Final Sediment Remedy Confirmation
Ottawa River-Reach 1 Site Characterization
Site Characterization Report

Maumee Area of Concern, Toledo, Ohio

Great Lakes Architect-Engineer Services
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LIST OF ACRONYMS AND ABBREVIATIONS

g_{oc}	Gram organic carbon
mg	Milligram(s)
mg/kg	Milligram(s) per kilogram
µg/kg	Microgram(s) per kilogram
µmol	Micromoles per gram
AOC	Area of concern
AVS	Acid volatile sulfide
BUI	Beneficial use impairment
COC	Constituent of concern
EA	EA Engineering, Science, and Technology, (MI) PLC and its affiliate EA Science and Technology
EPA	U.S. Environmental Protection Agency
ESBTU	Equilibrium Partitioning Sediment Benchmark Toxic Unit
ft	Foot (feet)
FSP	Field Sampling Plan
GLNPO	Great Lakes National Program Office
GNSS	Global Navigation Satellite System
GPS	Global positioning system
in.	Inch(es)
MNR	Monitored natural recovery
NELAC	National Environmental Laboratory Accreditation Conference
ND	Non-detect
PAH	Polycyclic aromatic hydrocarbon
PCB	Polychlorinated biphenyl
PEC	Probable effect concentration
ppm	Part(s) per million
QAPP	Quality Assurance Project Plan
RL	Reporting limit
RM	River mile
R/V	Research vessel

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

SCR	Site Characterization Report
SEM	Simultaneously extracted metals
SVOC	Semi-volatile organic compound
SWAC	Surface weighted average concentration
TOC	Total organic carbon
UCLM	upper confidence interval of the mean
USACE	United States Army Corps of Engineers
VRS	Virtual reference station

1. INTRODUCTION

EA Engineering, Science, and Technology, (MI) PLC and its affiliate EA Science and Technology (EA), on behalf of the U.S. Environmental Protection Agency (EPA) Great Lakes National Program Office (GLNPO) has prepared this Site Characterization Report (SCR) for the Sediment Remedy Confirmation Ottawa River Reach 1 Site Characterization, located within the Maumee Area of Concern (AOC), Toledo, Ohio (Figure 1-1). The site characterization effort involved sediment sampling and data evaluation in Reach 1 of the Ottawa River. The field and analytical work was conducted in accordance with the Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP) (EA 2019).

1.1 SITE DESCRIPTION AND BACKGROUND

The confluence of the Ottawa River and Lake Erie serves as the northeastern extent of the Maumee AOC, which encompasses 775 square miles (including a majority of the City of Toledo), and drains into Lake Erie at Toledo (Figure 1-1). The Maumee AOC was originally identified as the area extending from the Bowling Green water intake near Waterville along the Maumee River downstream to Maumee Bay. The area includes direct drainage into waters that are within Lucas, Ottawa, and Wood counties. This includes Swan Creek, Ottawa River (Ten Mile Creek), Duck Creek, Otter Creek, Cedar Creek, Grassy Creek, and Crane Creek. In 1992, the Maumee AOC was extended to the east to include Turtle Creek, Packer Creek, and the Toussaint River. Heavy metals and organic chemical contamination in sediment are what led to the lower Maumee River being classified as an AOC. The Maumee AOC Stage 2 Watershed Restoration Plan (Maumee RAP 2006) provided background on each of the constituent watershed subareas (or Hydrologic Units) of the Maumee AOC and described impairments for each of the subareas. Of the ten beneficial use impairments (BUIs) identified for the Maumee AOC, nine were determined to apply for the Ottawa River. The removal of these BUIs will be necessary to meet the goals of the Maumee AOC restoration, and the eventual delisting of the Maumee AOC:

- BUI 1–Restrictions on fish and wildlife consumption
- BUI 3–Degradation of fish and wildlife populations
- BUI 4–Fish tumors or other deformities
- BUI 6–Degradation of benthos
- BUI 7–Restriction on dredging activities
- BUI 10–Beach closings (recreational contact)
- BUI 11–Degradation of aesthetics
- BUI 12–Added cost to agriculture and industry
- BUI 14-Loss of fish and wildlife habitat.

The Ottawa River Cleanup was designed in 2010 to address portions of the lower 9.2 miles of the river (defined as the Lower Ottawa River and equivalent to this site) where human activity has had the greatest impact on the beneficial uses of the river. While many of these impairments are derived from physical impacts to the river from construction, re-channelization, and bank stabilization, this area also has the greatest inventory of sediment contaminated with constituents

of concern (COCs). The primary COCs at the site were polychlorinated biphenyls (PCBs), polycyclic aromatic hydrocarbons (PAHs), heavy metals (primarily lead), and oil and grease. PCBs constituted the primary COCs for this site, with PAHs and lead comprising secondary COCs.

Risk evaluations for the Lower Ottawa river identified exposure to PCBs from consumption of fish as the primary human health risk. Ecological risks were identified for wildlife and aquatic receptors as a result of concentrations of lead and PCBs in sediment and fish. Fish deformities were linked to current PAH concentrations (Conestoga Rovers and Associates 2009). Additional information on risk assessment and risk management considerations are provided in the Ecological Screening Level Risk Assessment of the Lower Ottawa River (Parameterix, October 2001), and Screening Level Human Health Risk Assessment for the Lower Ottawa River, Ohio (Intertox, Inc., October 2001). Sediment contamination was associated with impacts to the aquatic community through indices of invertebrate and fish community diversity, fish health, and fish tissue concentrations (Ohio EPA, 2007).

The remedial action focused on the reduction of surface weighted average concentrations (SWAC) for PCBs, PAHs and lead in an effort to reduce the concentration of chemical constituents available to move through the food chain, reducing stresses at each trophic level and the amount of additional risk to end points, including human health from fish consumption (Conestoga Rovers and Associates 2009). Sediment goals were established to support the reduction of risk to human health, reduce the risk of toxic effects to aquatic life and improve the health of the entire food chain and for eventual elimination of beneficial use impairments. The short-term, post-remediation goals were identified as follows:

- PCBs (total Aroclors); 1.5 parts per million (ppm)
- Lead; 180 ppm
- Total PAHs (16); 30 ppm.

The long-term sediment goals for the river are:

- PCBs (total Aroclors); 0.22 ppm
- Lead; 128 ppm
- Total PAHs (16); 22.8 ppm.

These goals were established to represent achievable conditions after dredging that, with the additional cleanup effect of natural recovery processes, were anticipated to attain the final goals within a reasonable (ten year) period of sedimentation.

The lower 9.2 miles of the Ottawa River were remediated in 2010 in order to support BUI removal. The site was divided into four reaches. The selected remedial action in Reaches 2, 3, and 4 (all upstream of Reach 1) was mass removal of contaminants from sediment, with monitored natural recovery. Hydraulic dredging was carried out from May through December 2010 on the most contaminated areas, or units, within Reaches 2, 3, and 4 of the Lower Ottawa River stretching

upstream (generally south and west) from river mile (RM) 3.5 to RM 8.4. The approach in Reach 1 was monitored natural recovery coupled with upstream mass removal.

1.1.1 Sampling Efforts

Characterization of Reaches 2, 3, and 4 (Phase 1) was conducted by EPA GLNPO, Office of Research and Development, and their partners at federal and state agencies in the Fall of 2009 and early Spring of 2010 prior to remedial action. Phase 2 consisted of monitoring and sampling activities conducted during environmental dredging operations from late Spring to early Winter of 2010. Following dredging, Phase 3 near-term or immediate post-remedy monitoring was performed in November 2010 and from March to September 2011. Long-term monitoring commenced in Phase 4 of the study in 2012 and continued during 3 of the ensuing 4 years through 2015. Phase 4 monitoring was conducted in the summers of 2012 (Phase 4-1), 2013 (Phase 4-2), and 2015 (Phase 4-3).

A remedy effectiveness evaluation will be performed over the entire lower 9.2 miles of the Ottawa River Cleanup area as the next step in the AOC delisting process in 2020. Confirmation sampling in Reach 1 will be used to inform the remedy effectiveness evaluation. The determination regarding need for further management actions will be made by considering both this remedy confirmation sampling as well as subsequent remedy effectiveness sampling.

1.1.2 Reach 1 Description

Reach 1 extends approximately 3 RM, from the I-75 overpass (at the downstream limit of remediation of Reach 2) to the mouth of Lake Erie. This area is downstream of Reach 2 and just upstream of the mouth of Lake Erie.

In Reach 1, the river is over 1,000 feet (ft) wide, and water depths are relatively shallow (compared to the upstream reaches) and highly subject to wind-driven waves and currents, which are induced by Lake Erie seiches. Reach 1 also receives turbulence from recreational boat traffic. The downstream areas of the river widen, and the river becomes more lacustrine in nature and the frequency of flow reversals increases. Where the river is more subject to wind-wave action, seiche-driven currents, and other factors that minimize net deposition, the river may be less actively depositional. These effects are more pronounced downstream of Summit Avenue where there is more open water and boat activity. During low-water conditions caused by seiches, large areas of exposed mudflats or areas of only a few inches (in.) of water depth are visible in Reach 1. Sediment conditions in the downstream portion of the river indicate that these areas are subject to relatively greater mixing and resuspension. The resuspension of sediments by wind and waves, flushing by seiche events, and storm flows contribute to the dispersion of sediment in these areas.

1.2 PURPOSE AND OBJECTIVES

1.2.1 Project Purpose and Objective

This site characterization was conducted to obtain data to characterize the chemical and physical nature of sediments within Ottawa River Reach 1[1]. The primary objective of the field investigation was the collection of surface sediment from 21 locations within Reach 1 and one reference location in Maumee Bay for chemical, physical, and biological analyses. This information will be used to help identify possible areas of focus for further evaluation and/or remediation, if needed. The information obtained during this site characterization may also assist the Ohio EPA and Maumee AOC stakeholders in planning for remedy effectiveness monitoring of the entire lower 9.2 miles of the Ottawa River (planned for 2020).

1.2.2 Objectives of the Site Characterization Report

This Site Characterization Report summarizes the findings from the field investigation, including data tables and maps, data interpretation, and findings of the investigation. The results of this site characterization were evaluated to assess the sediment quality of the Ottawa River Reach 1 project area. The overall objectives of this report are to present the final validated analytical data collected for Reach 1, present the results of aquatic bioassays and bioaccumulation exposures, and compare results to the long and short-term sediment goals for the river.

1.3 REPORT ORGANIZATION

This report contains a comprehensive summary of the sampling program and the sediment testing results for the Ottawa River Reach 1 Site Characterization. An overview of the field sampling program is provided in Section 2. Section 3 presents the analytical sediment results, Section 4 presents the results of the toxicity and bioaccumulation testing, and Section 5 provides an integrated summary and discussion. References cited in this report are provided in Section 6.

1.4 REPORT APPENDIXES

The following data are incorporated into the appendixes:

Appendix A – Field Logbook and Data Collection Forms. A copy of the field data sheets and field logbooks that were maintained during sediment sampling and processing are provided in this appendix.

Appendix B – Photographic Record. A copy of the photographs that were taken during sediment sampling and processing is provided in this appendix.

1 Samples were focused in the portion of Reach 1 extending from the I-75 overpass (at the downstream limit of remediation of Reach 2) to the Summit Avenue overpass This modified Reach 1 area was selected for the current investigation following USACE's review of previous sampling results in the area south of Summit Avenue where sediment concentrations were less impacted.

Appendix C – Particle Size Data and Graphs. Graphs showing particle size distribution of each submitted grain size sample are provided in this appendix.

Appendix D – Eurofins TestAmerica Laboratory Reports. Copies of the chain-of-custody forms and the laboratory (Eurofins TestAmerica Laboratories, Inc.) analytical data reports are provided in this appendix.

Appendix E – Surface Sediment Weighted Average Concentration Calculations. The methods and results that were used to evaluate surface SWAC calculations are provided in this appendix.

Appendix F – Toxicity and Bioaccumulation Testing Report. The EA ecotoxicology laboratory toxicity and bioaccumulation testing report for sediment samples from Reach 1 to evaluate the toxicity of each of the site sediment samples based on the survival, growth, or tissue concentration of the test organisms is provided in this appendix.

Appendix G – Replicate Lumbriculus (L.) variegatus Tissue PCB Congener Concentrations. Replicate tissue PCBs concentration data from *L. variegatus* bioaccumulation testing is provided in this appendix.

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2. SAMPLING NARRATIVE

The Ottawa River Reach 1 site characterization included surface sediment collection and analysis. Work was performed in coordination with EPA and the United States Army Corps of Engineers (USACE). The investigation, including sampling activities and analytical testing methods, was carried out in accordance with procedures outlined in the QAPP and FSP (EA 2019). Any modifications to the intended procedures are discussed in this section.

2.1 SURFACE SAMPLE COLLECTION

Mobilization for the field effort commenced on 21 October 2019. Sample collection was initiated on 22 October 2019 and continued through 25 October 2019. Staging for the field investigation took place at Jockett's Marina in Toledo, Ohio.

USACE and EPA selected 21 locations for surface sediment sampling in the Ottawa River Reach 1 and one reference location in Maumee Bay, for a total of 22 sampling locations. Sampling locations were established by focusing greater sampling density on the upstream portion of Reach 1 between the I-75 overpass to location OR19-18 (Figure 2-1) targeting areas not actively remediated. An additional 3 sampling locations (OR19-19, OR19-20, and OR19-21) were located in areas downstream of OR19-18, to the Summit Street overpass as these areas had not been sampled in the last 10 years. Proposed sampling locations were established using an equilateral triangle grid with a 600 ft side for sample locations OR19-1 through OR19-18 and a 1,000 ft side for sample locations OR19-19 through OR19-21. As described in the QAPP and FSP (EA 2019), flexibility with regard to the actual sample locations provided that adequate spacing between samples was maintained across the sampling areas.

In addition to the sample locations within Reach 1, one reference sample was located in Maumee Bay in an area consistent with the USACE lake reference sampling stations for USACE operations and maintenance sediment evaluations (Figure 2-1).

Sampling for the majority of locations (20 locations) was completed aboard the Research Vessel (R/V) *Mudpuppy II* provided by GLNPO and operated by Cetacean Marine. Two locations (OR19-01 and OR19-02) inaccessible by the R/V *Mudpuppy II* were sampled from a jon boat provided by EA. Figure 2-1 presents the actual sample locations in the Ottawa River Reach 1 and Maumee Bay reference location. Collection of ponar surface samples for physical, chemical, and biological analysis were successfully performed at each location.

2.1.1 Navigation

The R/V *Mudpuppy II* used a Trimble R2 Global Navigation Satellite System (GNSS) receiver paired with a laptop computer running Trimble TerraSync software to derive global positioning system (GPS) positions with an accuracy of 1 to 3 meters. To enhance the positional accuracy of the Trimble R2 GNSS receiver, corrections for the satellite positioning data were received in real time through a subscription to the Ohio Department of Transportation Virtual Reference Station (VRS) Network. A wireless hotspot allows the Trimble R2 GNSS receiver to interface directly

with the VRS network over the internet and derive corrections to the satellite positioning information in real time. Following the application of the VRS corrections, the positional information generated by the roving Trimble R2 GNSS receiver unit yielded position fixes with a geodetic accuracy of 0.5 meters in the horizontal plane. The R/V *Mudpuppy II* crew validated the GPS unit for accuracy daily in accordance with EPA's *Interim Guidance for Developing Global Positioning System Data Collection Standard Operating Procedures and Quality Assurance Project Plans* (EPA 2008).

Precision positioning and navigation to the sampling locations with the jon boat (OR19-01 and OR19-02) was provided utilizing a Trimble R10 GNSS receiver paired to a Trimble TSC3 controller. To enhance the positional accuracy of the Trimble R10 GNSS receiver, corrections for the satellite positioning data were received in real time through a subscription to the Ohio Department of Transportation VRS Network. A broadband cellular modem that is integrated into the Trimble TSC3 controller allowed the Trimble R10 GNSS receiver to interface directly with the VRS network and derive corrections to the satellite positioning information in real time. Following the application of the VRS corrections, the positional information generated by the roving Trimble R10 GNSS receiver unit yielded position fixes with a geodetic accuracy of 2 centimeters in the horizontal plane and 5 centimeters in the vertical plane. EA's field crew checked the GPS unit for accuracy daily in accordance with EPA's *Interim Guidance for Developing Global Positioning System Data Collection Standard Operating Procedures and Quality Assurance Project Plans* (EPA 2008) and the procedures outlined in the QAPP (EA 2019). Proposed (target) and actual coordinates for the sampling locations are provided in Table 2-1.

2.1.2 Ponar Grab Sampling Methodology

A total of 22 surface sediment samples were successfully collected using a ponar grab sampler. The ponar grab sampler was either mechanically deployed with a knuckle-boom crane and electric winch and retrieved from the R/V *Mudpuppy II* or manually deployed and retrieved with a soft line onboard EA's jon boat. At each location, the ponar grab sampler was used to collect surficial sediment from a 9-in. by 9-in. surface area with a 0.5 ft penetration depth. The ponar grab sampler was capable of collecting 8.2 liters of sediment during each deployment.

At each sample location the procedure for collecting the sample included deploying the sampler off the edge of the R/V *Mudpuppy II* (or EA's jon boat), retrieving the sampler to the boat deck, decanting water at the top of the sampler, and transferring the sediment into a stainless steel pot or pan.

Grab samples were visually inspected to verify that the sampler was not overfilled, such that the sediment surface was touching the top of the sampler; there was no evidence of sample loss or washout (due to incomplete closure of the sampler, penetration at an angle, or titling upon retrieval); and the desired depth of penetration was achieved (for this project the desired depth interval was 0–0.5 ft [6 in.], penetration depths of 0–0.3 ft [4 in.] were considered acceptable). At many locations, multiple deployments were necessary to collect sufficient sediment volume for the specific location's predetermined sediment analyses. A decontaminated stainless-steel pot or stainless-steel pans were used to capture the sediment as it was transferred from the ponar grab

sampler. Detail on each sample location including date and time of collection, location coordinates and a description of each sample are provided in Table 2-1. General notes were recorded in the field notebook and are provided in Appendix A. At each location digital photographs were collected (Appendix B) and lithologic descriptions were completed to document sediment characteristics (Appendix A).

Sample containers submitted for simultaneously extracted metals (SEM)/acid volatile sulfide (AVS) analysis were filled immediately upon retrieval of the surface sample, prior to documentation and homogenizing the sediments in the surface interval to minimize aeration of the sample. SEM/AVS containers were filled without leaving head space. Following SEM/AVS sample collection, the remaining sediment was homogenized using stainless steel spoons/scoops and transferred directly into laboratory-provided, pre-cleaned, labeled sample containers onboard the vessel, and stored on ice. One 5-gallon bucket of homogenized sediment was also collected to be used for bioassay analysis at each location where bioassay sampling was identified (Table 2-2). Samples were logged and prepared for laboratory submittal upon returning to shore.

Personnel names, local weather conditions, and other information that impacted the field sampling program were also recorded. Each page of the logbooks was numbered and was dated by the personnel entering the information. Copies of the field logbooks and field collection forms are provided in Appendix A.

Water used for decontamination of the sampling equipment on the R/V *Mudpuppy II* and EA's jon boat was containerized, transported to EA's Ecotoxicology Laboratory in Hunt Valley, Maryland, and disposed of in accordance with applicable state and local regulations. Personal protective equipment and disposable sampling equipment were bagged for disposal and managed as a solid waste in accordance with standard operating procedures presented in the QAPP (EA 2019).

Analytical samples were defined as surface (collected via ponar) from 0 to 0.5 ft below sediment surface in accordance with the QAPP (EA 2019). Sample identifications included the location (OR), year of sampling (19), location number, and "SURF" for surface samples or "REF" for reference samples. For example, the analytical sample OR19-06-SURF is the surface (ponar) sample collected at Ottawa River Reach 1 location 06, and OR19-REF1 is the surface sediment sample collected from the reference location in the Maumee Bay.

2.2 ANALYTICAL PROGRAM

Sediment was successfully collected from each of the 22 sampling locations (21 investigation locations and one reference location). In total, 22 sediment samples and 3 field duplicates were submitted for grain size, total metals, total organic carbon (TOC) analyses, oil and grease, PCB Aroclors, PCB congeners, 34 PAHs, semi-volatile organic compounds (SVOCs); 14 sediment samples and 2 field duplicates were submitted for SEM/AVS; and 14 sediment samples were submitted for bioassay analysis (Table 2-2).

Samples (not including bioassay samples) were shipped priority overnight to Eurofins TestAmerica's Burlington, Vermont, laboratory. At the Burlington laboratory, samples were

analyzed for 34 PAHs, total metals, PCB Aroclors, SVOCs, oil and grease, grain size, and TOC analyses. Samples designated for SEM/AVS and percent solids analyses were shipped overnight from Eurofins TestAmerica's Burlington laboratory to Eurofins TestAmerica's Pittsburgh, Pennsylvania, laboratory; samples designated for PCB congeners analysis were shipped overnight to Eurofins TestAmerica's Knoxville, Tennessee, laboratory. Samples collected for bioassay analysis were transported via refrigeration trailer to EA's Ecotoxicology Laboratory in Hunt Valley, Maryland.

Samples designated for shipment via overnight delivery were sealed inside plastic bubble-wrapped bags and placed upright inside lined coolers filled with ice. Each cooler also contained a chain-of- custody specific to its contents and a temperature blank. Each cooler was sealed with custody seals and packing tape and was affixed an airbill in a viable location. Samples designated for transport via refrigeration trailer (sealed 5-gallon buckets) were securely placed within the trailer to prevent the bucket from tipping or rolling.

2.3 DEVIATIONS FROM THE QUALITY ASSURANCE PROJECT PLAN AND FIELD SAMPLING PLAN

2.3.1 Target Locations

Of the 21 sampling locations and one reference location, 11 were relocated more than 10 ft from the target sampling location following coordination with EPA and USACE, due to field conditions (i.e., low water levels, submerged utility lines). Per the QAPP, sample locations more than 10 ft from the target were noted in the field logbook. Of the 11 locations that were more than 10 ft from the target sampling location, 3 locations (OR19-11, -14, and -REF1) were relocated more than 30 ft from the target location. The target sampling location for OR19-01 was located on land, so the actual sampling location was shifted onto the water; OR19-11 and OR19-14 were shifted from their target sampling locations to accommodate low water levels, and OR19-REF1 was collected within the boundaries of the reference area used by USACE for operations and maintenance reference sampling. Table 2-1 presents coordinates for the target and the actual locations, the distance between the actual and target locations, and detailed information on sample location deviations.

3. ANALYTICAL RESULTS FOR SEDIMENTS

Validated results from the Ottawa River Reach 1 site characterization are presented in Tables 3-1 through 3-7. Detected concentrations of constituents were compared to the short- and long-term sediment remedial goals for PCBs, PAHs, and lead (Figure 3-1) established for the Ottawa River and probable effects concentrations (PEC) (MacDonald et al. 2000), where available, as described in the QAPP (EA 2019). Table 3-8 presents results from the surface weighted average concentration calculations and Table 3-9 provides a summary of the sediment concentration exceedances for short and long-term sediment goals and PEC values. Particle size graphs are provided in Appendix C. Eurofins TestAmerica Laboratory results are provided in Appendix D. The following sections briefly summarize the results.

3.1 SURFACE SEDIMENT ANALYSIS

The analytical results for surface sediment samples collected at 21 locations within Reach 1 and one reference location in Maumee Bay were screened against the short- and long-term sediment remedial goals for PCBs, PAHs, and lead established for the Ottawa River, and the sediment consensus-based PECs (MacDonald et al. 2000).

- The short-term, post-remediation goals for the river are:

  — PCBs (total Aroclors); 1.5 ppm
  — Lead; 180 ppm
  — Total PAHs (16); 30 ppm.

- The long-term sediment goals for the river are:

  — PCBs (total Aroclors); 0.22 ppm
  — Lead; 128 ppm
  — Total PAHs (16); 22.8 ppm.

Twenty-two sediment samples and 3 field duplicates were analyzed for 34 PAHs, total metals, PCB Aroclors, PCB congeners, SVOCs, oil and grease, grain size, TOC analyses, and percent solids analysis; 14 sediment samples and 2 field duplicates were analyzed for SEM/AVS and bioassay testing as described in Section 3.3. Validated results from the sampling effort are presented in Tables 3-1 through 3-7.

The short- and long-term sediment remedial goals for PCBs, PAHs, and lead in the Ottawa River are defined as SWACs, the results from the current investigation were used to generate SWACs as described in Section 3.3. Analytical results for the full set of compounds analyzed were screened against sediment consensus-based PECs (MacDonald et al. 2000). These criteria provide a standard point of comparison to evaluate the relative degree and extent of contaminated sediment. Individual results, as well as SWACs, were also screened against the short- and long-term sediment remedial goals for PCBs, PAHs, and lead established for the Ottawa River. Results are summarized

in the following sections by analytical group. Table 3-8 summarizes the sediment SWAC results for PCBs, PAHs, and lead. Table 3-9 provides a summary of the results for all locations compared to the sediment goals and PEC values for PCBs, PAHs, and lead.

3.2 BULK SEDIMENT RESULTS FOR THE OTTAWA RIVER REACH 1 AREA

3.2.1 Grain Size

A total of 25 surface (0-0.5 ft) samples (including field duplicates) were submitted for grain size analysis (American Society for Testing Materials D422). Of the total samples, 22 (88 percent) were composed primarily (greater than 50 percent) of silt and clay. Silt and clay content in samples ranged from 5.6 percent (OR19-02-SURF) to 96 percent (OR19-REF1 and OR19-12-SURF). Specifically, the reference location sample (OR19-REF1) was composed of 4 percent sand, 59 percent silt, and 37 percent clay. One sample (OR19-02-SURF), located furthest upstream, nearshore (north), and approximately 100 ft west of I-75 overpass (at the downstream limit of remediation of Reach 2), was composed of 94 percent sand, 0.4 percent gravel, 1.7 percent silt, and 3.9 percent clay. Two samples (OR19-11-SURF and OR19-11-SURFFD), located nearshore (north), were composed of 0.4 and 0 percent gravel, 74 and 77 percent sand, 16 and 14 percent silt, and 9.8 and 9.3 percent clay, respectively. Detailed analytical results are presented in Table 3-1. Matrix spike/matrix spike duplicates were not submitted for grain size analysis, in accordance with the QAPP and FSP (EA 2019) as there are no MS/MSD procedures for grain size.

3.2.2 Total Organic Carbon

A total of 25 samples (including field duplicates) were submitted for TOC analysis (Lloyd Kahn). TOC concentrations ranged from 0.6 percent (OR19-02-SURF) to 7 percent (OR19-05-SURF), with a median, arithmetic average and geometric mean of 3 percent. The reference sample (OR19-REF1) TOC concentration was 1.9 percent. Four of the 25 samples diverged from the site average including OR19-02-SURF, OR19-05-SURF, OR19-11-SURF, and OR19-11-SURFFD. Sample OR19-02-SURF located furthest upstream, nearshore (north), and approximately 100 ft west of I-75 overpass, had a TOC concentration of 0.6 percent. Samples OR19-11-SURF and OR19-11-SURFFD, located nearshore (north), had TOC concentrations of 1.1 and 1.2 percent, respectively. Sample OR19-05, located nearshore (south) and less than 25 ft east of a dock structure, had a TOC concentration of 7 percent. TOC results are provided in Table 3-2.

3.2.3 Oil and Grease

A total of 25 samples (including field duplicates) were submitted for oil and grease analysis (EPA 9071B). Oil and grease concentrations ranged from 421 milligrams per kilogram (mg/kg) (OR19-11-SURF) to 3,070 mg/kg (OR19-01-SURF) in the Reach 1 samples. The average concentration was 1,260 mg/kg, with a geometric mean of 1,130 mg/kg and a median concentration of 1,200 mg/kg at location OR19-21. Oil and grease was not detected in the sample collected from the reference location OR19-REF1. Oil and grease results are provided in Table 3-2.

3.2.4 Metals

A total of 25 sediment samples, including field duplicates, were submitted for total metals analysis (EPA Contractor Laboratory Program [CLP] ISMO02.4). Metal results were compared to respective PEC values presented in Table 3-2. Additionally, lead was compared to the short- and long-term goals established for the Ottawa River. Each of the metals analyzed have PEC screening criteria (arsenic, cadmium, chromium, copper, lead, nickel, and zinc) (MacDonald et al. 2000). Results are presented in Table 3-2 in numerical order of location numbers.

Arsenic concentrations ranged from 3.3 mg/kg (OR19-11-SURFFD) to 10.6 mg/kg (OR19-07-SURF). The reference location sample (OR19-REF1) arsenic concentration was 7.6 mg/kg. None of the samples submitted for arsenic analysis (including field duplicates) had concentrations that exceeded the PEC (33 mg/kg) (Table 3-2).

Cadmium concentrations ranged from 0.25 mg/kg (OR19-02-SURF) to 1.8 mg/kg (OR19-07-SURF, OR19-09-SURF, OR19-10-SURF, OR19-17-SURF, OR19-18-SURF, and OR19-21-SURF). The reference location sample (OR19-REF1) cadmium concentration was 1.7 mg/kg. None of the samples submitted for cadmium analysis (including field duplicates) had concentrations that exceeded the PEC (4.98 mg/kg) (Table 3-2).

Chromium concentrations ranged from 9.6 mg/kg (OR19-02-SURF) to 51.1 mg/kg (OR19-17-SURF). The reference location sample (OR19-REF1) chromium concentration was 36.8 mg/kg. None of the samples submitted for chromium analysis (including field duplicates) had concentrations that exceeded the PEC (111 mg/kg) (Table 3-2).

Copper concentrations ranged from 12.4 mg/kg (OR19-11-SURFFD) to 67.4 mg/kg (OR19-10-SURF). The reference location sample (OR19-REF1) copper concentration was 7.6 mg/kg. None of the samples submitted for copper analysis (including field duplicates) had concentrations that exceeded the PEC (149 mg/kg) (Table 3-2).

Lead concentrations ranged from 16.9 mg/kg (OR19-11-SURFFD) to 103 mg/kg (OR19-10-SURF). The reference location sample (OR19-REF1) lead concentration was 42.5 mg/kg. None of the total samples submitted for lead analysis (including field duplicates) had concentrations that exceeded the PEC (128 mg/kg), long-term goal (128 mg/kg), or short-term goal (180 mg/kg) (Table 3-2). Figure 3-1 depicts lead concentrations at each sampling location.

Nickel concentrations ranged from 10.4 mg/kg (OR19-11-SURFFD) to 40.9 mg/kg (OR19-15-SURF). The reference location sample (OR19-REF1) nickel concentration was 38.9 mg/kg. None of the samples submitted for nickel analysis (including field duplicates) had concentrations that exceeded the PEC (48.6 mg/kg) (Table 3-2).

Zinc concentrations ranged from 46.8 mg/kg (OR19-02-SURF) to 265 mg/kg (OR19-10-SURF). The reference location sample (OR19-REF1) zinc concentration was 151 mg/kg. None of the total samples submitted for zinc analysis (including field duplicates) had concentrations that exceeded the PEC (459 mg/kg) (Table 3-2).

3.2.5 Ratio of Simultaneously Extracted Metals to Acid Volatile Sulfide

The bioavailability of divalent metals to aquatic organisms is influenced by the presence of AVS. In low oxygenated (anaerobic) environments, divalent metals precipitate as metal sulfides, making them unavailable for uptake by aquatic organisms. Using this method, six metals (cadmium, copper, lead, mercury, nickel, and zinc) were extracted, measured, converted to units of micromoles per gram (µmol) and added together (including any values that were J-qualified) to determine the amount of SEM. If a metal was not detected, it was considered a zero in the calculation. SEM was then compared to the amount of AVS detected (units of µmol) in the same sediment sample. If AVS was not detected in the sample, the SEM/AVS ratio was not calculated.

An SEM/AVS ratio less than 1 indicates a high degree of probability that the metals are bound as metal sulfides and not bioavailable to aquatic organisms. If the SEM/AVS ratio is greater than 1, then the metals in sediment exceed the sulfide binding ability and have a higher probability of being bioavailable to aquatic organisms (EPA 2005).

A total of 16 surface (0 to 0.5 ft below ground surface) samples, including field duplicates, were submitted for SEM/AVS analysis (EPA 821-R-91-100, SW846 6010C and 7471/9030). SEM/AVS was calculated for 14 (56 percent) of the samples submitted. Three (12 percent) of the samples (OR19-02, OR19-04, and OR19-09) had a ratio greater than 1 (Table 3-3). The maximum ratio was 1.91 at OR19-04-SURF.

While the SEM/AVS ratio provides information on bioavailability, it does not always inform toxicity. Metal toxicity is evaluated through an indirect estimate of bioavailability based on the concentrations of AVS and SEM, as well as TOC in the sediments. Metal Equilibrium Partitioning Sediment Benchmark Toxic Units (ESBTUs) were calculated following the methods outlined in *Procedures for the Derivation of Equilibrium Partitioning Sediment Benchmarks (ESBs) for the Protection of Benthic Organisms: Metal Mixtures (Cadmium, Copper, Lead, Nickel, Silver, and Zinc)* (EPA 2005). The molar concentration of AVS was subtracted from the molar concentration of the sum of the SEM measured in each sediment sample, and the result was divided by the fraction of organic carbon, accounting for preferential sorption of metals to organic carbon. It should be noted that if the particular sample has excess AVS such that all SEM is accounted for, this value can be negative.

$$ESBTU_{Metals} = \frac{\sum SEM - AVS}{f_{oc}}$$

$ESBTU_{Metals}$ = Metal ESBTU
$\sum SEM - AVS$ = difference between sum of SEM and AVS
f_{oc} = fraction of organic carbon in sediment

As presented in the EPA 2005 guidance, when metals ESBTUs are calculated using this method, a value less than 130 µmol of residual SEM per gram organic carbon (g_{oc}) indicates that the sediment poses a low risk of adverse biological effects associated with metals. Toxicity is uncertain where the concentration is between 130 and 3,000 µmol/g_{oc} and values greater than 3,000 µmol/g_{oc} are expected to be associated with adverse effects.

All of the ESBTU results for metals were below the 130 µmol/g_{oc} in surface grab samples indicating that the surface sediment at the site poses a low risk of adverse biological effects associated with metals (Table 3-3).

3.2.6 Polychlorinated Biphenyl Aroclors

A total of 25 sediment samples, including field duplicates, were submitted for PCB Aroclor analysis (EPA CLP SOM02.4). There is a PEC value for total PCB Aroclor concentrations of 676 micrograms per kilogram (µg/kg), a short-term goal of 1,500 µg/kg, and a long-term goal of 220 µg/kg. Total PCB Aroclor concentrations were calculated and compared to the screening criteria by summing the concentrations of individual PCB Aroclors with non-detects (ND) treated as 0 (ND = 0). Individual Aroclor concentrations as well as the summed total are presented in Table 3-4 in numerical order of location numbers.

Of the nine analyzed individual Aroclors, two (Aroclors-1242 and -1260) were detected in each of the samples submitted. Total PCB Aroclor concentrations (ND = 0) ranged from 183 µg/kg (OR19-REF1) to 2,410 µg/kg (OR19-07-SURF) (Table 3-4). Of the samples submitted, 24 (96 percent) (including field duplicates) had total PCB concentrations (ND = 0) that exceeded the long-term goal (220 µg/kg), 21 (84 percent) (including field duplicates) had total PCB concentrations (ND = 0) that exceeded the PEC (676 µg/kg), and 3 (12 percent) (including field duplicates) had total PCB concentrations (ND = 0) that exceeded the short-term goals (1500 µg/kg). Sample locations that exceeded short-term goals were OR19-01-SURF, OR19-07-SURF, and OR19-19-SURF. Sample location OR19-01-SURF, located upstream, nearshore (south), and approximately 400 ft west of I-75 overpass, had a total PCBs Aroclor concentration of 1,810 µg/kg. Sample location OR19-07-SURF, located approximately 50 ft south of the Reach 1 northern shore and approximately 1,200 ft downstream of the Suder Avenue Bridge, had a total PCBs Aroclor concentration of 2,410 µg/kg. Sample location OR19-19-SURF, located near the middle of the river channel and downstream in Reach 1, had a total PCBs Aroclor concentration of 1,596 µg/kg. Figure 3-1 depicts total PCBs concentration at each sample location.

3.2.7 Polychlorinated Biphenyl Congeners

A total of 25 sediment samples, including field duplicates, were submitted for PCB congener analysis (EPA 1668A). There is a PEC value only for total PCB congener concentrations of 676 µg/kg. Total PCB congener concentrations were calculated and compared to the screening criteria by summing the concentrations of individual PCB congeners with non-detects treated as 0 (ND = 0). Individual congener concentrations, the summed total, and TOC-normalized concentrations are presented in Table 3-5 in numerical order of location numbers.

Of the 210 analyzed individual Congeners, 202 were detected in at least 1 of the samples submitted. Total PCB congener concentrations (ND = 0) ranged from 284 µg/kg (OR19-REF1) to 3,036 µg/kg (OR19-07-SURF). Of the samples submitted, 22 (88 percent) (including field duplicates) had total PCB concentrations (ND = 0) that exceeded the PEC (676 µg/kg). The highest total PCB Congener concentration (ND = 0) was greater than four times the PEC at sample location OR19-07.

3.2.8 Polycyclic Aromatic Hydrocarbons

A total of 25 sediment samples, including field duplicates, were submitted for 34 PAHs analysis (EPA CLP SOM02.4). The standard PAH method reports each of the 38 individual PAHs; the results are provided in Table 3-6 in numerical order of location numbers. TOC-normalized concentrations are also provided in Table 3-6.

Ten of the individual analyzed PAHs have PEC values (MacDonald et al. 2000). Of the analyzed individual PAHs, 4 (benzo(a)pyrene, chrysene, fluoranthene, and pyrene) had concentrations that exceeded respective PEC values in at least one sample. The following PAHs do not have a PEC screening level value and are not individually included in this results discussion: 1-methylnaphthalene, 2-methylnaphthalene, acenaphthene, acenaphthylene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, C1-chrysenes, C1-fluorenes, C1-fluoranthenes/pyrenes, C1-naphthalenes, C1-phenanthrenes/anthracenes, C2-chrysenes, C2-fluorenes, C2-fluoranthenes/pyrenes, C2-naphthalenes, C2-phenanthrenes/anthracenes, C3-chrysenes, C3-fluorenes, C3-fluoranthenes/pyrenes, C3-naphthalenes, C3-phenanthrenes/anthracenes, C4-chrysenes, C4-naphthalenes, C4-phenanthrenes/anthracenes, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and perylene.

Anthracene was detected in 25 of the 25 samples submitted for analysis. Anthracene concentrations ranged from 29 µg/kg (OR19-REF1 and OR19-11-SURF) to 220 µg/kg (OR19-02-SURF). Of the total samples submitted for anthracene analysis (including field duplicates), none had concentrations that exceeded the PEC (845 µg/kg) (Table 3-6).

Benzo(a)anthracene was detected in 25 of the 25 samples submitted for analysis. Benzo(a)anthracene concentrations ranged from 130 µg/kg (OR19-REF1) to 1,000 µg/kg (OR19-04-SURF and OR19-04-SURFFD). Of the total samples submitted for benzo(a)anthracene analysis (including field duplicates), none had concentrations that exceeded the PEC (1,050 µg/kg) (Table 3-6).

Benzo(a)pyrene was detected in 25 of the 25 samples submitted for analysis. Benzo(a)pyrene concentrations ranged from 180 µg/kg (OR19-REF1) to 1,500 µg/kg (OR19-04-SURF). Of the total samples submitted for benzo(a)pyrene analysis (including field duplicates), 1 (4 percent) had a concentration that exceeded the PEC (1,450 µg/kg) (Table 3-6).

Benzo(e)pyrene was detected in 25 of the 25 samples submitted for analysis. Benzo(e)pyrene concentrations ranged from 130 µg/kg (OR19-REF1) to 1,200 µg/kg (OR19-04-SURFFD). Of the total samples submitted for benzo(e)pyrene analysis (including field duplicates), none had concentrations that exceeded the PEC (1,450 µg/kg) (Table 3-6).

Chrysene was detected in 25 of the 25 samples submitted for analysis. Chrysene concentrations ranged from 170 µg/kg (OR19-REF1) to 1,800 µg/kg (OR19-04-SURFFD). Of the total samples submitted for chrysene analysis (including field duplicates), 10 (40 percent) had concentrations that exceeded the PEC (1,290 µg/kg) (Table 3-6).

Fluoranthene was detected in 25 of the 25 samples submitted for analysis. Fluoranthene concentrations ranged from 240 µg/kg (OR19-REF1) to 2,800 µg/kg (OR19-04-SURFFD). Of the total samples submitted for fluoranthene analysis (including field duplicates), 8 (32 percent) had concentrations that exceeded the PEC (2,230 µg/kg) (Table 3-6).

Fluorene was detected in 24 of the 25 samples submitted for analysis. Fluorene concentrations ranged from 9 µg/kg (OR19-11-SURF) to 130 µg/kg (OR19-02-SURF). Fluorene concentration of the reference sample (OR19-REF1) was 25 µg/kg. Of the total samples submitted for fluorene analysis (including field duplicates), none had concentrations that exceeded the PEC (536 µg/kg) (Table 3-6).

Naphthalene was detected in 17 of the 25 samples submitted for analysis. Naphthalene concentrations ranged from 13 µg/kg (OR19-14-SURF) to 42 µg/kg (OR19-REF1). Of the total samples submitted for naphthalene analysis (including field duplicates), none had a naphthalene concentration that exceeded the PEC (561 µg/kg) (Table 3-6).

Phenanthrene was detected in 25 of the 25 samples submitted for analysis. Phenanthrene concentrations ranged from 77 µg/kg (OR19-REF1) to 970 µg/kg (OR19-02-SURF). Of the total samples submitted for phenanthrene analysis (including field duplicates), none had concentrations that exceeded the PEC (1,170 µg/kg) (Table 3-6).

Pyrene was detected in 25 of the 25 samples submitted for analysis. Pyrene concentrations ranged from 150 µg/kg (OR19-REF1) to 1,600 µg/kg (OR19-04-SURF). Of the total samples submitted for pyrene analysis (including field duplicates), one (4 percent) had a concentration that exceeded the PEC (1,520 µg/kg) (Table 3-6).

