C Sediment Toxicity Testing Report

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TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

Job Number: 580-53253-3

Job Description: Red Devil Mine - 2014-2015

For:
Ecology and Environment, Inc.
Pacific Building
720 Third Avenue
Suite 1700
Seattle, WA 98104

Attention: Mark Longtine

Approved for release.
Kristine D Allen
Manager of Project Management
12/22/2015 5:18 PM

Kristine D Allen, Manager of Project Management
5755 8th Street East, Tacoma, WA, 98424
(253)248-4970
kristine.allen@testamericainc.com
12/22/2015

cc: Sub contracting

TestAmerica Tacoma is a part of TestAmerica Laboratories, Inc.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan and meet all requirements of NELAC. All data have been found to be compliant with laboratory protocol, with the exception of any items noted in the case narrative.

Table of Contents

Job Narrative
580-53253-3

Comments
No additional comments.

Receipt
The samples were received on 9/12/2015 11:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 19 coolers at receipt time were 1.3º C, 1.4º C, 1.6º C, 1.7º C, 2.0º C, 2.1º C, 2.4º C, 2.7º C, 2.7º C, 2.7º C, 2.9º C, 3.0º C, 3.1º C, 3.4º C, 3.6º C, 3.6º C, 3.9º C, 3.9º C and 4.0º C.

Subcontract Work
Method Toxicity - EPA 100.4 was subcontracted to Northwestern Aquatic Sciences. The subcontract laboratory certification is different from that of the facility issuing the final report.

SAMPLE SUMMARY

Client: Ecology and Environment, Inc. Job Number: 580-53253-3

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
580-53253-43	15KR082SD	Solid	09/02/2015 1111	09/11/2015 1711
580-53253-44	15KR083SD	Solid	09/02/2015 1320	09/11/2015 1711
580-53253-45	15KR084SD	Solid	09/05/2015 1616	09/11/2015 1711
580-53253-46	15KR085SD	Solid	09/02/2015 1700	09/11/2015 1711
580-53253-48	15KR087SD	Solid	09/02/2015 1825	09/11/2015 1711
580-53253-49	15KR088SD	Solid	09/02/2015 1900	09/11/2015 1711
580-53253-50	15KR089SD	Solid	09/06/2015 1330	09/11/2015 1711
580-53253-51	15KR090SD	Solid	09/03/2015 0944	09/11/2015 1711
580-53253-52	15KR091SD	Solid	09/06/2015 1730	09/11/2015 1711
580-53253-53	15KR092SD	Solid	09/03/2015 1140	09/11/2015 1711
580-53253-54	15KR093SD	Solid	09/06/2015 1930	09/11/2015 1711
580-53253-60	15KR099SD	Solid	09/05/2015 1050	09/11/2015 1711

METHOD SUMMARY

Client: Ecology and Environment, Inc. Job Number: 580-53253-3

Description	Lab Location	Method	Preparation Method
Matrix: Solid			
General Sub Contract Method	TAL SEA	Subcontract	

Lab References:

TAL SEA = TestAmerica Seattle

Method References:

DATA REPORTING QUALIFIERS

Lab Section	Qualifier	Description

Certification Summary

Client: Ecology and Environment, Inc.
Project/Site: Red Devil Mine - 2014-2015

TestAmerica Job ID: 580-53253-3

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Seattle	Alaska (UST)	State Program	10	UST-022
TestAmerica Seattle	California	State Program	9	2901
TestAmerica Seattle	L-A-B	DoD ELAP		L2236
TestAmerica Seattle	L-A-B	ISO/IEC 17025		L2236
TestAmerica Seattle	Montana (UST)	State Program	8	N/A
TestAmerica Seattle	Oregon	NELAP	10	WA100007
TestAmerica Seattle	US Fish & Wildlife	Federal		LE058448-0
TestAmerica Seattle	USDA	Federal		P330-14-00126
TestAmerica Seattle	Washington	State Program	10	C553

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

Report

of

Test No. 874-1

Assessment of Freshwater Sediments Using a 28-day Amphipod, *Hyalella azteca*, Sediment Bioassay as Part of the Kuskokwim River Sediment Characterization

Submitted to

Test America
5755 8th Street East
Tacoma, WA 98424

Prepared by

Northwestern Aquatic Sciences
3814 Yaquina Bay Road
P.O. Box 1437
Newport, OR 97365

December 22, 2015

TOXICITY TEST REPORT

TEST IDENTIFICATION

Test No.: 874-1

Title: Toxicity of freshwater sediments using a 28-day Amphipod, *Hyalella azteca*, sediment bioassay as part of the Kuskokwim River Sediment Characterization.

Protocol No.: NAS-XXX-HA4c, February 11, 2000. Revision 3 (4-26-05). Based on ASTM 2001 (Standard test methods for measuring the toxicity of sediment-associated contaminants with fresh water invertebrates, E1706-00), Am. Soc. Test. Mat., Phila., PA, and EPA Method 100.1 (Methods for measuring the toxicity and bioaccumulation of sediment-associated contaminants with freshwater invertebrates, EPA/600/R-99/064).

STUDY MANAGEMENT

Study Sponsor: Test America, Inc., 5755 8th Street East, Tacoma, WA 98424

Sponsor's Study Monitor: Ms. Kristine Allen

Testing Laboratory: Northwestern Aquatic Sciences, P.O. Box 1437, Newport, OR 97365

Test Location: Newport laboratory

Laboratory's Study Personnel: G.J. Irissarri, B.S., Proj. Man./Study Dir.; L.K. Nemeth, B.A., M.B.A., QA Officer; G.A. Buhler, B.S., Aq. Toxicologist; J. B. Brown, B.S., D.V.M., Assoc. Aq. Toxicol., Y. Nakahama, Sr.Tech.; L. Brady, B.S., Tech.

Study Schedule:

Test Beginning: 9-25-15, 1030 hrs.

Test Ending: 10-23-15, 1100 hrs.

Disposition of Study Records: All raw data, reports and other study records are stored at Northwestern Aquatic Sciences, 3814 Yaquina Bay Rd., Newport, OR 97365.

Statement of Quality Assurance: The test data were reviewed by the Quality Assurance Unit to assure that the study was performed in accordance with the protocol and standard operating procedures. This report is an accurate reflection of the raw data.

TEST MATERIAL

Test Sediments: Freshwater test sediments collected as part of the Kuskokwim River Sediment Characterization. Details are as follows:

NAS Sample No.	5428G	5429G	5430G	5431G
Description	15KR082SD	15KR083SD	15KR084SD	15KR085SD
Collection Date	9/2/15	9/2/15	9/5/15	9/2/15
Receipt Date	9/22/15	9/22/15	9/22/15	9/22/15
NAS Sample No.	5432G	5433G	5434G	5435G
Description	15KR087SD	15KR088SD	15KR089SD	15KR090SD
Collection Date	9/2/15	9/2/15	9/6/15	9/3/15
Receipt Date	9/22/15	9/22/15	9/22/15	9/22/15
NAS Sample No.	5436G	5437G	5438G	5439G
Description	15KR091SD	15KR092SD	15KR093SD	15KR099SD
Collection Date	9/6/15	9/3/15	9/6/15	9/5/15
Receipt Date	9/22/15	9/22/15	9/22/15	9/22/15

Control Sediment: The negative control sediment (NAS#5427G) was collected on 9-21-15 from an area approximately one mile east of the Hwy. 101 bridge at Beaver Creek, approx. 8 miles south of Newport, OR.

Treatments: Homogenized at test set up by mixing using stainless steel implements.

Storage: All test and control sediments were stored at 4°C in the dark in sealed containers until used.

TEST WATER

Source: Dechlorinated municipal tap water.
Date of Preparation: 9-22-15 and 10-3-15
Water Quality: (water quality was not recorded for third batch)
pH: 7.0, 6.9
conductivity: 98, 102 µmhos/cm
hardness: 17, 26 mg/L as $CaCO_3$
alkalinity: 40, 40 mg/L as $CaCO_3$.
total chlorine: < 0.02, <0.02 mg/L
Pretreatment: Dechlorinated and aerated ≥24 hr.

TEST ORGANISMS

Species: *Hyalella azteca,* amphipod.
Age/Size: 7-8 days old
Source: Chesapeake Cultures, Hayes, VA; received 9-23-15
Acclimation: Holding conditions for the three days prior to testing averaged: Temperature, 21.3 ± 1.0 °C; dissolved oxygen, 10.8 ± 3.7 mg/L; pH, 7.3 ± 0.2; conductivity, 329 ± 235 µmhos/cm; hardness, 74 ± 40 mg/L as $CaCO_3$; and alkalinity, 117 ± 72 mg/L as $CaCO_3$. Photoperiod, 16:8, L:D. Half of the water was replaced daily with dechlorinated municipal tap water during holding. Animals were fed YTC daily during holding.

TEST PROCEDURES AND CONDITIONS

The following is an abbreviated statement of the test procedures and a statement of the test conditions actually employed. See the test protocol (Appendix I) for a more detailed description of the test procedures used in this study.

Test Chambers: 300 ml high-form glass beakers
Test Volumes: 100 ml sediment layer; 175 ml test water.
Replicates/Treatment: 8 (plus two additional WQ beakers)
Organisms/Treatment: 80
Water Volume Changes: 2 water volumes per day
Aeration: None.
Feeding: Animals are fed 1.0 ml of YTC suspension per beaker daily.
Effects Criteria: 1) survival after 28 days, and 2) average individual dry weight after 28 days. Death is defined as no visible movement or response to tactile stimulation. Missing organisms were considered to be dead.
Water Quality and Other Test Conditions: The temperature, dissolved oxygen, conductivity, pH, hardness, alkalinity, and ammonia-nitrogen were measured in the overlying water of one replicate test container per treatment on days 0 and 28 of the test. Temperature was measured daily, pH and dissolved oxygen three times per week, and conductivity weekly, in the overlying water of one replicate test container per treatment. Hardness and alkalinity were measured with titrimetric methods. Ammonia-N was measured using Hach reagents based on the salicylate (Clin. Chim. Acta 14:403, 1996) colorimetric method; samples were not distilled prior to analysis. The photoperiod was 16:8, L:D.

DATA ANALYSIS METHODS

Survival, mortality and average individual dry weight were calculated for each replicate as follows:

percent survival = 100 x (number surviving/initial number tested)
percent mortality = 100 x (number dead/initial number tested)

average individual dry weight = (final wt. - tare wt.)/number weighed,
where:
final wt. = tare wt. + dry weight of organisms recovered on day 28, in mg

Means and standard deviations for the biological endpoints described above, and for water quality data, were computed using Microsoft Excel 2010. Individual dry weight and proportion survived in each test sediment was compared against that in the control, each of the two references, and the pooled data of both references (using either a Nonparametric Two Sample Test or Parametric Two Sample Test at the 0.05 level of significance). The software used for most of the statistical comparisons was CETIS v1.8.7.4 (Tidepool Scientific Software). BioStat (version Feb 9, 2006 (EXCEL) bioassay software developed by the U.S. Army Corps of Engineers, Seattle District) was used in the statistical comparison of both proportion survived and dry weight between reference 15KR082SD and reference 15KR083SD and also for the comparison of proportion survived between reference 15KR082SD and the test sediments.

PROTOCOL DEVIATIONS

None

REFERENCE TOXICANT TEST

The reference toxicant test is a multi-concentration toxicity test using potassium chloride, to evaluate the performance of the test organisms used in the sediment toxicity test. The performance is evaluated by comparing the results of this test with historical results obtained at the laboratory. A summary of the reference toxicant test result is given below. The reference toxicant test raw data are found in Appendix III.

Test No.: 999-3476
Reference Toxicant and Source: Potassium Chloride (KCl), Fisher Lot #114689.
Test Date: 9-25-15
Dilution Water Used: Moderately hard synthetic water prepared from Milli-Q® deionized water.
Result: 96-hr LC50, 0.38 g/L. This result is within the laboratory's control chart warning limits (0.27 – 0.46 g/L).

TEST RESULTS

Observations of water quality in the overlying water throughout the test are summarized in Table 1. A detailed tabulation of the water quality results by sample and test day can be found in Appendix II. The means and standard deviations of percent survival and average dry weight of *Hyalella* exposed for 28 days to sediments are summarized in Table 3. Detailed data organized by sample and replicate, and summary statistics for these observations, are given in Appendix II.

All water quality observations of overlying water temperature and dissolved oxygen were within the protocol specified ranges. Ammonia-N in the overlying water ranged between <0.1 and 0.3 mg/L for all day 0 and day 28 measurements. The test met the survival acceptability criteria specified in the test protocol with 93.8 % mean control survival (≥80% mean survival required). The reference toxicant test results were within control chart limits.

Control survival and growth were not significantly different from that in either reference sediment. Reference sediment 15KR082SD survival was significantly less than reference sediment 15KR083SD, but reference sediment 15KR083SD survival was not significantly different from reference 15KR082SD. Two test sediments, 15KR089SD and 15KR091SD, exhibited statistically significantly lower survival ($p<0.05$) than that of the control, each of the two reference sediments (15KR082SD and 15KR083SD) and the pooled data from both references. The survival of sample 15KR093SD was statistically significantly lower ($p<0.05$) than that of the control, reference 15KR083SD, and the pooled reference. Additionally, the growth of 15KR093SD was statistically significantly lower ($p<0.05$) than that of the control, each of the two reference sediments, and the pooled reference. See Table 2.

STUDY APPROVAL

Project Manager/Study Director — Date: 12-22-15

Quality Assurance Unit — Date: 12-22-15

Assistant Laboratory Director — Date: 12-22-15

Table 1. Summary of water quality conditions during tests of the amphipod, *Hyalella azteca*, exposed to freshwater sediments.

Water Quality Parameter	Mean ± S.D.	Minimum	Maximum	N
Temperature (°C)	23.2 ± 0.4	22.0	24.0	377
Dissolved oxygen (mg/L)	7.0 ± 0.6	5.4	8.3	169
Conductivity (µmhos/cm)	108 ± 22	93	290	78
pH	6.8 ± 0.2	6.4	7.3	169
Hardness (mg/L as $CaCO_3$)	30 ± 4	26	34	26
Alkalinity (mg/L as $CaCO_3$)	44 ± 5	40	50	26
Total ammonia (mg/L)	---	<0.1	0.3	26

Table 2. Survival and growth results of *Hyalella azteca* 28-day sediment toxicity test.

NAS Sample No.	Sample Description	Percent survival (Mean ± SD)	Average dry wt/amphipod (mg) (Mean ± SD)
5427G	Control	93.8 ± 9.2	0.26 ± 0.05
5428G	15KR082SD	81.3 ± 15.5[§]	0.26 ± 0.06
5429G	15KR083SD	96.3 ± 5.2	0.25 ± 0.04
5430G	15KR084SD	92.5 ± 10.4	0.24 ± 0.02
5431G	15KR085SD	92.5 ± 8.9	0.28 ± 0.04
5432G	15KR087SD	90.0 ± 14.1	0.23 ± 0.05
5433G	15KR088SD	88.8 ± 12.5	0.28 ± 0.03
5434G	15KR089SD	61.3 ± 17.3[*‡§†]	0.23 ± 0.03
5435G	15KR090SD	92.5 ± 17.5	0.22 ± 0.04
5436G	15KR091SD	61.3 ± 12.5[*‡§†]	0.24 ± 0.04
5437G	15KR092SD	90.0 ± 12.0	0.23 ± 0.02
5438G	15KR093SD	70.0 ± 26.2[*§†]	0.20 ± 0.03[*‡§†]
5439G	15KR099SD	90.0 ± 10.7	0.28 ± 0.04

*Significant difference from the control sediment ($p<0.05$).
‡Significant difference from the reference sediment 15KR082SD ($p<0.05$).
§Significant difference from the reference sediment 15KR083SD ($p<0.05$).
†Significant difference from the pooled data of references of 15KR082SD & 15KR083SD ($p<0.05$).

APPENDIX I

PROTOCOL

TEST PROTOCOL

FRESHWATER AMPHIPOD, *HYALELLA AZTECA*, 28-DAY SEDIMENT SURVIVAL AND GROWTH TEST

1. INTRODUCTION

1.1 Purpose of Study: The purpose of this study is to characterize the chronic toxicity of freshwater sediments using a 28-day exposure and survival and growth endpoints with the amphipod, *Hyalella azteca.*

1.2 Referenced Method: This protocol is based on ASTM Method E 1706-00 (ASTM 2001) and EPA Method 100.1 (EPA/600/R-99/064)

1.3 Summary of Method: A summary of test conditions for the amphipod 28-day sediment survival and growth test is tabulated below. The test with *Hyalella azteca* is conducted at 23 ± 1°C with a 16L:8D photoperiod at an illuminance of about 100-1000 lux. Test chambers are 300-mL high-form lipless beakers containing 100 mL of sediment and 175 mL of overlying water. Ten 7-8day old amphipods are used in each replicate. The number of replicates/treatment depends on the objective of the test. Eight replicates are recommended for routine testing. Amphipods in each test chamber are fed 1.0 mL of YCT food daily. Each chamber receives two volume additions per day of overlying water. Test endpoints include survival and growth.

2. STUDY MANAGEMENT

2.1 Sponsor's Name and Address:

_____
_____
_____
_____

2.2 Sponsor's Study Monitor:

_____

2.3 Name of Testing Laboratory:
Northwestern Aquatic Sciences
3814 Yaquina Bay Road, P.O. Box 1437
Newport, OR 97365.

2.4 Test Location:

_____

2.5 Laboratory's Personnel to be Assigned to the Study:
Study Director: _____
Quality Assurance Unit: _____
Aquatic Toxicologist: _____
Aquatic Toxicologist: _____

2.6 Proposed Testing Schedule: Tests are normally begun within 14 days of sample collection. Reference toxicant test to be run concurrently.

2.7 Good Laboratory Practices: The test is conducted following the principles of Good Laboratory Practices (GLP) as defined in the EPA/TSCA Good Laboratory Practice regulations revised August 17, 1989 (40 CFR Part 792).

3. TEST MATERIAL

The test materials are freshwater sediments. The control, reference, and test sediments are placed in solvent cleaned 1 L glass jars fitted with PTFE-lined screw caps. At the laboratory the samples are stored at 4°C in the dark. The original sealed containers may be stored for up to 8 weeks prior to testing, depending on the testing requirements. If jars are not full when received or if sediment is removed for testing, headspaces should be filled with nitrogen to retard deterioration. A negative control sediment is collected from a clean site. In addition, a reference sediment, a clean sediment with physical characteristics similar to the test sediments, may be employed as a comparison station.

4. TEST WATER

Test water (overlying water) at NAS is normally dechlorinated tap water or moderately hard synthetic water. Synthetic dilution water is prepared from Milli-Q reagent grade water and reagent grade chemicals. Test water may also be well water, surface water, site water, or other water depending on the study design. The hardness or other water quality parameters of the dilution water may need to be adjusted to meet the study design.

5. TEST ORGANISMS

5.1 Species: amphipod, *Hyalella azteca.*

5.2 Source: Cultured at NAS. Alternatively, animals may be purchased from a reputable commercial supplier.

5.3 Age: 7-8 days old at start of test

5.4 Acclimation and Pretest Observation: Cultures are maintained at 23 ± 1°C under a 16:8 L:D photoperiod. Cultured amphipods are fed dried maple leaves with YTC. Rabbit chow, Tetramin® or TetraFin-® flakes may also be used. Acclimation of test organisms to the test water may be desirable, depending on culture water, but it is not required. If test organisms are to be acclimated, fifty percent of the holding water is changed daily with the addition of test water.

6. DESCRIPTION OF TEST SYSTEM

6.1 Test Chambers and Environmental Control: Test chambers used in the toxicity test are 300-mL high-form lipless glass beakers. Test chambers are maintained at constant temperature by partial immersion in a temperature-controlled water bath or by placement in a temperature-controlled room. Aeration is not empolyed unless dissolved oxygen drops below 2.5 mg/L. The test is conducted under an illuminance of 100-1000 lux with a 16L:8D photoperiod.

6.2 Cleaning: All laboratory glassware, including test chambers, is cleaned as described in EPA/600/4-90/027F. New glassware and test systems are soaked 15 minutes in tap water and scrubbed with detergent (or cleaned in automatic dishwasher); rinsed twice with tap water; carefully rinsed once with fresh, dilute (10%, V:V) hydrochloric or nitric acid to remove scale, metals, and bases; rinsed twice with deionized water; rinsed once with acetone to remove organic compounds (using a fume hood or canopy); and rinsed three times with deionized water. Test systems and chambers are rinsed again with dilution water just before use.

7. EXPERIMENTAL DESIGN AND TEST PROCEDURES

7.1 Experimental Design: The test involves exposure of amphipods to test, control, and reference sediments. The sediments are placed on the bottom of the test containers and are overlain with test water. The test exposure is for 28 days. The renewal of overlying water consists of two volume additions per day, either continuous or intermittent. Each treatment consists of eight replicate test containers, each containing 10 organisms. Test chamber positions are completely randomized. Test organisms are randomly distributed to the test chambers. Blind testing is normally used.

7.2 Setup of Test Containers: Sediments are homogenized and placed in test chambers on the day before addition of test organisms. Sediment (100 ml) is placed into each of eight replicate beakers. After addition of the sediment, 175 ml of test water is gently added to each beaker in a manner to prevent resuspension. The overlying water is replaced twice daily. The test begins when amphipods are introduced to the test chambers. Initial water quality measurements are taken prior to the addition of test organisms.

7.3 Effect Criterion: The effect criteria used in the 28-day amphipod bioassay are mortality and growth. Death is defined as the lack of movement of body or appendages on response to tactile stimulation. Growth is measured as change in dry weight.

7.4 Test Conditions: No aeration is employed unless dissoved oxygen falls below 2.5 mg/L. The test temperature employed is 23 ± 1°C. A 16:8, L:D photoperiod is used. Illumination is supplied by daylight fluorescent lamps at 100-1000lux. The overlying water is replaced twice daily.

7.5 Beginning the Test: On the day the test begins, amphipods are impartially counted into small containers of test water (10/container). The test is begun by rinsing test organisms into the equilibrated test containers. For the growth endpoint, time-zero weight data should be collected.

7.6 Feeding: Amphipods are fed 1.0 mL of YCT daily per test chamber. A feeding may be skipped if there is a build up of excess food. However, all beakers must be treated similarly.

7.7 Test Duration, Type and Frequency of Observations, and Methods: The duration of the toxicity test is 28 days. The type and frequency of observations to be made are summarized as follows:

TYPE OF OBSERVATION	TIMES OF OBSERVATION
BIOLOGICAL DATA	
Survival, growth	Day 28
PHYSICAL AND CHEMICAL DATA	
Hardness, alkalinity, conductivity, and ammonia-N	Beginning and end of test in overlying water of one replicate beaker from each treatment.
Temperature	Daily in overlying water of one replicate beaker from each treatment.
Conductivity	Weekly
Dissolved oxygen and pH	3X/week
Optional pore water ammonia and/or sulfide	In test sediments prior to initiating the tests. Optionally in sediments from sacrificial test chambers at test beginning and/or end.

Dissolved oxygen is measured using a polarographic oxygen probe calibrated according to the manufacturer's recommendations. The pH is measured using a pH probe and a properly calibrated meter with scale divisions of 0.1 pH units. Temperature is measured with a calibrated mercury thermometer or telethermometer. Conductivity is measured with a conductivity meter. Hardness and alkalinity are measured using titrometric methods. Total soluble sulfide and total ammonia-N were

measured using Hach test kits based on the methylene blue (EPA Method 376.2) and salicylate (Clin. Chim. Acta 14:403, 1996) colorimetric methods, respectively; samples were not distilled prior to analysis.

Overlying water should be sampled just before water renewal from about 1 to 2 cm above the sediment surface using a pipet. It may be necessay to pool water samples from individual replicates. The pipet should be checked to make sure no organisms are removed during sampling of overlying water.

7.8 Test Termination: At test termination, the contents of each test container are sieved through a #35 (500 µm mesh) sieve to recover the amphipods. Amphipods from each replicate are put into a 30 mL plastic cup, rinsed with DI water, gently blotted and place into the appropriate tared aluminum weighing pan. The number of survivors for each container is recorded on the datasheet.

7.9 Growth Measurement: Growth is measured as average dry weight of animals in a test replicate at the end of the test on day 28. Pooled animals from each test replicate are gently blotted and placed into tared aluminum weigh pans. The pans are dried at 60-90°C to constant weight. The dried amphipods are placed into a dessicator and weighed as soon as possible to the nearest 0.01 mg (desirable to use 0.001 mg). The total weight of the dried amphipods in each pan is divided by the number of amphipods weighed to obtain an average dry weight per surviving amphipod per replicate.

8. CRITERIA OF TEST ACCEPTANCE

The test results are acceptable if the minimum survival of organisms in the control treatment at the end of the test is at least 80%.

9. DATA ANALYSIS

The endpoints of the toxicity test are survival and growth. Survival is obtained as a direct count of living organisms in each test container at the end of the test. Average amphipod dry weight, also measured at the end of the test, may be used to compare growth between treatment sediments and the control or reference sediment. Ordinarily the following data analysis is performed. Due to special requirements, alternative methods may be used. The means and standard deviations are calculated for each treatment level. Identification of toxic sediments is established by statistical comparison of test endpoints between test and control or reference sediments. Between treatment comparisons may be made using a Student's t-test or Wilcoxon's Two-Sample test, where each treatment is compared to the control or the reference sediment. An arcsine-square root transformation of proportional data, and tests for normality and heterogeneity of variances, are performed prior to statistical comparisons.

10. REPORTING

The final report of the test results must include all of the following standard information at a minimum: name and identification of the test; the investigator and laboratory; date and time of test beginning and end; information on the test material; information on the source and quality of the overlying/test water; detailed information about the test organisms including acclimation conditions; a description of the experimental design and test chambers and other test conditions including feeding, if any, and water quality; definition of the effect criteria and other observations; responses, if any, in the control treatment; tabulation and statistical analysis of measured responses and a summary table of endpoints; a description of the statistical methods used; any unusual information about the test or deviations from procedures; reference toxicant testing information.

11. STUDY DESIGN ALTERATION

Amendments made to the protocol must be approved by the sponsor and study director and should include a description of the change, the reason for the change, the date the change took effect and the dated signatures of the study director and sponsor. Any deviations in the protocol must be described and recorded in the study raw data.

12. REFERENCE TOXICANT

The reference toxicant test is a standard multi-concentration toxicity test using a specified chemical toxicant to evaluate the performance of test organisms used in the study. Reference toxicant tests are 96-hour, water only exposures, not 28-day sediment exposures. The reference toxicant test is run concurrently. Performance is evaluated by comparing the results of the reference toxicant test with historical results (e.g., control charts) obtained at the laboratory.

13. REFERENCED GUIDELINES

ASTM. 2001. Standard Test Methods for Measuring the Toxicity of Sediment-Associated Contaminants with Fresh Water Invertebrates. ASTM Standard Method No. E 1706-00. Am. Soc. Test. Mat., Philadelphia, PA.

U.S. EPA. 2000. Section 11, Test Method 100.1, *Hyalella azteca* 10-d Survival and Growth Test for Sediments, pp. 47-54 In: Methods for Measuring the Toxicity and Bioaccumulation of Sediment-associated Contaminants with Freshwater Invertebrates (Second Edition). EPA/600/R-99/064.

Weber, C.I. (Ed.) 1993. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms (Fourth Edition). EPA/600/4-90/027F.

14. APPROVALS

_____ for _____
Name Date

_____ for **Northwestern Aquatic Sciences**
Name Date

Appendix A
Test Conditions Summary

1. Test type	whole sediment toxicity test with renewal of overlying water
2. Test duration	28 days
3. Temperature	23 ± 1°C
4. Light quality	daylight fluorescent light
5. Illuminance	100-1000 lux
6. Photoperiod	16L:8D
7. Test chamber size	300-mL high-form lipless beakers, (Pyrex® 1040 or equivalent)
8. Sediment volume	100 mL
9. Overlying water volume	175 mL
10. Renewal overlying water	2 volume additions/day (continuous or intermittent)
11. Age of test organisms	7-8 days old at test initiation
12. Organisms per test chamber	10
13. Replicates per treatment	8 recommended for routine testing (depends on design)
14. Organisms per treatment	80
15. Feeding regime	YCT food, fed 1.0 mL daily/chamber
16. Cleaning	if screens are used, clean as needed
17. Aeration	None, unless DO falls below 2.5 mg/L
18. Overlying (test) water	Dechlorinated tap water, culture water, well water, surface water, site water or reconstituted water, depending on study design.
19. Water quality	Hardness, alkalinity, conductivity, ammonia-N beginning and end; temperature daily; conductivity weekly; DO & pH 3X/wk
20. Endpoints	Survival & growth (based on weight)
21. Test acceptability criteria	Minimum control survival of 80%
22. Sample holding	14 days at 4°C in the dark (recommended)
23. Sample volume required	1L (800 mL per sediment)
24. Reference toxicant	Concurrent testing required

APPENDIX II

RAW DATA

TEST DESCRIPTION, MONITORING, AND RESULTS BENCHSHEETS

NORTHWESTERN AQUATIC SCIENCES PROTOCOL NO. NAS-XXX-HA4c

HYALELLA AZTECA 28-DAY SOLID PHASE SEDIMENT TEST

Test No. 874-1 Client Test America Investigator

STUDY MANAGEMENT

Client: Test America, Inc., 5755 8th Street East, Tacoma, WA 98424

Client's Study Monitor: Ms. Kristine Allen

Testing Laboratory: Northwestern Aquatic Sciences

Test Location: Newport Laboratory

Laboratory's Study Personnel:

Proj. Man./Study Dir. G.J. Irissarri GJI

QA Officer L.K. Nemeth

1. [illegible] 2. Lauren Brady LB

3. J. Brown JB 4. [illegible]

5. 6.

7. 8.

Study Schedule:

Test Beginning: 9-25-15 1030 Test Ending: 10-23-15 1100

TEST MATERIAL

General description (see sample logbook/chain-of-custody for details):

NAS Sample No.:	5428G	5429G	5430G	5431G	5432G
Description:	15KR082SD	15KR083SD	15KR084SD	15KR085SD	15KR087SD
Collection Date:	9/2/15	9/2/15	9/5/15	9/2/15	9/2/15
Receipt Date:	9/22/15	9/22/15	9/22/15	9/22/15	9/22/15
:					

NAS Sample No.:	5433G	5434G	5435G	5436G	5437G
Description:	15KR088SD	15KR089SD	15KR090SD	15KR091SD	15KR092SD
Collection Date:	9/2/15	9/6/15	9/3/15	9/6/15	9/3/15
Receipt Date:	9/22/15	9/22/15	9/22/15	9/22/15	9/22/15
:					

NAS Sample No.:	5438G	5439G			
Description:	15KR093SD	15KR099SD			
Collection Date:	9/6/15	9/5/15			
Receipt Date:	9/22/15	9/22/15			
:					

NAS Sample No.:					
Description:					
Collection Date:					
Receipt Date:					
:					

NAS Sample No.:					
Description:					
Collection Date:					
Receipt Date:					
:					

Error codes: 1) correction of handwriting error
2) written in wrong location; entry deleted
3) wrong date deleted, replaced with corrrect date
4) error found in measurement; measurement repeated

Test No. 874-1 Client Test America Investigator

SEDIMENT DESCRIPTIONS -- SUPPLEMENTAL NOTES

Sample No.	Description
5428G	Brown muddy Gravel
5429G	Sandy gravel
5430G	sandy gravel
5431G	Brown muddy Gravel
5432G	Gray fine muddy sand
5433G	Brown Muddy Gravel
5434G	Brown clay & gravel
5435G	Thick wet mud with large rocks
5436G	Dark gray, rocky clay
5437G	Dark gray mud w/ rocks and fibrous material
5438G	Dark brown, thick rocky mud
5439G	Gray-green fine sand w/ rocks and sticks
5427G	BLACK FINE MUD

Test No. 874-1 Client Test America Investigator

TEST WATER

Source: Dechlorinated Newport, OR tap water
Date of Collection/Preparation: 9-22-15, 10-3-15
pH 7.0, 6.9
Cond (umhos/cm2) 98, 102
Hardness (mg/La0 17, 26
Alkalinity (mg/L) 40, 40
Total Chlorine (mg/l) <0.02, <0.02
Treatments: Aerated ≥ 24 hrs

TEST ORGANISMS

Species: *Hyalella azteca* Age: 7-8 DAYS Date received: 9-23-15
Source: Chesapeake Cultures, Hayes, VA

Acclimation Data:

Date	Temp. (deg.C)	pH	DO (mg/L)	Cond. umhos/cm	Hardness (mg/L)	Alkalinity (mg/L)	Feeding Amount	Feeding description	Water changes
9-23-15	20.8	7.1	>15.0	600	120	200	10mL	YTC	YES
9-24-15	20.7	7.3	8.6	196	51	80	"	"	YES
9-25-15	22.4	7.4	8.7	190	51	70	-	-	
Mean	21.3	7.3	10.8	329	74	117			
S.D.	1.0	0.2	3.7	235	40	72			
(N)	3	3	3	3	3	3			

Photoperiod during acclimation: 16:8, L:D

TEST PROCEDURES AND CONDITIONS

Test chambers: 300 ml glass beakers
Test volumes: 100 ml of test sediment; 275 ml total volume
Replicates/treatment: (8) 8 Organisms/treatment: (80) 80 (10/REP)
Test water changes: Twice daily
Aeration: only if DO falls below 2.5 mg/L
Feeding: everyday beginning with day zero
Test temperature (deg.C): 23
Beaker placement: Total randomization
Photoperiod: 16:8, L:D

Control Sediment:
Source: From an area approximately one mile east of the Hwy. 101 bridge at Beaver Creek, approx. 8 miles south of Newport, OR.
Date collected: 9-21-15
Sieved through 0.5 -mm screen
Storage: 4°C in the dark in closed containers. NAS# 54276

MISCELLANEOUS NOTES

Test No. 874-1 Client Test America Investigator _____

12/22/2015

Test conducted in (circle one): (room 1) room 2 trailer water bath other: _____

Randomization chart: TOP SHELF

5									
4									104
3									103
2									102
1									101

Randomization chart: FRONT

Randomization chart:

Randomization chart:

Test No. 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 0 (9/25/15) GAB / LS

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond.* (umhos/cm)	pH*	Hardness* (mg/L)	Alkalinity* (mg/L)	NH3* (ppm)	Comments
15	23.5	8.0	113	6.6	34	50		Each beaker fed 1.0 ml
43	22.9	7.9	111	6.6	34	50		YTC suspension
44	22.9	7.8	113	6.6	34	50		Initials: GAB
64	23.0	8.1	116	6.5	34	40		
66	22.9	8.0	104	6.5	34	50		
67	22.9	8.0	109	6.6	34	50		
72	22.7	7.7	290	6.8	34	40		
79	22.7	8.0	120	6.7	34	40		
83	22.9	7.9	114	6.6	34	40		Water changed in all
86	22.8	7.8	123	6.6	34	50		beakers.
89	22.9	8.1	117	6.6	34	50		Time: 0515
97	22.9	8.0	113	6.7	26	40		Initials: GAB
99	23.0	8.2	113	6.8	34	50		
								Water changed in all
								beakers.
								Time: 1630
								Initials: LS

*Water quality measurements to be taken.

Day 1 (9/26/15) GAB

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.5							Each beaker fed 1.0 ml
43	23.4							YTC suspension
44	23.4							Initials: BB
64	23.6							
66	23.7							
67	23.6							
72	23.5							
79	23.3							
83	23.5							Water changed in all
86	23.5							beakers.
89	23.5							Time: 0510
97	23.8							Initials: GB
99	23.9							
								Water changed in all
								beakers.
								Time: 1625
								Initials:

*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator _____

DAILY RECORD SHEET

Day 2 (9/27/15) GJ

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.0							Each beaker fed 1.0 ml
43	22.4							YTC suspension
44	22.4							Initials: GJ
64	22.5							
66	22.2							
67	22.1							
72	22.1							
79	22.3							
83	22.1							Water changed in all
86	22.3							beakers.
89	22.5							Time: 0510
97	22.5							Initials: GJ
99	22.7							
								Water changed in all
								beakers.
								Time: 1650
								Initials:

*Water quality measurements to be taken.

