was not observed in any of the 2018 samples.

In 2021, the fourth round of the study was conducted following a very dry wet season (20-30% of normal rainfall) and no pyrethroids were detected, however laboratory reporting limits were higher than in previous years which could obscure the presence of pyrethroids. Two non-pyrethroids (dichloran and pendimethalin) were detected at one site. Significant toxicity was initially observed in all samples, but the toxicity identification evaluation (TIE) determined that the likely cause was chironomids (midges) present naturally in the samples, which preyed upon the *H. azteca* during the test.

METHOD

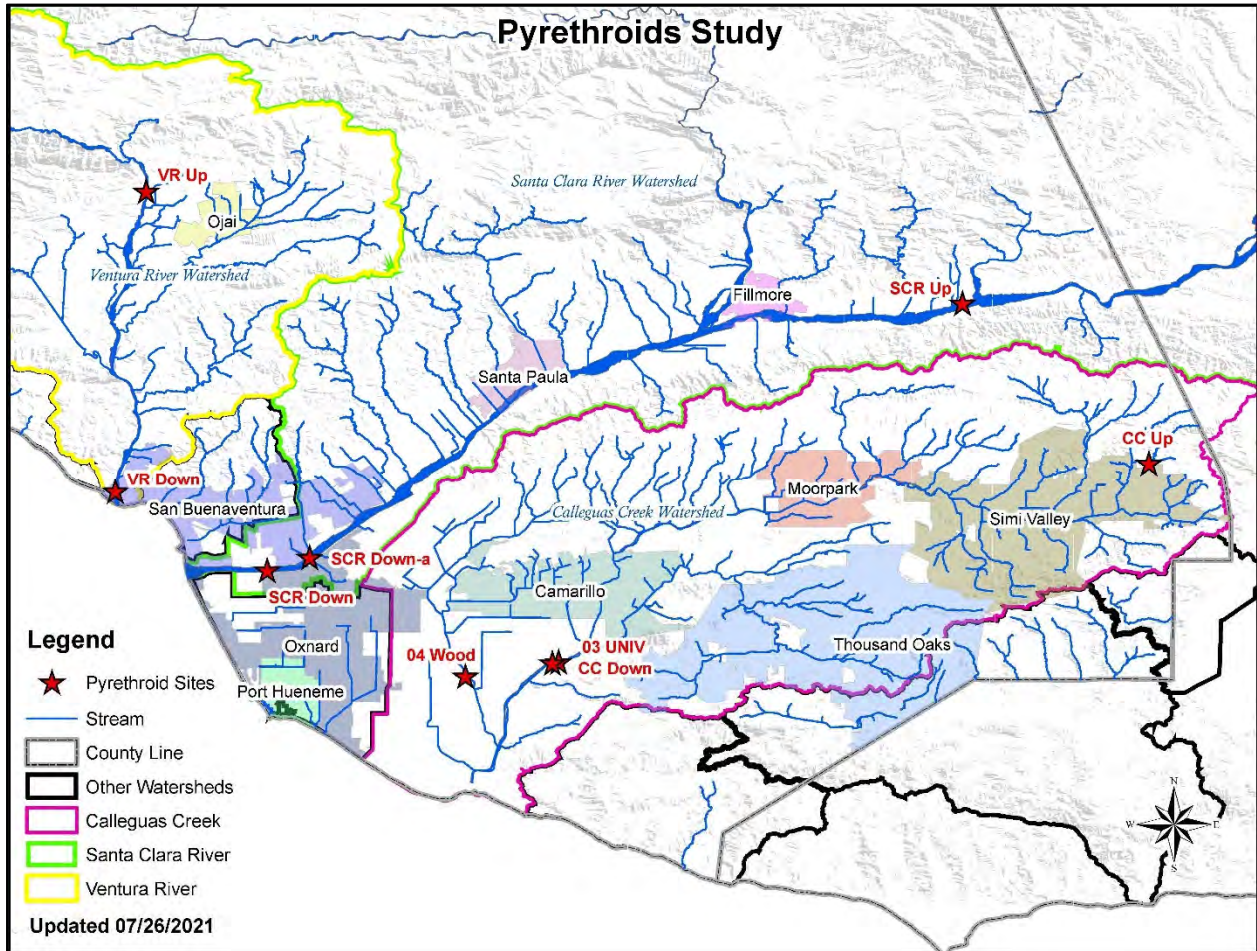
The Permit specifies that monitoring is to be conducted every three years for the duration of the Permit (i.e. 2012, 2015, 2018, 2021), after sediment has settled within the water body and safe access can be assured. In-stream sediment samples for chemical analysis and toxicity testing were collected using stainless steel scoops according to methods developed by the USGS and outlined in *Guidelines for Collecting and Processing Samples of Stream Bed Sediment for Analysis of Trace Elements and Organic Contaminants for the National Water Quality Assessment Program (1994)*. When possible, sediment sampling stations encompassed a section of the reach approximately 100 meters in length upstream from water-column sampling stations, but this varied depending on site conditions. Five to ten wadeable depositional zones (low energy areas where fine-grained particles can accumulate) within the reach were targeted (when possible) to obtain a sample representative of the site.

Two sites, an upstream site and a downstream site, were selected on the main stem in the Ventura River, Santa Clara River, and Calleguas Creek watersheds (Figure 1). The upstream site was located higher in the watershed to reduce the influence of urban sources and the downstream site was located low in the watershed to include urban contributions. It was not possible in all cases to exclude upstream sources of agriculture and/or urban runoff, including some sources outside of Ventura County. For the Ventura River watershed, the upstream site (VR Up) is on the Ventura River above the Casitas Municipal Water District's diversion structure near the north end of Rice Road in Meiners Oaks. The downstream site (VR Down) is on the Ventura River near the Main Street Bridge in Ventura. For the Santa Clara River watershed, the upstream site (SCR Up) is on the Santa Clara River east of Torrey Road near the Los Angeles/Ventura County Line and the downstream site (SCR Down) is on the Santa Clara River near the Victoria Avenue Bridge in Ventura. For 2021, SCR Down was completely dry with no evidence of recent flow, so the site was moved upstream near Los Angeles Avenue (SCR Down-a). For the Calleguas Creek watershed, the upstream site (CC Up) is in Las Lajas Canyon above Las Lajas Dam, north of Simi Valley, and the downstream site (CC Down) is on Calleguas Creek at the Camarillo Street (formerly University Drive) Bridge. Factors such as safety, ease of entry, upstream land use, hydrology, and long-term accessibility (including landowner permission) were considered in site selection.

For the first round of the Study (2012), two sites from the Calleguas Creek Watershed Toxicity Total Maximum Daily Load (TMDL) monitoring program were used to meet the requirements for that watershed, as allowed by the Permit. The TMDL sites were 03_UNIV (UNIV) – co-located with CC Down, and 04_WOOD (WOOD) – Revolon Slough at Wood Road. To increase comparability between samples, watersheds, and years, and eliminate differences between the Study and the TMDL (e.g. detection levels, sampling strategies, collection methods, reporting cycles, etc.), the TMDL sites in the study were replaced with CC Up and CC Down beginning in 2015.

As described in the Ventura County MS4 Pyrethroid Insecticides Monitoring Quality Assurance Project Plan (QAPP), the top layer (~1 cm) of the most recently deposited sediment was collected with a pre-cleaned stainless-steel scoop as specified in the Permit. The quantity of sediment required for the tests precluded sampling directly into glass jars, so the sediment was deposited in a 24" by 36" 2mm

Figure 1. Pyrethroid Sampling Locations



polyethylene bag per site. The bag was closed, and the sediment was manually homogenized onsite by squeezing and rotating the bag. Homogenized sediment was placed in one to two 8 oz wide-mouth glass jars and placed on ice for TOC and pyrethroid analysis. The jars were placed in the freezer at the end of the sampling day for pickup by the chemistry lab courier the following day. The remaining sediment (~ 3 liters) was double-bagged and kept on ice until delivered to the toxicity laboratory.

Water quality field measurements were taken with hand-held probes. All sediment samples were analyzed for total organic carbon (TOC) by EPA 9060, pyrethroids by GC/MS NCI-SIM, and toxicity to 7–10-day old *Hyalella azteca*, as described in *Aquatic Toxicity Due to Residential use of Pyrethroid Insecticides*³. A toxicity identification evaluation (TIE) procedure was conducted in 2021 to remove the native *Chironomus* population as a suspected cause of observed toxicity of the samples. The procedure is adapted from US EPA/600/R-07/080 and is a widely accepted means of organism removal treatment in TIE analysis. Two liters of control water were added to half of the remaining sediment and stirred with a stainless-steel paddle. *Chironomus* that were dislodged from the sediment were scooped off using stainless sieves and stored for an additional QC test. The added water was poured off and used as the

³ *Aquatic Toxicity Due to Residential Use of Pyrethroid Insecticides*; Weston, D., Holmes, R., You, J., Lydy, M.J (2005). *Environ. Sci. Technol.*; (Article); 2005; 39(24); 9780 pp.

overlying/control water for the treatment setup and renewals. The samples were then run side by side with the untreated samples. A known non-toxic sample was also run in the batch with the saved chironomids from one site (VR Up) added to it, as well as on its own without the chironomids. All samples used 100 ml of sediment with 175 ml of control water, of which ~50 ml of control water was poured off and new control water added each day during the 10-day test.

The stainless-steel trowels used for the Study were cleaned prior to sample collection with Alconox⁴ laboratory detergent and tap water, rinsed with distilled water, and air dried. They were then sealed in Ziploc bags until arrival at the site. An equipment blank was collected by the laboratory from one clean, unused stainless-steel trowel by rinsing it with one liter of laboratory grade de-ionized water and analyzing the rinsate for TOC by SM 5310C and pyrethroids by GC/MS NCI-SIM.

RESULTS

Three pyrethroids were detected in environmental samples during the Study: bifenthrin and permethrin, which were required analytes in the Permit, and fenpropathrin (danitol) which was not required by the Permit but was included in the analytical method. Two non-pyrethroid pesticides, dichloran and pendimethalin, were also detected but were not required by the Permit. These non-pyrethroid analytes were not part of the TMDL analytical method so data is not available for the 2012 TMDL sites.

Study Equipment Blanks

No pyrethroids (or non-pyrethroid constituents) were detected by the pyrethroid analytical method for the 2021 equipment blank (trowel). A small amount of TOC was detected below the reporting limit (Table 1). The 2021 TOC analysis was subbed out to another lab due to broken equipment at the primary laboratory, so the detection limit is higher for 2021. The equipment blank detections are similar to those seen in equipment blank samples in previous years of the Study. The detection of TOC was insignificant in relation to expected environmental concentrations, so no follow up testing was required in 2021. Additional testing following detections of parameters of interest was done in previous studies, i.e., 2012 and 2015, due to detections above the reporting limit in the initial blanks. The follow up testing showed reduced detections, as explained in the 2012 and 2015 reports.

⁴ Alconox laboratory detergent in 2018 and 2021, Citranox laboratory detergent in 2012 and 2015.