Total PAHs were calculated using 16 individual PAHs (Total 16 PAHs) to be consistent with the derivation of the site-specific values. The 16 PAHs included in this calculation are anthracene, pyrene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, benzo(b)fluoranthene, fluoranthene, benzo(k)fluoranthene, acenaphthylene, chrysene, benzo(a)pyrene, dibenzo(a,h)anthracene, benzo(a)anthracene, acenaphthene, phenanthrene, fluorene, and naphthalene. Total 16 PAH concentrations were calculated by summing the concentrations of individual 16 PAHs with ND treated as one-half the reporting limit (RL) (ND= ½ RL). Total 16 PAH concentrations (ND=½ RL) ranged from 1,700 µg/kg (OR19-REF1) to 16,615 µg/kg (OR19-04-SURFFD). Of the samples submitted (including field duplicates), none had total 16 PAH concentrations (ND=½RL) that exceeded the PEC and long-term goal (22,800 µg/kg) or the short-term goal (30,000 µg/kg). Figure 3-1 depicts total PAH concentrations at each sampling location.

3.2.9 Semi-Volatile Organic Compounds

A total of 25 sediment samples including field duplicates were submitted for SVOC analysis (EPA CLP SOM02.4) including PAHs (PAHs analyzed by the SVOC method generally have a higher RL resulting in a higher frequency of ND than the PAH results discussed in the previous section). Results were compared to PEC values and are presented in Table 3-7. Of the 68 SVOCs analyzed, PEC values (taken from MacDonald et al. 2000) are available for 2,4-dimethylphenol, 2-methylphenol, anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzofuran, diethylphthalate, dimethylphthalate, di-n-butylphthalate, di-n-octylphthalate, fluoranthene, fluorene, naphthalene, pentachlorophenol, phenanthrene, phenol, and pyrene. Detected concentrations were measured for anthracene, benzo(a)anthracene, benzo(a)pyrene, chrysene, dibenzofuran, di-n-octylphthalate, fluoranthene, fluorene, naphthalene, phenanthrene, phenol, and pyrene. Individual SVOC concentrations are presented in Table 3-7 in numerical order of location numbers.

Anthracene was detected in 25 of the 25 samples submitted for analysis. Anthracene concentrations ranged from 20 µg/kg (OR19-11-SURF) to 160 µg/kg (OR19-02-SURF). All concentrations (reference and Ottawa River sample locations) were estimated below the reporting limit. The reference sample location (OR19-REF1) anthracene concentration was estimated at 29 µg/kg. Of the total samples submitted for anthracene analysis (including field duplicates), none had concentrations that exceeded the PEC (845 µg/kg) (Table 3-7).

Benzo(a)anthracene was detected in 25 of the 25 samples submitted for analysis. Benzo(a)anthracene concentrations ranged from 99 µg/kg (OR19-REF1) to 750 µg/kg (OR19-04-SURFFD). Of the total samples submitted for benzo(a)anthracene analysis (including field duplicates), none had concentrations that exceeded the PEC (1,050 µg/kg) (Table 3-7).

Benzo(a)pyrene was detected in 25 of the 25 samples submitted for analysis. Benzo(a)pyrene concentrations ranged from 160 µg/kg (OR19-REF1) to 1,100 µg/kg (OR19-04-SURF and OR19-04-SURFFD). Of the total samples submitted for benzo(a)pyrene analysis (including field duplicates), none had concentrations that exceeded the PEC (1,450 µg/kg) (Table 3-7).

Chrysene was detected in 25 of the 25 samples submitted for analysis. Chrysene concentrations ranged from 140 µg/kg (OR19-REF1) to 1,300 µg/kg (OR19-04-SURFFD). Of the total samples submitted for chrysene analysis (including field duplicates), 1 (4 percent) had a concentration that exceeded the PEC (1,290 µg/kg) (Table 3-7).

Dibenzofuran was detected in 2 of the 25 samples submitted for analysis. Dibenzofuran concentrations ranged from 19 µg/kg (OR19-07-SURF) to 46 µg/kg (OR19-02-SURF). Of the total samples submitted for dibenzofuran analysis (including field duplicates), none had concentrations that exceeded the PEC (580 µg/kg) (Table 3-7).

Di-n-octylphthalate was detected in 17 of the 25 samples submitted for analysis. Di-n-octylphthalate concentrations ranged from 72 µg/kg (OR19-01-SURF) to 650 µg/kg (OR19-

08-SURF). Of the total samples submitted for di-n-octylphthalate analysis (including field duplicates), none had concentrations that exceeded the PEC (45,000 µg/kg) (Table 3-7).

Fluoranthene was detected in 25 of the 25 samples submitted for analysis. Fluoranthene concentrations ranged from 140 µg/kg (OR19-REF1) to 2,600 µg/kg (OR19-07-SURF). Of the total samples submitted for fluoranthene analysis (including field duplicates), 3 (12 percent) had concentrations that exceeded the PEC (2,230 µg/kg) (Table 3-7).

Fluorene was detected in 16 of the 25 samples submitted for analysis. Fluorene concentrations ranged from 25 µg/kg (OR19-10-SURF, OR19-15-SURF, and OR19-17-SURF) to 85 µg/kg (OR19-02-SURF). Fluorene was not detected in the reference sample (OR19-REF1). Of the total samples submitted for fluorene analysis (including field duplicates), none had concentrations that exceeded the PEC (536 µg/kg) (Table 3-7).

Naphthalene was detected in 2 of the 25 samples submitted for analysis. Naphthalene concentrations ranged from 19 µg/kg (OR19-02-SURF) to 26 µg/kg (OR19-REF1). Of the total samples submitted for naphthalene analysis (including field duplicates), none had a naphthalene concentration that exceeded the PEC (561 µg/kg) (Table 3-7).

Phenanthrene was detected in 25 of the 25 samples submitted for analysis. Phenanthrene concentrations ranged from 57 µg/kg (OR19-REF1) to 790 µg/kg (OR19-02-SURF). Of the total samples submitted for phenanthrene analysis (including field duplicates), none had concentrations that exceeded the PEC (1,170 µg/kg) (Table 3-7).

Phenol was detected in 1 of the 25 samples submitted for analysis. Phenol was detected at OR19-01-SURF at a concentration of 100 µg/kg. This concentration did not exceed the PEC (12,000 µg/kg) (Table 3-7).

Pyrene was detected in 25 of the 25 samples submitted for analysis. Pyrene concentrations ranged from 150 µg/kg (OR19-REF1) to 4,200 µg/kg (OR19-07-SURF). Of the total samples submitted for pyrene analysis (including field duplicates), 3 (12 percent) had a concentration that exceeded the PEC (1,520 µg/kg) (Table 3-7).

3.3 SURFACE SEDIMENT AVERAGE CONCENTRATION CALCULATION

An ancillary objective of this study was to estimate representative average concentrations of total PCBs (aroclors), total PAHs (16), and lead for Reach 1. The sample collection effort described in Section 2.0 involved the collection of surface sediment samples in Reach 1 in the Ottawa River for laboratory analysis. Sampling locations within Reach 1 were established by focusing greater sampling density on the upstream portion of this reach defined as the area between I-75 overpass to location OR19-18 (Figure 2-1) targeting areas not actively remediated (18 sampling locations proposed in this stretch). However, because 10 years has elapsed since downstream portions of Reach 1 were sampled, an additional 3 sampling locations (OR19-19, OR19-20, and OR19-21) were proposed for areas downstream of OR19-18, to the Summit Street overpass. Sampling locations were established using an equilateral triangle grid with a 600-ft side for sample locations

OR19-1 through OR19-18 and a 1,000 ft side for sample locations OR19-19 through OR19-21. In addition to the sample locations within Reach 1, one reference sample location was located in the Maumee Bay in the area that USACE uses as lake reference for its operations and maintenance evaluations (Figure 2-1).

The following three methods were evaluated for determining the surface sediment average concentrations:

1. Simple arithmetic mean
2. SWAC using nearest neighbors (aka, Thiessen polygons)
3. SWAC using ordinary kriging.

In order to determine the applicability of the above methods, the spatial patterns in the surface sediment data were accessed with both a spatial correlogram that plots spatial autocorrelation between neighboring samples as a function of distance, and a variogram that plots the difference between pairs of samples at various distances. Results from this evaluation informed the SWAC calculation method: for data sets showing no significant degree of spatial dependence the SWAC calculation would be computed using the arithmetic mean, whereas data sets showing spatial autocorrelations would be characterized with kriging if the variogram could be modeled or nearest neighbors if the variogram could not be modeled. Results of this evaluation are included in Appendix E.

3.3.1 Average Concentration Results

Examination of spatial correlograms and variograms for total PCBs (aroclors), total PAHs (16), and lead showed that none of the analytes exhibit spatial autocorrelation (Appendix E). Therefore, surface sediment average concentrations were computed as the simple arithmetic mean. A 95% upper confidence interval of the mean (UCLM) was computed using EPA's ProUCL software version 5.13 (EPA 2015). The total PCBs and total PAHs data sets were normally distributed, so the UCLM was computed using the Student's t-distribution. The lead data set was nonparametric with low skewness (approximately uniformly distributed), so the Student's t-distribution was also appropriate for computing the UCLM of lead.

Table 3-8 presents the surface sediment concentrations using the methods detailed in Section 3.3. Total PCBs, total PAHs, and lead had sediment surface weighted average concentrations [arithmetic mean (95% UCLM)] of 1.20 mg/kg, 11.6 mg/kg, and 78.0 mg/kg, respectively. Both total PAHs and lead SWAC results are below the short-term and long-term sediment goals for the Ottawa River. The total PCBs SWAC result of 1.2 mg/kg was below the short-term goal of 1.5 mg/kg and above the long-term sediment goal of 0.22 mg/kg for the river.

4. TOXICITY AND BIOACCUMULATION TESTING RESULTS

Toxicity and bioaccumulation testing was conducted on samples from 14 locations (OR19-01, OR19-02, OR19-03, OR19-04, OR19-05, OR19-07, OR19-09, OR19-11, OR19-13, OR19-15, OR19-18, OR19-19, OR19-21, and OR19-REF1TOX) by EA's Ecotoxicology Laboratory located in Hunt Valley, Maryland.Toxicity testing included 10-day sediment toxicity tests with *Hyalella azteca* (freshwater amphipod) and *Chironomus dilutus* (freshwater midge), evaluating the effects on survival and growth (determined by dry weight and ash free dry weight for *H. azteca* and *C. dilutus*, respectively) of the test organisms compared to control and/or reference locations. The testing consisted of a 10-day sediment exposure period, after which the organisms were retrieved from the sediment and survival was recorded. The organisms were processed for dry weight determinations (Methods EPA 100.1 and 100.2) to measure growth. Survival (percent survival) and growth (mean dry weight or mean ash free dry weight) results were statistically compared to reference and control samples. Samples with statistically significant lower survival and growth were identified.

Bioaccumulation testing consisted of 28-day bioaccumulation exposures with *Lumbriculus variegatus* (freshwater oligochaete worm) (EPA 100.3) on sediment samples from the 14 sample locations previously described. Following a 28-day sediment exposure period, organisms were retrieved from the sediment and allowed to depurate their digestive tracts for approximately 24 hours. After the depuration period, the organisms were placed into analytical jars and frozen. The testing produced five replicates per sediment sample and control, each with approximately 10 grams of tissue. Pre-test (control) tissues, which represent the constituent tissue concentrations in the test organisms upon arrival to the testing laboratory and prior to laboratory exposures, were also frozen for subsequent chemical analysis. Appendix F includes a complete report of the Toxicity and Bioaccumulation testing completed in EA's Ecotoxicology Laboratory. EA hand-delivered tissue from the Ecotoxicology Laboratory located in Hunt Valley, Maryland, to Eurofins TestAmerica in Pittsburgh, Pennsylvania, for analysis on 17 December 2019. The tissues were processed and analyzed for PCB congeners (EPA 1668A) and lipids (gravimetric).

As part of the bioaccumulation testing, a total of 80 *L. variegatus* tissue samples (5 replicate tissue composites for each of 14 locations) were analyzed for PCB congeners and lipids. Tissue from the organisms exposed to the site samples were compared to reference and control tissue. Samples with statistically higher total PCB congener tissue concentrations when compared to reference and/or control tissue samples were identified.

Figure 4-1 and Tables 4-1 and 4-2 presents survival and growth results from *H. azteca* and *C. dilutus* toxicity testing, respectively. Figure 4-2 presents the observed toxicological effects to *H. azteca* and *C. dilutus* noted at the locations that were used for toxicity testing. Table 4-3 presents mean lipid concentrations in *L. variegatus* tissue. Table 4-4 and Figure 4-3 present mean total PCB congener concentrations in *L. variegatus* tissues. Figure 4-4 presents a summary of toxicity testing results with sediment chemistry results. Replicate tissue concentrations for each location are presented in Appendix G. Results are discussed further in the following sections.

4.1 *CHIRONOMUS DILUTUS* SEDIMENT TOXICITY TEST

The results of the *C. dilutus* sediment toxicity tests complied with current National Environmental Laboratory Accreditation Conference (NELAC) standards. The survival and growth results of the *C. dilutus* toxicity tests were statistically analyzed according to EPA guidance (2000) to determine if any of the site sediments were significantly different (p=0.05) from the control or reference sediment. If the data were normally distributed, then a t-Test was performed to detect statistically significant differences between test sediments and the reference sediment. If the data distribution was non-normal, then a Wilcoxon Two Sample Test was used to compare the group means. Shapiro-Wilk's Test was used to determine if the data were normally distributed, and the F-Test was used to test for homogeneity of variance. Samples with statistically significant lower survival and growth when compared to the reference sample were identified. After 10 days of exposure, mean survival in 6 sediment samples (OR19-07, OR19-13, OR19-15, OR19-18, OR19-19, and OR19-21) was significantly less (p = 0.05) than the Maumee Bay reference sample (71 percent survival) (Table 4-1 and Figure 4-1). Survival in the remaining 7 site sediments ranged from 65 to 93 percent and were not significantly different than the reference sample. Figure 4-2 presents the geographical distribution of toxicological effects for the locations with co-located toxicity testing. Sample locations further downstream in Reach 1, with the exception of OR19-09, exhibited significantly lower survival compared to the reference sample.

Mean ash-free dry weights (growth) in the sediment samples ranged from 0.153 to 0.749 milligrams (mg) per organism. Growth at ten of thirteen locations (OR19-03, OR19-04, OR19-05, OR19-07, OR19-11, OR19-13, OR19-15, OR19-18, OR19-19, and OR19-21) was significantly lower from the reference sample which had a mean ash-free dry weight of 0.749 mg per organism (Table 4-1 and Figure 4-1). With the exception of sample location OR19-09, the 10 samples with significantly different growth from the reference sample were located downstream of the Suder Avenue Bridge. The furthest upstream sample, OR19-02, which was composed of 94 percent sand, did not exhibit significant survival or growth effects to *C. dilutus*. Aside from locations OR19-01 and OR19-02, the only other location with no statistically significant growth or survival effects was OR19-09.

4.2 *HYALELLA AZTECA* SEDIMENT TOXICITY TEST

The results of the *H. azteca* sediment toxicity tests complied with current NELAC standards. The survival and growth results of the *H. azteca* toxicity tests were statistically analyzed according the EPA guidance (2000) to determine if any of the site sediments were significantly different (p=0.05) from the control or reference sediment. If the data were normally distributed, then a t-Test was performed to detect statistically significant differences between test sediments and the reference sediment. If the data distribution was non-normal, then a Wilcoxon Two Sample Test was used to compare the group means. Shapiro-Wilk's Test was used to determine if the data were normally distributed, and the F-Test was used to test for homogeneity of variance. Samples with statistically significant lower survival and growth when compared to the reference sample were identified. After 10 days of exposure none of the tested site sediment samples was statistically different (p = 0.05) from the reference sample (73 percent survival) based on survival (Table 4-2 and Figure 4-1).

Mean dry weights (growth) in the sediment samples ranged from 0.095 to 0.129 mg per organism. Growth at three of the 13 locations distributed throughout the Reach 1 area (OR19-01, OR19-07, and OR19-13) was significantly different (lower) from the reference sample which had a mean dry weight of 0.118 mg per organism (Table 4-2 and Figure 4-1). Figure 4-2 presents the geographical distribution of toxicological effects at the locations with co-located toxicity testing.

4.3 *LUMBRICULUS VARIEGATUS* 28-DAY BIOACCUMULATION TEST

The results of the *L. variegatus* sediment 28-day bioaccumulation tests complied with current NELAC standards. Organisms were exposed to site sediments and reference sediments. Tissue results were compared between organisms exposed to site sediments and reference sediments as well as pre-test tissue. Pre-test tissue represents organism tissue upon receipt at the ecotoxicology laboratory (prior to test initiation). These tissues originate from organisms that are sacrificed from each shipment and subsequently frozen. These organisms are not exposed to test sediments, but contaminants in their tissues represent baseline contaminants that accumulated in their natural environment. Total PCB congener tissue data are represented by the sum of all PCB congeners (ND=0). Results are reported as wet weight.

Statistical analyses of tissue chemistry data were performed according to procedures outlined in Section 7.5.3 of the SERIM (USEPA/USACE 2008). Results of total PCB congener of *L. variegatus* tissue were lipid-normalized (wet weight) and statistically compared to reference site and the pre-test tissue concentration. Mean lipid concentrations and total mean PCBs concentrations in *L. variegatus* tissue are provided in Table 4-3 and Table 4-4, respectively. Figure 4-3 depicts mean PCBs concentrations in *L. variegatus* tissues (ND=0) exceedances compared to the reference and pre-test sample concentrations. Each of the 13 site sediment samples was statistically different ($p < 0.05$) from the reference tissue lipid-normalized concentration and the pre-test tissue concentration. Total lipid-normalized PCB congener (ND=0) tissue concentrations from site sediment exposures (13 stations in the Ottawa River Reach 1) ranged from 283 to 529 µg/kg-lipid with an average value of 388 µg/kg-lipid. The highest mean and lipid normalized total PCB tissue concentration (10 times greater than reference value) was at sample location OR19-07, which also exhibited the highest total PCBs congener concentration in the sediment. All other sample locations were at least 2 times (but less than 10 times) greater than the mean reference concentration, on a lipid-normalized basis concentrations ranged up to 13 times greater than the lipid-normalized reference location. The worm bioaccumulation data will be used in a weight-of-evidence approach with respect to the Maumee AOC BUIs, which include restrictions on fish and wildlife consumption, and associated BUI removal criteria. Interpretation of *L. variegatus* tissue data during the remedy effectiveness evaluation may be guided by the International Joint Commission (2004), EPA (2009), and Food and Drug Administration (2020) documentation to assist with determination and identification of the need (if any) for further action under GLLA in Ottawa River Reach 1.

4.4 SEDIMENT TOXICITY AND BIOACCUMULATION TESTING SUMMARY

The results of the toxicity and bioaccumulation testing indicated the following:

- Site locations OR19-07, OR19-13, OR19-15, OR19-18, OR19-19, and OR19-21 had an adverse effect on *C. dilutus* survival in the 10-day sediment exposures. Sites OR19-03, OR19-04, OR19-05, OR19-07, OR19-11, OR19-13, OR19-15, OR19-18, OR19-19, and OR19-21 had an adverse effect on mean ash-free dry weight (growth) of *C. dilutus* (Table 4-1 and Figure 4-1).

- None of the sediments had an adverse effect on *H. azteca* survival in the 10-day sediment exposures. Sites OR19-01, OR19-07, and OR19-13 had an adverse effect on mean dry weight (growth) of *H. azteca* (Table 4-2 and Figure 4-1).

- Overall, significantly inhibited growth was observed at two site locations (OR19-07 and OR19-13) for both *H. azteca* and *C. dilutus*.

- Two sites (OR19-02 and OR19-09) were not toxic to either *H. azteca* or *C. dilutus* for either survival or growth.

- Total PCB concentrations (ND=0, lipid-normalized) in *L. variegatus* tissue was statistically different (higher) than the reference site and pre-test tissue concentrations for each tested location.

- Three sites (OR19-01, OR19-07, and OR19-19) that exceeded the short-term sediment goal for total PCBs exhibited toxicity to at least one test species.

- Both total PCB congener (ND=0) concentrations in *L. variegatus* tissue and in sediments were highest at sample location OR19-07.

The results of the toxicity testing with *H. azteca* and *C. dilutus* indicated that the reference sample had statistically ($p=0.05$) lower survival when compared to the internal laboratory control. The results for growth indicated that there was no significant impact on the surviving organism's ability to grow during the toxicity test. As a part of the data evaluation, the observed statistical difference for survival was evaluated for both species. The results of that evaluation indicated that the organisms were of adequate quality as evident by an acceptable reference toxicant test conducted on the test species and a performance in the laboratory control that met test acceptability criteria. Additionally, the test data were reviewed for: test condition and procedural errors; within treatment variability; and test sensitivity. Evaluation of test conditions and procedures indicated that the response pattern was not a result of water quality abnormalities in isolated replicates, or procedural errors such as improper randomization, which could adversely impact survival in a specific sample.

The data were further evaluated against the co-located reference sediment chemical data. None of the measured constituent concentrations indicated a consistent relationship with the observed

toxicological response. Therefore, the results indicate that the observed response in the reference sediment may not be related to a contaminant(s) concentration.

Additionally, a comparison of the statistical difference for survival detected in the reference sample compared to the control indicates that while statistically significant, the response may not be biologically meaningful. A review of the data indicated that for both *H. azteca* and *C. dilutus* the observed response in the reference was greater than 80% of the control response. A response of greater than 80% of the control is generally considered to not be an indication of probable adverse effects on aquatic life (Wenning 2005). Therefore, based this review, the reference does not have a biologically meaningful survival difference when compared to the control and no significant or biological growth difference.

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5. SUMMARY OF FINDINGS

The Ottawa River Reach 1 Site Characterization was conducted to obtain data to characterize the chemical, physical, and biological nature of sediments within Reach 1 of the Ottawa River. The primary objective of the field investigation was the collection of surface sediment to help identify possible areas of focus for further evaluation and/or remediation, if needed. The information obtained during this site characterization may also assist the Ohio EPA and Maumee AOC stakeholders in planning for remedy effectiveness monitoring of the entire lower 9.2 miles of the Ottawa River (planned for 2020).

The remedial action focused on the reduction of surface weighted average concentrations (SWAC) for PCBs, PAHs and lead in an effort to reduce the concentration of chemical constituents available to move through the food chain, reducing stresses at each trophic level and the amount of additional risk to end points, including human health from fish consumption (Conestoga Rovers and Associates 2009). Remedial goals were established to support the reduction of risk to human health, reduce the risk of toxic effects to aquatic life, and improve the health of the entire food chain and for eventual removal of beneficial use impairments.

The remedial approach was based on a short-term, post-remediation goals of 1.5 ppm PCBs (total Aroclors), 180 ppm lead and 30 ppm Total PAHs (16). Following sediment removal activities in Reaches 2, 3, and 4, upstream of Reach 1, further improvement in environmental quality of the sediment surface was projected to occur from ongoing natural recovery processes. Long-term sediment goals for the river were established as 0.22 ppm PCBs (total Aroclors), 128 ppm for lead, and 22.8 ppm for Total PAHs (16) after approximately 10 years (Conestoga Rovers and Associates 2009).

The analytical results for surface sediment samples collected at 21 locations in Reach 1 and one reference location in Maumee Bay were screened against the short- and long-term sediment cleanup goals for total PCBs, total PAHs, and lead established for the Ottawa River, and the sediment consensus-based PECs (MacDonald et al. 2000).

SWACs were computed as the simple arithmetic mean (results showed no spatial autocorrelation) as total PCBs, total PAHs, and lead. Total PCBs, total PAHs, and lead had an arithmetic mean (95% UCLM) of 1.20 mg/kg, 11.6 mg/kg, and 78.0 mg/kg, respectively. Both total PAHs and lead SWAC results are below the short- and long-term sediment goals for the river. The total PCBs SWAC result of 1.2 mg/kg was below the short-term goal of 1.5 mg/kg and above the long-term sediment goal of 0.22 mg/kg for the river.

At individual sample locations concentrations were compared to the short- and long-term remedial goals and sediment consensus-based PECs (MacDonald et al. 2000). Concentrations reported for lead and total PAHs were below the short- and long-term sediment remedial goals and the sediment consensus-based PECs at each of the locations analyzed. Each of the 21 sampling locations had elevated total PCBs concentrations in sediment compared to the long-term sediment goal, while 19 sampling locations exceeded the PEC screening value for total PCBs and three individual sampling locations exceeded the short-term goal for total PCBs in sediment.

Toxicity and bioaccumulation testing was conducted at 14 of the 21 sampling locations. Toxicity testing results indicated survival and/or growth effects to at least one of the two tested species at 12 of the 14 locations. Two sites (OR19-02 and OR19-09) were not toxic to either *H. azteca* or *C. dilutus* for both survival and growth metrics. Two site locations (OR19-07 and OR19-13) adversely affected growth to both *H. azteca* and *C. dilutus*.

Results of total PCB congener of *L. variegatus* tissue were lipid-normalized (wet weight) and statistically compared to reference site and the pre-test tissue concentration. Total PCB congener concentrations (ND=0) in tissue for each of the locations were statistically different ($p < 0.05$) from the reference site concentration and pre-test tissue concentration. Total PCB congener (ND=0) tissue concentrations (wet weight, lipid normalized) ranged from 283 to 529 µg/kg-lipid with an average lipid-normalized value of 388 µg/kg-lipid. The highest mean and lipid-normalized PCBs tissue concentration (10 times greater than reference value) was at sample location OR19-07, which also experienced the highest total PCB congener concentration in the sediment. Mean tissue concentrations at each of the other sample locations were at least 2 times (but less than 10 times) greater than the mean reference concentration, lipid-normalized concentrations ranged up to 13 times greater than the lipid-normalized reference concentration. Interpretation of *L. variegatus* tissue data will be used in a weight-of evidence approach and may be guided by the International Joint Commission (2004), EPA (2009), and Food and Drug Administration (2020) documentation in determining need for further action (if any) under GLLA in Ottawa River Reach 1.

Given the relatively recent timeline (2010) of remediation in the Ottawa River, particularly Reach 1, it is encouraging that lead and total PAHs values are below short-term sediment goals. Future sampling efforts in Ottawa River sediments may be required to document ongoing recovery of the river and decreased total PCBs concentrations in the sediment and organism tissue over time.

6. REFERENCES

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Figures

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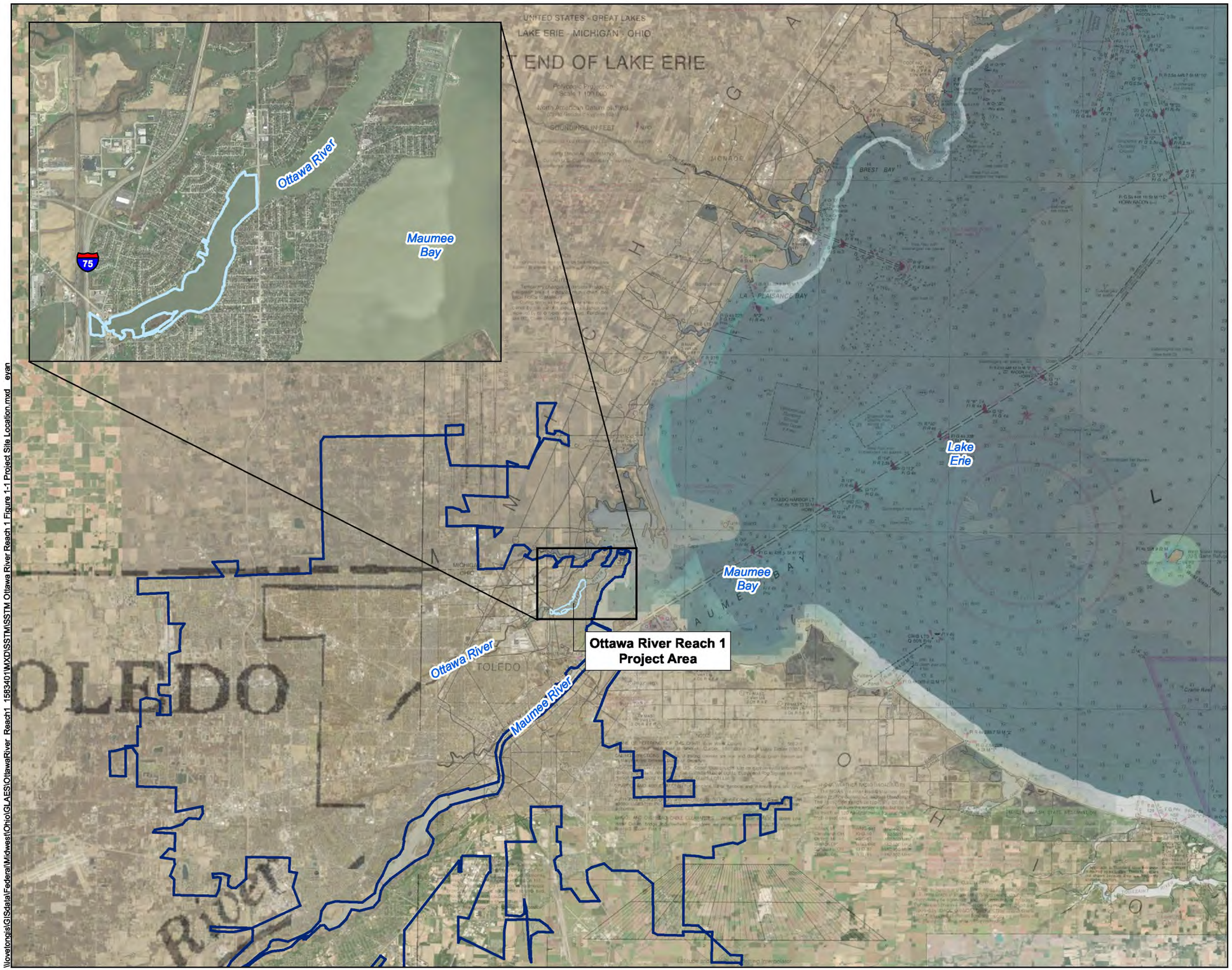

Legend

- Ottawa River Reach 1 Project Area
- City of Toledo

Map Date: 2/24/2020
Source: ESRI Basemap 2018, NOAA 2018
Projection: NAD 1983 State Plane Ohio North US Foot

N

0 2 4
Miles

Figure 1-1
Project Site Location
Ottawa River Reach 1, Maumee Area of Concern
Toledo, Ohio

\\lovetongis\GISdata\Federal\Midwest\Ohio\GLAES\OttawaRiver_Reach1_1583401\MXD\SSTM\SSTM Ottawa River Reach 1 Figure 1-1 Project Site Location.mxd evan

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Legend

- Sampling Location
- Sampling Location with Additional Bioassay Analysis
- Reference Sediment Sampling Location with Additional Bioassay Analysis
- Ottawa River Reach 1 Project Area

Map Date: 2/24/2020
Source: ESRI Basemap 2018, NOAA 2018
Projection: NAD 1983 State Plane Ohio North US Foot

N

0 500 1,000
Feet

Figure 2-1
Sampling Locations in the Ottawa River - Reach 1 Area and Maumee Bay Reference Location
Ottawa River Reach 1, Maumee Area of Concern
Toledo, Ohio

\\lovetongis\GISdata\Federal\Midwest\Ohio\GLAES\OttawaRiver_Reach1_1583401\MXD\SSTM\SSTM_Ottawa River Reach 1 Figure 2-1 Sampling Locations.mxd eyan

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Sediment				
Analyte	Long-term Goal	PEC	Short-term Goal	Unit
Lead	128	128	180	mg/kg
TPAH	22,800	22,800	30,000	µg/kg
TPCB	220	676	1,500	µg/kg

OR19-21	
Lead	86.5
TPAH	10,347
TPCB	***1,189***

OR19-20	
Lead	83.8
TPAH	9,117
TPCB	***1,076***

OR19-19	
Lead	95.3
TPAH	12,164
TPCB	***1,596***

OR19-18	
Lead	88.6
TPAH	13,764
TPCB	***1,171***

OR19-16	
Lead	76
TPAH	9,331
TPCB	***1,039***

OR19-17	
Lead	89.7
TPAH	12,744
TPCB	***1,181***

OR19-15	
Lead	84.2
TPAH	10,991
TPCB	***1,066***

OR19-14		
Lead	83.2	82.8 FD
TPAH	7,936	7,715 FD
TPCB	***882***	***916 FD***

OR19-12	
Lead	82.9
TPAH	11,674
TPCB	***1,287***

OR19-06	
Lead	74.3
TPAH	11,923
TPCB	***1,179***

OR19-11		
Lead	21.7	16.9 FD
TPAH	3,352	4,175 FD
TPCB	**231**	**230 FD**

OR19-04		
Lead	76.3	83.6 FD
TPAH	15,846	16,615 FD
TPCB	***1,491***	***1,383 FD***

OR19-13	
Lead	77.1
TPAH	12,321
TPCB	***1,281***

OR19-02	
Lead	21.2
TPAH	9,191
TPCB	**555**

OR19-10	
Lead	103
TPAH	12,139
TPCB	***1,280***

OR19-07	
Lead	89.2
TPAH	13,441
TPCB	***2,410***

OR19-08	
Lead	80.9
TPAH	13,791
TPCB	***1,488***

OR19-09	
Lead	77
TPAH	14,322
TPCB	***1,073***

OR19-01	
Lead	92.5
TPAH	14,810
TPCB	***1,810***

OR19-03	
Lead	78.6
TPAH	14,709
TPCB	***1,181***

OR19-05	
Lead	75.5
TPAH	9,373
TPCB	***764***

OR19-REF	
Lead	42.5
TPAH	1,700
TPCB	183

Ottawa River

N Summit St

Lake Erie

Maumee Bay

Ottawa River Reach 1 Project Area

VICINITY MAP

Project Site

Legend

Sampling Location

Ottawa River Reach 1 Project Area

Lead TPAH TPCB

Sediment Concentrations

- ≥ 10X Short Term Goal
- ≥ Short Term Goal and < 10X Short Term Goal
- ≥ PEC and < Short Term Goal
- ≥ Long Term Goal < PEC
- < Long Term Goal
- Not Detected

Notes:
1. **Bolded detected values exceed Long-term SWAC goal.**
2. ***Bolded and italicized detected values exceed Long-term SWAC goal and PEC screening value.***
3. ***Bolded, italicized, and thick-bordered detected values exceed Long-term SWAC goal, PEC screening value, and Short-term SWAC goal.***

PEC = Probable Effect Concentration
SWAC = Surface Weighted Average Concentration
TPAH = Total 16 PAHs (ND= ½ RL)
TPCB = Total PCB Aroclor (ND=0)
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
FD = Field Duplicate

Map Date: 4/30/2020
Source: ESRI Basemap 2018, NOAA 2018
Projection: NAD 1983 State Plane Ohio North US Foot

0 500 1,000
Feet

N

Figure 3-1
Ottawa River Surface Sediment Analytical Results
Ottawa River Reach 1, Maumee Area of Concern
Toledo, Ohio

\\lovetongis\GIS\data\Federal\Midwest\Ohio\GLAES\OttawaRiver_Reach1_1583401\MXD\SCR\SCR Ottawa River Reach 1 Figure 3-1 Ottawa River Surface Sediment Analytical Results.mxd eyan

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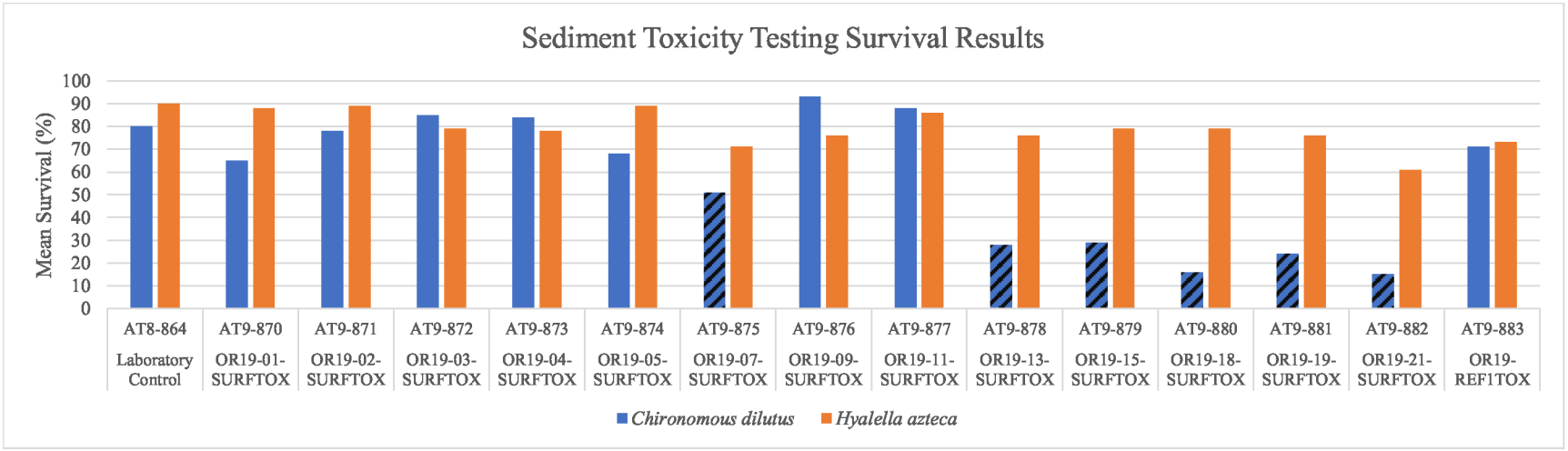
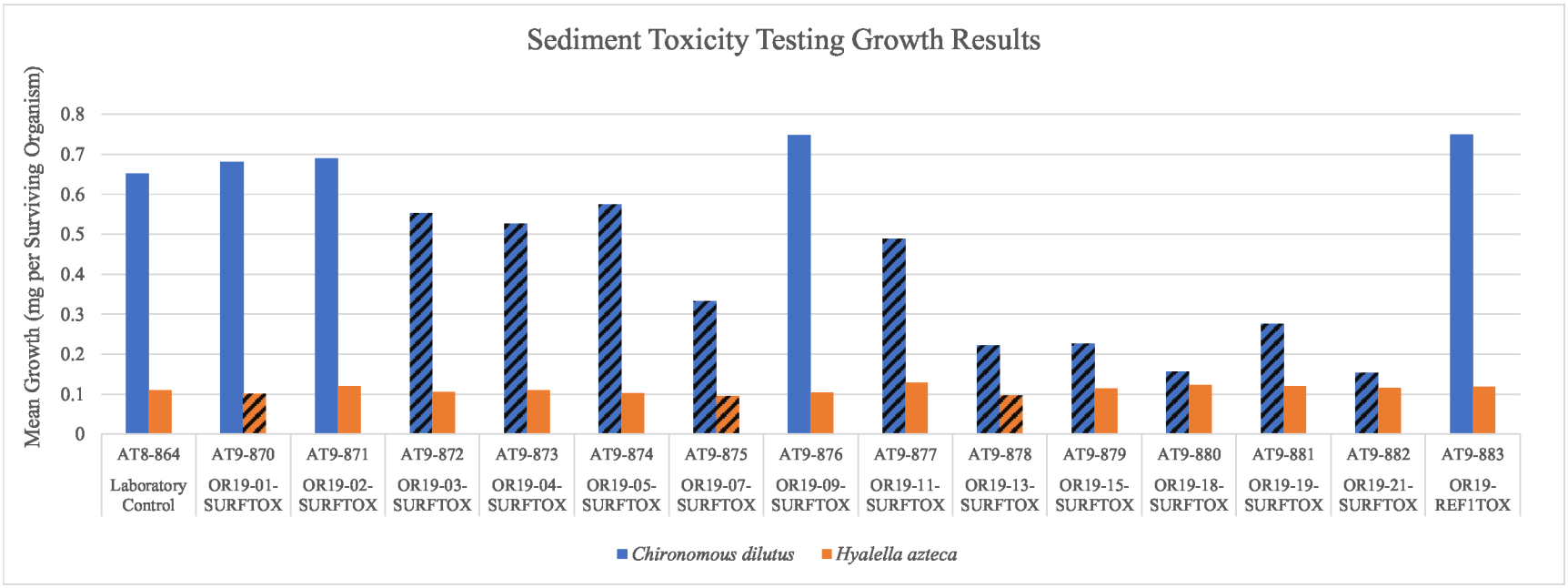
Figure 4-1 Ottawa River Toxicity Testing Survival and Growth Results for *Chironomous dilutus* and *Hyalella azteca*





Note: Patterned cells are significantly different than the reference (p = 0.05)

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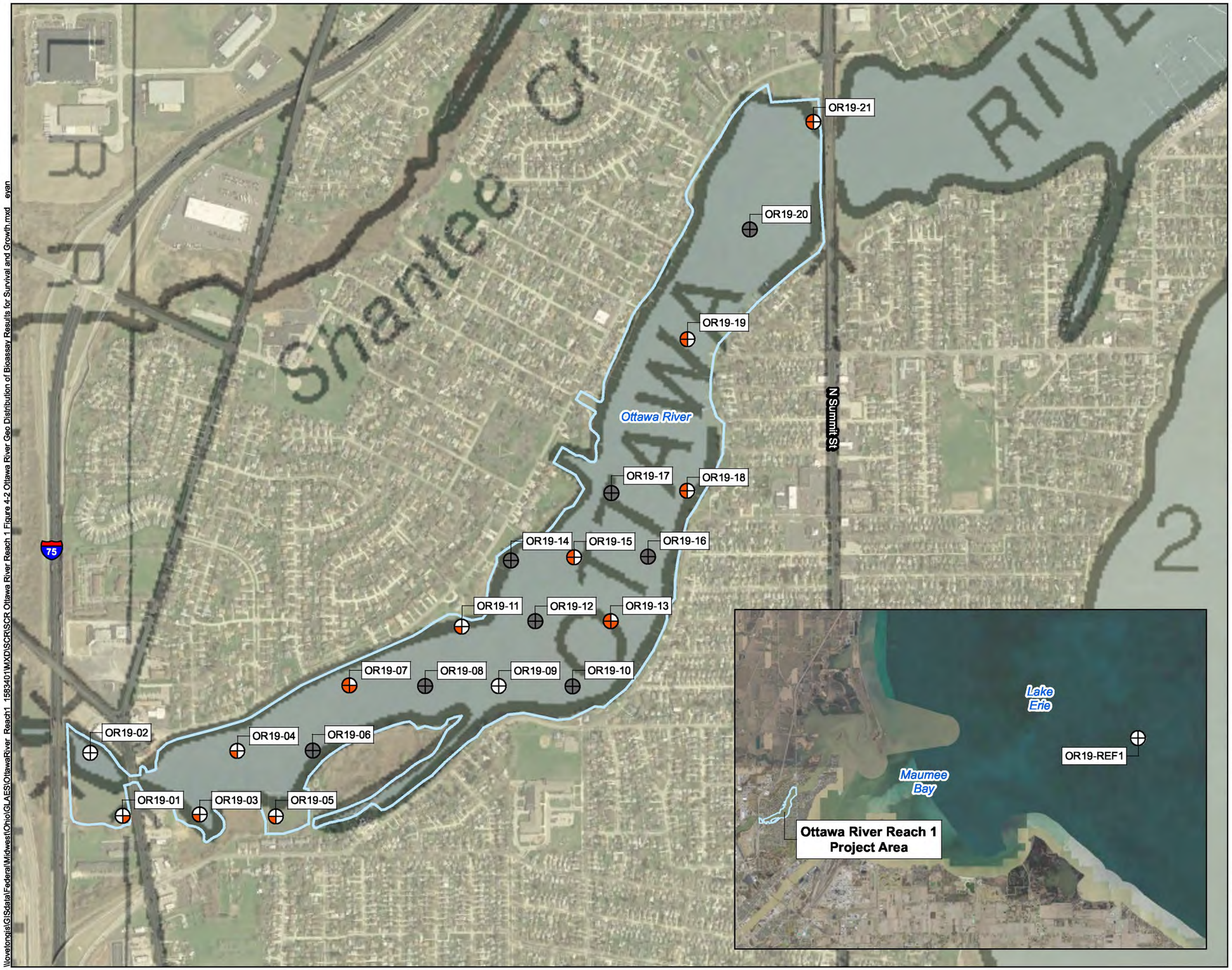

VICINITY MAP

Legend

- Sampling Location
- Ottawa River Reach 1 Project Area

1 = Survival Significance for *C. dilutus*
2 = Survival Significance for *H. azteca*
3 = Growth Significance for *C. dilutus*
4 = Growth Significance for *H. azteca*

Significance

- Significant ($p \leq 0.05$)
- Not Signifcant ($p > 0.05$)
- Not Sampled/Tested for Bioassays

Notes:
1. Toxicity results values represent statistical significance from the reference sample.