Day 3 (9/28/15) LB

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	22.5	7.9		6.7				Each beaker fed 1.0 ml
43	22.9	7.9		6.7				YTC suspension
44	22.1	7.9		6.8				Initials: GJ
64	22.0	7.8		6.6				
66	23.0	7.8		6.7				
67	22.7	7.8		6.8				
72	22.6	7.4		6.9				
79	23.1	7.6		6.7				
83	22.7	7.4		6.7				Water changed in all
86	23.0	7.4		6.8				beakers.
89	23.3	7.4		6.9				Time: 0505
97	23.3	7.7		6.9				Initials: GJ
99	23.5	7.9		6.9				
								Water changed in all
								beakers.
								1630 Time: ~~1650~~
								LB Initials:

2) 9-27-15

*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 4 (9 12/9/15) LB

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.8							Each beaker fed 1.0 ml
43	23.0							YTC suspension
44	23.3							Initials:
64	23.2							
66	23.0							
67	22.9							
72	22.8							
79	23.1							
83	22.9							Water changed in all
86	23.1							beakers.
89	23.3							Time: 0520
97	23.4							Initials:
99	23.5							
								Water changed in all
								beakers.
								Time: 1550
								Initials:

*Water quality measurements to be taken.

Day 5 (9 12/30/15) LB

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond.* (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	24.0	6.6	117	6.9				Each beaker fed 1.0 ml
43	23.5	6.7	113	6.9				YTC suspension
44	23.8	6.7	116	6.9				Initials:
64	23.7	6.4	112	6.8				
66	23.4	6.6	112	6.9				
67	23.4	6.6	111	7.0				
72	23.2	6.4	127	6.9				
79	23.6	6.5	117	7.0				
83	23.3	6.3	112	6.8				Water changed in all
86	23.5	6.4	115	6.8				beakers.
89	23.6	6.4	113	6.9				Time: 0510
97	23.8	6.6	111	7.0				Initials:
99	23.9	6.8	111	7.0				
								Water changed in all
								beakers.
								Time: 1620
								Initials:

*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 6 (10/11/15) YC/LB

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.8							Each beaker fed 1.0 ml
43	23.2							YTC suspension
44	23.4							Initials: YC
64	23.3							
66	23.1							
67	22.9							
72	22.9							
79	23.2							
83	22.9							Water changed in all
86	23.1							beakers.
89	23.3							Time: 0515
97	23.4							Initials: YC
99	23.5							
								Water changed in all
								beakers.
								Time: 1610
								Initials: LB

*Water quality measurements to be taken.

Day 7 (10/12/15) LB

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.8	7.1		6.7				Each beaker fed 1.0 ml
43	23.2	6.8		6.6				YTC suspension
44	23.5	6.8		6.7				Initials: GB
64	23.5	6.7		6.6				
66	23.0	7.0		6.8				
67	23.0	7.0		6.7				
72	22.9	6.5		6.7				
79	23.3	6.4		6.8				
83	23.0	6.4		6.7				Water changed in all
86	23.2	6.6		6.7				beakers.
89	23.4	6.6		6.8				Time: 0505
97	23.4	6.8		6.9				Initials: GB
99	23.6	6.9		6.9				
								Water changed in all
								beakers.
								Time: 1625
								Initials: YC

*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 8 (10/3/15) GS

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	24.0							Each beaker fed 1.0 ml
43	23.4							YTC suspension
44	23.7							Initials: GS
64	23.8							
66	23.8							
67	23.7							
72	23.0							
79	23.6							
83	23.1							Water changed in all
86	23.4							beakers.
89	23.6							Time: 0505
97	23.6							Initials: GS
99	23.8							
								Water changed in all
								beakers.
								Time: 1610
								Initials: GS

*Water quality measurements to be taken.

Day 9 (10/4/15) GJL

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.1							Each beaker fed 1.0 ml
43	23.3							YTC suspension
44	22.6							Initials: GJL
64	22.6							
66	22.3							
67	22.1							
72	22.1							
79	22.4							
83	22.1							Water changed in all
86	22.3							beakers.
89	22.5							Time: 0515
97	22.6							Initials: GJL
99	22.8							
								Water changed in all
								beakers.
								Time: 1650
								Initials: GJL

*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 10 (10/5/15) LB

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	24.0	6.8		7.0				Each beaker fed 1.0 ml
43	23.5	6.8		6.9				YTC suspension
44	23.8	6.8		7.0				Initials: GJ
64	23.7	6.8		6.9				
66	23.3	6.7		6.9				
67	23.2	6.9		7.0				
72	23.1	6.4		7.0				
79	23.6	6.5		7.1				
83	23.2	6.4		6.9				Water changed in all
86	23.4	6.8		6.9				beakers.
89	23.6	6.6		7.0				Time: 0510
97	23.6	6.8		7.0				Initials: GJ
99	23.8	6.9		7.0				
								Water changed in all
								beakers.
								Time: 1615
								Initials:

*Water quality measurements to be taken.

Day 11 (10/6/15) LB

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	24.0							Each beaker fed 1.0 ml
43	23.6							YTC suspension
44	24.0							Initials:
64	23.9							
66	23.6							
67	23.5							
72	23.5							
79	23.8							
83	23.5							Water changed in all
86	23.7							beakers.
89	23.9							Time: 0510
97	24.0							Initials:
99	24.0							
								Water changed in all
								beakers.
								Time: 16:25
								Initials:

*Water quality measurements to be taken.

NORTHWESTERN AQUATIC SCIENCES
PROTOCOL NO. NAS-XXX-HA4c
HYALELLA AZTECA 28-DAY SOLID PHASE SEDIMENT TEST

12/22/2015

Test No 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 12 (10/7/15) YV

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond.* (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	24.0	7.3	108	7.0				Each beaker fed 1.0 ml
43	23.5	6.9	105	7.0				YTC suspension
44	23.8	7.1	110	7.0				Initials:
64	23.8	6.9	108	6.9				
66	23.6	7.1	108	7.0				
67	23.5	7.2	107	7.0				
72	23.4	6.9	113	7.1				
79	23.7	6.9	114	7.1				
83	23.4	6.9	108	6.9				Water changed in all
86	23.7	7.3	111	6.9				beakers.
89	23.7	6.9	110	7.1				Time: 0505
97	24.0	7.1	110	7.2				Initials:
99	24.0	7.1	108	7.1				
								Water changed in all
								beakers.
								Time: 1620
								Initials:

*Water quality measurements to be taken.

Day 13 (10/8/15)

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	24.0							Each beaker fed 1.0 ml
43	23.5							YTC suspension
44	23.8							Initials:
64	23.7							
66	23.4							
67	23.4							
72	23.3							
79	23.6							
83	23.3							Water changed in all
86	23.5							beakers.
89	23.7							Time: 0570
97	23.7							Initials:
99	24.0							
								Water changed in all
								beakers.
								Time: 1625
								Initials:

*Water quality measurements to be taken.

NORTHWESTERN AQUATIC SCIENCES PROTOCOL NO. NAS-XXX-HA4c

HYALELLA AZTECA 28-DAY SOLID PHASE SEDIMENT TEST

Test No 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 14 (10/9/15) LB

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.9	6.8		7.3				Each beaker fed 1.0 ml
43	23.4	6.6		7.3				YTC suspension
44	23.7	6.6		7.2				Initials: LB
64	23.6	6.6		7.2				
66	23.5	6.6		7.2				
67	23.4	6.6		7.1				
72	23.3	6.1		7.3				
79	23.5	6.3		7.1				
83	23.3	6.1		7.0				Water changed in all
86	23.5	6.4		7.0				beakers.
89	23.6	6.3		7.1				Time: 0510
97	23.7	6.5		7.1				Initials: AD
99	23.8	6.5		7.1				
								Water changed in all
								beakers.
								Time: 1610
								Initials:

*Water quality measurements to be taken.

Day 15 (10/10/15) LB

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.3							Each beaker fed 1.0 ml
43	23.2							YTC suspension
44	23.5							Initials: LB
64	23.4							
66	23.3							
67	23.2							
72	23.2							
79	23.3							
83	23.2							Water changed in all
86	23.3							beakers.
89	23.4							Time: 0520
97	23.4							Initials: LB
99	23.6							
								Water changed in all
								beakers.
								Time: 1655
								Initials: LB

*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 16 (10/11/15) GJL

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	22.9							Each beaker fed 1.0 ml
43	22.9							YTC suspension
44	23.2							Initials: GJL
64	23.1							
66	23.0							
67	22.9							
72	22.9							
79	23.2							
83	23.0							Water changed in all
86	23.1							beakers.
89	23.3							Time: 0510
97	23.3							Initials: GJL
99	23.3							
								Water changed in all
								beakers.
								Time: 1140
								Initials: LB

*Water quality measurements to be taken.

Day 17 (10/12/15) LB

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.5	5.8		6.6				Each beaker fed 1.0 ml
43	23.0	6.0		6.5				YTC suspension
44	23.3	5.8		6.6				Initials: GJL
64	23.2	5.7		6.6				
66	23.0	5.7		6.7				
67	22.9	5.7		6.7				
72	22.9	5.4		6.9				
79	23.1	5.6		6.8				
83	22.9	5.6		6.7				Water changed in all
86	23.1	5.5		6.6				beakers.
89	23.3	5.6		6.7				Time: 0510
97	23.3	5.9		6.8				Initials: GJL
99	23.4	6.0		6.8				
								Water changed in all
								beakers.
								Time: 1600
								Initials: LB

*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 18 (10/13/15) YC

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.5							Each beaker fed 1.0 ml
43	22.9							YTC suspension
44	23.1							Initials: YC
64	23.1							
66	22.9							
67	22.8							
72	22.7							
79	22.9							
83	22.8							Water changed in all
86	23.0							beakers.
89	23.0							Time: 0510
97	23.1							Initials: YC
99	23.2							
								Water changed in all
								beakers.
								Time: 1620
								Initials: [illegible]

*Water quality measurements to be taken.

Day 19 (10/14/15) YC

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond.* (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.6	6.9	98	6.7				Each beaker fed 1.0 ml
43	23.1	7.1	98	6.7				YTC suspension
44	23.3	6.9	101	6.7				Initials: CRS
64	23.3	7.3	99	6.7				
66	23.1	7.3	100	6.8				
67	23.0	6.9	101	6.8				
72	23.0	6.9	105	7.1				
79	23.1	7.1	104	6.9				
83	22.9	6.9	100	6.8				Water changed in all
86	23.2	7.3	100	6.8				beakers.
89	23.2	7.3	101	6.8				Time: 0510
97	23.4	7.3	101	6.9				Initials: CRS
99	23.5	7.3	101	7.0				
								Water changed in all
								beakers.
								Time: 1610
								Initials: YC

*Water quality measurements to be taken.

Test No. 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 20 (20/05/2015)

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.6							Each beaker fed 1.0 ml
43	23.2							YTC suspension
44	23.4							Initials: YC
64	23.3							
66	23.2							
67	23.0							
72	23.0							
79	23.2							
83	23.0							Water changed in all
86	23.1							beakers.
89	23.2							Time: 0515
97	23.3							Initials: YC
99	23.3							
								Water changed in all
								beakers.
								Time: 1425
								Initials: MB

*Water quality measurements to be taken.

Day 21 (21/05/2015) GAB

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.8	7.0		7.0				Each beaker fed 1.0 ml
43	23.4	6.9		6.9				YTC suspension
44	23.3	6.8		6.9				Initials: GAB
64	23.3	6.8		7.0				
66	23.2	6.9		6.9				
67	23.2	6.8		6.9				
72	23.1	6.6		7.2				
79	23.2	6.8		7.1				
83	23.2	7.0		7.0				Water changed in all
86	23.1	6.9		6.9				beakers.
89	23.2	6.9		6.9				Time: 0505
97	23.4	6.7		6.9				Initials: MB
99	23.5	6.8		6.9				
								Water changed in all
								beakers.
								Time: 1610
								Initials: YC

*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 22 (10/17/15) OD

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.7							Each beaker fed 1.0 ml
43	23.6							YTC suspension
44	23.6							Initials: OD
64	23.2							
66	23.0							
67	23.0							
72	23.0							
79	22.8							
83	22.9							Water changed in all
86	22.8							beakers.
89	23.0							Time: 0545
97	23.0							Initials: GAS
99	23.3							
								Water changed in all
								beakers.
								Time: 1645
								Initials:

*Water quality measurements to be taken.

Day 23 (10/18/15) GJL

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.5							Each beaker fed 1.0 ml
43	23.2							YTC suspension
44	23.4							Initials: GJL
64	23.2							
66	23.2							
67	23.1							
72	23.1							
79	23.2							
83	23.2							Water changed in all
86	23.3							beakers.
89	23.4							Time: 0510
97	23.4							Initials: GJL
99	23.5							
								Water changed in all
								beakers.
								Time: 1640
								Initials: GJL

*Water quality measurements to be taken.

NORTHWESTERN AQUATIC SCIENCES
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HYALELLA AZTECA 28-DAY SOLID PHASE SEDIMENT TEST

Test No 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 24 (10/19/15) GJ

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond. (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.6	7.0		6.9				Each beaker fed 1.0 ml
43	23.2	7.1		6.8				YTC suspension
44	23.4	6.9		6.8				Initials: GJ
64	23.4	6.9		6.8				
66	23.3	7.1		6.9				
67	23.2	7.2		6.9				
72	23.2	7.1		7.2				
79	23.3	7.1		7.0				
83	23.2	7.2		6.9				Water changed in all
86	23.4	7.0		6.8				beakers.
89	23.5	7.0		6.9				Time: 0515
97	23.5	7.2		7.0				Initials: GJ
99	23.6	7.3		7.0				
								Water changed in all
								beakers.
								Time: 1600
								Initials:

*Water quality measurements to be taken.

Day 25 (10/20/15) GJ

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.4							Each beaker fed 1.0 ml
43	23.0							YTC suspension
44	23.2							Initials:
64	23.2							
66	23.0							
67	22.9							
72	22.8							
79	23.0							
83	22.9							Water changed in all
86	23.0							beakers.
89	23.1							Time: 0520
97	23.2							Initials:
99	23.3							
								Water changed in all
								beakers.
								Time: 1615
								Initials:

*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 26 (10/4/15) YF

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond.* (umhos/cm)	pH*	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.4	7.1	102	6.4				Each beaker fed 1.0 ml
43	22.8	6.9	100	6.5				YTC suspension
44	23.1	6.8	103	6.5				Initials: GM
64	23.1	7.1	100	6.4				
66	22.8	7.1	100	6.5				
67	22.7	6.9	99	6.6				
72	22.6	6.7	107	6.8				
79	22.8	6.7	105	6.6				
83	22.6	6.7	100	6.6				Water changed in all
86	22.8	6.5	102	6.5				beakers.
89	22.9	7.0	101	6.6				Time: 0500
97	22.9	7.2	102	6.7				Initials: CAB
99	23.1	7.4	100	6.8				
								Water changed in all
								beakers.
								Time: 1615
								Initials: YF

*Water quality measurements to be taken.

Day 27 (10/22/15) YF

Beaker No.	Temp.* (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments
15	23.1							Each beaker fed 1.0 ml
43	22.6							YTC suspension
44	22.9							Initials: YF
64	22.9							
66	22.6							
67	22.5							
72	22.4							
79	22.7							
83	22.5							Water changed in all
86	22.7							beakers.
89	22.8							Time: 0520
97	22.8							Initials: YF
99	23.0							
								Water changed in all
								beakers.
								Time: 1620
								Initials: LB

*Water quality measurements to be taken.

Test No 874-1 Client Test America Investigator

DAILY RECORD SHEET

Day 28 (12/23/15) JC

Beaker No.	Temp.* (deg.C)	DO* (ppm)	Cond.* (umhos/cm)	pH*	Hardness* (mg/L)	Alkalinity* (mg/L)	NH3* (ppm)	Comments
15	22.7	8.1	97	6.6	26	40		
43	22.1	8.0	95	6.7	26	40		
44	22.4	8.0	99	6.6	26	40		
64	22.3	7.7	95	6.5	26	40		
66	22.0	8.1	93	6.8	26	40		
67	22.0	8.1	94	6.7	26	40		
72	22.1	8.1	100	6.9	26	40		
79	22.1	8.2	99	6.8	26	50		
83	22.0	8.1	95	6.7	26	40		Water changed in all
86	22.0	8.1	96	6.6	26	40		beakers.
89	22.2	8.0	99	6.7	26	40		Time: 0505
97	22.2	8.3	96	6.9	26	50		Initials: GAS
99	22.4	8.3	97	7.0	34	40		

*Water quality measurements to be taken.

Day (/ /)

Beaker No.	Temp. (deg.C)	DO (ppm)	Cond. (umhos/cm)	pH	Hardness (mg/L)	Alkalinity (mg/L)	NH3 (ppm)	Comments

*Water quality measurements to be taken.

Test No. 874-1 Client Test America Investigator

DAY 28 TEST TERMINATION SHEET

Beaker No.	Number of survivors	Initials
1	8	
2	10	
3	8	
4	9	
5	9	GJL
6	10	GJL
7	10	
8	10	
9	9	GJL
10	9	GJL
11	9	
12	7	
13	9	GJL
14	10	GJL
15	2	GJL
16	10	GJL
17	6	
18	10	
19	10	
20	8	
21	6	GJL
22	6	GJL
23	9	
24	5	
25	GJL 10-29-15 8	GJL
26	8	GJL
27	10	
28	9	
29	9	GJL
30	10	GJL
31	9	GJL
32	9	GJL
33	10-29-15 6 3	
34	9	
35	9	
36	7	
37	6	GJL
38	9	GJL
39	7	
40	7	
41	7	GJL
42	10	GJL
43	GJL 10-29-15 9	GJL
44	5	GJL
45	9	

Beaker No.	Number of survivors	Initials
46	10	
47	10	
48	10	
49	9	GJL
50	9	GJL
51	9	
52	8	
53	7	GJL
54	7	GJL
55	4	
56	7	
57	7	GJL
58	8	GJL
59	4	
60	10	
61	4	
62	10	
63	6	GJL
64	10	GJL
65	10	
66	10	
67	10	GJL
68	10	GJL
69	2	
70	6	
71	10	GJL
72	10	GJL
73	6	GJL
74	9	GJL
75	9	
76	10-29-15 9 8	
77	9	GJL
78	10	GJL
79	10	
80	10	
81	10	
82	6	
83	10	GJL
84	7	GJL
85	7	
86	5	
87	7	GJL
88	10	GJL
89	10	
90	10	

Test No. 874-1 Client Test America Investigator

DAY 28 TEST TERMINATION SHEET

Beaker No.	Number of survivors	Initials
91	9	GJL
92	9	GJL
93	10	GJB
94	9	GJB
95	10	GJL
96	10	GJL
97	10	GJL
98	8	GJL
99	10	GJB
100	10	GJB
101	9	GJB
102	10	GJB
103	10	GJL
104	10	GJL

Beaker No.	Number of survivors	Initials

Test No. 874-1 Client Test America Investigator _____

ZERO-TIME WEIGHING DATA SHEET

Tare: Date 9.24-15 Oven temp (C.) 63 Drying time (hr.) 24 Initials JRF
Standard Weights: 10 mg: 10.008 100mg: 100.017

Final: Date 9.28.15 Oven temp (C.) 59 Drying time (hr.) 24 Initials JRF
Standard Weights: 10 mg: 10.007 100mg: 100.018

Equip. used: Oven: Blue-M HI Balance: Sartorius M3P

(Dry overnight at 60-90 degrees C)

Pan #	Tare wt. (mg)	Total wt. (mg)	#weighed	Comments
1	30.473	31.162	10	
2	33.373	34.047	10	
3	29.728	30.451	10	
4	30.076	30.859	10	
5	28.458	29.046	10	

NORTHWESTERN AQUATIC SCIENCES PROTOCOL NO. NAS-XXX-HA4c

HYALELLA AZTECA 28-DAY SOLID PHASE SEDIMENT TEST

12/22/2015

Test No. 874-1 Client Test America Investigator

WEIGHING DATA SHEET

Tare: Date 9 24-15 Oven temp (C.) 63 Drying time (hr.) 24 Initials JRF
Standard Weights: 10 mg: 10.008 100mg: 100.017

Final #1: Date 10.26-15 Oven temp (C.) 59 Drying time (hr.) 24 Initials JRF
Standard Weights: 10 mg: 10.006 100mg: 100.018

Final #2: Date 10-27-15 Oven temp (C.) 59 Drying time (hr.) 24 Initials JRF
Standard Weights: 10 mg: 10.006 100mg: 100.018

Equip. used: Oven BLUE M #1 Balance Sartorius M3P
(Dry overnight at 60-90 degrees C)

Bkr. #	Pan #	Tare wt. (mg)	Total wt. (mg) 1	Total wt. (mg) 2	no. weighed	put into pans-initials	Comments
1	1	29.458	31.831	31.805	8	LB	
2	2	32.232	33.977	33.962	10	LB	
3	3	29.740	32.387	32.360	8	LB	
4	4	30.242	31.626	31.615	9	LB	
5	5	31.353	34.147	34.120	9	LB	
6	6	30.001	32.604	32.576	10	LB	
7	7	29.254	31.406	31.390	10	LB	
8	8	28.918	30.674	30.650	10	LB	
9	9	31.817	33.842	33.815	9	LB	
10	10	31.856	33.977	33.955	9	LB	
11	11	28.757	30.519	30.492	9	LB	
12	12	30.397	31.994	31.971	7	LB	
13	13	30.155	32.558	32.525	9	LB	
14	14	30.895	32.862	32.826	10	LB	
15	15	30.806	31.260	31.246	2	LB	
16	16	30.261	32.683	32.639	10	LB	
17	17	30.090	31.612	31.579	6	LB	
18	18	29.890	31.993	31.952	10	LB	
19	19	32.748	34.777	34.740	10	LB	
20	20	30.391	32.057	32.022	8	LB	
21	21	31.133	32.404	32.392	6	LB	
22	22	30.087	31.186	31.173	6	LB	
23	23	29.740	31.887	31.857	9	LB	
24	24	32.711	33.938	33.917	5	LB	
25	25	29.192	30.971	30.944	8	LB	
26	26	30.688	32.915	32.882	8	LB	
27	27	30.739	33.121	33.091	10	LB	
28	28	28.453	30.319	30.292	9	LB	
29	29	31.283	33.471	33.446	9	LB	
30	30	28.711	31.106	31.080	10	LB	
31	31	29.894	32.426	32.398	9	LB	
32	32	31.704	34.205	34.180	9	LB	
33	33	31.186	32.457	32.441	5	LB	

Test No. 874-1 Client Test America Investigator

WEIGHING DATA SHEET

See page _____ for information on drying times and temperatures, standard weights,etc.

Bkr. #	Pan #	Tare wt. (mg)	Total wt. (mg) 1	Total wt. (mg) 2	no. weighed	put into pans-initials	Comments
34	34	29.387	31.544	31.517	9	LB	
35	35	29.770	32.042	32.010	9	LB	
36	36	31.214	33.728	33.706	7	LB	
37	37	29.902	31.615	31.606	6	LB	
38	38	30.550	32.593	32.574	9	LB	
39	39	32.352	34.432	34.413	7	LB	
40	40	30.289	32.595	32.570	7	LB	
41	41	31.927	33.795	33.770	7	LB	
42	42	30.656	33.265	33.235	10	LB	
43	43	31.821	33.088	33.078	9	LB	
44	44	33.721	34.950	34.934	5	LB	
45	45	30.512	32.184	32.181	9	YC	
46	46	28.739	30.708	30.702	10	YC	
47	47	30.884	32.629	32.612	10	YC	
48	48	28.889	31.266	31.244	10	YC	
49	49	30.774	32.891	32.884	9	YC	
50	50	30.432	32.882	32.872	9	YC	
51	51	30.429	32.037	32.041	9	YC	
52	52	30.590	32.198	32.197	8	YC	
53	53	30.286	31.993	31.995	7	YC	
54	54	30.308	31.979	31.978	7	YC	
55	55	32.523	33.598	33.598	4	YC	
56	56	32.549	34.996	33.992	7	YC	
57	57	29.365	30.979	30.968	7	YC	
58	58	32.207	34.071	34.064	8	YC	
59	59	30.597	31.588	31.579	4	YC	
60	60	30.768	32.618	32.606	10	YC	
61	61	31.207	32.470	32.463	4	YC	
62	62	31.487	34.336	34.320	10	YC	
63	63	30.432	32.043	32.036	6	YC	
64	64	31.168	33.837	33.819	10	YC	
65	65	30.795	33.042	33.032	10	YC	
66	66	30.748	33.827	33.804	10	YC	
67	67	31.008	33.364	33.350	10	YC	
68	68	30.167	32.733	32.718	10	YC	
69	69	28.785	30.887	30.875	8	YC	
70	70	30.655	31.955	31.944	6	YC	
71	71	32.441	35.546	35.525	10	YC	
72	72	31.402	34.374	34.352	10	YC	
73	73	29.383	30.991	30.970	6	LB	
74	74	28.507	30.580	30.550	9	LB	
75	75	31.171	33.467	33.433	9	LB	
76	76	29.555	32.199	32.159	8	LB	

NORTHWESTERN AQUATIC SCIENCES PROTOCOL NO. NAS-XXX-HA4c

HYALELLA AZTECA 28-DAY SOLID PHASE SEDIMENT TEST

12/22/2015

Test No. 874-1 Client Test America Investigator

WEIGHING DATA SHEET

See page _____ for information on drying times and temperatures, standard weights,etc.

Bkr. #	Pan #	Tare wt. (mg)	Total wt. (mg) 1	Total wt. (mg) 2	no. weighed	put into pans-initials	Comments
77	77	28.885	31.485	31.436	9	LB	
78	78	32.175	34.504	34.464	10	LB	
79	79	29.565	31.808	31.764	10	LB	
80	80	30.784	33.313	33.274	10	LB	
81	81	29.802	32.388	32.344	10	LB	
82	82	34.146	35.843	35.814	6	LB	
83	83	30.943	33.098	33.075	10	LB	
84	84	33.680	35.112	35.086	7	LB	
85	85	31.715	33.281	33.260	7	LB	
86	86	29.302	30.245	30.234	5	LB	
87	87	30.773	32.431	32.400	7	LB	
88	88	29.296	32.148	32.093	10	LB	
89	89	32.219	34.428	34.426	10	LB	
90	90	30.440	32.897	32.862	10	LB	
91	91	29.867	32.013	32.011	9	LB	
92	92	29.665	31.904	31.871	9	LB	
93	93	30.020	32.758	32.724	10	LB	
94	94	33.062	35.663	35.644	9	LB	
95	95	29.657	32.854	32.819	10	LB	
96	96	31.409	34.503	34.490	10	LB	
97	97	29.983	32.324	32.300	10	LB	
98	98	31.490	33.023	33.006	8	LB	
99	99	32.690	35.681	35.653	10	LB	
100	100	30.957	33.553	33.526	10	LB	
101	101	30.212	33.396	33.361	9	LB	
102	102	29.117	32.070	32.036	10	LB	
103	103	32.341	35.074	35.049	10	LB	
104	104	32.573	35.803	35.769	10	LB	

Chesapeake Cultures

P.O. Box 507 Hayes, VA 23072 (804)693-4046 (804)694-4704 fax
www.c-cultures.com
growfish@c-cultures.com

NAS

Rec 9-23-15
LB

Shipment Information

Species Hyalella azteca Date 9/22/15

Age ~4-5 days on shipment ~1.5 mm P.O. No. verbal

Quantity 1550+ Invoice No. 8831

Temperature 24°C Salinity — pH 7.85

Notes

Biologist

Please inspect shipment and report any problem immediately

TEST DATA ANALYSIS RECORDS

data entry verified against laboratory bench sheets 12.16.15 JMF

Endpoints Data Entry and Calculations File

BKR=beaker number
INIT=initial number
SURV=number survivors
MORT=number dead=INIT-SURV
PSURV=%survival=100(SURV/INIT)
PMORT=%mortality=100(MORT/INIT)

TARE WT= ashed weight of pan used for that replicate at test termination (mg), or dry weight of pan if ash-free dry weight is not an endpoint
WT COUNT= number of test organisms weighed at test end
DRY WT= TARE WT + dry weight of test organisms recovered at test termination (mg)
TWT=total biomass=DRY WT-TARE WT
WT=average individual biomass=TWT/WT COUNT

INITIAL WEIGHT				
pan #	tare wt (mg)	final wt (mg)	wt count	avg. wt/ organism
1	30.473	31.162	10	0.069
2	33.373	34.047	10	0.067
3	29.728	30.451	10	0.072
4	30.076	30.859	10	0.078
5	28.458	29.046	10	0.059
			Mean	0.069

INDEX	BKR	NAS SMPL	CLIENT DESCRIP	REPL		INIT	SURV	MORT	PSURV	PMORT	TARE WT (mg)	WT COUNT	DRY WT (mg)	TWT (mg)	WT (mg)		SURV	MORT	PSURV	PMORT	WT
1	14	5427G	Control	1		10	10	0	100.0	0.0	30.895	10	32.826	1.93	0.19						
2	32	5427G	Control	2		10	9	1	90.0	10.0	31.704	9	34.180	2.48	0.28						
3	6	5427G	Control	3		10	10	0	100.0	0.0	30.001	10	32.576	2.58	0.26						
4	88	5427G	Control	4		10	10	0	100.0	0.0	29.296	10	32.093	2.80	0.28						
5	7	5427G	Control	5		10	10	0	100.0	0.0	29.254	10	31.390	2.14	0.21	Mean	9.4	0.6	93.8	6.3	0.26
6	20	5427G	Control	6		10	8	2	80.0	20.0	30.391	8	32.022	1.63	0.20	SD	0.9	0.9	9.2	9.2	0.05
7	76	5427G	Control	7		10	8	2	80.0	20.0	29.555	8	32.159	2.60	0.33	n	8	8	8	8	8
8	72	5427G	Control	8	wq replicate	10	10	0	100.0	0.0	31.402	10	34.352	2.95	0.30						
9	17	5428G	15KR082SD	1		10	6	4	60.0	40.0	30.090	6	31.579	1.49	0.25						
10	63	5428G	15KR082SD	2		10	6	4	60.0	40.0	30.432	6	32.036	1.60	0.27						
11	41	5428G	15KR082SD	3		10	7	3	70.0	30.0	31.927	7	33.770	1.84	0.26						
12	103	5428G	15KR082SD	4		10	10	0	100.0	0.0	32.341	10	35.049	2.71	0.27						
13	101	5428G	15KR082SD	5		10	9	1	90.0	10.0	30.212	9	33.361	3.15	0.35	Mean	8.1	1.9	81.3	18.8	0.26
14	94	5428G	15KR082SD	6		10	9	1	90.0	10.0	33.062	9	35.644	2.58	0.29	SD	1.6	1.6	15.5	15.5	0.06
15	29	5428G	15KR082SD	7		10	9	1	90.0	10.0	31.283	9	33.446	2.16	0.24	n	8	8	8	8	8
16	43	5428G	15KR082SD	8	wq replicate	10	9	1	90.0	10.0	31.621	9	33.078	1.26	0.14						
17	47	5429G	15KR083SD	1		10	10	0	100.0	0.0	30.884	10	32.612	1.73	0.17						
18	81	5429G	15KR083SD	2		10	10	0	100.0	0.0	29.802	10	32.344	2.54	0.25						
19	31	5429G	15KR083SD	3		10	9	1	90.0	10.0	29.894	9	32.398	2.50	0.28						
20	102	5429G	15KR083SD	4		10	10	0	100.0	0.0	29.117	10	32.036	2.92	0.29						
21	23	5429G	15KR083SD	5		10	9	1	90.0	10.0	29.740	9	31.857	2.12	0.24	Mean	9.6	0.4	96.3	3.8	0.25
22	9	5429G	15KR083SD	6		10	9	1	90.0	10.0	31.817	9	33.815	2.00	0.22	SD	0.5	0.5	5.2	5.2	0.04
23	95	5429G	15KR083SD	7		10	10	0	100.0	0.0	29.657	10	32.819	3.16	0.32	n	8	8	8	8	8
24	67	5429G	15KR083SD	8	wq replicate	10	10	0	100.0	0.0	31.008	10	33.350	2.34	0.23						
25	35	5430G	15KR084SD	1		10	9	1	90.0	10.0	29.770	9	32.010	2.24	0.25						
26	48	5430G	15KR084SD	2		10	10	0	100.0	0.0	28.889	10	31.244	2.36	0.24						
27	53	5430G	15KR084SD	3		10	7	3	70.0	30.0	30.286	7	31.995	1.71	0.24						
28	100	5430G	15KR084SD	4		10	10	0	100.0	0.0	30.957	10	33.526	2.57	0.26						
29	19	5430G	15KR084SD	5		10	10	0	100.0	0.0	32.748	10	34.740	1.99	0.20	Mean	9.3	0.8	92.5	7.5	0.24
30	49	5430G	15KR084SD	6		10	9	1	90.0	10.0	30.774	9	32.884	2.11	0.23	SD	1.0	1.0	10.4	10.4	0.02
31	74	5430G	15KR084SD	7		10	9	1	90.0	10.0	26.507	9	30.550	2.04	0.23	n	8	8	8	8	8
32	64	5430G	15KR084SD	8	wq replicate	10	10	0	100.0	0.0	31.168	10	33.819	2.65	0.27						