Table 1. Equipment Blank Results 2012 - 2021

Analyte	2012 Initial Trowel Blank (µg/L, MDL varies)	2012 2 nd Trowel Blank (same trowel, 2nd rinse) (µg/L, MDL varies)	2015 Initial Trowel Blank (µg/L, MDL varies)	2015 2 nd Trowel Blank (2 nd trowel) (µg/L, MDL varies)	2018 Trowel Blank (µg/L, MDL varies)	2021 Trowel Blank (µg/L, MDL varies)
Allethrin	ND (<0.00085)	ND (<0.00085)	ND (<0.00085)	ND (<0.00085)	ND (<0.00085)	ND (<0.00085)
Bifenthrin	0.0041	ND (<0.00079)	0.0026	0.00091 (DNQ)	0.00085 (DNQ)	ND (<0.00079)
Cyfluthrin	ND (<0.00083)	ND (<0.00083)	ND (<0.00083)	ND (<0.00083)	ND (<0.00083)	ND (<0.00083)
Cypermethrin	0.0026	ND (<0.00066)	ND (<0.00066)	ND (<0.00066)	0.00087 (DNQ)	ND (<0.00066)
Deltamethrin/Tralomethrin	ND (<0.0019)	ND (<0.0019)	ND (<0.0019)	ND (<0.0019)	ND (<0.0019)	ND (<0.0019)
Dichloran	ND (<0.00080)	ND (<0.00080)	ND (<0.00080)	ND (<0.00080)	ND (<0.00080)	ND (<0.00080)
Esfenvalerate	ND (<0.00098)	ND (<0.00098)	ND (<0.00098)	ND (<0.00098)	ND (<0.00098)	ND (<0.00098)
Fenpropathrin			ND (<0.0020)	ND (<0.0020)	ND (<0.0020)	ND (<0.0020)
Fenvalerate	ND (<0.00098)	ND (<0.00098)	ND (<0.00098)	ND (<0.00098)	ND (<0.00098)	ND (<0.00098)
L-Cyhalothrin	ND (<0.0012)	ND (<0.0012)	ND (<0.0012)	ND (<0.0012)	ND (<0.0012)	ND (<0.0012)
Pendimethalin	0.0025	ND (<0.00050)	ND (<0.00050)	ND (<0.00050)	ND (<0.00050)	ND (<0.00050)
Permethrin	ND (<0.0050)	ND (<0.0050)	ND (<0.0050)	ND (<0.0050)	ND (<0.0050)	ND (<0.0050)
Prallethrin	ND (<0.00092)	ND (<0.00092)	ND (<0.00092)	ND (<0.00092)	ND (<0.00092)	ND (<0.00092)
Sumithrin	ND (<0.0024)	ND (<0.0024)	ND (<0.0024)	ND (<0.0024)	ND (<0.0024)	ND (<0.0024)
Tefluthrin	ND (<0.00093)	ND (<0.00093)	ND (<0.00093)	ND (<0.00093)	ND (<0.00093)	ND (<0.00093)
TOC	0.17 mg/L (DNQ)	N/A	0.18 mg/L (DNQ)	0.23 mg (DNQ)	0.23 mg/L	0.49 mg/L (DNQ)

Analyte listed in Permit
Detections
ND = Not Detected
DNQ = Detected Not Quantified

2021 Study

The 2020/21 water year was exceptionally dry, and Ventura County received only 20-30% of normal rainfall, with most of the rain falling in December, January, and March. Sampling was conducted on March 23 and 24, 2021, one to two weeks after the March storm. VR Up (Figure 2), VR Down (Figure 3), SCR Up (Figure 4), and CC Down (Figure 7) were flowing, however CC Up (Figure 6) and SCR Down (Figure 8) were completely dry with no evidence of recent flow. An alternate wet SCR Down site was identified approximately 5.5 miles upstream at the Los Angeles Avenue Bridge and access permission obtained, so sampling was conducted at this alternate site, SCR Down-a (Figure 5). There was not a suitable backup site for CC Up so samples above the urban influence in the Calleguas Creek watershed were not collected for this event.

Figure 2. VR Up



Figure 3. VR Down



Figure 4. SCR Up



Figure 5. SCR Down-a



Figure 6. CC Up (Dry)



Figure 7. CC Down



Figure 8. SCR Down (Dry)



The chemistry laboratory was instructed to perform the pyrethroid analyses with reporting limits (RLs) below or as close to 1 ng/g as possible, per the permit and as done for the previous three rounds of the study, however the laboratory did not achieve these limits for 2021. No pyrethroids were detected in the 2021 sediment samples, including the eight pyrethroids specified by the Permit for analysis (bifenthrin, cyfluthrin, cypermethrin, deltamethrin, esfenvalerate, I-cyhalothrin, permethrin, and tralomethrin), however the RLs were high enough that they would have obscured detections at levels seen in previous events. Dichloran and pendimethalin, two non-pyrethroid pesticides, were detected above the RL (49 and 16 ng/g, respectively) at one site (SCR Down-a). TOC amounts ranged from 5.19 g/kg at CC Down to 43.1 g/kg at VR Up and this range is similar to previous years, although it varies between sites.

All samples were subjected to a 10-day survival and growth sediment bioassay using *Hyalella azteca*. The laboratory observed *Chironomus* and *Ostracoda* present in all samples during setup. Substantial survival and growth toxicity occurred in all⁵ samples. Laboratory staff observed the chironomids attacking and attaching to the *H. azteca* and so suspected that the measured toxicity was due to the *Chironomus* preying on the *H. azteca* during the test. A toxicity identification evaluation (TIE) was initiated with a treatment to

⁵ VR Down did not exhibit toxicity for growth. Growth was higher for VR Down than for its field duplicate (VR Down (Dup)*) and the control. Survival was similar with significant toxicity in VR Down and VR Down (Dup). *Field duplicate named VR Down 2 in laboratory reports.

remove the *Chironomus* from the sample. 10-day survival bioassays of the treated samples were run side by side with untreated samples. The treated samples did not display significant toxicity, but the untreated samples displayed toxicity levels similar to the original tests. Similarly, the chironomids that were removed from the VR Up sample were added to a known non-toxic sample and this treated sample was run side by side with an untreated sample from the same site. The formerly non-toxic sample was still non-toxic without the chironomids (100% survival) but was toxic with the added chironomids (0% survival).

The field duplicate (VR Down (Dup)) results were within allowed limits for relative percent difference for pyrethroids, TOC, and toxicity survival, however there was a difference in growth toxicity, as VR Down outperformed the control unlike all other Study samples, including its field duplicate.

Table 2. Laboratory Results 2021

Analyte	CC Down	SCR Up	SCR Down-a	VR Up	VR Down	VR Down (Dup)	Non-Toxic Tox QA	Units
<u>Chemistry</u>								
Allethrin	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
Bifenthrin	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
Cyfluthrin	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
Cypermethrin	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
Deltamethrin	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
Dichloran	<4.2	<4.0	49	<1.7	<4.3	<7.4	NA	ng/g
Esfenvalerate	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
Fenpropathrin	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
Fenvalerate	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
L-Cyhalothrin	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
Pendimethalin	<4.2	<4.0	16	<1.7	<4.3	<7.4	NA	ng/g
Permethrin	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
Prallethrin	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
Sumithrin	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
Tefluthrin	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
Tralomethrin	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	NA	ng/g
TOC	5.19	7.04	15.3	43.1	10.7	16.2	NA	g/kg
<u>Toxicity to <i>H. azteca</i>: Initial</u>								
Survival	12.50 SG	62.50 SG	35.00 SG	7.50 SG	75.00 SG	67.50 SG	NA	% Survival
Growth	57.69 SG	38.46 SG	65.38 SG	73.08 SG	-50.00	61.54 SG	NA	% Effect
<u>Toxicity to <i>H. azteca</i>: TIE</u>								
Survival, with chironomids	17.50 SG	72.50 SG	45.00 SG	0.00 SG	NA	52.50 SG	0.00 SG	% Survival
Survival, without chironomids	100.00	97.50	100.00	97.50	NA	100.00	100.00	% Survival

Analyte listed in Permit

< Not detected at method detection limit
NA = Not Applicable
SG = Significant effect compared to control

Detected (chemistry) or Significant effect (toxicity)

Dup = field duplicate
- Sample performed better than the control

2012, 2015 and 2018 Combined Results⁶

Data from the Calleguas Creek Watershed Toxicity Total Maximum Daily Load (TMDL) monitoring program was used to meet the requirements for that watershed in 2012, as allowed by the Permit. However, TMDL site 04_WOOD (WOOD) is not co-located with CC Up, and although TMDL site 03_UNIV (UNIV) is co-located with CC Down, the sample collection methods and protocols for the TMDL are different to this Study. To increase comparability between samples and watersheds, two sites in the Calleguas Creek Watershed were added in 2015 to avoid issues with different detection levels, sampling strategies, and reporting cycles. TMDL data (except for 2012) is not included in this report. The 2012-2018 laboratory results are grouped by watershed in Table 3, Table 4, and Table 5.

⁶ Since 2021 reporting limits were higher than those of previous study years, the 2021 results have not been added to the 2012-2018 results tables.

Table 3. Laboratory Results 2012-2018 – Calleguas Creek Watershed

Analyte	<u>WOOD</u>	CC Up		<u>UNIV (co-located with CC Down)</u>		CC Down			Units
	2012	2015	2018	2012	2012 Dup	2015	2015 Dup	2018	
Allethrin	<0.5	<0.93	<0.85	<0.5	<0.5	<0.93	<0.92	<0.93	ng/g
Bifenthrin	<u>2.7</u>	<0.93	<0.85	<u>1</u>[^]	<u>0.9</u>[^]	<u>3.3</u>	<u>5.9</u>	<0.93	ng/g
Cyfluthrin	<0.5	<0.93	<0.85	<0.5	<0.5	<0.93	<0.92	<0.93	ng/g
Cypermethrin	<0.5	<0.93	<0.85	<0.5	<0.5	<0.93	<0.92	<0.93	ng/g
Deltamethrin	<0.5	<0.93	<0.85	<0.5	<0.5	<0.93	<0.92	<0.93	ng/g
Dichloran	NS	<0.93	<0.85	NS	NS	<0.93	<0.92	<0.93	ng/g
Esfenvalerate	<0.5	<0.93	<0.85	<0.5	<0.5	<0.93	<0.92	<0.93	ng/g
Fenpropathrin	<0.5	<0.93	<0.85	<0.5	<0.5	<0.93	<0.92	<0.93	ng/g
Fenvalerate	<0.5	<0.93	<0.85	<0.5	<0.5	<0.93	<0.92	<0.93	ng/g
L-Cyhalothrin	<0.5	<0.93	<0.85	<0.5	<0.5	<0.93	<0.92	<0.93	ng/g
Pendimethalin	NS	<0.93	<0.85	NS	NS	<u>3.8</u>	<u>2.5</u>	<0.93	ng/g
Permethrin	<5	<0.93	<0.85	<5	<5	<u>3.3</u>	<u>5.4</u>	<0.93	ng/g
Prallethrin	<0.5	<0.93	<0.85	<0.5	<0.5	<0.93	<0.92	<0.93	ng/g
Sumithrin	NS	<0.93	<0.85	NS	NS	<0.93	<0.92	<0.93	ng/g
Tefluthrin	NS	<0.93	<0.85	NS	NS	<0.93	<0.92	<0.93	ng/g
Tralomethrin	NS	<0.93	<0.85	NS	NS	<0.93	<0.92	<0.93	ng/g
TOC	<u>5.6</u>	<u>12.2</u>	<u>1.43</u>	<u>4.4</u>	<u>3.3</u>	<u>12.3</u>	<u>8.27</u>	<u>7.01</u>	g/kg
Toxicity to <i>H. azteca</i>, Survival	<u>66.3</u> <u>SG</u>	95.0	100 100*	<u>75.0</u> <u>SG</u>	NS	82.5	87.5	95 100*	% Survival
Toxicity to <i>H. azteca</i>, Mortality	<u>33.7</u> <u>SG</u>	5.0	0 0*	<u>25.0</u> <u>SG</u>	NS	17.5	12.5	5.0 0*	% Mortality
Toxicity to <i>H. azteca</i> , Growth	<u>69.4</u> <u>SG</u>	-565	-304	-7.71	NS	-216	-161	-189	% Effect

TMDL = Samples collected at TMDL sites using TMDL methods. Only applicable to 2012 results.