Map Date: 4/30/2020
Source: ESRI Basemap 2018, NOAA 2018
Projection: NAD 1983 State Plane Ohio North US Foot

0 500 1,000
Feet

N

Figure 4-2
Ottawa River Geographical Distribution of Bioassay Results for Survival and Growth
Ottawa River Reach 1, Maumee Area of Concern
Toledo, Ohio

\\lovetongis\GIS\data\Federal\Midwest\Ohio\GLAES\OttawaRiver_Reach1_1583401\MXD\SCR\SCR Ottawa River Reach 1 Figure 4-2 Ottawa River Geo Distribution of Bioassay Results for Survival and Growth.mxd evan

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Tissue			
	Pre-Test	Maumee Bay Reference	Unit
TPCB Congeners	0.069	75.9	µg/kg

OR19-21 TPCB (Tissue) 528

OR19-20

OR19-19 TPCB (Tissue) 735

OR19-15 TPCB (Tissue) 526

OR19-18 TPCB (Tissue) 655

OR19-17

OR19-14

OR19-16

OR19-13 TPCB (Tissue) 690

OR19-11 TPCB (Tissue) 418

OR19-12

OR19-04 TPCB (Tissue) 505

OR19-08

OR19-10

OR19-02 TPCB (Tissue) 391

OR19-06

OR19-07 TPCB (Tissue) 841

OR19-09 TPCB (Tissue) 682

OR19-01 TPCB (Tissue) 587

OR19-03 TPCB (Tissue) 475

OR19-05 TPCB (Tissue) 325

OR19-REF TPCB (Tissue) 75.9

Ottawa River

N Summit St

Lake Erie

Maumee Bay

Ottawa River Reach 1 Project Area

VICINITY MAP

Project Site

Legend

- Sampling Location
- Ottawa River Reach 1 Project Area

Tissue Concentrations

- > 10X Reference
- > 2X Reference
- > Reference
- ≤ Reference
- < Pre-Test/Control Sample
- Not Tested

Notes:
1. ***Bolded and italicized detected values exceed pre-test for tissue.***
2. ***Bolded, italicized, and thick-bordered detected values exceed pre-test and reference area for tissue and are statistically different from reference value.***

TPCB (Tissue) = Total PCB Congener (ND=0) (wet weight)
µg/kg = micrograms per kilogram

Map Date: 5/1/2020
Source: ESRI Basemap 2018, NOAA 2018
Projection: NAD 1983 State Plane Ohio North US Foot

0 500 1,000
Feet

N

Figure 4-3
Mean Total Polychlorinated Biphenyl (PCB) Congener Concentrations (µg/kg) (ND=0) in *Lumbriculus variegatus* Tissues
Ottawa River Reach 1, Maumee Area of Concern
Toledo, Ohio

\\lovetongia\GIS\data\Federal\Midwest\Ohio\GLAES\OttawaRiver_Reach1_1583401\MXD\SCR\SCR Ottawa River Reach 1 Figure 4-3 Mean PCB Congener Concs in L variegatus Tissues.mxd evan

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Sediment				
Analyte	**Long-term Goal**	**PEC**	**Short-term Goal**	**Unit**
Lead	128	128	180	mg/kg
TPAH	22,800	22,800	30,000	µg/kg
TPCB	220	676	1,500	µg/kg
Tissue				
	Pre-Test	**Maumee Bay Reference**		**Unit**
TPCB Congeners	0.069	75.9		µg/kg

OR19-21	
Lead	86.5
TPAH	10,347
TPCB	***1,189***
TPCB (Tissue)	***528***

OR19-20	
Lead	83.8
TPAH	9,117
TPCB	***1,076***

OR19-19	
Lead	95.3
TPAH	12,164
TPCB	***1,596***
TPCB (Tissue)	***735***

OR19-18	
Lead	88.6
TPAH	13,764
TPCB	***1,171***
TPCB (Tissue)	***655***

OR19-16	
Lead	76
TPAH	9,331
TPCB	***1,039***

OR19-17	
Lead	89.7
TPAH	12,744
TPCB	***1,181***

OR19-15	
Lead	84.2
TPAH	10,991
TPCB	***1,066***
TPCB (Tissue)	***526***

OR19-14		
Lead	83.2	82.8
TPAH	7,936	7,715
TPCB	***882***	***916***

OR19-12	
Lead	82.9
TPAH	11,674
TPCB	***1,287***

OR19-06	
Lead	74.3
TPAH	11,923
TPCB	***1,179***

OR19-11		
Lead	21.7	16.9 FD
TPAH	3,352	4,175 FD
TPCB	**231**	**230 FD**
TPCB (Tissue)	***418***	

OR19-13	
Lead	77.1
TPAH	12,321
TPCB	***1,281***
TPCB (Tissue)	***690***

OR19-04		
Lead	76.3	83.6 FD
TPAH	15,846	16,615 FD
TPCB	***1,491***	***1,383 FD***
TPCB (Tissue)	***505***	

OR19-02	
Lead	21.2
TPAH	9,191
TPCB	**555**
TPCB (Tissue)	***391***

OR19-10	
Lead	103
TPAH	12,139
TPCB	***1,280***

OR19-07	
Lead	89.2
TPAH	13,441
TPCB	***2,410***
TPCB (Tissue)	***841***

OR19-08	
Lead	80.9
TPAH	13,791
TPCB	***1,488***

OR19-09	
Lead	77
TPAH	14,322
TPCB	***1,073***
TPCB (Tissue)	***682***

OR19-01	
Lead	92.5
TPAH	14,810
TPCB	***1,810***
TPCB (Tissue)	***587***

OR19-03	
Lead	78.6
TPAH	14,709
TPCB	***1,181***
TPCB (Tissue)	***475***

OR19-05	
Lead	75.5
TPAH	9,373
TPCB	***764***
TPCB (Tissue)	***325***

OR19-REF	
Lead	42.5
TPAH	1,700
TPCB	183
TPCB (Tissue)	***75.9***

VICINITY MAP

Legend

- Sampling Location
- Ottawa River Reach 1 Project Area

1 = Survival Significance for *C. dilutus*
2 = Survival Significance for *H. azteca*
3 = Growth Significance for *C. dilutus*
4 = Growth Significance for *H. azteca*

Significance

- Significant (p ≤ 0.05)
- Not Signifcant (p > 0.05)
- Not Tested for Bioassays/Bioaccumulation

Notes:
1. **Bolded detected values exceed Long-term SWAC goal.**
2. ***Bolded and italicized detected values exceed Long-term SWAC goal and PEC screening value or pre-test for tissue.***
3. ***Bolded, italicized, and thick-bordered detected values exceed Long-term SWAC goal, PEC screening value, and Short-term SWAC goal or reference for tissue.***

PEC = Probable Effect Concentration
SWAC = Surface Weighted Average Concentration
TPAH = Total 16 PAHs (ND= ½ RL)
TPCB = Total PCB Aroclor (ND=0)
TPCB (Tissue) = Total PCB Congener (ND=0) (wet weight)
mg/kg = milligrams per kilogram
µg/kg = micrograms per kilogram
FD = Field Duplicate

Map Date: 5/1/2020
Source: ESRI Basemap 2018, NOAA 2018
Projection: NAD 1983 State Plane Ohio North US Foot

0 500 1,000
Feet

N

Figure 4-4
Ottawa River Summary of Analytical and Bioassay Results
Ottawa River Reach 1, Maumee Area of Concern
Toledo, Ohio

\\lovetongis\GIS\data\Federal\Midwest\Ohio\GLAES\OttawaRiver_Reach1_1583401\MXD\SCR\SCR Ottawa River Reach 1 Figure 4-4 Ottawa River Summary of Analytical and Bioassay Results.mxd eyan

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Tables

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Table 2-1 Ottawa River - Reach 1 Area Site Characterization Surface Sample Coordinates, Description, and Field Notes
Maumee Area of Concern, Toledo, Ohio (October 2019)

Location ID	Date Sampled	Time Sampled (local)	Target Coordinates		Actual Coordinates		Distance from Target Coordinates (ft)	Surface Sample Description	Field Notes
			Northing	Easting	Northing	Easting			
			NAD83 State Plane Ohio North (U.S. Survey Feet)						
OR19-01	10/22/19	10:10	745919.35	1695470.93	745911.94	1695444.90	27	Light brown silt, loose cohesion, high SAV content, high water content.	Sampled via jon boat. Relocated as original target location was plotted on land.
OR19-02	10/22/19	11:10	746439.16	1695170.81	746418.90	1695183.59	24	Medium grain sand with some fine sand and trace silts, light brown, trace woody debris.	Sampled via jon boat.
OR19-03	10/24/19	15:55	745919.35	1696071.15	745923.19	1696066.06	6	Light brown, silts over medium brown clay, medium cohesion, no odor, no sheen.	---
OR19-04	10/24/19	16:35	746439.16	1696371.26	746435.18	1696367.12	6	Light brown silts over medium brown clay, no odor, no sheen, medium cohesion.	---
OR19-05	10/24/19	15:00	745919.35	1696671.37	745906.46	1696675.89	14	Medium brown, loose silts, high SAV content (moss like mats), high water content, wood debris, no sheen, no odor.	---
OR19-06	10/25/19	10:50	746439.16	1696971.48	746436.14	1696973.07	3	Light brown silts over medium brown silty-clay with medium cohesion, no odor, no sheen.	---
OR19-07	10/25/19	11:20	746958.97	1697271.59	746961.36	1697267.68	5	Light brown silts over medium brown silty-clay with medium cohesion, no odor, no sheen.	---
OR19-08	10/25/19	11:55	746958.97	1697871.81	746955.80	1697877.48	6	Light brown silts over medium brown silty-clay with medium cohesion, no odor, no sheen.	---
OR19-09	10/24/19	10:40	746958.97	1698472.04	746954.03	1698468.53	6	Light brown silts over medium brown silty-clay with medium cohesion, no odor, no sheen.	---
OR19-10	10/24/19	10:10	746958.97	1699072.26	746952.29	1699062.09	12	Light brown silts over medium brown silty-clay with medium cohesion, no odor, no sheen.	---
OR19-11	10/24/19	11:20	747478.77	1698171.92	747433.54	1698171.31	45	Light brown silts over loose cohesive clays with fine grain sands and silts, trace woody debris, no odor, no sheen.	Shifted from original target due to low water levels.
OR19-12	10/23/19	16:50	747478.77	1698772.15	747476.77	1698761.30	11	Medium brown silts over clay with some silts, no sheen, no odor, medium cohesion.	---
OR19-13	10/23/19	16:10	747478.77	1699372.37	747477.23	1699367.58	5	Light brown, loose silts over medium brown clay with silts, medium cohesion, no odor, no sheen.	---
OR19-14	10/24/19	12:05	747998.58	1698472.04	747963.87	1698566.37	101	Light brown, soft silts overlaying medium brown silty-clay with medium cohesion, no odor, no sheen.	Shifted from original target due to low water levels.
OR19-15	10/24/19	9:30	747998.58	1699072.26	747990.28	1699073.42	8	Light brown silts over medium brown clays with some silts, medium cohesion, no odor, no sheen.	---
OR19-16	10/23/19	15:40	747998.58	1699672.48	747995.58	1699669.10	5	Light brown silts, over medium brown clays with silts, medium cohesion on clays, no odor, no sheen.	---
OR19-17	10/23/19	15:07	748518.39	1699372.37	748506.75	1699373.96	12	Medium brown silts over silty-clay, medium cohesion, no odors, no sheen.	---
OR19-18	10/23/19	12:00	748518.39	1699972.59	748523.74	1699983.86	12	Medium brown, loose clays and silts over clay, no odor, no sheen.	---
OR19-19	10/24/19	8:45	749757.73	1699992.07	749743.03	1699986.63	16	Light brown silts over medium brown clays with silts, medium cohesion, no odor, no sheen.	Shifted from original target due to submerged utility line.
OR19-20	10/23/19	11:20	750623.74	1700492.07	750626.79	1700485.18	8	Light brown, mostly silts, some clays, medium-lose cohesion, no odor, no sheen.	---
OR19-21	10/24/19	17:30	751489.76	1700992.06	751490.19	1700997.14	5	Light brown silts over medium brown silty clay, medium cohesion, trace woody debris, no odor, no sheen.	---
OR19-REF1	10/25/2019	8:55	759798.99	1757241.63	759785.95	1757271.24	32	Medium brown clays, some silts, medium cohesion, no odor, no sheen.	---

NOTES:
EPA = U.S. Environmental Protection Agency
ft = Foot (feet)
ID = Identification
NAD83 = North American Datum of 1983
SAV = Submerged aquatic vegetation

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Table 2-2 Ottawa River - Reach 1 Area Analytical Program Summary, Maumee Area of Concern, Toledo, Ohio (October 2019)

		Analytical Group and Method														
		Chemistry									Bioassay					
Sample Location/ Sample ID	Sample Depth Interval (ft)	Total Organic Carbon Lloyd Kahn	Grain Size (with hydrometer) ASTM D422	Percent Solids ASTM D2216	Semivolatile Organics EPA CLP SOM02.4	34 PAHs[1] EPA CLP SOM02.4	PCB Congeners EPA 1668A	PCB - Arcolors (including 1260) EPA CLP SOM02.4	Oil and Grease (hexane-extractable materials) EPA 9071B	Total Metals[2] EPA CLP ISM02.4 (ICP-AES)	SEM/AVS EPA 821-R-91-100, SW846 6010C & 7471/9030	Toxicity - *Hyalella azaea* (10 Day) EPA 100.1	Toxicity - *Chironomus dilutus* (10 Day) EPA 100.2	Bioaccumulation-*Lumbriculus variegatus* (28 Day) EPA 100.3	% Lipids (Lumbriculus tissue)	PCB Congeners in Lumbriculus tissue EPA 1668A
OR19-01-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
OR19-02-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
OR19-03-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
OR19-04-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
OR19-05-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
OR19-06-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1						
OR19-07-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
OR19-08-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1						
OR19-09-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
OR19-10-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1						
OR19-11-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
OR19-12-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1						
OR19-13-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
OR19-14-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1						
OR19-15-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
OR19-16-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1						
OR19-17-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1						
OR19-18-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
OR19-19-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
OR19-20-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1						
OR19-21-SURF	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
OR19-REF1	surf (0-0.5)	1	1	1	1	1	1	1	1	1	1	1	1	1	5	5
Total Sediment Samples		**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**22**	**14**	**14**	**14**	**14**	**80***	**80***
Field Quality Control Samples																
Field Duplicate (10% of samples)		**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**3**	**2**	**0**	**0**	**0**	**0**	**0**
Matrix Spike/Matrix Spike Duplicate (5% of samples)		**2**	**0**	**0**	**2**	**2**	**2**	**2**	**2**	**2**	**1**	**0**	**0**	**0**	**0**	**0**
Performance Evaluation Samples		**0**	**0**	**0**	**0**	**1**	**1**	**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**0**
Total Field Quality Control Samples		**5**	**3**	**3**	**5**	**6**	**6**	**5**	**5**	**6**	**3**	**0**	**0**	**0**	**0**	**0**
Total Samples		**27**	**25**	**25**	**27**	**28**	**28**	**27**	**27**	**28**	**17**	**14**	**14**	**14**	**80***	**80***

1. Thirty-four (34) PAHs include: Acenaphthene, Acenaphthylene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(g,h,i)perylene, Benzo(k)fluoranthene, C1 Chrysenes, C1 Fluorenes, C1-Fluoranthenes/Pyrenes, C1-Naphthalenes, C1-Phenanthrenes/Anthracenes, C2 Chrysenes, C2 Fluorenes, C2-Fluoranthenes/Pyrenes, C2-Naphthalenes, C2-Phenanthrenes/Anthracenes, C3 Chrysenes, C3 Fluorenes, C3-Fluoranthenes/Pyrenes, C3-Naphthalenes, C3-Phenanthrenes/Anthracenes, C4 Chrysenes, C4-Naphthalenes, C4-Phenanthrenes/Anthracenes, Chrysene, Dibenzo(a,h)anthracene, Fluoranthene, Fluorene, Indeno(1,2,3-cd)pyrene, Naphthalene, Phenanthrene, Pyrene.
2. Metals include: arsenic, cadmium, chromium, copper, lead, nickel, and zinc
* Includes 5 pretest samples and 5 control samples to be collected at the Ecotoxicology Laboratory

NOTES:
AVS = Acid volatile sulfide
ft = Foot (feet)
CLP = Contract Laboratory Program
EPA = U.S. Environmental Protection Agency
ID = Identification
PAH = Polyaromatic hydrocarbons
PCB = Polychlorinated biphenyl
SEM = Simultaneously extracted metal

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Table 3-1 Sediment Results for Grain Size

Location ID		OR19-REF	OR19-01	OR19-02	OR19-03	OR19-04	OR19-04	OR19-05	OR19-06
Sample Name		OR19-REF1	OR19-01-SURF	OR19-02-SURF	OR19-03-SURF	OR19-04-SURF	OR19-04-SURFFD	OR19-05-SURF	OR19-06-SURF
Sample Date		10/25/2019	10/22/2019	10/22/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/25/2019
Depth Interval (ft)		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	**Unit**								
Gravel	%	0	0.4	0.4	0	0	0	2.3	0
Sand	%	4.2	17	94	9.3	19	6.9	19	26
Coarse Sand	%	0.2	0.4	1.7	0	0.3	0.2	1.8	0.7
Medium Sand	%	2.3	4.1	11	3.3	3.9	2.4	9.7	3.6
Fine Sand	%	1.7	13	81	6	14	4.3	7.7	22
Silt	%	59	55.0	1.7	61.0	54.0	66.0	64.0	48.0
Clay	%	37	27.0	3.9	30.0	27.0	27.0	15.0	26.0
Silt + Clay	%	96	82.0	5.6	91.0	81.0	93.0	79.0	74.0
Moisture Content	%	120	210	38	140	120	120	330	120
Percent Solids	%	44	30	70.1	37.7	42.3	42.3	23.4	42
Hydrometer and Sieve Analysis									
Sieve Size 3 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size 2 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size 1.5 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size 1 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size 0.75 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size 0.375 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size #4 - Percent Finer	% passed	100	100	100	100	100	100	98	100
Sieve Size #10 - Percent Finer	% passed	100	99	98	100	100	100	96	99
Sieve Size #20 - Percent Finer	% passed	99	97	95	99	98	99	91	98
Sieve Size #40 - Percent Finer	% passed	98	95	87	97	96	97	86	96
Sieve Size #60 - Percent Finer	% passed	97	84	56	95	93	96	82	91
Sieve Size #80 - Percent Finer	% passed	96	83	23	94	91	95	81	86
Sieve Size #100 - Percent Finer	% passed	96	83	12	93	90	94	79	83
Sieve Size #200 - Percent Finer	% passed	96	83	5.6	91	82	93	79	74
Hydrometer Reading 1 - Percent Finer	% passed	60	54	6.6	62	53	43	26	49
Hydrometer Reading 2 - Percent Finer	% passed	52	44	6	52	48	40	23	45
Hydrometer Reading 3 - Percent Finer	% passed	47	38	5.5	41	39	34	21	36
Hydrometer Reading 4 - Percent Finer	% passed	41	34	4.4	35	32	30	18	31
Hydrometer Reading 5 - Percent Finer	% passed	37	27	3.9	30	27	27	15	26
Hydrometer Reading 6 - Percent Finer	% passed	30	22	3.3	24	22	21	9.9	22
Hydrometer Reading 7 - Percent Finer	% passed	23	17	2.8	17	16	16	6.7	15

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Table 3-1 Sediment Results for Grain Size

Location ID		OR19-07	OR19-08	OR19-09	OR19-10	OR19-11	OR19-11	OR19-12	OR19-13	OR19-14
Sample Name		OR19-07-SURF	OR19-08-SURF	OR19-09-SURF	OR19-10-SURF	OR19-11-SURF	OR19-11-SURFFD	OR19-12-SURF	OR19-13-SURF	OR19-14-SURF
Sample Date		10/25/2019	10/25/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/23/2019	10/23/2019	10/24/2019
Depth Interval (ft)		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	**Unit**									
Gravel	%	0	0	0	0	0.4	0	0	0	0
Sand	%	21	6.9	5.6	13	74	77	4.1	5.3	22
Coarse Sand	%	0.4	0.3	0	0	0.2	0.6	0.1	0	0.2
Medium Sand	%	3.3	2.6	2.4	6.4	11	12	2.2	3	7
Fine Sand	%	17	4	3.2	6.3	63	64	1.8	2.3	15
Silt	%	53.0	60.0	65.0	58.0	16.0	14.0	61.0	66.0	49.0
Clay	%	27.0	33.0	29.0	30.0	9.8	9.3	35.0	29.0	30.0
Silt + Clay	%	80.0	93.0	94.0	88.0	25.8	23.3	96.0	95.0	79.0
Moisture Content	%	100	150	140	120	47	47	160	140	160
Percent Solids	%	46.4	38	36.4	41.1	65.5	65.3	33.9	40.5	37.9
Hydrometer and Sieve Analysis										
Sieve Size 3 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100	100
Sieve Size 2 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100	100
Sieve Size 1.5 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100	100
Sieve Size 1 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100	100
Sieve Size 0.75 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100	100
Sieve Size 0.375 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100	100
Sieve Size #4 - Percent Finer	% passed	100	100	100	100	100	100	100	100	100
Sieve Size #10 - Percent Finer	% passed	100	100	100	100	99	99	100	100	100
Sieve Size #20 - Percent Finer	% passed	99	99	99	96	98	98	99	99	97
Sieve Size #40 - Percent Finer	% passed	96	97	98	94	88	87	98	97	93
Sieve Size #60 - Percent Finer	% passed	93	96	97	91	48	47	97	96	87
Sieve Size #80 - Percent Finer	% passed	92	95	96	90	33	32	96	95	85
Sieve Size #100 - Percent Finer	% passed	90	93	95	89	27	28	96	95	83
Sieve Size #200 - Percent Finer	% passed	79	93	94	87	26	23	96	95	78
Hydrometer Reading 1 - Percent Finer	% passed	50	51	60	57	18	19	70	62	55
Hydrometer Reading 2 - Percent Finer	% passed	47	47	54	52	17	16	56	54	47
Hydrometer Reading 3 - Percent Finer	% passed	38	41	46	44	12	13	48	42	40
Hydrometer Reading 4 - Percent Finer	% passed	33	37	35	36	12	11	40	36	34
Hydrometer Reading 5 - Percent Finer	% passed	27	33	29	30	9.8	9.3	35	29	30
Hydrometer Reading 6 - Percent Finer	% passed	21	25	24	24	8.3	8.1	28	23	24
Hydrometer Reading 7 - Percent Finer	% passed	17	19	18	18	6.3	6.4	20	17	18

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Table 3-1 Sediment Results for Grain Size

Location ID		OR19-14	OR19-15	OR19-16	OR19-17	OR19-18	OR19-19	OR19-20	OR19-21
Sample Name		OR19-14-SURFFD	OR19-15-SURF	OR19-16-SURF	OR19-17-SURF	OR19-18-SURF	OR19-19-SURF	OR19-20-SURF	OR19-21-SURF
Sample Date		10/24/2019	10/24/2019	10/23/2019	10/23/2019	10/23/2019	10/24/2019	10/23/2019	10/24/2019
Depth Interval (ft)		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	**Unit**								
Gravel	%	0	0	0	0	0	0	0	0
Sand	%	15	13	11	8.5	5.7	12	9.9	11
Coarse Sand	%	0.2	0.1	0	0.4	0.1	0.3	0.1	0.3
Medium Sand	%	7.5	4.3	3	4	3.2	3.2	3.1	8.2
Fine Sand	%	7.2	8.7	8.2	4.1	2.4	8.4	6.7	2.5
Silt	%	57.0	54.0	55	62	61	53	55	59
Clay	%	28.0	33.0	34	30	33	36	35	30
Silt + Clay	%	85.0	87.0	89	92	94	89	90	89
Moisture Content	%	160	150	160	150	140	150	150	180
Percent Solids	%	36.5	37.2	38	36.2	35.7	34.5	35.3	33.1
Hydrometer and Sieve Analysis									
Sieve Size 3 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size 2 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size 1.5 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size 1 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size 0.75 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size 0.375 inch - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size #4 - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size #10 - Percent Finer	% passed	100	100	100	100	100	100	100	100
Sieve Size #20 - Percent Finer	% passed	95	98	99	98	99	99	99	94
Sieve Size #40 - Percent Finer	% passed	92	96	97	96	97	97	97	92
Sieve Size #60 - Percent Finer	% passed	89	93	94	94	96	94	94	90
Sieve Size #80 - Percent Finer	% passed	88	91	93	93	95	92	93	89
Sieve Size #100 - Percent Finer	% passed	85	90	92	92	94	91	92	89
Sieve Size #200 - Percent Finer	% passed	85	87	89	92	94	88	90	89
Hydrometer Reading 1 - Percent Finer	% passed	52	62	63	51	61	64	62	57
Hydrometer Reading 2 - Percent Finer	% passed	45	56	54	47	56	57	55	53
Hydrometer Reading 3 - Percent Finer	% passed	39	45	45	40	48	50	50	45
Hydrometer Reading 4 - Percent Finer	% passed	34	38	39	36	38	42	41	36
Hydrometer Reading 5 - Percent Finer	% passed	28	33	34	30	33	36	35	30
Hydrometer Reading 6 - Percent Finer	% passed	22	26	26	24	24	27	26	24
Hydrometer Reading 7 - Percent Finer	% passed	17	20	19	18	18	22	18	18

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Table 3-2 Sediment Results for Metals, Total Organic Carbon, and Oil and Grease

				Location ID	OR19-REF	OR19-01	OR19-02	OR19-03	OR19-04	OR19-04	OR19-05	OR19-06	OR19-07
				Sample Name	OR19-REF1	OR19-01-SURF	OR19-02-SURF	OR19-03-SURF	OR19-04-SURF	OR19-04-SURFFD	OR19-05-SURF	OR19-06-SURF	OR19-07-SURF
				Sample Date	10/25/2019	10/22/2019	10/22/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/25/2019	10/25/2019
				Depth Interval (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	**Long-term Goal**	**PEC**	**Short-term Goal**	**Unit**									
Arsenic	NSL	33	NSL	mg/kg	7.6	8.3	4.6	8.7	8.7	9.2	8.5	8.8	10.6
Cadmium	NSL	4.98	NSL	mg/kg	1.7	1.7	0.25 J	1.5	1.6	1.6	1.2	1.6	1.8
Chromium	NSL	111	NSL	mg/kg	39.7	44.8	9.6	44	39.8	43.8	37.3	43.1	46.6
Copper	NSL	149	NSL	mg/kg	36.8	62.5	23.3	56	49.8	58.2	52.6	46.7	57
Lead	128	128	180	mg/kg	42.5	92.5	21.2	78.6	76.3	83.6	75.5	74.3	89.2
Nickel	NSL	48.6	NSL	mg/kg	38.9	35.7	10.9	34.5	29.5	32.7	37.7	31.6	36.4
Zinc	NSL	459	NSL	mg/kg	151	258	46.8	235	208	223	219	206	223
Total organic carbon	NSL	NSL	NSL	%	1.9	4.3	0.6	3.2	3.5	3.4	7.0	3.6	3.1
Oil and grease	NSL	NSL	NSL	mg/kg	378 U	3070	444	1890	1670	1390	1180	1320	2050

NOTES:
% = Percent
FD = Field duplicate
ft = Foot (feet)
mg/kg = Milligram(s) per kilogram
NSL = No screening level
TOC = Total organic carbon
PEC = Probable effect concentration. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (MacDonald et al. 2000)
SWAC = Surface weighted average concentration (EPA 2019)
Bolded detected values exceed Long-term SWAC goal
Bolded and Shaded detected values exceed Long-term SWAC goal and PEC screening value
Bolded, Shaded, and *Italicized* detected values exceed Long-term SWAC goal, PEC screening value, and Short-term SWAC goal
U = Analyte was analyzed but not detected.

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Table 3-2 Sediment Results for Metals, Total Organic Carbon, and Oil and Grease

				Location ID	**OR19-08**	**OR19-09**	**OR19-10**	**OR19-11**	**OR19-11**	**OR19-12**	**OR19-13**	**OR19-14**	**OR19-14**
				Sample Name	**OR19-08-SURF**	**OR19-09-SURF**	**OR19-10-SURF**	**OR19-11-SURF**	**OR19-11-SURFFD**	**OR19-12-SURF**	**OR19-13-SURF**	**OR19-14-SURF**	**OR19-14-SURFFD**
				Sample Date	**10/25/2019**	**10/24/2019**	**10/24/2019**	**10/24/2019**	**10/24/2019**	**10/23/2019**	**10/23/2019**	**10/24/2019**	**10/24/2019**
				Depth Interval (ft)	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**
Analyte	**Long-term Goal**	**PEC**	**Short-term Goal**	**Unit**									
Arsenic	NSL	33	NSL	mg/kg	10	9.1	10	3.8	3.3	9.6	8.6	10.2	10
Cadmium	NSL	4.98	NSL	mg/kg	1.7	1.8	1.8	0.4 J	0.3 J	1.6	1.5	1.5	1.5
Chromium	NSL	111	NSL	mg/kg	43.3	41.5	49.2	13.8	10.3	48.8	41.5	46.9	46.1
Copper	NSL	149	NSL	mg/kg	53.7	55.2	67.4	15.9	12.4	60.2	53.7	61	60.4
Lead	128	128	180	mg/kg	80.9	77	103	21.7	16.9	82.9	77.1	83.2	82.8
Nickel	NSL	48.6	NSL	mg/kg	34.2	33.6	40.1	12.8	10.4	39.2	33.1	39.1	38.6
Zinc	NSL	459	NSL	mg/kg	225	224	265	66.2	50.2	250	219	230	223
Total organic carbon	NSL	NSL	NSL	%	3.0	2.6	3.6	1.1	1.2	2.4	2.8	3.9	4.8
Oil and grease	NSL	NSL	NSL	mg/kg	1590	943	1530	421	487	1340	1130	880	917

NOTES:
% = Percent
FD = Field duplicate
ft = Foot (feet)
mg/kg = Milligram(s) per kilogram
NSL = No screening level
TOC = Total organic carbon
PEC = Probable effect concentration. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (MacDonald et al. 2000)
SWAC = Surface weighted average concentration (EPA 2019)
Bolded detected values exceed Long-term SWAC goal
Bolded and Shaded detected values exceed Long-term SWAC goal and PEC screening value
Bolded, Shaded, and *Italicized* detected values exceed Long-term SWAC goal, PEC screening value, and Short-term SWAC goal
U = Analyte was analyzed but not detected.

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Table 3-2 Sediment Results for Metals, Total Organic Carbon, and Oil and Grease

				Location ID	**OR19-15**	**OR19-16**	**OR19-17**	**OR19-18**	**OR19-19**	**OR19-20**	**OR19-21**
				Sample Name	**OR19-15-SURF**	**OR19-16-SURF**	**OR19-17-SURF**	**OR19-18-SURF**	**OR19-19-SURF**	**OR19-20-SURF**	**OR19-21-SURF**
				Sample Date	**10/24/2019**	**10/23/2019**	**10/23/2019**	**10/23/2019**	**10/24/2019**	**10/23/2019**	**10/24/2019**
				Depth Interval (ft)	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**
Analyte	**Long-term Goal**	**PEC**	**Short-term Goal**	**Unit**							
Arsenic	NSL	33	NSL	mg/kg	10.2	8.7	9.5	9.5	9.5	8.4	10.2
Cadmium	NSL	4.98	NSL	mg/kg	1.7	1.6	1.8	1.8	1.7	1.6	1.8
Chromium	NSL	111	NSL	mg/kg	49.3	43.9	51.1	47.3	45.9	48.1	47.9
Copper	NSL	149	NSL	mg/kg	61.5	55.9	65.2	63.9	55.3	59.7	63.4
Lead	128	128	180	mg/kg	84.2	76	89.7	88.6	95.3	83.8	86.5
Nickel	NSL	48.6	NSL	mg/kg	40.9	35.1	40.2	38	36.8	38.7	39.6
Zinc	NSL	459	NSL	mg/kg	242	223	246	251	230	235	244
Total organic carbon	NSL	NSL	NSL	%	2.9	4.8	3.0	3.0	3.3	2.6	3.2
Oil and grease	NSL	NSL	NSL	mg/kg	1210	1040	1360	1110	1910	1080	1200

NOTES:
% = Percent
FD = Field duplicate
ft = Foot (feet)
mg/kg = Milligram(s) per kilogram
NSL = No screening level
TOC = Total organic carbon
PEC = Probable effect concentration. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (MacDonald et al. 2000)
SWAC = Surface weighted average concentration (EPA 2019)
Bolded detected values exceed Long-term SWAC goal
Bolded and Shaded detected values exceed Long-term SWAC goal and PEC screening value
Bolded, Shaded, and *Italicized* detected values exceed Long-term SWAC goal, PEC screening value, and Short-term SWAC goal
U = Analyte was analyzed but not detected.

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Table 3-3 Sediment Results for Simultaneously Extracted Metals/Acid Volatile Sulfide

Location ID		OR19-REF	OR19-01	OR19-02	OR19-03	OR19-04	OR19-04	OR19-05	OR19-07	OR19-09
Sample Name		OR19-REF1	OR19-01-SURF	OR19-02-SURF	OR19-03-SURF	OR19-04-SURF	OR19-04-SURFFD	OR19-05-SURF	OR19-07-SURF	OR19-09-SURF
Sample Date		10/25/2019	10/22/2019	10/22/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/25/2019	10/24/2019
Depth Interval (ft)		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	**Unit**									
Cadmium	µmole/g	0.0098	0.015	0.0025	0.013	0.011	0.012	0.012	0.015	0.0084
Copper	µmole/g	0.35	0.74 J	0.13 J	0.57	0.43	0.47	0.59	0.43	0.44
Lead	µmole/g	0.15	0.43 J	0.27 J	0.37	0.3	0.35	0.38	0.42	0.23
Mercury	µmole/g	0.000056 U	0.000083 U	0.000035 U	0.000066 U	0.000059 U	0.000059 U	0.00011 U	0.000054 U	0.000068 U
Nickel	µmole/g	0.27	0.39	0.087	0.26	0.21	0.24	0.36	0.26	0.18
Zinc	µmole/g	1.1	3	0.63	2.4	2	2.2	2.7	2.4	1.6
ΣSEM	µmole/g	1.88	4.58	1.12	3.61	2.95	3.27	4.04	3.53	2.46
Acid Volatile Sulfides	µmole/g	1.1 U	40.7 J-	0.79 J-	11.4 J-	1.5 J-	3.5 J-	26.3 J-	7.10	1.5 J-
foc	fraction	0.0189	0.0434	0.00564	0.0319	0.0349	0.0343	0.0702	0.0305	0.0259
(Σ SEM - AVS)/foc	µmole/g_{oc}	---	-832	58.4	-244	41.6	-6.65	-317	-117	37
SEM/AVS Ratio	none	---	0.11	**1.43**	0.32	**1.91**	0.94	0.15	0.50	**1.62**

NOTES:
FD = Field duplicate
ft = Foot (feet)
AVS = Acid volatile sulfides
foc = fraction organic carbon
SEM = Simultaneously extracted metals
µmole/g = Micromole(s) per gram
Bolded values exceed 1 SEM/AVS ratio.
Bolded and shaded values exceed 130 µmole/g_{oc}.
J - = compound was detected, but result is below the reporting limit and
greater than or equal to the method detection limit, but may be biased low
U = Analyte was analyzed but not detected.
"---" SEM/AVS not calculated because AVS was not detected.

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Table 3-3 Sediment Results for Simultaneously Extracted Metals/Acid Volatile Sulfide

Location ID		OR19-11	OR19-11	OR19-13	OR19-15	OR19-18	OR19-19	OR19-21
Sample Name		OR19-11-SURF	OR19-11-SURFFD	OR19-13-SURF	OR19-15-SURF	OR19-18-SURF	OR19-19-SURF	OR19-21-SURF
Sample Date		10/24/2019	10/24/2019	10/23/2019	10/24/2019	10/23/2019	10/24/2019	10/24/2019
Depth Interval (ft)		0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	**Unit**							
Cadmium	µmole/g	0.0024	0.0028	0.0095	0.014	0.013	0.014	0.013
Copper	µmole/g	0.096	0.11	0.48 J	0.56	0.61 J	0.57	0.62
Lead	µmole/g	0.069	0.075	0.26 J	0.37	0.33 J	0.41	0.36
Mercury	µmole/g	0.000038 U	0.000038 U	0.000061 U	0.000067 U	0.00007 U	0.000072 U	0.000075 U
Nickel	µmole/g	0.06	0.066	0.27	0.29	0.32	0.32	0.29
Zinc	µmole/g	0.5	0.56	1.9	2.3	2.3	2.4	2.2
ΣSEM	µmole/g	0.727	0.814	2.92	3.53	3.57	3.71	3.48
Acid Volatile Sulfides	µmole/g	0.84 J-	0.71 U	15.30	6.6 J-	17.90	17.9 J-	10.20
foc	fraction	0.0112	0.0117	0.028	0.0294	0.0302	0.0329	0.0315
(Σ SEM - AVS)/foc	µmole/g_{oc}	-10.1	---	-442	-104	-474	-431	-213
SEM/AVS Ratio	none	0.863	---	0.19	0.54	0.20	0.21	0.35

NOTES:
FD = Field duplicate
ft = Foot (feet)
AVS = Acid volatile sulfides
foc = fraction organic carbon
SEM = Simultaneously extracted metals
µmole/g = Micromole(s) per gram
Bolded values exceed 1 SEM/AVS ratio.
Bolded and shaded values exceed 130 µmole/g_{oc}.
J - = compound was detected, but result is below the reporting limit
greater than or equal to the method detection limit, but may be biase
U = Analyte was analyzed but not detected.
"---" SEM/AVS not calculated because AVS was not detected.

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Table 3-4 Sediment Results for Polychlorinated Biphenyl Aroclors

				Location ID	OR19-REF	OR19-01	OR19-02	OR19-03	OR19-04	OR19-04	OR19-05	OR19-06	OR19-07
				Sample Name	OR19-REF1	OR19-01-SURF	OR19-02-SURF	OR19-03-SURF	OR19-04-SURF	OR19-04-SURFFD	OR19-05-SURF	OR19-06-SURF	OR19-07-SURF
				Sample Date	10/25/2019	10/22/2019	10/22/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/25/2019	10/25/2019
				Depth Interval (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	**Long-term Goal**	**PEC**	**Short-term Goal**	**Unit**									
Total Organic Carbon (TOC)	--	--	--	%	1.89	4.34	0.56	3.19	3.49	3.43	7.02	3.55	3.05
Aroclor-1016	NSL	NSL	NSL	µg/kg	76 U	110 U	47 U	89 U	80 U	79 U	140 U	77 U	70 U
Aroclor-1221	NSL	NSL	NSL	µg/kg	76 U	110 U	47 U	89 U	80 U	79 U	140 U	77 U	70 U
Aroclor-1232	NSL	NSL	NSL	µg/kg	76 U	110 U	47 U	89 U	80 U	79 U	140 U	77 U	70 U
Aroclor-1242	NSL	NSL	NSL	µg/kg	130	1700	520	1100	1400	1300	690	1100	2300
Aroclor-1248	NSL	NSL	NSL	µg/kg	76 U	110 U	47 U	89 U	80 U	79 U	140 U	77 U	70 U
Aroclor-1254	NSL	NSL	NSL	µg/kg	76 U	110 U	47 U	89 U	80 U	79 U	140 U	77 U	70 U
Aroclor-1260	NSL	NSL	NSL	µg/kg	53 J	110	35 J	81 J	91	83	74 J	79	110
Aroclor-1262	NSL	NSL	NSL	µg/kg	76 U	110 U	47 U	89 U	80 U	79 U	140 U	77 U	70 U
Aroclor-1268	NSL	NSL	NSL	µg/kg	76 U	110 U	47 U	89 U	80 U	79 U	140 U	77 U	70 U
Total PCBs ND=0	220	676	1500	µg/kg	183	***1810***	**555**	**1181**	**1491**	**1383**	**764**	**1179**	***2410***
Total PCBs ND=0[(a)]	220	676	1500	µg/kg	96.8	**417**	**984**	**370**	**427**	**403**	109	**332**	**790**

NOTES:
[(a)] TOC normalized concentration
FD = Field duplicate
ft = Foot (feet)
µg/kg = Microgram(s) per kilogram
NSL = No screening level
PCB = Polychlorinated biphenyl
PEC = Probable effect concentration. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (MacDonald et al. 2000).
SWAC = Surface weighted average concentration. (EPA 2019)
Bolded detected values exceed Long-term SWAC goal
Bolded and Shaded detected values exceed Long-term SWAC goal and PEC screening value
Bolded, Shaded, and Italicized detected values exceed Long-term SWAC goal, PEC screening value, and Short-term SWAC goal
J = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated).
U = Analyte was analyzed but not detected.