INDEX	BKR	NAS SMPL	CLIENT DESCRIP	REPL		INIT	SURV	MORT	PSURV	PMORT	TARE WT (mg)	WT COUNT	DRY WT (mg)	TWT (mg)	WT (mg)		SURV	MORT	PSURV	PMORT	WT
33	96	5431G	15KR085SD	1		10	10	0	100.0	0.0	31.409	10	34.490	3.08	0.31						
34	5	5431G	15KR085SD	2		10	9	1	90.0	10.0	31.353	9	34.120	2.77	0.31						
35	68	5431G	15KR085SD	3		10	10	0	100.0	0.0	30.167	10	32.718	2.55	0.26						
36	92	5431G	15KR085SD	4		10	9	1	90.0	10.0	29.665	9	31.871	2.21	0.25						
37	80	5431G	15KR085SD	5		10	10	0	100.0	0.0	30.784	10	33.274	2.49	0.25	Mean	9.3	0.8	92.5	7.5	0.28
38	1	5431G	15KR085SD	6		10	8	2	80.0	20.0	29.458	8	31.805	2.35	0.29	SD	0.9	0.9	8.9	8.9	0.04
39	3	5431G	15KR085SD	7		10	8	2	80.0	20.0	29.740	8	32.360	2.62	0.33	n	8	8	8	8	8
40	97	5431G	15KR085SD	8	wq replicate	10	10	0	100.0	0.0	29.983	10	32.300	2.32	0.23						
41	28	5432G	15KR087SD	1		10	9	1	90.0	10.0	28.453	9	30.292	1.84	0.20						
42	16	5432G	15KR087SD	2		10	10	0	100.0	0.0	30.261	10	32.639	2.38	0.24						
43	25	5432G	15KR087SD	3		10	8	2	80.0	20.0	29.192	8	30.944	1 75	0.22						
44	46	5432G	15KR087SD	4		10	10	0	100.0	0.0	28.739	10	30.702	1.96	0.20						
45	45	5432G	15KR087SD	5		10	9	1	90.0	10.0	30.512	9	32.181	1.67	0.19	Mean	9.0	1.0	90.0	10.0	0.23
46	37	5432G	15KR087SD	6		10	6	4	60.0	40.0	29.902	6	31.606	1.70	0.28	SD	1.4	1.4	14.1	14.1	0.05
47	104	5432G	15KR087SD	7		10	10	0	100.0	0.0	32.573	10	35.769	3.20	0.32	n	8	8	8	8	8
48	79	5432G	15KR087SD	8	wq replicate	10	10	0	100.0	0.0	29.565	10	31.784	2.20	0.22						
49	40	5433G	15KR088SD	1		10	7	3	70.0	30.0	30.289	7	32.570	2.28	0.33						
50	50	5433G	15KR088SD	2		10	9	1	90.0	10.0	30.432	9	32.872	2.44	0.27						
51	93	5433G	15KR088SD	3		10	10	0	100.0	0.0	30.020	10	32.724	2.70	0.27						
52	75	5433G	15KR088SD	4		10	9	1	90.0	10.0	31.171	9	33.433	2.26	0.25						
53	39	5433G	15KR088SD	5		10	7	3	70.0	30.0	32.352	7	34.413	2.06	0.29	Mean	8.9	1.1	88.8	11.3	0.28
54	10	5433G	15KR088SD	6		10	9	1	90.0	10.0	31.856	9	33.955	2.10	0.23	SD	1.2	1.2	12.5	12.5	0.03
55	62	5433G	15KR088SD	7		10	10	0	100.0	0.0	31.487	10	34.320	2.83	0.28	n	8	8	8	8	8
56	66	5433G	15KR088SD	8	wq replicate	10	10	0	100.0	0.0	30.748	10	33.804	3.06	0.31						
57	91	5434G	15KR089SD	1		10	9	1	90.0	10.0	29.867	9	32.011	2.14	0.24						
58	55	5434G	15KR089SD	2		10	4	6	40.0	60.0	32.523	4	33.598	1.08	0.27						
59	87	5434G	15KR089SD	3		10	7	3	70.0	30.0	30.773	7	32.400	1.63	0.23						
60	22	5434G	15KR089SD	4		10	6	4	60.0	40.0	30.087	6	31.173	1.09	0.18						
61	59	5434G	15KR089SD	5		10	4	6	40.0	60.0	30.597	4	31.579	0.98	0.25	Mean	6.1	3.9	61 3	38.8	0.23
62	54	5434G	15KR089SD	6		10	7	3	70.0	30.0	30.308	7	31.978	1.67	0.24	SD	1.7	1.7	17 3	17.3	0.03
63	85	5434G	15KR089SD	7		10	7	3	70.0	30.0	31.715	7	33.260	1.55	0.22	n	8	8	8	8	8
64	86	5434G	15KR089SD	8	wq replicate	10	5	5	50.0	50.0	29.302	5	30.234	0.93	0.19						
65	8	5435G	15KR090SD	1		10	10	0	100.0	0.0	28.918	10	30.650	1.73	0.17						
66	71	5435G	15KR090SD	2		10	10	0	100.0	0.0	32.441	10	35.525	3.08	0.31						
67	18	5435G	15KR090SD	3		10	10	0	100.0	0.0	29.890	10	31.952	2.06	0.21						
68	38	5435G	15KR090SD	4		10	9	1	90.0	10.0	30.550	9	32.574	2.02	0.22						
69	33	5435G	15KR090SD	5		10	5	5	50.0	50.0	31.186	5	32.441	1.26	0.25	Mean	9.3	0.8	92.5	7.5	0.22
70	65	5435G	15KR090SD	6		10	10	0	100.0	0.0	30.795	10	33.032	2.24	0.22	SD	1.8	1.8	17.5	17.5	0.04
71	2	5435G	15KR090SD	7		10	10	0	100.0	0.0	32.232	10	33.962	1.73	0.17	n	8	8	8	8	8
72	89	5435G	15KR090SD	8	wq replicate	10	10	0	100.0	0.0	32.219	10	34.426	2.21	0.22						
73	61	5436G	15KR091SD	1		10	4	6	40.0	60.0	31.207	4	32.463	1.26	0.31						
74	98	5436G	15KR091SD	2		10	8	2	80.0	20.0	31.490	8	33.008	1.52	0.19						
75	57	5436G	15KR091SD	3		10	7	3	70.0	30.0	29.365	7	30.968	1.60	0.23						
76	82	5436G	15KR091SD	4		10	6	4	60.0	40.0	34.146	6	35.814	1.67	0.28						
77	84	5436G	15KR091SD	5		10	7	3	70.0	30.0	33.660	7	35.086	1.41	0.20	Mean	6.1	3.9	61.3	38.8	0.24
78	73	5436G	15KR091SD	6		10	6	4	60.0	40.0	29.383	6	30.970	1.59	0 26	SD	1.2	1.2	12.5	12.5	0.04
79	70	5436G	15KR091SD	7		10	6	4	60.0	40.0	30.655	6	31.944	1.29	0.21	n	8	8	8	8	8
80	44	5436G	15KR091SD	8	wq replicate	10	5	5	50.0	50.0	33.721	5	34.934	1.21	0.24						

INDEX	BKR	NAS SMPL	CLIENT DESCRIP	REPL		INIT	SURV	MORT	PSURV	PMORT	TARE WT (mg)	WT COUNT	DRY WT (mg)	TWT (mg)	WT (mg)		SURV	MORT	PSURV	PMORT	WT
81	30	5437G	15KR092SD	1		10	10	0	100.0	0.0	28.711	10	31.080	2.37	0.24						
82	90	5437G	15KR092SD	2		10	10	0	100.0	0.0	30.440	10	32.862	2.42	0.24						
83	78	5437G	15KR092SD	3		10	10	0	100.0	0.0	32.175	10	34.464	2.29	0.23						
84	58	5437G	15KR092SD	4		10	8	2	80.0	20.0	32.207	8	34.064	1.86	0.23						
85	51	5437G	15KR092SD	5		10	9	1	90.0	10.0	30.429	9	32.041	1.61	0.18	Mean	9.0	1.0	90.0	10.0	0.23
86	69	5437G	15KR092SD	6		10	8	2	80.0	20.0	28.785	8	30.875	2.09	0.26	SD	1.2	1.2	12.0	12.0	0.02
87	12	5437G	15KR092SD	7		10	7	3	70.0	30.0	30.397	7	31.971	1.57	0.22	n	8	8	8	8	8
88	83	5437G	15KR092SD	8	wq replicate	10	10	0	100.0	0.0	30.943	10	33.075	2.13	0.21						
89	11	5438G	15KR093SD	1		10	9	1	90.0	10.0	28.757	9	30.492	1.74	0.19						
90	56	5438G	15KR093SD	2		10	7	3	70.0	30.0	32.549	7	33.992	1.44	0.21						
91	60	5438G	15KR093SD	3		10	10	0	100.0	0.0	30.768	10	32.606	1.84	0.18						
92	4	5438G	15KR093SD	4		10	9	1	90.0	10.0	30.242	9	31.615	1.37	0.15						
93	24	5438G	15KR093SD	5		10	5	5	50.0	50.0	32.711	5	33.917	1.21	0.24	Mean	7.0	3.0	70.0	30.0	0.20
94	21	5438G	15KR093SD	6		10	6	4	60.0	40.0	31.133	6	32.392	1.26	0.21	SD	2.6	2.6	26.2	26.2	0.03
95	52	5438G	15KR093SD	7		10	8	2	80.0	20.0	30.590	8	32.197	1.61	0.20	n	8	8	8	8	8
96	15	5438G	15KR093SD	8	wq replicate	10	2	8	20.0	80.0	30.806	2	31.246	0.44	0.22						
97	77	5439G	15KR099SD	1		10	9	1	90.0	10.0	26.885	9	31.436	2.55	0.28						
98	36	5439G	15KR099SD	2		10	7	3	70.0	30.0	31.214	7	33.708	2.49	0.36						
99	34	5439G	15KR099SD	3		10	9	1	90.0	10.0	29.387	9	31.517	2.13	0.24						
100	13	5439G	15KR099SD	4		10	9	1	90.0	10.0	30.155	9	32.525	2.37	0.26						
101	27	5439G	15KR099SD	5		10	10	0	100.0	0.0	30.739	10	33.091	2.35	0.24	Mean	9.0	1.0	90.0	10.0	0.28
102	26	5439G	15KR099SD	6		10	8	2	80.0	20.0	30.668	8	32.882	2.19	0.27	SD	1.1	1.1	10.7	10.7	0.04
103	42	5439G	15KR099SD	7		10	10	0	100.0	0.0	30.656	10	33.235	2.58	0.26	n	8	8	8	8	8
104	99	5439G	15KR099SD	8	wq replicate	10	10	0	100.0	0.0	32.690	10	35.653	2.96	0.30						

Survival and Growth: Control vs. both Reference Sediments

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	09-3566-5208	Endpoint:	Proportion Survived	CETIS Version: CETISv1.8.7
Analyzed:	30 Nov-15 8:59	Analysis:	Nonparametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR082SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C <> T	NA	NA	12.6%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR082SD	51.5	NA	2	14	0.0791	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.1142294	0.1142294	1	3.899	0.0684	Non-Significant Effect
Error	0.4101465	0.02929618	14			
Total	0.5243759		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.976	8.885	0.3889	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8137	0.8408	0.0042	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR082SD	8	0.8125	0.6827	0.9423	0.9	0.6	1	0.05489	19.11%	13.33%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR082SD	8	1.146	0.9815	1.311	1.249	0.8861	1.412	0.06974	17.2%	12.85%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR082SD	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR082SD	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	20-3031-1280	Endpoint:	Proportion Survived	CETIS Version: CETISv1.8.7
Analyzed:	30 Nov-15 8:59	Analysis:	Nonparametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR083SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C <> T	NA	NA	7.97%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR083SD	65	NA	2	14	0.7650	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.005033694	0.005033694	1	0.3756	0.5498	Non-Significant Effect
Error	0.1876122	0.01340087	14			
Total	0.1926459		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.767	8.885	0.2027	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7881	0.8408	0.0019	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR083SD	8	0.9625	0.9192	1	1	0.9	1	0.0183	5.38%	-2.67%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR083SD	8	1.351	1.28	1.421	1.412	1.249	1.412	0.02982	6.24%	-2.7%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR083SD	1	1	0.9	1	0.9	0.9	1	1

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR083SD	1.412	1.412	1.249	1.412	1.249	1.249	1.412	1.412

CETIS Analytical Report

Report Date: 30 Nov-15 09:00 (p 1 of 5)
Test Code: 874-1 | 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences	
Analysis ID:	03-5610-8963	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	30 Nov-15 8:59	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR082SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C <> T	NA	NA	22.4%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR082SD	0.1079	2.145	0.057	14	0.9156	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.299832E-05	3.299832E-05	1	0.01163	0.9156	Non-Significant Effect
Error	0.0397169	0.002836922	14			
Total	0.0397499		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.522	8.885	0.5932	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9701	0.8408	0.8402	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR082SD	8	0.2583	0.2094	0.3072	0.2653	0.1397	0.3499	0.02069	22.65%	-1.12%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR082SD	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397

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Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	14-6871-0756	Endpoint:	Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed:	30 Nov-15 8:59	Analysis:	Parametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR083SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C <> T	NA	NA	19.4%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR083SD	0.209	2.145	0.05	14	0.8375	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.332348E-05	9.332348E-05	1	0.04368	0.8375	Non-Significant Effect
Error	0.02991023	0.002136445	14			
Total	0.03000356		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.112	8.885	0.8921	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9706	0.8408	0.8490	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR083SD	8	0.2506	0.213	0.2882	0.2447	0.1728	0.3162	0.0159	17.95%	1.89%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR083SD	0.1728	0.2542	0.2782	0.2919	0.2352	0.222	0.3162	0.2342

Survival and Growth: References Against Each Other

Project Name: P874-1 Hyalella % Survival

Sample:	x1
Samp ID:	15KR082SD
Alias:	NAS# 5428G
Replicates:	8
Mean:	81.25
SD:	15.526
Tr Mean:	N/A
Trans SD:	N/A

Ref Samp:	x2
Ref ID:	15KR083SD
Alias:	NAS# 5429G
Replicates:	8
Mean:	96.25
SD:	5.175
Tr Mean:	N/A
Trans SD:	N/A

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	9.949
SS:	1880.51
K:	8
b:	39.985
Alpha Level:	0.05
Calculated Value:	0.8502
Critical Value:	<= 0.887
Normally Distributed:	No
Override Option:	Not Invoked

Levene's Results:

Test Residual Mean:	10.536
Test Residual SD:	7.124
Ref. Residual Mean:	8.641
Ref. Residual SD:	2.385
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.7133
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Mann-Whitney
Balanced Design:	Yes
Transformation:	rank-order

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1:	8
Mann-Whitney N2:	8
Degrees of Freedom:	
Experimental Alpha Level:	0.05
Calculated Value:	52.5
Critical Value:	>= 49.000
Accept Null Hypothesis:	No
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	60	1.5	100	13.5	16.055	6.913	1.5		-16.055
2	60	1.5	100	13.5	16.055	6.913	1.5		-16.055
3	70	3	90	7	10.034	11.522	3		-11.522
4	100	13.5	100	13.5	23.177	6.913	7		-11.522
5	90	7	90	7	4.742	11.522	7		-11.522
6	90	7	90	7	4.742	11.522	7		-10.034
7	90	7	100	13.5	4.742	6.913	7		4.742
8	90	7	100	13.5	4.742	6.913	7		4.742
9							7		4.742
10							7		4.742
11							13.5		6.913
12							13.5		6.913
13							13.5		6.913
14							13.5		6.913
15							13.5		6.913
16							13.5		23.177

The percent survival in reference sediment 15KR082SD was significantly lower than that of the reference 15KR083SD at α=0.05. — 641

Project Name: P874-1 Hyalella % Survival

Sample:	x1
Samp ID:	15KR083SD
Alias:	NAS# 5429G
Replicates:	8
Mean:	96.25
SD:	5.175
Tr Mean:	N/A
Trans SD:	N/A

Ref Samp:	x2
Ref ID:	15KR082SD
Alias:	NAS# 5428G
Replicates:	8
Mean:	81.25
SD:	15.526
Tr Mean:	N/A
Trans SD:	N/A

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	9.949
SS:	1880.51
K:	8
b:	39.985
Alpha Level:	0.05
Calculated Value:	0.8502
Critical Value:	<= 0.887
Normally Distributed:	No
Override Option:	Not Invoked

Levene's Results:

Test Residual Mean:	8.641
Test Residual SD:	2.385
Ref. Residual Mean:	10.536
Ref. Residual SD:	7.124
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.7133
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Mann-Whitney
Balanced Design:	Yes
Transformation:	rank-order

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1:	8
Mann-Whitney N2:	8
Degrees of Freedom:	
Experimental Alpha Level:	0.05
Calculated Value:	11.5
Critical Value:	>= 49.000
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	100	13.5	60	1.5	6.913	16.055	1.5		-16.055
2	100	13.5	60	1.5	6.913	16.055	1.5		-16.055
3	90	7	70	3	11.522	10.034	3		-11.522
4	100	13.5	100	13.5	6.913	23.177	7		-11.522
5	90	7	90	7	11.522	4.742	7		-11.522
6	90	7	90	7	11.522	4.742	7		-10.034
7	100	13.5	90	7	6.913	4.742	7		4.742
8	100	13.5	90	7	6.913	4.742	7		4.742
9							7		4.742
10							7		4.742
11							13.5		6.913
12							13.5		6.913
13							13.5		6.913
14							13.5		6.913
15							13.5		6.913
16							13.5		23.177

The percent survival in reference sediment 15KR083SD was not significantly lower than that of the reference 15KR082SD at α=0.05. —GJ

Project Name: P874-1 Hyalella Growth (dry wt)

Sample:	x1
Samp ID:	15KR083SD
Alias:	NAS# 5429G
Replicates:	8
Mean:	0.25
SD:	0.047
Tr Mean:	0.25
Trans SD:	0.047

Ref Samp:	x2
Ref ID:	15KR082SD
Alias:	NAS# 5428G
Replicates:	8
Mean:	0.259
SD:	0.059
Tr Mean:	0.259
Trans SD:	0.059

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.045
SS:	0.039
K:	8
b:	0.194
Alpha Level:	0.05
Calculated Value:	0.9531
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.035
Test Residual SD:	0.028
Ref. Residual Mean:	0.037
Ref. Residual SD:	0.044
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.0853
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	0.3304
Critical Value:	>= 1.761
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.17	0.17	0.25	0.25	0.08	0.009			-0.119
2	0.25	0.25	0.27	0.27	0	0.011			-0.08
3	0.28	0.28	0.26	0.26	0.03	0.001			-0.03
4	0.29	0.29	0.27	0.27	0.04	0.011			-0.02
5	0.24	0.24	0.35	0.35	0.01	0.091			-0.019
6	0.22	0.22	0.29	0.29	0.03	0.031			-0.01
7	0.32	0.32	0.24	0.24	0.07	0.019			-0.009
8	0.23	0.23	0.14	0.14	0.02	0.119			0
9									0.001
10									0.011
11									0.011
12									0.03
13									0.031
14									0.04
15									0.07
16									0.091

Average individual growth (dry wt) in reference sediment 15KR083SD is not significantly less than that in the reference 15KR082SD at α=0.05. -6.11

Project Name: P874-1 Hyalella Growth (dry wt)

Sample:	x1
Samp ID:	15KR082SD
Alias:	NAS# 5428G
Replicates:	8
Mean:	0.259
SD:	0.059
Tr Mean:	0.259
Trans SD:	0.059

Ref Samp:	x2
Ref ID:	15KR083SD
Alias:	NAS# 5429G
Replicates:	8
Mean:	0.25
SD:	0.047
Tr Mean:	0.25
Trans SD:	0.047

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	0.045
SS:	0.039
K:	8
b:	0.194
Alpha Level:	0.05
Calculated Value:	0.9531
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	0.037
Test Residual SD:	0.044
Ref. Residual Mean:	0.035
Ref. Residual SD:	0.028
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.0853
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	No Transformation

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	-0.3304
Critical Value:	>= 1.761
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	0.25	0.25	0.17	0.17	0.009	0.08			-0.119
2	0.27	0.27	0.25	0.25	0.011	0			-0.08
3	0.26	0.26	0.28	0.28	0.001	0.03			-0.03
4	0.27	0.27	0.29	0.29	0.011	0.04			-0.02
5	0.35	0.35	0.24	0.24	0.091	0.01			-0.019
6	0.29	0.29	0.22	0.22	0.031	0.03			-0.01
7	0.24	0.24	0.32	0.32	0.019	0.07			-0.009
8	0.14	0.14	0.23	0.23	0.119	0.02			0
9									0.001
10									0.011
11									0.011
12									0.03
13									0.031
14									0.04
15									0.07
16									0.091

Average individual growth (dry wt) in reference sediment 15KR082SD is not significantly less than that in the reference 15KR083SD at α=0.05. —CSL

Survival: Control vs. Test Sediments

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	09-9707-4413	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:11	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR084SD	02-8109-3592	05 Sep-15 16:16	22 Sep-15 11:15	19d 18h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR084SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.18%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR084SD	65.5	NA	2	14	0.4119	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001174183	0.001174183	1	0.05646	0.8156	Non-Significant Effect
Error	0.2911539	0.02079671	14			
Total	0.2923281		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.113	8.885	0.8916	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7888	0.8408	0.0019	Non-normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR084SD	8	0.925	0.8385	1	0.95	0.7	1	0.0366	11.19%	1.33%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR084SD	8	1.298	1.175	1.422	1.331	0.9912	1.412	0.05233	11.4%	1.3%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR084SD	0.9	1	0.7	1	1	0.9	0.9	1

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR084SD	1.249	1.412	0.9912	1.412	1.412	1.249	1.249	1.412

Proportion Survived Binomials

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10
15KR084SD	9/10	10/10	7/10	10/10	10/10	9/10	9/10	10/10

CETIS Analytical Report

Report Date: 25 Nov-15 14:31 (p 12 of 20)
Test Code: 874-1 | 15-8552-1299

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	10-8038-1436	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:11	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	22d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR085SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	7.79%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR085SD	65	NA	3	14	0.4608	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001659958	0.001659958	1	0.08691	0.7725	Non-Significant Effect
Error	0.2673843	0.01909888	14			
Total	0.2690443		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.064	8.885	0.9373	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7701	0.8408	0.0011	Non-normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR085SD	8	0.925	0.8509	0.9991	0.95	0.8	1	0.03134	9.58%	1.33%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR085SD	8	1.295	1.181	1.409	1.331	1.107	1.412	0.0481	10.51%	1.55%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR085SD	1	0.9	1	0.9	1	0.8	0.8	1

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR085SD	1.412	1.249	1.412	1.249	1.412	1.107	1.107	1.412

Proportion Survived Binomials

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10
15KR085SD	10/10	9/10	10/10	9/10	10/10	8/10	8/10	10/10

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	20-9624-0766	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:11	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR087SD	11-4764-2282	02 Sep-15 18:25	22 Sep-15 11:15	22d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR087SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.74%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR087SD	64	NA	3	14	0.3727	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.009218013	0.009218013	1	0.3282	0.5758	Non-Significant Effect
Error	0.3932301	0.02808786	14			
Total	0.4024481		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.853	8.885	0.4343	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8321	0.8408	0.0075	Non-normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR087SD	8	0.9	0.7818	1	0.95	0.6	1	0.05	15.71%	4.0%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR087SD	8	1.267	1.108	1.427	1.331	0.8861	1.412	0.06754	15.07%	3.65%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR087SD	0.9	1	0.8	1	0.9	0.6	1	1

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR087SD	1.249	1.412	1.107	1.412	1.249	0.8861	1.412	1.412

Proportion Survived Binomials

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10
15KR087SD	9/10	10/10	8/10	10/10	9/10	6/10	10/10	10/10

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	03-4369-0911	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:11	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	22d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR088SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.11%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR088SD	0.8816	1.761	0.139	14	0.1964	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01945502	0.01945502	1	0.7773	0.3929	Non-Significant Effect
Error	0.3504149	0.02502963	14			
Total	0.3698699		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.543	8.885	0.5814	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8479	0.8408	0.0127	Normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR088SD	8	0.8875	0.7833	0.9917	0.9	0.7	1	0.04407	14.04%	5.33%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR088SD	8	1.246	1.1	1.391	1.249	0.9912	1.412	0.06162	13.99%	5.3%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR088SD	0.7	0.9	1	0.9	0.7	0.9	1	1

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR088SD	0.9912	1.249	1.412	1.249	0.9912	1.249	1.412	1.412

Proportion Survived Binomials

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10
15KR088SD	7/10	9/10	10/10	9/10	7/10	9/10	10/10	10/10

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Northwestern Aquatic Sciences**

Analysis ID:	05-2630-0118	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:11	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR089SD	08-9083-1299	06 Sep-15 13:30	22 Sep-15 11:15	18d 21h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR089SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.69%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR089SD	4.882	1.761	0.147	14	0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.6642228	0.6642228	1	23.84	0.0002	Significant Effect
Error	0.3900911	0.02786365	14			
Total	1.054314		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.831	8.885	0.4435	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8648	0.8408	0.0227	Normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR089SD	8	0.6125	0.4681	0.7569	0.65	0.4	0.9	0.06105	28.19%	34.67%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR089SD	8	0.9079	0.7492	1.067	0.9386	0.6847	1.249	0.06712	20.91%	30.98%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR089SD	0.9	0.4	0.7	0.6	0.4	0.7	0.7	0.5

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR089SD	1.249	0.6847	0.9912	0.8861	0.6847	0.9912	0.9912	0.7854

Proportion Survived Binomials

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10
15KR089SD	9/10	4/10	7/10	6/10	4/10	7/10	7/10	5/10

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	08-8982-7485	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:11	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	22d 1h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR090SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	10.9%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR090SD	71.5	NA	2	14	0.6795	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.781507E-05	1.781507E-05	1	0.000521	0.9821	Non-Significant Effect
Error	0.4790916	0.03422083	14			
Total	0.4791094		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.476	8.885	0.2545	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.6336	0.8408	<0.0001	Non-normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR090SD	8	0.925	0.7785	1	1	0.5	1	0.06196	18.95%	1.33%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR090SD	8	1.313	1.129	1.498	1.412	0.7854	1.412	0.07807	16.81%	0.16%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR090SD	1	1	1	0.9	0.5	1	1	1

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR090SD	1.412	1.412	1.412	1.249	0.7854	1.412	1.412	1.412

Proportion Survived Binomials

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10
15KR090SD	10/10	10/10	10/10	9/10	5/10	10/10	10/10	10/10

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Northwestern Aquatic Sciences**

Analysis ID:	04-5473-3253	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:11	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR091SD	05-2188-6902	06 Sep-15 17:30	22 Sep-15 11:15	18d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR091SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	7.63%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR091SD	6.095	1.761	0.119	14	<0.0001	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.6829424	0.6829424	1	37.15	<0.0001	Significant Effect
Error	0.2573644	0.01838317	14			
Total	0.9403068		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.153	8.885	0.8560	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8778	0.8408	0.0359	Normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR091SD	8	0.6125	0.5083	0.7167	0.6	0.4	0.8	0.04407	20.35%	34.67%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR091SD	8	0.9022	0.793	1.011	0.8861	0.6847	1.107	0.0462	14.48%	31.41%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR091SD	0.4	0.8	0.7	0.6	0.7	0.6	0.6	0.5

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR091SD	0.6847	1.107	0.9912	0.8861	0.9912	0.8861	0.8861	0.7854

Proportion Survived Binomials

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10
15KR091SD	4/10	8/10	7/10	6/10	7/10	6/10	6/10	5/10

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Northwestern Aquatic Sciences**

Analysis ID:	04-2948-0879	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:12	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	21d 23h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR092SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.09%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR092SD	62.5	NA	3	14	0.3238	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01107017	0.01107017	1	0.4437	0.5162	Non-Significant Effect
Error	0.3493092	0.02495066	14			
Total	0.3603794		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.535	8.885	0.5859	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8318	0.8408	0.0074	Non-normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR092SD	8	0.9	0.8001	0.9999	0.95	0.7	1	0.04226	13.28%	4.0%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR092SD	8	1.263	1.118	1.408	1.331	0.9912	1.412	0.06145	13.76%	4.0%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR092SD	1	1	1	0.8	0.9	0.8	0.7	1

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR092SD	1.412	1.412	1.412	1.107	1.249	1.107	0.9912	1.412

Proportion Survived Binomials

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10
15KR092SD	10/10	10/10	10/10	8/10	9/10	8/10	7/10	10/10

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	03-2748-8354	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:12	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	18d 15h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR093SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	14.7%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR093SD	2.509	1.761	0.209	14	0.0125	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.3539917	0.3539917	1	6.295	0.0250	Significant Effect
Error	0.7873083	0.05623631	14			
Total	1.1413		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.713	8.885	0.0581	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9368	0.8408	0.3112	Normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR093SD	8	0.7	0.4811	0.9189	0.75	0.2	1	0.09258	37.41%	25.33%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR093SD	8	1.018	0.7633	1.273	1.049	0.4636	1.412	0.1077	29.92%	22.62%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR093SD	0.9	0.7	1	0.9	0.5	0.6	0.8	0.2

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR093SD	1.249	0.9912	1.412	1.249	0.7854	0.8861	1.107	0.4636

Proportion Survived Binomials

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10
15KR093SD	9/10	7/10	10/10	9/10	5/10	6/10	8/10	2/10

CETIS Analytical Report

Report Date: 25 Nov-15 14:31 (p 20 of 20)
Test Code: 874-1 15-8552-1299

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	05-7928-0575	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:12	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	20d		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR099SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.37%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR099SD	0.7508	1.761	0.13	14	0.2326	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01220654	0.01220654	1	0.5637	0.4652	Non-Significant Effect
Error	0.3031401	0.02165287	14			
Total	0.3153467		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.2	8.885	0.8164	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8693	0.8408	0.0265	Normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.9375	0.8609	1	1	0.8	1	0.03239	9.77%	0.0%
15KR099SD	8	0.9	0.8106	0.9894	0.9	0.7	1	0.0378	11.88%	4.0%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	1.315	1.198	1.433	1.412	1.107	1.412	0.04961	10.67%	0.0%
15KR099SD	8	1.26	1.132	1.389	1.249	0.9912	1.412	0.05433	12.2%	4.2%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1	0.9	1	1	1	0.8	0.8	1
15KR099SD	0.9	0.7	0.9	0.9	1	0.8	1	1

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412
15KR099SD	1.249	0.9912	1.249	1.249	1.412	1.107	1.412	1.412

Proportion Survived Binomials

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	10/10	9/10	10/10	10/10	10/10	8/10	8/10	10/10
15KR099SD	9/10	7/10	9/10	9/10	10/10	8/10	10/10	10/10

Growth: Control vs. Test Sediments

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	14-2820-4449	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR084SD	02-8109-3592	05 Sep-15 16:16	22 Sep-15 11:15	19d 18h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR084SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.6%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR084SD	0.9059	1.761	0.032	14	0.1902	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001092465	0.001092465	1	0.8207	0.3803	Non-Significant Effect
Error	0.01863579	0.001331128	14			
Total	0.01972826		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	5.455	8.885	0.0396	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9659	0.8408	0.7678	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR084SD	8	0.2389	0.2219	0.2559	0.2398	0.1992	0.2651	0.00718	8.5%	6.47%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR084SD	0.2489	0.2355	0.2441	0.2569	0.1992	0.2344	0.227	0.2651

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	11-5515-7124	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	22d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR085SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	14.5%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR085SD	-1.033	1.761	0.037	14	0.8405	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001891037	0.001891037	1	1.068	0.3190	Non-Significant Effect
Error	0.02479385	0.00177099	14			
Total	0.02668489		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.741	8.885	0.4816	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9449	0.8408	0.4135	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR085SD	8	0.2772	0.2471	0.3072	0.2742	0.2317	0.3275	0.01271	12.97%	-8.51%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR085SD	0.3081	0.3074	0.2551	0.2451	0.249	0.2934	0.3275	0.2317

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	09-5476-6462	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR087SD	11-4764-2282	02 Sep-15 18:25	22 Sep-15 11:15	22d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR087SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	16.1%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR087SD	0.9455	1.761	0.041	14	0.1802	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001958239	0.001958239	1	0.8939	0.3605	Non-Significant Effect
Error	0.03066966	0.00219069	14			
Total	0.0326279		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.056	8.885	0.9450	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9531	0.8408	0.5401	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR087SD	8	0.2333	0.1947	0.2719	0.2195	0.1854	0.3196	0.01632	19.79%	8.66%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR087SD	0.2043	0.2378	0.219	0.1963	0.1854	0.284	0.3196	0.2199

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Northwestern Aquatic Sciences**

Analysis ID:	02-0620-5881	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	22d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR088SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.6%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR088SD	-1.213	1.761	0.035	14	0.8773	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002300794	0.002300794	1	1.471	0.2453	Non-Significant Effect
Error	0.02190457	0.001564612	14			
Total	0.02420536		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.558	8.885	0.2384	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9714	0.8408	0.8605	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR088SD	8	0.2794	0.2546	0.3042	0.2772	0.2332	0.3259	0.01048	10.61%	-9.39%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR088SD	0.3259	0.2711	0.2704	0.2513	0.2944	0.2332	0.2833	0.3056

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Northwestern Aquatic Sciences**

Analysis ID:	10-8788-2821	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:13	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR089SD	08-9083-1299	06 Sep-15 13:30	22 Sep-15 11:15	18d 21h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR089SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.6%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR089SD	1.464	1.761	0.035	14	0.0826	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003358181	0.003358181	1	2.144	0.1652	Non-Significant Effect
Error	0.02192506	0.001566076	14			
Total	0.02528324		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.55	8.885	0.2400	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9446	0.8408	0.4093	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR089SD	8	0.2264	0.2016	0.2513	0.2353	0.181	0.2688	0.0105	13.12%	11.34%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR089SD	0.2382	0.2688	0.2324	0.181	0.2455	0.2386	0.2207	0.1864

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	06-5272-5753	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:** CETISv1.8.7
Analyzed:	25 Nov-15 14:13	**Analysis:**	Parametric-Two Sample	**Official Results:** Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	22d 1h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR090SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	15.7%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR090SD	1.438	1.761	0.040	14	0.0862	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004299961	0.004299961	1	2.069	0.1723	Non-Significant Effect
Error	0.02909668	0.002078334	14			
Total	0.03339664		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.18	8.885	0.8328	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9463	0.8408	0.4337	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR090SD	8	0.2226	0.1861	0.2591	0.2222	0.173	0.3084	0.01544	19.61%	12.84%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR090SD	0.1732	0.3084	0.2062	0.2249	0.251	0.2237	0.173	0.2207

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CETIS Analytical Report

Report Date: 16 Dec-15 12:03 (p 1 of 1)
Test Code: 874-1 | 15-8552-1299

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	19-9099-6134	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Dec-15 11:35	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR091SD	05-2188-6902	06 Sep-15 17:30	22 Sep-15 11:15	18d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR091SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	15.4%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR091SD	0.6145	1.761	0.039	14	0.2744	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0007575717	0.0007575717	1	0.3776	0.5488	Non-Significant Effect
Error	0.0280907	0.002006479	14			
Total	0.02884827		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.276	8.885	0.7559	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9434	0.8408	0.3931	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR091SD	8	0.2417	0.2066	0.2768	0.2358	0.1895	0.314	0.01485	17.38%	5.39%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR091SD	0.314	0.1895	0.229	0.278	0.2009	0.2645	0.2148	0.2426

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CETIS Analytical Report

Test Code: 874-1 15-8552-1299

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	20-4211-0736	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	21d 23h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR092SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR092SD	1.496	1.761	0.033	14	0.0784	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00315964	0.00315964	1	2.238	0.1569	Non-Significant Effect
Error	0.01976853	0.001412038	14			
Total	0.02292817		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.918	8.885	0.0921	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9578	0.8408	0.6218	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR092SD	8	0.2273	0.2073	0.2474	0.2305	0.1791	0.2613	0.008472	10.54%	11.0%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR092SD	0.2369	0.2422	0.2289	0.2321	0.1791	0.2613	0.2249	0.2132

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	15-7248-8842	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	18d 15h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR093SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.2%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR093SD	2.847	1.761	0.034	14	0.0065	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01189197	0.01189197	1	8.105	0.0129	Significant Effect
Error	0.02054077	0.001467198	14			
Total	0.03243274		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.287	8.885	0.1391	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9649	0.8408	0.7514	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR093SD	8	0.2009	0.179	0.2228	0.2035	0.1526	0.2412	0.00925	13.02%	21.35%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR093SD	0.1928	0.2061	0.1838	0.1526	0.2412	0.2098	0.2009	0.22

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CETIS Analytical Report

Report Date: 25 Nov-15 14:31 (p 10 of 20)
Test Code: 874-1 | 15-8552-1299

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	04-9075-6975	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Nov-15 14:14	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control 874-1	17-1631-8892	21 Sep-15 06:30	21 Sep-15 07:00	4d 4h	Test America	
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	20d		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control 874-1	Sediment	Kuskokwim River Sediment Char			
15KR099SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	14.9%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Control 874-1		15KR099SD	-0.9209	1.761	0.038	14	0.8137	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001594187	0.001594187	1	0.8481	0.3727	Non-Significant Effect
Error	0.02631636	0.00187974	14			
Total	0.02791054		15			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.49	8.885	0.6116	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9599	0.8408	0.6606	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 874-1	8	0.2554	0.2158	0.2951	0.2663	0.1931	0.3255	0.01677	18.57%	0.0%
15KR099SD	8	0.2754	0.2429	0.3079	0.2688	0.2352	0.356	0.01374	14.11%	-7.82%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Control 874-1	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295
15KR099SD	0.2834	0.356	0.2367	0.2633	0.2352	0.2743	0.2579	0.2963

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Survival: Reference 15KR082SD vs. Test Sediments

Project Name: P874-1 Hyalella % Survival

Sample:	x1
Samp ID:	15KR084SD
Alias:	NAS# 5430G
Replicates:	8
Mean:	92.5
SD:	10.351
Tr Mean:	78.936
Trans SD:	12.779

Ref Samp:	x2
Ref ID:	15KR082SD
Alias:	NAS# 5428G
Replicates:	8
Mean:	81.25
SD:	15.526
Tr Mean:	66.823
Trans SD:	13.327

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	11.207
SS:	2386.423
K:	8
b:	47.369
Alpha Level:	0.05
Calculated Value:	0.9402
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	11.064
Test Residual SD:	4.837
Ref. Residual Mean:	10.536
Ref. Residual SD:	7.124
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.1736
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	ArcSin

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	-1.8554
Critical Value:	>= 1.761
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	90	71.565	60	50.768	7.37	16.055			-22.146
2	100	90	60	50.768	11.064	16.055			-16.055
3	70	56.789	70	56.789	22.146	10.034			-16.055
4	100	90	100	90	11.064	23.177			-10.034
5	100	90	90	71.565	11.064	4.742			-7.37
6	90	71.565	90	71.565	7.37	4.742			-7.37
7	90	71.565	90	71.565	7.37	4.742			-7.37
8	100	90	90	71.565	11.064	4.742			4.742
9									4.742
10									4.742
11									4.742
12									11.064
13									11.064
14									11.064
15									11.064
16									23.177

The percent survival in reference sediment 15KR084SD was not significantly lower than that of the reference 15KR082SD at α=0.05. -GJ

Project Name: P874-1 Hyalella % Survival

Sample:	x1
Samp ID:	15KR085SD
Alias:	NAS# 5431G
Replicates:	8
Mean:	92.5
SD:	8.864
Tr Mean:	78.75
Trans SD:	12.413