Analyte listed in Permit

- < Not detected at method detection limit
- [^] Detected not quantified
- * Samples re-run to include growth
- Sample performed better than control

Detected (chemistry) or Significant (toxicity)

- Dup = Duplicate
- NS = Not sampled
- SG = Significant effect compared to control

Table 4. Laboratory Results 2012-2018 – Santa Clara River Watershed

Analyte	SCR Up			SCR Down			Units
	2012	2015	2018	2012	2015	2018	
Allethrin	<0.5	<0.92	<0.88	<0.5	<0.94	<0.93	ng/g
Bifenthrin	0.78	<0.92	<0.88	0.74	2.6	<0.93	ng/g
Cyfluthrin	<0.5	<0.92	<0.88	<0.5	<0.94	<0.93	ng/g
Cypermethrin	<0.5	<0.92	<0.88	<0.5	<0.94	<0.93	ng/g
Deltamethrin	<0.5	<0.92	<0.88	<0.5	<0.94	<0.93	ng/g
Dichloran	<0.5	<0.92	<0.88	0.54	1.1	2.1	ng/g
Esfenvalerate	<0.5	<0.92	<0.88	<0.5	<0.94	<0.93	ng/g
Fenpropathrin	<0.5	<0.92	<0.88	<0.5	<0.94	<0.93	ng/g
Fenvalerate	<0.5	<0.92	<0.88	<0.5	<0.94	<0.93	ng/g
L-Cyhalothrin	<0.5	<0.92	<0.88	<0.5	<0.94	<0.93	ng/g
Pendimethalin	0.69	1.4	<0.88	5.4	8.8	<0.93	ng/g
Permethrin	<0.5	<0.92	<0.88	<0.5	<0.94	<0.93	ng/g
Prallethrin	<0.5	<0.92	<0.88	<0.5	<0.94	<0.93	ng/g
Sumithrin	<0.5	<0.92	<0.88	<0.5	<0.94	<0.93	ng/g
Tefluthrin	<0.5	<0.92	<0.88	<0.5	<0.94	<0.93	ng/g
Tralomethrin	<0.5	<0.92	<0.88	<0.5	<0.94	<0.93	ng/g
TOC	5.4	17	13.3	11	11.4	14.6	g/kg
Toxicity to H. azteca, Survival	98.75	55.0 SG	95.0 100*	96.25	90.0	100 97.5*	% Survival
Toxicity to H. azteca, Mortality	1.25	45.0 SG	5.0 0*	3.75	10.0	0 2.50*	% Mortality
Toxicity to <i>H. azteca</i> , Growth	NS	58.06	-226.35	NS	-387.10	-292.00	% Effect

Analyte listed in Permit

- < Not detected at method detection limit
- * Samples re-run to include growth
- Sample performed better than control

Detected (chemistry) or Significant (toxicity)

- NS = Not sampled
- SG = Significant effect compared to control

Table 5. Laboratory Results 2012-2018 – Ventura River Watershed

Analyte	VR Up			VR Down				Units
	2012	2015	2018	2012	2015	2018	2018 Dup	
Allethrin	<0.5	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
Bifenthrin	<0.5	<0.83	<0.90	1.2	2.8	<0.99	<0.93	ng/g
Cyfluthrin	<0.5	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
Cypermethrin	<0.5	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
Deltamethrin	<0.5	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
Dichloran	<0.5	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
Esfenvalerate	<0.5	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
Fenpropathrin	<0.5	<0.83	<0.90	<0.5	1.4	<0.99	<0.93	ng/g
Fenvalerate	<0.5	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
L-Cyhalothrin	<0.5	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
Pendimethalin	<0.5	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
Permethrin	5.3	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
Prallethrin	<0.5	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
Sumithrin	<0.5	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
Tefluthrin	<0.5	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
Tralomethrin	<0.5	<0.83	<0.90	<0.5	<0.82	<0.99	<0.93	ng/g
TOC	22	33.8	13	26	18.8	27.1	31.4	g/kg
Toxicity to H. azteca, Survival	83.75	95.0	100 100*	88.75	20.0 SG	97.5 97.5*	NS	% Survival
Toxicity to H. azteca, Mortality	16.25	5.0	0 0*	11.25	80.0 SG	2.5 2.5*	NS	% Mortality
Toxicity to H. azteca, Growth	NS	5.00	-147.58	NS	54.84	-162.08	NS	% Effect

Analyte listed in Permit

- < Not detected at method detection limit
- * Samples re-run to include growth
- Sample performed better than control

Detected (chemistry) or Significant (toxicity)

- Dup = Duplicate
- NS = Not sampled
- SG = Significant effect compared to control

2012 - 2021 Charts

The three pyrethroids (bifenthrin, fenpropathrin, and permethrin) and two non-pyrethroid pesticides (dichloran and pendimethalin) that were detected during the Study (2012 - 2021) are graphed by watershed in Figure 9, Figure 10, and Figure 11. The MDLs are included to show the limitations of the laboratory to detect the pyrethroids each year.

Figure 9. 2012-2021 Detected Pyrethroids/Non-Pyrethroids and MDLs - Calleguas Creek Watershed

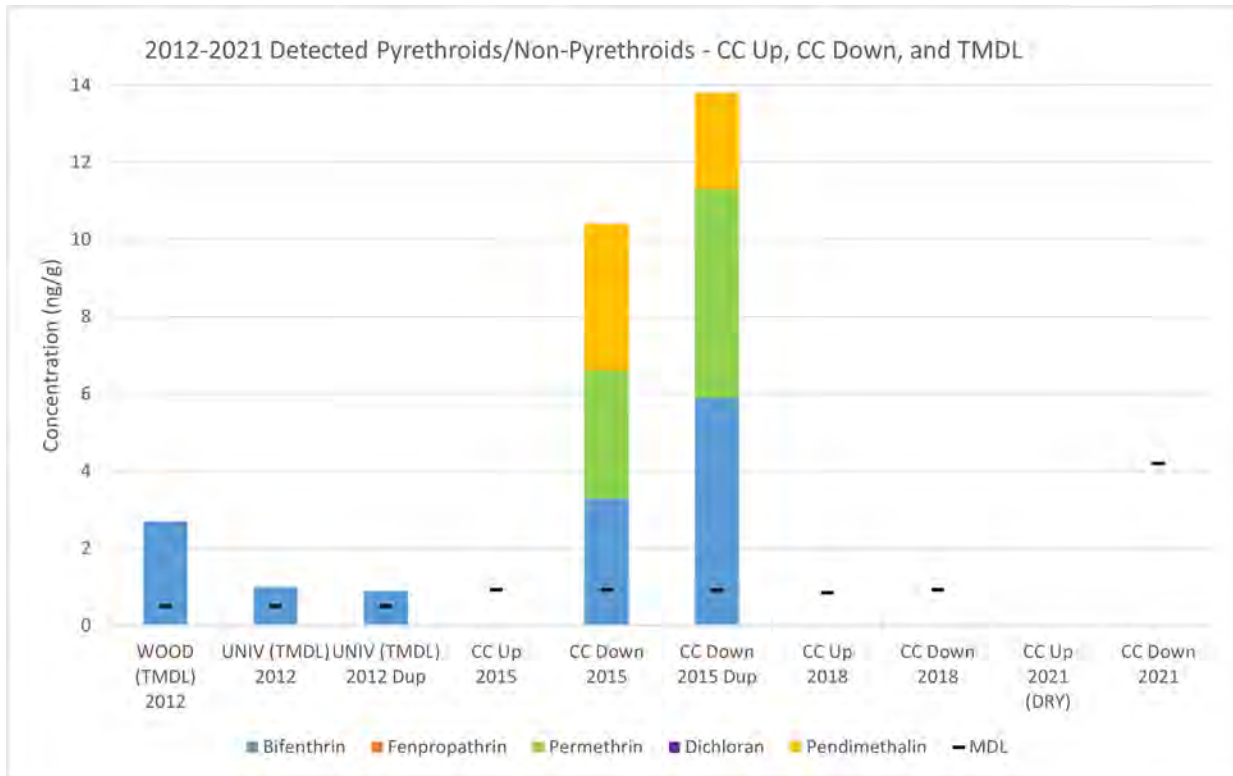


Figure 10. 2012-2021 Detected Pyrethroids/Non-Pyrethroids and MDLs - Ventura River Watershed

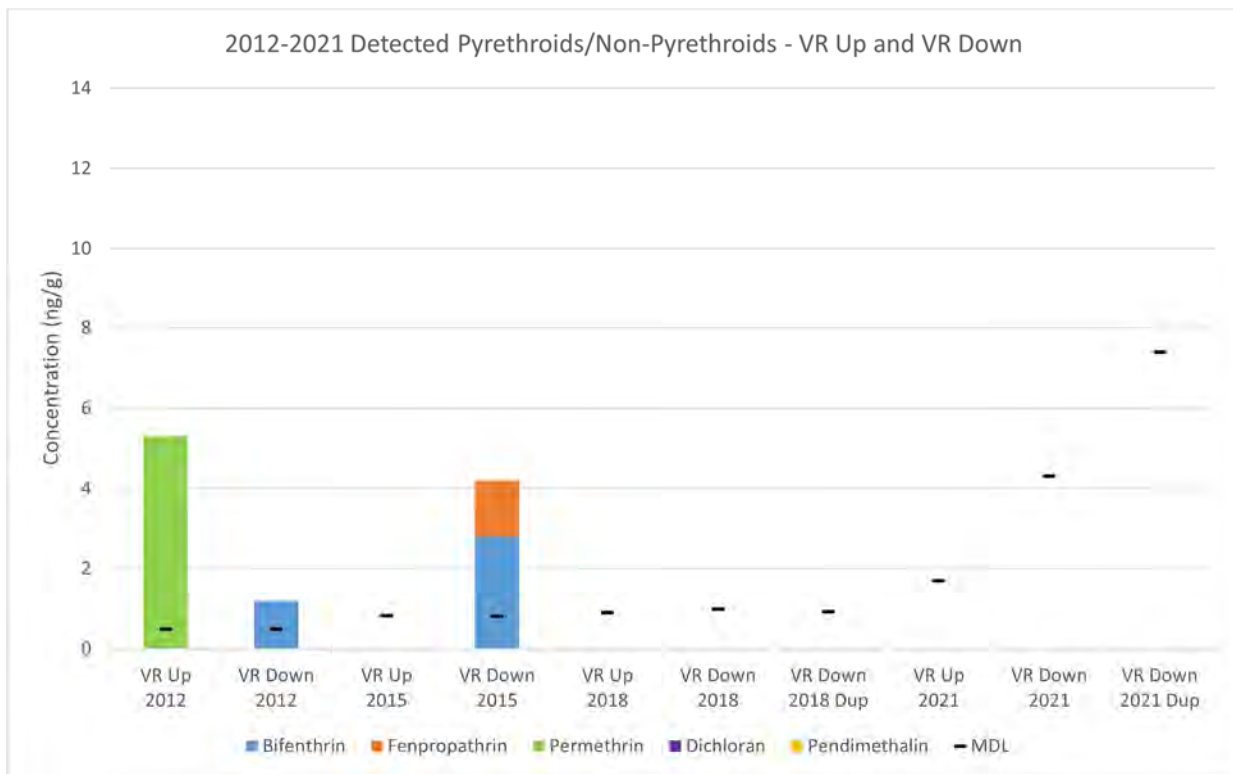
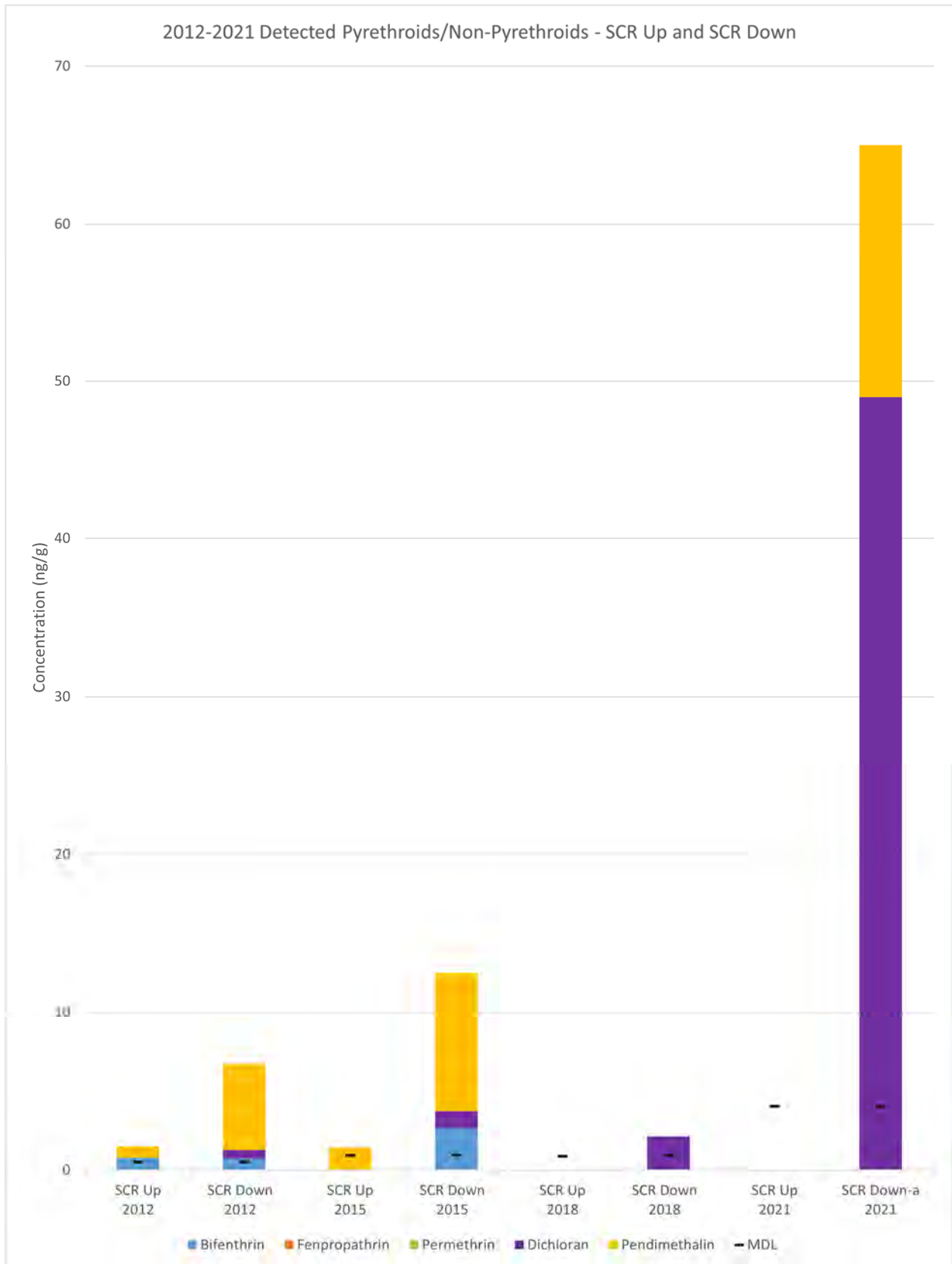


Figure 11. 2012-2021 Detected Pyrethroids/Non-Pyrethroids and MDLs – Santa Clara River Watershed



DISCUSSION OF RESULTS

The 2020/21 wet season was very dry, and only 20-30% of normal seasonal rainfall (approximately two to six inches) fell between October 2020 and March 2021. Sampling was conducted on March 23 and 24, 2021, approximately one to two weeks after the last storm. VR Up, VR Down, SCR Up, and CC Down were flowing, however SCR Down and CC Up were completely dry with no evidence of recent flow. SCR Down was moved to an alternate site approximately 5.5 miles upstream where water was still present in the Santa Clara River, SCR Down-a, however there was not a suitable backup site for CC Up so an alternate location was not sampled.