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Table 3-4 Sediment Results for Polychlorinated Biphenyl Aroclors

					Location ID	**OR19-08**	**OR19-09**	**OR19-10**	**OR19-11**	**OR19-11**	**OR19-12**	**OR19-13**	**OR19-14**	**OR19-14**
					Sample Name	**OR19-08-SURF**	**OR19-09-SURF**	**OR19-10-SURF**	**OR19-11-SURF**	**OR19-11-SURFFD**	**OR19-12-SURF**	**OR19-13-SURF**	**OR19-14-SURF**	**OR19-14-SURFFD**
					Sample Date	**10/25/2019**	**10/24/2019**	**10/24/2019**	**10/24/2019**	**10/24/2019**	**10/23/2019**	**10/23/2019**	**10/24/2019**	**10/24/2019**
					Depth Interval (ft)	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**
Analyte	**Long-term Goal**	**PEC**	**Short-term Goal**	**Unit**										
Total Organic Carbon (TOC)	--	--	--	%		3.00	2.59	3.64	1.12	1.17	2.42	2.80	3.94	4.82
Aroclor-1016	NSL	NSL	NSL	µg/kg		86 U	93 U	81 U	49 U	49 U	97 U	83 U	89 U	92 U
Aroclor-1221	NSL	NSL	NSL	µg/kg		86 U	93 U	81 U	49 U	49 U	97 U	83 U	89 U	92 U
Aroclor-1232	NSL	NSL	NSL	µg/kg		86 U	93 U	81 U	49 U	49 U	97 U	83 U	89 U	92 U
Aroclor-1242	NSL	NSL	NSL	µg/kg		1400	1000	1200	210	210	1200	1200	810	840
Aroclor-1248	NSL	NSL	NSL	µg/kg		86 U	93 U	81 U	49 U	49 U	97 U	83 U	89 U	92 U
Aroclor-1254	NSL	NSL	NSL	µg/kg		86 U	93 U	81 U	49 U	49 U	97 U	83 U	89 U	92 U
Aroclor-1260	NSL	NSL	NSL	µg/kg		88	73 J	80 J	21 J	20 J	87 J	81 J	72 J	76 J
Aroclor-1262	NSL	NSL	NSL	µg/kg		86 U	93 U	81 U	49 U	49 U	97 U	83 U	89 U	92 U
Aroclor-1268	NSL	NSL	NSL	µg/kg		86 U	93 U	81 U	49 U	49 U	97 U	83 U	89 U	92 U
Total PCBs ND=0	220	676	1500	µg/kg		**1488**	**1073**	**1280**	**231**	**230**	**1287**	**1281**	**882**	**916**
Total PCBs ND=0[a]	220	676	1500	µg/kg		**496**	**414**	**352**	206	197	**532**	**458**	**224**	190

NOTES:
[a] TOC normalized concentration
FD = Field duplicate
ft = Foot (feet)
µg/kg = Microgram(s) per kilogram
NSL = No screening level
PCB = Polychlorinated biphenyl
PEC = Probable effect concentration. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (MacDonald et al. 2000).
SWAC = Surface weighted average concentration. (EPA 2019)
Bolded detected values exceed Long-term SWAC goal
Bolded and Shaded detected values exceed Long-term SWAC goal and PEC screening value
Bolded, Shaded, and Italicized detected values exceed Long-term SWAC goal, PEC screening value, and Short-term SWAC goal
J = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated).
U = Analyte was analyzed but not detected.

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Table 3-4 Sediment Results for Polychlorinated Biphenyl Aroclors

				Location ID	**OR19-15**	**OR19-16**	**OR19-17**	**OR19-18**	**OR19-19**	**OR19-20**	**OR19-21**
				Sample Name	**OR19-15-SURF**	**OR19-16-SURF**	**OR19-17-SURF**	**OR19-18-SURF**	**OR19-19-SURF**	**OR19-20-SURF**	**OR19-21-SURF**
				Sample Date	**10/24/2019**	**10/23/2019**	**10/23/2019**	**10/23/2019**	**10/24/2019**	**10/23/2019**	**10/24/2019**
				Depth Interval (ft)	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**
Analyte	**Long-term Goal**	**PEC**	**Short-term Goal**	**Unit**							
Total Organic Carbon (TOC)	--	--	--	%	2.94	4.80	3.03	3.02	3.29	2.55	3.15
Aroclor-1016	NSL	NSL	NSL	µg/kg	91 U	89 U	93 U	95 U	95 U	93 U	100 U
Aroclor-1221	NSL	NSL	NSL	µg/kg	91 U	89 U	93 U	95 U	95 U	93 U	100 U
Aroclor-1232	NSL	NSL	NSL	µg/kg	91 U	89 U	93 U	95 U	95 U	93 U	100 U
Aroclor-1242	NSL	NSL	NSL	µg/kg	990	970	1100	1100	1500	1000	1100
Aroclor-1248	NSL	NSL	NSL	µg/kg	91 U	89 U	93 U	95 U	95 U	93 U	100 U
Aroclor-1254	NSL	NSL	NSL	µg/kg	91 U	89 U	93 U	95 U	95 U	93 U	100 U
Aroclor-1260	NSL	NSL	NSL	µg/kg	76 J	69 J	81 J	71 J	96	76 J	89 J
Aroclor-1262	NSL	NSL	NSL	µg/kg	91 U	89 U	93 U	95 U	95 U	93 U	100 U
Aroclor-1268	NSL	NSL	NSL	µg/kg	91 U	89 U	93 U	95 U	95 U	93 U	100 U
Total PCBs ND=0	220	676	1500	µg/kg	**1066**	**1039**	**1181**	**1171**	***1596***	**1076**	**1189**
Total PCBs ND=0[(a)]	220	676	1500	µg/kg	**363**	216	**390**	**388**	**485**	**422**	**377**

NOTES:
[(a)] TOC normalized concentration
FD = Field duplicate
ft = Foot (feet)
µg/kg = Microgram(s) per kilogram
NSL = No screening level
PCB = Polychlorinated biphenyl
PEC = Probable effect concentration. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (MacDonald et al. 2000).
SWAC = Surface weighted average concentration. (EPA 2019)
Bolded detected values exceed Long-term SWAC goal
Bolded and Shaded detected values exceed Long-term SWAC goal and PEC screening value
Bolded, Shaded, and Italicized detected values exceed Long-term SWAC goal, PEC screening value, and Short-term SWAC goal
J = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated).
U = Analyte was analyzed but not detected.

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Table 3-5 Sediment Results for Polychlorinated Biphenyl Congeners

Location ID			OR19-REF1	OR19-01	OR19-02	OR19-03	OR19-04	OR19-04	OR19-05	OR19-06	OR19-07	OR19-08	OR19-09	OR19-10	OR19-11	OR19-11	OR19-12
Sample Name			OR19-REF1	OR19-01-SURF	OR19-02-SURF	OR19-03-SURF	OR19-04-SURF	OR19-04-SURFFD	OR19-05-SURF	OR19-06-SURF	OR19-07-SURF	OR19-08-SURF	OR19-09-SURF	OR19-10-SURF	OR19-11-SURF	OR19-11-SURFFD	OR19-12-SURF
Sample Date			10/25/2019	10/22/2019	10/22/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/25/2019	10/25/2019	10/25/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/23/2019
Depth Interval (ft)			0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	PEC	Unit															
Total Organic Carbon (TOC)	–	%	1.89	4.34	0.56	3.19	3.49	3.43	7.02	3.55	3.05	3.00	2.59	3.64	1.12	1.17	2.42
PCB-1	NSL	µg/kg	0.076	3.0	1.5	3.5 J	6.7	4.4	2.2	4.3	6.5	4.5	5.5	5.2	0.52	0.55	3.1
PCB-2	NSL	µg/kg	0.049	0.6	0.25	0.73 J	1.1	0.75	0.38 J	0.7	1.0	0.71	0.88	0.82	0.095	0.1	0.53 J
PCB-3	NSL	µg/kg	0.093	4.3	1.4	3.2 J	5.8	3.8	2.1	3.9	5.4	4	5.3	5.8	0.56	0.6	3.2
PCB-4	NSL	µg/kg	0.33	23	16	22	36	25	16 J	27	47	27	37	33	4.4	4.7	23
PCB-5	NSL	µg/kg	0.0093 J	0.46 J	0.25	0.37	0.7	0.51	0.32 J	0.49	0.79	0.48	0.66	0.62	0.075	0.067 J	0.47
PCB-6	NSL	µg/kg	0.4	20	8.3	16	26	19	11 J	18	28	20	25	24	3.3	3.6	18
PCB-7	NSL	µg/kg	0.037	2.5	1.2	1.7	3.0	2.2	1.2 J	2.3	3.4	2.2	3.0	3.1	0.39	0.41	2.1
PCB-8	NSL	µg/kg	0.76	40	19	34	57	41	24 J	41	63	41	53	50	6.7	7.0	37
PCB-9	NSL	µg/kg	0.04	2.2	1.0	2.0	3.3	2.3	1.4 J	2.4	3.8	2.4	2.9	2.7	0.36	0.4	2.0
PCB-10	NSL	µg/kg	0.016 J	0.76	0.44 J	0.62	1.2	0.81	0.45 J	0.94	1.5	0.93	1.2	0.95	0.15	0.14	0.77
PCB-11	NSL	µg/kg	0.24	1.3	0.7	1.4	2.1	1.5	1.1 UJ	1.3	2.1	1.4	1.8	1.5	0.27	0.25	1.2
PCB-12	NSL	µg/kg	0.26	12	6.5	10	19	13	8.7 J	12	19	13	17	16	2.2	2.3	12
PCB-13	NSL	µg/kg	0.26	12	6.5	10	19	13	8.7 J	12	19	13	17	16	2.2	2.3	12
PCB-14	NSL	µg/kg	0.022 U	0.17 U	0.069 U	0.32 U	0.11 U	0.12 U	0.53 UJ	0.12 U	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-15	NSL	µg/kg	1.3	51	24	34	64	45	34 J	44	61	45	65	63	9.2	9.5	47
PCB-16	NSL	µg/kg	0.46	12	6.0	9.9	14	11	8.7	11	21	12	15	15	2.4	2.2	12
PCB-17	NSL	µg/kg	0.8	43	23	33	45	35	27	36	60	35	58	59	8.4	8.1	41
PCB-18	NSL	µg/kg	1.3	36	18	28	36	28	22	28	50	29	47	46	7.5	6.9	36
PCB-19	NSL	µg/kg	0.15	7.2	4.1	5.3	9.1	7.0	5.2	8.1	13	6.9	11	10	1.5	1.4	6.6
PCB-20	NSL	µg/kg	5.0	140	53	96	140	110	81	120	200	110	160	170	23	24	120
PCB-21	NSL	µg/kg	1.0	18	6.5	11	15	11	8.8	11	21	12	17	19	2.6	2.7	14
PCB-22	NSL	µg/kg	1.1	32	13	23	34	26	19	27	44	27	36	38	5.1	5.2	27
PCB-23	NSL	µg/kg	0.022 U	0.17 UJ	0.048 J	0.32 U	0.17 U	0.13 U	0.53 U	0.13 U	0.22 U	0.14 U	0.11 J	0.14 J	0.018 J	0.016 J	0.1 J
PCB-24	NSL	µg/kg	0.017 J	0.68	0.34	0.49	0.65	0.52	0.44 J	0.51	1.0	0.55	0.89	0.82	0.14	0.13	0.68 J
PCB-25	NSL	µg/kg	0.94	33	14	27	37	28	22	29	45	28	40	42	5.5	5.7	28
PCB-26	NSL	µg/kg	1.3	38	17	30	43	33	26	34	53	33	47	49	6.5	6.7	33
PCB-27	NSL	µg/kg	0.21	7.3	3.8	5.2	8.0	6.2	5.3	6.8	10	6.3	10	10	1.5	1.4	6.7
PCB-28	NSL	µg/kg	5.0	140	53	96	140	110	81	120	200	110	160	170	23	24	120
PCB-29	NSL	µg/kg	1.3	38	17	30	43	33	26	34	53	33	47	49	6.5	6.7	33
PCB-30	NSL	µg/kg	1.3	36	18	28	36	28	22	28	50	29	47	46	7.5	6.9	36
PCB-31	NSL	µg/kg	3.3	100	43	70	110	81	59	86	150	83	120	120	17	17	85
PCB-32	NSL	µg/kg	0.76	27	14	19	29	23	17	24	38	23	37	37	5.4	5.1	26
PCB-33	NSL	µg/kg	1.0	18	6.5	11	15	11	8.8	11	21	12	17	19	2.6	2.7	14
PCB-34	NSL	µg/kg	0.033	1.2	0.47	0.95	1.3	1.0	0.76	1.1	1.7	1.0	1.4	1.5	0.19	0.2	1.0
PCB-35	NSL	µg/kg	0.082	0.17 U	0.35	0.76	1.1	0.87	0.62	0.85	1.5	0.83	0.97	0.81	0.13	0.13	0.62
PCB-36	NSL	µg/kg	0.022 U	0.17 U	0.069 U	0.32 U	0.16 U	0.12 U	0.53 U	0.12 U	0.21 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-37	NSL	µg/kg	1.6	18	6.2	13	19	15	12	15	24	15	19	20	2.8	3.0	15
PCB-38	NSL	µg/kg	0.022 U	0.17 U	0.069 U	0.32 U	0.16 U	0.12 U	0.53 U	0.13 U	0.21 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-39	NSL	µg/kg	0.025 J	0.17 U	0.15	0.31 J	0.49	0.37	0.34 J	0.4	0.2 U	0.13 U	0.47	0.45	0.062 J	0.07	0.37
PCB-40	NSL	µg/kg	2.8	35	14	22	32	25	24	26	42	25	40	44	6.3	6.4	30
PCB-41	NSL	µg/kg	2.8	35	14	22	32	25	24	26	42	25	40	44	6.3	6.4	30
PCB-42	NSL	µg/kg	1.5	21 J	7.7 J	14	19	16	16	16	25	15	23 J	26 J	3.8 J	3.8 J	17 J
PCB-43	NSL	µg/kg	0.11	3.2	1.2	1.8 J	2.7	2.1	2.3	2.2	3.6	2.2	3.1	3.6	0.52	0.55	2.6
PCB-44	NSL	µg/kg	4.4	64	24	41	56	44	46	46	71	43	73	80	12	12	54
PCB-45	NSL	µg/kg	0.66	13	5.1	7.4	12	9.2	9.1	9.8	16	8.9	15	16	2.3	2.4	10
PCB-46	NSL	µg/kg	0.25	3.6	1.5	2.1	3.4	2.6	2.6	3.0	4.5	2.6	4.1	4.4	0.65	0.65	3.0
PCB-47	NSL	µg/kg	4.4	64	24	41	56	44	46	46	71	43	73	80	12	12	54
PCB-48	NSL	µg/kg	0.54	7.4 J	3 J	4.8	6.4	5.0	4.8	5.3	9.6	5	8.1 J	9 J	1.3 J	1.3 J	6.2 J
PCB-49	NSL	µg/kg	2.9	45	17	30	40	31	32	33	51	31	52	57	8.1	8.3	38
PCB-50	NSL	µg/kg	0.51	9.0	3.7	5.1	8.6	6.7	6.7	7.5	11	6.4	11	12	1.6	1.6	7.4
PCB-51	NSL	µg/kg	0.66	13	5.1	7.4	12	9.2	9.1	9.8	16	8.9	15	16	2.3	2.4	10
PCB-52	NSL	µg/kg	5.1	58	21 J	38	51	40	43	42	67	39	65 J	71 J	10	11	49
PCB-53	NSL	µg/kg	0.51	9.0	3.7	5.1	8.6	6.7	6.7	7.5	11	6.4	11	12	1.6	1.6	7.4
PCB-54	NSL	µg/kg	0.0032 J	0.19	0.059 J	0.094 J	0.29	0.22	0.14 J	0.24	0.34	0.2	0.22	0.25	0.033	0.04	0.17
PCB-55	NSL	µg/kg	0.097	1.1	0.41	0.71 J	0.93	0.78	0.76	0.63 J	1.1 J	0.7	1.0	1.2 J	0.15 J	0.15 J	1.1
PCB-56	NSL	µg/kg	2.6	17	6.0	11	16	13	12	13	22	13	19	21	3.1	3.1	15
PCB-57	NSL	µg/kg	0.04	0.82	0.28 J	0.64	0.87	0.69	0.61	0.72	1.1	0.65	0.95	0.99	0.14	0.14	0.69
PCB-58	NSL	µg/kg	0.025 J	0.17 U	0.12	0.24 J	0.32	0.3	0.3 J	0.3	0.43	0.24	0.34 J	0.4	0.065	0.068	0.25 J
PCB-59	NSL	µg/kg	0.49	6.7	2.5	4.4	6.1	4.7	4.8	4.9	8	4.8	7.6	8.2	1.2	1.2	5.7
PCB-60	NSL	µg/kg	0.93	8.0	2.7	4.9	6.8	5.4	4.7	5.3	8.3	5.3	8.1	8.9	1.3	1.3	6.5
PCB-61	NSL	µg/kg	6.9	58	21	38	50	41	38	41	72	41	64	70	10	11	51
PCB-62	NSL	µg/kg	0.49	6.7	2.5	4.4	6.1	4.7	4.8	4.9	8	4.8	7.6	8.2	1.2	1.2	5.7
PCB-63	NSL	µg/kg	0.19	3.7	1.3	2.5	3.4	2.8	2.4	2.8	4.3	2.7	4.1	4.5	0.64	0.65	3.1
PCB-64	NSL	µg/kg	2.2	27 J	10 J	17	24	19	18	19	31	18	31 J	34 J	4.9 J	5 J	23 J
PCB-65	NSL	µg/kg	4.4	64	24	41	56	44	46	46	71	43	73	80	12	12	54
PCB-66	NSL	µg/kg	5.7	39	13	27	36	29	29	30	50	29	43	48	7.1	7.2	35
PCB-67	NSL	µg/kg	0.14	1.7	0.65	1.4	1.9	1.5	1.3	1.5	2.6	1.4	2.0	2.1	0.31	0.31	1.5
PCB-68	NSL	µg/kg	0.053	0.7	0.26	0.49	0.64	0.49 J	0.58	0.52	0.75	0.5	0.72	0.89	0.12	0.13	0.62
PCB-69	NSL	µg/kg	2.9	45	17	30	40	31	32	33	51	31	52	57	8.1	8.3	38
PCB-70	NSL	µg/kg	6.9	58	21	38	50	41	38	41	72	41	64	70	10	11	51
PCB-71	NSL	µg/kg	2.8	35	14	22	32	25	24	26	42	25	40	44	6.3	6.4	30
PCB-72	NSL	µg/kg	0.078	0.83 J	0.34	0.73	0.91	0.65 J	0.8	0.73	1	0.69	1.1	1.1	0.17	0.17	0.86

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Table 3-5 Sediment Results for Polychlorinated Biphenyl Congeners

Location ID			OR19-REF1	OR19-01	OR19-02	OR19-03	OR19-04	OR19-04	OR19-05	OR19-06	OR19-07	OR19-08	OR19-09	OR19-10	OR19-11	OR19-11	OR19-12
Sample Name			OR19-REF1	OR19-01-SURF	OR19-02-SURF	OR19-03-SURF	OR19-04-SURF	OR19-04-SURFFD	OR19-05-SURF	OR19-06-SURF	OR19-07-SURF	OR19-08-SURF	OR19-09-SURF	OR19-10-SURF	OR19-11-SURF	OR19-11-SURFFD	OR19-12-SURF
Sample Date			10/25/2019	10/22/2019	10/22/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/25/2019	10/25/2019	10/25/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/23/2019
Depth Interval (ft)			0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	**PEC**	**Unit**															
PCB-73	NSL	µg/kg	0.11	3.2	1.2	1.8 J	2.7	2.1	2.3	2.2	3.6	2.2	3.1	3.6	0.52	0.55	2.6
PCB-74	NSL	µg/kg	6.9	58	21	38	50	41	38	41	72	41	64	70	10	11	51
PCB-75	NSL	µg/kg	0.49	6.7	2.5	4.4	6.1	4.7	4.8	4.9	8	4.8	7.6	8.2	1.2	1.2	5.7
PCB-76	NSL	µg/kg	6.9	58	21	38	50	41	38	41	72	41	64	70	10	11	51
PCB-77	NSL	µg/kg	0.86	4.2	1.4	2.9	4.4	3.6	3.3	3.7	5.7	3.6	4.5	4.9	0.71	0.74	3.5
PCB-78	NSL	µg/kg	0.022 U	0.17 U	0.069 U	0.32 U	0.11 U	0.12 U	0.53 U	0.12 U	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-79	NSL	µg/kg	0.068	0.17 U	0.062 J	0.19 J	0.26	0.2 J	0.23 J	0.22	0.33	0.22	0.23	0.22	0.028	0.033 J	0.15 J
PCB-80	NSL	µg/kg	0.022 U	0.17 U	0.069 U	0.32 U	0.11 U	0.12 U	0.53 U	0.12 U	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-81	NSL	µg/kg	0.024 J	0.17 U	0.06 J	0.081 J	0.15	0.13	0.13 J	0.12 J	0.21	0.14 J	0.14	0.11 J	0.013 J	0.02	0.12 J
PCB-82	NSL	µg/kg	1.2	4.2 J	1.3	2.8	4.8	3.8	3.3	3.6	6.3	3.9	4.1	4.8	0.8	0.82	4.0
PCB-83	NSL	µg/kg	4.3	16	4.5	11	18	14	13	14	23	15	17	18	3.0	3.1	15
PCB-84	NSL	µg/kg	1.7	8.3	2.7	5.2	9.2	7.4	6.3	7.1	12	7.5	9.5	9.8	1.6	1.6	7.7
PCB-85	NSL	µg/kg	1.5	6.1	1.8	4.4	6.9	5.5	5.0	5.3	8.9	5.6	6.7	7.1	1.2	1.2	5.9
PCB-86	NSL	µg/kg	4.0	15	4.8	10	17	6.8	12	13	22	14	17	18	2.9	3.1	15
PCB-87	NSL	µg/kg	4.0	15	4.8	10	17	6.8	12	13	22	14	17	18	2.9	3.1	15
PCB-88	NSL	µg/kg	1.1	6.2	1.9	4.2	6.7	5.3	4.9	5.3	8.8	5.4	7.0	7.2	1.2	1.2	5.6
PCB-89	NSL	µg/kg	0.12	0.82	0.25	0.6	0.96	0.81	0.62	0.72	1.3	0.85	0.96	1.0	0.15	0.16	0.82
PCB-90	NSL	µg/kg	5.7	19	5.4	13	20	16	15	16	26	17	20	21	3.5	3.7	18
PCB-91	NSL	µg/kg	1.1	6.2	1.9	4.2	6.7	5.3	4.9	5.3	8.8	5.4	7.0	7.2	1.2	1.2	5.6
PCB-92	NSL	µg/kg	1.3	4.8	1.5	3.8	5.9	4.7	4.4	4.6	7.3	4.6	5.4	5.5	0.93	0.96	4.5
PCB-93	NSL	µg/kg	0.11	0.64 J	0.19 J	0.63 U	0.86	0.73	1.1 U	0.68 J	1.2	0.7	0.82	0.93	0.13	0.15	0.66 J
PCB-94	NSL	µg/kg	0.041	0.39	0.12	0.31 J	0.45	0.36	0.35 J	0.39	0.61	0.38	0.42	0.41 J	0.07 J	0.079	0.36 J
PCB-95	NSL	µg/kg	4.2	18	5.5	11	18	14	14	14	24	15	20	21	3.3	3.5	17
PCB-96	NSL	µg/kg	0.047	0.54	0.18	0.33	0.62	0.47	0.41 J	0.51	0.84	0.49	0.6	0.66	0.1	0.1	0.43 J
PCB-97	NSL	µg/kg	4.0	15	4.8	10	17	6.8	12	13	22	14	17	18	2.9	3.1	15
PCB-98	NSL	µg/kg	0.26	1.8	0.53	1.3	2.1	1.7	1.5	1.7	2.8	1.7	2.0	2.1	0.33	0.34	1.6
PCB-99	NSL	µg/kg	4.3	16	4.5	11	18	14	13	14	23	15	17	18	3.0	3.1	15
PCB-100	NSL	µg/kg	0.11	0.64 J	0.19 J	0.63 U	0.86	0.73	1.1 U	0.68 J	1.2	0.7	0.82	0.93	0.13	0.15	0.66 J
PCB-101	NSL	µg/kg	5.7	19	5.4	13	20	16	15	16	26	17	20	21	3.5	3.7	18
PCB-102	NSL	µg/kg	0.26	1.8	0.53	1.3	2.1	1.7	1.5	1.7	2.8	1.7	2.0	2.1	0.33	0.34	1.6
PCB-103	NSL	µg/kg	0.081	0.36	0.11 J	0.28 J	0.41	0.32	0.3 J	0.33	0.49	0.28	0.39	0.38	0.066	0.073	0.3 J
PCB-104	NSL	µg/kg	0.00095 J	0.17 U	0.069 U	0.32 U	0.0093 J	0.01 J	0.53 U	0.009 J	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-105	NSL	µg/kg	2.3	8.0	2.3	5.1	7.9	6.3	5.9	6.0	9.5	6.2	8.6	8.4	1.4	1.4	6.6
PCB-106	NSL	µg/kg	0.022 U	0.17 U	0.022 J	0.32 U	0.11 U	0.12 U	0.029 J	0.12 U	0.11 U	0.13 U	0.055 J	0.056 J	0.0077 J	0.0066 J	0.045 J
PCB-107	NSL	µg/kg	0.45	2 J	0.57 J	1.2	1.8	1.4	1.4	1.4	2.2	1.4	2.1 J	2.2 J	0.35 J	0.35 J	1.6 J
PCB-108	NSL	µg/kg	0.21	0.66 J	0.2 J	0.4 J	0.65	0.48	0.49 J	0.49	0.79	0.49	0.68 J	0.66 J	0.11 J	0.12 J	0.51 J
PCB-109	NSL	µg/kg	4.0	15	4.8	10	17	6.8	12	13	22	14	17	18	2.9	3.1	15
PCB-110	NSL	µg/kg	9.0	27	8.5	19	31	25	23	24	40	26	30	32	5.3	5.5	26
PCB-111	NSL	µg/kg	0.022 U	0.17 UJ	0.069 UJ	0.32 U	0.11 U	0.12 U	0.53 U	0.12 U	0.11 U	0.13 U	0.14 UJ	0.12 UJ	0.015 UJ	0.015 UJ	0.14 UJ
PCB-112	NSL	µg/kg	0.036	0.17 UJ	0.069 U	0.32 U	0.21	0.16 J	0.23 J	0.18	0.11 U	0.13 U	0.1 J	0.035 J	0.024	0.029 J	0.15 J
PCB-113	NSL	µg/kg	5.7	19	5.4	13	20	16	15	16	26	17	20	21	3.5	3.7	18
PCB-114	NSL	µg/kg	0.12	0.66	0.18	0.4	0.67	0.51	0.44 J	0.48	0.81	0.5	0.71	0.73	0.11	0.12	0.58
PCB-115	NSL	µg/kg	9.0	27	8.5	19	31	25	23	24	40	26	30	32	5.3	5.5	26
PCB-116	NSL	µg/kg	1.5	6.1	1.8	4.4	6.9	5.5	5.0	5.3	8.9	5.6	6.7	7.1	1.2	1.2	5.9
PCB-117	NSL	µg/kg	1.5	6.1	1.8	4.4	6.9	5.5	5.0	5.3	8.9	5.6	6.7	7.1	1.2	1.2	5.9
PCB-118	NSL	µg/kg	4.9	17	4.9	11	17	13	12	12	20	13	19	19	2.9	3.0	15
PCB-119	NSL	µg/kg	4.0	15	4.8	10	17	6.8	12	13	22	14	17	18	2.9	3.1	15
PCB-120	NSL	µg/kg	0.052	0.17 UJ	0.036 J	0.094 J	0.11 UJ	0.13	0.098 J	0.12 U	0.17	0.13	0.14 UJ	0.13 J	0.018	0.019 J	0.091 J
PCB-121	NSL	µg/kg	0.0033 J	0.17 UJ	0.069 UJ	0.32 U	0.11 U	0.12 U	0.53 U	0.12 U	0.11 U	0.13 U	0.14 UJ	0.12 UJ	0.015 UJ	0.015 UJ	0.14 UJ
PCB-122	NSL	µg/kg	0.11	0.39	0.11	0.26 J	0.37	0.3	0.31 J	0.29	0.48	0.29	0.47	0.41	0.077	0.075 J	0.39
PCB-123	NSL	µg/kg	0.13	0.48	0.14 J	0.33 J	0.48	0.4	0.33 J	0.35	0.63	0.39	0.47 J	0.55	0.081	0.09	0.41 J
PCB-124	NSL	µg/kg	0.21	0.66 J	0.2 J	0.4 J	0.65	0.48	0.49 J	0.49	0.79	0.49	0.68 J	0.66 J	0.11 J	0.12 J	0.51 J
PCB-125	NSL	µg/kg	4.0	15	4.8	10	17	6.8	12	13	22	14	17	18	2.9	3.1	15
PCB-126	NSL	µg/kg	0.038	0.17 U	0.069 U	0.049 J	0.037 J	0.076 J	0.087 J	0.042 J	0.065 J	0.074 J	0.14 UJ	0.12	0.016 J	0.02 J	0.15
PCB-127	NSL	µg/kg	0.022 U	0.17 U	0.069 U	0.32 U	0.11 U	0.12 U	0.53 U	0.12 U	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-128	NSL	µg/kg	0.97	2.0	0.44	1.2	1.9	1.4	1.6	1.4	2.2	1.5	2.1	2.0	0.35	0.39	1.7
PCB-129	NSL	µg/kg	5.8	13	2.9	8.0	12	9.6	9.6	8.5	13	9.2	14	14	2.3	2.5	12
PCB-130	NSL	µg/kg	0.46	0.96	0.2 J	0.6	0.89	0.73	0.77	0.67	1	0.7	1.0	0.98	0.18	0.18	0.8
PCB-131	NSL	µg/kg	0.065	0.21 J	0.047 J	0.11 J	0.17	0.13	0.14 J	0.14	0.19	0.14	0.21	0.18	0.035	0.04	0.18
PCB-132	NSL	µg/kg	1.8	4.6	1.0	2.6	4.1	3.2	3.3	2.9	4.7	3	5.0	5.0	0.82	0.88	4.2
PCB-133	NSL	µg/kg	0.099	0.21	0.059 J	0.12 J	0.21	0.15 J	0.13 J	0.14	0.24	0.16 J	0.24	0.25	0.039	0.044	0.22 J
PCB-134	NSL	µg/kg	0.3	0.84	0.18	0.55 J	0.75	0.58	0.58 J	0.54	0.84	0.57	0.91	0.93	0.15	0.16	0.68
PCB-135	NSL	µg/kg	2.0	3.9	0.98	2.5	4.5	3.8	3.4	3.3	5.5	3.7	4.4	4.4	0.73	0.77	4.0
PCB-136	NSL	µg/kg	0.63	1.4	0.32	0.79	1.7	1.4	1.2	1.2	2	1.3	1.6	1.5	0.24	0.27	1.3
PCB-137	NSL	µg/kg	0.23	0.59	0.14	0.34	0.54	0.44	0.46 J	0.39	0.59	0.39	0.63 J	0.63	0.1	0.12	0.54
PCB-138	NSL	µg/kg	5.8	13	2.9	8.0	12	9.6	9.6	8.5	13	9.2	14	14	2.3	2.5	12
PCB-139	NSL	µg/kg	0.096	0.23 J	0.046 J	0.63 UJ	0.25	0.19 J	1.1 U	0.17 J	0.27	0.17 J	0.25 J	0.25	0.044	0.048	0.24 J
PCB-140	NSL	µg/kg	0.096	0.23 J	0.046 J	0.63 UJ	0.25	0.19 J	1.1 U	0.17 J	0.27	0.17 J	0.25 J	0.25	0.044	0.048	0.24 J
PCB-141	NSL	µg/kg	1.0	2.3	0.52	1.5	2.1	1.7	1.7	1.6	2.5	1.6	2.6	2.4	0.44	0.46	2.1
PCB-142	NSL	µg/kg	0.022 U	0.17 U	0.069 U	0.32 U	0.11 U	0.12 U	0.53 U	0.12 U	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-143	NSL	µg/kg	0.3	0.84	0.18	0.55 J	0.75	0.58	0.58 J	0.54	0.84	0.57	0.91	0.93	0.15	0.16	0.68
PCB-144	NSL	µg/kg	0.24	0.51	0.14	0.34	0.61	0.51	0.53 U	0.45	0.78	0.49	0.52	0.54	0.1	0.1	0.52
PCB-145	NSL	µg/kg	0.0029 J	0.17 U	0.069 U	0.32 U	0.013 J	0.01 J	0.53 U	0.0068 J	0.0095 J	0.0041 J	0.14 U	0.12 U	0.015 U	0.015 U	0.14 UJ

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Table 3-5 Sediment Results for Polychlorinated Biphenyl Congeners

Location ID			OR19-REF1	OR19-01	OR19-02	OR19-03	OR19-04	OR19-04	OR19-05	OR19-06	OR19-07	OR19-08	OR19-09	OR19-10	OR19-11	OR19-11	OR19-12
Sample Name			OR19-REF1	OR19-01-SURF	OR19-02-SURF	OR19-03-SURF	OR19-04-SURF	OR19-04-SURFFD	OR19-05-SURF	OR19-06-SURF	OR19-07-SURF	OR19-08-SURF	OR19-09-SURF	OR19-10-SURF	OR19-11-SURF	OR19-11-SURFFD	OR19-12-SURF
Sample Date			10/25/2019	10/22/2019	10/22/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/25/2019	10/25/2019	10/25/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/23/2019
Depth Interval (ft)			0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	**PEC**	**Unit**															
PCB-146	NSL	µg/kg	1.0	2.1	0.49	1.3	1.9	1.5	1.6	1.4	2.2	1.5	2.3	2.3	0.38	0.42	1.9
PCB-147	NSL	µg/kg	4.3	12	2.5	6.3	9.2	7.2	7.4	6.7	11	7.1	12	12	2.0	2.2	10
PCB-148	NSL	µg/kg	0.011 J	0.17 U	0.069 U	0.016 J	0.023 J	0.019 J	0.035 J	0.021 J	0.028 J	0.022 J	0.029 J	0.042 J	0.015 U	0.0043 J	0.14 U
PCB-149	NSL	µg/kg	4.3	12	2.5	6.3	9.2	7.2	7.4	6.7	11	7.1	12	12	2.0	2.2	10
PCB-150	NSL	µg/kg	0.022 UJ	0.019 J	0.069 U	0.018 J	0.11 UJ	0.12 UJ	0.032 J	0.12 U	0.11 U	0.13 U	0.018 J	0.02 J	0.0044 J	0.0034 J	0.016 J
PCB-151	NSL	µg/kg	2.0	3.9	0.98	2.5	4.5	3.8	3.4	3.3	5.5	3.7	4.4	4.4	0.73	0.77	4.0
PCB-152	NSL	µg/kg	0.0044 J	0.016 J	0.069 U	0.0074 J	0.022 J	0.019 J	0.53 U	0.02 J	0.028 J	0.019 J	0.029 J	0.013 J	0.003 J	0.0033 J	0.02 J
PCB-153	NSL	µg/kg	4.6	9.7	2.1	6.3	9.0	7.4	7.4	6.6	10	7.1	11	11	1.8	1.9	8.8
PCB-154	NSL	µg/kg	0.11	0.15 J	0.04 J	0.11 J	0.21	0.17 J	0.12 J	0.16	0.24	0.17	0.18 J	0.19	0.032	0.036	0.15
PCB-155	NSL	µg/kg	0.022 U	0.17 U	0.069 U	0.32 U	0.11 U	0.12 U	0.013 J	0.12 U	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-156	NSL	µg/kg	0.69	1.4	0.33	0.95	1.5	1.2	1.1	1.0	1.6	1.1	1.5	1.5	0.25	0.27	1.3
PCB-157	NSL	µg/kg	0.69	1.4	0.33	0.95	1.5	1.2	1.1	1.0	1.6	1.1	1.5	1.5	0.25	0.27	1.3
PCB-158	NSL	µg/kg	0.55	1.2	0.29	0.79	1.2	0.96	0.89	0.87	1.4	0.95	1.4	1.3	0.22	0.23	1.1
PCB-159	NSL	µg/kg	0.075	0.098 J	0.069 U	0.11 J	0.15	0.12	0.11 J	0.11 J	0.17	0.11 J	0.1 J	0.095 J	0.015	0.014 J	0.12 J
PCB-160	NSL	µg/kg	5.8	13	2.9	8.0	12	9.6	9.6	8.5	13	9.2	14	14	2.3	2.5	12
PCB-161	NSL	µg/kg	0.022 U	0.17 U	0.069 U	0.32 U	0.11 U	0.12 U	0.53 U	0.12 U	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-162	NSL	µg/kg	0.031	0.17 U	0.069 U	0.031 J	0.045 J	0.041 J	0.039 J	0.036 J	0.11 U	0.037 J	0.038 J	0.072 J	0.0079 J	0.0088 J	0.072 J
PCB-163	NSL	µg/kg	5.8	13	2.9	8.0	12	9.6	9.6	8.5	13	9.2	14	14	2.3	2.5	12
PCB-164	NSL	µg/kg	0.44	0.87	0.2	0.58	0.85	0.68	0.68	0.62	1.0	0.68	0.92	0.91	0.16 J	0.17 J	0.8 J
PCB-165	NSL	µg/kg	0.022 U	0.17 U	0.069 U	0.32 U	0.11 U	0.12 U	0.53 U	0.12 U	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-166	NSL	µg/kg	0.97	2.0	0.44	1.2	1.9	1.4	1.6	1.4	2.2	1.5	2.1	2.0	0.35	0.39	1.7
PCB-167	NSL	µg/kg	0.25	0.49	0.11	0.28 J	0.47	0.39	0.37 J	0.36	0.53	0.37	0.48	0.54	0.085	0.09	0.47
PCB-168	NSL	µg/kg	4.6	9.7	2.1	6.3	9.0	7.4	7.4	6.6	10	7.1	11	11	1.8	1.9	8.8
PCB-169	NSL	µg/kg	0.022 UJ	0.17 U	0.069 U	0.32 U	0.11 UJ	0.12 U	0.53 UJ	0.12 UJ	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 UJ
PCB-170	NSL	µg/kg	1.6	3.4	0.72	2.3	3.6	2.8	2.5	2.6	3.8	2.8	3.8	3.7	0.66	0.68	3.3
PCB-171	NSL	µg/kg	0.53	1.0	0.2 J	0.73	1.2	0.91	1.1 U	0.84	1.3	0.93	1.2	1.1	0.2	0.21	1.0
PCB-172	NSL	µg/kg	0.34	0.61	0.17	0.44	0.68	0.53	0.5 J	0.49	0.73	0.54	0.71	0.69	0.12	0.13	0.56
PCB-173	NSL	µg/kg	0.53	1.0	0.2 J	0.73	1.2	0.91	1.1 U	0.84	1.3	0.93	1.2	1.1	0.2	0.21	1.0
PCB-174	NSL	µg/kg	1.8	3.4	0.69	2.4	4.0	3.3	3.0	2.9	4.4	3.1	3.7	3.6	0.64	0.67	3.3
PCB-175	NSL	µg/kg	0.077	0.15 J	0.069 U	0.11 J	0.16	0.13	0.11 J	0.11 J	0.17	0.12 J	0.16	0.16	0.024	0.032	0.13 J
PCB-176	NSL	µg/kg	0.18	0.43	0.062 J	0.25 J	0.43	0.34	0.31 J	0.3	0.47	0.32	0.43	0.43	0.074	0.082	0.4
PCB-177	NSL	µg/kg	1.1	1.9	0.41	1.4	2.4	1.9	1.7	1.7	2.5	1.8	2.1	2.1	0.37	0.39	1.7
PCB-178	NSL	µg/kg	0.37	0.71	0.14	0.48	0.76	0.6	0.51 J	0.55	0.83	0.59	0.76	0.8	0.13	0.15	0.7
PCB-179	NSL	µg/kg	0.66	1.3	0.28	0.85	1.5	1.2	1.0	1.0	1.6	1.1	1.5	1.5	0.26	0.28	1.4
PCB-180	NSL	µg/kg	3.7	7.1	1.5	5.1	8.3	6.6	6.0	5.9	8.8	6.4	7.9	8.0	1.3	1.4	6.9
PCB-181	NSL	µg/kg	0.022 U	0.17 U	0.069 U	0.32 U	0.11 UJ	0.12 UJ	0.024 J	0.12 UJ	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-182	NSL	µg/kg	0.021 J	0.17 U	0.069 U	0.032 J	0.039 J	0.038 J	0.027 J	0.028 J	0.11 U	0.033 J	0.049 J	0.039 J	0.0072 J	0.006 J	0.045 J
PCB-183	NSL	µg/kg	1.1	2.3	0.49	1.6	2.5	2.0	1.8	1.8	2.7	1.9	2.7	2.5	0.43	0.46	2.1
PCB-184	NSL	µg/kg	0.0028 J	0.17 U	0.069 U	0.32 U	0.11 U	0.12 U	0.53 U	0.12 U	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-185	NSL	µg/kg	1.1	2.3	0.49	1.6	2.5	2.0	1.8	1.8	2.7	1.9	2.7	2.5	0.43	0.46	2.1
PCB-186	NSL	µg/kg	0.022 U	0.17 U	0.069 U	0.32 U	0.11 U	0.12 U	0.53 U	0.12 U	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-187	NSL	µg/kg	2.1	4.0	0.8	2.8	4.6	3.6	3.3	3.3	5.1	3.5	4.3	4.3	0.75	0.79	4.0
PCB-188	NSL	µg/kg	0.0047 J	0.17 U	0.069 U	0.32 U	0.0052 J	0.004 J	0.53 U	0.12 U	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-189	NSL	µg/kg	0.066	0.17 U	0.069 U	0.096 J	0.14	0.12	0.11 J	0.12 U	0.15	0.13 UJ	0.16	0.13	0.017 J	0.028	0.14 U
PCB-190	NSL	µg/kg	0.34	0.62	0.11 J	0.45	0.73	0.59	0.52 J	0.55	0.78	0.58	0.68	0.7	0.11	0.11	0.57
PCB-191	NSL	µg/kg	0.072	0.17 U	0.069 U	0.087 J	0.18	0.14	0.096 J	0.12	0.17	0.14	0.16	0.15	0.03	0.024 J	0.14 UJ
PCB-192	NSL	µg/kg	0.022 U	0.17 U	0.069 U	0.32 U	0.11 U	0.12 U	0.53 U	0.12 U	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-193	NSL	µg/kg	3.7	7.1	1.5	5.1	8.3	6.6	6.0	5.9	8.8	6.4	7.9	8.0	1.3	1.4	6.9
PCB-194	NSL	µg/kg	0.89	1.8	0.33	1.3	2.0	1.5	1.5	1.4	2.0	1.5	2.1	2.0	0.33	0.36	1.8
PCB-195	NSL	µg/kg	0.36	0.72	0.11 J	0.56	0.82	0.6	0.58	0.55	0.84	0.63	0.81	0.8	0.15	0.15	0.74
PCB-196	NSL	µg/kg	0.42	0.83	0.17	0.57	0.96	0.74	0.6	0.69	1	0.78	0.89	0.9	0.14	0.15	0.99
PCB-197	NSL	µg/kg	0.031	0.063 J	0.069 U	0.033 J	0.061 J	0.055 J	0.065 J	0.045 J	0.062 J	0.051 J	0.042 J	0.065 J	0.012 J	0.0095 J	0.037 J
PCB-198	NSL	µg/kg	1.0	1.9	0.31 J	1.3	2.2	1.7	1.5	1.6	2.2	1.8	2.1	1.9	0.32	0.35	1.9
PCB-199	NSL	µg/kg	1.0	1.9	0.31 J	1.3	2.2	1.7	1.5	1.6	2.2	1.8	2.1	1.9	0.32	0.35	1.9
PCB-200	NSL	µg/kg	0.12	0.18	0.057 J	0.2 J	0.24	0.19	0.17 J	0.17	0.25	0.22	0.2 J	0.17 J	0.032	0.038	0.22
PCB-201	NSL	µg/kg	0.11	0.19	0.027 J	0.32 U	0.25	0.2	0.53 U	0.18	0.25	0.18 J	0.22	0.21	0.031 J	0.035	0.21
PCB-202	NSL	µg/kg	0.19	0.32	0.052 J	0.32 U	0.37	0.29	0.53 U	0.3	0.39	0.3	0.33	0.34	0.06	0.067	0.38
PCB-203	NSL	µg/kg	0.56	1.1	0.2	0.77	1.3	0.95	0.85	0.92	1.3	1	1.1	1.1	0.19	0.21	1.2
PCB-204	NSL	µg/kg	0.022 UJ	0.17 U	0.069 U	0.32 U	0.11 U	0.12 U	0.53 U	0.12 U	0.11 U	0.13 U	0.14 U	0.12 U	0.015 U	0.015 U	0.14 U
PCB-205	NSL	µg/kg	0.041	0.17 U	0.069 U	0.32 UJ	0.09 J	0.063 J	0.53 U	0.069 J	0.091 J	0.066 J	0.14 UJ	0.12 U	0.015 J	0.018	0.14 UJ
PCB-206	NSL	µg/kg	0.45	0.8	0.14	0.57 J	1.1	1.0	0.96 J	0.7 J	0.93	1.1 J	0.89	0.88	0.16	0.18	1.1
PCB-207	NSL	µg/kg	0.065	0.097 J	0.069 U	0.039 J	0.13	0.084 J	0.092 J	0.084 J	0.11	0.086 J	0.078 J	0.086 J	0.018	0.025	0.12 J
PCB-208	NSL	µg/kg	0.13	0.23	0.037 J	0.15 J	0.28	0.22	0.23 J	0.19	0.25	0.22	0.22 J	0.25	0.041	0.045	0.3
PCB-209	NSL	µg/kg	0.5	0.53	0.11	0.36	0.56	0.47	0.59	0.41	0.59	0.55	0.54	0.63	0.099	0.096 J	0.53
Total PCBs ND=0	676	µg/kg	284	**2314**	**874**	**1587**	**2350**	**1788**	**1580**	**1857**	**3036**	**1839**	**2685**	**2817**	413	427	**2058**
Total PCBs ND=0 [a]	676	µg/kg-TOC	150	533	**1549**	497	673	521	225	523	**995**	613	**1037**	**774**	369	365	**851**