Ref Samp:	x2
Ref ID:	15KR082SD
Alias:	NAS# 5428G
Replicates:	8
Mean:	81.25
SD:	15.526
Tr Mean:	66.823
Trans SD:	13.327

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	11.055
SS:	2321.895
K:	8
b:	45.652
Alpha Level:	0.05
Calculated Value:	0.8976
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	11.25
Test Residual SD:	3.073
Ref. Residual Mean:	10.536
Ref. Residual SD:	7.124
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.2603
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	ArcSin

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	-1.8522
Critical Value:	>= 1.761
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	100	90	60	50.768	11.25	16.055			-16.055
2	90	71.565	60	50.768	7.185	16.055			-16.055
3	100	90	70	56.789	11.25	10.034			-15.315
4	90	71.565	100	90	7.185	23.177			-15.315
5	100	90	90	71.565	11.25	4.742			-10.034
6	80	63.435	90	71.565	15.315	4.742			-7.185
7	80	63.435	90	71.565	15.315	4.742			-7.185
8	100	90	90	71.565	11.25	4.742			4.742
9									4.742
10									4.742
11									4.742
12									11.25
13									11.25
14									11.25
15									11.25
16									23.177

The percent survival in reference sediment 15KR085SD was not significantly lower than that of the reference 15KR082SD at α=0.05. –GJL

Project Name: P874-1 Hyalella % Survival

Sample:	x1
Samp ID:	15KR087SD
Alias:	NAS# 5432G
Replicates:	8
Mean:	90
SD:	14.142
Tr Mean:	77.167
Trans SD:	15.151

Ref Samp:	x2
Ref ID:	15KR082SD
Alias:	NAS# 5428G
Replicates:	8
Mean:	81.25
SD:	15.526
Tr Mean:	66.823
Trans SD:	13.327

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	12.248
SS:	2850.254
K:	8
b:	51.965
Alpha Level:	0.05
Calculated Value:	0.9474
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	12.833
Test Residual SD:	6.43
Ref. Residual Mean:	10.536
Ref. Residual SD:	7.124
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.6771
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	ArcSin

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	-1.4498
Critical Value:	>= 1.761
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	90	71.565	60	50.768	5.602	16.055			-26.398
2	100	90	60	50.768	12.833	16.055			-16.055
3	80	63.435	70	56.789	13.732	10.034			-16.055
4	100	90	100	90	12.833	23.177			-13.732
5	90	71.565	90	71.565	5.602	4.742			-10.034
6	60	50.768	90	71.565	26.398	4.742			-5.602
7	100	90	90	71.565	12.833	4.742			-5.602
8	100	90	90	71.565	12.833	4.742			4.742
9									4.742
10									4.742
11									4.742
12									12.833
13									12.833
14									12.833
15									12.833
16									23.177

The percent survival in reference sediment 15KR087SD was not significantly lower than that of the reference 15KR082SD at α=0.05. -6) 1

Project Name: P874-1 Hyalella % Survival

Sample:	x1
Samp ID:	15KR088SD
Alias:	NAS# 5433G
Replicates:	8
Mean:	88.75
SD:	12.464
Tr Mean:	74.784
Trans SD:	14.007

Ref Samp:	x2
Ref ID:	15KR082SD
Alias:	NAS# 5428G
Replicates:	8
Mean:	81.25
SD:	15.526
Tr Mean:	66.823
Trans SD:	13.327

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	11.735
SS:	2616.595
K:	8
b:	49.256
Alpha Level:	0.05
Calculated Value:	0.9272
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	11.412
Test Residual SD:	6.881
Ref. Residual Mean:	10.536
Ref. Residual SD:	7.124
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.2501
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	ArcSin

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	-1.1646
Critical Value:	>= 1.761
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	70	56.789	60	50.768	17.995	16.055			-17.995
2	90	71.565	60	50.768	3.219	16.055			-17.995
3	100	90	70	56.789	15.216	10.034			-16.055
4	90	71.565	100	90	3.219	23.177			-16.055
5	70	56.789	90	71.565	17.995	4.742			-10.034
6	90	71.565	90	71.565	3.219	4.742			-3.219
7	100	90	90	71.565	15.216	4.742			-3.219
8	100	90	90	71.565	15.216	4.742			-3.219
9									4.742
10									4.742
11									4.742
12									4.742
13									15.216
14									15.216
15									15.216
16									23.177

The percent survival in reference sediment 15KR088SD was not significantly lower than that of the reference 15KR082SD at α=0.05. -GL

Project Name: P874-1 Hyalella % Survival

Sample:	x1
Samp ID:	15KR089SD
Alias:	NAS# 5434G
Replicates:	8
Mean:	61.25
SD:	17.269
Tr Mean:	52.02
Trans SD:	10.877

Ref Samp:	x2
Ref ID:	15KR082SD
Alias:	NAS# 5428G
Replicates:	8
Mean:	81.25
SD:	15.526
Tr Mean:	66.823
Trans SD:	13.327

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	10.442
SS:	2071.475
K:	8
b:	43.058
Alpha Level:	0.05
Calculated Value:	0.895
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	8.463
Test Residual SD:	6.039
Ref. Residual Mean:	10.536
Ref. Residual SD:	7.124
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.6279
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	ArcSin
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	2.4339
Critical Value:	>= 1.761
Accept Null Hypothesis:	No
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	90	71.565	60	50.768	19.545	16.055			-16.055
2	40	39.232	60	50.768	12.789	16.055			-16.055
3	70	56.789	70	56.789	4.769	10.034			-12.789
4	60	50.768	100	90	1.252	23.177			-12.789
5	40	39.232	90	71.565	12.789	4.742			-10.034
6	70	56.789	90	71.565	4.769	4.742			-7.02
7	70	56.789	90	71.565	4.769	4.742			-1.252
8	50	45	90	71.565	7.02	4.742			4.742
9									4.742
10									4.742
11									4.742
12									4.769
13									4.769
14									4.769
15									19.545
16									23.177

The percent survival in reference sediment 15KR089SD was significantly lower than that of the reference 15KR082SD at α=0.05. —GJL

Project Name: P874-1 Hyalella % Survival

Sample:	x1
Samp ID:	15KR090SD
Alias:	NAS# 5435G
Replicates:	8
Mean:	92.5
SD:	17.525
Tr Mean:	N/A
Trans SD:	N/A

Ref Samp:	x2
Ref ID:	15KR082SD
Alias:	NAS# 5428G
Replicates:	8
Mean:	81.25
SD:	15.526
Tr Mean:	N/A
Trans SD:	N/A

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	12.784
SS:	3105.144
K:	8
b:	51.082
Alpha Level:	0.05
Calculated Value:	0.8403
Critical Value:	<= 0.887
Normally Distributed:	No
Override Option:	Not Invoked

Levene's Results:

Test Residual Mean:	11.894
Test Residual SD:	10.213
Ref. Residual Mean:	10.536
Ref. Residual SD:	7.124
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.3085
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Mann-Whitney
Balanced Design:	Yes
Transformation:	rank-order

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Mann-Whitney N1:	8
Mann-Whitney N2:	8
Degrees of Freedom:	
Experimental Alpha Level:	0.05
Calculated Value:	14
Critical Value:	>= 49.000
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	100	13	60	2.5	7.929	16.055	1		-37.071
2	100	13	60	2.5	7.929	16.055	2.5		-16.055
3	100	13	70	4	7.929	10.034	2.5		-16.055
4	90	7	100	13	10.506	23.177	4		-10.506
5	50	1	90	7	37.071	4.742	7		-10.034
6	100	13	90	7	7.929	4.742	7		4.742
7	100	13	90	7	7.929	4.742	7		4.742
8	100	13	90	7	7.929	4.742	7		4.742
9							7		4.742
10							13		7.929
11							13		7.929
12							13		7.929
13							13		7.929
14							13		7.929
15							13		7.929
16							13		23.177

The percent survival in reference sediment 15KR090SD was not significantly lower than that of the reference 15KR082SD at α=0.05. —GJ

Project Name: P874-1 Hyalella % Survival

Sample:	x1
Samp ID:	15KR091SD
Alias:	NAS# 5436G
Replicates:	8
Mean:	61.25
SD:	12.464
Tr Mean:	51.694
Trans SD:	7.488

Ref Samp:	x2
Ref ID:	15KR082SD
Alias:	NAS# 5428G
Replicates:	8
Mean:	81.25
SD:	15.526
Tr Mean:	66.823
Trans SD:	13.327

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	9.279
SS:	1635.759
K:	8
b:	39.012
Alpha Level:	0.05
Calculated Value:	0.9304
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	5.483
Test Residual SD:	4.659
Ref. Residual Mean:	10.536
Ref. Residual SD:	7.124
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	1.679
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	ArcSin

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	2.7994
Critical Value:	>= 1.761
Accept Null Hypothesis:	No
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	40	39.232	60	50.768	12.462	16.055			-16.055
2	80	63.435	60	50.768	11.741	16.055			-16.055
3	70	56.789	70	56.789	5.095	10.034			-12.462
4	60	50.768	100	90	0.925	23.177			-10.034
5	70	56.789	90	71.565	5.095	4.742			-6.694
6	60	50.768	90	71.565	0.925	4.742			-0.925
7	60	50.768	90	71.565	0.925	4.742			-0.925
8	50	45	90	71.565	6.694	4.742			-0.925
9									4.742
10									4.742
11									4.742
12									4.742
13									5.095
14									5.095
15									11.741
16									23.177

The percent survival in reference sediment 15KR091SD was significantly lower than that of the reference 15KR082SD at α=0.05. —GJ

Project Name: P874-1 Hyalella % Survival

Sample:	x1
Samp ID:	15KR092SD
Alias:	NAS# 5437G
Replicates:	8
Mean:	90
SD:	11.952
Tr Mean:	76.903
Trans SD:	14.55

Ref Samp:	x2
Ref ID:	15KR082SD
Alias:	NAS# 5428G
Replicates:	8
Mean:	81.25
SD:	15.526
Tr Mean:	66.823
Trans SD:	13.327

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	11.976
SS:	2725.262
K:	8
b:	49.905
Alpha Level:	0.05
Calculated Value:	0.9139
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	13.097
Test Residual SD:	3.959
Ref. Residual Mean:	10.536
Ref. Residual SD:	7.124
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.8888
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	ArcSin

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	-1.4449
Critical Value:	>= 1.761
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	100	90	60	50.768	13.097	16.055			-20.114
2	100	90	60	50.768	13.097	16.055			-16.055
3	100	90	70	56.789	13.097	10.034			-16.055
4	80	63.435	100	90	13.468	23.177			-13.468
5	90	71.565	90	71.565	5.338	4.742			-13.468
6	80	63.435	90	71.565	13.468	4.742			-10.034
7	70	56.789	90	71.565	20.114	4.742			-5.338
8	100	90	90	71.565	13.097	4.742			4.742
9									4.742
10									4.742
11									4.742
12									13.097
13									13.097
14									13.097
15									13.097
16									23.177

The percent survival in reference sediment 15KR092SD was not significantly lower than that of the reference 15KR082SD at α=0.05. -6J1

Project Name: P874-1 Hyalella % Survival

Sample:	x1
Samp ID:	15KR093SD
Alias:	NAS# 5438G
Replicates:	8
Mean:	70
SD:	26.186
Tr Mean:	59.461
Trans SD:	19.329

Ref Samp:	x2
Ref ID:	15KR082SD
Alias	NAS# 5428G
Replicates:	8
Mean:	81.25
SD:	15.526
Tr Mean:	66.823
Trans SD:	13.327

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	14.251
SS:	3858.698
K:	8
b:	61.173
Alpha Level:	0.05
Calculated Value:	0.9698
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	14.68
Test Residual SD:	11.284
Ref. Residual Mean:	10.536
Ref. Residual SD:	7.124
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.8784
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	ArcSin
Experimental Hypothesis	
Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	0.8869
Critical Value:	>= 1.761
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	90	71.565	60	50.768	12.104	16.055			-32.896
2	70	56.789	60	50.768	2.672	16.055			-16.055
3	100	90	70	56.789	30.539	10.034			-16.055
4	90	71.565	100	90	12.104	23.177			-14.461
5	50	45	90	71.565	14.461	4.742			-10.034
6	60	50.768	90	71.565	8.692	4.742			-8.692
7	80	63.435	90	71.565	3.974	4.742			-2.672
8	20	26.565	90	71.565	32.896	4.742			3.974
9									4.742
10									4.742
11									4.742
12									4.742
13									12.104
14									12.104
15									23.177
16									30.539

The percent survival in reference sediment 15KR093SD was not significantly lower than that of the reference 15KR082SD at α=0.05. —GJL

Project Name: P874-1 Hyalella % Survival

Sample:	x1
Samp ID:	15KR099SD
Alias:	NAS# 5439G
Replicates:	8
Mean:	90
SD:	10.69
Tr Mean:	75.615
Trans SD:	12.944

Ref Samp:	x2
Ref ID:	15KR082SD
Alias:	NAS# 5428G
Replicates:	8
Mean:	81.25
SD:	15.526
Tr Mean:	66.823
Trans SD:	13.327

Shapiro-Wilk Results:

Residual Mean:	0
Residual SD:	11.277
SS:	2416.056
K:	8
b:	47.791
Alpha Level:	0.05
Calculated Value:	0.9453
Critical Value:	<= 0.887
Normally Distributed:	Yes
Override Option:	N/A

Levene's Results:

Test Residual Mean:	10.789
Test Residual SD:	5.875
Ref. Residual Mean:	10.536
Ref. Residual SD:	7.124
Deg. of Freedom:	14
Alpha Level:	0.1
Calculated Value:	0.0775
Critical Value:	>= 1.761
Variances Homogeneous:	Yes

Test Results:

Statistic:	Student's t
Balanced Design:	Yes
Transformation:	ArcSin

Experimental Hypothesis

Null:	x1 >= x2
Alternate:	x1 < x2
Degrees of Freedom:	14
Experimental Alpha Level:	0.05
Calculated Value:	-1.3385
Critical Value:	>= 1.761
Accept Null Hypothesis:	Yes
Power:	
Min. Difference for Power:	

Replicate Number	Test Data	Trans. Test Data	Reference Data	Trans. Reference Data	Levene's Test Residuals	Levene's Reference Residuals	Mann-Whitney Ranks	Rankits	Shipiro-Wilk Residuals
1	90	71.565	60	50.768	4.05	16.055			-18.826
2	70	56.789	60	50.768	18.826	16.055			-16.055
3	90	71.565	70	56.789	4.05	10.034			-16.055
4	90	71.565	100	90	4.05	23.177			-12.18
5	100	90	90	71.565	14.385	4.742			-10.034
6	80	63.435	90	71.565	12.18	4.742			-4.05
7	100	90	90	71.565	14.385	4.742			-4.05
8	100	90	90	71.565	14.385	4.742			-4.05
9									4.742
10									4.742
11									4.742
12									4.742
13									14.385
14									14.385
15									14.385
16									23.177

The percent survival in reference sediment 15KR099SD was not significantly lower than that of the reference 15KR082SD at α=0.05. —GJ

Growth: Reference 15KR082SD vs. Test Sediments

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	21-3181-4823	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:** CETISv1.8.7
Analyzed:	29 Nov-15 11:57	**Analysis:**	Parametric-Two Sample	**Official Results:** Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h		
15KR084SD	02-8109-3592	05 Sep-15 16:16	22 Sep-15 11:15	19d 18h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR082SD	Sediment	Kuskokwim River Sediment Char			
15KR084SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	11.9%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR082SD		15KR084SD	0.892	1.697	0.030	30	0.1898	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00151182	0.00151182	1	0.7956	0.3795	Non-Significant Effect
Error	0.0570074	0.001900247	30			
Total	0.05851922		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	5.706	7.669	0.0242	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9767	0.9081	0.7007	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR084SD	8	0.2389	0.2219	0.2559	0.2398	0.1992	0.2651	0.00718	8.5%	6.23%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR084SD	0.2489	0.2355	0.2441	0.2569	0.1992	0.2344	0.227	0.2651		

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	12-4245-7388	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:** CETISv1.8.7
Analyzed:	29 Nov-15 11:57	**Analysis:**	Parametric-Two Sample	**Official Results:** Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h		
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	22d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR082SD	Sediment	Kuskokwim River Sediment Char			
15KR085SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.5%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR082SD		15KR085SD	-1.196	1.697	0.032	30	0.8794	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003009403	0.003009403	1	1.429	0.2412	Non-Significant Effect
Error	0.06316546	0.002105515	30			
Total	0.06617486		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.821	7.669	0.4231	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9888	0.9081	0.9791	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR085SD	8	0.2772	0.2471	0.3072	0.2742	0.2317	0.3275	0.01271	12.97%	-8.79%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR085SD	0.3081	0.3074	0.2551	0.2451	0.249	0.2934	0.3275	0.2317		

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test					Northwestern Aquatic Sciences
Analysis ID:	03-3195-4555	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	29 Nov-15 11:57	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h		
15KR087SD	11-4764-2282	02 Sep-15 18:25	22 Sep-15 11:15	22d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR082SD	Sediment	Kuskokwim River Sediment Char			
15KR087SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR082SD		15KR087SD	1.096	1.697	0.033	30	0.1408	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002766624	0.002766624	1	1.202	0.2816	Non-Significant Effect
Error	0.06904127	0.002301376	30			
Total	0.07180789		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.104	7.669	0.9619	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9928	0.9081	0.9985	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR087SD	8	0.2333	0.1947	0.2719	0.2195	0.1854	0.3196	0.01632	19.79%	8.43%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR087SD	0.2043	0.2378	0.219	0.1963	0.1854	0.284	0.3196	0.2199		

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Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	11-0908-2226	Endpoint:	Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed:	29 Nov-15 11:57	Analysis:	Parametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h		
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	22d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR082SD	Sediment	Kuskokwim River Sediment Char			
15KR088SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.2%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR082SD		15KR088SD	-1.346	1.697	0.031	30	0.9059	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003641583	0.003641583	1	1.812	0.1883	Non-Significant Effect
Error	0.06027618	0.002009206	30			
Total	0.06391776		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.676	7.669	0.1835	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9878	0.9081	0.9694	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR088SD	8	0.2794	0.2546	0.3042	0.2772	0.2332	0.3259	0.01048	10.61%	-9.67%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR088SD	0.3259	0.2711	0.2704	0.2513	0.2944	0.2332	0.2833	0.3056		

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	11-0879-9258	Endpoint:	Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed:	29 Nov-15 11:57	Analysis:	Parametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h		
15KR089SD	08-9083-1299	06 Sep-15 13:30	22 Sep-15 11:15	18d 21h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR082SD	Sediment	Kuskokwim River Sediment Char			
15KR089SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.2%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR082SD		15KR089SD	1.547	1.697	0.031	30	0.0661	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004812896	0.004812896	1	2.395	0.1322	Non-Significant Effect
Error	0.06029667	0.002009889	30			
Total	0.06510957		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.667	7.669	0.1849	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9818	0.9081	0.8497	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR089SD	8	0.2264	0.2016	0.2513	0.2353	0.181	0.2688	0.0105	13.12%	11.12%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR089SD	0.2382	0.2688	0.2324	0.181	0.2455	0.2386	0.2207	0.1864		

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Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	08-8279-0332	Endpoint:	Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed:	29 Nov-15 11:57	Analysis:	Parametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h		
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	22d 1h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR082SD	Sediment	Kuskokwim River Sediment Char			
15KR090SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.9%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR082SD		15KR090SD	1.66	1.697	0.033	30	0.0537	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00619571	0.00619571	1	2.755	0.1074	Non-Significant Effect
Error	0.06746829	0.002248943	30			
Total	0.07366399		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.234	7.669	0.8245	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9869	0.9081	0.9571	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR090SD	8	0.2226	0.1861	0.2591	0.2222	0.173	0.3084	0.01544	19.61%	12.61%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR090SD	0.1732	0.3084	0.2062	0.2249	0.251	0.2237	0.173	0.2207		

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Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	13-5995-3161	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:** CETISv1.8.7
Analyzed:	29 Nov-15 11:57	**Analysis:**	Parametric-Two Sample	**Official Results:** Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h		
15KR091SD	05-2188-6902	06 Sep-15 17:30	22 Sep-15 11:15	18d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR082SD	Sediment	Kuskokwim River Sediment Char			
15KR091SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.8%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR082SD		15KR091SD	0.6299	1.697	0.033	30	0.2668	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008737755	0.0008737755	1	0.3967	0.5336	Non-Significant Effect
Error	0.06607594	0.002202532	30			
Total	0.06694972		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.378	7.669	0.6963	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9899	0.9081	0.9884	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR091SD	8	0.2427	0.2082	0.2773	0.2358	0.1895	0.314	0.01461	17.03%	4.74%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR091SD	0.314	0.1895	0.229	0.278	0.2009	0.2645	0.2232	0.2426		

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test					Northwestern Aquatic Sciences
Analysis ID:	19-3902-1151	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	29 Nov-15 11:57	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h		
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	21d 23h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR082SD	Sediment	Kuskokwim River Sediment Char			
15KR092SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR082SD		15KR092SD	1.528	1.697	0.031	30	0.0686	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004521895	0.004521895	1	2.333	0.1371	Non-Significant Effect
Error	0.05814014	0.001938005	30			
Total	0.06266204		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.098	7.669	0.0618	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9776	0.9081	0.7276	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR092SD	8	0.2273	0.2073	0.2474	0.2305	0.1791	0.2613	0.008472	10.54%	10.78%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR092SD	0.2369	0.2422	0.2289	0.2321	0.1791	0.2613	0.2249	0.2132		

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CETIS Analytical Report

Test Code: 874-1 / 15-8552-1299

Hyalella 28-d Survival and Growth Sediment Test					Northwestern Aquatic Sciences
Analysis ID:	01-4172-3465	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	29 Nov-15 11:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h		
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	18d 15h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR082SD	Sediment	Kuskokwim River Sediment Char			
15KR093SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.1%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR082SD		15KR093SD	2.978	1.697	0.031	30	0.0028	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01741347	0.01741347	1	8.867	0.0057	Significant Effect
Error	0.05891238	0.001963746	30			
Total	0.07632585		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.437	7.669	0.0985	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9816	0.9081	0.8446	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR093SD	8	0.2009	0.179	0.2228	0.2035	0.1526	0.2412	0.00925	13.02%	21.15%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR093SD	0.1928	0.2061	0.1838	0.1526	0.2412	0.2098	0.2009	0.22		

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences	
Analysis ID:	07-4964-6356	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	29 Nov-15 11:58	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR082SD	07-2107-8578	02 Sep-15 11:11	22 Sep-15 11:15	22d 23h		
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	20d		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR082SD	Sediment	Kuskokwim River Sediment Char			
15KR099SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.6%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR082SD		15KR099SD	-1.088	1.697	0.032	30	0.8573	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002550191	0.002550191	1	1.183	0.2855	Non-Significant Effect
Error	0.06468797	0.002156266	30			
Total	0.06723816		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.559	7.669	0.5654	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.988	0.9081	0.9717	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR082SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR099SD	8	0.2754	0.2429	0.3079	0.2688	0.2352	0.356	0.01374	14.11%	-8.09%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR082SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR099SD	0.2834	0.356	0.2367	0.2633	0.2352	0.2743	0.2579	0.2963		

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Survival: Reference 15KR083SD vs. Test Sediments

CETIS Analytical Report

Report Date: 30 Nov-15 14:55 (p 1 of 9)
Test Code: 874-1 | 15-8552-1299

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Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	06-5934-0672	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	30 Nov-15 14:48	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR084SD	02-8109-3592	05 Sep-15 16:16	22 Sep-15 11:15	19d 18h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR084SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	5000	1969083	7.24%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value 99% CL
15KR083SD		15KR084SD	139.5	NA	3	30	0.6670	M Carlo	Non-Significant Effect	0.6498 - 0.6842

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004495295	0.004495295	1	0.1677	0.6851	Non-Significant Effect
Error	0.8042752	0.02680917	30			
Total	0.8087705		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.292	7.669	0.7700	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8076	0.9081	<0.0001	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%
15KR084SD	8	0.925	0.8385	1	0.95	0.7	1	0.0366	11.19%	-2.3%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%
15KR084SD	8	1.298	1.175	1.422	1.331	0.9912	1.412	0.05233	11.4%	-2.15%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1
	0.9	0.9	1	1						
15KR084SD	0.9	1	0.7	1	1	0.9	0.9	1		

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861
15KR084SD	1.249	1.412	0.9912	1.412	1.412	1.249	1.249	1.412		

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	04-2933-3822	Endpoint:	Proportion Survived	CETIS Version: CETISv1.8.7
Analyzed:	30 Nov-15 14:49	Analysis:	Nonparametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	22d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR085SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	5000	1562837	7.11%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value 99% CL
15KR083SD		15KR085SD	136	NA	3	30	0.5822	M Carlo	Non-Significant Effect	0.5642 - 0.6002

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003494611	0.003494611	1	0.1343	0.7166	Non-Significant Effect
Error	0.7805057	0.02601686	30			
Total	0.7840003		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.529	7.669	0.5848	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8208	0.9081	0.0001	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%
15KR085SD	8	0.925	0.8509	0.9991	0.95	0.8	1	0.03134	9.58%	-2.3%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%
15KR085SD	8	1.295	1.181	1.409	1.331	1.107	1.412	0.0481	10.51%	-1.9%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1
	0.9	0.9	1	1						
15KR085SD	1	0.9	1	0.9	1	0.8	0.8	1		

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861
15KR085SD	1.412	1.249	1.412	1.249	1.412	1.107	1.107	1.412		

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	19-6921-0350	Endpoint:	Proportion Survived	CETIS Version: CETISv1.8.7
Analyzed:	30 Nov-15 14:49	Analysis:	Nonparametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR087SD	11-4764-2282	02 Sep-15 18:25	22 Sep-15 11:15	22d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR087SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	5000	1562837	7.82%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value 99% CL
15KR083SD		15KR087SD	133	NA	4	30	0.5442	M Carlo	Non-Significant Effect	0.5261 - 0.5623

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.351081E-05	7.351081E-05	1	0.002433	0.9610	Non-Significant Effect
Error	0.9063514	0.03021172	30			
Total	0.9064249		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.289	4.047	0.5983	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7837	0.9081	<0.0001	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%
15KR087SD	8	0.9	0.7818	1	0.95	0.6	1	0.05	15.71%	0.46%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%
15KR087SD	8	1.267	1.108	1.427	1.331	0.8861	1.412	0.06754	15.07%	0.28%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1
	0.9	0.9	1	1						
15KR087SD	0.9	1	0.8	1	0.9	0.6	1	1		

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861
15KR087SD	1.249	1.412	1.107	1.412	1.249	0.8861	1.412	1.412		

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	03-7194-8177	Endpoint:	Proportion Survived	CETIS Version: CETISv1.8.7
Analyzed:	30 Nov-15 14:50	Analysis:	Nonparametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	22d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR088SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	5000	1562837	7.58%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value 99% CL
15KR083SD		15KR088SD	123.5	NA	3	30	0.3630	M Carlo	Non-Significant Effect	0.3455 - 0.3805

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003821023	0.003821023	1	0.1327	0.7182	Non-Significant Effect
Error	0.8635362	0.02878454	30			
Total	0.8673573		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.073	4.047	0.8229	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8306	0.9081	0.0002	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%
15KR088SD	8	0.8875	0.7833	0.9917	0.9	0.7	1	0.04407	14.04%	1.84%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%
15KR088SD	8	1.246	1.1	1.391	1.249	0.9912	1.412	0.06162	13.99%	1.99%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1
	0.9	0.9	1	1						
15KR088SD	0.7	0.9	1	0.9	0.7	0.9	1	1		

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861
15KR088SD	0.9912	1.249	1.412	1.249	0.9912	1.249	1.412	1.412		

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Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	01-4947-5286	Endpoint:	Proportion Survived	CETIS Version: CETISv1.8.7
Analyzed:	30 Nov-15 14:50	Analysis:	Nonparametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR089SD	08-9083-1299	06 Sep-15 13:30	22 Sep-15 11:15	18d 21h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR089SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	5000	1562837	7.8%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value 99% CL
15KR083SD		15KR089SD	53.5	NA	3	30	<0.0001	M Carlo	Significant Effect	

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.7905893	0.7905893	1	26.26	<0.0001	Significant Effect
Error	0.9032125	0.03010708	30			
Total	1.693802		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.273	4.047	0.6128	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8997	0.9081	0.0061	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%
15KR089SD	8	0.6125	0.4681	0.7569	0.65	0.4	0.9	0.06105	28.19%	32.26%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%
15KR089SD	8	0.9079	0.7492	1.067	0.9386	0.6847	1.249	0.06712	20.91%	28.56%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1
	0.9	0.9	1	1						
15KR089SD	0.9	0.4	0.7	0.6	0.4	0.7	0.7	0.5		

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861
15KR089SD	1.249	0.6847	0.9912	0.8861	0.6847	0.9912	0.9912	0.7854		

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	18-1953-6228	Endpoint:	Proportion Survived	CETIS Version: CETISv1.8.7
Analyzed:	30 Nov-15 14:50	Analysis:	Nonparametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	22d 1h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR090SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	5000	1562837	8.28%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value 99% CL
15KR083SD		15KR090SD	156	NA	2	30	0.8674	M Carlo	Non-Significant Effect	0.8550 - 0.8798

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01078381	0.01078381	1	0.3261	0.5722	Non-Significant Effect
Error	0.992213	0.03307377	30			
Total	1.002997		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.723	4.047	0.3063	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7747	0.9081	<0.0001	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%
15KR090SD	8	0.925	0.7785	1	1	0.5	1	0.06196	18.95%	-2.3%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%
15KR090SD	8	1.313	1.129	1.498	1.412	0.7854	1.412	0.07807	16.81%	-3.34%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1
	0.9	0.9	1	1						
15KR090SD	1	1	1	0.9	0.5	1	1	1		

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861
15KR090SD	1.412	1.412	1.412	1.249	0.7854	1.412	1.412	1.412		

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	09-0337-1195	Endpoint:	Proportion Survived	CETIS Version: CETISv1.8.7
Analyzed:	30 Nov-15 14:50	Analysis:	Nonparametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR091SD	05-2188-6902	06 Sep-15 17:30	22 Sep-15 11:15	18d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR091SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	5000	1562837	7.05%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value 99% CL
15KR083SD		15KR091SD	48	NA	3	30	<0.0001	M Carlo	Significant Effect	

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.8156233	0.8156233	1	31.76	<0.0001	Significant Effect
Error	0.7704858	0.02568286	30			
Total	1.586109		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.657	7.669	0.5063	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8558	0.9081	0.0006	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%
15KR091SD	8	0.6125	0.5083	0.7167	0.6	0.4	0.8	0.04407	20.35%	32.26%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%
15KR091SD	8	0.9022	0.793	1.011	0.8861	0.6847	1.107	0.0462	14.48%	29.01%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1
	0.9	0.9	1	1						
15KR091SD	0.4	0.8	0.7	0.6	0.7	0.6	0.6	0.5		

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861
15KR091SD	0.6847	1.107	0.9912	0.8861	0.9912	0.8861	0.8861	0.7854		

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences	
Analysis ID:	15-0362-1684	Endpoint:	Proportion Survived	CETIS Version:	CETISv1.8.7
Analyzed:	30 Nov-15 14:50	Analysis:	Nonparametric-Two Sample	Official Results:	Yes
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	21d 23h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR092SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	5000	1562837	7.57%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value 99% CL
15KR083SD		15KR092SD	129.5	NA	4	30	0.4352	M Carlo	Non-Significant Effect	0.4171 - 0.4533

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003938988	0.0003938988	1	0.0137	0.9076	Non-Significant Effect
Error	0.8624306	0.02874769	30			
Total	0.8628245		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.068	4.047	0.8295	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8136	0.9081	<0.0001	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%
15KR092SD	8	0.9	0.8001	0.9999	0.95	0.7	1	0.04226	13.28%	0.46%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%
15KR092SD	8	1.263	1.118	1.408	1.331	0.9912	1.412	0.06145	13.76%	0.64%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1
	0.9	0.9	1	1						
15KR092SD	1	1	1	0.8	0.9	0.8	0.7	1		

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861
15KR092SD	1.412	1.412	1.412	1.107	1.249	1.107	0.9912	1.412		

CETIS Analytical Report

Report Date: 14 Dec-15 07:41 (p 1 of 1)
Test Code: 874-1 | 15-8552-1299

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Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	03-5726-6762	Endpoint:	Proportion Survived	CETIS Version:	CETISv1.8.7
Analyzed:	14 Dec-15 7:41	Analysis:	Parametric-Two Sample	Official Results:	Yes
Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	18d 15h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR093SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.82%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR083SD		15KR093SD	2.976	1.697	0.144	30	0.0029	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.3839963	0.3839963	1	8.859	0.0057	Significant Effect
Error	1.30043	0.04334766	30			
Total	1.684426		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.278	4.047	0.0289	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9104	0.9081	0.0115	Normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%
15KR093SD	8	0.7	0.4811	0.9189	0.75	0.2	1	0.09258	37.41%	22.58%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%
15KR093SD	8	1.018	0.7633	1.273	1.049	0.4636	1.412	0.1077	29.92%	19.91%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1
	0.9	0.9	1	1						
15KR093SD	0.9	0.7	1	0.9	0.5	0.6	0.8	0.2		

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861
15KR093SD	1.249	0.9912	1.412	1.249	0.7854	0.8861	1.107	0.4636		

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Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	06-1991-8329	Endpoint:	Proportion Survived	CETIS Version: CETISv1.8.7
Analyzed:	30 Nov-15 14:50	Analysis:	Nonparametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	20d		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR099SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	5000	1562837	7.31%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)	P-Value 99% CL
15KR083SD		15KR099SD	125	NA	4	30	0.3734	M Carlo	Non-Significant Effect	0.3558 - 0.3910

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0006916497	0.0006916497	1	0.02542	0.8744	Non-Significant Effect
Error	0.8162615	0.02720872	30			
Total	0.8169532		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.198	7.669	0.8601	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.818	0.9081	<0.0001	Non-normal Distribution

Proportion Survived Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.9042	0.8521	0.9562	0.9	0.6	1	0.02517	13.64%	0.0%
15KR099SD	8	0.9	0.8106	0.9894	0.9	0.7	1	0.0378	11.88%	0.46%

Angular (Corrected) Transformed Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	1.271	1.2	1.342	1.249	0.8861	1.412	0.03434	13.24%	0.0%
15KR099SD	8	1.26	1.132	1.389	1.249	0.9912	1.412	0.05433	12.2%	0.84%

Proportion Survived Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1	0.9	1	1	1	0.8	0.8	1	0.6	0.6
	0.7	1	0.9	0.9	0.9	0.9	1	1	0.9	1
	0.9	0.9	1	1						
15KR099SD	0.9	0.7	0.9	0.9	1	0.8	1	1		

Angular (Corrected) Transformed Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	1.412	1.249	1.412	1.412	1.412	1.107	1.107	1.412	0.8861	0.8861
15KR099SD	1.249	0.9912	1.249	1.249	1.412	1.107	1.412	1.412		

Growth: Reference 15KR083SD vs. Test Sediments

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences	
Analysis ID:	18-9830-5681	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	29 Nov-15 11:56	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR084SD	02-8109-3592	05 Sep-15 16:16	22 Sep-15 11:15	19d 18h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR084SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	11.9%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR083SD		15KR084SD	0.892	1.697	0.030	30	0.1898	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00151182	0.00151182	1	0.7956	0.3795	Non-Significant Effect
Error	0.0570074	0.001900247	30			
Total	0.05851922		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	5.706	7.669	0.0242	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9767	0.9081	0.7007	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR084SD	8	0.2389	0.2219	0.2559	0.2398	0.1992	0.2651	0.00718	8.5%	6.23%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR084SD	0.2489	0.2355	0.2441	0.2569	0.1992	0.2344	0.227	0.2651		

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	07-7666-6173	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	29 Nov-15 11:56	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	22d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR085SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.5%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR083SD		15KR085SD	-1.196	1.697	0.032	30	0.8794	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003009403	0.003009403	1	1.429	0.2412	Non-Significant Effect
Error	0.06316546	0.002105515	30			
Total	0.06617486		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.821	7.669	0.4231	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9888	0.9081	0.9791	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR085SD	8	0.2772	0.2471	0.3072	0.2742	0.2317	0.3275	0.01271	12.97%	-8.79%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR085SD	0.3081	0.3074	0.2551	0.2451	0.249	0.2934	0.3275	0.2317		