Equipment Blank

No pyrethroids (or non-pyrethroid constituents) were detected by the pyrethroid analytical method for the 2021 equipment blank (trowel) but a small amount of TOC was detected below the reporting limit (RL). The amount of TOC is similar to the equipment blank samples in previous years of the Study and is insignificant in relation to expected environmental concentrations.

The pyrethroid method has detected bifenthrin, cypermethrin, and pendimethalin in the equipment blank in previous years of the study, including in 2012 when the trowel was new, however the source of the contamination is unknown. The trowels do not appear to have contaminated the environmental samples as the detected levels of contamination were several orders of magnitude below the amounts measured in the samples. Pendimethalin has not been detected in the equipment blank since 2012. The equipment blank is collected by rinsing the trowel with one liter of laboratory grade deionized water and collecting the rinsate for analysis. One liter is used as it is the volume required for the analytical method and collecting extra for a potential re-analysis may dilute the sample, so a replicate is not feasible. The laboratory QC was within limits for all pyrethroid method equipment blank batches 2012-2021, i.e. constituents were not detected above the RL of 0.0020 µg/L in the laboratory method blank, and the laboratory control samples and duplicates were all within acceptance limits.

A detectable amount of TOC was measured in all equipment (trowel) blanks for the study (2012-2021), including (DNQ) 0.49 mg/L in 2021, which was below the RL of 1.0 mg/L⁷. TOC was not detected in the 2021 laboratory method blank. Small (DNQ) amounts of TOC were seen in the laboratory method blanks in 2012-2018, but these amounts (≤ 0.0898 mg/L) were significantly less than seen in the equipment blanks (≤ 0.23 mg/L) which in turn are significantly less than the amounts seen in the environmental samples (≥ 1.43 g/kg, equal to 1430 mg/kg), so are not considered to be enough to significantly impact the sediment TOC results (i.e. TOC measured in the equipment blank was at least three orders of magnitude below the environmental samples).

Potential sources of the contamination in previous years could be from air drying, during rinsate collection and/or during analysis at the laboratory. The trowels were washed before and after they were used (with Citranox for 2012 and 2015 and with Alconox for 2018 and 2021). Alconox appears to have worked as

⁷ The 2021 equipment blank TOC sample was subbed to another laboratory due to broken equipment at the primary laboratory and the sub laboratory had a higher RL. The TOC RL for the previous study years was 0.30 mg/L.

well or better than Citranox for bifenthrin removal, and similarly or better than Citranox for cypermethrin removal.

Pyrethroids and Toxicity

The initial toxicity observed in the 2021 samples appears to be due to predation of the *H. azteca* by chironomids that were naturally present in the samples. Removing the chironomids from the samples coincided with the removal of toxicity. Transferring the removed chironomids from a study sample to a previously non-toxic non-study sample resulted in 100% mortality of the formerly non-toxic sample. While the higher pyrethroid RLs for the 2021 samples could obscure levels of pyrethroids previously measured in the study, the high survival rates in the TIE samples in which the chironomids were removed, support the supposition that the 2021 samples did not contain toxic levels of pyrethroids.

Table 6. 2021 Toxicity Results including TIE

Analyte	CC Down	SCR Up	SCR Down-a	VR Up	VR Down	VR Down (Dup)	Non-Toxic Tox QA	Units
<u>Toxicity to <i>H. azteca</i>: Initial</u>								
Survival	12.50 SG	62.50 SG	35.00 SG	7.50 SG	75.00 SG	67.50 SG	NA	% Survival
Growth	57.69 SG	38.46 SG	65.38 SG	73.08 SG	-50.00	61.54 SG	NA	% Effect
<u>Toxicity to <i>H. azteca</i>: TIE</u>								
Survival, with chironomids	17.50 SG	72.50 SG	45.00 SG	0.00 SG	NA	52.50 SG	0.00 SG	% Survival
Survival, without chironomids	100.0 NSG	97.5 NSG	100.0 NSG	97.5 NSG	NA	100.0 NSG	100.0 NSG	% Survival

Dup = field duplicate

- Sample performed better than the control

SG = Significant effect compared to control

NSG = Non-significant effect compared to control

Toxicity levels vary between pyrethroids. Hypothetical toxicity units (TU_H) can be calculated to compare the expected relative toxicity of different samples and pyrethroids. This is done by normalizing the sediment pyrethroid concentrations to TOC concentration to account for hydrophobicity and then dividing by the *H. azteca* ten-day median lethal concentration (LC50⁸) for each detected pyrethroid, if available. LC50s for the detected analytes bifenthrin and permethrin were obtained from the study referenced in the Permit, "Aquatic Toxicity Due to Residential Use of Pyrethroid Insecticides (2005) by Weston *et al.* The Study did not include an LC50 for the pyrethroid fenpropathrin or the non-pyrethroids dichloran and pendimethalin. To complete this Pyrethroid Study, an LC50 for fenpropathrin was obtained from the Los Angeles Regional Water Quality Control Boards study, "Occurrence and Toxicity of Three Classes of Insecticides in Water and Sediment in Two Southern California Coastal Watersheds (2011) by Delgado-Moreno *et al.* The overall hypothetical pyrethroid toxicity of a sample can be calculated by summing all

⁸ LC50 is the lethal concentration required to kill 50% of the population.

the pyrethroid TU_H for that sample. TU_H greater than one indicates significant hypothetical toxicity. The non-pyrethroids were not included in these analyses as they are not pyrethroids and do not have LC50s in the Permit-referenced study.

Since the 2021 MDLs were higher than previous years and there were no detections of pyrethroids, the MDL and the measured TOC were used to calculate a worst-case scenario TU_H for the pyrethroids previously detected in the study (Table 7). This would be the hypothetical toxicity if the pyrethroid concentration was just below the detection limit for bifenthrin, fenpropathrin, and permethrin. The MDL concentration TU_H for fenpropathrin and permethrin were below 1 for all samples, supporting the evidence from the toxicity TIE (Table 6) that they were not contributing to toxicity in the samples. The MDL TU_H for bifenthrin at CC Down and SCR Up was above 1, which indicates that toxicity could be expected if bifenthrin was present in the samples at/above the MDL, however, the lack of corresponding toxicity seen in the TIE samples supports the likelihood that the level of bifenthrin in the samples was well below the MDL.

Table 7. 2021 Hypothetical Toxicity Calculated at the MDL

Analyte	CC Down	SCR Up	SCR Down-a	VR Up	VR Down	VR Down (Dup)	Units
<u>2021 Chemistry Results</u>							
Pyrethroids MDL	<4.2	<4.0	<4.0	<1.7	<4.3	<7.4	ng/g
TOC	5.19	7.04	15.3	43.1	10.7	16.2	g/kg
<u>2021 MDL Normalized to TOC (= [Pyrethroid MDL] / TOC Result)</u>							
Pyrethroid MDL normalized to TOC	<0.81	<0.57	<0.26	<0.04	<0.40	<0.46	ng/g
<u>Maximum Hypothetical Toxicity Units (TU_H) = (Pyrethroid MDL / TOC Result) / [LC50 (ug/g TOC)]</u>							
Bifenthrin [LC50=0.52 (ug/g TOC)]	<1.56	<1.09	<0.50	<0.08	<0.77	<0.88	TU _H
Fenpropathrin [LC50=1.1 (ug/g TOC)]	<0.74	<0.52	<0.24	<0.04	<0.37	<0.42	TU _H
Permethrin [LC50=10.83 (ug/g TOC)]	<0.08	<0.05	<0.02	<0.004	<0.04	<0.04	TU _H
Total TU_H	<2.37	<1.67	<0.77	<0.115	<1.18	<1.34	TU_H

< Not detected at method detection limit Dup = field duplicate

Conversely, since the TIE samples without chironomids were non-toxic, a hypothetical maximum concentration of each pyrethroid could be back-calculated using a TU_H=1, which would give the hypothetical pyrethroid concentration equivalent to the LC50 concentration for the measured TOC concentration at each site (Table 8). These calculated concentrations were above the MDL at all sites for fenpropathrin and permethrin, and at all sites except SCR Up and CC Down for bifenthrin, which indicates that the 2021 MDLs were sufficiently low to detect these pyrethroids at toxic levels in most cases. The two exceptions are bifenthrin at the two sites with the lowest TOC concentrations, SCR Up and CC Down which have calculated maximum bifenthrin concentrations of 3.7 and 2.7 and ng/g, respectively, which

could be considered upper limits of concentration for bifenthrin and would have been obscured by the MDLs of 4.0 and 4.2 ng/g, respectively. However, since survival rates were very high in the toxicity samples once the chironomids were removed, these calculated upper limits are likely higher than the actual pyrethroid concentrations in the samples.

Table 8. Maximum Calculated Pyrethroid Concentrations for $TU_H = 1$

Maximum Calculated Concentration (if $TU_H = 1$) = $TU_H \times TOC \text{ Result} \times [LC50 \text{ (ug/g TOC)}]$							
Analyte	CC Down	SCR Up	SCR Down-a	VR Up	VR Down	VR Down (Dup)	Units
Pyrethroids MDL	4.2	4.0	4.0	1.7	4.3	7.4	ng/g
Bifenthrin [LC50=0.52 (ug/g TOC)]	2.7	3.7	8.0	22.4	5.6	8.4	TU_H
Fenpropathrin [LC50=1.1 (ug/g TOC)]	5.7	7.7	16.8	47.4	11.8	17.8	TU_H
Permethrin [LC50=10.83 (ug/g TOC)]	56.2	76.2	165.7	466.8	115.9	175.4	TU_H

Dup = field duplicate

No pyrethroids were detected in the 2018 Study samples, so all TU_H for 2018 are equal to zero and toxicity due to pyrethroids is not expected. This was supported by the lack of toxicity observed in the sediment samples for both survival and growth. The 2012-2018 results are summarized by watershed below, showing their measured toxicity (% mortality) as compared to their hypothetical pyrethroid toxicity units. In some cases, e.g. UNIV (2012), SCR Up (2015), and VR Down (2015), significant toxicity was observed but the TU_H were low, in which case a different contaminant is likely the cause of the observed toxicity. At WOOD (2012), pyrethroids may have contributed to or been the cause of the toxicity observed in the sample, since the pyrethroid TU_H is close to 1. For CC Down Dup (2015), the TU_H were high but the observed toxicity was not, which may be due to other factors such as antagonistic effects with other components in the sample or subsample differences (e.g. differences in concentrations of TOC and pyrethroids). Subsample differences seem a likely cause since CC Down (2015) had a similar observed toxicity but a lower TU_H mostly due to higher TOC and lower bifenthrin concentrations.

Except for the CC Down Dup (2015), the TU_H for the Study samples were all less than one (Table 9) and so pyrethroid toxicity is not expected to be an issue for these samples according to this evaluation method. For the 2015 CC Down Duplicate, even though the TU_H was greater than one, the measured toxicity units were not above one, which means that significant toxicity was not observed in the *H. azteca* test.

The study referenced in the Permit does not contain an LC50 for dichloran or pendimethalin, however the lack of toxicity in the environmental sample infers a TU_H of less than one for these analytes. The TU_H were not correlated with the observed toxicity, possibly due to the presence of unanalyzed constituents in the samples.