NOTES:
[a] TOC normalized concentration
FD = Field duplicate
ft = Foot (feet)
µg/kg = Microgram(s) per kilogram
NSL = No screening level
PCB = Polychlorinated biphenyl
PEC = Probable effect concentration. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (MacDonald et al. 2000).
Bolded and Shaded detected values exceed the PEC
J = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated).
U = Analyte was analyzed but not detected.
Site specific goals were not developed for PCB Congeners. Total PCB Congeners were screened exclusively against the PEC.

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Table 3-5 Sediment Results for Polychlorinated Biphenyl Congeners

		Location ID	OR19-13	OR19-14	OR19-14	OR19-15	OR19-16	OR19-17	OR19-18	OR19-19	OR19-20	OR19-21
		Sample Name	OR19-13-SURF	OR19-14-SURF	OR19-14-SURFFD	OR19-15-SURF	OR19-16-SURF	OR19-17-SURF	OR19-18-SURF	OR19-19-SURF	OR19-20-SURF	OR19-21-SURF
		Sample Date	10/23/2019	10/24/2019	10/24/2019	10/24/2019	10/23/2019	10/23/2019	10/23/2019	10/24/2019	10/23/2019	10/24/2019
		Depth Interval (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	PEC	Unit										
Total Organic Carbon (TOC)	–	%	2.80	3.94	4.82	2.94	4.80	3.03	3.02	3.29	2.55	3.15
PCB-1	NSL	µg/kg	5.0	2.3	2.3	2.8	4.1	3.7	4.5	3.0	3.5	3.4
PCB-2	NSL	µg/kg	0.76	0.58	0.6	0.54	0.62	0.64	0.76	0.48	0.62	0.53
PCB-3	NSL	µg/kg	5.2	4.5	4.5	3.5	4.2	4.4	5.8	3.1	4.8	4.3
PCB-4	NSL	µg/kg	32	21	21	23	27	25	31	18	27	20
PCB-5	NSL	µg/kg	0.64	0.47	0.46	0.5	0.6	0.53	0.68	0.36	0.7	0.4
PCB-6	NSL	µg/kg	24	17	18	19	19	20	23	13	19	15
PCB-7	NSL	µg/kg	2.9	2.2	2.3	2.2	2.4	2.5	2.9	1.6	2.4	1.9
PCB-8	NSL	µg/kg	48	34	35	37	39	40	48	28	40	32
PCB-9	NSL	µg/kg	2.6	1.9	2.0	2.0	2.2	2.2	2.6	1.6	2.4	1.8
PCB-10	NSL	µg/kg	0.83 J	0.71 J	0.69 J	0.78	0.79	0.81 J	1.0	0.58 J	0.89	0.72
PCB-11	NSL	µg/kg	1.5	1.0	1.2	1.2	1.3	1.4	1.6	0.9	1.2	0.9
PCB-12	NSL	µg/kg	15	12	12	12	13	13	15	8.7	13	9.1
PCB-13	NSL	µg/kg	15	12	12	12	13	13	15	8.7	13	9.1
PCB-14	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-15	NSL	µg/kg	60	56	60	49	52	56	61	35	53	41
PCB-16	NSL	µg/kg	14	11	12	12	12	15	14	8.4	15	9.8
PCB-17	NSL	µg/kg	52	38	39	41	43	51	54	25	46	30
PCB-18	NSL	µg/kg	43	36	37	36	36	45	46	21	44	24
PCB-19	NSL	µg/kg	9.4	6.4	6.5	6.9	7.5	8.2	9.0	4.6	7.9	5.1
PCB-20	NSL	µg/kg	150	120	130	120	130	130	160	86	140	110
PCB-21	NSL	µg/kg	18	16	16	15	15	16	18	11	20	13
PCB-22	NSL	µg/kg	35	27	28	27	29	30	37	20	33	25
PCB-23	NSL	µg/kg	0.08 J	0.066 J	0.11 J	0.062 J	0.079 J	0.11 J	0.093 J	0.35 U	0.1 J	0.37 U
PCB-24	NSL	µg/kg	0.73 J	0.73	0.73	0.77	0.58	0.86	0.88	0.43	0.98	0.51
PCB-25	NSL	µg/kg	38	29	30	29	32	32	41	23	33	26
PCB-26	NSL	µg/kg	45	33	35	34	37	37	46	25	38	29
PCB-27	NSL	µg/kg	9.0	6.7	6.9	7.0	7.5	8.8	9.0	4.6	7.6	5.4
PCB-28	NSL	µg/kg	150	120	130	120	130	130	160	86	140	110
PCB-29	NSL	µg/kg	45	33	35	34	37	37	46	25	38	29
PCB-30	NSL	µg/kg	43	36	37	36	36	45	46	21	44	24
PCB-31	NSL	µg/kg	110	86	92	88	95	97	120	61	100	71
PCB-32	NSL	µg/kg	33	25	26	27	28	32	34	16	29	19
PCB-33	NSL	µg/kg	18	16	16	15	15	16	18	11	20	13
PCB-34	NSL	µg/kg	1.4	0.98	1.0	0.96	1.0	1.1	1.4	0.76	1.2	0.9
PCB-35	NSL	µg/kg	0.97	0.69	0.7	0.69	0.85	0.79	0.81 J	0.57 J	0.99	0.7
PCB-36	NSL	µg/kg	0.12 U	0.051 J	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-37	NSL	µg/kg	19	19	20	16	18	18	21	13	21	16
PCB-38	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.063 J	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-39	NSL	µg/kg	0.44	0.36	0.4	0.37	0.34	0.43 J	0.51	0.29 J	0.41	0.39
PCB-40	NSL	µg/kg	39	34	34	33	32	36	41	23	39	29
PCB-41	NSL	µg/kg	39	34	34	33	32	36	41	23	39	29
PCB-42	NSL	µg/kg	23 J	20 J	20 J	19 J	19 J	21 J	25 J	15	23 J	19
PCB-43	NSL	µg/kg	3.1	2.6	2.9	2.7	2.6	2.9	3.4	2.0	3.0	2.5
PCB-44	NSL	µg/kg	71	61	62	59	60	65	75	40	69	53
PCB-45	NSL	µg/kg	14	12	12	12	12	13	15	8.1	14	10
PCB-46	NSL	µg/kg	4.0	3.4	3.5	3.3	3.2	3.6	4.1	2.3	4.0	2.8
PCB-47	NSL	µg/kg	71	61	62	59	60	65	75	40	69	53
PCB-48	NSL	µg/kg	7.7 J	7 J	7.4 J	7 J	6.6 J	7.7 J	8.5 J	4.8	8.7 J	6.3
PCB-49	NSL	µg/kg	50	43	44	41	42	46	53	28	48	38
PCB-50	NSL	µg/kg	9.9	8.3	8.3	8.2	7.9	8.8	11	5.6	9.3	7.1
PCB-51	NSL	µg/kg	14	12	12	12	12	13	15	8.1	14	10
PCB-52	NSL	µg/kg	63 J	55	56	52	54 J	59	66 J	37	61 J	48
PCB-53	NSL	µg/kg	9.9	8.3	8.3	8.2	7.9	8.8	11	5.6	9.3	7.1
PCB-54	NSL	µg/kg	0.24	0.21	0.18	0.19	0.17	0.17 J	0.24	0.1 J	0.19	0.12 J
PCB-55	NSL	µg/kg	1.2	0.99	1.1	0.85	1.1 J	0.99	1.2	0.71	1.3	0.82 J
PCB-56	NSL	µg/kg	18	18	18	16	16	18	20	12	20	16
PCB-57	NSL	µg/kg	0.92	0.76	0.81	0.74	0.76	0.9	1.1 J	0.51 J	0.87 J	0.77
PCB-58	NSL	µg/kg	0.24 J	0.27 J	0.35	0.26 J	0.35	0.43	0.37 J	0.28 J	0.41	0.35 J
PCB-59	NSL	µg/kg	7.5	6.5	6.7	6.4	6.3	7.2	8.1	4.4	7.4	5.9
PCB-60	NSL	µg/kg	7.4	7.2	7.5	6.9	7	7.4	8.1	4.6	7.7	5.9
PCB-61	NSL	µg/kg	61	57	58	55	55	60	65	37	67	49
PCB-62	NSL	µg/kg	7.5	6.5	6.7	6.4	6.3	7.2	8.1	4.4	7.4	5.9
PCB-63	NSL	µg/kg	4.0	3.3	3.4	3.3	3.4	3.7	4.2	2.3	3.8	2.9
PCB-64	NSL	µg/kg	30 J	26 J	27 J	26 J	25 J	29 J	32 J	17	30 J	23
PCB-65	NSL	µg/kg	71	61	62	59	60	65	75	40	69	53
PCB-66	NSL	µg/kg	42	40	41	38	38	42	46	28	47	37
PCB-67	NSL	µg/kg	1.8	1.6	1.6 J	1.6	1.6	1.8	2.0	1.3	1.9	1.7
PCB-68	NSL	µg/kg	0.78	0.65	0.72	0.64	0.65	0.77	0.79	0.41 J	0.72	0.6
PCB-69	NSL	µg/kg	50	43	44	41	42	46	53	28	48	38
PCB-70	NSL	µg/kg	61	57	58	55	55	60	65	37	67	49
PCB-71	NSL	µg/kg	39	34	34	33	32	36	41	23	39	29
PCB-72	NSL	µg/kg	1.1	0.8	0.85 J	0.8 J	0.85	0.91 J	1.1	0.65	1.1	0.85

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Table 3-5 Sediment Results for Polychlorinated Biphenyl Congeners

		Location ID	OR19-13	OR19-14	OR19-14	OR19-15	OR19-16	OR19-17	OR19-18	OR19-19	OR19-20	OR19-21
		Sample Name	OR19-13-SURF	OR19-14-SURF	OR19-14-SURFFD	OR19-15-SURF	OR19-16-SURF	OR19-17-SURF	OR19-18-SURF	OR19-19-SURF	OR19-20-SURF	OR19-21-SURF
		Sample Date	10/23/2019	10/24/2019	10/24/2019	10/24/2019	10/23/2019	10/23/2019	10/23/2019	10/24/2019	10/23/2019	10/24/2019
		Depth Interval (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	PEC	Unit										
PCB-73	NSL	µg/kg	3.1	2.6	2.9	2.7	2.6	2.9	3.4	2.0	3.0	2.5
PCB-74	NSL	µg/kg	61	57	58	55	55	60	65	37	67	49
PCB-75	NSL	µg/kg	7.5	6.5	6.7	6.4	6.3	7.2	8.1	4.4	7.4	5.9
PCB-76	NSL	µg/kg	61	57	58	55	55	60	65	37	67	49
PCB-77	NSL	µg/kg	4.4	3.9	4.2	3.8	4.1	4.2	4.8	2.9	4.8	3.8
PCB-78	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-79	NSL	µg/kg	0.17 J	0.17 J	0.18	0.22	0.17 J	0.2	0.21 J	0.19 J	0.16 J	0.25 J
PCB-80	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.043 J	0.14 U	0.37 U
PCB-81	NSL	µg/kg	0.12 U	0.1 J	0.12 J	0.099 J	0.13 U	0.16	0.14 J	0.12 J	0.11 J	0.14 J
PCB-82	NSL	µg/kg	4.2	4.4	4.4	3.9	3.9	4.5	4.5	2.7	4.5	3.5
PCB-83	NSL	µg/kg	16	16	16	15	15	17	18	11	18	13
PCB-84	NSL	µg/kg	8.8	8.6	9.0	8.1	8.3	8.8	9.4	5.4	9.1	6.6
PCB-85	NSL	µg/kg	6.2	6.0	6.2	5.9	6.0	6.4	6.5	4.1	6.7	5.0
PCB-86	NSL	µg/kg	16	16	16	15	16	16	17	10	17	13
PCB-87	NSL	µg/kg	16	16	16	15	16	16	17	10	17	13
PCB-88	NSL	µg/kg	6.6	6.2	6.7	6.0	6.0	6.7	7.1	3.9	6.9	5.0
PCB-89	NSL	µg/kg	0.93	0.9	0.87	0.78	0.69 J	0.88	0.8 J	0.54	0.82 J	0.66
PCB-90	NSL	µg/kg	19	19	20	18	19	20	21	12	21	15
PCB-91	NSL	µg/kg	6.6	6.2	6.7	6.0	6.0	6.7	7.1	3.9	6.9	5.0
PCB-92	NSL	µg/kg	5.1	4.9	5.0	4.4	4.8	5.1	5.5	3.5	5.2	4.5
PCB-93	NSL	µg/kg	0.8	0.72	0.71 J	0.62 J	0.65	0.7	0.82	0.71 U	0.76	0.73 U
PCB-94	NSL	µg/kg	0.41	0.41	0.36	0.29 J	0.35	0.44	0.39 J	0.27 J	0.44	0.32 J
PCB-95	NSL	µg/kg	19	19	19	17	18	19	20	11	20	14
PCB-96	NSL	µg/kg	0.58	0.52 J	0.57	0.53	0.49	0.56	0.59	0.35	0.53	0.43
PCB-97	NSL	µg/kg	16	16	16	15	16	16	17	10	17	13
PCB-98	NSL	µg/kg	2.0	1.7	1.7	1.6	1.6	1.8	1.8	1.2	1.6 J	1.6
PCB-99	NSL	µg/kg	16	16	16	15	15	17	18	11	18	13
PCB-100	NSL	µg/kg	0.8	0.72	0.71 J	0.62 J	0.65	0.7	0.82	0.71 U	0.76	0.73 U
PCB-101	NSL	µg/kg	19	19	20	18	19	20	21	12	21	15
PCB-102	NSL	µg/kg	2.0	1.7	1.7	1.6	1.6	1.8	1.8	1.2	1.6 J	1.6
PCB-103	NSL	µg/kg	0.38	0.3 J	0.37	0.35	0.3 J	0.36	0.44	0.24 J	0.35 J	0.31 J
PCB-104	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-105	NSL	µg/kg	8.0	7.3	7.4	7.0	7.8	7.6	8.4	4.9	8.5	7.0
PCB-106	NSL	µg/kg	0.061 J	0.054 J	0.038 J	0.032 J	0.056 J	0.061 J	0.14 U	0.03 J	0.053 J	0.37 U
PCB-107	NSL	µg/kg	2 J	1.9 J	1.9 J	1.7 J	1.9 J	2 J	2.3 J	1.1	2.2 J	1.5
PCB-108	NSL	µg/kg	0.66 J	0.57 J	0.64 J	0.58 J	0.69 J	0.65 J	0.72 J	0.4 J	0.76 J	0.55 J
PCB-109	NSL	µg/kg	16	16	16	15	16	16	17	10	17	13
PCB-110	NSL	µg/kg	29	28	29	26	28	29	31	18	30	23
PCB-111	NSL	µg/kg	0.12 UJ	0.13 UJ	0.14 UJ	0.13 UJ	0.13 UJ	0.087 J	0.14 UJ	0.35 U	0.14 UJ	0.37 U
PCB-112	NSL	µg/kg	0.19	0.21	0.18	0.15 J	0.17	0.24 J	0.14 U	0.13 J	0.14 U	0.15 J
PCB-113	NSL	µg/kg	19	19	20	18	19	20	21	12	21	15
PCB-114	NSL	µg/kg	0.61	0.59	0.58	0.62	0.57 J	0.61	0.72	0.38	0.76	0.52
PCB-115	NSL	µg/kg	29	28	29	26	28	29	31	18	30	23
PCB-116	NSL	µg/kg	6.2	6.0	6.2	5.9	6.0	6.4	6.5	4.1	6.7	5.0
PCB-117	NSL	µg/kg	6.2	6.0	6.2	5.9	6.0	6.4	6.5	4.1	6.7	5.0
PCB-118	NSL	µg/kg	18	16	17	16	18	17	19	11	19	14
PCB-119	NSL	µg/kg	16	16	16	15	16	16	17	10	17	13
PCB-120	NSL	µg/kg	0.093 J	0.13 U	0.1 J	0.094 J	0.13 UJ	0.078 J	0.097 J	0.079 J	0.11 J	0.091 J
PCB-121	NSL	µg/kg	0.12 UJ	0.13 UJ	0.14 UJ	0.13 UJ	0.13 UJ	0.14 UJ	0.14 UJ	0.35 U	0.14 UJ	0.37 U
PCB-122	NSL	µg/kg	0.52	0.42	0.39	0.41	0.43	0.38 J	0.54	0.25 J	0.44 J	0.34 J
PCB-123	NSL	µg/kg	0.45	0.44	0.48 J	0.36 J	0.47	0.46	0.58 J	0.31 J	0.48 J	0.43
PCB-124	NSL	µg/kg	0.66 J	0.57 J	0.64 J	0.58 J	0.69 J	0.65 J	0.72 J	0.4 J	0.76 J	0.55 J
PCB-125	NSL	µg/kg	16	16	16	15	16	16	17	10	17	13
PCB-126	NSL	µg/kg	0.13 J	0.13 UJ	0.14 U	0.13 U	0.13	0.14 UJ	0.16	0.079 J	0.14 J	0.11 J
PCB-127	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-128	NSL	µg/kg	1.8	1.9	1.9	1.7	2.1	1.9	2.1	1.3	2.0	1.7
PCB-129	NSL	µg/kg	13	12	13	12	14	13	15	7.9	14	10
PCB-130	NSL	µg/kg	1.0	1.0	1.0	0.9	1.1	1.0	1.2	0.59	0.97 J	0.84
PCB-131	NSL	µg/kg	0.22	0.17	0.23	0.2	0.2 J	0.17 J	0.27	0.1 J	0.23 J	0.14 J
PCB-132	NSL	µg/kg	4.5	4.5	4.7	4.1	4.9	4.3	5.4	2.8	4.8	3.6
PCB-133	NSL	µg/kg	0.25	0.25	0.24	0.18	0.22	0.22	0.22	0.13 J	0.25	0.19 J
PCB-134	NSL	µg/kg	0.88	0.8	0.89	0.68	0.92	0.8	1.0	0.53 J	0.9	0.71 J
PCB-135	NSL	µg/kg	4.2	3.9	4.1	3.7	3.9	4.2	4.8	2.6	4.4	3.2
PCB-136	NSL	µg/kg	1.5	1.4	1.4	1.3	1.5	1.5	1.7	0.94	1.4	1.2
PCB-137	NSL	µg/kg	0.58	0.53	0.58 J	0.55	0.66	0.48 J	0.65	0.35	0.67	0.46
PCB-138	NSL	µg/kg	13	12	13	12	14	13	15	7.9	14	10
PCB-139	NSL	µg/kg	0.29	0.26	0.23 J	0.23 J	0.29	0.27 J	0.28	0.71 U	0.26 J	0.73 U
PCB-140	NSL	µg/kg	0.29	0.26	0.23 J	0.23 J	0.29	0.27 J	0.28	0.71 U	0.26 J	0.73 U
PCB-141	NSL	µg/kg	2.4	2.3	2.4	2.0	2.4	2.3	2.8	1.4	2.5	1.8
PCB-142	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-143	NSL	µg/kg	0.88	0.8	0.89	0.68	0.92	0.8	1.0	0.53 J	0.9	0.71 J
PCB-144	NSL	µg/kg	0.52	0.4 J	0.44	0.51	0.54	0.53	0.65	0.35 UJ	0.53	0.43
PCB-145	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 UJ	0.13 UJ	0.14 U	0.14 U	0.35 U	0.14 U	0.012 J

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Table 3-5 Sediment Results for Polychlorinated Biphenyl Congeners

		Location ID	OR19-13	OR19-14	OR19-14	OR19-15	OR19-16	OR19-17	OR19-18	OR19-19	OR19-20	OR19-21
		Sample Name	OR19-13-SURF	OR19-14-SURF	OR19-14-SURFFD	OR19-15-SURF	OR19-16-SURF	OR19-17-SURF	OR19-18-SURF	OR19-19-SURF	OR19-20-SURF	OR19-21-SURF
		Sample Date	10/23/2019	10/24/2019	10/24/2019	10/24/2019	10/23/2019	10/23/2019	10/23/2019	10/24/2019	10/23/2019	10/24/2019
		Depth Interval (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	PEC	Unit										
PCB-146	NSL	µg/kg	2.1	1.9	2.1	1.9	2.1	2.0	2.5	1.4	2.3	1.8
PCB-147	NSL	µg/kg	11	11	11	9.9	11	11	13	6.2	12	8.5
PCB-148	NSL	µg/kg	0.024 J	0.13 U	0.025 J	0.044 J	0.029 J	0.022 J	0.034 J	0.021 J	0.027 J	0.021 J
PCB-149	NSL	µg/kg	11	11	11	9.9	11	11	13	6.2	12	8.5
PCB-150	NSL	µg/kg	0.024 J	0.019 J	0.018 J	0.024 J	0.016 J	0.015 J	0.031 J	0.021 J	0.02 J	0.02 J
PCB-151	NSL	µg/kg	4.2	3.9	4.1	3.7	3.9	4.2	4.8	2.6	4.4	3.2
PCB-152	NSL	µg/kg	0.019 J	0.01 J	0.012 J	0.023 J	0.02 J	0.0098 J	0.024 J	0.022 J	0.023 J	0.012 J
PCB-153	NSL	µg/kg	9.9	9.3	9.8	8.6	10	9.5	12	6.2	11	8.2
PCB-154	NSL	µg/kg	0.15 J	0.13 J	0.17	0.15 J	0.15	0.2	0.2	0.14 J	0.15 J	0.16 J
PCB-155	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.008 J	0.14 U	0.37 U
PCB-156	NSL	µg/kg	1.4	1.3	1.4	1.3	1.5	1.3	1.6	0.95	1.4	1.3
PCB-157	NSL	µg/kg	1.4	1.3	1.4	1.3	1.5	1.3	1.6	0.95	1.4	1.3
PCB-158	NSL	µg/kg	1.3	1.1	1.2	1.1	1.4	1.2	1.5	0.75	1.3	1.0
PCB-159	NSL	µg/kg	0.075 J	0.071 J	0.091 J	0.091 J	0.084 J	0.096 J	0.1 J	0.079 J	0.097 J	0.14 J
PCB-160	NSL	µg/kg	13	12	13	12	14	13	15	7.9	14	10
PCB-161	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-162	NSL	µg/kg	0.073 J	0.061 J	0.054 J	0.053 J	0.055 J	0.057 J	0.09 J	0.042 J	0.049 J	0.063 J
PCB-163	NSL	µg/kg	13	12	13	12	14	13	15	7.9	14	10
PCB-164	NSL	µg/kg	0.91	0.93 J	0.9 J	0.77 J	0.97	0.87 J	1.0	0.61	1.0	0.74
PCB-165	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-166	NSL	µg/kg	1.8	1.9	1.9	1.7	2.1	1.9	2.1	1.3	2.0	1.7
PCB-167	NSL	µg/kg	0.5	0.46	0.45	0.43	0.47	0.47	0.54	0.33 J	0.49	0.42
PCB-168	NSL	µg/kg	9.9	9.3	9.8	8.6	10	9.5	12	6.2	11	8.2
PCB-169	NSL	µg/kg	0.12 U	0.13 U	0.14 UJ	0.13 U	0.13 U	0.14 U	0.14 U	0.35 UJ	0.14 U	0.37 U
PCB-170	NSL	µg/kg	3.7	3.3	3.4	3.3	3.4	3.4	4.2	2.4	3.9	2.9
PCB-171	NSL	µg/kg	1.1	0.94	0.94 J	0.99	1.0	1.0	1.3	0.71	1.0	0.89
PCB-172	NSL	µg/kg	0.71	0.56	0.63	0.59	0.6	0.63	0.77	0.44	0.7	0.55
PCB-173	NSL	µg/kg	1.1	0.94	0.94 J	0.99	1.0	1.0	1.3	0.71	1.0	0.89
PCB-174	NSL	µg/kg	3.5	3.1	3.4	3.3	3.2	3.4	4.0	2.6	3.6	3.1
PCB-175	NSL	µg/kg	0.11 J	0.14 J	0.13 J	0.11 J	0.13	0.17	0.17 J	0.12 J	0.16	0.1 J
PCB-176	NSL	µg/kg	0.38 J	0.41	0.44	0.39	0.39	0.42	0.47	0.28 J	0.4	0.34 J
PCB-177	NSL	µg/kg	2.1	1.8	1.9	1.9	1.9	1.9	2.4	1.5	2.1	1.9
PCB-178	NSL	µg/kg	0.75	0.64	0.71	0.7	0.67	0.79	0.76 J	0.45	0.76	0.61
PCB-179	NSL	µg/kg	1.5	1.3	1.5	1.3	1.3	1.5	1.6	0.94	1.5	1.2
PCB-180	NSL	µg/kg	7.3	6.5	7.1	6.7	6.7	7.5	8.6	5.0	7.5	6.3
PCB-181	NSL	µg/kg	0.12 UJ	0.13 U	0.14 U	0.13 UJ	0.13 UJ	0.14 U	0.14 U	0.025 J	0.14 U	0.034 J
PCB-182	NSL	µg/kg	0.12 U	0.13 U	0.048 J	0.046 J	0.13 U	0.14 U	0.031 J	0.025 J	0.14 U	0.036 J
PCB-183	NSL	µg/kg	2.4	2.1	2.3	2.1	2.2	2.4	2.8	1.5	2.4	2.0
PCB-184	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.0098 J
PCB-185	NSL	µg/kg	2.4	2.1	2.3	2.1	2.2	2.4	2.8	1.5	2.4	2.0
PCB-186	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-187	NSL	µg/kg	4.3	3.5	4.0	3.6	3.7	4.1	4.5	2.9	4.2	3.6
PCB-188	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-189	NSL	µg/kg	0.13	0.13	0.14 U	0.13 U	0.13 U	0.14 UJ	0.14 UJ	0.095 J	0.14 U	0.12 J
PCB-190	NSL	µg/kg	0.6	0.55	0.58	0.54	0.57	0.65	0.74	0.42	0.67	0.56
PCB-191	NSL	µg/kg	0.12 UJ	0.13	0.14 U	0.14	0.13	0.17	0.14 U	0.088 J	0.15 J	0.13 J
PCB-192	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-193	NSL	µg/kg	7.3	6.5	7.1	6.7	6.7	7.5	8.6	5.0	7.5	6.3
PCB-194	NSL	µg/kg	2.1	1.8	1.8	1.7	1.8	1.8	2.1	1.3	2.0	1.6
PCB-195	NSL	µg/kg	0.85	0.7	0.72	0.71	0.69	0.73	0.89	0.54	0.83	0.68
PCB-196	NSL	µg/kg	0.79	0.85	0.77	0.84	0.74	0.82	0.98	0.55	0.88	0.74
PCB-197	NSL	µg/kg	0.049 J	0.065 J	0.073 J	0.069 J	0.032 J	0.042 J	0.084 J	0.043 J	0.073 J	0.041 J
PCB-198	NSL	µg/kg	1.8	1.8	1.8	1.8	1.8	1.9	2.1	1.3	2.0	1.7
PCB-199	NSL	µg/kg	1.8	1.8	1.8	1.8	1.8	1.9	2.1	1.3	2.0	1.7
PCB-200	NSL	µg/kg	0.17	0.15	0.15 J	0.18	0.17	0.19	0.18 J	0.11 J	0.17	0.16 J
PCB-201	NSL	µg/kg	0.19	0.15	0.17	0.17 J	0.19	0.19	0.24	0.35 U	0.2	0.37 UJ
PCB-202	NSL	µg/kg	0.32 J	0.31	0.33	0.3	0.3	0.28 J	0.36	0.35 U	0.36 J	0.37 U
PCB-203	NSL	µg/kg	1.0	0.97	1.0	1.0	0.95	1.1	1.2	0.68 J	1.1 J	0.93
PCB-204	NSL	µg/kg	0.12 U	0.13 U	0.14 U	0.13 U	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-205	NSL	µg/kg	0.12 U	0.13 UJ	0.14 U	0.13 UJ	0.13 U	0.14 U	0.14 U	0.35 U	0.14 U	0.37 U
PCB-206	NSL	µg/kg	0.89	0.6 J	0.78	0.78	0.82	0.8	0.89	0.71	0.91	0.95
PCB-207	NSL	µg/kg	0.11 J	0.096 J	0.087 J	0.067 J	0.1 J	0.072 J	0.12 J	0.079 J	0.11 J	0.097 J
PCB-208	NSL	µg/kg	0.23	0.21	0.21	0.22	0.23	0.23	0.23	0.18 J	0.24	0.22 J
PCB-209	NSL	µg/kg	0.59	0.47	0.52	0.47 J	0.53 J	0.53	0.55	0.36	0.58	0.47
Total PCBs ND=0	676	µg/kg	**2537**	**2188**	**2266**	**2139**	**2235**	**2372**	**2701**	**1485**	**2503**	**1869**
Total PCBs ND=0[a]	676	µg/kg-TOC	**906**	555	470	**728**	466	**783**	**894**	451	**982**	593

NOTES:
[a] TOC normalized concentration
FD = Field duplicate
ft = Foot (feet)
µg/kg = Microgram(s) per kilogram
NSL = No screening level
PCB = Polychlorinated biphenyl
PEC = Probable effect concentration. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (MacDonald et al. 2000).
Bolded and Shaded detected values exceed the PEC
J = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated).
U = Analyte was analyzed but not detected.
Site specific goals were not developed for PCB Congeners. Total PCB Congeners were screened exclusively against the PEC.

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Table 3-6 Sediment Results for Polycyclic Aromatic Hydrocarbons

				Location ID	OR19-REF	OR19-01	OR19-02	OR19-03	OR19-04	OR19-04	OR19-05	OR19-06	OR19-07
				Sample Name	OR19-REF1	OR19-01-SURF	OR19-02-SURF	OR19-03-SURF	OR19-04-SURF	OR19-04-SURFFD	OR19-05-SURF	OR19-06-SURF	OR19-07-SURF
				Sample Date	10/25/2019	10/22/2019	10/22/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/25/2019	10/25/2019
				Depth Interval (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	**Long-term Goal**	**PEC**	**Short-term Goal**	**Unit**									
Total Organic Carbon (TOC)	–	–	–	%	1.89	4.34	0.56	3.19	3.49	3.43	7.02	3.55	3.05
1-Methylnaphthalene	NSL	NSL	NSL	µg/kg	11	220 U	33	180 U	160 U	160 U	140 U	150 U	240 U
2-Methylnaphthalene	NSL	NSL	NSL	µg/kg	17	34 J	40 J	180 U	160 U	160 U	140 U	150 U	240 U
Acenaphthene	NSL	NSL	NSL	µg/kg	9.9 J	33 J	69 J	32 J	37 J	44 J	20 J	31 J	42 J
Acenaphthylene	NSL	NSL	NSL	µg/kg	16	37 J	20 J	34 J	35 J	36 J	24 J	31 J	40 J
Anthracene	NSL	845	NSL	µg/kg	29	95 J	220	100 J	130 J	140 J	54 J	92 J	150 J
Benzo(a)anthracene	NSL	1050	NSL	µg/kg	130	830	630	870	1000	1000	490	740	900
Benzo(a)pyrene	NSL	1450	NSL	µg/kg	180	1300	670	1300	1400	**1500**	780	1000	1200
Benzo(b)fluoranthene	NSL	NSL	NSL	µg/kg	150	1600	640	1700	1700	1800	1100	1300	1300
Benzo(e)pyrene	NSL	1450	NSL	µg/kg	130	1100	440	1100	1100	1200	720	810	840
Benzo(g,h,i)perylene	NSL	NSL	NSL	µg/kg	130	1400	520	1300	1400	1500	990	1000	1100
Benzo(k)fluoranthene	NSL	NSL	NSL	µg/kg	150	1700	660	1300	1500	1600	840	1100	1200
C1 Chrysenes	NSL	NSL	NSL	µg/kg	150 J	580 J	260 J	520 J	540 J	570 J	300 J	420 J	530 J
C1 Fluorenes	NSL	NSL	NSL	µg/kg	18 J	220 U	93 U	180 U	160 U	160 U	140 U	150 U	240 U
C1-Fluoranthenes/Pyrenes	NSL	NSL	NSL	µg/kg	180 J	1000 J	650 J	990 J	1200 J	1100 J	600 J	850 J	1100 J
C1-Naphthalenes	NSL	NSL	NSL	µg/kg	16 U	220 U	93 U	180 U	160 U	160 U	140 U	150 U	240 U
C1-Phenanthrenes/Anthracenes	NSL	NSL	NSL	µg/kg	85 J	230 J	270 J	240 J	280 J	290 J	140 U	210 J	300 J
C2 Chrysenes	NSL	NSL	NSL	µg/kg	85 J	280 J	120 J	240 J	230 J	190 J	150 J	190 J	240 J
C2 Fluorenes	NSL	NSL	NSL	µg/kg	36 J	220 U	93 U	180 U	160 U	160 U	140 U	150 U	240 U
C2-Fluoranthenes/Pyrenes	NSL	NSL	NSL	µg/kg	150 J	850 J	380 J	750 J	820 J	820 J	450 J	610 J	760 J
C2-Naphthalenes	NSL	NSL	NSL	µg/kg	490 J	780 J	410 J	660 J	600 J	570 J	890 J	500 J	470 J
C2-Phenanthrenes/Anthracenes	NSL	NSL	NSL	µg/kg	110 J	250 J	170 J	230 J	250 J	260 J	140 J	200 J	320 J
C3 Chrysenes	NSL	NSL	NSL	µg/kg	78 J	350 J	93 U	180 U	170 J	180 J	140 U	150 U	240 U
C3 Fluorenes	NSL	NSL	NSL	µg/kg	56 J	220 U	93 U	180 J	200 J	200 J	140 U	160 J	240 U
C3-Fluoranthenes/Pyrenes	NSL	NSL	NSL	µg/kg	97 J	510 J	210 J	290 J	310 J	360 J	180 J	240 J	310 J
C3-Naphthalenes	NSL	NSL	NSL	µg/kg	420 J	630 J	350 J	520 J	490 J	480 J	690 J	410 J	440 J
C3-Phenanthrenes/Anthracenes	NSL	NSL	NSL	µg/kg	86 J	290 J	130 J	190 J	200 J	230 J	140 U	160 J	310 J
C4 Chrysenes	NSL	NSL	NSL	µg/kg	16 U	220 U	93 U	180 U	160 U	160 U	140 U	150 U	240 U
C4-Naphthalenes	NSL	NSL	NSL	µg/kg	150 J	220 U	110 J	180 U	160 U	160 U	140 U	150 U	240 U
C4-Phenanthrenes/Anthracenes	NSL	NSL	NSL	µg/kg	75 J	250 J	97 J	220 J	220 J	230 J	140 J	170 J	310 J
Chrysene	NSL	1290	NSL	µg/kg	170	**1500**	820	**1600**	**1700**	**1800**	990	**1300**	**1400**
Dibenzo(a,h)anthracene	NSL	NSL	NSL	µg/kg	61	490	210	470	520	560	330	370	420
Fluoranthene	NSL	2230	NSL	µg/kg	240	**2500**	2100	**2700**	**2600**	**2800**	1600	2200	**2400**
Fluorene	NSL	536	NSL	µg/kg	25	49 J	130	48 J	57 J	59 J	34 J	46 J	59 J
Indeno(1,2,3-cd)pyrene	NSL	NSL	NSL	µg/kg	140	1500	560	1400	1500	1600	1000	1100	1200
Naphthalene	NSL	561	NSL	µg/kg	42	36 J	32 J	25 J	27 J	26 J	31 J	23 J	240 U
Perylene	NSL	NSL	NSL	µg/kg	310	440	180	380	390	420	200	320	390
Phenanthrene	NSL	1170	NSL	µg/kg	77	440	970	530	640	650	290	490	610
Pyrene	NSL	1520	NSL	µg/kg	150 J	1300	940	1300 J	**1600 J**	1500 J	800 J	1100 J	1300 J
Total PAH16 ND=1/2RL	22800	22800	30000	µg/kg	1700	14810	9191	14709	15846	16615	9373	11923	13441
Total PAH34 ND=1/2RL	22800	22800	30000	µg/kg	3982	21470	12627	20279	21756	22495	13543	16493	19371
Total PAH16 ND=1/2RL[(a)]	22800	22800	30000	µg/kg-TOC	899	3412	16296	4611	4540	4844	1335	3359	4407
Total PAH34 ND=1/2RL[(a)]	22800	22800	30000	µg/kg-TOC	2107	4947	22388	6357	6234	6558	1929	4646	6351

This table reports all 38 PAHs. Total PAH16 ND=1/2RL include the following: anthracene, pyrene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, benzo(b)fluoranthene, fluoranthene, benzo(k)fluoranthene, acenaphthylene, chrysene, benzo(a)pyrene, dibenzo(a,h)anthracene, benzo(a)anthracene, acenaphthene, phenanthrene, fluorene, and naphthalene.
Total PAH34 ND=1/2RL include the following: acenaphthene, acenaphthylene, anthracene benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, C1-Naphthalenes, C2-Naphthalenes, C3-Naphthalenes, C4-Naphthalenes, C1-Fluorenes, C2-Fluorenes, C3-Fluorenes, C1-Phenanthrenes/Anthracenes, C2-Phenanthrenes/Anthracenes, C3-Phenanthrenes/Anthracenes, C4-Phenanthrenes/Anthracenes, C1-Fluoranthenes/Pyrenes, C2-Fluoranthenes/Pyrenes, C3-Fluoranthenes/Pyrenes, C1-Chrysenes, C2-Chrysenes, C3-Chrysenes, and C4-Chrysene
NOTES:
[(a)] TOC normalized concentration
FD = Field duplicate
ft = Foot (feet)
µg/kg = Microgram(s) per kilogram
ND = Non-detect
NSL = No screening level
PAH = Polycyclic aromatic hydrocarbon
PEC = Probable effect concentration. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (MacDonald et al. 2000).
RL = Reporting limit
SWAC = Surface weighted average concentration (EPA 2019)
Bolded and italicized individual PAHs names are considered in total PAHs calculation.
Bolded detected values exceed Long-term SWAC goal
Bolded and Shaded detected values exceed Long-term SWAC goal and PEC screening value
Bolded, Shaded, and Italicized detected values exceed Long-term SWAC goal, PEC screening value, and Short-term SWAC goal
J = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated).
J+ = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated), but may be biased high.
U = Analyte was analyzed but not detected.