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Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	19-9457-6275	Endpoint:	Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed:	29 Nov-15 11:56	Analysis:	Parametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR087SD	11-4764-2282	02 Sep-15 18:25	22 Sep-15 11:15	22d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR087SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR083SD		15KR087SD	1.096	1.697	0.033	30	0.1408	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002766624	0.002766624	1	1.202	0.2816	Non-Significant Effect
Error	0.06904127	0.002301376	30			
Total	0.07180789		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.104	7.669	0.9619	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9928	0.9081	0.9985	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR087SD	8	0.2333	0.1947	0.2719	0.2195	0.1854	0.3196	0.01632	19.79%	8.43%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR087SD	0.2043	0.2378	0.219	0.1963	0.1854	0.284	0.3196	0.2199		

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	02-8741-2404	Endpoint:	Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed:	29 Nov-15 11:56	Analysis:	Parametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	22d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR088SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.2%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR083SD		15KR088SD	-1.346	1.697	0.031	30	0.9059	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003641583	0.003641583	1	1.812	0.1883	Non-Significant Effect
Error	0.06027618	0.002009206	30			
Total	0.06391776		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.676	7.669	0.1835	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9878	0.9081	0.9694	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR088SD	8	0.2794	0.2546	0.3042	0.2772	0.2332	0.3259	0.01048	10.61%	-9.67%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR088SD	0.3259	0.2711	0.2704	0.2513	0.2944	0.2332	0.2833	0.3056		

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test					Northwestern Aquatic Sciences
Analysis ID:	13-1870-2523	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	29 Nov-15 11:56	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR089SD	08-9083-1299	06 Sep-15 13:30	22 Sep-15 11:15	18d 21h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR089SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.2%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR083SD		15KR089SD	1.547	1.697	0.031	30	0.0661	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004812896	0.004812896	1	2.395	0.1322	Non-Significant Effect
Error	0.06029667	0.002009889	30			
Total	0.06510957		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.667	7.669	0.1849	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9818	0.9081	0.8497	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR089SD	8	0.2264	0.2016	0.2513	0.2353	0.181	0.2688	0.0105	13.12%	11.12%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR089SD	0.2382	0.2688	0.2324	0.181	0.2455	0.2386	0.2207	0.1864		

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test					Northwestern Aquatic Sciences
Analysis ID:	12-3782-5773	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	29 Nov-15 11:56	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	22d 1h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR090SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.9%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR083SD		15KR090SD	1.66	1.697	0.033	30	0.0537	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.00619571	0.00619571	1	2.755	0.1074	Non-Significant Effect
Error	0.06746829	0.002248943	30			
Total	0.07366399		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.234	7.669	0.8245	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9869	0.9081	0.9571	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR090SD	8	0.2226	0.1861	0.2591	0.2222	0.173	0.3084	0.01544	19.61%	12.61%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR090SD	0.1732	0.3084	0.2062	0.2249	0.251	0.2237	0.173	0.2207		

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CETIS Analytical Report

Test Code: 874-1 15-8552-1299

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	03-5819-8158	Endpoint:	Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed:	29 Nov-15 11:56	Analysis:	Parametric-Two Sample	Official Results: Yes

Batch ID:	10-5989-7118	Test Type:	Survival-Growth	Analyst:	
Start Date:	25 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	28d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR091SD	05-2188-6902	06 Sep-15 17:30	22 Sep-15 11:15	18d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR091SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.8%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR083SD		15KR091SD	0.6299	1.697	0.033	30	0.2668	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008737755	0.0008737755	1	0.3967	0.5336	Non-Significant Effect
Error	0.06607594	0.002202532	30			
Total	0.06694972		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.378	7.669	0.6963	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9899	0.9081	0.9884	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR091SD	8	0.2427	0.2082	0.2773	0.2358	0.1895	0.314	0.01461	17.03%	4.74%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR091SD	0.314	0.1895	0.229	0.278	0.2009	0.2645	0.2232	0.2426		

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test					Northwestern Aquatic Sciences
Analysis ID:	15-8390-1031	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	29 Nov-15 11:56	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	21d 23h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR092SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR083SD		15KR092SD	1.528	1.697	0.031	30	0.0686	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004521895	0.004521895	1	2.333	0.1371	Non-Significant Effect
Error	0.05814014	0.001938005	30			
Total	0.06266204		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.098	7.669	0.0618	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9776	0.9081	0.7276	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR092SD	8	0.2273	0.2073	0.2474	0.2305	0.1791	0.2613	0.008472	10.54%	10.78%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR092SD	0.2369	0.2422	0.2289	0.2321	0.1791	0.2613	0.2249	0.2132		

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	06-8889-6750	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	29 Nov-15 11:56	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	18d 15h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR093SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.1%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR083SD		15KR093SD	2.978	1.697	0.031	30	0.0028	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01741347	0.01741347	1	8.867	0.0057	Significant Effect
Error	0.05891238	0.001963746	30			
Total	0.07632585		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.437	7.669	0.0985	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9816	0.9081	0.8446	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR093SD	8	0.2009	0.179	0.2228	0.2035	0.1526	0.2412	0.00925	13.02%	21.15%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR093SD	0.1928	0.2061	0.1838	0.1526	0.2412	0.2098	0.2009	0.22		

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences	
Analysis ID:	04-7505-0196	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	29 Nov-15 11:56	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes

Batch ID:	10-5989-7118	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	25 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	28d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
15KR083SD	05-9987-8649	02 Sep-15 13:20	22 Sep-15 11:15	22d 21h		
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	20d		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
15KR083SD	Sediment	Kuskokwim River Sediment Char			
15KR099SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.6%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
15KR083SD		15KR099SD	-1.088	1.697	0.032	30	0.8573	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002550191	0.002550191	1	1.183	0.2855	Non-Significant Effect
Error	0.06468797	0.002156266	30			
Total	0.06723816		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.559	7.669	0.5654	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.988	0.9081	0.9717	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
15KR083SD	24	0.2548	0.2343	0.2753	0.2604	0.1397	0.3499	0.009902	19.04%	0.0%
15KR099SD	8	0.2754	0.2429	0.3079	0.2688	0.2352	0.356	0.01374	14.11%	-8.09%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
15KR083SD	0.1931	0.2751	0.2575	0.2797	0.2136	0.2039	0.3255	0.295	0.2482	0.2673
	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542	0.2782	0.2919
	0.2352	0.222	0.3162	0.2342						
15KR099SD	0.2834	0.356	0.2367	0.2633	0.2352	0.2743	0.2579	0.2963		

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CETIS Data Entry

data entry verified against laboratory bench sheets 12-16-15 JTAK

CETIS Test Data Worksheet

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Start Date:	25 Sep-15 10:30	**Species:**	Hyalella azteca
End Date:	23 Oct-15 11:00	**Protocol:**	EPA/600/R-99/064 (2000)
Sample Date:	21 Sep-15 06:30	**Material:**	Sediment
Sample Code:	Control 874-1		
Sample Source:	Kuskokwim River Sediment Charact		
Sample Station:			

Group	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	InitialWgt
Control 874-1	1	26	10	10	32.826	30.895	10		0.069
Control 874-1	2	80	10	9	34.18	31.704	9		0.069
Control 874-1	3	30	10	10	32.576	30.001	10		0.069
Control 874-1	4	17	10	10	32.093	29.296	10		0.069
Control 874-1	5	65	10	10	31.39	29.254	10		0.069
Control 874-1	6	43	10	8	32.022	30.391	8		0.069
Control 874-1	7	46	10	8	32.159	29.555	8		0.069
Control 874-1	8	104	10	10	34.352	31.402	10		0.069
15KR082SD	1	59	10	6	31.579	30.09	6		0.069
15KR082SD	2	35	10	6	32.036	30.432	6		0.069
15KR082SD	3	100	10	7	33.77	31.927	7		0.069
15KR082SD	4	93	10	10	35.049	32.341	10		0.069
15KR082SD	5	67	10	9	33.361	30.212	9		0.069
15KR082SD	6	61	10	9	35.644	33.062	9		0.069
15KR082SD	7	45	10	9	33.446	31.283	9		0.069
15KR082SD	8	37	10	9	33.078	31.821	9		0.069
15KR083SD	1	27	10	10	32.612	30.884	10		0.069
15KR083SD	2	83	10	10	32.344	29.802	10		0.069
15KR083SD	3	33	10	9	32.398	29.894	9		0.069
15KR083SD	4	75	10	10	32.036	29.117	10		0.069
15KR083SD	5	9	10	9	31.857	29.74	9		0.069
15KR083SD	6	14	10	9	33.815	31.817	9		0.069
15KR083SD	7	60	10	10	32.819	29.857	10		0.069
15KR083SD	8	89	10	10	33.35	31.008	10		0.069
15KR084SD	1	47	10	9	32.01	29.77	9		0.069
15KR084SD	2	15	10	10	31.244	28.889	10		0.069
15KR084SD	3	7	10	7	31.995	30.286	7		0.069
15KR084SD	4	1	10	10	33.526	30.957	10		0.069
15KR084SD	5	98	10	10	34.74	32.748	10		0.069
15KR084SD	6	13	10	9	32.884	30.774	9		0.069
15KR084SD	7	19	10	9	30.55	28.507	9		0.069
15KR084SD	8	29	10	10	33.819	31.168	10		0.069
15KR085SD	1	36	10	10	34.49	31.409	10		0.069
15KR085SD	2	102	10	9	34.12	31.353	9		0.069
15KR085SD	3	6	10	10	32.718	30.167	10		0.069
15KR085SD	4	56	10	9	31.871	29.665	9		0.069
15KR085SD	5	31	10	10	33.274	30.784	10		0.069
15KR085SD	6	88	10	8	31.805	29.458	8		0.069
15KR085SD	7	82	10	8	32.36	29.74	8		0.069
15KR085SD	8	32	10	10	32.3	29.983	10		0.069
15KR087SD	1	97	10	9	30.292	28.453	9		0.069
15KR087SD	2	84	10	10	32.639	30.261	10		0.069
15KR087SD	3	70	10	8	30.944	29.192	8		0.069
15KR087SD	4	54	10	10	30.702	28.739	10		0.069
15KR087SD	5	74	10	9	32.181	30.512	9		0.069
15KR087SD	6	2	10	6	31.606	29.902	6		0.069
15KR087SD	7	94	10	10	35.769	32.573	10		0.069

CETIS Test Data Worksheet

Sample Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	InitialWgt
15KR087SD	8	55	10	10	31.764	29.585	10		0.069
15KR088SD	1	21	10	7	32.57	30.289	7		0.069
15KR088SD	2	20	10	9	32.872	30.432	9		0.069
15KR088SD	3	53	10	10	32.724	30.02	10		0.069
15KR088SD	4	48	10	9	33.433	31.171	9		0.069
15KR088SD	5	57	10	7	34.413	32.352	7		0.069
15KR088SD	6	23	10	9	33.955	31.856	9		0.069
15KR088SD	7	68	10	10	34.32	31.487	10		0.069
15KR088SD	8	50	10	10	33.804	30.748	10		0.069
15KR089SD	1	62	10	9	32.011	29.867	9		0.069
15KR089SD	2	96	10	4	33.598	32.523	4		0.069
15KR089SD	3	3	10	7	32.4	30.773	7		0.069
15KR089SD	4	91	10	6	31.173	30.087	6		0.069
15KR089SD	5	22	10	4	31.579	30.597	4		0.069
15KR089SD	6	103	10	7	31.978	30.308	7		0.069
15KR089SD	7	38	10	7	33.26	31.715	7		0.069
15KR089SD	8	63	10	5	30.234	29.302	5		0.069
15KR090SD	1	64	10	10	30.65	28.918	10		0.069
15KR090SD	2	18	10	10	35.525	32.441	10		0.069
15KR090SD	3	72	10	10	31.952	29.89	10		0.069
15KR090SD	4	92	10	9	32.574	30.55	9		0.069
15KR090SD	5	85	10	5	32.441	31.186	5		0.069
15KR090SD	6	90	10	10	33.032	30.795	10		0.069
15KR090SD	7	41	10	10	33.962	32.232	10		0.069
15KR090SD	8	77	10	10	34.426	32.219	10		0.069
15KR091SD	1	81	10	4	32.463	31.207	4		0.069
15KR091SD	2	71	10	8	33.006	31.49	8		0.069
15KR091SD	3	40	10	7	30.968	29.365	7		0.069
15KR091SD	4	58	10	6	35.814	34.146	6		0.069
15KR091SD	5	42	10	7	35.086	33.68	7		0.069
15KR091SD	6	34	10	6	30.97	29.383	6		0.069
15KR091SD	7	44	10	6	31.944	30.655	6		0.069
15KR091SD	8	8	10	5	34.934	33.721	5		0.069
15KR092SD	1	95	10	10	31.08	28.711	10		0.069
15KR092SD	2	78	10	10	32.862	30.44	10		0.069
15KR092SD	3	66	10	10	34.464	32.175	10		0.069
15KR092SD	4	12	10	8	34.064	32.207	8		0.069
15KR092SD	5	87	10	9	32.041	30.429	9		0.069
15KR092SD	6	76	10	8	30.875	28.785	8		0.069
15KR092SD	7	73	10	7	31.971	30.397	7		0.069
15KR092SD	8	11	10	10	33.075	30.943	10		0.069
15KR093SD	1	99	10	9	30.492	28.757	9		0.069
15KR093SD	2	49	10	7	33.992	32.549	7		0.069
15KR093SD	3	5	10	10	32.606	30.768	10		0.069
15KR093SD	4	51	10	9	31.615	30.242	9		0.069
15KR093SD	5	26	10	5	33.917	32.711	5		0.069
15KR093SD	6	24	10	6	32.392	31.133	6		0.069
15KR093SD	7	101	10	8	32.197	30.59	8		0.069
15KR093SD	8	16	10	2	31.246	30.806	2		0.069
15KR099SD	1	25	10	9	31.436	28.885	9		0.069
15KR099SD	2	79	10	7	33.706	31.214	7		0.069
15KR099SD	3	69	10	9	31.517	29.387	9		0.069

CETIS Test Data Worksheet

Group	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	InitialWgt
15KR099SD	4	52	10	9	32.525	30.155	9		0.069
15KR099SD	5	39	10	10	33.091	30.739	10		0.069
15KR099SD	6	4	10	8	32.682	30.688	8		0.069
15KR099SD	7	10	10	10	33.235	30.656	10		0.069
15KR099SD	8	86	10	10	35.653	32.69	10		0.069

Survival: Combined References vs. Test Sediments

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences	
Analysis ID:	15-1267-7590	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:40	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR084SD	10-3893-7565	05 Sep-15 16:16	22 Sep-15 11:15	20d 18h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR084SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.57%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR084SD	110	NA	3	22	0.7779	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01313371	0.01313371	1	0.4496	0.5095	Non-Significant Effect
Error	0.6426935	0.02921334	22			
Total	0.6558272		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.489	7.968	0.6131	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8225	0.884	0.0007	Non-normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR084SD	8	0.925	0.8385	1	0.95	0.7	1	0.0366	11.19%	-4.23%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR084SD	8	1.298	1.175	1.422	1.331	0.9912	1.412	0.05233	11.4%	-3.97%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
	0.9	1	0.9	0.9	1	1				
15KR084SD	0.9	1	0.7	1	1	0.9	0.9	1		

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR084SD	1.249	1.412	0.9912	1.412	1.412	1.249	1.249	1.412		

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	13-2606-5748	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:40	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	23d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR085SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.36%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR085SD	107	NA	2	22	0.7047	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01147562	0.01147562	1	0.4079	0.5296	Non-Significant Effect
Error	0.6189239	0.0281329	22			
Total	0.6303995		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.762	7.968	0.4575	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8487	0.884	0.0021	Non-normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR085SD	8	0.925	0.8509	0.9991	0.95	0.8	1	0.03134	9.58%	-4.23%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR085SD	8	1.295	1.181	1.409	1.331	1.107	1.412	0.0481	10.51%	-3.72%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
	0.9	1	0.9	0.9	1	1				
15KR085SD	1	0.9	1	0.9	1	0.8	0.8	1		

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR085SD	1.412	1.249	1.412	1.249	1.412	1.107	1.107	1.412		

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	11-7975-2114	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:41	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR087SD	12-9078-6026	02 Sep-15 18:25	22 Sep-15 11:15	23d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR087SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.44%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR087SD	105	NA	3	22	0.6182	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001875447	0.001875447	1	0.0554	0.8161	Non-Significant Effect
Error	0.7447697	0.03385317	22			
Total	0.7466452		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.118	4.847	0.8031	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8004	0.884	0.0003	Non-normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR087SD	8	0.9	0.7818	1	0.95	0.6	1	0.05	15.71%	-1.41%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR087SD	8	1.267	1.108	1.427	1.331	0.8861	1.412	0.06754	15.07%	-1.5%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
	0.9	1	0.9	0.9	1	1				
15KR087SD	0.9	1	0.8	1	0.9	0.6	1	1		

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR087SD	1.249	1.412	1.107	1.412	1.249	0.8861	1.412	1.412		

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	04-8484-3054	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:41	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	23d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR088SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.08%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR088SD	99.5	NA	3	22	0.4672	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.746204E-05	4.746204E-05	1	0.001488	0.9696	Non-Significant Effect
Error	0.7019545	0.03190702	22			
Total	0.7020019		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.074	7.968	0.9777	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7998	0.884	0.0003	Non-normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR088SD	8	0.8875	0.7833	0.9917	0.9	0.7	1	0.04407	14.04%	0.0%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR088SD	8	1.246	1.1	1.391	1.249	0.9912	1.412	0.06162	13.99%	0.24%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
	0.9	1	0.9	0.9	1	1				
15KR088SD	0.7	0.9	1	0.9	0.7	0.9	1	1		

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR088SD	0.9912	1.249	1.412	1.249	0.9912	1.249	1.412	1.412		

CETIS Analytical Report

Test Code: 874-1B | 10-4925-1185

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	00-5532-5186	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR089SD	09-2513-6691	06 Sep-15 13:30	22 Sep-15 11:15	19d 21h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR089SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.41%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR089SD	4.286	1.717	0.137	22	0.0002	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.6192267	0.6192267	1	18.37	0.0003	Significant Effect
Error	0.7416307	0.03371049	22			
Total	1.360857		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.105	4.847	0.8177	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9174	0.884	0.0512	Normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR089SD	8	0.6125	0.4681	0.7569	0.65	0.4	0.9	0.06105	28.19%	30.99%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR089SD	8	0.9079	0.7492	1.067	0.9386	0.6847	1.249	0.06712	20.91%	27.29%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
	0.9	1	0.9	0.9	1	1				
15KR089SD	0.9	0.4	0.7	0.6	0.4	0.7	0.7	0.5		

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR089SD	1.249	0.6847	0.9912	0.8861	0.6847	0.9912	0.9912	0.7854		

CETIS Analytical Report

Test Code: 874-1B 10-4925-1185

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	04-4825-0919	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:41	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	23d 1h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR090SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	10.1%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR090SD	120.5	NA	2	22	0.9153	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.02228931	0.02228931	1	0.5904	0.4505	Non-Significant Effect
Error	0.8306312	0.03775597	22			
Total	0.8529205		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.494	4.847	0.4849	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.7765	0.884	0.0001	Non-normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR090SD	8	0.925	0.7785	1	1	0.5	1	0.06196	18.95%	-4.23%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR090SD	8	1.313	1.129	1.498	1.412	0.7854	1.412	0.07807	16.81%	-5.18%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
	0.9	1	0.9	0.9	1	1				
15KR090SD	1	1	1	0.9	0.5	1	1	1		

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR090SD	1.412	1.412	1.412	1.249	0.7854	1.412	1.412	1.412		

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	19-1621-5006	Endpoint:	Proportion Survived	CETIS Version: CETISv1.8.7
Analyzed:	10 Dec-15 11:41	Analysis:	Nonparametric-Two Sample	Official Results: Yes

Batch ID:	06-5161-8051	Test Type:	Survival-Growth	Analyst:	
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	27d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR091SD	17-1206-1859	06 Sep-15 17:30	22 Sep-15 11:15	19d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR091SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.27%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR091SD	47	NA	2	22	<0.0001	Exact	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.6401256	0.6401256	1	23.13	<0.0001	Significant Effect
Error	0.608904	0.02767745	22			
Total	1.24903		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.91	7.968	0.3931	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8629	0.884	0.0038	Non-normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR091SD	8	0.6125	0.5083	0.7167	0.6	0.4	0.8	0.04407	20.35%	30.99%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR091SD	8	0.9022	0.793	1.011	0.8861	0.6847	1.107	0.0462	14.48%	27.75%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
	0.9	1	0.9	0.9	1	1				
15KR091SD	0.4	0.8	0.7	0.6	0.7	0.6	0.6	0.5		

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR091SD	0.6847	1.107	0.9912	0.8861	0.9912	0.8861	0.8861	0.7854		

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Northwestern Aquatic Sciences**

Analysis ID:	03-8048-1886	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:41	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	22d 23h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR092SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	9.07%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR092SD	103	NA	3	22	0.6076	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001067859	0.001067859	1	0.03352	0.8564	Non-Significant Effect
Error	0.7008488	0.03185676	22			
Total	0.7019167		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.08	7.968	0.9715	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8273	0.884	0.0009	Non-normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR092SD	8	0.9	0.8001	0.9999	0.95	0.7	1	0.04226	13.28%	-1.41%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR092SD	8	1.263	1.118	1.408	1.331	0.9912	1.412	0.06145	13.76%	-1.13%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
	0.9	1	0.9	0.9	1	1				
15KR092SD	1	1	1	0.8	0.9	0.8	0.7	1		

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR092SD	1.412	1.412	1.412	1.107	1.249	1.107	0.9912	1.412		

CETIS Analytical Report

Test Code: 874-1B 10-4925-1185

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	01-3200-9980	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	19d 15h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR093SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	12.4%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR093SD	2.342	1.717	0.169	22	0.0143	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.2839234	0.2839234	1	5.485	0.0286	Significant Effect
Error	1.138848	0.05176581	22			
Total	1.422771		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.844	4.847	0.0846	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9227	0.884	0.0672	Normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR093SD	8	0.7	0.4811	0.9189	0.75	0.2	1	0.09258	37.41%	21.13%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR093SD	8	1.018	0.7633	1.273	1.049	0.4636	1.412	0.1077	29.92%	18.48%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
	0.9	1	0.9	0.9	1	1				
15KR093SD	0.9	0.7	1	0.9	0.5	0.6	0.8	0.2		

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR093SD	1.249	0.9912	1.412	1.249	0.7854	0.8861	1.107	0.4636		

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	00-7791-8848	**Endpoint:**	Proportion Survived	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:41	**Analysis:**	Nonparametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	21d		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR099SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Angular (Corrected)	NA	C > T	NA	NA	8.68%	

Wilcoxon Rank Sum Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR099SD	100	NA	3	22	0.5015	Exact	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.000707282	0.000707282	1	0.02377	0.8789	Non-Significant Effect
Error	0.6546798	0.02975817	22			
Total	0.655387		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.381	7.968	0.6910	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.8186	0.884	0.0006	Non-normal Distribution

Proportion Survived Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.8875	0.815	0.96	0.9	0.6	1	0.034	15.33%	0.0%
15KR099SD	8	0.9	0.8106	0.9894	0.9	0.7	1	0.0378	11.88%	-1.41%

Angular (Corrected) Transformed Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	1.249	1.152	1.345	1.249	0.8861	1.412	0.04515	14.46%	0.0%
15KR099SD	8	1.26	1.132	1.389	1.249	0.9912	1.412	0.05433	12.2%	-0.92%

Proportion Survived Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.6	0.6	0.7	1	0.9	0.9	0.9	0.9	1	1
	0.9	1	0.9	0.9	1	1				
15KR099SD	0.9	0.7	0.9	0.9	1	0.8	1	1		

Angular (Corrected) Transformed Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.8861	0.8861	0.9912	1.412	1.249	1.249	1.249	1.249	1.412	1.412
15KR099SD	1.249	0.9912	1.249	1.249	1.412	1.107	1.412	1.412		

Growth: Combined References vs. Test Sediments

CETIS Analytical Report

Report Date: 10 Dec-15 11:43 (p 1 of 20)
Test Code: 874-1B | 10-4925-1185

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	20-9636-0899	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:41	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR084SD	10-3893-7565	05 Sep-15 16:16	22 Sep-15 11:15	20d 18h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR084SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.7%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR084SD	0.8292	1.717	0.032	22	0.2080	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.001289154	0.001289154	1	0.6875	0.4159	Non-Significant Effect
Error	0.04125331	0.001875151	22			
Total	0.04254247		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	6.202	7.968	0.0211	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9402	0.884	0.1649	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR084SD	8	0.2389	0.2219	0.2559	0.2398	0.1992	0.2651	0.00718	8.5%	6.11%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR084SD	0.2489	0.2355	0.2441	0.2569	0.1992	0.2344	0.227	0.2651		

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test					Northwestern Aquatic Sciences
Analysis ID:	09-5695-3814	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR085SD	19-8292-8550	02 Sep-15 17:00	22 Sep-15 11:15	23d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR085SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.6%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR085SD	-1.13	1.717	0.035	22	0.8648	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002753549	0.002753549	1	1.278	0.2705	Non-Significant Effect
Error	0.04741137	0.002155063	22			
Total	0.05016492		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.98	7.968	0.3667	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9743	0.884	0.7729	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR085SD	8	0.2772	0.2471	0.3072	0.2742	0.2317	0.3275	0.01271	12.97%	-8.93%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR085SD	0.3081	0.3074	0.2551	0.2451	0.249	0.2934	0.3275	0.2317		

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Analysis ID:	13-8958-9850	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR087SD	12-9078-6026	02 Sep-15 18:25	22 Sep-15 11:15	23d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR087SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	14.4%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR087SD	0.9923	1.717	0.037	22	0.1659	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002385043	0.002385043	1	0.9847	0.3318	Non-Significant Effect
Error	0.05328718	0.002422145	22			
Total	0.05567222		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.2	7.968	0.8475	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.978	0.884	0.8555	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR087SD	8	0.2333	0.1947	0.2719	0.2195	0.1854	0.3196	0.01632	19.79%	8.31%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR087SD	0.2043	0.2378	0.219	0.1963	0.1854	0.284	0.3196	0.2199		

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences	
Analysis ID:	17-9540-6842	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR088SD	14-8995-5801	02 Sep-15 19:00	22 Sep-15 11:15	23d 16h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR088SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.1%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR088SD	-1.281	1.717	0.033	22	0.8933	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003323286	0.003323286	1	1.642	0.2134	Non-Significant Effect
Error	0.04452209	0.002023731	22			
Total	0.04784538		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.909	7.968	0.1586	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9663	0.884	0.5767	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR088SD	8	0.2794	0.2546	0.3042	0.2772	0.2332	0.3259	0.01048	10.61%	-9.81%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR088SD	0.3259	0.2711	0.2704	0.2513	0.2944	0.2332	0.2833	0.3056		

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Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	04-8294-7655	Endpoint:	Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed:	10 Dec-15 11:42	Analysis:	Parametric-Two Sample	Official Results: Yes

Batch ID:	06-5161-8051	Test Type:	Survival-Growth	Analyst:	
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	27d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR089SD	09-2513-6691	06 Sep-15 13:30	22 Sep-15 11:15	19d 21h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR089SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.1%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR089SD	1.437	1.717	0.033	22	0.0824	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.004180111	0.004180111	1	2.065	0.1648	Non-Significant Effect
Error	0.04454258	0.002024663	22			
Total	0.04872269		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	2.899	7.968	0.1599	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9617	0.884	0.4738	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR089SD	8	0.2264	0.2016	0.2513	0.2353	0.181	0.2688	0.0105	13.12%	11.0%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR089SD	0.2382	0.2688	0.2324	0.181	0.2455	0.2386	0.2207	0.1864		

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences
Analysis ID:	09-0988-9663	Endpoint:	Mean Dry Weight-mg	CETIS Version: CETISv1.8.7
Analyzed:	10 Dec-15 11:42	Analysis:	Parametric-Two Sample	Official Results: Yes

Batch ID:	06-5161-8051	Test Type:	Survival-Growth	Analyst:	
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	27d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR090SD	19-8991-2116	03 Sep-15 09:44	22 Sep-15 11:15	23d 1h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR090SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	14.2%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR090SD	1.515	1.717	0.036	22	0.0720	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.005396009	0.005396009	1	2.296	0.1440	Non-Significant Effect
Error	0.0517142	0.002350645	22			
Total	0.05711021		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.341	7.968	0.7225	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9722	0.884	0.7211	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR090SD	8	0.2226	0.1861	0.2591	0.2222	0.173	0.3084	0.01544	19.61%	12.5%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR090SD	0.1732	0.3084	0.2062	0.2249	0.251	0.2237	0.173	0.2207		

CETIS Analytical Report

Report Date: 16 Dec-15 11:34 (p 1 of 1)
Test Code: 874-1B | 10-4925-1185

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Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences	
Analysis ID:	05-3566-2993	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Dec-15 11:33	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR091SD	17-1206-1859	06 Sep-15 17:30	22 Sep-15 11:15	19d 17h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR091SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	14.0%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR091SD	0.6149	1.717	0.036	22	0.2725	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0008714955	0.0008714955	1	0.3781	0.5449	Non-Significant Effect
Error	0.05070822	0.002304919	22			
Total	0.05157971		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.451	7.968	0.6397	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9838	0.884	0.9548	Normal Distribution

Mean Dry Weight-mg Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR091SD	8	0.2417	0.2066	0.2768	0.2358	0.1895	0.314	0.01485	17.38%	5.02%

Mean Dry Weight-mg Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR091SD	0.314	0.1895	0.229	0.278	0.2009	0.2645	0.2148	0.2426		

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences	
Analysis ID:	04-5974-6207	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR092SD	11-6812-3165	03 Sep-15 11:40	22 Sep-15 11:15	22d 23h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR092SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.8%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR092SD	1.427	1.717	0.033	22	0.0838	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.003924471	0.003924471	1	2.037	0.1676	Non-Significant Effect
Error	0.04238605	0.001926639	22			
Total	0.04631052		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	4.454	7.968	0.0535	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9454	0.884	0.2144	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR092SD	8	0.2273	0.2073	0.2474	0.2305	0.1791	0.2613	0.008472	10.54%	10.66%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR092SD	0.2369	0.2422	0.2289	0.2321	0.1791	0.2613	0.2249	0.2132		

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CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences	
Analysis ID:	08-2335-3477	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Dec-15 11:42	**Analysis:**	Parametric-Two Sample	**Official Results:**	Yes
Batch ID:	06-5161-8051	**Test Type:**	Survival-Growth	**Analyst:**	
Start Date:	26 Sep-15 10:30	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	**Species:**	Hyalella azteca	**Brine:**	
Duration:	27d 1h	**Source:**	Chesapeake Cultures, VA	**Age:**	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR093SD	12-3637-7543	06 Sep-15 19:30	22 Sep-15 11:15	19d 15h		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR093SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	12.9%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR093SD	2.792	1.717	0.033	22	0.0053	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.01529168	0.01529168	1	7.795	0.0106	Significant Effect
Error	0.04315829	0.001961741	22			
Total	0.05844998		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	3.736	7.968	0.0853	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9537	0.884	0.3258	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR093SD	8	0.2009	0.179	0.2228	0.2035	0.1526	0.2412	0.00925	13.02%	21.04%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR093SD	0.1928	0.2061	0.1838	0.1526	0.2412	0.2098	0.2009	0.22		

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test				Northwestern Aquatic Sciences	
Analysis ID:	12-0805-4796	Endpoint:	Mean Dry Weight-mg	CETIS Version:	CETISv1.8.7
Analyzed:	10 Dec-15 11:42	Analysis:	Parametric-Two Sample	Official Results:	Yes
Batch ID:	06-5161-8051	Test Type:	Survival-Growth	Analyst:	
Start Date:	26 Sep-15 10:30	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Dechlorinated Tap Water
Ending Date:	23 Oct-15 11:00	Species:	Hyalella azteca	Brine:	
Duration:	27d 1h	Source:	Chesapeake Cultures, VA	Age:	

Sample Code	Sample Notes
Combined Ref	Data from both reference sediments, 15KR082SD and 15KR083SD, were combined into one reference "Combined Ref".