Table 9. 2012-2018 Hypothetical Toxicity Units Vs. Observed Toxicity – By Watershed

Calleguas Creek Watershed									
Analyte	LC50 (ug/g TOC)	Units	WOOD	CC Up		UNIV	CC Down		
			2012	2015	2018	2012	2015	2015 Dup	2018
Bifenthrin	0.52	TU _H	0.927			0.437 [^]	0.516	1.372	
Fenpropathrin	1.1	TU _H							
Permethrin	10.83	TU _H					0.025	0.060	
Summed Hypothetical TU _H		TU _H	0.927			0.437 [^]	0.541	1.432	
Significant Observed Toxicity			Yes	No	No	Yes	No	No	No

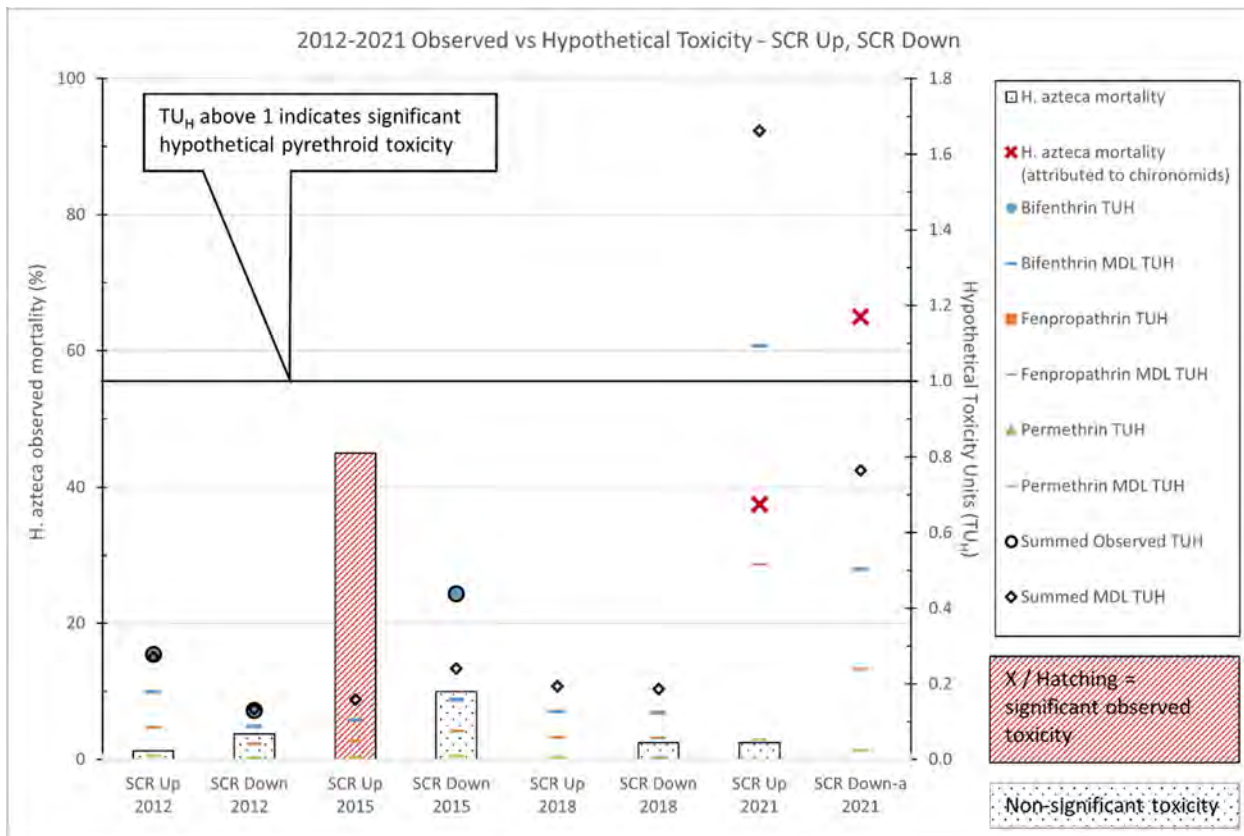
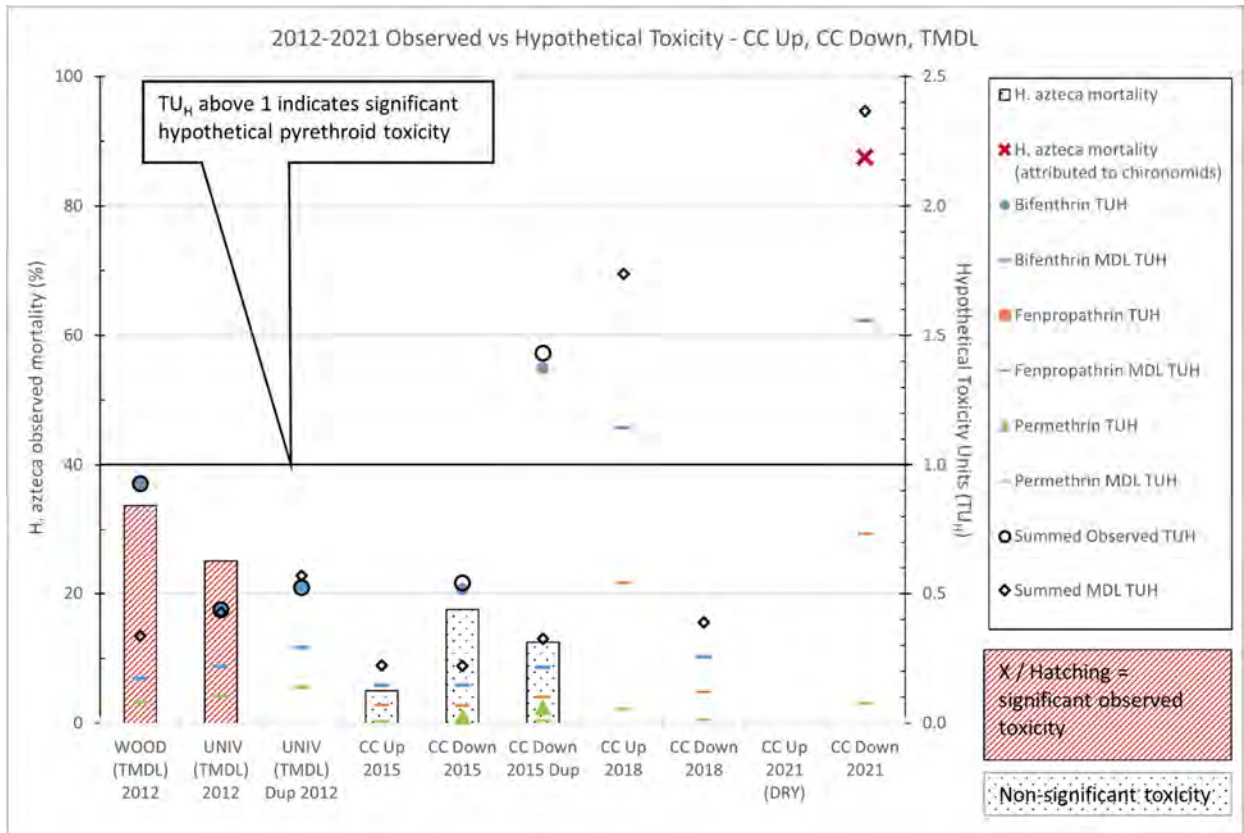
[^] DNQ

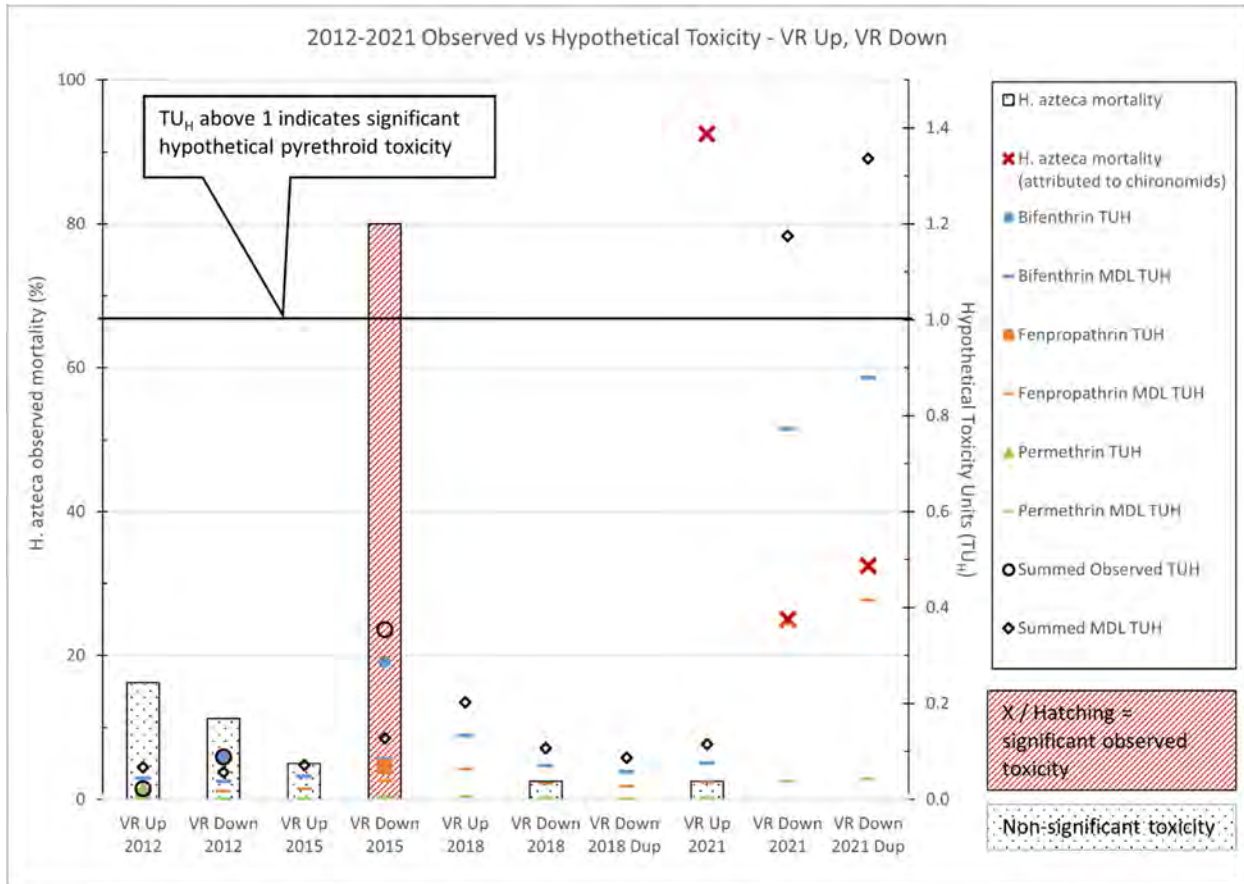
Santa Clara River Watershed								
Analyte	LC50 (ug/g TOC)	Units	SCR Up			SCR Down		
			2012	2015	2018	2012	2015	2018
Bifenthrin	0.52	TU _H	0.278			0.129	0.439	
Fenpropathrin	1.1	TU _H						
Permethrin	10.83	TU _H						
Summed Hypothetical TU _H		TU _H	0.278			0.129	0.439	
Significant Observed Toxicity			No	Yes	No	No	No	No

Ventura River Watershed								
Analyte	LC50 (ug/g TOC)	Units	VR Up			VR Down		
			2012	2015	2018	2012	2015	2018
Bifenthrin	0.52	TU _H				0.089	0.286	
Fenpropathrin	1.1	TU _H					0.068	
Permethrin	10.83	TU _H	0.022					
Summed Hypothetical TU _H		TU _H	0.022			0.089	0.354	
Significant Observed Toxicity			No	No	No	No	Yes	No

Figure 12 shows toxicity results (left vertical axis) and TU_H (right vertical access, calculated from pyrethroid detections and from MDLs for samples that were all ND for pyrethroids) from 2012-2021 by watershed (including the 2021 TIE results in which survival was so high that toxicity does not register on the graph scale).

Figure 12. Hypothetical Toxicity Units Vs. Observed Toxicity – By Watershed





Pyrethroid pesticides were more prevalent in the downstream samples for most analytes/watersheds. The high pyrethroid RLs in 2021 at all sites precludes drawing conclusions regarding trends in pyrethroid concentrations over the term of the study, however the lack of toxicity in these samples (after accounting for chironomid predation) supports the data collected in previous years which showed that pyrethroids are not likely causing or contributing to toxicity at the study sites.