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Table 3-6 Sediment Results for Polycyclic Aromatic Hydrocarbons

				Location ID	OR19-08	OR19-09	OR19-10	OR19-11	OR19-11	OR19-12	OR19-13	OR19-14	OR19-14
				Sample Name	OR19-08-SURF	OR19-09-SURF	OR19-10-SURF	OR19-11-SURF	OR19-11-SURFFD	OR19-12-SURF	OR19-13-SURF	OR19-14-SURF	OR19-14-SURFFD
				Sample Date	10/25/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/23/2019	10/23/2019	10/24/2019	10/24/2019
				Depth Interval (ft)	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	**Long-term Goal**	**PEC**	**Short-term Goal**	**Unit**									
Total Organic Carbon (TOC)	–	–	–	%	3.00	2.59	3.64	1.12	1.17	2.42	2.80	3.94	4.82
1-Methylnaphthalene	NSL	NSL	NSL	µg/kg	17	180 U	160 U	51 U	50 U	200 U	160 U	85 U	91 U
2-Methylnaphthalene	NSL	NSL	NSL	µg/kg	22 J	180 U	160 U	51 U	50 U	200 U	160 U	85 U	91 U
Acenaphthene	NSL	NSL	NSL	µg/kg	34 J	31 J	24 J	51 U	50 U	200 U	25 J	13 J	13 J
Acenaphthylene	NSL	NSL	NSL	µg/kg	32 J	29 J	28 J	13 J	35 J	27 J	27 J	21 J	21 J
Anthracene	NSL	845	NSL	µg/kg	110	100 J	79 J	29 J	40 J	73 J	83 J	45 J	43 J
Benzo(a)anthracene	NSL	1050	NSL	µg/kg	870	860	720	210	300	670	740	440	420
Benzo(a)pyrene	NSL	1450	NSL	µg/kg	1300	1200	1100	300	400	1000	1100	700	650
Benzo(b)fluoranthene	NSL	NSL	NSL	µg/kg	1500	1600	1300	350	370	1300	1400	870	810
Benzo(e)pyrene	NSL	1450	NSL	µg/kg	1000	1000	880	230	260	870	910	620	580
Benzo(g,h,i)perylene	NSL	NSL	NSL	µg/kg	1100	1400	1300	320	360	1200	1300	810	810
Benzo(k)fluoranthene	NSL	NSL	NSL	µg/kg	1300	1300	1200	310	370	1100	1100	860	830
C1 Chrysenes	NSL	NSL	NSL	µg/kg	450 J	480 J	400 J	110 J	140 J	410 J	440 J	280 J	280 J
C1 Fluorenes	NSL	NSL	NSL	µg/kg	85 U	180 U	160 U	51 U	50 U	200 U	160 U	85 U	91 U
C1-Fluoranthenes/Pyrenes	NSL	NSL	NSL	µg/kg	1000 J	960 J	790 J	210 J	300 J	750 J	810 J	530 J	500 J
C1-Naphthalenes	NSL	NSL	NSL	µg/kg	85 U	180 U	160 U	51 U	50 U	200 U	160 U	85 U	91 U
C1-Phenanthrenes/Anthracenes	NSL	NSL	NSL	µg/kg	220 J	230 J	180 J	54 J	92 J	200 U	180 J	120 J	110 J
C2 Chrysenes	NSL	NSL	NSL	µg/kg	220 J	240 J	190 J	53 J	55 J	230 J	210 J	150 J	140 J
C2 Fluorenes	NSL	NSL	NSL	µg/kg	85 U	180 U	160 U	51 U	50 U	200 U	160 U	85 U	91 U
C2-Fluoranthenes/Pyrenes	NSL	NSL	NSL	µg/kg	700 J	690 J	590 J	150 J	170 J	630 J	590 J	410 J	390 J
C2-Naphthalenes	NSL	NSL	NSL	µg/kg	620 J	580 J	520 J	330 J	280 J	690 J	500 J	550 J	580 J
C2-Phenanthrenes/Anthracenes	NSL	NSL	NSL	µg/kg	210 J	210 J	180 J	51 U	68 J	200 U	170 J	120 J	120 J
C3 Chrysenes	NSL	NSL	NSL	µg/kg	100 J	180 J	170 J	51 U	51 J	240 J	210 J	130 J	130 J
C3 Fluorenes	NSL	NSL	NSL	µg/kg	200 J	180 U	160 U	51 U	50 U	200 U	160 U	85 U	91 U
C3-Fluoranthenes/Pyrenes	NSL	NSL	NSL	µg/kg	260 J	360 J	260 J	61 J	65 J	310 J	260 J	220 J	210 J
C3-Naphthalenes	NSL	NSL	NSL	µg/kg	500 J	480 J	440 J	250 J	210 J	550 J	420 J	420 J	450 J
C3-Phenanthrenes/Anthracenes	NSL	NSL	NSL	µg/kg	190 J	200 J	180 J	51 U	50 U	200 U	170 J	120 J	110 J
C4 Chrysenes	NSL	NSL	NSL	µg/kg	85 U	180 U	160 U	51 U	50 U	200 U	160 U	85 U	91 U
C4-Naphthalenes	NSL	NSL	NSL	µg/kg	120 J	180 U	160 U	51 U	50 U	200 U	160 U	85 U	91 U
C4-Phenanthrenes/Anthracenes	NSL	NSL	NSL	µg/kg	150 J	180 U	160 U	51 U	50 U	200 U	160 U	100 J	95 J
Chrysene	NSL	1290	NSL	µg/kg	**1400**	**1400**	1200	340	390	1200	1200	790	760
Dibenzo(a,h)anthracene	NSL	NSL	NSL	µg/kg	430	510	450	120	130	400	430	280	280
Fluoranthene	NSL	2230	NSL	µg/kg	**2500**	**2500**	2000	560	770	1900	2000	1300	1300
Fluorene	NSL	536	NSL	µg/kg	51 J	47 J	35 J	9 J	10 J	34 J	36 J	24 J	24 J
Indeno(1,2,3-cd)pyrene	NSL	NSL	NSL	µg/kg	1300	1500	1300	340	390	1200	1300	850	850
Naphthalene	NSL	561	NSL	µg/kg	24 J	25 J	23 J	51 U	50 U	200 U	160 U	13 J	14 J
Perylene	NSL	NSL	NSL	µg/kg	390	380	360	84	100	320	370	230	210
Phenanthrene	NSL	1170	NSL	µg/kg	540	520	380	110	150	370	400	230	230
Pyrene	NSL	1520	NSL	µg/kg	1300	1300	1000	290	410	1000	1100	690	660
Total PAH16 ND=1/2RL	22800	22800	30000	µg/kg	13791	14322	12139	3352	4175	11674	12321	7936	7715
Total PAH34 ND=1/2RL	22800	22800	30000	µg/kg	18901	19562	16599	4825	5806	16484	16841	11341	11103
Total PAH16 ND=1/2RL[ω]	22800	22800	30000	µg/kg-TOC	4597	5530	3335	2993	3568	4824	4400	2014	1601
Total PAH34 ND=1/2RL[ω]	22800	22800	30000	µg/kg-TOC	6300	7553	4560	4308	4962	6812	6015	2878	2304

This table reports all 38 PAHs. Total PAH16 ND=1/2RL include the following: anthracene, pyrene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, benzo(b)fluoranthene, fluoranthene, benzo(k)fluoranthene, acenaphthylene, chrysene, benzo(a)pyrene, dibenzo(a,h)anthracene, benzo(a)anthracene, acenaphthene, phenanthrene, fluorene, and naphthalene.
Total PAH34 ND=1/2RL include the following: acenaphthene, acenaphthylene, anthracene benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, C1-Naphthalenes, C2-Naphthalenes, C3-Naphthalenes, C4-Naphthalenes, C1-Fluorenes, C2-Fluorenes, C3-Fluorenes, C1-Phenanthrenes/Anthracenes, C2-Phenanthrenes/Anthracenes, C3-Phenanthrenes/Anthracenes, C4-Phenanthrenes/Anthracenes, C1-Fluoranthenes/Pyrenes, C2-Fluoranthenes/Pyrenes, C3-Fluoranthenes/Pyrenes, C1-Chrysenes, C2-Chrysenes, C3-Chrysenes, and C4-Chrysene
NOTES:
[ω] TOC normalized concentration
FD = Field duplicate
ft = Foot (feet)
µg/kg = Microgram(s) per kilogram
ND = Non-detect
NSL = No screening level
PAH = Polycyclic aromatic hydrocarbon
PEC = Probable effect concentration. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (MacDonald et al. 2000).
RL = Reporting limit
SWAC = Surface weighted average concentration (EPA 2019)
Bolded and italicized individual PAHs names are considered in total PAHs calculation.
Bolded detected values exceed Long-term SWAC goal
Bolded and Shaded detected values exceed Long-term SWAC goal and PEC screening value
Bolded, Shaded, and Italicized detected values exceed Long-term SWAC goal, PEC screening value, and Short-term SWAC goal
J = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated).
J+ = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated), but may be biased high.
U = Analyte was analyzed but not detected.

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Table 3-6 Sediment Results for Polycyclic Aromatic Hydrocarbons

				Location ID	**OR19-15**	**OR19-16**	**OR19-17**	**OR19-18**	**OR19-19**	**OR19-20**	**OR19-21**
				Sample Name	**OR19-15-SURF**	**OR19-16-SURF**	**OR19-17-SURF**	**OR19-18-SURF**	**OR19-19-SURF**	**OR19-20-SURF**	**OR19-21-SURF**
				Sample Date	**10/24/2019**	**10/23/2019**	**10/23/2019**	**10/23/2019**	**10/24/2019**	**10/23/2019**	**10/24/2019**
				Depth Interval (ft)	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**	**0-0.5**
Analyte	**Long-term Goal**	**PEC**	**Short-term Goal**	**Unit**							
Total Organic Carbon (TOC)	–	–	–	%	2.94	4.80	3.03	3.02	3.29	2.55	3.15
1-Methylnaphthalene	NSL	NSL	NSL	µg/kg	180 U	120 U	180 U	190 U	190 U	130 U	200 U
2-Methylnaphthalene	NSL	NSL	NSL	µg/kg	180 U	120 U	180 U	190 U	190 UJ	130 U	200 U
Acenaphthene	NSL	NSL	NSL	µg/kg	180 U	120 U	180 U	29 J	28 J	19 J	200 U
Acenaphthylene	NSL	NSL	NSL	µg/kg	28 J	20 J	31 J	31 J	33 J	24 J	30 J
Anthracene	NSL	845	NSL	µg/kg	76 J	60 J	84 J	99 J	96 J	65 J	67 J
Benzo(a)anthracene	NSL	1050	NSL	µg/kg	640	550	760	820	750	520	600
Benzo(a)pyrene	NSL	1450	NSL	µg/kg	1000	850	1200	1200	1100	830	920
Benzo(b)fluoranthene	NSL	NSL	NSL	µg/kg	1300	1000	1400	1500	1400	970	1200
Benzo(e)pyrene	NSL	1450	NSL	µg/kg	840	690	930	1000	930	700	780
Benzo(g,h,i)perylene	NSL	NSL	NSL	µg/kg	990	930	1200	1300	1100	920	930
Benzo(k)fluoranthene	NSL	NSL	NSL	µg/kg	1100	960	1300	1300	1200	990	1000
C1 Chrysenes	NSL	NSL	NSL	µg/kg	410 J	330 J	460 J	500 J	470 J	340 J	410 J
C1 Fluorenes	NSL	NSL	NSL	µg/kg	180 U	120 U	180 U	190 U	190 U	130 U	200 U
C1-Fluoranthenes/Pyrenes	NSL	NSL	NSL	µg/kg	760 J	620 J	850 J	900 J	1000 J	580 J	700 J
C1-Naphthalenes	NSL	NSL	NSL	µg/kg	180 U	120 U	180 U	190 U	190 U	130 U	200 U
C1-Phenanthrenes/Anthracenes	NSL	NSL	NSL	µg/kg	180 J	140 J	200 J	220 J	200 J	140 J	200 U
C2 Chrysenes	NSL	NSL	NSL	µg/kg	190 J	160 J	210 J	220 J	260 J	180 J	200 J
C2 Fluorenes	NSL	NSL	NSL	µg/kg	180 U	120 U	180 U	190 U	190 U	130 U	200 U
C2-Fluoranthenes/Pyrenes	NSL	NSL	NSL	µg/kg	550 J	470 J	620 J	640 J	700 J	460 J	560 J
C2-Naphthalenes	NSL	NSL	NSL	µg/kg	590 J	490 J	640 J	560 J	660 J	550 J	720 J
C2-Phenanthrenes/Anthracenes	NSL	NSL	NSL	µg/kg	180 J	140 J	200 J	200 J	230 J	140 J	200 U
C3 Chrysenes	NSL	NSL	NSL	µg/kg	220 J	130 J	190 J	190 U	190 U	200 J	200 U
C3 Fluorenes	NSL	NSL	NSL	µg/kg	180 U	120 U	180 U	190 U	190 U	130 U	200 U
C3-Fluoranthenes/Pyrenes	NSL	NSL	NSL	µg/kg	320 J	210 J	260 J	410 J	370 J	200 J	220 J
C3-Naphthalenes	NSL	NSL	NSL	µg/kg	470 J	390 J	510 J	460 J	550 J	430 J	560 J
C3-Phenanthrenes/Anthracenes	NSL	NSL	NSL	µg/kg	180 J	120 J	190 J	190 J	250 J	150 J	200 U
C4 Chrysenes	NSL	NSL	NSL	µg/kg	180 U	120 U	180 U	190 U	190 U	130 U	200 U
C4-Naphthalenes	NSL	NSL	NSL	µg/kg	180 U	120 U	180 U	190 U	190 U	130 U	200 U
C4-Phenanthrenes/Anthracenes	NSL	NSL	NSL	µg/kg	180 U	120 U	180 U	190 U	350 J	130 J	200 U
Chrysene	NSL	1290	NSL	µg/kg	1100	910	1200	**1400**	**1300**	860	1000
Dibenzo(a,h)anthracene	NSL	NSL	NSL	µg/kg	350	330	440	470	380	320	330
Fluoranthene	NSL	2230	NSL	µg/kg	1900	1500	2100	**2400**	2100	1500	1700
Fluorene	NSL	536	NSL	µg/kg	32 J	24 J	39 J	40 J	40 J	30 J	200 U
Indeno(1,2,3-cd)pyrene	NSL	NSL	NSL	µg/kg	1000	980	1300	1400	1100	970	1000
Naphthalene	NSL	561	NSL	µg/kg	25 J	17 J	180 U	190 U	27 J	19 J	200 U
Perylene	NSL	NSL	NSL	µg/kg	330	270	370	410	470	300	350
Phenanthrene	NSL	1170	NSL	µg/kg	360	300	410	480	410	300	330
Pyrene	NSL	1520	NSL	µg/kg	1000	840	1100	1200	1100	780	940 J
Total PAH16 ND=1/2RL	22800	22800	30000	µg/kg	10991	9331	12744	13764	12164	9117	10347
Total PAH34 ND=1/2RL	22800	22800	30000	µg/kg	15671	12951	17704	18824	17869	13007	14817
Total PAH16 ND=1/2RL[a]	22800	22800	30000	µg/kg-TOC	3738	1944	4206	4558	3697	3575	3285
Total PAH34 ND=1/2RL[a]	22800	22800	30000	µg/kg-TOC	5330	2698	5843	6233	5431	5101	4704

This table reports all 38 PAHs. Total PAH16 ND=1/2RL include the following: anthracene, pyrene, benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, benzo(b)fluoranthene, fluoranthene, benzo(k)fluoranthene, acenaphthylene, chrysene, benzo(a)pyrene, dibenzo(a,h)anthracene, benzo(a)anthracene, acenaphthene, phenanthrene, fluorene, and naphthalene.
Total PAH34 ND=1/2RL include the following: acenaphthene, acenaphthylene, anthracene benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, C1-Naphthalenes, C2-Naphthalenes, C3-Naphthalenes, C4-Naphthalenes, C1-Fluorenes, C2-Fluorenes, C3-Fluorenes, C1-Phenanthrenes/Anthracenes, C2-Phenanthrenes/Anthracenes, C3-Phenanthrenes/Anthracenes, C4-Phenanthrenes/Anthracenes, C1-Fluoranthenes/Pyrenes, C2-Fluoranthenes/Pyrenes, C3-Fluoranthenes/Pyrenes, C1-Chrysenes, C2-Chrysenes, C3-Chrysenes, and C4-Chrysene
NOTES:
[a] TOC normalized concentratio
FD = Field duplicate
ft = Foot (feet)
µg/kg = Microgram(s) per kilogram
ND = Non-detect
NSL = No screening level
PAH = Polycyclic aromatic hydrocarbon
PEC = Probable effect concentration. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (MacDonald et al. 2000).
RL = Reporting limit
SWAC = Surface weighted average concentration (EPA 2019)
Bolded and italicized individual PAHs names are considered in total PAHs calculation.
Bolded detected values exceed Long-term SWAC goal
Bolded and Shaded detected values exceed Long-term SWAC goal and PEC screening value
Bolded, Shaded, and Italicized detected values exceed Long-term SWAC goal, PEC screening value, and Short-term SWAC goal
J = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated).
J+ = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated), but may be biased high.
U = Analyte was analyzed but not detected.

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Table 3-7 Sediment Results for Semi-Volatile Organic Compounds

Location ID			OR19-REF1	OR19-01	OR19-02	OR19-03	OR19-04	OR19-04	OR19-05	OR19-06	OR19-07	OR19-08	OR19-09	OR19-10
Sample Name			OR19-REF1	OR19-01-SURF	OR19-02-SURF	OR19-03-SURF	OR19-04-SURF	OR19-04-SURFFD	OR19-05-SURF	OR19-06-SURF	OR19-07-SURF	OR19-08-SURF	OR19-09-SURF	OR19-10-SURF
Sample Date			10/25/2019	10/22/2019	10/22/2019	10/24/2019	10/24/2019	10/24/2019	10/24/2019	10/25/2019	10/25/2019	10/25/2019	10/24/2019	10/24/2019
Depth Interval (ft)			0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	**PEC**	**Unit**												
1,1'-Biphenyl	NSL	µg/kg	400 U	570 U	11 J	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
1,2,4,5-Tetrachlorobenzene	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
1,4-Dioxane	NSL	µg/kg	160 UJ	220 UJ	95 UJ	180 UJ	160 UJ	160 UJ	280 UJ	160 UJ	140 UJ	170 UJ	180 UJ	170 UJ
2,2'-Oxybis(1-chloropropane)	NSL	µg/kg	780 U	1100 U	470 U	890 U	790 U	800 U	1400 U	760 U	710 U	850 U	900 U	810 U
2,3,4,6-Tetrachlorophenol	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
2,4,5-Trichlorophenol	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
2,4,6-Trichlorophenol	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
2,4-Dichlorophenol	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
2,4-Dimethylphenol	290	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
2,4-Dinitrophenol	NSL	µg/kg	780 U	1100 U	470 U	890 U	790 U	800 U	1400 U	760 U	710 U	850 U	900 U	810 U
2,4-Dinitrotoluene	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 UJ	390 U	360 U	440 U	460 U	420 U
2,6-Dinitrotoluene	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
2-Chloronaphthalene	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
2-Chlorophenol	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
2-Methylnaphthalene	NSL	µg/kg	400 U	570 U	26 J	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
2-Methylphenol	6700	µg/kg	780 U	1100 U	470 U	890 U	790 U	800 U	1400 U	760 U	710 U	850 U	900 U	810 U
2-Nitroaniline	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
2-Nitrophenol	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
3,3'-Dichlorobenzidine	NSL	µg/kg	780 U	1100 U	470 U	890 U	790 U	800 U	1400 U	760 U	710 U	850 U	900 U	810 U
3-Nitroaniline	NSL	µg/kg	780 U	1100 U	470 U	890 U	790 U	800 U	1400 U	760 U	710 U	850 U	900 U	810 U
4,6-Dinitro-2-methylphenol	NSL	µg/kg	780 U	1100 U	470 U	890 U	790 U	800 U	1400 U	760 U	710 U	850 U	900 U	810 U
4-Bromophenyl-phenylether	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
4-Chloro-3-methylphenol	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
4-Chloroaniline	NSL	µg/kg	780 UJ	1100 UJ	470 U	890 UJ	790 UJ	800 UJ	1400 UJ	760 UJ	710 UJ	850 UJ	900 UJ	810 UJ
4-Chlorophenyl-phenyl ether	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
4-Methylphenol	NSL	µg/kg	780 U	1100 U	470 U	890 U	790 U	800 U	1400 U	760 U	710 U	850 U	900 U	810 U
4-Nitroaniline	NSL	µg/kg	780 U	1100 U	470 U	890 U	790 U	800 U	1400 U	760 U	710 U	850 U	900 U	810 U
4-Nitrophenol	NSL	µg/kg	780 UJ	1100 U	470 U	890 UJ	790 UJ	800 UJ	1400 U	760 UJ	710 UJ	850 UJ	900 U	810 U
Acenaphthene	NSL	µg/kg	400 U	570 U	49 J	460 U	26 J	34 J	710 U	22 J	29 J	440 U	460 U	420 U
Acenaphthylene	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
Acetophenone	NSL	µg/kg	780 UJ	370 J	72 J	890 UJ	790 UJ	800 UJ	1400 U	760 UJ	710 U	850 U	900 U	810 U
Anthracene	845	µg/kg	29 J	61 J	160 J	63 J	80 J	82 J	41 J	59 J	78 J	68 J	60 J	57 J
Atrazine	NSL	µg/kg	780 U	1100 U	470 U	890 U	790 U	800 U	1400 U	760 U	710 U	850 U	900 U	810 U
Benzaldehyde	NSL	µg/kg	780 U	210 J	27 J	44 J	41 J	35 J	1400 U	760 U	46 J	850 U	46 J	44 J
Benzo(a)anthracene	1050	µg/kg	99 J	570	440	550	690	750	380 J	470	680 J+	660 J+	570	530
Benzo(a)pyrene	1450	µg/kg	160 J+	940	520	950	1100 J+	1100 J+	590 J+	780 J+	850 J+	990 J+	950	870
Benzo(b)fluoranthene	NSL	µg/kg	170 J+	1900	670	1800	2400 J+	2400 J+	940 J+	1400 J+	1500 J+	1500 J+	1900	2000
Benzo(g,h,i)perylene	NSL	µg/kg	58 J+	690	230 J	550	590 J+	640 J+	930 J+	460 J+	580 J+	640 J+	610	570
Benzo(k)fluoranthene	NSL	µg/kg	160 J+	1700 J	690 J	1400	1600 J+	1900 J+	770 J+	1300 J+	1500 J	1700 J	1000	1500
Bis(2-chloroethoxy)methane	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
Bis(2-chloroethyl) ether	NSL	µg/kg	780 U	1100 U	470 U	890 U	790 U	800 U	1400 U	760 U	710 U	850 U	900 U	810 U
Bis(2-ethylhexyl)phthalate	NSL	µg/kg	400 U	690	360	830	970	1100	710 UJ	740	2100	1100	860	810
Butylbenzylphthalate	NSL	µg/kg	400 U	570 U	85 J	460 U	400 U	410 U	710 UJ	390 U	160 J	110 J	460 U	420 U
Caprolactam	NSL	µg/kg	780 U	1100 U	470 U	890 U	790 U	800 U	1400 U	760 U	710 U	850 U	900 U	810 U
Carbazole	NSL	µg/kg	780 U	48 J	41 J	59 J	50 J	65 J	1400 U	48 J	54 J	54 J	58 J	39 J
Chrysene	1290	µg/kg	140 J	1100	610	1000	1200	**1300**	850	910	1000 J+	1000 J+	1100	840
Dibenzo(a,h)anthracene	NSL	µg/kg	400 UJ	190 J	68 J	210 J	190 J+	220 J+	710 UJ	110 J+	180 J+	190 J+	190 J	420 U
Dibenzofuran	580	µg/kg	400 U	570 U	46 J	460 U	400 U	410 U	710 U	390 U	19 J	440 U	460 U	420 U
Diethylphthalate	1000	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
Dimethylphthalate	530	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
Di-n-butylphthalate	17000	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
Di-n-octylphthalate	45000	µg/kg	780 UJ	72 J	190 J	120 J	250 J+	350 J+	1400 UJ	210 J+	520 J	650 J	180 J	150 J
Fluoranthene	2230	µg/kg	140 J	1800 J	1500 J	1500	2000	**2300**	1300 J	1400	**2600 J+**	**2500 J+**	1500	1300
Fluorene	536	µg/kg	400 U	30 J	85 J	31 J	42 J	42 J	710 U	27 J	37 J	27 J	30 J	25 J
Hexachlorobenzene	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
Hexachlorobutadiene	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
Hexachlorocyclo-pentadiene	NSL	µg/kg	780 UJ	1100 UJ	470 UJ	890 UJ	790 UJ	800 UJ	1400 UJ	760 UJ	710 UJ	850 UJ	900 U	810 U
Hexachloroethane	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 UJ	390 U	360 U	440 U	460 U	420 U
Indeno(1,2,3-cd)pyrene	NSL	µg/kg	48 J+	570	210 J	540	590 J+	620 J+	750 J	410 J+	490 J+	580 J+	550	500
Isophorone	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
Naphthalene	561	µg/kg	26 J	570 U	19 J	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
Nitrobenzene	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
N-Nitroso-di-n propylamine	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
N-Nitrosodiphenylamine	NSL	µg/kg	400 U	570 U	240 U	460 U	400 U	410 U	710 U	390 U	360 U	440 U	460 U	420 U
Pentachlorophenol	200	µg/kg	780 U	1100 U	470 U	890 U	790 U	800 U	1400 U	760 U	710 U	850 U	900 U	810 U
Phenanthrene	1170	µg/kg	57 J	300 J	790	340 J	390 J	400 J	270 J	340 J	360	350 J	370 J	270 J
Phenol	12000	µg/kg	780 U	100 J	470 U	890 U	790 U	800 U	1400 U	760 U	710 U	850 U	900 U	810 U
Pyrene	1520	µg/kg	150 J	940	830	1100	1400	**1600**	1200	970	**4200 J+**	**3500 J+**	1100	1100

NOTES:
Total PAH values are not calculated from the SVOCs analysis. See Table 3-6 for the PAH analysis.
FD = Field Duplicate
ft = Foot (feet)
µg/kg = Microgram(s) per kilogram
NSL = No Screening Level
RL = Reporting limit
PEC = Probable effect concentration. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (MacDonald et al. 2000).
Bolded and Shaded detected values exceed the PEC
B = Compound was found in the blank and sample greater than or equal to the method detection limit (value is estimated).
J = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated).
J+ = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated), but may be biased
U = Analyte was analyzed but not detected.
Site specific goals were not developed for SVOCs, SVOCs were screened exclusively against the PEC.

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Table 3-7 Sediment Results for Semi-Volatile Organic Compounds

Location ID			OR19-11	OR19-11	OR19-12	OR19-13	OR19-14	OR19-14	OR19-15	OR19-16	OR19-17	OR19-18	OR19-19	OR19-20	OR19-21
Sample Name			OR19-11-SURF	OR19-11-SURFFD	OR19-12-SURF	OR19-13-SURF	OR19-14-SURF	OR19-14-SURFFD	OR19-15-SURF	OR19-16-SURF	OR19-17-SURF	OR19-18-SURF	OR19-19-SURF	OR19-20-SURF	OR19-21-SURF
Sample Date			10/24/2019	10/24/2019	10/23/2019	10/23/2019	10/24/2019	10/24/2019	10/24/2019	10/23/2019	10/23/2019	10/23/2019	10/24/2019	10/23/2019	10/24/2019
Depth Interval (ft)			0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5	0-0.5
Analyte	PEC	Unit													
1,1'-Biphenyl	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
1,2,4,5-Tetrachlorobenzene	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
1,4-Dioxane	NSL	µg/kg	100 UJ	100 UJ	200 UJ	160 UJ	170 UJ	180 UJ	180 UJ	180 UJ	180 UJ	190 UJ	190 UJ	180 UJ	210 UJ
2,2'-Oxybis(1-chloropropane)	NSL	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 U	900 U	1000 U
2,3,4,6-Tetrachlorophenol	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
2,4,5-Trichlorophenol	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
2,4,6-Trichlorophenol	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
2,4-Dichlorophenol	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
2,4-Dimethylphenol	290	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
2,4-Dinitrophenol	NSL	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 U	900 U	1000 U
2,4-Dinitrotoluene	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
2,6-Dinitrotoluene	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
2-Chloronaphthalene	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
2-Chlorophenol	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
2-Methylnaphthalene	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
2-Methylphenol	6700	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 U	900 U	1000 U
2-Nitroaniline	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
2-Nitrophenol	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
3,3'-Dichlorobenzidine	NSL	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 U	900 U	1000 U
3-Nitroaniline	NSL	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 U	900 U	1000 U
4,6-Dinitro-2-methylphenol	NSL	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 U	900 U	1000 U
4-Bromophenyl-phenylether	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
4-Chloro-3-methylphenol	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
4-Chloroaniline	NSL	µg/kg	510 U	500 U	980 UJ	810 UJ	850 UJ	910 UJ	880 UJ	870 U	910 UJ	960 UJ	950 UJ	900 U	1000 UJ
4-Chlorophenyl-phenyl ether	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
4-Methylphenol	NSL	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 U	900 U	1000 U
4-Nitroaniline	NSL	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 U	900 U	1000 U
4-Nitrophenol	NSL	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 UJ	900 U	1000 UJ
Acenaphthene	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Acenaphthylene	NSL	µg/kg	260 U	13 J	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Acetophenone	NSL	µg/kg	510 U	500 U	980 U	86 J	850 U	910 U	880 U	73 J	910 U	58 J	950 UJ	44 J	1000 UJ
Anthracene	845	µg/kg	20 J	27 J	46 J	56 J	29 J	30 J	54 J	39 J	53 J	59 J	57 J	42 J	52 J
Atrazine	NSL	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 U	900 U	1000 U
Benzaldehyde	NSL	µg/kg	510 U	500 U	53 J	65 J	51 J	62 J	48 J	40 J	55 J	58 J	46 J	49 J	1000 U
Benzo(a)anthracene	1050	µg/kg	130 J	200 J	400 J	520	290 J	270 J	460	350 J	550	550	460 J	300 J	400 J
Benzo(a)pyrene	1450	µg/kg	220 J	300	750	880	490	490	740	630	910	960	880 J+	590	730 J+
Benzo(b)fluoranthene	NSL	µg/kg	340	360	1700	2000	990	1100	1400	1300	1900	2000	1500 J+	1100	1100 J+
Benzo(g,h,i)perylene	NSL	µg/kg	150 J	170 J	510	600	360 J	340 J	500	410 J	620	580	480 J+	340 J	470 J+
Benzo(k)fluoranthene	NSL	µg/kg	290	320	1100 J	1200 J	920	850	1200	860 J	1000	1400 J	1200 J+	1000 J	1800 J+
Bis(2-chloroethoxy)methane	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Bis(2-chloroethyl) ether	NSL	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 U	900 U	1000 U
Bis(2-ethylhexyl)phthalate	NSL	µg/kg	150 J	99 J	510	610	430 J	450 J	610	430 J	810	640	1200	470	530
Butylbenzylphthalate	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Caprolactam	NSL	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 U	900 U	1000 U
Carbazole	NSL	µg/kg	510 U	500 U	40 J	40 J	850 U	33 J	40 J	32 J	49 J	48 J	37 J	900 U	1000 U
Chrysene	1290	µg/kg	220 J	260	730	840	510	510	800	620	870	920	880	540	620
Dibenzo(a,h)anthracene	NSL	µg/kg	260 U	55 J	140 J	190 J	440 U	470 U	450 U	120 J	470 U	210 J	150 J+	89 J	130 J+
Dibenzofuran	580	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Diethylphthalate	1000	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Dimethylphthalate	530	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Di-n-butylphthalate	17000	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Di-n-octylphthalate	45000	µg/kg	510 U	500 U	110 J	130 J	850 U	910 U	880 U	120 J	910 U	110 J	300 J+	98 J	83 J+
Fluoranthene	2230	µg/kg	310 J	400 J	1300 J	1500 J	710 J	710 J	1100	990 J	1400	1600 J	1200	900 J	920 J
Fluorene	536	µg/kg	260 U	260 U	27 J	27 J	440 U	470 U	25 J	450 U	25 J	27 J	26 J	470 U	530 U
Hexachlorobenzene	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Hexachlorobutadiene	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Hexachlorocyclo-pentadiene	NSL	µg/kg	510 U	500 U	980 UJ	810 UJ	850 U	910 U	880 U	870 UJ	910 U	960 UJ	950 UJ	900 UJ	1000 UJ
Hexachloroethane	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Indeno(1,2,3-cd)pyrene	NSL	µg/kg	130 J	160 J	440 J	510	320 J	300 J	460	350 J	560	560	470 J+	330 J	440 J+
Isophorone	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Naphthalene	561	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Nitrobenzene	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
N-Nitroso-di-n propylamine	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
N-Nitrosodiphenylamine	NSL	µg/kg	260 U	260 U	510 U	420 U	440 U	470 U	450 U	450 U	470 U	490 U	490 U	470 U	530 U
Pentachlorophenol	200	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 U	900 U	1000 U
Phenanthrene	1170	µg/kg	82 J	99 J	230 J	280 J	150 J	150 J	260 J	200 J	290 J	330 J	270 J	190 J	230 J
Phenol	12000	µg/kg	510 U	500 U	980 U	810 U	850 U	910 U	880 U	870 U	910 U	960 U	950 U	900 U	1000 U
Pyrene	1520	µg/kg	260	410	800	940	660	620	980	630	1200	1000	1100	590	790

NOTES:

Total PAH values are not calculated from the SVOCs analysis. See Table 3-6 for the PAH analysis.

FD = Field Duplicate

ft = Foot (feet)

µg/kg = Microgram(s) per kilogram

NSL = No Screening Level

RL = Reporting limit

PEC = Probable effect concentration. Development and Evaluation of Consensus-Based Sediment Quality Guidelines for Freshwater Ecosystems (MacDonald et al. 2000).

Bolded and Shaded detected values exceed the PEC

B = Compound was found in the blank and sample greater than or equal to the method detection limit (value is estimated).

J = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated).

J+ = Compound was detected, but result is below the reporting limit and greater than or equal to the method detection limit (value is estimated), but may be biased

U = Analyte was analyzed but not detected.

Site specific goals were not developed for SVOCs, SVOCs were screened exclusively against the PEC.

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Table 3-8 Sediment Results for Sediment Surface Weighted Average Concentrations

Analyte	Total Number of Submitted Samples (without FDs)	Number of Detects	Maximum Detected Concentration	Minimum Detected Concentration	Units	Long-Term Sediment Goal	PEC	Short-Term Sediment Goal	Distribution	St. Dev. of Log(X)	Arithmetic Mean (95% UCLM)	
Lead	22	22	103	16.9	mg/kg	128	128	180	Nonparametric	0.4	78.0	(85.6)[1]
PCBs (total Aroclors)	22	22	2410	183	µg/kg	0.22	0.676	1.5	Normal	0.5	**1.20**	**(1.37)[1]**
Total PAHs (16)	22	22	15846	899	µg/kg	22.8	22.8	30	Normal	0.3	11.6	(12.7)[1]
[1] UCLM computed using Student's *t*-distribution as per ProUCL recommendation.												

NOTES:
PEC = Probable effect concentration
Bolded detected values exceed Long-term SWAC goal.
Bolded and Shaded detected values exceed Long-term SWAC goal and PEC screening value
Bolded, Shaded, and Italicized detected values exceed Long-term SWAC goal, PEC screening value, and Short-term SWAC goal.

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Table 3-9 Overall Summary of Exceedances for Short and Long-term Sediment Goals and Probable Effect Concentrations

Analyte	Total Number of Submitted Samples (without FDs)	Number of Detects	Maximum Concentration	Units	Maximum Location	Long-term Goal	PEC	Short-term Goal	Number Samples Exceeding Long-Term Sediment Goal	Number Samples Exceeding PEC	Number Samples Exceeding Short-Term Sediment Goal	Percentage of Samples Exceeding Long-Term Sediment Goal	Percentage of Samples Exceeding PEC	Percentage of Samples Exceeding Short-Term Sediment Goal	Number of Sampling Locations with Exceedances	Total Number of Locations Sampled
Lead	22	22	103	mg/kg	OR19-10-SURF	128	128	180	--	--	--	--	--	--	--	22
PCBs (total Aroclors)	22	22	2,410	µg/kg	OR19-07-SURF	220	676	1,500	21	19	3	95	86	14	21	22
Total PAHs (16)	22	22	15,846	µg/kg	OR19-04-SURF	22,800	22,800	30,000	--	--	--	--	--	--	--	22

NOTES:
-- = No value available.
mg/kg = Milligrams per kilogram.
PAH = Polycyclic Aromatic Hydrocarbon.
PCB = Polychlorinated Biphenyl
PEC = Probable effect concentration.
µg/kg = Micrograms per kilogram.

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Table 4-1: Summary of Survival and Growth Results for *Chironomous dilutus*, Ottawa River-Reach 1 Area, Maumee Area of Concern, Toledo, Ohio (December 2019)

Sample Identification	EA Accession Number	10-Day Survival (percent)	Mean Ash Free Dry Weight as mg/Organism (±SD)
Laboratory Control	AT8-864	80	0.652 (±0.117)
OR19-01-SURFTOX	AT9-870	65[a]	0.681 (±0.076)
OR19-02-SURFTOX	AT9-871	78	0.690 (±0.123)
OR19-03-SURFTOX	AT9-872	85	0.553 (±0.076)[ab]
OR19-04-SURFTOX	AT9-873	84	0.526 (±0.122)[ab]
OR19-05-SURFTOX	AT9-874	68[a]	0.575 (±0.085)[b]
OR19-07-SURFTOX	AT9-875	51[ab]	0.332 (±0.063)[ab]
OR19-09-SURFTOX	AT9-876	93	0.748 (±0.164)
OR19-11-SURFTOX	AT9-877	88	0.489 (±0.099)[ab]
OR19-13-SURFTOX	AT9-878	28[ab]	0.222 (±0.076)[ab]
OR19-15-SURFTOX	AT9-879	29[ab]	0.226 (±0.053)[ab]
OR19-18-SURFTOX	AT9-880	16[ab]	0.156 (±0.029)[ab]
OR19-19-SURFTOX	AT9-881	24[ab]	0.276 (±0.168)[ab]
OR19-21-SURFTOX	AT9-882	15[ab]	0.153 (±0.053)[ab]
OR19-REF1TOX	AT9-883	71[a]	0.749 (±0.115)

(a) Significantly different (p=0.05) from laboratory control.
(b) Significantly different (p=0.05) from OR19-REF1TOX (AT9-883).

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Table 4-2: Summary of Survival and Growth Results for *Hyalella azteca*, Ottawa River-Reach 1 Area, Maumee Area of Concern, Toledo, Ohio (December 2019)

Sample Identification	EA Accession Number	10-Day Survival (percent)	Mean Dry Weight as mg/Organism (±SD)
Laboratory Control	AT8-864	90	0.110 (±0.015)
OR19-01-SURFTOX	AT9-870	88	0.101 (±0.020)[b]
OR19-02-SURFTOX	AT9-871	89	0.119 (±0.023)
OR19-03-SURFTOX	AT9-872	79	0.105 (±0.017)
OR19-04-SURFTOX	AT9-873	78[a]	0.109 (±0.015)
OR19-05-SURFTOX	AT9-874	89	0.102 (±0.022)
OR19-07-SURFTOX	AT9-875	71[a]	0.095 (±0.018)[ab]
OR19-09-SURFTOX	AT9-876	76[a]	0.103 (±0.031)
OR19-11-SURFTOX	AT9-877	86	0.129 (±0.016)
OR19-13-SURFTOX	AT9-878	76	0.096 (±0.022)[b]
OR19-15-SURFTOX	AT9-879	79	0.114 (±0.025)
OR19-18-SURFTOX	AT9-880	79[a]	0.122 (±0.026)
OR19-19-SURFTOX	AT9-881	76[a]	0.119 (±0.011)
OR19-21-SURFTOX	AT9-882	61[a]	0.115 (±0.020)
OR19-REF1TOX	AT9-883	73[a]	0.118 (±0.015)

(a) Significantly different (p=0.05) from laboratory control.
(b) Significantly different (p=0.05) from OR19-REF1TOX (AT9-883).