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Combined Ref	04-6258-6262	02 Sep-15	22 Sep-15 11:15	24d 10h		
15KR099SD	20-3303-6234	05 Sep-15 10:50	22 Sep-15 11:15	21d		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Combined Ref	Sediment	Kuskokwim River Sediment Char			
15KR099SD	Sediment	Kuskokwim River Sediment Char			

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	Test Result
Untransformed	NA	C > T	NA	NA	13.8%	

Equal Variance t Two-Sample Test

Sample Code	vs	Sample Code	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Combined Ref		15KR099SD	-1.026	1.717	0.035	22	0.8419	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.002339167	0.002339167	1	1.052	0.3163	Non-Significant Effect
Error	0.04893388	0.002224267	22			
Total	0.05127304		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F	1.694	7.968	0.4915	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9676	0.884	0.6073	Normal Distribution

Mean Dry Weight-mg Summary

Group	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Combined Ref	16	0.2544	0.2275	0.2814	0.2587	0.1397	0.3499	0.01264	19.88%	0.0%
15KR099SD	8	0.2754	0.2429	0.3079	0.2688	0.2352	0.356	0.01374	14.11%	-8.23%

Mean Dry Weight-mg Detail

Group	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Combined Ref	0.2482	0.2673	0.2633	0.2708	0.3499	0.2869	0.2403	0.1397	0.1728	0.2542
	0.2782	0.2919	0.2352	0.222	0.3162	0.2342				
15KR099SD	0.2834	0.356	0.2367	0.2633	0.2352	0.2743	0.2579	0.2963		

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CETIS Data Entry for Combined Reference Comparisons

data entry verified against laboratory bench sheets 12-16-15 JRF

CETIS Test Data Worksheet

Report Date: 10 Dec-15 11:36 (p 1 of 4)
Test Code: 10-4925-1185/874-1B

12/22/2015

Hyalella 28-d Survival and Growth Sediment Test — Northwestern Aquatic Sciences

Start Date:	26 Sep-15 10:30	**Species:**	Hyalella azteca
End Date:	23 Oct-15 11:00	**Protocol:**	EPA/600/R-99/064 (2000)
Sample Date:	02 Sep-15	**Material:**	Sediment
Sample Code:	Combined Ref		
Sample Source:	Kuskokwim River Sediment Charact		
Sample Station:			

Group	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	InitialWgt
Combined Ref	1	101	10	6	31.579	30.09	6		
Combined Ref	2	161	10	6	32.036	30.432	6		
Combined Ref	3	122	10	7	33.77	31.927	7		
Combined Ref	4	3	10	10	35.049	32.341	10		
Combined Ref	5	166	10	9	33.361	30.212	9		
Combined Ref	6	43	10	9	35.644	33.062	9		
Combined Ref	7	146	10	9	33.446	31.283	9		
Combined Ref	8	17	10	9	33.078	31.821	9		
Combined Ref	9	12	10	10	32.612	30.884	10		
Combined Ref	10	124	10	10	32.344	29.802	10		
Combined Ref	11	39	10	9	32.398	29.894	9		
Combined Ref	12	66	10	10	32.036	29.117	10		
Combined Ref	13	141	10	9	31.857	29.74	9		
Combined Ref	14	18	10	9	33.815	31.817	9		
Combined Ref	15	125	10	10	32.819	29.657	10		
Combined Ref	16	26	10	10	33.35	31.008	10		
15KR084SD	1	153	10	9	32.01	29.77	9		
15KR084SD	2	78	10	10	31.244	28.889	10		
15KR084SD	3	29	10	7	31.995	30.286	7		
15KR084SD	4	79	10	10	33.526	30.957	10		
15KR084SD	5	148	10	10	34.74	32.748	10		
15KR084SD	6	167	10	9	32.884	30.774	9		
15KR084SD	7	61	10	9	30.55	28.507	9		
15KR084SD	8	112	10	10	33.819	31.168	10		
15KR084SD	9	42							
15KR084SD	10	33							
15KR084SD	11	116							
15KR084SD	12	103							
15KR084SD	13	58							
15KR084SD	14	52							
15KR084SD	15	110							
15KR084SD	16	92							
15KR085SD	1	142	10	10	34.49	31.409	10		
15KR085SD	2	134	10	9	34.12	31.353	9		
15KR085SD	3	95	10	10	32.718	30.167	10		
15KR085SD	4	173	10	9	31.871	29.665	9		
15KR085SD	5	96	10	10	33.274	30.784	10		
15KR085SD	6	155	10	8	31.805	29.458	8		
15KR085SD	7	58	10	8	32.36	29.74	8		
15KR085SD	8	169	10	10	32.3	29.983	10		
15KR085SD	9	88							
15KR085SD	10	24							
15KR085SD	11	172							
15KR085SD	12	84							
15KR085SD	13	99							
15KR085SD	14	154							
15KR085SD	15	2							

CETIS Test Data Worksheet

Group	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	InitialWgt
15KR085SD	16	28							
15KR087SD	1	4	10	9	30.292	28.453	9		
15KR087SD	2	80	10	10	32.639	30.261	10		
15KR087SD	3	105	10	8	30.944	29.192	8		
15KR087SD	4	132	10	10	30.702	28.739	10		
15KR087SD	5	72	10	9	32.181	30.512	9		
15KR087SD	6	137	10	6	31.606	29.902	6		
15KR087SD	7	149	10	10	35.769	32.573	10		
15KR087SD	8	115	10	10	31.764	29.565	10		
15KR087SD	9	90							
15KR087SD	10	21							
15KR087SD	11	47							
15KR087SD	12	175							
15KR087SD	13	93							
15KR087SD	14	64							
15KR087SD	15	104							
15KR087SD	16	55							
15KR088SD	1	27	10	7	32.57	30.289	7		
15KR088SD	2	40	10	9	32.872	30.432	9		
15KR088SD	3	14	10	10	32.724	30.02	10		
15KR088SD	4	15	10	9	33.433	31.171	9		
15KR088SD	5	9	10	7	34.413	32.352	7		
15KR088SD	6	82	10	9	33.955	31.856	9		
15KR088SD	7	22	10	10	34.32	31.487	10		
15KR088SD	8	164	10	10	33.804	30.748	10		
15KR088SD	9	59							
15KR088SD	10	131							
15KR088SD	11	143							
15KR088SD	12	48							
15KR088SD	13	37							
15KR088SD	14	5							
15KR088SD	15	150							
15KR088SD	16	151							
15KR089SD	1	174	10	9	32.011	29.867	9		
15KR089SD	2	45	10	4	33.598	32.523	4		
15KR089SD	3	49	10	7	32.4	30.773	7		
15KR089SD	4	114	10	6	31.173	30.087	6		
15KR089SD	5	86	10	4	31.579	30.597	4		
15KR089SD	6	87	10	7	31.978	30.308	7		
15KR089SD	7	70	10	7	33.26	31.715	7		
15KR089SD	8	111	10	5	30.234	29.302	5		
15KR089SD	9	31							
15KR089SD	10	38							
15KR089SD	11	78							
15KR089SD	12	75							
15KR089SD	13	176							
15KR089SD	14	34							
15KR089SD	15	6							
15KR089SD	16	89							
15KR090SD	1	118	10	10	30.65	28.918	10		
15KR090SD	2	168	10	10	35.525	32.441	10		
15KR090SD	3	51	10	10	31.952	29.89	10		

CETIS Test Data Worksheet

Sample Code	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	InitialWgt
15KR090SD	4	171	10	9	32.574	30.55	9		
15KR090SD	5	85	10	5	32.441	31.186	5		
15KR090SD	6	69	10	10	33.032	30.795	10		
15KR090SD	7	44	10	10	33.962	32.232	10		
15KR090SD	8	158	10	10	34.426	32.219	10		
15KR090SD	9	145							
15KR090SD	10	10							
15KR090SD	11	16							
15KR090SD	12	36							
15KR090SD	13	144							
15KR090SD	14	138							
15KR090SD	15	77							
15KR090SD	16	25							
15KR091SD	1	57	10	4	32.463	31.207	4		
15KR091SD	2	129	10	8	33.006	31.49	8		
15KR091SD	3	65	10	7	30.968	29.365	7		
15KR091SD	4	121	10	6	35.814	34.146	6		
15KR091SD	5	11	10	7	35.086	33.68	7		
15KR091SD	6	63	10	6	30.97	29.383	6		
15KR091SD	7	133	10	6	31.944	30.655	6		
15KR091SD	8	54	10	5	34.934	33.721	5		
15KR091SD	9	123							
15KR091SD	10	41							
15KR091SD	11	7							
15KR091SD	12	46							
15KR091SD	13	1							
15KR091SD	14	120							
15KR091SD	15	23							
15KR091SD	16	13							
15KR092SD	1	136	10	10	31.08	28.711	10		
15KR092SD	2	162	10	10	32.862	30.44	10		
15KR092SD	3	113	10	10	34.464	32.175	10		
15KR092SD	4	68	10	8	34.064	32.207	8		
15KR092SD	5	73	10	9	32.041	30.429	9		
15KR092SD	6	102	10	8	30.875	28.785	8		
15KR092SD	7	32	10	7	31.971	30.397	7		
15KR092SD	8	100	10	10	33.075	30.943	10		
15KR092SD	9	19							
15KR092SD	10	98							
15KR092SD	11	126							
15KR092SD	12	106							
15KR092SD	13	109							
15KR092SD	14	152							
15KR092SD	15	60							
15KR092SD	16	35							
15KR093SD	1	8	10	9	30.492	28.757	9		
15KR093SD	2	94	10	7	33.992	32.549	7		
15KR093SD	3	127	10	10	32.606	30.768	10		
15KR093SD	4	156	10	9	31.615	30.242	9		
15KR093SD	5	160	10	5	33.917	32.711	5		
15KR093SD	6	157	10	6	32.392	31.133	6		
15KR093SD	7	83	10	8	32.197	30.59	8		

CETIS Test Data Worksheet

Report Date: 10 Dec-15 11:36 (p 4 of 4)
Test Code: 10-4925-1185/874-1B

Group	Rep	Pos	# Exposed	# Survived	Total Weight-mg	Tare Weight-mg	Pan Count	Mean Length-mm	InitialWgt
15KR093SD	8	97	10	2	31.246	30.806	2		
15KR093SD	9	107							
15KR093SD	10	170							
15KR093SD	11	117							
15KR093SD	12	130							
15KR093SD	13	30							
15KR093SD	14	50							
15KR093SD	15	165							
15KR093SD	16	81							
15KR099SD	1	108	10	9	31.436	28.885	9		
15KR099SD	2	53	10	7	33.706	31.214	7		
15KR099SD	3	74	10	9	31.517	29.387	9		
15KR099SD	4	147	10	9	32.525	30.155	9		
15KR099SD	5	135	10	10	33.091	30.739	10		
15KR099SD	6	91	10	8	32.682	30.688	8		
15KR099SD	7	20	10	10	33.235	30.656	10		
15KR099SD	8	67	10	10	35.653	32.69	10		
15KR099SD	9	159							
15KR099SD	10	62							
15KR099SD	11	128							
15KR099SD	12	163							
15KR099SD	13	140							
15KR099SD	14	119							
15KR099SD	15	139							
15KR099SD	16	71							

12/22/2015

data entry verified against laboratory bench sheets 12.15.15 JDF

Water Quality Data

BKR	NAS SMPL	CLIENT DESCRIP	REPL	DAY	Overlying water TEMP	DO	COND	pH	NH3	HARD	ALK
15	5438G	15KR093SD	8	0	23.5	8.0	113	6.6	<0.1	34	50
43	5428G	15KR082SD	8	0	22.9	7.9	111	6.6	<0.1	34	50
44	5436G	15KR091SD	8	0	22.9	7.8	113	6.6	<0.1	34	50
64	5430G	15KR084SD	8	0	23.0	8.1	116	6.5	<0.1	34	40
66	5433G	15KR088SD	8	0	22.9	8.0	104	6.5	0.3	34	50
67	5429G	15KR083SD	8	0	22.9	8.0	109	6.6	<0.1	34	50
72	5427G	Control	8	0	22.7	7.7	290	6.8	<0.1	34	40
79	5432G	15KR087SD	8	0	22.7	8.0	120	6.7	0.1	34	40
83	5437G	15KR092SD	8	0	22.9	7.9	114	6.6	0.1	34	40
86	5434G	15KR089SD	8	0	22.8	7.8	123	6.6	0.1	34	50
89	5435G	15KR090SD	8	0	22.9	8.1	117	6.6	<0.1	34	50
97	5431G	15KR085SD	8	0	22.9	8.0	113	6.7	0.1	26	40
99	5439G	15KR099SD	8	0	23.0	8.2	113	6.8	<0.1	34	50
15	5438G	15KR093SD	8	1	23.5						
43	5428G	15KR082SD	8	1	23.4						
44	5436G	15KR091SD	8	1	23.4						
64	5430G	15KR084SD	8	1	23.6						
66	5433G	15KR088SD	8	1	23.7						
67	5429G	15KR083SD	8	1	23.6						
72	5427G	Control	8	1	23.5						
79	5432G	15KR087SD	8	1	23.3						
83	5437G	15KR092SD	8	1	23.5						
86	5434G	15KR089SD	8	1	23.5						
89	5435G	15KR090SD	8	1	23.5						
97	5431G	15KR085SD	8	1	23.8						
99	5439G	15KR099SD	8	1	23.9						
15	5438G	15KR093SD	8	2	23.0						
43	5428G	15KR082SD	8	2	22.4						
44	5436G	15KR091SD	8	2	22.4						
64	5430G	15KR084SD	8	2	22.5						
66	5433G	15KR088SD	8	2	22.2						
67	5429G	15KR083SD	8	2	22.1						
72	5427G	Control	8	2	22.1						
79	5432G	15KR087SD	8	2	22.3						
83	5437G	15KR092SD	8	2	22.1						
86	5434G	15KR089SD	8	2	22.3						
89	5435G	15KR090SD	8	2	22.5						
97	5431G	15KR085SD	8	2	22.5						
99	5439G	15KR099SD	8	2	22.7						
15	5438G	15KR093SD	8	3	22.5	7.9		6.7			
43	5428G	15KR082SD	8	3	22.9	7.9		6.7			
44	5436G	15KR091SD	8	3	22.1	7.9		6.7			
64	5430G	15KR084SD	8	3	22.0	7.8		6.6			
66	5433G	15KR088SD	8	3	23.0	7.8		6.7			
67	5429G	15KR083SD	8	3	22.7	7.8		6.8			
72	5427G	Control	8	3	22.6	7.4		6.9			
79	5432G	15KR087SD	8	3	23.1	7.6		6.7			
83	5437G	15KR092SD	8	3	22.7	7.4		6.7			
86	5434G	15KR089SD	8	3	23.0	7.4		6.8			
89	5435G	15KR090SD	8	3	23.3	7.4		6.9			
97	5431G	15KR085SD	8	3	23.3	7.7		6.9			
99	5439G	15KR099SD	8	3	23.5	7.9		6.9			
15	5438G	15KR093SD	8	4	23.8						
43	5428G	15KR082SD	8	4	23.0						
44	5436G	15KR091SD	8	4	23.3						
64	5430G	15KR084SD	8	4	23.2						
66	5433G	15KR088SD	8	4	23.0						
67	5429G	15KR083SD	8	4	22.9						
72	5427G	Control	8	4	22.8						
79	5432G	15KR087SD	8	4	23.1						
83	5437G	15KR092SD	8	4	22.9						
86	5434G	15KR089SD	8	4	23.1						

89	5435G	15KR090SD	8	4	23.3			
97	5431G	15KR085SD	8	4	23.4			
99	5439G	15KR099SD	8	4	23.5			
15	5438G	15KR093SD	8	5	24.0	6.6	117	6.9
43	5428G	15KR082SD	8	5	23.5	6.7	113	6.9
44	5436G	15KR091SD	8	5	23.8	6.7	116	6.9
64	5430G	15KR084SD	8	5	23.7	6.4	112	6.8
66	5433G	15KR088SD	8	5	23.4	6.6	112	6.9
67	5429G	15KR083SD	8	5	23.4	6.6	111	7.0
72	5427G	Control	8	5	23.2	6.4	127	6.9
79	5432G	15KR087SD	8	5	23.6	6.5	117	7.0
83	5437G	15KR092SD	8	5	23.3	6.3	112	6.8
86	5434G	15KR089SD	8	5	23.5	6.4	115	6.8
89	5435G	15KR090SD	8	5	23.6	6.4	113	6.9
97	5431G	15KR085SD	8	5	23.8	6.6	111	7.0
99	5439G	15KR099SD	8	5	23.9	6.8	111	7.0
15	5438G	15KR093SD	8	6	23.8			
43	5428G	15KR082SD	8	6	23.2			
44	5436G	15KR091SD	8	6	23.4			
64	5430G	15KR084SD	8	6	23.3			
66	5433G	15KR088SD	8	6	23.1			
67	5429G	15KR083SD	8	6	22.9			
72	5427G	Control	8	6	22.9			
79	5432G	15KR087SD	8	6	23.2			
83	5437G	15KR092SD	8	6	22.9			
86	5434G	15KR089SD	8	6	23.1			
89	5435G	15KR090SD	8	6	23.3			
97	5431G	15KR085SD	8	6	23.4			
99	5439G	15KR099SD	8	6	23.5			
15	5438G	15KR093SD	8	7	23.8	7.1		6.7
43	5428G	15KR082SD	8	7	23.2	6.8		6.6
44	5436G	15KR091SD	8	7	23.5	6.8		6.7
64	5430G	15KR084SD	8	7	23.5	6.7		6.6
66	5433G	15KR088SD	8	7	23.0	7.0		6.8
67	5429G	15KR083SD	8	7	23.0	7.0		6.7
72	5427G	Control	8	7	22.9	6.5		6.7
79	5432G	15KR087SD	8	7	23.3	6.4		6.8
83	5437G	15KR092SD	8	7	23.0	6.4		6.7
86	5434G	15KR089SD	8	7	23.2	6.6		6.7
89	5435G	15KR090SD	8	7	23.4	6.6		6.8
97	5431G	15KR085SD	8	7	23.4	6.8		6.9
99	5439G	15KR099SD	8	7	23.6	6.9		6.9
15	5438G	15KR093SD	8	8	24.0			
43	5428G	15KR082SD	8	8	23.4			
44	5436G	15KR091SD	8	8	23.7			
64	5430G	15KR084SD	8	8	23.8			
66	5433G	15KR088SD	8	8	23.8			
67	5429G	15KR083SD	8	8	23.7			
72	5427G	Control	8	8	23.0			
79	5432G	15KR087SD	8	8	23.6			
83	5437G	15KR092SD	8	8	23.1			
86	5434G	15KR089SD	8	8	23.4			
89	5435G	15KR090SD	8	8	23.6			
97	5431G	15KR085SD	8	8	23.6			
99	5439G	15KR099SD	8	8	23.8			
15	5438G	15KR093SD	8	9	23.1			
43	5428G	15KR082SD	8	9	22.3			
44	5436G	15KR091SD	8	9	22.6			
64	5430G	15KR084SD	8	9	22.6			
66	5433G	15KR088SD	8	9	22.3			
67	5429G	15KR083SD	8	9	22.1			
72	5427G	Control	8	9	22.1			
79	5432G	15KR087SD	8	9	22.4			
83	5437G	15KR092SD	8	9	22.1			
86	5434G	15KR089SD	8	9	22.3			

89	5435G	15KR090SD	8	9	22.5			
97	5431G	15KR085SD	8	9	22.6			
99	5439G	15KR099SD	8	9	22.8			
15	5438G	15KR093SD	8	10	24.0	6.8		7.0
43	5428G	15KR082SD	8	10	23.3	6.8		6.9
44	5436G	15KR091SD	8	10	23.8	6.8		7.0
64	5430G	15KR084SD	8	10	23.7	6.8		6.9
66	5433G	15KR088SD	8	10	23.3	6.7		6.9
67	5429G	15KR083SD	8	10	23.2	6.9		7.0
72	5427G	Control	8	10	23.1	6.4		7.0
79	5432G	15KR087SD	8	10	23.6	6.5		7.1
83	5437G	15KR092SD	8	10	23.2	6.4		6.9
86	5434G	15KR089SD	8	10	23.4	6.8		6.9
89	5435G	15KR090SD	8	10	23.6	6.6		7.0
97	5431G	15KR085SD	8	10	23.6	6.8		7.0
99	5439G	15KR099SD	8	10	23.8	6.9		7.0
15	5438G	15KR093SD	8	11	24.0			
43	5428G	15KR082SD	8	11	23.6			
44	5436G	15KR091SD	8	11	24.0			
64	5430G	15KR084SD	8	11	23.9			
66	5433G	15KR088SD	8	11	23.6			
67	5429G	15KR083SD	8	11	23.5			
72	5427G	Control	8	11	23.5			
79	5432G	15KR087SD	8	11	23.8			
83	5437G	15KR092SD	8	11	23.5			
86	5434G	15KR089SD	8	11	23.7			
89	5435G	15KR090SD	8	11	23.9			
97	5431G	15KR085SD	8	11	24.0			
99	5439G	15KR099SD	8	11	24.0			
15	5438G	15KR093SD	8	12	24.0	7.3	108	7.0
43	5428G	15KR082SD	8	12	23.5	6.9	105	7.0
44	5436G	15KR091SD	8	12	23.8	7.1	110	7.0
64	5430G	15KR084SD	8	12	23.8	6.9	108	6.9
66	5433G	15KR088SD	8	12	23.6	7.1	108	7.0
67	5429G	15KR083SD	8	12	23.5	7.2	107	7.0
72	5427G	Control	8	12	23.4	6.9	113	7.1
79	5432G	15KR087SD	8	12	23.7	6.9	114	7.1
83	5437G	15KR092SD	8	12	23.4	6.9	108	6.9
86	5434G	15KR089SD	8	12	23.7	7.3	111	6.9
89	5435G	15KR090SD	8	12	23.7	6.9	110	7.1
97	5431G	15KR085SD	8	12	24.0	7.1	110	7.2
99	5439G	15KR099SD	8	12	24.0	7.1	108	7.1
15	5438G	15KR093SD	8	13	24.0			
43	5428G	15KR082SD	8	13	23.5			
44	5436G	15KR091SD	8	13	23.8			
64	5430G	15KR084SD	8	13	23.7			
66	5433G	15KR088SD	8	13	23.4			
67	5429G	15KR083SD	8	13	23.4			
72	5427G	Control	8	13	23.3			
79	5432G	15KR087SD	8	13	23.6			
83	5437G	15KR092SD	8	13	23.3			
86	5434G	15KR089SD	8	13	23.5			
89	5435G	15KR090SD	8	13	23.7			
97	5431G	15KR085SD	8	13	23.7			
99	5439G	15KR099SD	8	13	24.0			
15	5438G	15KR093SD	8	14	23.9	6.8		7.3
43	5428G	15KR082SD	8	14	23.4	6.6		7.3
44	5436G	15KR091SD	8	14	23.7	6.6		7.2
64	5430G	15KR084SD	8	14	23.6	6.6		7.2
66	5433G	15KR088SD	8	14	23.5	6.6		7.2
67	5429G	15KR083SD	8	14	23.4	6.6		7.1
72	5427G	Control	8	14	23.3	6.1		7.3
79	5432G	15KR087SD	8	14	23.5	6.3		7.1
83	5437G	15KR092SD	8	14	23.3	6.1		7.0
86	5434G	15KR089SD	8	14	23.5	6.4		7.0

89	5435G	15KR090SD	8	14	23.6	6.3		7.1
97	5431G	15KR085SD	8	14	23.7	6.5		7.1
99	5439G	15KR099SD	8	14	23.8	6.5		7.1
15	5438G	15KR093SD	8	15	23.3			
43	5428G	15KR082SD	8	15	23.2			
44	5436G	15KR091SD	8	15	23.5			
64	5430G	15KR084SD	8	15	23.4			
66	5433G	15KR088SD	8	15	23.3			
67	5429G	15KR083SD	8	15	23.2			
72	5427G	Control	8	15	23.2			
79	5432G	15KR087SD	8	15	23.3			
83	5437G	15KR092SD	8	15	23.2			
86	5434G	15KR089SD	8	15	23.3			
89	5435G	15KR090SD	8	15	23.4			
97	5431G	15KR085SD	8	15	23.4			
99	5439G	15KR099SD	8	15	23.6			
15	5438G	15KR093SD	8	16	22.9			
43	5428G	15KR082SD	8	16	22.9			
44	5436G	15KR091SD	8	16	23.2			
64	5430G	15KR084SD	8	16	23.1			
66	5433G	15KR088SD	8	16	23.0			
67	5429G	15KR083SD	8	16	22.9			
72	5427G	Control	8	16	22.9			
79	5432G	15KR087SD	8	16	23.2			
83	5437G	15KR092SD	8	16	23.0			
86	5434G	15KR089SD	8	16	23.1			
89	5435G	15KR090SD	8	16	23.3			
97	5431G	15KR085SD	8	16	23.3			
99	5439G	15KR099SD	8	16	23.3			
15	5438G	15KR093SD	8	17	23.5	5.8		6.6
43	5428G	15KR082SD	8	17	23.0	6.0		6.5
44	5436G	15KR091SD	8	17	23.3	5.8		6.6
64	5430G	15KR084SD	8	17	23.2	5.7		6.6
66	5433G	15KR088SD	8	17	23.0	5.7		6.7
67	5429G	15KR083SD	8	17	22.9	5.7		6.7
72	5427G	Control	8	17	22.9	5.4		6.9
79	5432G	15KR087SD	8	17	23.1	5.6		6.8
83	5437G	15KR092SD	8	17	22.9	5.6		6.7
86	5434G	15KR089SD	8	17	23.1	5.5		6.6
89	5435G	15KR090SD	8	17	23.3	5.6		6.7
97	5431G	15KR085SD	8	17	23.3	5.9		6.8
99	5439G	15KR099SD	8	17	23.4	6.0		6.8
15	5438G	15KR093SD	8	18	23.5			
43	5428G	15KR082SD	8	18	22.9			
44	5436G	15KR091SD	8	18	23.1			
64	5430G	15KR084SD	8	18	23.1			
66	5433G	15KR088SD	8	18	22.9			
67	5429G	15KR083SD	8	18	22.8			
72	5427G	Control	8	18	22.7			
79	5432G	15KR087SD	8	18	22.9			
83	5437G	15KR092SD	8	18	22.8			
86	5434G	15KR089SD	8	18	23.0			
89	5435G	15KR090SD	8	18	23.0			
97	5431G	15KR085SD	8	18	23.1			
99	5439G	15KR099SD	8	18	23.2			
15	5438G	15KR093SD	8	19	23.6	6.9	98	6.7
43	5428G	15KR082SD	8	19	23.1	7.1	98	6.7
44	5436G	15KR091SD	8	19	23.3	6.9	101	6.7
64	5430G	15KR084SD	8	19	23.3	7.3	99	6.7
66	5433G	15KR088SD	8	19	23.1	7.3	100	6.8
67	5429G	15KR083SD	8	19	23.0	6.9	101	6.8
72	5427G	Control	8	19	23.0	6.9	105	7.1
79	5432G	15KR087SD	8	19	23.1	7.1	104	6.9
83	5437G	15KR092SD	8	19	22.9	6.9	100	6.8
86	5434G	15KR089SD	8	19	23.2	7.3	100	6.8

89	5435G	15KR090SD	8	19	23.2	7.3	101	6.8
97	5431G	15KR085SD	8	19	23.4	7.3	101	6.9
99	5439G	15KR099SD	8	19	23.5	7.3	101	7.0
15	5438G	15KR093SD	8	20	23.6			
43	5428G	15KR082SD	8	20	23.2			
44	5436G	15KR091SD	8	20	23.4			
64	5430G	15KR084SD	8	20	23.3			
66	5433G	15KR088SD	8	20	23.2			
67	5429G	15KR083SD	8	20	23.0			
72	5427G	Control	8	20	23.0			
79	5432G	15KR087SD	8	20	23.2			
83	5437G	15KR092SD	8	20	23.0			
86	5434G	15KR089SD	8	20	23.1			
89	5435G	15KR090SD	8	20	23.2			
97	5431G	15KR085SD	8	20	23.3			
99	5439G	15KR099SD	8	20	23.3			
15	5438G	15KR093SD	8	21	23.8	7.0		7.0
43	5428G	15KR082SD	8	21	23.4	6.9		6.9
44	5436G	15KR091SD	8	21	23.3	6.8		6.9
64	5430G	15KR084SD	8	21	23.3	6.8		7.0
66	5433G	15KR088SD	8	21	23.2	6.9		6.9
67	5429G	15KR083SD	8	21	23.2	6.8		6.9
72	5427G	Control	8	21	23.1	6.6		7.2
79	5432G	15KR087SD	8	21	23.2	6.8		7.1
83	5437G	15KR092SD	8	21	23.2	7.0		7.0
86	5434G	15KR089SD	8	21	23.1	6.9		6.9
89	5435G	15KR090SD	8	21	23.2	6.9		6.9
97	5431G	15KR085SD	8	21	23.4	6.7		6.9
99	5439G	15KR099SD	8	21	23.5	6.8		6.9
15	5438G	15KR093SD	8	22	23.7			
43	5428G	15KR082SD	8	22	23.6			
44	5436G	15KR091SD	8	22	23.6			
64	5430G	15KR084SD	8	22	23.2			
66	5433G	15KR088SD	8	22	23.0			
67	5429G	15KR083SD	8	22	23.0			
72	5427G	Control	8	22	23.0			
79	5432G	15KR087SD	8	22	22.8			
83	5437G	15KR092SD	8	22	22.9			
86	5434G	15KR089SD	8	22	22.8			
89	5435G	15KR090SD	8	22	23.0			
97	5431G	15KR085SD	8	22	23.0			
99	5439G	15KR099SD	8	22	23.3			
15	5438G	15KR093SD	8	23	23.5			
43	5428G	15KR082SD	8	23	23.2			
44	5436G	15KR091SD	8	23	23.4			
64	5430G	15KR084SD	8	23	23.2			
66	5433G	15KR088SD	8	23	23.2			
67	5429G	15KR083SD	8	23	23.1			
72	5427G	Control	8	23	23.1			
79	5432G	15KR087SD	8	23	23.2			
83	5437G	15KR092SD	8	23	23.2			
86	5434G	15KR089SD	8	23	23.3			
89	5435G	15KR090SD	8	23	23.4			
97	5431G	15KR085SD	8	23	23.4			
99	5439G	15KR099SD	8	23	23.5			
15	5438G	15KR093SD	8	24	23.6	7.0		6.9
43	5428G	15KR082SD	8	24	23.2	7.1		6.8
44	5436G	15KR091SD	8	24	23.4	6.9		6.8
64	5430G	15KR084SD	8	24	23.4	6.9		6.8
66	5433G	15KR088SD	8	24	23.3	7.1		6.9
67	5429G	15KR083SD	8	24	23.2	7.2		6.9
72	5427G	Control	8	24	23.2	7.1		7.2
79	5432G	15KR087SD	8	24	23.3	7.1		7.0
83	5437G	15KR092SD	8	24	23.2	7.2		6.9
86	5434G	15KR089SD	8	24	23.4	7.0		6.8

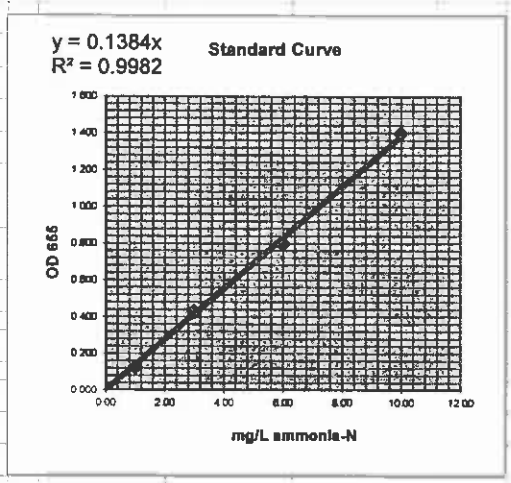
89	5435G	15KR090SD	8	24	23.5	7.0		6.9				
97	5431G	15KR085SD	8	24	23.5	7.2		7.0				
99	5439G	15KR099SD	8	24	23.6	7.3		7.0				
15	5438G	15KR093SD	8	25	23.4							
43	5428G	15KR082SD	8	25	23.0							
44	5436G	15KR091SD	8	25	23.2							
64	5430G	15KR084SD	8	25	23.2							
66	5433G	15KR088SD	8	25	23.0							
67	5429G	15KR083SD	8	25	22.9							
72	5427G	Control	8	25	22.8							
79	5432G	15KR087SD	8	25	23.0							
83	5437G	15KR092SD	8	25	22.9							
86	5434G	15KR089SD	8	25	23.0							
89	5435G	15KR090SD	8	25	23.1							
97	5431G	15KR085SD	8	25	23.2							
99	5439G	15KR099SD	8	25	23.3							
15	5438G	15KR093SD	8	26	23.4	7.1	102	6.4				
43	5428G	15KR082SD	8	26	22.8	6.9	100	6.5				
44	5436G	15KR091SD	8	26	23.1	6.3	103	6.5				
64	5430G	15KR084SD	8	26	23.1	7.1	100	6.4				
66	5433G	15KR088SD	8	26	22.8	7.1	100	6.5				
67	5429G	15KR083SD	8	26	22.7	6.9	99	6.6				
72	5427G	Control	8	26	22.6	6.7	107	6.8				
79	5432G	15KR087SD	8	26	22.8	6.7	105	6.6				
83	5437G	15KR092SD	8	26	22.6	6.7	100	6.6				
86	5434G	15KR089SD	8	26	22.8	6.5	102	6.5				
89	5435G	15KR090SD	8	26	22.9	7.0	101	6.6				
97	5431G	15KR085SD	8	26	22.9	7.2	102	6.7				
99	5439G	15KR099SD	8	26	23.1	7.4	100	6.8				
15	5438G	15KR093SD	8	27	23.1							
43	5428G	15KR082SD	8	27	22.6							
44	5436G	15KR091SD	8	27	22.9							
64	5430G	15KR084SD	8	27	22.9							
66	5433G	15KR088SD	8	27	22.6							
67	5429G	15KR083SD	8	27	22.5							
72	5427G	Control	8	27	22.4							
79	5432G	15KR087SD	8	27	22.7							
83	5437G	15KR092SD	8	27	22.5							
86	5434G	15KR089SD	8	27	22.7							
89	5435G	15KR090SD	8	27	22.8							
97	5431G	15KR085SD	8	27	22.8							
99	5439G	15KR099SD	8	27	23.0							
15	5438G	15KR093SD	8	28	22.7	8.1	97	6.6	<0.1	26	40	
43	5428G	15KR082SD	8	28	22.1	8.0	95	6.7	0.1	26	40	
44	5436G	15KR091SD	8	28	22.4	8.0	99	6.6	<0.1	26	40	
64	5430G	15KR084SD	8	28	22.3	7.7	95	6.5	<0.1	26	40	
66	5433G	15KR088SD	8	28	22.0	8.1	93	6.8	<0.1	26	40	
67	5429G	15KR083SD	8	28	22.0	8.1	94	6.7	<0.1	26	40	
72	5427G	Control	8	28	22.1	8.1	100	6.9	<0.1	26	40	
79	5432G	15KR087SD	8	28	22.1	8.2	99	6.8	<0.1	26	50	
83	5437G	15KR092SD	8	28	22.0	8.1	95	6.7	<0.1	26	40	
86	5434G	15KR089SD	8	28	22.0	8.1	96	6.6	<0.1	26	40	
89	5435G	15KR090SD	8	28	22.2	8.0	99	6.7	<0.1	26	40	
97	5431G	15KR085SD	8	28	22.2	8.3	96	6.9	<0.1	26	50	
99	5439G	15KR099SD	8	28	22.4	8.3	97	7.0	<0.1	34	40	
				Mean	23.2	7.0	108	6.8	—	30	44	
				SD	0.4	0.6	22	0.2	—	4	5	
				n	377	169	78	169	26	26	26	
				Min	22.0	5.4	93	6.4	<0.1	26	40	
				Max	24.0	8.3	290	7.3	0.3	34	50	

AMMONIA EXPOSURE BENCHSHEETS AND ANALYSIS

Total Ammonia-N in Sediment Pore Water: Computation Worksheet
Salicylate Method (SOP #5492)

Result

	Sample description	Dilution factor	OD_{655}	NH_3-N (mg/L)	pH	Salinity (ppt)
	Blank	-----	----	-----		
	1.0 mg/L NH_3-N Std.	----	0.125	1.00		
	3.0 mg/L NH_3-N Std.	----	0.429	3.00		
	6.0 mg/L NH_3-N Std.	----	0.799	6.00		
	10.0 mg/L NH_3-N Std.	----	1.400	10.00		
	3.0 mg/L spike	----	0.435	3.14		
	3.0 mg/L spike dupl.	-----	0.430	3.11		
	5.0 mg/L 2nd source		0.590	4.26		
1.	Day 0 (9-25-15)					
2.	15	1	0.000	ND		
3.	43	1	0.010	ND		
4.	44	1	0.009	ND		
5.	64	1	0.001	ND		
6.	66	1	0.039	0.28		
7.	67	1	0.000	ND		
8.	72	1	0.008	ND		
9.	79	1	0.014	0.10		
10.	83	1	0.019	0.14		
11.	86	1	0.019	0.14		
12.	89	1	0.001	ND		
13.	97	1	0.018	0.13		
14.	99	1	0.007	ND		
15.						
16.	Day 28 (10-23-15)					
17.	15	1	0.001	ND		
18.	43	1	0.019	0.14		
19.	44	1	0.004	ND		
20.	64	1	0.000	ND		
21.	66	1	0.001	ND		
22.	67	1	0.000	ND		
23.	72	1	0.000	ND		
24.	79	1	0.003	ND		
25.	83	1	0.001	ND		
26.	86	1	0.002	ND		
27.	89	1	0.000	ND		
28.	97	1	0.000	ND		
29.	99	1	0.000	ND		
30.						
31.						
32.						
33.						
34.						
35.						
36.						



Reporting limit (mg/L) =	0.1
Recovery (%) =	104.1
Precision (RPD) =	1.16
2nd source (%) =	85.2
Sample volume (ml):	0.50
Dilution factor	1

Sample Set Description:
Proj. No.: 874-1
Test Day: 0 & 28
Species: *Hyalella*

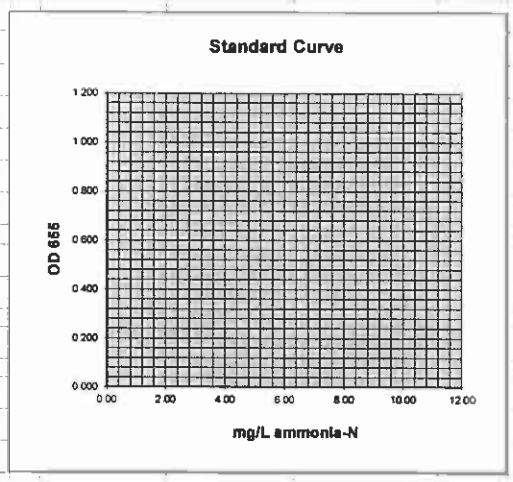
Sample Type (check)
Bulk Sediment Porewaters
Test Beaker Porewaters
X Overlying Water

Analyst: JB
Date analysed: 10/29/2015

Total Ammonia-N in Sediment Pore Water: Computation Worksheet
Salicylate Method (SOP #5492)

Result

	Sample description	Dilution factor	OD_{655}	NH_3-N (mg/L)	pH	Salinity (ppt)
	Blank	----	-----	----		
	1.0 mg/L NH_3-N Std.	-----	0.125	1.00		
	3.0 mg/L NH_3-N Std.	-----	0.429	3.00		
	6.0 mg/L NH_3-N Std.	-----	0.794	6.00		
	10.0 mg/L NH_3-N Std.	-----	1.400	10.00		
	3.0 mg/L spike	-----	0.435			
	3.0 mg/L spike dupl.	-----	0.430			
	5.0 mg/L 2nd source		0.590			
1.	Day 0 (9-25-15)					
2.	15	1	0.000			
3.	43	1	0.010			
4.	44	1	0.009			
5.	64	1	0.001			
6.	66	1	0.039			
7.	67	1	0.000			
8.	72	1	0.008			
9.	79	1	0.014			
10.	83	1	0.019			
11.	86	1	0.019			
12.	89	1	0.001			
13.	97	1	0.018			
14.	99	1	0.007			
15.						
16.	Day 28 (10-23-15)					
17.	15	1	0.001			
18.	43	1	0.019			
19.	44	1	0.004			
20.	64	1	0.000			
21.	66	1	0.001			
22.	67	1	0.000			
23.	72	1	0.000			
24.	79	1	0.003			
25.	83	1	0.001			
26.	86	1	0.002			
27.	89	1	0.000			
28.	97	1	0.000			
29.	99	1	0.000			
30.						
31.						
32.						
33.						
34.						
35.						
36.						