POTENTIAL PESTICIDE SOURCES

The application of pesticides for residential, industrial, and commercial use is not tracked, except for structural pest control by certified applicators. Many pesticides have both general use (lower concentrations and/or small areas) and restricted use (higher concentrations and/or large-scale applications) formulations. General use pesticides can be applied by anyone however restricted use pesticides applications require California Department of Pesticide Regulation (CDPR) Certified Pesticide Applicators.

The pounds of pesticides applied annually for agriculture and structural pest control is tracked by the CDPR. The *Annual Pesticide Use Report Indexed by Chemical* (PUR) for Ventura County summarizes the annual reported pesticide use for regulated applications, including agriculture (e.g. food and ornamental), structural pest control, and other purposes (e.g. animal premise, golf course turf, landscape maintenance, public health, regulatory pest control, rights of way, vertebrate control). These reports typically become

available two years after the year referenced, so 2019-2021 reports were unavailable for this Study report, although data for 2019 was obtained by special request. The pounds used for regulated uses of the detected pesticides in this Study are summarized in Table 10.

Five pesticides (three pyrethroids and two non-pyrethroids) were detected by the laboratory's pyrethroid analytical method during the Study. Bifenthrin and permethrin are pyrethroid insecticides that have general and restricted applications for agricultural and urban use. Bifenthrin and permethrin are both used in significant quantities for regulated applications for structural and agricultural pest control in Ventura County but are also known to have unregulated applications for residential and industrial uses, which are not tracked. The pyrethroid insecticide fenpropathrin and the non-pyrethroid fungicide dichloran are agricultural pesticides without urban uses. The non-pyrethroid herbicide pendimethalin is used for agricultural and urban uses. Fenpropathrin, dichloran, and pendimethalin are not used for structural pest control in Ventura County.

Bifenthrin is used as a restricted use pesticide in orchards, nurseries, and buildings (e.g. structural pest control). Some products with lower concentrations are available for unrestricted residential use for indoor and outdoor insect control. Bifenthrin was detected at all Study sites except CC Up and VR Up at least once from 2012-2021. All the sites at which bifenthrin was detected (TMDL sites in 2012, CC Down in 2015, VR Down in 2012 and 2015, SCR Up in 2012, and SCR Down in 2012 and 2015) have both urban and agricultural influences but are in predominantly agricultural areas. In contrast, CC Up doesn't have urban or agricultural influences and VR Up has a small amount of agriculture and low-density housing. WOOD 2012 is a predominantly agricultural site and given its location within the Oxnard Plain, an area notable for its large crops of strawberries, peppers, and leafy green vegetables, the source of the bifenthrin is likely agricultural, however there are upstream discharges from urban areas.

Table 10. Ventura County Pesticide Use (Pounds) Reported to California Department of Pesticide Regulation (DPR)

Pesticide	2011					2012				
	Total Pounds	Agriculture	Structural	Other	Major crop - pounds	Total Pounds	Agriculture	Structural	Other	Major crop - pounds
Bifenthrin	2771.79	1732.74	1005.79	33.26	Strawberry 1499	2911.63	1673.06	1211.49	27.08	Strawberry 1364
Permethrin	4742.67	3635.45	1059.45	47.77	Celery 2162	4625.02	2060.4	2515.73	48.89	Celery 873
Fenpropathrin (Danitol)**	969.21	969.21	0	0	Strawberry 849	788.71	788.08	0	0.63	Strawberry 595
Dichloran*,**	22733.97	22733.97	0	0	Celery 21916	15545.81	15545.81	0	0	Celery 14854
Pendimethalin*,**	2788.84	2627.32	0	161.52	Strawberry 2515	5983.35	5739.14	0	244.21	Strawberry 5140

Pesticide	2013					2014				
	Total Pounds	Agriculture	Structural	Other	Major crop - pounds	Total Pounds	Agriculture	Structural	Other	Major crop - pounds
Bifenthrin	3350.01	1635.33	1684.09	30.59	Strawberry 1253	4699.88	2453.05	2133.09	113.74	Strawberry 1413
Permethrin	4678.32	2408.77	2201.2	68.35	Celery 1142	3807.76	2755.71	933.95	118.1	Celery 945
Fenpropathrin (Danitol)**	1668.9	1668.9	0	0	Strawberry 1307	1820.92	1820.92	0	0	Strawberry 1215
Dichloran*,**	19557.51	19557.51	0	0	Celery 18984	19983.11	19983.11	0	0	Celery 19347
Pendimethalin*,**	11899.69	11862.37	0	37.32	Strawberry 10855	12617.4	12557.56	0	59.84	Strawberry 11255

Pesticide	2015					2016				
	Total Pounds	Agriculture	Structural	Other	Major crop - pounds	Total Pounds	Agriculture	Structural	Other	Major crop - pounds
Bifenthrin	6048.4	2657.4	3362.52	28.48	Strawberry 1615	3239.03	2003.42	1123.58	112.03	Strawberry 1068
Permethrin	3222.6	2503.93	660.79	57.88	Container plants 906, Celery 657	2865.9	2193.48	612.48	59.94	Celery 721
Fenpropathrin (Danitol)**	2131.63	2130.85	0	0.78	Strawberry 1852	1831.09	1831.09	0	0	Strawberry 1250
Dichloran*,**	18702.35	18702.35	0	0	Celery 18146	17521.95	17521.95	0	0	Celery 17400
Pendimethalin*,**	11350.8	11296.26	0	54.54	Strawberry 8854	12068.51	11978.68	0	89.83	Strawberry 10089

Pesticide	2017					2018				
	Total Pounds	Agriculture	Structural	Other	Major crop - pounds	Total Pounds	Agriculture	Structural	Other	Major crop - pounds
Bifenthrin	3192.05	2118.75	1047.19	26.11	Strawberry 1205	2735.61	1637.93	1074.84	22.84	Strawberry 919
Permethrin	2517.57	1988.14	495.51	33.92	Celery 1016	2289.62	1531.88	720.47	37.27	Celery 791
Fenpropathrin (Danitol)**	2976.84	2975.47	0	1.37	Lemon 1537, Strawberry 934	3162.96	3162.96	0	0	Lemon 1693, Strawberry 918
Dichloran*,**	15560.57	15560.57	0	0	Celery 15547	10631.66	10631.66	0	0	Celery 10619
Pendimethalin*,**	9697.88	9695.22	0	2.66	Strawberry 7328	10352.18	10264.51	0	87.67	Strawberry 8514

Pesticide	2019				
	Total Pounds	Agriculture	Structural	Other	Major crop - pounds
Bifenthrin	2780.6	1616.33	1145.93	18.35	Strawberry 983
Permethrin	2360.13	1656.2	681.22	22.71	Celery 909
Fenpropathrin (Danitol)**	3505.56	3505.56	0	0	Lemon 2009, Strawberry 907
Dichloran*,**	7329.65	7329.65	0	0	Celery 7297
Pendimethalin*,**	5015.211	4923.74	0	91.47	Strawberry 3651

* Not analyzed by TMDL ** Analytes not required by Permit

Other - Includes animal premise, golf course turf, landscape maintenance, public health, regulatory pest control, rights of way, vertebrate control, unknown Data from Pesticide Use Annual Summary Reports at <https://www.cdpr.ca.gov/docs/pur/purmain.htm>, indexed by Chemical and restricted to Ventura County E.g "Department of Pesticide Regulation 2015 Annual Pesticide Use Report Indexed by Chemical - Ventura County"

There is approximately a two-year delay for the California Department of Pesticide Regulation Annual Pesticide Use Reports (PUR) to become available online. This means that 2011 and 2012 PUR were unavailable for the 2012 Study report, 2014 and 2015 PUR were unavailable for the 2015 Study report, 2017 and 2018 PUR were unavailable for the 2018 Study Report, and 2019-2021 PUR were unavailable for the 2021 Report (2019 PUR data was made available on request).

Permethrin is a restricted use pesticide for crop and wide area applications (e.g. nurseries, sod farms) but is also a general use pesticide for residential (e.g. indoor and outdoor spaces, pets) and industrial applications. According to the United States Environmental Protection Agency's "Reregistration Eligibility Decision (RED) for Permethrin (Revised May 2009)", approximately 70% of permethrin is used in non-agricultural settings and approximately 30% is used on food/feed crops in agricultural settings. The RED states that approximately 55% of the non-agricultural applications are made by professionals, 41% by homeowners on residential areas, and 4% on mosquito abatement areas. Permethrin was only detected at VR Up in 2012, which is downstream of a small amount of agriculture and low-density housing, and at CC Down in 2015, which has both urban and agricultural influences. The TMDL permethrin detection limit of 5 ng/g was above/near the quantities measured in the 2015 CC Down samples, so the higher TMDL detection limit may have obscured the presence of similar concentrations of permethrin in the TMDL samples. The CDPR reports show that the regulated use of permethrin in Ventura County is predominantly for row crops and structural pest control, however according to the Environmental Health Tracking Program (www.cehtp.org/pesticidetool), which uses CDPR data, there were no applications near VR Up, so the source may be from unregistered residential users but the data is inconclusive at this time.

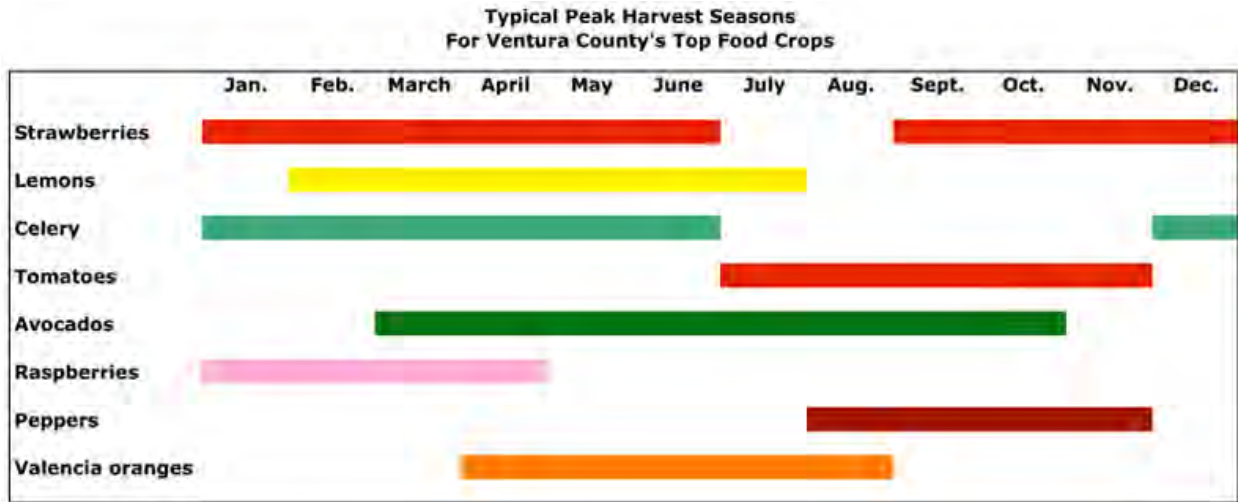
Fenprothrin is a pyrethroid insecticide that is registered for multiple crops, but its restricted use designation makes it unlikely to have an urban source, however it can be used to treat Asian citrus psyllid infestations (as can cyfluthrin, which was not detected), which have become a problem in Ventura County. It was only detected once during the Study, at VR Down in 2015.

Dichloran is a (non-pyrethroid) general use fungicide with no residential uses [DCNA (Dicloran) Reregistration Eligibility Decision (RED) Fact Sheet (EPA 738-F-06-013, July 2006)], therefore the detected dichloran is not from an urban source. Dichloran was only detected at the downstream SCR sites (SCR Down and SCR Down-a) and was detected during all four study years (2015, 2015, 2018, and 2021).

Pendimethalin is a (non-pyrethroid) general use selective herbicide used to control broadleaf weeds and grassy seed species in agricultural and non-agricultural settings. Pendimethalin was predominantly detected in the Santa Clara River Watershed at SCR Up (2012, 2015) and SCR Down in (2012, 2015, 2021) but it was also detected at CC Down in 2015. It is unknown if the detection of this non-pyrethroid is related to an urban source, but its concentrations tended to be higher at the downstream sites, where agriculture is a more direct influence.

The PUR are summarized by calendar year, however samples for this Study were collected in March-May so the previous year's applications are also relevant. Strawberry and celery are among the top 10 crops grown in Ventura County, and are also the major crops on which the five detected pesticides (3 pyrethroids and 2 non-pyrethroids) are applied. Additionally, as seen in Figure 13, the strawberry and celery growing seasons lead into the sampling period. This suggests that the pesticides could have an agricultural source, however it does not exclude an urban source for those pesticides which have urban uses.