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Table 4-3 Mean Lipid Concentrations (Percent of Total Body Wet Weight) in *Lumbriculus Variegatus,* Ottawa River-Reach 1 Area, Maumee Area of Concern, Toledo, Ohio (December 2019)

Sample Identification	Worms
Pre-test	3.18
Control	1.72
Reference Site	1.92
OR19-01-SURF	1.32
OR19-02-SURF	1.3
OR19-03-SURF	1.33
OR19-04-SURF	1.44
OR19-05-SURF	1.19
OR19-07-SURF	1.87
OR19-09-SURF	1.94
OR19-11-SURF	1.5
OR19-13-SURF	1.52
OR19-15-SURF	1.5
OR19-18-SURF	1.5
OR19-19-SURF	1.54
OR19-21-SURF	1.72

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Table 4-4 Mean Total Polychlorinated Biphenyls Congener Concentrations (µg/kg) in *Lumbriculus variegtus* Tissues
Ottawa River-Reach 1 Area, Maumee Area of Concern, Toledo, Ohio (December 2019)

		Pre-test	Maumee Bay Reference	OR19-01-SURF	OR19-02-SURF	OR19-03-SURF	OR19-04-SURF	OR19-05-SURF	OR19-07-SURF	OR19-09-SURF	OR19-11-SURF	OR19-13-SURF	OR19-15-SURF	OR19-18-SURF	OR19-19-SURF	OR19-21-SURF
Analyte	Units	%Lipids = 3.18	%Lipids = 1.92	%Lipids = 1.32	%Lipids = 1.3	%Lipids = 1.33	%Lipids = 1.44	%Lipids = 1.19	%Lipids = 1.87	%Lipids = 1.94	%Lipids = 1.5	%Lipids = 1.52	%Lipids = 1.5	%Lipids = 1.5	%Lipids = 1.54	%Lipids = 1.72
PCB-1	µg/kg	ND	ND	0.164	0.087	0.116	0.161	0.038	0.365	0.169	0.100	0.176	0.128	0.182	0.254	0.114
PCB-2	µg/kg	ND	ND	0.026	0.013	0.022	0.032	0.016	0.060	0.041	0.025	0.038	0.035	0.039	0.034	0.029
PCB-3	µg/kg	ND	ND	0.246	0.073	0.128	0.220	0.075	0.330	0.310	0.128	0.204	0.190	0.362	0.328	0.191
PCB-4	µg/kg	ND	0.070	3.50	2.68	3.26	4.24	1.90	8.86	6.78	2.48	4.52	3.06	4.86	6.78	2.74
PCB-5	µg/kg	ND	ND	0.048	0.023	0.038	0.068	0.021	0.102	0.060	0.033	0.069	0.023	0.055	0.107	0.035
PCB-6	µg/kg	ND	0.038	2.60	1.28	1.98	2.54	1.22	4.34	3.36	1.46	2.60	1.86	3.06	3.08	1.86
PCB-7	µg/kg	ND	ND	0.378	0.170	0.256	0.342	0.148	0.600	0.474	0.163	0.354	0.248	0.430	0.476	0.274
PCB-8	µg/kg	ND	0.082	5.24	2.82	3.98	5.22	2.42	9.18	7.02	2.92	5.20	3.72	6.34	7.14	3.90
PCB-9	µg/kg	ND	ND	0.298	0.146	0.232	0.310	0.134	0.580	0.414	0.136	0.310	0.218	0.366	0.428	0.228
PCB-10	µg/kg	ND	ND	0.100	0.103	0.112	0.129	0.041	0.270	0.212	0.085	0.133	0.096	0.160	0.240	0.054
PCB-11	µg/kg	0.02	0.036	0.061	0.108	0.089	0.110	0.078	0.134	0.094	0.088	0.072	0.072	0.082	0.061	ND
PCB-12	µg/kg	ND	ND	0.526	0.640	0.742	1.06	0.540	1.72	1.10	0.578	0.806	0.616	0.808	0.876	0.524
PCB-13	µg/kg	ND	ND	0.526	0.640	0.742	1.06	0.540	1.72	1.10	0.578	0.806	0.616	0.808	0.876	0.524
PCB-14	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-15	µg/kg	ND	0.098	4.16	3.16	3.72	4.46	2.50	6.70	5.52	3.20	4.60	3.46	5.08	5.32	3.70
PCB-16	µg/kg	ND	0.080	2.78	1.72	2.42	2.70	1.50	5.58	3.90	1.80	3.06	2.42	3.32	4.06	2.26
PCB-17	µg/kg	ND	0.193	11.7	7.98	10.1	11.5	6.84	21.0	17.0	7.62	13.0	9.36	14.4	15.2	8.74
PCB-18	µg/kg	ND	0.288	10.0	6.08	8.66	9.70	5.80	18.4	13.4	6.46	11.1	8.30	12.0	13.0	7.88
PCB-19	µg/kg	ND	0.042	2.22	1.78	2.14	2.38	1.30	4.58	3.88	1.56	2.76	1.92	2.80	3.66	1.66
PCB-20	µg/kg	ND	0.614	22.4	13.0	17.2	18.8	10.5	31.8	24.0	14.2	23.0	16.6	22.8	23.4	17.4
PCB-21	µg/kg	ND	0.112	2.96	1.50	2.02	2.10	1.07	3.94	2.84	1.66	2.76	2.04	3.06	3.80	2.36
PCB-22	µg/kg	ND	0.134	5.28	3.44	4.32	4.54	2.48	7.88	6.02	3.36	5.50	4.08	5.66	5.86	3.88
PCB-23	µg/kg	ND	ND	ND	ND	ND	0.01	ND	ND	ND	ND	ND	0.02	0.02	ND	ND
PCB-24	µg/kg	ND	ND	0.186	0.071	0.152	0.188	0.082	0.314	0.224	0.121	0.226	0.117	0.240	0.251	0.158
PCB-25	µg/kg	ND	0.117	5.52	3.62	4.56	4.74	2.46	7.38	5.66	3.36	5.56	3.82	5.26	4.82	3.74
PCB-26	µg/kg	ND	0.154	6.82	4.84	6.06	6.32	3.34	9.86	7.34	4.48	7.16	4.96	6.66	6.10	4.60
PCB-27	µg/kg	ND	0.047	2.02	1.44	1.72	2.08	1.34	3.56	3.08	1.42	2.38	1.72	2.60	2.74	1.64
PCB-28	µg/kg	ND	0.614	22.4	13.0	17.2	18.8	10.5	31.8	24.0	14.2	23.0	16.6	22.8	23.4	17.4
PCB-29	µg/kg	ND	0.154	6.82	4.84	6.06	6.32	3.34	9.86	7.34	4.48	7.16	4.96	6.66	6.10	4.60
PCB-30	µg/kg	ND	0.288	10.0	6.08	8.66	9.70	5.80	18.4	13.4	6.46	11.1	8.30	12.0	13.0	7.88
PCB-31	µg/kg	ND	0.416	17.8	12.0	15.4	16.0	8.4	27.6	19.4	11.2	18.2	13.2	17.4	17.4	11.8
PCB-32	µg/kg	ND	0.153	7.40	5.46	6.42	7.40	4.20	12.60	10.50	5.02	8.74	6.10	9.22	9.24	5.80
PCB-33	µg/kg	ND	0.112	2.96	1.50	2.02	2.10	1.07	3.94	2.84	1.66	2.76	2.04	3.06	3.80	2.36
PCB-34	µg/kg	ND	ND	0.28	0.170	0.220	0.230	0.118	0.382	0.290	0.166	0.282	0.196	0.268	0.204	0.190
PCB-35	µg/kg	ND	ND	0.03	0.026	ND	0.019	0.029	0.066	0.044	0.031	0.042	0.023	0.047	0.043	0.028
PCB-36	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-37	µg/kg	ND	0.093	1.80	1.10	1.46	1.52	0.92	2.72	1.98	1.18	1.86	1.50	1.94	2.10	1.54
PCB-38	µg/kg	ND	ND	0.02	0.012	ND	0.016	0.018	ND	ND	ND	0.028	0.019	0.027	0.030	ND
PCB-39	µg/kg	ND	ND	0.06	0.032	ND	0.040	0.036	0.120	0.088	0.056	0.066	0.043	0.090	0.086	0.052
PCB-40	µg/kg	ND	0.634	10.6	7.40	8.94	10.3	6.14	16.2	13.8	8.18	14.0	11.1	13.4	14.4	10.2
PCB-41	µg/kg	ND	0.634	10.6	7.40	8.94	10.3	6.14	16.2	13.8	8.18	14.0	11.1	13.4	14.4	10.2
PCB-42	µg/kg	ND	0.336	6.18	4.28	5.06	5.80	3.70	9.08	7.84	4.70	8.12	6.38	7.84	8.32	6.08
PCB-43	µg/kg	ND	0.042	0.881	0.726	0.904	1.0	0.60	1.60	1.14	0.778	1.38	1.10	1.33	1.38	0.964
PCB-44	µg/kg	ND	1.17	20.4	14.2	16.8	19.4	12.6	30.2	26.4	15.6	26.8	21.0	25.4	26.8	19.6
PCB-45	µg/kg	ND	0.226	4.68	3.40	4.16	3.85	2.11	7.50	5.13	2.67	5.96	4.58	5.48	4.75	3.96
PCB-46	µg/kg	ND	0.083	1.22	0.89	1.10	1.26	0.69	2.04	1.72	0.92	1.58	1.26	1.52	1.70	1.08

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Table 4-4 Mean Total Polychlorinated Biphenyls Congener Concentrations (µg/kg) in *Lumbriculus variegtus* Tissues
Ottawa River-Reach 1 Area, Maumee Area of Concern, Toledo, Ohio (December 2019)

		Pre-test	Maumee Bay Reference	OR19-01-SURF	OR19-02-SURF	OR19-03-SURF	OR19-04-SURF	OR19-05-SURF	OR19-07-SURF	OR19-09-SURF	OR19-11-SURF	OR19-13-SURF	OR19-15-SURF	OR19-18-SURF	OR19-19-SURF	OR19-21-SURF
Analyte	Units	%Lipids = 3.18	%Lipids = 1.92	%Lipids = 1.32	%Lipids = 1.3	%Lipids = 1.33	%Lipids = 1.44	%Lipids = 1.19	%Lipids = 1.87	%Lipids = 1.94	%Lipids = 1.5	%Lipids = 1.52	%Lipids = 1.5	%Lipids = 1.5	%Lipids = 1.54	%Lipids = 1.72
PCB-47	µg/kg	ND	1.17	20.4	14.2	16.8	19.4	12.6	30.2	26.4	15.6	26.8	21.0	25.4	26.8	19.6
PCB-48	µg/kg	ND	0.130	2.36	1.58	1.96	2.20	1.28	3.96	3.02	1.74	3.06	2.50	2.88	3.48	2.26
PCB-49	µg/kg	ND	0.806	15.40	10.3	12.6	14.6	9.44	22.2	19.4	11.2	20.0	15.8	19.0	20.0	14.6
PCB-50	µg/kg	ND	0.180	3.68	2.54	3.18	3.38	1.92	5.44	4.38	2.52	4.38	3.22	3.98	4.08	2.88
PCB-51	µg/kg	ND	0.226	4.68	3.40	4.16	3.85	2.11	7.50	5.13	2.67	5.96	4.58	5.48	4.75	3.96
PCB-52	µg/kg	0.01	1.58	21.40	14.4	17.6	20.4	13.2	31.0	27.2	16.0	27.8	22.2	26.6	27.6	20.0
PCB-53	µg/kg	ND	0.180	3.68	2.54	3.18	3.38	1.92	5.44	4.38	2.52	4.38	3.22	3.98	4.08	2.88
PCB-54	µg/kg	ND	ND	0.06	0.059	0.068	0.070	0.034	0.134	0.128	0.054	0.077	0.073	0.083	0.087	0.043
PCB-55	µg/kg	ND	0.018	0.13	0.069	0.090	0.101	0.111	ND	0.134	0.090	0.241	0.197	0.093	0.204	0.155
PCB-56	µg/kg	ND	0.288	3.44	2.28	2.72	3.02	1.98	5.12	4.00	2.60	4.26	3.48	3.98	4.62	3.40
PCB-57	µg/kg	ND	ND	0.22	0.150	0.174	0.172	0.079	0.302	0.256	0.164	0.272	0.204	0.246	0.228	0.172
PCB-58	µg/kg	ND	ND	0.08	0.036	0.057	0.059	0.032	0.118	0.077	ND	0.074	0.095	0.061	0.088	0.049
PCB-59	µg/kg	ND	0.129	2.22	1.52	1.82	2.14	1.36	3.38	2.86	1.72	2.96	2.38	2.80	3.04	2.18
PCB-60	µg/kg	ND	0.098	1.40	0.942	1.10	1.29	0.752	1.88	1.44	1.00	1.48	1.24	1.36	1.58	1.13
PCB-61	µg/kg	ND	0.898	13.00	8.88	10.6	11.9	7.40	19.8	15.4	9.54	16.0	12.8	14.6	17.0	12.0
PCB-62	µg/kg	ND	0.129	2.22	1.52	1.82	2.14	1.36	3.38	2.86	1.72	2.96	2.38	2.80	3.04	2.18
PCB-63	µg/kg	ND	0.040	1.01	0.704	0.824	0.948	0.564	1.48	1.21	0.758	1.26	0.970	1.17	1.24	0.902
PCB-64	µg/kg	ND	0.520	8.38	5.68	6.96	7.74	4.82	12.60	10.40	6.40	11.10	8.44	10.70	11.40	8.36
PCB-65	µg/kg	ND	1.17	20.4	14.2	16.8	19.4	12.6	30.2	26.4	15.6	26.8	21.0	25.4	26.8	19.6
PCB-66	µg/kg	ND	0.598	7.86	5.16	6.20	6.90	4.86	11.30	9.10	5.98	9.90	7.98	9.22	10.50	7.84
PCB-67	µg/kg	ND	ND	0.294	0.270	0.312	0.366	0.210	0.582	0.462	0.239	0.492	0.380	0.368	0.486	0.340
PCB-68	µg/kg	ND	ND	0.142	0.124	0.146	0.143	0.097	0.210	0.208	0.144	0.136	0.186	0.185	0.179	0.116
PCB-69	µg/kg	ND	0.806	15.4	10.3	12.6	14.6	9.44	22.2	19.4	11.2	20.0	15.8	19.0	20.0	14.6
PCB-70	µg/kg	ND	0.898	13.0	8.88	10.6	11.9	7.40	19.8	15.4	9.54	16.0	12.8	14.6	17.0	12.0
PCB-71	µg/kg	ND	0.634	10.6	7.40	8.94	10.3	6.14	16.2	13.8	8.18	14.0	11.1	13.4	14.4	10.2
PCB-72	µg/kg	ND	0.018	0.266	0.190	0.214	0.202	0.139	0.368	0.310	0.200	0.284	0.246	0.318	0.328	0.187
PCB-73	µg/kg	ND	0.042	0.881	0.726	0.904	1.00	0.600	1.60	1.14	0.778	1.38	1.10	1.33	1.38	0.964
PCB-74	µg/kg	ND	0.898	13.0	8.88	10.6	11.9	7.40	19.8	15.4	9.54	16.0	12.8	14.6	17.0	12.0
PCB-75	µg/kg	ND	0.129	2.22	1.52	1.82	2.14	1.36	3.38	2.86	1.72	2.96	2.38	2.80	3.04	2.18
PCB-76	µg/kg	ND	0.898	13.0	8.88	10.6	11.9	7.40	19.8	15.4	9.54	16.0	12.8	14.6	17.0	12.0
PCB-77	µg/kg	ND	0.049	0.426	0.332	0.372	0.181	0.219	0.664	0.392	0.255	0.438	0.352	0.418	0.472	0.380
PCB-78	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-79	µg/kg	ND	0.017	0.068	0.029	ND	0.039	0.032	0.070	0.072	0.050	0.090	0.061	0.068	0.063	0.043
PCB-80	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-81	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-82	µg/kg	ND	0.159	1.12	0.710	0.840	0.758	0.471	1.38	1.12	0.187	0.281	0.698	0.181	ND	0.589
PCB-83	µg/kg	ND	1.02	5.70	3.72	4.28	3.54	3.20	6.68	5.66	4.22	6.50	4.56	5.86	6.04	5.24
PCB-84	µg/kg	ND	0.498	2.70	1.86	2.12	1.98	1.54	3.66	3.14	2.02	3.28	2.38	3.02	3.18	2.44
PCB-85	µg/kg	ND	0.308	2.06	1.34	1.54	1.31	1.16	2.44	2.02	1.52	2.30	1.64	2.08	2.12	1.86
PCB-86	µg/kg	ND	0.866	5.04	3.28	3.76	3.23	2.76	6.08	5.06	3.62	5.60	4.10	5.08	5.40	4.48
PCB-87	µg/kg	ND	0.866	5.04	3.28	3.76	3.23	2.76	6.08	5.06	3.62	5.60	4.10	5.08	5.40	4.48
PCB-88	µg/kg	ND	0.412	2.52	1.72	1.94	1.70	1.44	3.22	2.78	1.86	2.98	2.20	2.78	2.84	2.32
PCB-89	µg/kg	ND	0.023	0.270	0.174	0.171	0.194	0.129	0.376	0.250	0.216	0.281	0.202	0.232	0.314	0.250
PCB-90	µg/kg	ND	1.54	7.44	4.72	5.54	4.45	3.90	8.44	7.06	5.30	8.14	5.76	7.36	8.18	6.76
PCB-91	µg/kg	ND	0.412	2.52	1.72	1.94	1.70	1.44	3.22	2.78	1.86	2.98	2.20	2.78	2.84	2.32
PCB-92	µg/kg	ND	0.420	2.08	1.36	1.58	1.34	1.16	2.48	2.14	1.54	2.44	1.76	2.22	2.28	1.92

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Table 4-4 Mean Total Polychlorinated Biphenyls Congener Concentrations (µg/kg) in *Lumbriculus variegtus* Tissues
Ottawa River-Reach 1 Area, Maumee Area of Concern, Toledo, Ohio (December 2019)

		Pre-test	Maumee Bay Reference	OR19-01-SURF	OR19-02-SURF	OR19-03-SURF	OR19-04-SURF	OR19-05-SURF	OR19-07-SURF	OR19-09-SURF	OR19-11-SURF	OR19-13-SURF	OR19-15-SURF	OR19-18-SURF	OR19-19-SURF	OR19-21-SURF
Analyte	Units	%Lipids = 3.18	%Lipids = 1.92	%Lipids = 1.32	%Lipids = 1.3	%Lipids = 1.33	%Lipids = 1.44	%Lipids = 1.19	%Lipids = 1.87	%Lipids = 1.94	%Lipids = 1.5	%Lipids = 1.52	%Lipids = 1.5	%Lipids = 1.5	%Lipids = 1.54	%Lipids = 1.72
PCB-93	µg/kg	ND	0.037	0.286	0.202	0.188	0.214	0.143	0.382	0.300	0.194	0.368	0.262	0.344	0.358	0.278
PCB-94	µg/kg	ND	0.019	0.126	0.094	0.100	0.120	0.081	0.178	0.192	0.128	0.202	0.148	0.163	0.149	0.129
PCB-95	µg/kg	0.011	1.8	8.04	5.24	6.22	5.06	4.40	10.1	8.42	5.76	9.24	6.74	8.50	9.44	7.46
PCB-96	µg/kg	ND	0.02	0.208	0.138	0.142	0.168	0.120	0.310	0.274	0.168	0.268	0.198	0.244	0.266	0.198
PCB-97	µg/kg	ND	0.866	5.04	3.28	3.76	3.23	2.76	6.08	5.06	3.62	5.60	4.10	5.08	5.40	4.48
PCB-98	µg/kg	ND	0.099	0.746	0.496	0.574	0.518	0.410	0.980	0.848	0.562	0.918	0.666	0.836	0.866	0.547
PCB-99	µg/kg	ND	1.02	5.70	3.72	4.28	3.54	3.20	6.68	5.66	4.22	6.50	4.56	5.86	6.04	5.24
PCB-100	µg/kg	ND	0.037	0.286	0.202	0.188	0.214	0.143	0.382	0.300	0.194	0.368	0.262	0.344	0.358	0.278
PCB-101	µg/kg	ND	1.54	7.44	4.72	5.54	4.45	3.90	8.44	7.06	5.30	8.14	5.76	7.36	8.18	6.76
PCB-102	µg/kg	ND	0.099	0.75	0.50	0.57	0.52	0.41	0.98	0.85	0.56	0.92	0.67	0.84	0.87	0.55
PCB-103	µg/kg	ND	0.024	0.093	0.098	0.087	0.103	0.082	0.154	0.170	0.092	0.157	0.126	0.119	0.180	0.150
PCB-104	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-105	µg/kg	ND	0.28	1.66	1.12	1.30	1.32	0.90	1.90	1.56	1.16	1.68	1.36	1.54	1.76	1.46
PCB-106	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.02	ND	ND
PCB-107	µg/kg	ND	ND	0.548	0.304	0.414	0.282	ND	0.519	0.280	0.386	0.147	0.360	0.103	ND	ND
PCB-108	µg/kg	ND	0.040	0.178	0.103	0.140	0.122	0.091	0.214	0.188	0.138	0.210	0.166	0.161	ND	0.109
PCB-109	µg/kg	ND	0.866	5.04	3.28	3.76	3.23	2.76	6.08	5.06	3.62	5.60	4.10	5.08	5.40	4.48
PCB-110	µg/kg	ND	2.02	9.66	6.34	7.32	6.06	5.36	11.3	9.42	7.06	10.7	7.52	9.80	10.2	8.82
PCB-111	µg/kg	ND	ND	ND	0.012	ND	ND	ND	ND	0.023	0.025	ND	ND	ND	ND	ND
PCB-112	µg/kg	ND	0.017	0.068	0.028	0.061	0.048	0.027	0.106	0.035	0.043	0.130	0.072	0.087	0.046	0.043
PCB-113	µg/kg	ND	1.54	7.44	4.72	5.54	4.45	3.90	8.44	7.06	5.30	8.14	5.76	7.36	8.18	6.76
PCB-114	µg/kg	ND	0.018	0.154	0.085	0.114	0.107	0.086	0.190	0.162	0.118	0.145	0.144	0.128	0.178	0.140
PCB-115	µg/kg	ND	2.02	9.66	6.34	7.32	6.06	5.36	11.3	9.42	7.06	10.7	7.52	9.80	10.2	8.82
PCB-116	µg/kg	ND	0.308	2.06	1.34	1.54	1.31	1.16	2.44	2.02	1.52	2.30	1.64	2.08	2.12	1.86
PCB-117	µg/kg	ND	0.308	2.06	1.34	1.54	1.31	1.16	2.44	2.02	1.52	2.30	1.64	2.08	2.12	1.86
PCB-118	µg/kg	0.01	0.712	4.30	2.90	3.26	3.32	2.36	5.0	4.12	3.02	4.66	3.60	4.12	4.66	3.78
PCB-119	µg/kg	ND	0.866	5.04	3.28	3.76	3.23	2.76	6.08	5.06	3.62	5.60	4.10	5.08	5.40	4.48
PCB-120	µg/kg	ND	ND	0.022	0.016	ND	ND	0.017	ND	0.025	0.025	0.032	ND	0.024	ND	0.027
PCB-121	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-122	µg/kg	ND	0.018	0.094	0.055	0.061	0.059	0.059	0.103	0.109	0.074	0.130	0.105	0.103	0.099	0.087
PCB-123	µg/kg	ND	0.022	0.087	0.063	0.063	0.081	0.038	0.120	0.132	0.048	0.121	0.075	0.092	0.072	0.084
PCB-124	µg/kg	ND	0.040	0.178	0.103	0.140	0.122	0.091	0.214	0.188	0.138	0.210	0.166	0.161	ND	0.109
PCB-125	µg/kg	ND	0.866	5.04	3.28	3.76	3.23	2.76	6.08	5.06	3.62	5.60	4.10	5.08	5.40	4.48
PCB-126	µg/kg	ND	ND	0.02	ND	0.02	0.01	ND	0.02	ND	ND	ND	ND	0.02	ND	ND
PCB-127	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-128	µg/kg	ND	0.342	0.524	0.362	0.398	0.428	0.298	0.582	0.502	0.412	0.596	0.476	0.516	0.712	0.554
PCB-129	µg/kg	ND	2.400	4.34	3.06	3.44	3.38	2.42	4.76	4.02	3.22	4.78	3.84	4.12	6.32	4.54
PCB-130	µg/kg	ND	0.174	0.248	0.182	0.190	0.208	0.095	0.288	0.246	0.161	0.302	0.240	0.206	0.334	0.274
PCB-131	µg/kg	ND	ND	0.035	0.020	ND	0.034	0.025	0.038	0.043	0.034	0.044	0.025	0.052	0.057	0.048
PCB-132	µg/kg	ND	0.698	1.24	0.884	0.976	1.05	0.670	1.46	1.20	0.932	1.42	1.11	1.22	1.90	1.29
PCB-133	µg/kg	ND	0.064	0.081	0.054	0.053	0.063	0.038	0.086	0.078	0.063	0.076	0.076	0.067	0.086	0.081
PCB-134	µg/kg	ND	0.08	0.186	0.154	0.168	0.168	0.118	0.206	0.222	0.149	0.256	0.196	0.220	0.320	0.234
PCB-135	µg/kg	ND	1.25	1.90	1.26	1.46	1.50	1.04	2.22	1.92	1.44	2.12	1.68	1.88	2.94	2.14
PCB-136	µg/kg	ND	0.182	0.470	0.332	0.372	0.416	0.268	0.588	0.524	0.382	0.580	0.444	0.506	0.820	0.552
PCB-137	µg/kg	ND	0.038	0.094	0.044	0.083	0.084	0.068	0.132	0.108	0.070	0.098	0.086	0.061	0.117	0.118
PCB-138	µg/kg	ND	2.4	4.34	3.06	3.44	3.38	2.42	4.76	4.02	3.22	4.78	3.84	4.12	6.32	4.54

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Table 4-4 Mean Total Polychlorinated Biphenyls Congener Concentrations (µg/kg) in *Lumbriculus variegtus* Tissues
Ottawa River-Reach 1 Area, Maumee Area of Concern, Toledo, Ohio (December 2019)

		Pre-test	Maumee Bay Reference	OR19-01-SURF	OR19-02-SURF	OR19-03-SURF	OR19-04-SURF	OR19-05-SURF	OR19-07-SURF	OR19-09-SURF	OR19-11-SURF	OR19-13-SURF	OR19-15-SURF	OR19-18-SURF	OR19-19-SURF	OR19-21-SURF
Analyte	Units	%Lipids = 3.18	%Lipids = 1.92	%Lipids = 1.32	%Lipids = 1.3	%Lipids = 1.33	%Lipids = 1.44	%Lipids = 1.19	%Lipids = 1.87	%Lipids = 1.94	%Lipids = 1.5	%Lipids = 1.52	%Lipids = 1.5	%Lipids = 1.5	%Lipids = 1.54	%Lipids = 1.72
PCB-139	µg/kg	ND	0.038	0.073	0.052	0.045	0.063	0.040	0.087	0.069	0.059	0.058	0.062	0.069	0.088	0.070
PCB-140	µg/kg	ND	0.038	0.073	0.052	0.045	0.063	0.040	0.087	0.069	0.059	0.058	0.062	0.069	0.088	0.070
PCB-141	µg/kg	ND	0.158	0.452	0.182	0.338	0.382	0.209	0.514	0.416	0.328	0.450	0.384	0.392	1.070	0.503
PCB-142	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-143	µg/kg	ND	0.080	0.186	0.154	0.168	0.168	0.118	0.206	0.222	0.149	0.256	0.196	0.220	0.320	0.234
PCB-144	µg/kg	ND	0.081	0.144	0.094	0.090	0.126	0.071	0.176	0.128	0.103	0.143	0.132	0.127	0.278	0.170
PCB-145	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-146	µg/kg	ND	0.532	0.746	0.516	0.568	0.568	0.414	0.804	0.666	0.544	0.820	0.614	0.738	1.060	0.796
PCB-147	µg/kg	0.02	3.06	4.94	3.48	4.02	3.78	2.62	5.54	4.56	3.64	5.50	4.40	4.76	7.44	5.20
PCB-148	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-149	µg/kg	0.020	3.06	4.94	3.48	4.02	3.78	2.62	5.54	4.56	3.64	5.50	4.40	4.76	7.44	5.20
PCB-150	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-151	µg/kg	ND	1.25	1.90	1.26	1.46	1.50	1.04	2.22	1.92	1.44	2.12	1.68	1.88	2.94	2.14
PCB-152	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-153	µg/kg	0.021	2.14	3.44	2.36	2.72	2.64	1.92	3.76	3.18	2.56	3.86	3.08	3.30	5.62	3.76
PCB-154	µg/kg	ND	0.045	0.059	0.033	0.030	0.035	0.035	0.069	0.061	0.041	0.063	0.057	0.048	0.053	0.062
PCB-155	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-156	µg/kg	ND	0.135	0.296	0.196	0.228	0.252	0.176	0.352	0.294	0.240	0.346	0.276	0.290	0.430	0.330
PCB-157	µg/kg	ND	0.135	0.296	0.196	0.228	0.252	0.176	0.352	0.294	0.240	0.346	0.276	0.290	0.430	0.330
PCB-158	µg/kg	ND	0.137	0.312	0.200	0.248	0.264	0.147	0.364	0.312	0.244	0.356	0.282	0.300	0.496	0.330
PCB-159	µg/kg	ND	0.02	0.024	0.016	ND	0.014	0.017	ND	0.025	0.026	0.028	0.018	0.022	0.065	0.042
PCB-160	µg/kg	ND	2.4	4.34	3.06	3.44	3.38	2.42	4.76	4.02	3.22	4.78	3.84	4.12	6.32	4.54
PCB-161	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-162	µg/kg	ND	ND	ND	0.01	ND	ND	0.02	ND	ND	ND	ND	ND	ND	ND	ND
PCB-163	µg/kg	ND	2.4	4.34	3.06	3.44	3.38	2.42	4.76	4.02	3.22	4.78	3.84	4.12	6.32	4.54
PCB-164	µg/kg	ND	0.192	0.290	0.202	0.232	0.234	0.164	0.332	0.288	0.232	0.338	0.278	0.292	0.456	0.326
PCB-165	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-166	µg/kg	ND	0.342	0.524	0.362	0.398	0.428	0.298	0.582	0.502	0.412	0.596	0.476	0.516	0.712	0.554
PCB-167	µg/kg	ND	0.047	0.089	0.073	0.038	0.094	0.068	0.126	0.093	0.092	0.128	0.085	0.113	0.160	0.125
PCB-168	µg/kg	0.021	2.14	3.44	2.36	2.72	2.64	1.92	3.76	3.18	2.56	3.86	3.08	3.30	5.62	3.76
PCB-169	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-170	µg/kg	ND	0.458	0.602	0.356	0.430	0.482	0.330	0.664	0.558	0.448	0.630	0.520	0.526	1.480	0.824
PCB-171	µg/kg	ND	0.157	0.192	0.136	0.148	0.168	0.098	0.226	0.202	0.116	0.188	0.176	0.190	0.482	0.253
PCB-172	µg/kg	ND	0.091	0.114	0.054	0.058	0.094	0.056	0.130	0.120	0.096	0.124	0.103	0.092	0.282	0.149
PCB-173	µg/kg	ND	0.157	0.192	0.136	0.148	0.168	0.098	0.226	0.202	0.116	0.188	0.176	0.190	0.482	0.253
PCB-174	µg/kg	ND	0.514	0.680	0.384	0.512	0.550	0.372	0.754	0.638	0.502	0.708	0.580	0.592	1.76	0.938
PCB-175	µg/kg	ND	0.024	0.029	0.019	0.019	0.022	0.016	0.032	0.030	0.025	0.028	0.022	0.025	0.068	0.042
PCB-176	µg/kg	ND	0.113	0.111	0.080	0.076	0.091	0.058	0.125	0.113	0.087	0.126	0.104	0.109	0.250	0.147
PCB-177	µg/kg	ND	0.460	0.462	0.322	0.362	0.368	0.262	0.518	0.460	0.362	0.524	0.424	0.450	1.060	0.618
PCB-178	µg/kg	ND	0.171	0.184	0.130	0.148	0.148	0.105	0.212	0.196	0.150	0.173	0.178	0.186	0.400	0.212
PCB-179	µg/kg	ND	0.444	0.414	0.292	0.334	0.340	0.228	0.472	0.408	0.322	0.476	0.386	0.398	0.928	0.540
PCB-180	µg/kg	ND	0.340	0.624	0.250	0.446	0.610	0.374	0.802	0.624	0.468	0.590	0.524	0.514	2.780	1.220
PCB-181	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-182	µg/kg	ND	ND	0.018	0.012	ND	0.014	ND	0.022	ND	ND	ND	ND	0.022	0.026	ND
PCB-183	µg/kg	ND	0.43	0.540	0.342	0.426	0.438	0.288	0.596	0.526	0.412	0.582	0.480	0.496	1.300	0.716
PCB-184	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

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Table 4-4 Mean Total Polychlorinated Biphenyls Congener Concentrations (µg/kg) in *Lumbriculus variegtus* Tissues
Ottawa River-Reach 1 Area, Maumee Area of Concern, Toledo, Ohio (December 2019)

Analyte	Units	Pre-test %Lipids = 3.18	Maumee Bay Reference %Lipids = 1.92	OR19-01-SURF %Lipids = 1.32	OR19-02-SURF %Lipids = 1.3	OR19-03-SURF %Lipids = 1.33	OR19-04-SURF %Lipids = 1.44	OR19-05-SURF %Lipids = 1.19	OR19-07-SURF %Lipids = 1.87	OR19-09-SURF %Lipids = 1.94	OR19-11-SURF %Lipids = 1.5	OR19-13-SURF %Lipids = 1.52	OR19-15-SURF %Lipids = 1.5	OR19-18-SURF %Lipids = 1.5	OR19-19-SURF %Lipids = 1.54	OR19-21-SURF %Lipids = 1.72
PCB-185	µg/kg	ND	0.43	0.540	0.342	0.426	0.438	0.288	0.596	0.526	0.412	0.582	0.480	0.496	1.30	0.716
PCB-186	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-187	µg/kg	0.016	2.42	2.64	1.68	2.04	1.82	1.34	2.74	2.36	1.90	2.66	2.32	2.24	3.90	2.94
PCB-188	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-189	µg/kg	ND	0.018	0.021	0.013	0.018	0.019	0.016	0.026	0.022	0.025	0.027	0.021	ND	0.047	0.030
PCB-190	µg/kg	ND	0.072	0.100	0.052	0.062	0.095	0.064	0.130	0.082	0.090	0.110	0.098	0.114	0.274	0.137
PCB-191	µg/kg	ND	ND	0.020	0.013	0.017	0.016	ND	0.025	0.023	ND	ND	0.019	0.024	0.063	0.040
PCB-192	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-193	µg/kg	ND	0.34	0.624	0.250	0.446	0.610	0.374	0.802	0.624	0.468	0.590	0.524	0.514	2.78	1.22
PCB-194	µg/kg	ND	0.184	0.168	0.093	0.120	0.163	0.090	0.216	0.190	0.150	0.178	0.172	0.146	0.718	0.324
PCB-195	µg/kg	ND	0.148	0.096	0.077	0.070	0.086	0.065	0.116	0.102	0.093	0.099	0.081	0.057	0.388	0.156
PCB-196	µg/kg	ND	0.066	0.055	0.030	0.032	0.070	0.041	0.073	0.066	0.052	0.076	0.061	0.035	0.298	0.120
PCB-197	µg/kg	ND	0.018	ND	ND	ND	0.014	ND	ND	ND	ND	ND	ND	ND	0.029	ND
PCB-198	µg/kg	ND	0.456	0.310	0.192	0.216	0.290	0.202	0.402	0.364	0.292	0.402	0.328	0.340	0.842	0.510
PCB-199	µg/kg	ND	0.456	0.310	0.192	0.216	0.290	0.202	0.402	0.364	0.292	0.402	0.328	0.340	0.842	0.510
PCB-200	µg/kg	ND	0.039	0.025	0.013	0.019	0.027	0.019	0.030	0.034	0.027	0.036	0.026	0.032	0.096	0.049
PCB-201	µg/kg	ND	0.059	0.028	0.023	0.020	0.033	0.021	0.045	0.038	0.034	0.032	0.035	0.039	0.100	0.060
PCB-202	µg/kg	ND	0.105	0.062	0.039	0.031	0.050	0.035	0.079	0.071	0.060	0.077	0.066	0.062	0.127	0.082
PCB-203	µg/kg	ND	0.204	0.099	0.087	0.107	0.145	0.097	0.196	0.178	0.142	0.192	0.125	0.158	0.442	0.248
PCB-204	µg/kg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCB-205	µg/kg	ND	0.019	0.019	ND	0.016	0.015	ND	0.023	ND	ND	ND	0.016	ND	0.031	0.030
PCB-206	µg/kg	ND	0.088	0.064	0.046	0.043	0.070	0.044	0.111	0.091	0.063	0.053	0.053	0.036	0.180	0.075
PCB-207	µg/kg	ND	0.021	ND	0.012	0.015	0.014	ND	ND	ND	ND	ND	ND	ND	0.025	0.027
PCB-208	µg/kg	ND	0.045	0.021	0.018	0.021	0.021	0.017	0.029	0.029	0.027	0.030	0.020	0.024	0.045	0.038
PCB 209	µg/kg	ND	0.096	0.056	0.017	0.030	0.034	0.020	0.077	0.051	0.029	0.035	0.035	0.027	0.042	0.039
TOTAL PCBs (ND=0)	µg/kg	0.069	75.9	587	391	475	505	325	841	682	418	690	526	655	735	528
TOTAL PCBs (ND=0)[a]	µg/kg-lipid	0.021	39.8	445	301	367	415	313	529	357	283	455	353	446	479	306

NOTES: For all tissue tests n = 5.
Lumbriculus variegatus species used for worm tissue tests.
The mean concentrations presented on the table are not lipid-normalized. The statistical comparisons (blue highlighting) indicating that the analyte concentration is significantly higher than the reference site concentration ($p<0.05$) and the pre-test tissue concentration ($p<0.05$) was based on lipid normalized concentration. EA has added a row at the bottom of the table reporting the results for total, lipid normalized PCBs.
[a] lipid-normalized concentration.
ND = Not detected or was detected below the reporting limit in each of the tested tissue replicates.
NA = Not analyzed
RL = Reporting limit
µg/kg = Microgram(s) per kilogram
Analyte concentration is significantly higher than the reference site concentration ($p<0.05$)
Analyte concentration is significantly higher than the reference site concentration ($p<0.05$) and the pre-test tissue concentration ($p<0.05$)
As described in the Quality Assurance Project Plan, there is no current fish tissue screening level for polychlornated biphenyls. The most conservative Aroclor fish tissue screening level from the 2018 EPA RSL is 2.1 µg/kg, concentrations at all locations exceed this screening value as well as the reference site concentration ($p<0.05$) and the pre-test tissue concentration ($p<0.05$) as indicated.

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Appendix A

Field Logbook and Data Collection Forms

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A1. Field Team Lead Logbook

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Ottawa River 10/22/19

0715 M. Stephens, S. Hudson, & D. Shimshock head to Jocketts Marine to get Sampling supplies from trailer.
0750 Arrive @ Howard Pinkley landing to prep gear & launch Jon Boat.
Wx: Partly Cloudy, temps mid 50's, winds S/SW 15-20 Knots.
0820 H+S Brief
- Vessel Safety/Stability
- Power Grabs
- EVAC/911
- Slips trips Falls
- Chemicals
- Housekeeping/trash/tools
- Allergies (Bees) M. Stephens

Andrew Shue
Dalene Shimshock
Michelle Hudson

0920 Depart landing for field S.K. S. Hudson & M. Stephens on boat, D. Shimshock in truck.
0940 OR19-01 target coordinates are on land. Shifting location ~25 ft to the West.
N: 745911.944
E: 1695144.995
1010 OR19-01 sample time
OR19-01 Water depth was recorded @ 1005.
1040 Head to shore to drop off samples & decon equipment.
1055 Head to OR19-2
N: 746432.71
E: 1695175.38
1101 Water depth recorded @ OR19-2
1110 OR19-2 Sample time
1130 Head back to Landing Demob jon boat.
1213 Head to Jocketts Marine to put samples in reefer.
1240 Samples secure in reefer trailer. Break for Lunch.
1340 Head out to Validate GPS unit.
1500 GPS validated at two NGS Bench marks.
MC1715 & MC0736.
1515 Meeting C. Kiehl-Simpson to discuss todays sampling & go over FSP.
1630 EA offsite.

10/22/19

Ottawa River 10/23/19

0900 M. Stephens, S. Hudson, D. Shimshock, & C. Kiehl-Simpson arrive @ Jocketts Marine to prep sampling gear.
0930 K. Keil (USACE) arrive
0940 EPA Mudpuppy crew arrive.
WX: Sunny, temps today in 50's, Winds SW/S 15 Knots.
0910 Mudpuppy safety brief. ↳ low water levels
1040 Depart Dock.
EA: M. Stephens
S. Hudson
EPA: Joe Bonem (Captain)
Kaitlyn Karamon
Mark Lozo
Diana Mally (Chief Scientist)
1100 Anchors down @ OR19-20
1120 OR19-20 sample time
1140 Anchors up @ OR19-20
1152 Anchors down @ OR19-18.
1200 OR19-18 sample time
1235 Anchors up @ OR19-18.
1240 Head back to dock for lunch break.
1305 Back @ Jocketts Marina. Break for lunch.
1430 Back @ Jocketts Marina.
1435 Depart dock.
1457 Anchors down @ OR19-17
1507 OR19-17 sample time.
1525 Anchors up @ OR19-17.
1533 Anchor down @ OR19-16
1540 OR19-16 sample time
1550 Anchors up @ OR19-16.
1600 Anchors down @ OR19-13
1610 OR19-13 sample time
1635 Anchors up @ OR19-13.
1645 Anchors down @ OR19-12
1650 OR19-12 sample time
1720 Anchors up @ OR19-12. Headed back in.
1750 Back @ dock. Offload samples
1810 EA offsite.