Reporting limit (mg/L) =	0.1
Recovery (%) =	#VALUE!
Precision (RPD) =	#VALUE!
2nd source (%) =	#VALUE!
Sample volume (ml):	0.50
Dilution factor	1

Sample Set Description:
Proj. No.: 874-1
Test Day: 0 & 28
Species: *Hyalella*

Sample Type (check)
- Bulk Sediment Porewaters
- Test Beaker Porewaters
- X Overlying Water

Analyst: JB
Date analysed: 10/29/2015

CHAIN-OF-CUSTODY RECORDS

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler:	Lab PM: Allen, Kristine D	Carrier Tracking No(s):	COC No: 580-30367.1
Client Contact: Shipping/Receiving	Phone:	E-Mail: kristine.allen@testamericainc.com		Page: Page 1 of 2
Company: TestAmerica Laboratories, Inc.		**Analysis Requested**		Job #: 580-53253-1
Address: 5755 8th Street East,	Due Date Requested: 9/15/2015			**Preservation Codes:**
City: Tacoma	TAT Requested (days):			A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, G - Amchlor, H - Ascorbic Acid, I - Ice, J - DI Water, K - EDTA, L - EDA
State, Zip: WA, 98424				M - Hexane, N - None, O - AsNaO2, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, T - TSP Dodecahydrate, U - Acetone, V - MCAA, W - ph 4-5, Z - other (specify)
Phone: 253-922-2310(Tel) 253-922-5047(Fax)	PO #:			
Email:	WO #:			
Project Name: Red Devil Mine - 2014-2015	Project #: 58008798			Other:
Site:	SSOW#:			

Sample Identification - Client ID (Lab ID)		Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	D422/D422 Grain Size	SUB (Toxicity - EPA 100.4 - Northwestern Aquatic Sciences)	9060 Quadruplicate Analysis TOC	Moisture	6020A_LL/3050B (MOD) Template for building analyte list	6010B/3050B (MOD) Template for building analyte list	7471A/7471A_Prep	9060/ Soil Quadruplicate Analysis TOC	Total Number of containers	Special Instructions/Note:
				Preservation Code:													
15KR082SD (580-53253-43)	(5428G)	9/2/15	11:11 Alaskan		Solid			X	X	X	X	X	X	X		1	, See Northwestern Aquatic Sciences quote. We are surcharging 10%
15KR083SD (580-53253-44)	(5429G)	9/2/15	13:20 Alaskan		Solid			X	X	X	X	X	X	X		2	, See Northwestern Aquatic Sciences quote. We are surcharging 10%
15KR084SD (580-53253-45)	(5430G)	9/5/15	16:16 Alaskan		Solid			X	X	X	X	X	X	X		2	, See Northwestern Aquatic Sciences quote. We are surcharging 10%
15KR085SD (580-53253-46)	(5431G)	9/2/15	17:00 Alaskan		Solid			X	X	X	X	X	X	X		2	, See Northwestern Aquatic Sciences quote. We are surcharging 10%
15KR087SD (580-53253-48)	(5432G)	9/2/15	18:25 Alaskan		Solid			X	X	X	X	X	X	X		2	See Northwestern Aquatic Sciences quote. We are surcharging 10% =1.1*2780, Site is
15KR088SD (580-53253-49)	(5433G)	9/2/15	19:00 Alaskan		Solid			X	X	X	X	X	X	X		2	, See Northwestern Aquatic Sciences quote. We are surcharging 10%
15KR089SD (580-53253-50)	(5434G)	9/6/15	13:30 Alaskan		Solid			X	X	X	X	X	X	X		1	, See Northwestern Aquatic Sciences quote. We are surcharging 10%
15KR090SD (580-53253-51)	(5435G)	9/3/15	09:44 Alaskan		Solid			X	X	X	X	X	X	X		2	, See Northwestern Aquatic Sciences quote. We are surcharging 10%
15KR091SD (580-53253-52)	(5436G)	9/6/15	17:30 Alaskan		Solid			X	X	X	X	X	X	X	X	1	, See Northwestern Aquatic Sciences quote. We are surcharging 10%
15KR092SD (580-53253-53)	(5437G)	9/3/15	11:40 Alaskan		Solid			X	X	X	X	X	X	X		3	, See Northwestern Aquatic Sciences quote. We are surcharging 10%
15KR093SD (580-53253-54)	(5438G)	9/6/15	19:30 Alaskan		Solid			X	X	X	X	X	X	X		1	, See Northwestern Aquatic Sciences quote. We are surcharging 10%

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ *Return To Client* ☐ *Disposal By Lab* ☐ *Archive For ______ Months*

Deliverable Requested: I, II, III, IV, Other (specify) 9/21/15 CC

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:		Method of Shipment	
Relinquished by: Cathy Gamble	Date/Time: 9/18/15 11:00	Company: TA-Sea	Received by: [signature]	Date/Time: 9-22-15 / 1115	Company: NAS
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
Relinquished by:	Date/Time:	Company:	Received by:	Date/Time:	Company:
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:		Cooler Temperature(s) °C and Other Remarks:		

133 of 137

12/22/2015

TestAmerica Seattle
5755 8th Street East
Tacoma, WA 98424
Phone (253) 922-2310 Fax (253) 922-5047

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)	Sampler	Lab PM: Allen, Kristine D	Carrier Tracking No(s)	COC No: 580-30367.2
Client Contact: Shipping/Receiving	Phone	E-Mail: kristine.allen@testamericainc.com		Page: Page 2 of 2
Company: TestAmerica Laboratories, Inc.				Job #: 580-53253-1
Address: 5755 8th Street East,	Due Date Requested: 9/15/2015			
City: Tacoma	TAT Requested (days):			
State, Zip: WA, 98424				
Phone: 253-922-2310(Tel) 253-922-5047(Fax)	PO #			
Email	WO #			
Project Name: Red Devil Mine - 2014-2015	Project #: 58008798			
Site	SSOW#			

Analysis Requested

Preservation Codes:
A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; G - Amchlor; H - Ascorbic Acid; I - Ice; J - DI Water; K - EDTA; L - EDA
M - Hexane; N - None; O - AsNaO2; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; T - TSP Dodecahydrate; U - Acetone; V - MCAA; W - ph 4-5; Z - other (specify)
Other:

Sample Identification - Client ID (Lab ID)	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Field Filtered Sample (Yes or No)	Perform MS/MSD (Yes or No)	~~D422/D422 Grain Size~~	SUB (Toxicity - EPA 100.4 - Northwestern Aquatic Sciences)	~~9060/ Quadruplicate Analysis TOC~~	~~Moisture~~	~~6020A_LL/3050B (MOD) Template for building analyte list~~	6010B/3050B (MOD) Template for building analyte list	~~7471A/7471A_Prep~~	~~9060/ Soil Quadruplicate Analysis TOC~~	Total Number of containers	Special Instructions/Note:
			Preservation Code													
15KR099SD (580-53253-60) (5439G)	9/5/15	10:50 Alaskan		Solid			X	X	X	X	X	X	X		2	See Northwestern Aquatic Sciences quote. We are surcharging 10% =1.1*2780, Site is

Possible Hazard Identification
Unconfirmed

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ______ Months

Deliverable Requested: I, II, III, IV, Other (specify) 9/21/15 CC

Special Instructions/QC Requirements:

Empty Kit Relinquished by:	Date:	Time:	Method of Shipment:		
Relinquished by: Cathy Gunhb	Date/Time: 9/10/15 1400	Company: TA Sea	Received by: Gerald Irissarri	Date/Time: 9-22-15 / 1115	Company: NAS
Relinquished by:	Date/Time:	Company	Received by	Date/Time	Company
Relinquished by	Date/Time	Company	Received by	Date/Time	Company

Custody Seals Intact: Δ Yes Δ No	Custody Seal No.:	Cooler Temperature(s) °C and Other Remarks

12/22/2015

134 of 137

Cooler 1 of 3

Cooler Temp = 2°C

SAMPLE RECEIVING
TESTAMERICA INC
5755 8TH ST E

FIFE, WA 98424
UNITED STATES US

BILL SENDER

TO **RECEIVING**
NORTHWESTER AQUATIC SCIENCES
3814 YAQUENA BAY ROAD

NEWPORT OR 97365

INV
PO:

REF:

FedEx Express

1 of 3

TRK# 0201 6496 7498 2526

MASTER

86 ONPA

TUE – 22 SEP 12:00P
PRIORITY OVERNIGHT

97365
OR-US **PDX**

Part # 156148PV-43A RIT2 04/15

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Custody Seal

DATE 9/24/15

SIGNATURE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
239193

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Custody Seal

DATE 9/24/15

SIGNATURE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
239194

SAMPLE RECEIVING
TESTAMERICA INC
5755 8TH ST E

FIFE, WA 98424
UNITED STATES US

SHIP DATE: 21SEP15
ACTWGT: 45.00 LB MAN
CAD: 9893246/CAFE2802

BILL SENDER

TO **RECEIVING**
NORTHWESTER AQUATIC SCIENCES
3814 YAQUENA BAY ROAD

NEWPORT OR 97365

INV:
PO:
DEPT:

FedEx Express

2 of 3
MPS# 6496 7498 2537
Mstr# 6496 7498 2526

TUE – 22 SEP 12:00P
PRIORITY OVERNIGHT

86 ONPA

97365
OR-US **PDX**

Part # 156148V-434 RIT2 04/15

Cooler 2 of 3

Cooler Temp = 2°c

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica
239192

Custody Seal

DATE 9/21/15

SIGNATURE Cathy Coakley

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
239192

THE LEADER IN ENVIRONMENTAL TESTING
TestAmerica
239191

Custody Seal

DATE 9/21/15

SIGNATURE Cathy Coakley

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
239191

ORIGIN ID:FCMA (253) 922-2310
SAMPLE RECEIVING
TESTAMERICA INC
5755 8TH ST E

FIFE, WA 98424
UNITED STATES US

SHIP DATE: 21SEP15
ACTWGT: 45.00 LB MAN
CAD: 9897481/INET2800

BILL SENDER

TO **RECEIVING**
NORTHWESTER AQUATIC SCIENCES
3814 YAQUENA BAY ROAD

NEWPORT OR 97365

REF
INV.
PO#
DEPT#

FedEx Express

3 of 3
MPS# 6496 7498 2548
Mstr# 6496 7498 2526

TUE – 22 SEP 12:00P
PRIORITY OVERNIGHT

86 ONPA

97365
OR-US **PDX**

Part # 156148V-434 RIT2 04/15

Cooler 3 of 3

Cooler Temp = 1°C

239219

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica

Custody Seal 9/21/15
DATE
Cathy Crabtree
SIGNATURE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
239219

239220

THE LEADER IN ENVIRONMENTAL TESTING

TestAmerica

Custody Seal 9/21/15
DATE
Cathy Crabtree
SIGNATURE

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING
239220

APPENDIX III

RAW DATA – REFERENCE TOXICANT TEST

NORTHWESTERN AQUATIC SCIENCES PROTOCOL NO. NAS-XXX-HA1

ACUTE TOXICITY TEST (ALL SPECIES)

Test No. 999-3476 Client: QC Test Investigator ______

Test Type (rangefinding/definitive) [definitive circled] Test Length (hr) 96

Species *Hyalella azteca*

STUDY MANAGEMENT

Client: QC test

Client's Study Monitor: QC test

Testing Laboratory: Northwestern Aquatic Sciences

Test Location: Newport Laboratory

Laboratory's Study Personnel:

Proj. Man./Study Dir. G.J. Irissarri GJI

QA Officer L. K. Nemeth

1. QA Behler [illegible] 2. ______

3. ______ 4. ______

Test Beginning: 9-25-15 1015 Test Ending: 9-29-15 1115

TEST MATERIAL

Description: Potassium Chloride Crystals - Fisher Lot No.: 114689

NAS Sample No. ______

Date of Collection: ______

Date of Receipt: ______

Temperature (deg C): ______

Dissolved oxygen (mg/L): ______

pH: ______

Conductivity (umhos/cm): ______

Hardness (mg/L): ______

Alkalinity (mg/L): ______

Salinity (ppt): ______

Total chlorine (mg/L): ______

Total ammonia-N (mg/L): ______

______ : ______

DILUTION WATER

Description: Moderately hard synthetic water

Date of Preparation/Collection: 9-22-15

Water Quality: Cond. (umhos/cm): 299 Salinity (ppt) ______ pH 7.9

Hardness (mg/L as $CaCO_3$): 94 Alkalinity (mg/L as $CaCO_3$): 70

Treatments: Aerated ≥ 24 hrs

TEST LOCATION

Test conducted in (circle one): room 1 [circled] room 2 trailer water bath other: ______

Randomization chart:

B	0.125	ø	0.063	0.5	1.0	0.25				
A	ø	1.0	0.25	0.125	0.5	0.063				

Error codes: 1) Correction of handwriting error
2) Written in wrong location; entry deleted
3) Wrong date deleted; replaced with correct date
4) Error found in measurement; measurement repeated

Revised 12-5-01

Test No. 999-3476 Client QC Test Investigator

TEST ORGANISMS

Species: *Hyalella azteca* Age: 7-8 DAYS Size:
Source: Chesapeake Cultures, Hayes, VA Date received: 9-23-15

Acclimation Data:

Date	Temp. (deg.C)	pH	DO (mg/L)	Cond. umhos/cm	Hardness (mg/L)	Alkalinity (mg/L)	Feeding Amount	Feeding description	Water changes
9-23-15	20.8	7.1	>15.0	600	120	200	10 mL	YTC	YES
9-24-15	20.7	7.3	8.6	196	51	80	"	"	YES
9-25-15	22.4	7.4	8.7	190	51	70	–	–	–
Mean	21.3	7.3	10.8	329	74	117			
S.D.	1.0	0.2	3.7	235	40	72			
(N)	3	3	3	3	3	3			

Photoperiod during acclimation: 16:8, L:D

TEST PROCEDURES AND CONDITIONS

Test concentrations (50% series recommended): 1, 0.5, 0.25, 0.125, 0.063 0 g/L

Test chamber: 250 ml glass beakers Test volume: 100 ml
Replicates/treatment: 2 Organisms/treatment: 20 (10/rep)
Test water changes: None Aeration during test: None
Feeding: 0.5 ml YTC suspension per beaker on days 0 and 2

Duration: 24-hr, 48-hr, 96-hr Test temperature (deg.C): 23 ± 1 or 20 ± 1
Beaker placement: Stratified randomization Photoperiod: 16:8, L:D

MISCELLANEOUS NOTES

Test solution preparation:
Working stock: Dissolve 0.5g KCl crystals in dilution water and dilute to 500 mL.
Final conc.: 1.0 g/L.

GB 9-25-15

Test concentration (g/L)	KCl working stock (ml/200ml)	Dilution water
1	200	Brought up to final volume of 200 ml with dilution water and distributed evenly between two replicates
0.5	100	
0.25	50	
0.125	25	
0.063	12.5	
0	0	

Test No. 999-3476 Client QC Test

DAILY RECORD SHEET

Day 0 (9/25/15) CB

Conc. (g/L)	Temp. (deg.C)	pH	Cond. (umhos/cm)	DO (ppm)	Hardness (mg/L)	Alkalinity (mg/L)	Survivors A	Survivors B
1. 1	23.5	7.9	1995	8.5	94	80	10	10
2. 0.5	23.5	7.8	1130	8.6			10	10
3. 0.25	23.5	7.8	766	8.7			10	10
4. 0.125	23.5	7.8	520	8.6			10	10
5. 0.063	23.5	7.8	415	8.5			10	10
6. 0	23.6	7.8	306	8.6	94	70		
Each beaker fed 0.5 ml YTC suspension. Initials: CAS								

Day 1 (9/26/15) CAS

Conc. (g/L)	Temp. (deg.C)	pH	Cond. (umhos/cm)	DO (ppm)	Hardness (mg/L)	Alkalinity (mg/L)	Survivors A	Survivors B
1. 1	23.8	7.6	1979	8.3			3(7D)	4(6D)
2. 0.5	23.7	7.6	1128	8.3			8(2D)	8(2D)
3. 0.25	23.8	7.6	743	8.5			10	10
4. 0.125	23.8	7.6	505	8.3			10	10
5. 0.063	23.7	7.6	405	8.2			10	10
6. 0	23.8	7.7	302	8.4			10	10

Day 2 (9/27/15) CSL

Conc. (g/L)	Temp. (deg.C)	pH	Cond. (umhos/cm)	DO (ppm)	Hardness (mg/L)	Alkalinity (mg/L)	Survivors A	Survivors B
1. 1	23.2	7.8	1950	7.9			Ø (3D)	Ø (4D)
2. 0.5	23.1	7.7	1176	7.9			3(5D)	4(4D)
3. 0.25	23.3	7.6	755	8.0			10	10
4. 0.125	23.2	7.6	523	8.0			10	10
5. 0.063	23.2	7.5	421	8.0			10	10
6. 0	23.3	7.5	324	8.1			10	10
Each beaker fed 0.5 ml YTC suspension. Initials: CSL								

Day 3 (9/28/15) CB/CSL

Conc. (g/L)	Temp. (deg.C)	pH	Cond. (umhos/cm)	DO (ppm)	Hardness (mg/L)	Alkalinity (mg/L)	Survivors A	Survivors B
1. 1	—	—	—	—			Ø	Ø
2. 0.5	23.4	7.9	1164	8.0			2(1D)	2(2D)
3. 0.25	23.7	7.8	743	7.8			10	10
4. 0.125	23.6	7.7	509	7.8			10	10
5. 0.063	23.6	7.7	410	7.8			10	10
6. 0	23.7	7.5	308	7.8			10	10

Day 4 (9/29/15) CB/CSL

Conc. (g/L)	Temp. (deg.C)	pH	Cond. (umhos/cm)	DO (ppm)	Hardness (mg/L)	Alkalinity (mg/L)	Survivors A	Survivors B
1. 1	—	—	—	—	—	—	Ø	Ø
2. 0.5	23.8	8.0	1247	7.8			2	2
3. 0.25	23.8	7.9	770	7.8			9(1D)	10
4. 0.125	23.9	7.8	543	7.8			9(1D)	10
5. 0.063	23.8	7.8	434	7.8			10	10
6. 0	23.5	7.8	340	7.9	103	90	10	10
Mean								
SD								
n								

(SEE PAGE 4)

data entry verified against laboratory bench sheets 12/16/15 JMP

Water Quality Data - test #999-3476 Hyalella KCl QC test							
Day	Concentration (g/L)	Temperature	pH	Conductivity	DO	Hardness	Alkalinity
0	1	23.5	7.9	1995	8.5	94	80
0	0.5	23.5	7.8	1130	8.6		
0	0.25	23.5	7.8	766	8.7		
0	0.125	23.5	7.8	520	5.6		
0	0.063	23.5	7.8	415	8.5		
0	0	23.6	7.8	306	8.6	94	70
1	1	23.8	7.6	1979	8.3		
1	0.5	23.7	7.6	1128	8.3		
1	0.25	23.8	7.6	743	8.5		
1	0.125	23.8	7.6	505	8.3		
1	0.063	23.7	7.6	405	8.2		
1	0	23.8	7.7	302	8.4		
2	1	23.2	7.8	1950	7.9		
2	0.5	23.1	7.7	1176	7.9		
2	0.25	23.3	7.6	755	8.0		
2	0.125	23.2	7.6	523	8.0		
2	0.063	23.2	7.5	421	8.0		
2	0	23.3	7.5	324	8.1		
3	1						
3	0.5	23.4	7.9	1164	8.0		
3	0.25	23.7	7.8	743	7.8		
3	0.125	23.6	7.7	509	7.8		
3	0.063	23.6	7.7	410	7.8		
3	0	23.7	7.5	308	7.8		
4	1						
4	0.5	23.8	8.0	1247	7.8		
4	0.25	23.8	7.9	770	7.8		
4	0.125	23.9	7.8	543	7.8		
4	0.063	23.8	7.8	434	7.8		
4	0	23.5	7.8	340	7.9	103	90
	MEAN	23.6	7.7		8.0	97	80
	SD	0.2	0.1		0.6	5	10
	N	28	28		28	3	3
	MIN	23.1	7.5		5.6	94	70
	MAX	23.9	8.0		8.7	103	90
		MEAN 1.0 g/L		1975			
		SD					
		N		3			
		MEAN 0 g/L		316			
		SD		16			
		N		5			

Chesapeake Cultures
P.O. Box 507 Hayes, VA 23072 (804)693-4046 (804)694-4704 fax
www.c-cultures.com
growfish@c-cultures.com

NAS

Rec 9-23-15
LB

Shipment Information

Species Hyalella azteca Date 9/22/15

Age ~4-5 days on shipment ~1.5 mm P.O. No. verbal

Quantity 1550+ Invoice No. 8831

Temperature 24°C Salinity — pH 7.85

Notes

Biologist S

Please inspect shipment and report any problem immediately

5 of 8

Acute 96-hr Toxicity Test-96 Hr Survival

Start Date:	9/25/2015 10:15	Test ID:	999-3476	Sample ID:	REF-Ref Toxicant
End Date:	9/29/2015 11:15	Lab ID:	ORNAS-Northwestern Aquati	Sample Type:	KCL-Potassium chloride
Sample Date:		Protocol:	NASXXXHA1-Hyalella acute	Test Species:	HA-Hyalella azteca
Comments:					

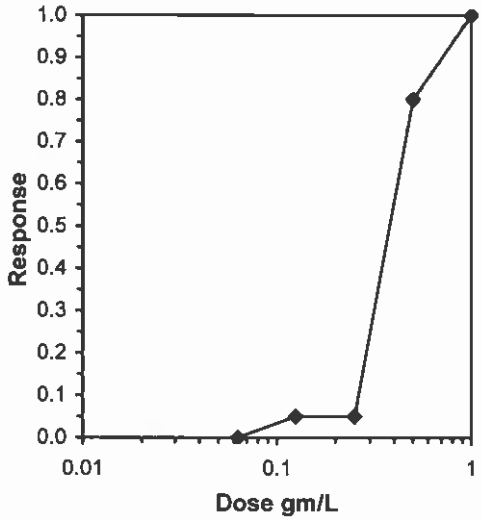
Conc-gm/L	1	2
D-Control	1.0000	1.0000
0.063	1.0000	1.0000
0.125	0.9000	1.0000
0.25	0.9000	1.0000
0.5	0.2000	0.2000
1	0.0000	0.0000

			Transform: Arcsin Square Root					Number	Total
Conc-gm/L	Mean	N-Mean	Mean	Min	Max	CV%	N	Resp	Number
D-Control	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
0.063	1.0000	1.0000	1.4120	1.4120	1.4120	0.000	2	0	20
0.125	0.9500	0.9500	1.3305	1.2490	1.4120	8.661	2	1	20
0.25	0.9500	0.9500	1.3305	1.2490	1.4120	8.661	2	1	20
0.5	0.2000	0.2000	0.4636	0.4636	0.4636	0.000	2	16	20
1	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	2	20	20

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Normality of the data set cannot be confirmed				
Equality of variance cannot be confirmed				

Trimmed Spearman-Karber

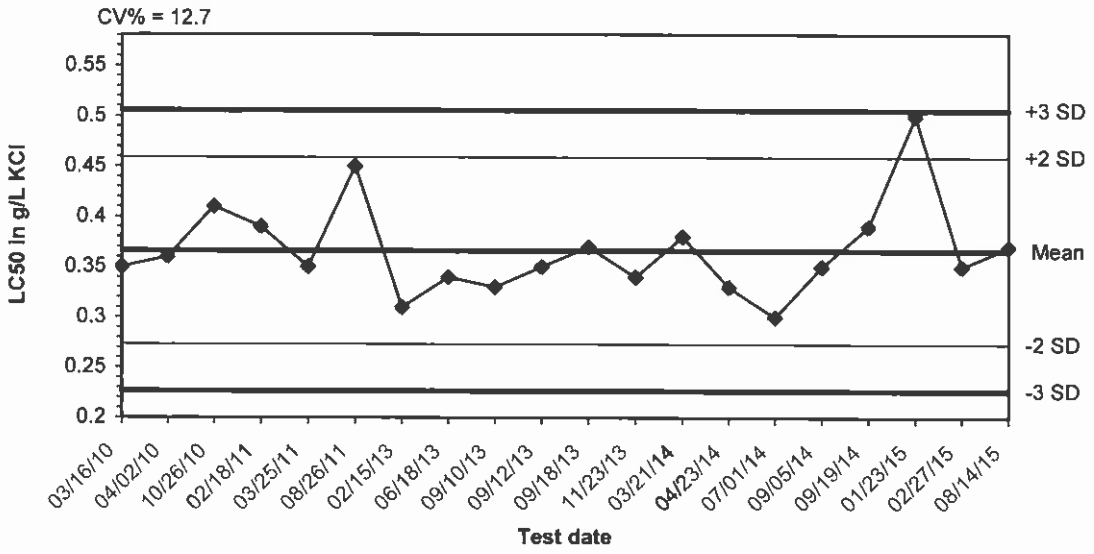
Trim Level	EC50	95% CL	
0.0%	0.3790	0.3241	0.4432
5.0%	0.3912	0.3405	0.4493
10.0%	0.3850	0.3344	0.4432
20.0%	0.3789	0.3410	0.4211
Auto-0.0%	0.3790	0.3241	0.4432



Test: AT-Acute 96-hr Toxicity Test						Test ID: 999-3476			
Species: HA-Hyalella azteca						Protocol: NASXXXHA1-Hyalella acute			
Sample ID: REF-Ref Toxicant						Sample Type: KCL-Potassium chloride			
Start Date: 9/25/2015 10:15			End Date: 9/29/2015 11:1			Lab ID: ORNAS-Northwestern Aquatic Sciences			
Pos	ID	Rep	Group	Start	24 Hr	48 Hr	72 Hr	96 Hr	Notes
	1	1	D-Control	10				10	
	2	2	D-Control	10				10	
	3	1	0.063	10				10	
	4	2	0.063	10				10	
	5	1	0.125	10				9	
	6	2	0.125	10				10	
	7	1	0.250	10				9	
	8	2	0.250	10				10	
	9	1	0.500	10				2	
	10	2	0.500	10				2	
	11	1	1.000	10				0	
	12	2	1.000	10				0	

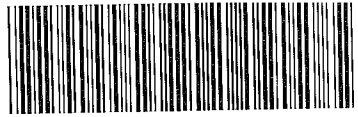
Comments: data entry verified against laboratory bench sheets 12-14-15 JMF

Amphipod, Hyalella azteca, acute reference toxicant test



Dates	Values	Mean	-2 SD	-3 SD	+2 SD	+3 SD
03/16/10	0.3500	0.3660	0.2730	0.2265	0.4590	0.5055
04/02/10	0.3600	0.3660	0.2730	0.2265	0.4590	0.5055
10/26/10	0.4100	0.3660	0.2730	0.2265	0.4590	0.5055
02/18/11	0.3900	0.3660	0.2730	0.2265	0.4590	0.5055
03/25/11	0.3500	0.3660	0.2730	0.2265	0.4590	0.5055
08/26/11	0.4500	0.3660	0.2730	0.2265	0.4590	0.5055
02/15/13	0.3100	0.3660	0.2730	0.2265	0.4590	0.5055
06/18/13	0.3400	0.3660	0.2730	0.2265	0.4590	0.5055
09/10/13	0.3300	0.3660	0.2730	0.2265	0.4590	0.5055
09/12/13	0.3500	0.3660	0.2730	0.2265	0.4590	0.5055
09/18/13	0.3700	0.3660	0.2730	0.2265	0.4590	0.5055
11/23/13	0.3400	0.3660	0.2730	0.2265	0.4590	0.5055
03/21/14	0.3800	0.3660	0.2730	0.2265	0.4590	0.5055
04/23/14	0.3300	0.3660	0.2730	0.2265	0.4590	0.5055
07/01/14	0.3000	0.3660	0.2730	0.2265	0.4590	0.5055
09/05/14	0.3500	0.3660	0.2730	0.2265	0.4590	0.5055
09/19/14	0.3900	0.3660	0.2730	0.2265	0.4590	0.5055
01/23/15	0.5000	0.3660	0.2730	0.2265	0.4590	0.5055
02/27/15	0.3500	0.3660	0.2730	0.2265	0.4590	0.5055
08/14/15	0.3700	0.3660	0.2730	0.2265	0.4590	0.5055

Shipping and Receiving Documents



580-53253 Chain of Custody

Test America, Kris Allen
5755 8th Sreet East
Tacoma, WA 89424
(253) 248-4970

CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

12/22/2015

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915EB01	Methylmercury	water	9/10/2015	14:30	1	250mL FLPE	None		
	0915EB01	Total TAL Metals	water	9/10/2015	14:30	1	250mL HDPE	HNO3 pH<2	N	
	0915FB01	Total Low-Level Mercury	water	9/10/2015	18:00	1	250mL FLPE	None	N	
	0915FB02	Total Low-Level Mercury	water	9/10/2015	18:05	1	250mL FLPE	None	N	
	0915FB03	Total Low-Level Mercury	water	9/10/2015	18:10	1	250mL FLPE	None	N	
	0915MW01GW	Total Low-Level Mercury	Ground Water	9/3/2015	20:25	1	250mL FLPE	None	N	
	0915MW01GW	Nitrate Nitrite as N	Ground Water	9/3/2015	20:25	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW01GW	Total Suspended Solids	Ground Water	9/3/2015	20:25	1	500 mL HDPE	None	N	
	0915MW01GW	Dissolved Low-Level Mercury	Ground Water	9/3/2015	20:25	1	250mL FLPE	None	N	
	0915MW01GW	Total TAL Metals	Ground Water	9/3/2015	20:25	2	250 mL HDPE	HNO3 pH<2	N	
	0915MW01GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/3/2015	20:25	1	250 mL HDPE	None	N	
	0915MW06GW	Total Low-Level Mercury	Ground Water	9/8/2015	14:10	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
	E&E	9-11-15/1935	TA-AN	9/11/15 1935	
		9/11/15 2100	TA-SEA	9/12/15 1110	

Temps.: 3.2, 3.0, 1.7, 2.5, 3.1, 4.0, 2.8, 1.5, 1.8, 2.8, 4.1, 4.0, 2.1, 1.4, 2.2, 3.7, 3.9, 3.5, 2.8

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MW06GW	Total TAL Metals	Ground Water	9/8/2015	14:10	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW06GW	Nitrate Nitrite as N	Ground Water	9/8/2015	14:10	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW06GW	Total Suspended Solids	Ground Water	9/8/2015	14:10	1	500 mL HDPE	None	N	
	0915MW06GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/8/2015	14:10	1	250 mL HDPE	None	N	
	0915MW06GW	Dissolved Low-Level Mercury	Ground Water	9/8/2015	14:10	1	250mL FLPE	None	N	
	0915MW08GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/8/2015	09:30	1	250 mL HDPE	None	N	
	0915MW08GW	Nitrate Nitrite as N	Ground Water	9/8/2015	09:30	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW08GW	Total Suspended Solids	Ground Water	9/8/2015	09:30	1	500 mL HDPE	None	N	
	0915MW08GW	Total TAL Metals	Ground Water	9/8/2015	09:30	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW08GW	Total Low-Level Mercury	Ground Water	9/8/2015	09:30	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEA	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
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Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MW08GW	Dissolved Low-Level Mercury	Ground Water	9/8/2015	09:30	1	250mL FLPE	None	N	
	0915MW09GW	Dissolved Low-Level Mercury	Ground Water	9/9/2015	09:52	1	250mL FLPE	None	N	
	0915MW09GW	Total Suspended Solids	Ground Water	9/9/2015	09:52	1	500 mL HDPE	None	N	
	0915MW09GW	Total Low-Level Mercury	Ground Water	9/9/2015	09:52	1	250mL FLPE	None	N	
	0915MW09GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/9/2015	09:52	1	250 mL HDPE	None	N	
	0915MW09GW	Nitrate Nitrite as N	Ground Water	9/9/2015	09:52	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW09GW	Total TAL Metals	Ground Water	9/9/2015	09:52	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW10GW	Total Suspended Solids	Ground Water	9/5/2015	13:35	1	500 mL HDPE	None	N	
	0915MW10GW	Nitrate Nitrite as N	Ground Water	9/5/2015	13:35	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW10GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/5/2015	13:35	1	250 mL HDPE	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			ITA-SEA	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MW10GW	Dissolved Low-Level Mercury	Ground Water	9/5/2015	13:35	1	250mL FLPE	None	N	
	0915MW10GW	Total Low-Level Mercury	Ground Water	9/5/2015	13:35	1	250mL FLPE	None	N	
	0915MW10GW	Total TAL Metals	Ground Water	9/5/2015	13:35	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW16GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/5/2015	18:20	1	250 mL HDPE	None	N	
	0915MW16GW	Dissolved Low-Level Mercury	Ground Water	9/5/2015	18:20	1	250mL FLPE	None	N	
	0915MW16GW	Total Low-Level Mercury	Ground Water	9/5/2015	18:20	1	250mL FLPE	None	N	
	0915MW16GW	Total TAL Metals	Ground Water	9/5/2015	18:20	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW16GW	Nitrate Nitrite as N	Ground Water	9/5/2015	18:20	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW16GW	Total Suspended Solids	Ground Water	9/5/2015	18:20	1	500 mL HDPE	None	N	
	0915MW17GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/5/2015	16:20	1	250 mL HDPE	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-56A	9/12/15 1110	

Test America, Kris Allen
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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MW17GW	Dissolved Low-Level Mercury	Ground Water	9/5/2015	16:20	1	250mL FLPE	None	N	
	0915MW17GW	Total Suspended Solids	Ground Water	9/5/2015	16:20	1	500 mL HDPE	None	N	
	0915MW17GW	Total TAL Metals	Ground Water	9/5/2015	16:20	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW17GW	Nitrate Nitrite as N	Ground Water	9/5/2015	16:20	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW17GW	Total Low-Level Mercury	Ground Water	9/5/2015	16:20	1	250mL FLPE	None	N	
	0915MW19GW	BTEX/GRO	Ground Water	9/8/2015	17:15	12	40 ml VOA	HCl	Y	MS/MSD
	0915MW19GW	Total Suspended Solids	Ground Water	9/8/2015	17:15	2	500 mL HDPE	None	Y	lab duplicate
	0915MW19GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/8/2015	17:15	2	250 mL HDPE	None	Y	lab duplicate
	0915MW19GW	Semi-Volatile Organic Compounds	Ground Water	9/8/2015	17:15	4	1 liter amber	None	Y	MS/MSD
	0915MW19GW	Total TAL Metals	Ground Water	9/8/2015	17:15	2	250 mL HDPE	HNO3 pH<2	Y	MS/MSD

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEA	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

12/22/2015

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MW19GW	Dissolved Low-Level Mercury	Ground Water	9/8/2015	17:15	1	250mL FLPE	None	Y	MS/MSD
	0915MW19GW	Diesel Range Organics	Ground Water	9/8/2015	17:15	5	250 mL glass	HCl	Y	MS/MSD
	0915MW19GW	Total Low-Level Mercury	Ground Water	9/8/2015	17:15	1	250mL FLPE	None	Y	MS/MSD
	0915MW19GW	Nitrate Nitrite as N	Ground Water	9/8/2015	17:15	2	250 mL HDPE	H2SO4 pH<2	Y	lab duplicate
	0915MW22GW	Nitrate Nitrite as N	Ground Water	9/9/2015	10:20	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW22GW	Total Suspended Solids	Ground Water	9/9/2015	10:20	1	500 mL HDPE	None	Y	
	0915MW22GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/9/2015	10:20	1	250 mL HDPE	None	N	
	0915MW22GW	Total Low-Level Mercury	Ground Water	9/9/2015	10:20	1	250mL FLPE	None	N	
	0915MW22GW	Dissolved Low-Level Mercury	Ground Water	9/9/2015	10:20	1	250mL FLPE	None	N	
	0915MW22GW	Total TAL Metals	Ground Water	9/9/2015	10:20	1	250 mL HDPE	HNO3 pH<2	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEH	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MW22GW	Diesel Range Organics	Ground Water	9/9/2015	10:20	2	250 mL glass	HCl	N	
	0915MW22GW	BTEX/GRO	Ground Water	9/9/2015	10:20	6	40 ml VOA	HCl	N	
	0915MW22GW	Semi-Volatile Organic Compounds	Ground Water	9/9/2015	10:20	2	1 liter amber	None	N	
	0915MW26GW	Total TAL Metals	Ground Water	9/4/2015	10:50	2	250 mL HDPE	HNO3 pH<2	N	
	0915MW26GW	Dissolved Low-Level Mercury	Ground Water	9/4/2015	10:50	1	250mL FLPE	None	N	
	0915MW26GW	Nitrate Nitrite as N	Ground Water	9/4/2015	10:50	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW26GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/4/2015	10:50	1	250 mL HDPE	None	N	
	0915MW26GW	Total Low-Level Mercury	Ground Water	9/4/2015	10:50	1	250mL FLPE	None	N	
	0915MW26GW	Total Suspended Solids	Ground Water	9/4/2015	10:50	1	500 mL HDPE	None	N	
	0915MW27GW	Total TAL Metals	Ground Water	9/4/2015	20:55	2	250 mL HDPE	HNO3 pH<2	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEH	9/12/15 1110	