Figure 13. Peak Harvest Seasons



(Chart obtained from <http://www.farmbureauvc.com/new/images/typical-peak.jpg>)

PESTICIDE USE TRENDS

According to the most recently available CDPR Pesticide Use Report (2018) (<https://www.cdpr.ca.gov/docs/pur/pur18rep/18sum.htm>), “Since 1990, the reported pounds of pesticides applied and acres treated have fluctuated from year to year. These fluctuations can be attributed to a variety of factors, including changes in planted acreage, crop plantings, pest pressures, and weather conditions. An increase or decrease in use from one year to the next or in the span of a few years may not necessarily indicate a general trend in use, but rather variations related to changes in weather, pricing, supply of raw ingredients, or regulations. Regression analyses on use over the last twenty years do not indicate a significant trend of either increase or decrease in total pesticide use.” These factors combined with differences in rainfall and runoff intensities and amounts could all contribute to the variations in concentrations seen in the Study.

The 2019-2021 PUR reports were not released by CDPR in time for this report, however the 2019 data was available by special request, so the comparison of analytical data to pesticide application amounts to look for trends are limited to the 2011-2019 period. The multiple factors that can affect fluctuations and the lack of PUR data for 2020-2021, combine to prevent drawing conclusions from any apparent trends. However, some possible trends from the current available data are visible in Figure 14, Figure 15, Figure 16, Figure 17, and Figure 18, and are described below.

Figure 14. 2011-2019 Bifenthrin Use in Ventura County (CDPR)

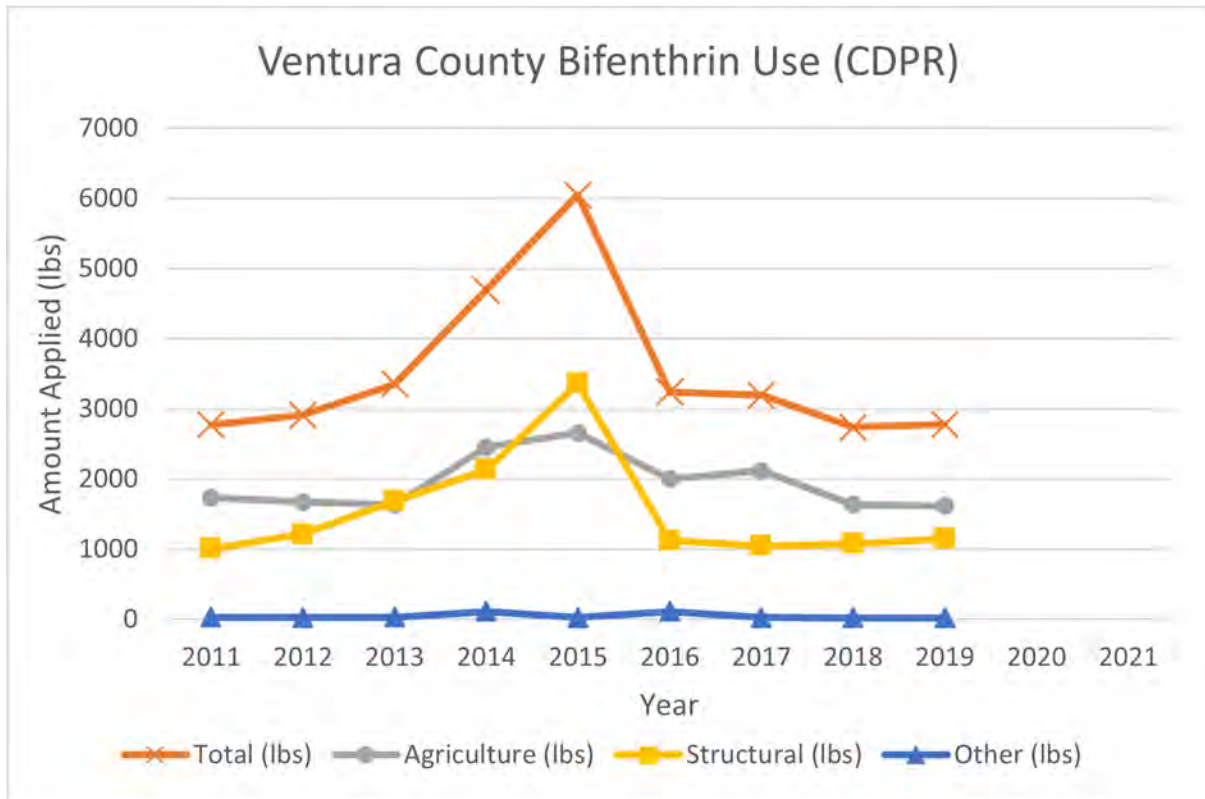


Figure 15. 2011-2019 Permethrin Use in Ventura County (CDPR)

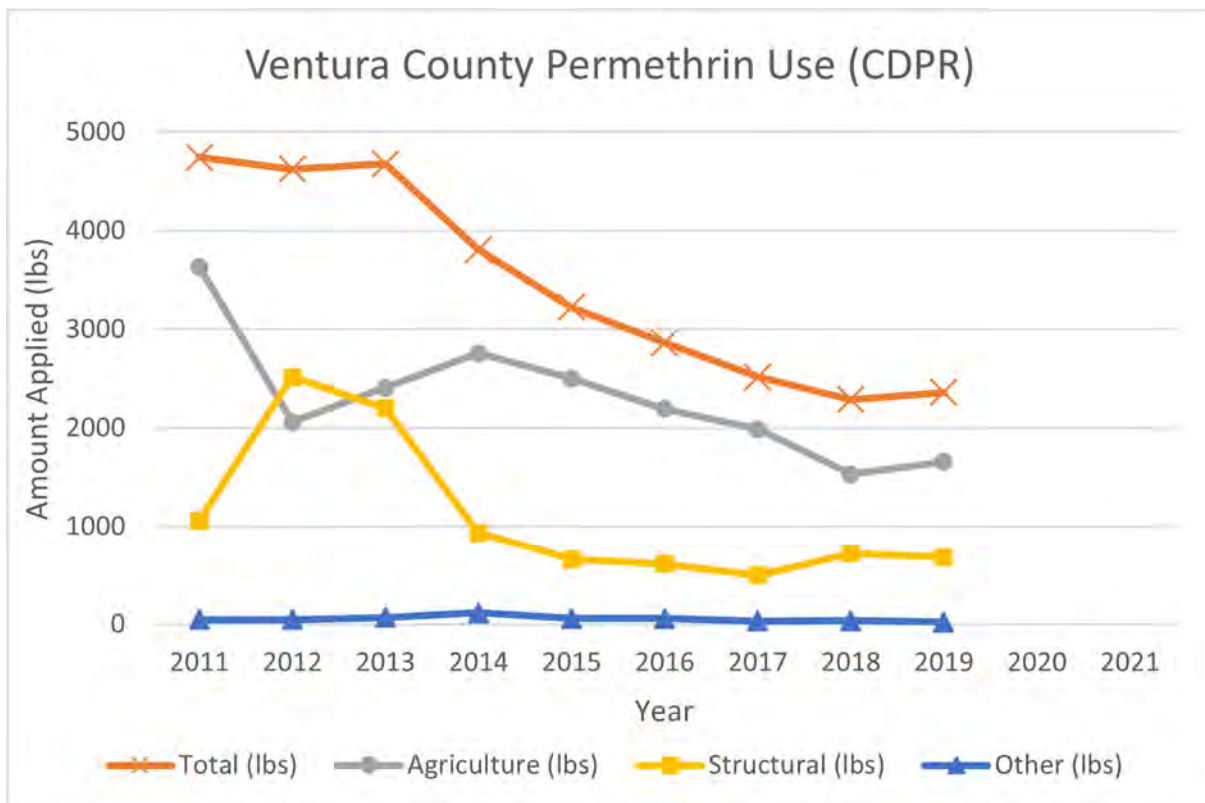


Figure 16. 2011-2019 Fenpropathrin Use in Ventura County (CDPR)

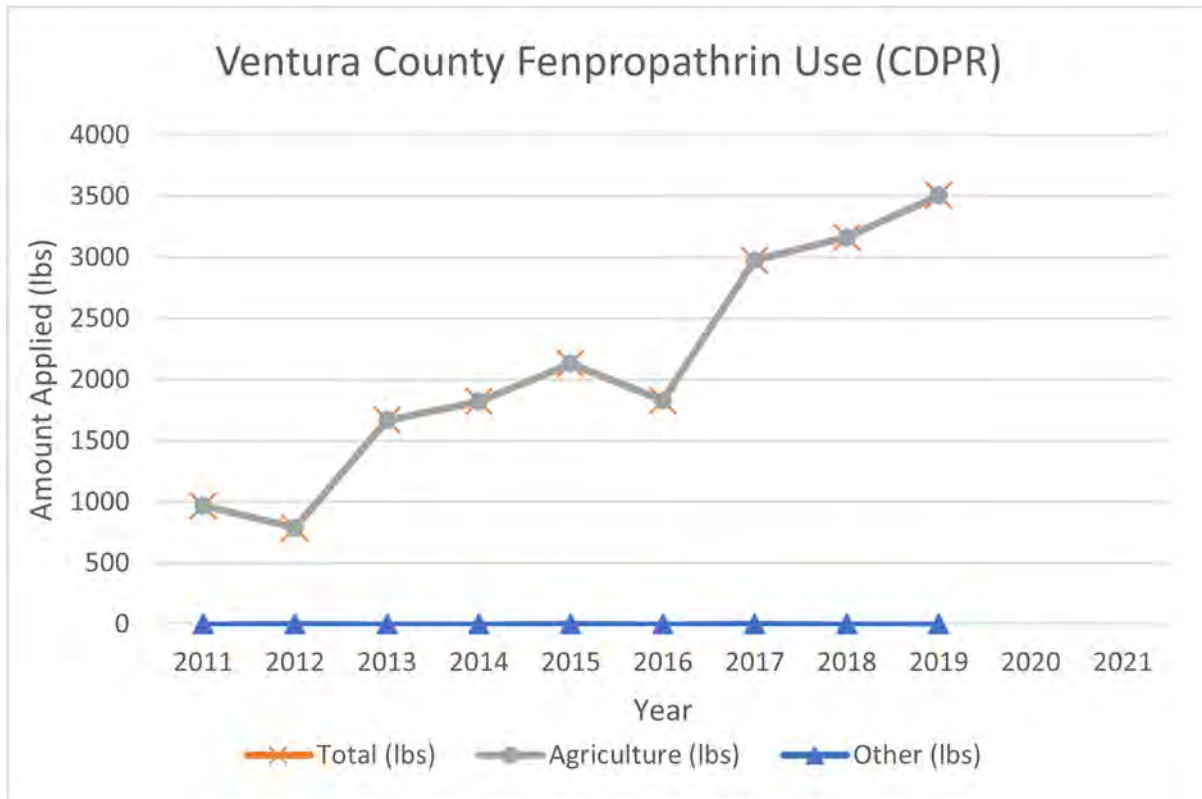


Figure 17. 2011-2019 Dichloran Use in Ventura County (CDPR)