Test America, Kris Allen
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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

12/22/2015

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MW27GW	Nitrate Nitrite as N	Ground Water	9/4/2015	20:55	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW27GW	Total Suspended Solids	Ground Water	9/4/2015	20:55	1	500 mL HDPE	None	N	
	0915MW27GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/4/2015	20:55	1	250 mL HDPE	None	N	
	0915MW27GW	Dissolved Low-Level Mercury	Ground Water	9/4/2015	20:55	1	250mL FLPE	None	N	
	0915MW27GW	Total Low-Level Mercury	Ground Water	9/4/2015	20:55	1	250mL FLPE	None	N	
	0915MW28GW	Total Suspended Solids	Ground Water	9/4/2015	18:55	1	500 mL HDPE	None	N	
	0915MW28GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/4/2015	18:55	1	250 mL HDPE	None	N	
	0915MW28GW	Dissolved Low-Level Mercury	Ground Water	9/4/2015	18:55	1	250mL FLPE	None	N	
	0915MW28GW	Total Low-Level Mercury	Ground Water	9/4/2015	18:55	1	250mL FLPE	None	N	
	0915MW28GW	Total TAL Metals	Ground Water	9/4/2015	18:55	2	250 mL HDPE	HNO3 pH<2	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TASEA	9/12/15 1110	

Test America, Kris Allen
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CHAIN OF CUSTODY RECORD
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No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

12/22/2015

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MW28GW	Nitrate Nitrite as N	Ground Water	9/4/2015	18:55	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW29GW	Total Suspended Solids	Ground Water	9/7/2015	14:08	1	500 mL HDPE	None	N	
	0915MW29GW	Total TAL Metals	Ground Water	9/7/2015	14:08	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW29GW	Nitrate Nitrite as N	Ground Water	9/7/2015	14:08	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW29GW	Total Low-Level Mercury	Ground Water	9/7/2015	14:08	1	250mL FLPE	None	N	
	0915MW29GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/7/2015	14:08	1	250 mL HDPE	None	N	
	0915MW29GW	Dissolved Low-Level Mercury	Ground Water	9/7/2015	14:08	1	250mL FLPE	None	N	
	0915MW31GW	Total TAL Metals	Ground Water	9/6/2015	21:05	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW31GW	Nitrate Nitrite as N	Ground Water	9/6/2015	21:05	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW31GW	Total Suspended Solids	Ground Water	9/6/2015	21:05	1	500 mL HDPE	None	N	

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Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEA	9/12/15 1110	

Test America, Kris Allen
5755 8th Sreet East
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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MW31GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/6/2015	21:05	1	250 mL HDPE	None	N	
	0915MW31GW	Dissolved Low-Level Mercury	Ground Water	9/6/2015	21:05	1	250mL FLPE	None	N	
	0915MW31GW	Total Low-Level Mercury	Ground Water	9/6/2015	21:05	1	250mL FLPE	None	N	
	0915MW32GW	Nitrate Nitrite as N	Ground Water	9/8/2015	12:40	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW32GW	Total Suspended Solids	Ground Water	9/8/2015	12:40	1	500 mL HDPE	None	N	
	0915MW32GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/8/2015	12:40	1	250 mL HDPE	None	N	
	0915MW32GW	Dissolved Low-Level Mercury	Ground Water	9/8/2015	12:40	1	250mL FLPE	None	N	
	0915MW32GW	Total TAL Metals	Ground Water	9/8/2015	12:40	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW32GW	Total Low-Level Mercury	Ground Water	9/8/2015	12:40	1	250mL FLPE	None	N	
	0915MW33GW	Dissolved Low-Level Mercury	Ground Water	9/8/2015	15:42	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			ITH-SEH	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

12/22/2015

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MW33GW	Nitrate Nitrite as N	Ground Water	9/8/2015	15:42	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW33GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/8/2015	15:42	1	250 mL HDPE	None	N	
	0915MW33GW	Total Low-Level Mercury	Ground Water	9/8/2015	15:42	1	250mL FLPE	None	N	
	0915MW33GW	Total TAL Metals	Ground Water	9/8/2015	15:42	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW33GW	Total Suspended Solids	Ground Water	9/8/2015	15:42	1	500 mL HDPE	None	N	
	0915MW40GW	Nitrate Nitrite as N	Ground Water	9/6/2015	17:35	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW40GW	Total Suspended Solids	Ground Water	9/6/2015	17:35	1	500 mL HDPE	None	N	
	0915MW40GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/6/2015	17:35	1	250 mL HDPE	None	N	
	0915MW40GW	Dissolved Low-Level Mercury	Ground Water	9/6/2015	17:35	1	250mL FLPE	None	N	
	0915MW40GW	Total Low-Level Mercury	Ground Water	9/6/2015	17:35	1	250mL FLPE	None	N	

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Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEA	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
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12/22/2015

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MW40GW	Total TAL Metals	Ground Water	9/6/2015	17:35	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW42GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/6/2015	14:48	1	250 mL HDPE	None	N	
	0915MW42GW	Dissolved Low-Level Mercury	Ground Water	9/6/2015	14:48	1	250mL FLPE	None	N	
	0915MW42GW	Total Low-Level Mercury	Ground Water	9/6/2015	14:48	1	250mL FLPE	None	N	
	0915MW42GW	Total TAL Metals	Ground Water	9/6/2015	14:48	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW42GW	Nitrate Nitrite as N	Ground Water	9/6/2015	14:48	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW42GW	Total Suspended Solids	Ground Water	9/6/2015	14:48	1	500 mL HDPE	None	N	
	0915MW43GW	Total Suspended Solids	Ground Water	9/6/2015	10:55	1	500 mL HDPE	None	N	
	0915MW43GW	Total TAL Metals	Ground Water	9/6/2015	10:55	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW43GW	Total Low-Level Mercury	Ground Water	9/6/2015	10:55	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			ITA-SEH	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
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12/22/2015

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MW43GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/6/2015	10:55	1	250 mL HDPE	None	N	
	0915MW43GW	Nitrate Nitrite as N	Ground Water	9/6/2015	10:55	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW43GW	Dissolved Low-Level Mercury	Ground Water	9/6/2015	10:55	1	250mL FLPE	None	N	
	0915MW50GW	Nitrate Nitrite as N	Ground Water	9/5/2015	13:55	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW50GW	Total Suspended Solids	Ground Water	9/5/2015	13:55	1	500 mL HDPE	None	N	
	0915MW50GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/5/2015	13:55	1	250 mL HDPE	None	N	
	0915MW50GW	Dissolved Low-Level Mercury	Ground Water	9/5/2015	13:55	1	250mL FLPE	None	N	
	0915MW50GW	Total Low-Level Mercury	Ground Water	9/5/2015	13:55	1	250mL FLPE	None	N	
	0915MW50GW	Total TAL Metals	Ground Water	9/5/2015	13:55	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW51GW	Total Low-Level Mercury	Ground Water	9/6/2015	11:30	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TH-SEH	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
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Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915MW51GW	Dissolved Low-Level Mercury	Ground Water	9/6/2015	11:30	1	250mL FLPE	None	N	
	0915MW51GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/6/2015	11:30	1	250 mL HDPE	None	N	
	0915MW51GW	Total Suspended Solids	Ground Water	9/6/2015	11:30	1	500 mL HDPE	None	N	
	0915MW51GW	Nitrate Nitrite as N	Ground Water	9/6/2015	11:30	1	250 mL HDPE	H2SO4 pH<2	N	
	0915MW51GW	Total TAL Metals	Ground Water	9/6/2015	11:30	1	250 mL HDPE	HNO3 pH<2	N	
	0915MW52GW	Semi-Volatile Organic Compounds	Ground Water	9/9/2015	10:40	2	1 liter amber	None	N	
	0915MW52GW	Diesel Range Organics	Ground Water	9/9/2015	10:40	2	250 mL glass	HCl	N	
	0915MW52GW	BTEX/GRO	Ground Water	9/9/2015	10:40	6	40 ml VOA	HCl	N	
	0915RD05SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	15:30	1	250mL FLPE	None	N	Field Filtered
	0915RD05SW	Nitrate Nitrite as N	Surface Water	9/9/2015	15:30	1	250 mL HDPE	H2SO4 pH<2	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			ZBO / TA-SEA	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
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12/22/2015

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD05SW	Total Dissolved Solids	Surface Water	9/9/2015	15:30	1	500 mL HDPE	None	N	Field Filtered
	0915RD05SW	Total Suspended Solids	Surface Water	9/9/2015	15:30	1	500 mL HDPE	None	N	
	0915RD05SW	Total Organic Carbon	Surface Water	9/9/2015	15:30	1	250 mL glass	H2SO4 pH<2	N	
	0915RD05SW	Total TAL Metals	Surface Water	9/9/2015	15:30	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD05SW	Dissolved TAL Metals	Surface Water	9/9/2015	15:30	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD05SW	Total Low-Level Mercury	Surface Water	9/9/2015	15:30	1	250mL FLPE	None	N	
	0915RD05SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	15:30	1	250 mL HDPE	None	N	
	0915RD06SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	14:20	1	250mL FLPE	None	N	Field Filtered
	0915RD06SW	Total TAL Metals	Surface Water	9/9/2015	14:20	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD06SW	Nitrate Nitrite as N	Surface Water	9/9/2015	14:20	1	250 mL HDPE	H2SO4 pH<2	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEA	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

12/22/2015

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD06SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	14:20	1	250 mL HDPE	None	N	
	0915RD06SW	Total Dissolved Solids	Surface Water	9/9/2015	14:20	1	500 mL HDPE	None	N	Field Filtered
	0915RD06SW	Total Organic Carbon	Surface Water	9/9/2015	14:20	1	250 mL glass	H2SO4 pH<2	N	
	0915RD06SW	Total Low-Level Mercury	Surface Water	9/9/2015	14:20	1	250mL FLPE	None	N	
	0915RD06SW	Dissolved TAL Metals	Surface Water	9/9/2015	14:20	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD06SW	Total Suspended Solids	Surface Water	9/9/2015	14:20	1	500 mL HDPE	None	N	
	0915RD08SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	13:32	1	250 mL HDPE	None	N	
	0915RD08SW	Nitrate Nitrite as N	Surface Water	9/9/2015	13:32	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RD08SW	Dissolved TAL Metals	Surface Water	9/9/2015	13:32	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD08SW	Total Low-Level Mercury	Surface Water	9/9/2015	13:32	1	250mL FLPE	None	N	

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Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			ITASEH	9/17/15 1116	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
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Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD08SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	13:32	1	250mL FLPE	None	N	Field Filtered
	0915RD08SW	Total Organic Carbon	Surface Water	9/9/2015	13:32	1	250 mL glass	H2SO4 pH<2	N	
	0915RD08SW	Total Suspended Solids	Surface Water	9/9/2015	13:32	1	500 mL HDPE	None	N	
	0915RD08SW	Total TAL Metals	Surface Water	9/9/2015	13:32	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD08SW	Total Dissolved Solids	Surface Water	9/9/2015	13:32	1	500 mL HDPE	None	N	Field Filtered
	0915RD09SW	Total Suspended Solids	Surface Water	9/9/2015	14:44	1	500 mL HDPE	None	N	
	0915RD09SW	Nitrate Nitrite as N	Surface Water	9/9/2015	14:44	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RD09SW	Total Dissolved Solids	Surface Water	9/9/2015	14:44	1	500 mL HDPE	None	N	Field Filtered
	0915RD09SW	Total Organic Carbon	Surface Water	9/9/2015	14:44	1	250 mL glass	H2SO4 pH<2	N	
	0915RD09SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	14:44	1	250mL FLPE	None	N	Field Filtered

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEA	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
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No: 10-091115-121237-0007
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720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD09SW	Total Low-Level Mercury	Surface Water	9/9/2015	14:44	1	250mL FLPE	None	N	
	0915RD09SW	Dissolved TAL Metals	Surface Water	9/9/2015	14:44	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD09SW	Total TAL Metals	Surface Water	9/9/2015	14:44	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD09SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	14:44	1	250 mL HDPE	None	N	
	0915RD10SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	17:30	1	250mL FLPE	None	Y	Field Filtered, MS/MSD
	0915RD10SW	Nitrate Nitrite as N	Surface Water	9/9/2015	17:30	2	250 mL HDPE	H2SO4 pH<2	Y	Lab Duplicate
	0915RD10SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	17:30	2	250 mL HDPE	None	Y	Lab Duplicate
	0915RD10SW	Total Low-Level Mercury	Surface Water	9/9/2015	17:30	1	250mL FLPE	None	Y	MS/MSD
	0915RD10SW	Total TAL Metals	Surface Water	9/9/2015	17:30	2	250 mL HDPE	HNO3 pH<2	Y	MS/MSD
	0915RD10SW	Total Organic Carbon	Surface Water	9/9/2015	17:30	2	250 mL glass	H2SO4 pH<2	Y	Lab Duplicate

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TH-SEH	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
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1001095.0002
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No: 10-091115-121237-0007
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Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD10SW	Total Suspended Solids	Surface Water	9/9/2015	17:30	2	500 mL HDPE	None	Y	Lab Duplicate
	0915RD10SW	Total Dissolved Solids	Surface Water	9/9/2015	17:30	2	500 mL HDPE	None	Y	Field Filtered, Lab Duplicate
	0915RD10SW	Dissolved TAL Metals	Surface Water	9/9/2015	17:30	2	250 mL HDPE	HNO3 pH<2	Y	Field Filtered, MS/MSD
	0915RD14SW	Total Organic Carbon	Surface Water	9/9/2015	16:30	1	250 mL glass	H2SO4 pH<2	N	
	0915RD14SW	Dissolved TAL Metals	Surface Water	9/9/2015	16:30	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD14SW	Nitrate Nitrite as N	Surface Water	9/9/2015	16:30	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RD14SW	Total Low-Level Mercury	Surface Water	9/9/2015	16:30	1	250mL FLPE	None	N	
	0915RD14SW	Total Suspended Solids	Surface Water	9/9/2015	16:30	1	500 mL HDPE	None	N	
	0915RD14SW	Total Dissolved Solids	Surface Water	9/9/2015	16:30	1	500 mL HDPE	None	N	Field Filtered
	0915RD14SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	16:30	1	250 mL HDPE	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

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No: 10-091115-121237-0007
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Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD14SW	Total TAL Metals	Surface Water	9/9/2015	16:30	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD14SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	16:30	1	250mL FLPE	None	N	Field Filtered
	0915RD15SW	Total TAL Metals	Surface Water	9/9/2015	16:00	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD15SW	Dissolved TAL Metals	Surface Water	9/9/2015	16:00	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD15SW	Total Low-Level Mercury	Surface Water	9/9/2015	16:00	1	250mL FLPE	None	N	
	0915RD15SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	16:00	1	250mL FLPE	None	N	Field Filtered
	0915RD15SW	Total Organic Carbon	Surface Water	9/9/2015	16:00	1	250 mL glass	H2SO4 pH<2	N	
	0915RD15SW	Total Suspended Solids	Surface Water	9/9/2015	16:00	1	500 mL HDPE	None	N	
	0915RD15SW	Total Dissolved Solids	Surface Water	9/9/2015	16:00	1	500 mL HDPE	None	N	Field Filtered
	0915RD15SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	16:00	1	250 mL HDPE	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEA	9/12/15 1110	

Test America, Kris Allen
5755 8th Sreet East
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(253) 248-4970

CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD15SW	Nitrate Nitrite as N	Surface Water	9/9/2015	16:00	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RD16SW	Nitrate Nitrite as N	Surface Water	9/9/2015	15:08	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RD16SW	Total TAL Metals	Surface Water	9/9/2015	15:08	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD16SW	Dissolved TAL Metals	Surface Water	9/9/2015	15:08	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RD16SW	Total Low-Level Mercury	Surface Water	9/9/2015	15:08	1	250mL FLPE	None	N	
	0915RD16SW	Total Organic Carbon	Surface Water	9/9/2015	15:08	1	250 mL glass	H2SO4 pH<2	N	
	0915RD16SW	Total Suspended Solids	Surface Water	9/9/2015	15:08	1	500 mL HDPE	None	N	
	0915RD16SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	15:08	1	250mL FLPE	None	N	Field Filtered
	0915RD16SW	Total Dissolved Solids	Surface Water	9/9/2015	15:08	1	500 mL HDPE	None	N	Field Filtered
	0915RD16SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	15:08	1	250 mL HDPE	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEH	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RD25SW	Total Organic Carbon	Surface Water	9/9/2015	16:50	1	250 mL glass	H2SO4 pH<2	N	
	0915RD25SW	Nitrate Nitrite as N	Surface Water	9/9/2015	16:50	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RD25SW	Alkalinity as CO3/HCO3 and Inorganic Ions	Surface Water	9/9/2015	16:50	1	250 mL HDPE	None	N	
	0915RD25SW	Total Suspended Solids	Surface Water	9/9/2015	16:50	1	500 mL HDPE	None	N	
	0915RD25SW	Dissolved Low-Level Mercury	Surface Water	9/9/2015	16:50	1	250mL FLPE	None	N	Field Filtered
	0915RD25SW	Total Low-Level Mercury	Surface Water	9/9/2015	16:50	1	250mL FLPE	None	N	
	0915RD25SW	Total TAL Metals	Surface Water	9/9/2015	16:50	1	250 mL HDPE	HNO3 pH<2	N	
	0915RD25SW	Total Dissolved Solids	Surface Water	9/9/2015	16:50	1	500 mL HDPE	None	N	Field Filtered
	0915RD25SW	Dissolved TAL Metals	Surface Water	9/9/2015	16:50	1	250 mL HDPE	HNO3 pH<2	N	Field Filtered
	0915RS01GW	Dissolved Low-Level Mercury	Ground Water	9/7/2015	10:30	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEA	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

12/22/2015

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RS01GW	Nitrate Nitrite as N	Ground Water	9/7/2015	10:30	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RS01GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/7/2015	10:30	1	250 mL HDPE	None	N	
	0915RS01GW	Total Low-Level Mercury	Ground Water	9/7/2015	10:30	1	250mL FLPE	None	N	
	0915RS01GW	Total TAL Metals	Ground Water	9/7/2015	10:30	1	250 mL HDPE	HNO3 pH<2	N	
	0915RS01GW	Total Suspended Solids	Ground Water	9/7/2015	10:30	1	500 mL HDPE	None	N	
	0915RS02GW	Nitrate Nitrite as N	Ground Water	9/7/2015	10:45	1	250 mL HDPE	H2SO4 pH<2	N	
	0915RS02GW	Total Suspended Solids	Ground Water	9/7/2015	10:45	1	500 mL HDPE	None	N	
	0915RS02GW	Total TAL Metals	Ground Water	9/7/2015	10:45	1	250 mL HDPE	HNO3 pH<2	N	
	0915RS02GW	Total Low-Level Mercury	Ground Water	9/7/2015	10:45	1	250mL FLPE	None	N	
	0915RS02GW	Dissolved Low-Level Mercury	Ground Water	9/7/2015	10:45	1	250mL FLPE	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

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			TA-SEA	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	0915RS02GW	Alkalinity as CO3/HCO3 and Inorganic Ions	Ground Water	9/7/2015	10:45	1	250 mL HDPE	None	N	
	0915RS03	Total TAL Metals	Sediment	9/7/2015	10:40	1	250mL HDPE	HNO3 pH<2	N	
	0915RS03	Methylmercury	Sediment	9/7/2015	10:40	1	250mL FLPE	None		
	0915RS04	Methylmercury	water	9/7/2015	10:50	1	250mL FLPE	None		
	0915RS04	Total TAL Metals	water	9/7/2015	10:50	1	250mL HDPE	HNO3 pH<2	N	
	0915RS05	Methylmercury	water	9/7/2015	10:55	1	250mL FLPE	None		
	0915RS05	Total TAL Metals	water	9/7/2015	10:55	1	250mL HDPE	HNO3 pH<2	N	
	0915TB01	Total Low-Level Mercury	water	9/10/2015		3	40 ml VOA	HCl	Y	BR-supplied TB
	0915TB02	Total Low-Level Mercury	water	9/10/2015		3	40 ml VOA	HCl	Y	
	15KR082SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/2/2015	11:11	2	1L amber	None	N	
	15KR082SD	Total TAL Metals	Sediment	9/2/2015	11:11	1	4 oz glass jar	None	N	
	15KR082SD	Grain Size	Sediment	9/2/2015	11:11	1	16 oz glass	None	N	
	15KR082SD	Total Organic Carbon	Sediment	9/2/2015	11:11	1	4 oz glass jar	None	N	
	15KR083SD	Total Organic Carbon	Sediment	9/2/2015	13:20	1	4 oz glass jar	None	N	
	15KR083SD	Total TAL Metals	Sediment	9/2/2015	13:20	1	4 oz glass jar	None	N	
	15KR083SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/2/2015	13:20	2	1L amber	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			ITA-SEA	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

12/22/2015

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	15KR083SD	Grain Size	Sediment	9/2/2015	13:20	1	16 oz glass	None	N	
	15KR084SD	Total Organic Carbon	Sediment	9/5/2015	16:16	1	4 oz glass jar	None	N	
	15KR084SD	Mercury SSE	Sediment	9/5/2015	16:16	1	8 oz HDPE jar	None	N	
	15KR084SD	Methylmercury	Sediment	9/5/2015	16:16	1	8 oz HDPE jar	None	N	
	15KR084SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/5/2015	16:16	2	1 gallon ziploc	None	N	
	15KR084SD	Total TAL Metals	Sediment	9/5/2015	16:16	1	4 oz glass jar	None	N	
	15KR084SD	Grain Size	Sediment	9/5/2015	16:16	1	16 oz glass	None	N	
	15KR085SD	Total Organic Carbon	Sediment	9/2/2015	17:00	1	4 oz glass jar	None	N	
	15KR085SD	Grain Size	Sediment	9/2/2015	17:00	1	16 oz glass	None	N	
	15KR085SD	Total TAL Metals	Sediment	9/2/2015	17:00	1	4 oz glass jar	None	N	
	15KR085SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/2/2015	17:00	2	1L poly	None	N	
	15KR086SD	Total Organic Carbon	Sediment	9/6/2015	11:40	1	4 oz glass jar	None	N	
	15KR086SD	Total TAL Metals	Sediment	9/6/2015	11:40	1	4 oz glass jar	None	N	
	15KR086SD	Grain Size	Sediment	9/6/2015	11:40	1	16 oz glass	None	N	
	15KR087SD	Total TAL Metals	Sediment	9/2/2015	18:25	1	4 oz glass jar	None	N	
	15KR087SD	Grain Size	Sediment	9/2/2015	18:25	1	16 oz glass	None	N	
	15KR087SD	Total Organic Carbon	Sediment	9/2/2015	18:25	1	4 oz glass jar	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEA	9/12/15 1110	

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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

12/22/2015

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	15KR087SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/2/2015	18:25	2	1L poly	None	N	
	15KR088SD	Mercury SSE	Sediment	9/2/2015	19:00	1	8 oz HDPE jar	None	N	
	15KR088SD	Methylmercury	Sediment	9/2/2015	19:00	1	8 oz HDPE jar	None	N	
	15KR088SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/2/2015	19:00	2	1L poly	None	N	
	15KR088SD	Total TAL Metals	Sediment	9/2/2015	19:00	1	4 oz glass jar	None	N	
	15KR088SD	Total Organic Carbon	Sediment	9/2/2015	19:00	1	4 oz glass jar	None	N	
	15KR088SD	Grain Size	Sediment	9/2/2015	19:00	1	16 oz glass	None	N	
	15KR089SD	Total TAL Metals	Sediment	9/6/2015	13:30	2	4 oz glass jar	None	Y	MS/MSD
	15KR089SD	Methylmercury	Sediment	9/6/2015	13:30	1	8 oz HDPE jar	None	N	
	15KR089SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/6/2015	13:30	1	1 gallon ziploc	None	N	
	15KR089SD	Total Organic Carbon	Sediment	9/6/2015	13:30	2	4 oz glass jar	None	Y	MS/MSD
	15KR089SD	Grain Size	Sediment	9/6/2015	13:30	1	16 oz glass	None	N	
	15KR089SD	Mercury SSE	Sediment	9/6/2015	13:30	2	8 oz HDPE jar	None	Y	MS/MSD
	15KR090SD	Total Organic Carbon	Sediment	9/3/2015	09:44	1	4 oz glass jar	None	N	
	15KR090SD	Grain Size	Sediment	9/3/2015	09:44	1	16 oz glass	None	N	
	15KR090SD	Total TAL Metals	Sediment	9/3/2015	09:44	1	4 oz glass jar	None	N	

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Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TASEH	9/12/15 1110	

Test America, Kris Allen
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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	15KR090SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/3/2015	09:44	2	1L poly	None	N	
	15KR091SD	Mercury SSE	Sediment	9/6/2015	17:30	1	8 oz HDPE jar	None	N	
	15KR091SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/6/2015	17:30	1	1 gallon ziploc	None	N	
	15KR091SD	Total TAL Metals	Sediment	9/6/2015	17:30	1	4 oz glass jar	None	N	
	15KR091SD	Methylmercury	Sediment	9/6/2015	17:30	1	8 oz HDPE jar	None	N	
	15KR091SD	Total Organic Carbon	Sediment	9/6/2015	17:30	1	4 oz glass jar	None	N	
	15KR091SD	Grain Size	Sediment	9/6/2015	17:30	1	16 oz glass	None	N	
	15KR092SD	Grain Size	Sediment	9/3/2015	11:40	1	16 oz glass	None	N	
	15KR092SD	Mercury SSE	Sediment	9/3/2015	11:40	1	8 oz HDPE jar	None	N	
	15KR092SD	Methylmercury	Sediment	9/3/2015	11:40	1	8 oz HDPE jar	None	N	
	15KR092SD	Total Organic Carbon	Sediment	9/3/2015	11:40	1	4 oz glass jar	None	N	
	15KR092SD	Total TAL Metals	Sediment	9/3/2015	11:40	1	4 oz glass jar	None	N	
	15KR092SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/3/2015	11:40	3	32oz wide mouth poly	None	N	
	15KR093SD	Grain Size	Sediment	9/6/2015	19:30	1	16 oz glass	None	N	
	15KR093SD	Mercury SSE	Sediment	9/6/2015	19:30	1	8 oz HDPE jar	None	N	
	15KR093SD	Total Organic Carbon	Sediment	9/6/2015	19:30	1	4 oz glass jar	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEH	9/12/15 1110	

Test America, Kris Allen
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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
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Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	15KR093SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/6/2015	19:30	1	1 gallon ziploc	None	N	
	15KR093SD	Methylmercury	Sediment	9/6/2015	19:30	1	8 oz HDPE jar	None	N	
	15KR093SD	Total TAL Metals	Sediment	9/6/2015	19:30	1	4 oz glass jar	None	N	
	15KR094SD	Total TAL Metals	Sediment	9/3/2015	11:00	1	4 oz glass jar	None	N	
	15KR094SD	Grain Size	Sediment	9/3/2015	11:00	1	16 oz glass	None	N	
	15KR094SD	Total Organic Carbon	Sediment	9/3/2015	11:00	1	4 oz glass jar	None	N	
	15KR095SD	Total TAL Metals	Sediment	9/3/2015	16:56	1	4 oz glass jar	None	N	
	15KR095SD	Grain Size	Sediment	9/3/2015	16:56	1	16 oz glass	None	N	
	15KR095SD	Total Organic Carbon	Sediment	9/3/2015	16:56	1	4 oz glass jar	None	N	
	15KR096SD	Methylmercury	Sediment	9/3/2015	17:40	1	8 oz HDPE jar	None	N	
	15KR096SD	Grain Size	Sediment	9/3/2015	17:40	1	16 oz glass	None	N	
	15KR096SD	Total Organic Carbon	Sediment	9/3/2015	17:40	1	4 oz glass jar	None	N	
	15KR096SD	Total TAL Metals	Sediment	9/3/2015	17:40	1	4 oz glass jar	None	N	
	15KR097SD	Methylmercury	Sediment	9/4/2015	14:35	3	8 oz HDPE jar	None	Y	MS/MSD
	15KR097SD	Total Organic Carbon	Sediment	9/4/2015	14:35	3	4 oz glass jar	None	Y	MS/MSD
	15KR097SD	Grain Size	Sediment	9/4/2015	14:35	1	16 oz glass	None	Y	
	15KR097SD	Total TAL Metals	Sediment	9/4/2015	14:35	3	4 oz glass jar	None	Y	MS/MSD
	15KR098SD	Methylmercury	Sediment	9/4/2015	10:40	1	8 oz HDPE jar	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
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CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
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Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	15KR098SD	Total Organic Carbon	Sediment	9/4/2015	10:40	1	4 oz glass jar	None	N	
	15KR098SD	Grain Size	Sediment	9/4/2015	10:40	1	16 oz glass	None	N	
	15KR098SD	Total TAL Metals	Sediment	9/4/2015	10:40	1	4 oz glass jar	None	N	
	15KR099SD	Total TAL Metals	Sediment	9/5/2015	10:50	1	4 oz glass jar	None	N	
	15KR099SD	Grain Size	Sediment	9/5/2015	10:50	1	16 oz glass	None	N	
	15KR099SD	Total Organic Carbon	Sediment	9/5/2015	10:50	1	4 oz glass jar	None	N	
	15KR099SD	Toxicity - Hyalella Azteca (28 day)	Sediment	9/5/2015	10:50	2	1 gallon ziploc	None	N	
	15KR100SD	Total TAL Metals	Sediment	9/4/2015	16:55	1	4 oz glass jar	None	N	
	15KR100SD	Methylmercury	Sediment	9/4/2015	16:55	1	8 oz HDPE jar	None	N	
	15KR100SD	Total Organic Carbon	Sediment	9/4/2015	16:55	1	4 oz glass jar	None	N	
	15KR100SD	Grain Size	Sediment	9/4/2015	16:55	1	16 oz glass	None	N	
	15KR101SD	Methylmercury	Sediment	9/4/2015	16:10	1	8 oz HDPE jar	None	N	
	15KR101SD	Total Organic Carbon	Sediment	9/4/2015	16:10	1	4 oz glass jar	None	N	
	15KR101SD	Total TAL Metals	Sediment	9/4/2015	16:10	1	4 oz glass jar	None	N	
	15KR101SD	Grain Size	Sediment	9/4/2015	16:10	1	16 oz glass	None	N	
	15KR102SD	Methylmercury	Sediment	9/5/2015	12:25	1	8 oz HDPE jar	None	N	
	15KR102SD	Grain Size	Sediment	9/5/2015	12:25	1	16 oz glass	None	N	
	15KR102SD	Total TAL Metals	Sediment	9/5/2015	12:25	1	4 oz glass jar	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TA-SEA	9/12/15 1110	

Test America, Kris Allen
5755 8th Sreet East
Tacoma, WA 89424
(253) 248-4970

CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	15KR102SD	Total Organic Carbon	Sediment	9/5/2015	12:25	1	4 oz glass jar	None	N	
	15KR103SD	Total Organic Carbon	Sediment	9/5/2015	12:50	1	4 oz glass jar	None	N	
	15KR103SD	Total TAL Metals	Sediment	9/5/2015	12:50	1	4 oz glass jar	None	N	
	15KR103SD	Grain Size	Sediment	9/5/2015	12:50	1	16 oz glass	None	N	
	15KR104SD	Grain Size	Sediment	9/5/2015	12:10	1	16 oz glass	None	N	
	15KR104SD	Total Organic Carbon	Sediment	9/5/2015	12:10	1	4 oz glass jar	None	N	
	15KR104SD	Methylmercury	Sediment	9/5/2015	12:10	1	8 oz HDPE jar	None	N	
	15KR104SD	Total TAL Metals	Sediment	9/5/2015	12:10	1	4 oz glass jar	None	N	
	15KR105SD	Methylmercury	Sediment	9/5/2015	11:30	1	8 oz HDPE jar	None	N	
	15KR105SD	Total TAL Metals	Sediment	9/5/2015	11:30	1	4 oz glass jar	None	N	
	15KR105SD	Total Organic Carbon	Sediment	9/5/2015	11:30	1	4 oz glass jar	None	N	
	15KR105SD	Grain Size	Sediment	9/5/2015	11:30	1	16 oz glass	None	N	
	15KR106SD	Total TAL Metals	Sediment	9/4/2015	11:11	1	4 oz glass jar	None	N	
	15KR107SD	Total TAL Metals	Sediment	9/4/2015	11:25	1	4 oz glass jar	None	N	
	15KR108SD	Total TAL Metals	Sediment	9/4/2015	11:40	1	4 oz glass jar	None	N	
	15KR109SD	Total TAL Metals	Sediment	9/4/2015	12:00	1	4 oz glass jar	None	N	
	15KR200SD	Methylmercury	Sediment	9/4/2015	10:50	1	8 oz HDPE jar	None	N	
	15KR200SD	Total Organic Carbon	Sediment	9/4/2015	10:50	1	4 oz glass jar	None	N	
	15KR200SD	Total TAL Metals	Sediment	9/4/2015	10:50	1	4 oz glass jar	None	N	

Special Instructions: TAL metals includes Hg
All samples for Brooks Rand (LL mercury, methylmercury, Hg SSE) have labels on outside of bag only.
All groundwater samples for TDS, dissolved Hg have been field filtered.

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CHAIN OF CUSTODY #

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			TA-SEA	9/12/15 1110	

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Tacoma, WA 89424
(253) 248-4970

CHAIN OF CUSTODY RECORD
Red Devil Mine 2015/AK
1001095.0002
Method of Shipment: FedEx Priority Overnight

No: 10-091115-121237-0007
E&E, Inc., Mark Longtine
720 Third St, Suite 1700
Seattle, WA 98104 (206) 624-9537

12/22/2015

Lab #	Sample #	Analyses	Matrix	Collected	Sample Time	Numb Cont	Container	Preservative	Lab QC	Description
	15KR200SD	Grain Size	Sediment	9/4/2015	10:50	1	16 oz glass	None	N	
	15KR201SD	Total TAL Metals	Sediment	9/5/2015	11:00	1	4 oz glass jar	None	N	
	15KR201SD	Grain Size	Sediment	9/5/2015	11:00	1	16 oz glass	None	N	
	15KR201SD	Total Organic Carbon	Sediment	9/5/2015	11:00	1	4 oz glass jar	None	N	
	15KR202SD	Methylmercury	Sediment	9/5/2015	16:30	1	8 oz HDPE jar	None	N	
	15KR202SD	Total Organic Carbon	Sediment	9/5/2015	16:30	1	4 oz glass jar	None	N	
	15KR202SD	Grain Size	Sediment	9/5/2015	16:30	1	16 oz glass	None	N	
	15KR202SD	Total TAL Metals	Sediment	9/5/2015	16:30	1	4 oz glass jar	None	N	
	15KR202SD	Mercury SSE	Sediment	9/5/2015	16:30	1	8 oz HDPE jar	None	N	

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SAMPLES TRANSFERRED FROM

CHAIN OF CUSTODY #

Items/Reason	Relinquished by (Signature and Organization)	Date/Time	Received by (Signature and Organization)	Date/Time	Sample Condition Upon Receipt
			TASEA	9/12/15 1110	

Login Sample Receipt Checklist

Client: Ecology and Environment, Inc.

Job Number: 580-53253-3

Login Number: 53253
List Number: 1
Creator: Pilch, Andrew C

List Source: TestAmerica Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	False	Refer to Job Narrative for details.
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	N/A	
Samples do not require splitting or compositing.	N/A	
Residual Chlorine Checked.	N/A	