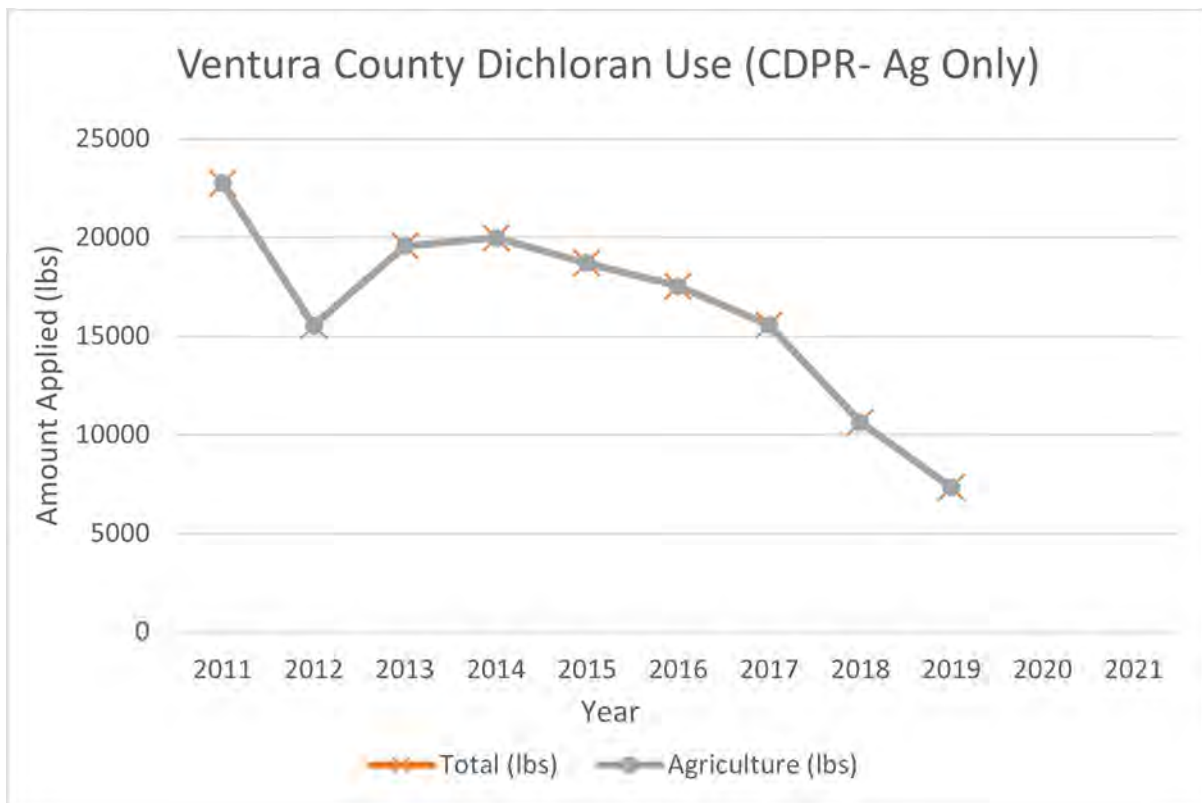
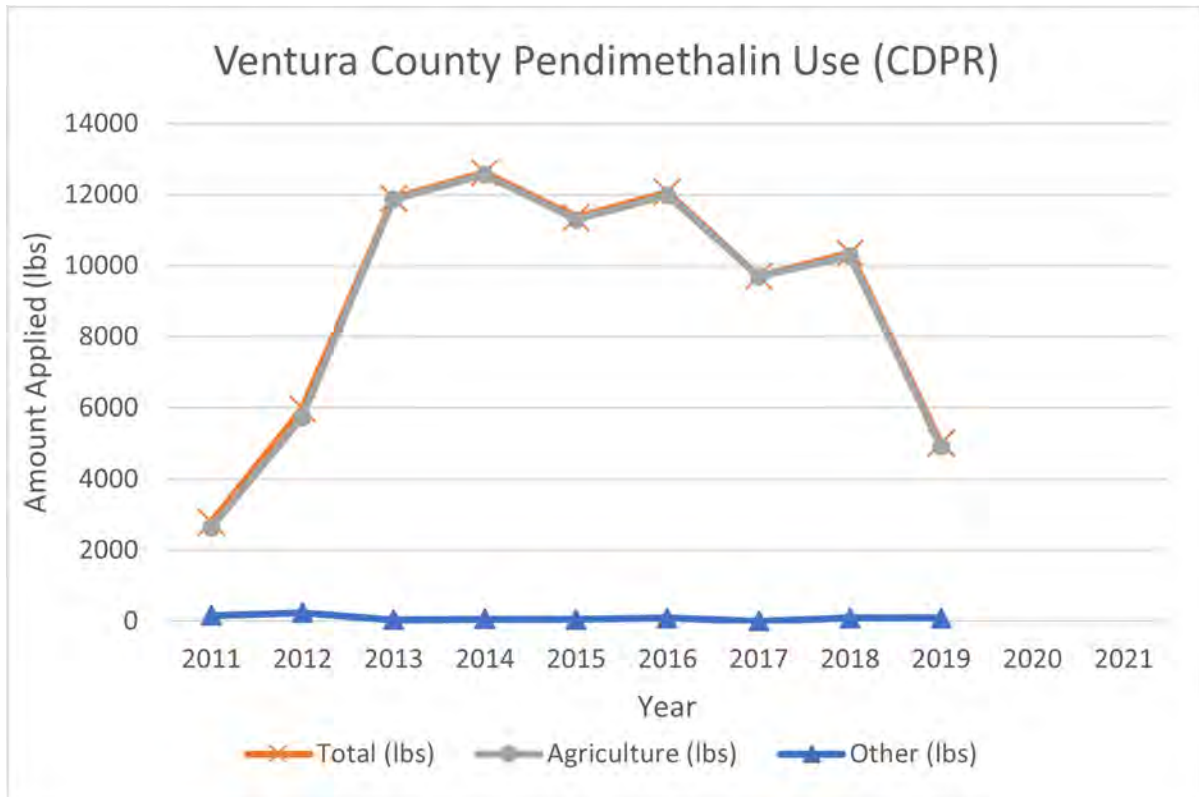


Figure 18. 2011-2019 Pendimethalin Use in Ventura County (CDPR)



The 2011-2019 PUR data show dichloran and pendimethalin (non-pyrethroids) are used in larger quantities (pounds) for regulated applications (primarily agriculture) in the County than the pyrethroids bifenthrin, permethrin, and fenpropathrin, however their use trended down between 2014-2019. Overall, bifenthrin and permethrin use has been trending down due to lower agricultural and structural use. While initially the bifenthrin and permethrin use drop was largely due to decreasing structural use, use amounts have remained relatively steady in recent years. In contrast, fenpropathrin use has trended upward since 2011 due to increasing agricultural use. These five pesticides are all applied to strawberry or celery as their major crop (fenpropathrin major crop is lemon, followed by strawberry), and these are among the top ten crops in Ventura County and are mainly grown in the lower regions of each watershed.

Bifenthrin use (according to CDPR) was highest in 2015, which correlates with the concentrations measured at downstream sites, however, use amounts for the other pesticides do not correlate with detection amounts for the Study years. The 2020 and 2021 CDPR data are unavailable to see if the trends continue.

PESTICIDE REDUCTION EFFORTS

Integrated Pest Management Programs

A model integrated pest management (IPM) program was drafted through the Public Agencies Activities Subcommittee and used as a template by the Permittees to develop their own plans by November 2009.

This standardized protocol was amended in February 2014 at the amended version is posted on Program's website at: <http://www.vcstormwater.org/index.php/publications/manuals/pesticide-application-protocol>.

The prevention of pesticides from harming non-target organisms is the primary goal of the Permittees IPM program. The intent is to focus on preventing pesticides, fertilizers, and herbicides from entering the storm drain system and discharging to receiving waters. This protocol is applicable to 1) the outdoor use of pesticides, herbicides, and fertilizers; 2) the use of pesticides and fertilizers where the materials may come into contact with precipitation; 3) the use of pesticides, herbicides, and fertilizers where these materials may come into contact with runoff (natural or induced); and 4) the use of pesticides, herbicides, or fertilizers anywhere where they may be directly or indirectly discharged to a storm drainage system.

An effective IPM program includes the following elements:

- Pesticides are used only if monitoring indicates they are needed according to established guidelines.
- Treatment is made with the goal of removing only the target organism.
- Pest controls are selected and applied in a manner that minimizes risks to human health, beneficial, non-target organisms, and the environment.
- The use of pesticides, including organophosphates and pyrethroids do not threaten water quality.
- Partner with other agencies and organizations to encourage the use of IPM.
- Adopt and verifiably implement policies, procedures, and/or ordinances requiring the minimization of pesticide use and encouraging the use of IPM techniques (including beneficial insects) in the Permittees' overall operations and on municipal property.
- Policies, procedures, and ordinances shall include commitments and timelines to reduce the use of pesticides that cause impairment of surface waters by implementing the following procedures:
 - Quantify pesticide use by its staff and hired contractors.
 - Prepare and annually update an inventory of pesticides used by all internal departments, divisions, and other operational units.
 - Demonstrate reductions in pesticide use.

The protocol is applicable to any Permittee staff and contracted services that apply pesticides, fertilizers, or herbicides. Such staff commonly include, park, public works, purchasing, building/grounds maintenance, hazardous materials, and pesticide application staff. It is not applicable to the indoor use of pesticides, herbicides or fertilizers, but is applicable to the consequential outdoor handling, mixing, transport, or disposal of materials related to indoor use. This protocol also does not apply when another NPDES permit and/or abatement orders are in effect at the selected site. Furthermore, this protocol is not intended to replace federal or state requirements or provide complete directions for applying, handling, transporting, mixing, or storing pesticides, fertilizers, or herbicides.

Public Outreach and Education on Pesticide Use

Ventura County’s Community for a Clean Watershed (CCW) is the Program’s public outreach effort, and it regularly targets pesticide use in its campaigns. CCW has developed creative materials to promote the safe and correct use of outdoor pesticides. The outreach campaigns are run in the spring to coincide with the spring planting season.

In 2018-2020, CCW developed new radio, video, and print materials in English and Spanish for their “yard chemical” public outreach campaigns. The new English and Spanish radio spots were developed and run in annual campaigns beginning in 2018, and the video and print materials were added to the annual campaigns in 2019 (English) and 2020 (Spanish). The materials encourage the use of eco-friendly options and the importance of following product application instructions. Campaigns include a variety of outreach methods, such as radio ads, digital display ads, print media, and paid social media.



2019/20 Pesticide Outreach Examples

In 2018, radio ads in English and Spanish were run for four weeks. In 2019, radio ads were run for five weeks on five English-language and two Spanish-language stations, and digital ads were run for eight weeks. In addition, print ads were placed in a monthly magazine targeting homeowners. The 2020 campaign expanded to include print ads in several local newspapers and ran for longer with each media type utilized for 6-9 weeks. The campaign in 2021 followed a similar outline to 2020, with most outreach types targeted for 4-8 weeks.

Spring CCW campaigns prior to 2018 also included radio, video, and print materials in English and Spanish to encourage the responsible use of pesticide and herbicide products. Outreach materials for the previous campaigns included the animated “More, Better” television commercial, which graphically demonstrated how using too much pesticide results in runoff into the storm drains, eventually making it into the Watershed where it adversely affects plants and animals.



Newspaper Advertisement

The television ad was also adapted into a radio spot featuring the two animated characters as they defend their house against garden pests and inadvertently poison the watershed. An animated web banner corresponded with both broadcast media while the transit shelters took a more direct approach showing a snail and telling residents “Don’t kill an ocean just to keep pests out of your garden.”

In 2010, CCW ran a five-week campaign on television and radio, as well as animated web banners and transit shelter posters. A similar campaign was run in 2016 for four weeks, utilizing the thirty second radio spot, digital web banner, and six transit shelters showing the snail poster. The radio spot was also run for four weeks on Pandora in January – February 2017.

In February 2016, April 2016, and twice in January 2017, CCW sent out e-blasts targeting 100,000 homeowners in Ventura County each time. The e-blast promoted the Program’s rain barrel and compost bin truckload sale and included links to the Program’s “Yard Care Watershed Protection Tips” brochure and “Pesticides, Herbicides, & Fertilizer Application Best Practices” BMP sheet.



Spanish Language Pesticide Outreach

Retail Partnership Brochures: Nurseries and Gardeners

“Watershed Protection Tips for Gardeners” pamphlets were created in 2010 to encourage residents to follow best practices in their homes and yards when gardening and dealing with pests. These brochures were distributed to targeted retail stores and numerous outreach events across the county to reach the population that is likely involved in the activities. The colorful pamphlet defines the Watershed, explains the storm drain system, how and why polluted water is damaging, and gives both overall and topic-specific tips for how to keep the Watershed clean. The pamphlet covers plant selection, irrigation, fertilizer and pesticide practices, integrated pest management, and proper yard maintenance. The pamphlet was updated in 2016 to include pictures of drought tolerant plants and an updated link to Integrated Pest Management resources.

The Program also created a best management practices fact sheet covering commercial pesticide, herbicide, & fertilizer application and a poster covering best management practices for nurseries. These were distributed during stormwater business inspections. All the materials are also posted on the CCW website www.cleanwatershed.org.



2010 Gardening Retail Partnership Brochure



2016 Gardening Retail Partnership Brochure



RECOMMENDATIONS

Urban use of pesticides remains one of the priority pollutants for the Program. Through maintaining a strong public outreach effort to educate the public on the use and handling of pesticides coupled with household hazardous waste collections providing proper disposal of unwanted products, the Program expects to reduce the pesticide contamination in stormwater discharge. The results of this study, and the previous studies in 2012, 2015 and 2018, do not directly show a link between pyrethroids and significant toxicity in the samples, therefore the instances of measured toxicity could be from other pesticides or other pollutants. The Program is committed to reducing all pollutants in MS4 runoff and through the continued implementation of the Program, these other potential causes of toxicity will be addressed.

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