10/23/19

Ottawa River 10/24/19

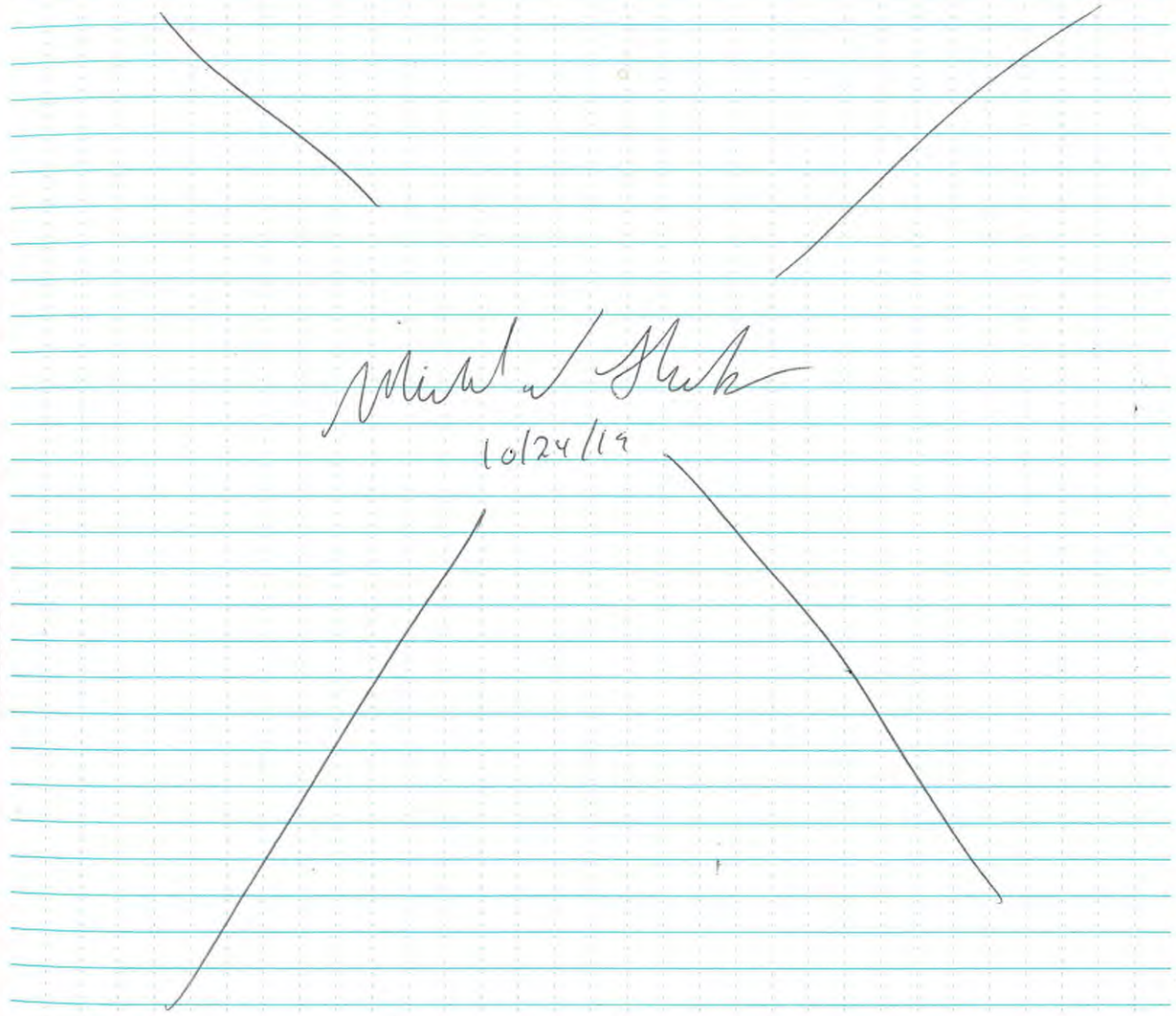
0715 M. Stephens arrive @ Sackett's Marina. Prep sampling gear. S. Hudson will stay on shore today to allow Karen Kiehl to come on mudpuppy.
WX: Today's forecast is partly cloudy, temps high 90's, winds SW 5-10 knots. Still low water levels.
0805 Depart Dock:
Personnel

EA	USACE	EPA
M. Stephens	Karen Kiehl	T. Boreen
		K. Karamon
		M. Lotto
		D. Mally

0835 Anchors down @ OR19-19.
0845 Sample time OR19-19.
0910 Anchors up @ OR19-19
0922 Anchor down @ OR19-15
0930 Sample time OR19-15
0952 Anchors up @ OR19-15.
1002 Anchors down @ OR19-10.
1010 OR19-10 Sample time
1025 Anchors up @ OR19-10.
1035 Anchors down @ OR19-09
1040 OR19-09 Sample time
1105 Anchors up @ OR19-09
1112 Anchors down @ OR19-11
1120 Sample time OR19-11. FD taken
1150 Anchors up @ OR19-11
1202 Anchors down @ OR19-14.
1205 OR19-14 Sample time, FD taken.
1218 Anchors up @ OR19-14. Head in for lunch.
1242 Back @ dock. Offload samples, break for lunch.
1423 Depart dock
1450 Anchors down @ OR19-05. ~~MAST~~ up 10/24/19
1500 OR19-05 Sample time. MS/MSD taken.
1535 Anchors up @ OR19-05.
1540 Anchors down @ OR19-03
1555 OR19-03 sample time.
1620 Anchors up @ OR19-03
1625 Anchors down @ OR19-04.
1635 FD collected. Sample time OR19-04

Ottawa River 10/24/19

1656 Anchors up @ OR19-04.
1718 Anchors down @ OR19-21.
1730 OR19-21 Sample time
1745 Anchors up @ OR19-21. Head back to dock.
1802 Back @ dock. Offload samples
1815 EA Offsite



Ottawa River 10/25/14

0730 M. Stephens arrive @ Jacketts Marina. Prep Sampling gear
WX: Cloudy, temps 50's Winds @ 7 knots
0800 Depart Dock, Head for reference Sample

Personnel
EA: M. Stephens USACE: G. Kirchi

EPA
J. Boren
K. Karaman
M. Lozo
D. Mally

0845 Anchor down @ OR19-Ref-1.
0855 OR19-Ref-1 sample time
0935 Anchor up @ OR19-Ref-1
1045 Anchor down @ OR19-06
1050 OR19-06 Sample time
1105 Anchors up @ OR19-06
1115 Anchors down @ OR19-07
1120 OR19-07 sample time.
1140 Anchors up @ OR19-07.
1150 Anchors down @ OR19-08.
1155 OR19-08 Sample time. MS/MSD taken.
1203 Anchors up @ OR19-08. Sampling Complete. Head back to Marina.
1225 Back @ Marina. Offload samples.
1300 Demob M. Stephens head back to Maryland.
2100 Back @ HV. Offload samples into top Lab.
2130 Offsite.

Mind w/ Head
10/25/14

Scale: 1 square = _____

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A2. GPS Validation

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U.S. EPA Great Lakes National Program Office
GPS Daily Check

Collect these data on at least the first day of sampling. Collecting on each sampling day is recommended.

Project Title: Ottawa River Site Characterization
Date: 10/22/19

Horizontal Control Point 1	
Benchmark ID: MC0736	Time: 14:46
Established ~~Latitude~~: Northing: 745368.39	Measured Latitude: 745368.447
Established ~~Longitude~~: Easting: 1687954.21	Measured Longitude: 1687954.240
Displacement (include UOM): ↳ State plane Ohio North →	
Horizontal Control Point 2	
Benchmark ID: MC1715	Time: 14:25
Established ~~Latitude~~: Northing: 753992.41	Measured Latitude: 753992.417
Established ~~Longitude~~: Easting: 1697651.12	Measured Longitude: 1697651.218
Displacement (include UOM): ↳ State Plane Ohio North →	
Vertical Control Point 1	
Benchmark ID: MC0736	Time: 14:46
Established Elevation: 592.6 ft NAVD88	Measured Elevation: 592.48
Displacement (include UOM):	

Vertical Control Point 2	
Benchmark ID:	Time:
Established Elevation:	Measured Elevation:
Displacement (include UOM):	
Reference Point 1	
Time:	
Physical/Locational description:	
Measured Latitude:	Measured Longitude:
Reference Point 2	
Time:	
Physical/Locational description:	
Measured Latitude:	Measured Longitude:
Reference Point 3	
Time:	
Physical/Locational description:	
Measured Latitude:	Measured Longitude:

Horizontal data information — horizontal collection method, horizontal accuracy value, and horizontal units of measure.

Vertical data information — water surface elevation, sediment surface elevation, bedrock elevation, elevation collection method, elevation accuracy value, and vertical datum code.

Reference point — a structure or recognizable feature within or near the study area that is viewable using aerial photography.

Control point — a previously surveyed location with known coordinates (e.g., a benchmark).

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A3. Sediment Data Collection Forms

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LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- 01	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO 8 Start Date/Time	Stop Date/Time
Michael Stephens	1583401	10/22/14 10:05	10/22/14 10:16
2 Drilling Subcontractor/Equipment Operator	6 Latitude/Northing/Grid	9 Sed Surface Elevation	570.35 ft
N/A	745911.94	10 Coordinate System H NAD83 V IGLD85	
3 Operator Name *(License # If Required)*	7 Longitude/Easting/Grid	11 Depth of Water, ft (start/end) 2.41 ft	
N/A	1695444.99	12 Weather (Temp, circle conditions, wind direction) Sunny/Cloudy/Rain SW	

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes
had to shift from original target

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	light brown silt, loose cohesion, high vegetative debris content, very soupy/high water content	OR19-01	

Other: Sample time 1010

1 5 gallon too
1 16 oz
1 8 oz
3 4 oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19-02	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO	
Michael Stephens	1583401	8 Start Date/Time: 10/22/19 1100	Stop Date/Time: 10/22/19 11:25
2 Drilling Subcontractor/Equipment Operator	6 Latitude/Northing/Grid	9 Sed Surface Elevation: 565.39 ft	
N/A	746432.71	10 Coordinate System: H NAD83 V IGLD85	
3 Operator Name *(License # If Required)*	7 Longitude/Easting/Grid	11 Depth of Water, ft (start/end): 7.4 @ 1101	
N/A	1695175.38	12 Weather (Temp, circle conditions, wind direction): Sunny/Cloudy/Rain	

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	medium grain sand w/ some fine sands and trace silts, light brown, trace woody debris	OR19-02	

Other: Sample time 1110

1 5 gallon tox
1 16 oz
1 8 oz
3 4 oz

LITHOLOGIC LOG
Sediment Collection Log
EA Engineering, Science, & Technology, Inc., PBC

Client Name and Project Name: GLAES / Ottawa River Reach 1

Location/Boring Name: OR19- 03

Sheet: 1 of 1

1 Geologist Name/Signature: Michael Stephens

5 Project Number: 1583401

CORE COLLECTION INFO

8 Start Date/Time: 10/24/19 1545 — Stop Date/Time: 10/24/19 1610

2 Drilling Subcontractor/Equipment Operator: EPA Mudpuppy

6 Latitude/Northing/Grid: 41° 42.584825' N

9 Sed Surface Elevation: 570.82 ft

10 Coordinate System: H NAD83 V IGLD85

3 Operator Name *(License # If Required)*: J. Bonem

7 Longitude/Easting/Grid: 83° 29.865643' W

11 Depth of Water, ft (start/end): 3.0 @ 1549

12 Weather (Temp, circle conditions, wind direction): P. Clouds — Sunny/Cloudy/Rain — light wind

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: ____ -ft barrel ____ -in diameter
- [ ] Core: ____ -ft barrel ____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x ____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval (Depth)	Description of Materials (Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions)	Sample ID	USCS Code
Grab Sample (~0-0.5 ft)	light brown, silts on top of medium brown clay, medium cohesion, SAV w/ roots, no odor, no sheen	OR19-03	

Other: 1555 sample time

1 5 gallon tox

1 16 oz

1 8 oz

3 4 oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- 04	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO 8 Start Date/Time	Stop Date/Time
Michael Stephens	1583401	10/24/19 1625	10/24/19 1650
2 Drilling Subcontractor/Equipment Operator	6 Latitude/Northing/Grid	9 Sed Surface Elevation	570.32 ft
EPA Mudpuppy	41° 42.669694' N	10 Coordinate System H NAD83 V IGLD85	
3 Operator Name *(License # If Required)*	7 Longitude/Easting/Grid	11 Depth of Water, ft (start/end)	3.5 @1628
J. Boren	83° 29.800608' W	12 Weather (Temp, circle conditions, wind direction)	P. Cloudy Sunny/Cloudy/Rain 2 kts W

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	light brown silts over medium brown clay, no odor/no sheen; medium cohesion	OR19-04	

Other: 1635 sample time

1	5 gallon	tox
1	16 oz	
1	8 oz	
3	4 oz	

FD collected

1	16 oz
1	8 oz
3	4 oz

EA LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19-05	Sheet 1 of 1
1 Geologist Name/Signature: Michael Stephens	5 Project Number: 1583401	**CORE COLLECTION INFO** 8 **Start Date/Time**: 10/24/19 1450 — **Stop Date/Time**: 10/24/19 1535	
2 Drilling Subcontractor/Equipment Operator: EPA Mudpuppy	6 Latitude/Northing/Grid: 41° 42.583179' N	9 Sed Surface Elevation: 572.19 ft 10 Coordinate System H NAD83 V IGLD85 11 Depth of Water, ft (start/end): 1.6 @ 1455	
3 Operator Name *(License # If Required)*: J. Bonem	7 Longitude/Easting/Grid: 83° 29.731506' W	12 Weather (Temp, circle conditions, wind direction): P. Cloudy (Sunny/Cloudy/Rain) 3 Knots	

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/(Ponar)/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	**Description of Materials** Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	**Sample ID**	**USCS** *Code*
Grab Sample (~0-0.5 ft)	medium brown, loose silts, high content of vegetative matter, moss like mats, high water content, woody debris, loose cohesion (soupy consistency), no sheen, no odor.	OR19-05	

Other: 1500 Sample time

MS/MSD of 10/24/19 taken

1 5 gallon tote

1 16 oz

1 8 oz

3 4 oz

2 8 oz

6 4 oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- 06	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO 8 Start Date/Time	Stop Date/Time
Michael Stephens	1583401	10/25/19 1045	10/25/19 1100
2 Drilling Subcontractor/Equipment Operator	6 Latitude/Northing/Grid	9 Sed Surface Elevation 567.64 ft	
EPH Mudpuppy	41° 42.670977' N	10 Coordinate System H NAD83 V IGLD85	
3 Operator Name *(License # If Required)*	7 Longitude/Easting/Grid	11 Depth of Water, ft (start/end) 5.4 @ 1048	
J. Boreen	83° 29.667551' W	12 Weather (Temp, circle conditions, wind direction) Sunny/Cloudy/Rain 65 k	

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	Light brown silts over Medium brown silty-clay w/ Medium cohesion. No odor. No sheen.	OR19-06	

Other: 1050 sample time

1 16 oz
1 8 oz
2 4 oz

LITHOLOGIC LOG
Sediment Collection Log
EA Engineering, Science, & Technology, Inc., PBC

Client Name and Project Name: GLAES / Ottawa River Reach 1

Location/Boring Name: OR19- 07

Sheet: 1 of 1

1 Geologist Name/Signature: Michael Stephens

5 Project Number: 1583401

CORE COLLECTION INFO

8 **Start Date/Time**: 10/25/14 1115 — **Stop Date/Time**: 10/25/14 1135

2 Drilling Subcontractor/Equipment Operator: EPA Mudpuppy

6 Latitude/Northing/Grid: 41° 42.758045'N

9 Sed Surface Elevation: 568.93 ft

10 Coordinate System: H NAD83 V IGLD85

11 Depth of Water, ft (start/end): 4.0 e 1115

3 Operator Name *(License # If Required)*: J. Boren

7 Longitude/Easting/Grid: 83° 29.604175'W

12 Weather (Temp, circle conditions, wind direction): Sunny/Cloudy/Rain E 5K

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100 %

16 Location Notes

Interval (Depth)	Description of Materials (Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions)	Sample ID	USCS Code
Grab Sample (~0-0.5 ft)	Light brown Silts ow Medium brown Silty clay w/ medium cohesion. No odors Sheen.	OR19-07	

Other: 1120 Sample time

1 5 gallon tub

1 16 oz

1 8 oz

3 4 oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- 08	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO 8 Start Date/Time	Stop Date/Time
Michael Stephens	1583401	10/25/19 1145	10/25/19 1200
2 Drilling Subcontractor/Equipment Operator	6 Latitude/Northing/Grid	9 Sed Surface Elevation	568.4 ft
GPA Mudpuppy	41° 42.758277' N	10 Coordinate System H NAD83 V IGLD85	
3 Operator Name *(License # If Required)*	7 Longitude/Easting/Grid	11 Depth of Water, ft (start/end)	4.4 @ 1147
J. Boreen	83° 29.470108' W	12 Weather (Temp, circle conditions, wind direction) Sunny/Cloudy/Rain	~5K

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	Light brown silts over medium brown ~~silts w/ cly~~ 10/25/19 silty-clay w/ medium cohesion. No odor, no sheen.	OR19-08	

Other: 1155 Sample time

1 16 oz

~~4~~ 4 4 oz

MS/MSD

* 8 4 oz

* Ran out of 8 oz jars, used 2 4 oz instead

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- 09	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO 8 Start Date/Time / Stop Date/Time
Michael Stephens	1583401	10/24/19 1035 / 10/24/19 1055
2 Drilling Subcontractor/Equipment Operator	6 Latitude/Northing/Grid	9 Sed Surface Elevation 569.11 ft
EPA Mudpuppy	41° 42.759072' N	10 Coordinate System H NAD83 V IGLD85
3 Operator Name *(License # If Required)*	7 Longitude/Easting/Grid	11 Depth of Water, ft (start/end) 3.3 @ 1037
J. Bowen	83° 29.340194' W	12 Weather (Temp, circle conditions, wind direction) P. Cloudy Sunny/Cloudy/Rain ~5 Kts

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	light brown silty over medium brown silty-clay w/ medium cohesion. No odor. No sheen.	OR19-09	

Other: ~~1024~~ est 10/24/19 1040 Sample time

1 5 gallon tub

1 16 oz

1 8 oz

3 4 oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- 10	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO	
Michael Stephens	1583401	8 Start Date/Time 10/24/19 1005	Stop Date/Time 10/24/19
2 Drilling Subcontractor/Equipment Operator	6 Latitude/Northing/Grid	9 Sed Surface Elevation 569.75 ft	
EPA Mudpuppy	41° 42.760012' N	10 Coordinate System H NAD83 V IGLD85	
3 Operator Name *(License # If Required)*	7 Longitude/Easting/Grid	11 Depth of Water, ft (start/end) 2.5 e 1007	
J. Bonem	83° 29.209790' W	12 Weather (Temp, circle conditions, wind direction) P. Cloudy Sunny/Cloudy/Rain W 5K	

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	light brown silts over medium brown silty-clay w/ medium cohesion. No odor. No sheen.	OR19-10	

Other: 1010 Sample time

1 16 oz

1 8 oz

2 4 oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- 11	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO	
Michael Stephens	1583401	8 Start Date/Time: 10/24/19 1110	Stop Date/Time: 10/24/19 1140
2 Drilling Subcontractor/Equipment Operator: EPA Mudpuppy	6 Latitude/Northing/Grid: 41° 42.837488' N	9 Sed Surface Elevation: 570.28 ft	
		10 Coordinate System H NAD83 V IGLD85	
3 Operator Name *(License # If Required)*: J. Bonem	7 Longitude/Easting/Grid: 83° 29.406724' W	11 Depth of Water, ft (start/end): 2.3 @ 1114	
		12 Weather (Temp, circle conditions, wind direction): P. Cloudy Sunny/Cloudy/Rain SW 5kts	

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes: have to shift due to low water levels

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	light brown silts over loose cohesive clays with fine grain sands & silts, trace woody debris. No odor, no sheen.	OR19-11	

Other: 1120 Sample time

1 5 gallon tox
1 16 oz
1 8 oz
3 4 oz

FD w/ AVS/SEM collected

1 16 oz
1 8 oz
3 4 oz

LITHOLOGIC LOG
Sediment Collection Log
EA Engineering, Science, & Technology, Inc., PBC

Client Name and Project Name: GLAES / Ottawa River Reach 1

Location/Boring Name: OR19- 12

Sheet: 1 of 1

1 Geologist Name/Signature: Michael Stephens

5 Project Number: 1583401

CORE COLLECTION INFO

8 Start Date/Time: 10/23/19 1645

Stop Date/Time: 10/23/19 1715

2 Drilling Subcontractor/Equipment Operator: EPA Mudpuppy

6 Latitude/Northing/Grid: 41° 42.845662' N

9 Sed Surface Elevation: 568.84 ft

10 Coordinate System: H NAD83 V IGLD85

11 Depth of Water, ft (start/end): 2.9 e 1703

3 Operator Name *(License # If Required)*: J. Boreen

7 Longitude/Easting/Grid: 83° 29.27727'W

12 Weather (Temp, circle conditions, wind direction): P. Cloudy (Sunny/Cloudy/Rain) SW 15 Kts

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: ____ -ft barrel ____ -in diameter
- [ ] Core: ____ -ft barrel ____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x ____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft): 0.5

14 Recovery (ft): 0.5

15 % Recovery: 100%

16 Location Notes

Interval (Depth)	Description of Materials (Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions)	Sample ID	USCS Code
Grab Sample (~0-0.5 ft)	Medium brown silts over clay with some silts. No sheen, no odor. Medium cohesion.	OR19-12	

Other: 1650 Sample time

1 16 oz
1 8 oz
2 4 oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- 13	Sheet 1 of 1

1 Geologist Name/Signature Michael Stephens	5 Project Number 1583401	CORE COLLECTION INFO 8 Start Date/Time: 10/23/14 1600 — Stop Date/Time: 10/23/14	
2 Drilling Subcontractor/Equipment Operator EPA Mudpuppy	6 Latitude/Northing/Grid 41° 42.846911' N	9 Sed Surface Elevation: 569.13 ft 10 Coordinate System: H NAD83 V IGLD85	
3 Operator Name *(License # If Required)* J. Borem	7 Longitude/Easting/Grid 83° 29.143966' W	11 Depth of Water, ft (start/end) 2.5 @ 1605	
		12 Weather (Temp, circle conditions, wind direction) P. Cloudy Sunny/Cloudy/Rain SW 15 Knots	

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	light brown, loose silts over med. brown clay w/silts, medium consistency, no odor, no sheen	OR19-13	

Other: 1610 Sample time

1 5 gallon tote

1 16 oz

1 8 oz

3 4 oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- 14	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO 8 Start Date/Time	Stop Date/Time
Michael Stephens	1583401	10/24/14 1200	10/24/14
2 Drilling Subcontractor/Equipment Operator	6 Latitude/Northing/Grid	9 Sed Surface Elevation ~~+7~~ 571.09 ft	
EPH Mud Puppy	41° 42.925501' N	10 Coordinate System H NAD83 V IGLD85	
3 Operator Name *(License # If Required)*	7 Longitude/Easting/Grid	11 Depth of Water, ft (start/end) 1.7e 1202	
J. Bonem	83° 29.321254' W	12 Weather (Temp, circle conditions, wind direction) P. Cloudy Sunny/Cloudy/Rain W 5K	

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes
Have to shift due to low water levels

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	Soft silts (light brown) overlying Medium brown silty-clay w/ medium cohesion. No odor, No sheen.	OR19-14	

Other: 1205 Sample time FD taken

1	16	oz	1	16	oz
1	8	oz	1	8	oz
2	4	oz	2	4	oz

EA

LITHOLOGIC LOG
Sediment Collection Log
EA Engineering, Science, & Technology, Inc., PBC

Client Name and Project Name: GLAES / Ottawa River Reach 1

Location/Boring Name: OR19- 15

Sheet: 1 of 1

1 Geologist Name/Signature: Michael Stephens

5 Project Number: 1583401

CORE COLLECTION INFO

8 Start Date/Time: 10/24/19 0925

Stop Date/Time: 10/24/19 0950

2 Drilling Subcontractor/Equipment Operator: EPA Mudpuppy

6 Latitude/Northing/Grid: 41° 42.930798' N

9 Sed Surface Elevation: 569.56 ft

10 Coordinate System: H NAD83 V IGLD85

3 Operator Name *(License # If Required)*: J. Boren

7 Longitude/Easting/Grid: 83° 29.209881' W

11 Depth of Water, ft (start/end): 2.4 @ 0926

12 Weather (Temp, circle conditions, wind direction): P Cloudy (Sunny/Cloudy/Rain) W 5K.

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: ____ -ft barrel ____ -in diameter
- [ ] Core: ____ -ft barrel ____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x ____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft): 0.5

14 Recovery (ft): 0.5

15 % Recovery: 100%

16 Location Notes

Interval (Depth)	Description of Materials (Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions)	Sample ID	USCS Code
Grab Sample (~0-0.5 ft)	light brown silts over medium brown clays w/ some silts. Medium cohesion. No odor. No sheen.	OR19-15	

Other: 0930 Sample time

1 5 gallon tub

1 16 oz

1 8 oz

3 4 oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- 16	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO 8 Start Date/Time	Stop Date/Time
Michael Stephens	1583401	10/23/19 1535	10/23/19

2 Drilling Subcontractor/Equipment Operator	6 Latitude/Northing/Grid	9 Sed Surface Elevation	568.76 ft
EPA Mudpuppy	41° 42.933040' N	10 Coordinate System H NAD83 V IGLD85	
3 Operator Name *(License # If Required)*	7 Longitude/Easting/Grid	11 Depth of Water, ft (start/end)	
J. Borem	83° 29.079055' W	2.9 @ 1535	
		12 Weather (Temp, circle conditions, wind direction) Sunny/Cloudy/Rain SW 15	

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: ____ -ft barrel ____ -in diameter
- [ ] Core: ____ -ft barrel ____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x ____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	light brown silts, over medium brown clays w/ silts, medium cohesion on clays, no odor, no sheen	OR19-16	

Other: 1540 Sample time

1 16 oz

1 8 oz

2 4 oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- 17	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO	
Michael Stephens	1583401	8 Start Date/Time: 10/23/19	Stop Date/Time: 10/23/19
2 Drilling Subcontractor/Equipment Operator	6 Latitude/Northing/Grid	9 Sed Surface Elevation: 569.33 ft	
EPA Mudpuppy	41° 43.017154' N	10 Coordinate System: H NAD83 V IGLD85	
3 Operator Name *(License # If Required)*	7 Longitude/Easting/Grid	11 Depth of Water, ft (start/end): 2.3 @ 1504	
J. Boreen	83° 29.145836' W	12 Weather (Temp, circle conditions, wind direction): (Sunny)/Cloudy/Rain SW 15-20kts	

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	medium brown, silts ~~w/ clay~~ 5ft 10/23/19 over silts w/clay medium cohesion, no odors, no sheen	OR19-17	

Other: 1507 Sample time

1 16 oz

1 8 oz

2 4oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- 18	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO	
Michael Stephens	1583401	8 Start Date/Time: 10/23/14 11:55	Stop Date/Time: 10/23/14 12:25
2 Drilling Subcontractor/Equipment Operator: EPH Mudpuppy	6 Latitude/Northing/Grid: 41° 43.020175' N	9 Sed Surface Elevation: 568.34 ft	
		10 Coordinate System: H NAD83 V IGLD85	
3 Operator Name *(License # If Required)*: J. Bonen	7 Longitude/Easting/Grid: 83° 29.010330' W	11 Depth of Water, ft (start/end): 3.2 @ 1159	
		12 Weather (Temp, circle conditions, wind direction): Sunny/Cloudy/Rain SW 15kts	

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	medium brown, clays & silts loose silts over clay, no odor no sheen	OR19-18	

Other: Sample time 1200

1 5 gallon tox
1 16 oz
1 8 oz
3 4 oz

EA LITHOLOGIC LOG
Sediment Collection Log
EA Engineering, Science, & Technology, Inc., PBC

Client Name and Project Name: GLAES / Ottawa River Reach 1

Location/Boring Name: OR19- 19

Sheet: 1 of 1

1 Geologist Name/Signature: Michael Stephens

5 Project Number: 1583401

CORE COLLECTION INFO

8 Start Date/Time: 10/24/14 0830 — Stop Date/Time: 10/24/14 0900

2 Drilling Subcontractor/Equipment Operator: EPA Mudpuppy

6 Latitude/Northing/Grid: 41° 43.221043' N

9 Sed Surface Elevation: 567.49 ft

10 Coordinate System: H NAD83 V IGLD85

3 Operator Name *(License # If Required)*: J. Bonem

7 Longitude/Easting/Grid: 83° 29.013552' W

11 Depth of Water, ft (start/end): 4.1 @ 0838

12 Weather (Temp, circle conditions, wind direction): Sunny/Cloudy/Rain 5w 5 Kts

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes: Station shifted ~10 ft due to submerged utility

Interval (Depth)	Description of Materials (Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions)	Sample ID	USCS Code
Grab Sample (~0-0.5 ft)	light brown silts over medium brown clays with silts. Medium cohesive clays. No odor, no sheen.	OR19-19	

Other: 0845 Sample time

1 5 gallon tub

1 16 oz

1 8 oz

3 4 oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- 20	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO 8 Start Date/Time	Stop Date/Time
Michael Stephens	1583401	10/23/14 1109	10/23/14 1135
2 Drilling Subcontractor/Equipment Operator	6 Latitude/Northing/Grid	9 Sed Surface Elevation	567.57 ft
EPA Mudpuppy	41° 43.367412' N	10 Coordinate System H NAD83 V IGLD85	
3 Operator Name *(License # If Required)*	7 Longitude/Easting/Grid	11 Depth of Water, ft (start/end) 4.2 @ 1109	
J. Bonan	83° 28.906056' W	12 Weather (Temp, circle conditions, wind direction) Sunny/Cloudy/Rain	

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	light brown, mostly silts, some clays medium - loose cohesion, no odor, no sheen	OR19-20	

Other:

Sample time 1120

1 16 oz

1 8 oz

~~2~~ 4 oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19-~~06~~ 21	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO
Michael Stephens	1583401	8 Start Date/Time: 10/24/19 1718 — Stop Date/Time: 10/24/19
2 Drilling Subcontractor/Equipment Operator: EPA Mudpuppy	6 Latitude/Northing/Grid: 41° 43.510618' N	9 Sed Surface Elevation: 569.16 ft
		10 Coordinate System: H NAD83 V IGLD85
3 Operator Name *(License # If Required)*: J. Bonen	7 Longitude/Easting/Grid: 83° 28.795796' W	11 Depth of Water, ft (start/end): 4.5 @ 1720
		12 Weather (Temp, circle conditions, wind direction): (Sunny)/Cloudy/Rain 1 Knot

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	light brown, silts over medium brown silty clay, medium cohesion, trace woody debris, no odor, no sheen	OR19-~~06~~ 21	

Other: 1730 Sample time

1 5 gallon tote
1 16 oz
1 8 oz
3 4 oz

LITHOLOGIC LOG *Sediment Collection Log* *EA Engineering, Science, & Technology, Inc., PBC*	Client Name and Project Name GLAES Ottawa River Reach 1	Location/Boring Name OR19- Ref-1	Sheet 1 of 1

1 Geologist Name/Signature	5 Project Number	CORE COLLECTION INFO 8 Start Date/Time	Stop Date/Time
Michael Stephens	1583401	10/25/14 0845	10/25/14 0920
2 Drilling Subcontractor/Equipment Operator	6 Latitude/Northing/Grid	9 Sed Surface Elevation 549.21 ft	
EPA Mudpuppy	41° 44.969852' N	10 Coordinate System H NAD83 V IGLD85	
3 Operator Name *(License # If Required)*	7 Longitude/Easting/Grid	11 Depth of Water, ft (start/end) 24.5' @ 0850	
J. Bowen	83° 16.443988' W	12 Weather (Temp, circle conditions, wind direction) Sunny/Cloudy/Rain ~ 10K	

4 Sampling Equipment and Methodology (Check One)

- [ ] Rotosonic: _____ -ft barrel _____ -in diameter
- [ ] Core: _____ -ft barrel _____ -in diameter Manual Push/Vibracore
- [x] Grab Sample: 0 -ft x _____ -ft x 0.5 -ft Box/Ponar/Van Veen/Other
- [ ] Other:
- [ ] Sample Collection Method:

13 Boring Depth (ft)	14 Recovery (ft)	15 % Recovery
0.5	0.5	100%

16 Location Notes

Interval *(Depth)*	Description of Materials Major Sediment type, color, presence of SAV/rock/wood, odor/sheen, other inclusions	Sample ID	USCS *Code*
Grab Sample (~0-0.5 ft)	Medium brown clays, some silts. Medium cohesion. No odor, no sheen.	OR19-Ref-1	

Other: Sample time 0855

1 5 gallon tub

1 16 oz

1 8 oz

3 4 oz

Appendix B

Photographic Record

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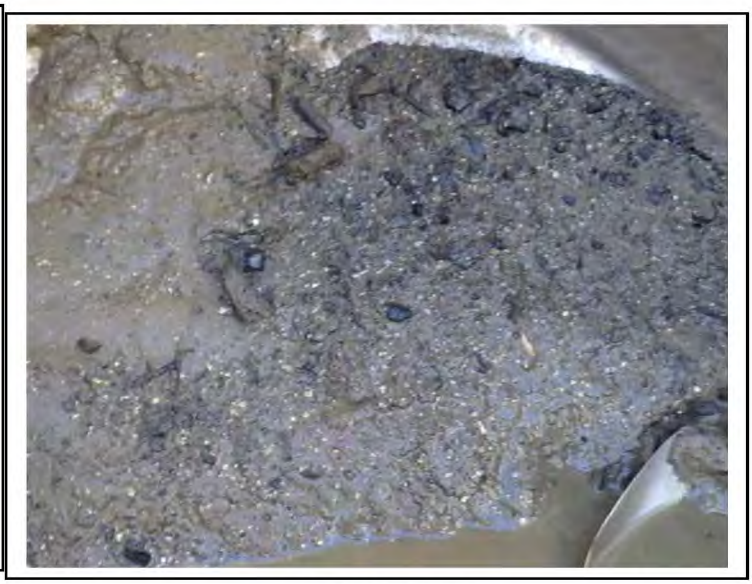
Surface Sediment Samples

OR19-01-SURF



OR19-02-SURF

OR19-03-SURF

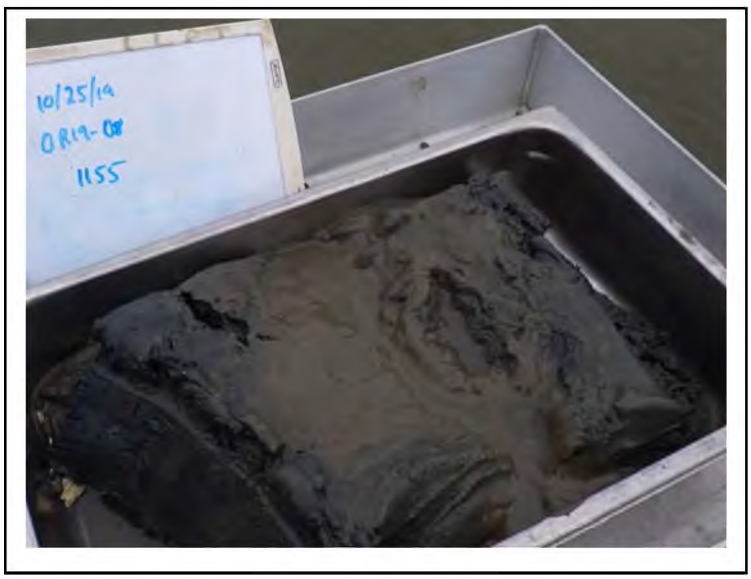
OR19-04-SURF

Surface Sediment Samples

OR19-05-SURF

OR19-06-SURF

OR19-07-SURF



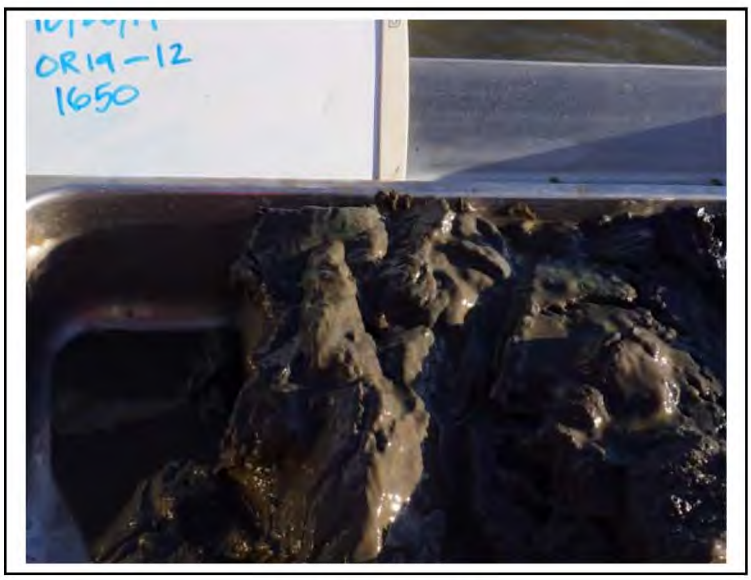
OR19-08-SURF

Surface Sediment Samples

OR19-09-SURF

OR19-10-SURF

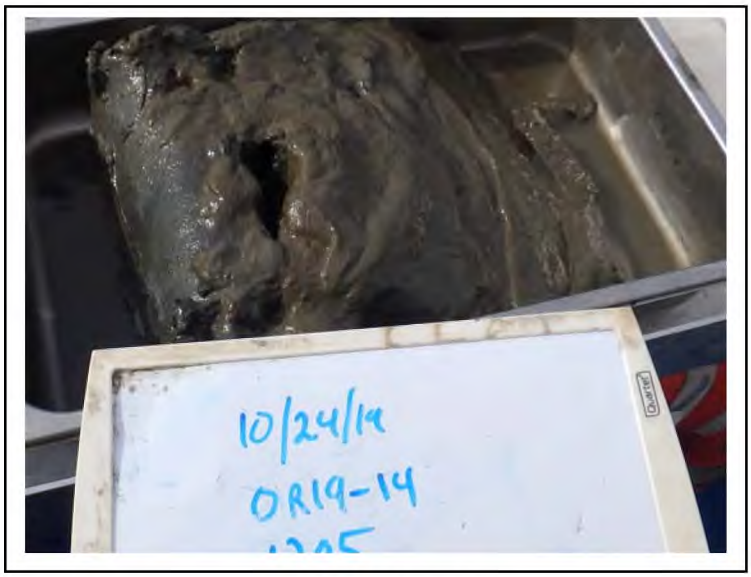
OR19-11-SURF



OR19-12-SURF

Surface Sediment Samples

OR19-13-SURF

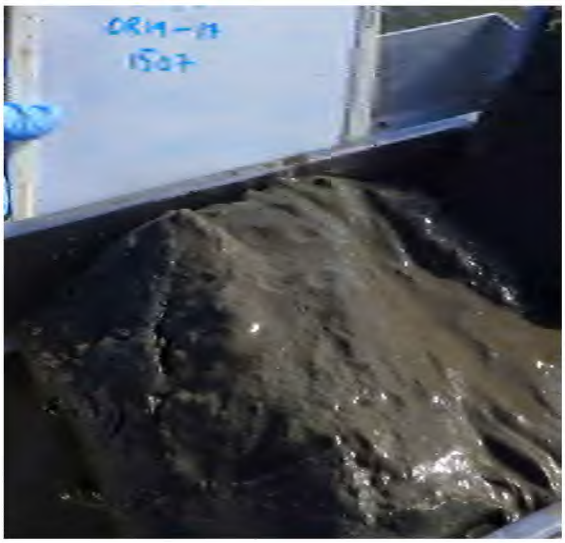


OR19-14-SURF

OR19-15-SURF

OR19-16-SURF

Surface Sediment Samples



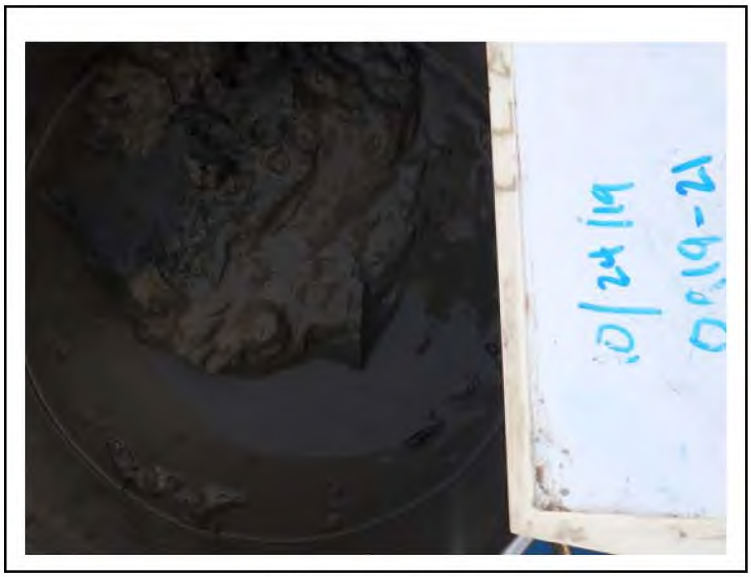
OR19-17-SURF

OR19-18-SURF

OR19-19-SURF

OR19-20-SURF

Surface Sediment Samples



OR19-21-SURF

OR19-REF-1

Site Characterization Activities

Sediment Collection from Location OR19-01 and OR19-02 using Jon Boat

Sediment Collection Using Ponar on Mud Puppy

Sediment collection for Bioassay analysis

Sediment Collection for SEM/AVS before sediment homogenization

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Appendix C

Particle Size Data and Graphs

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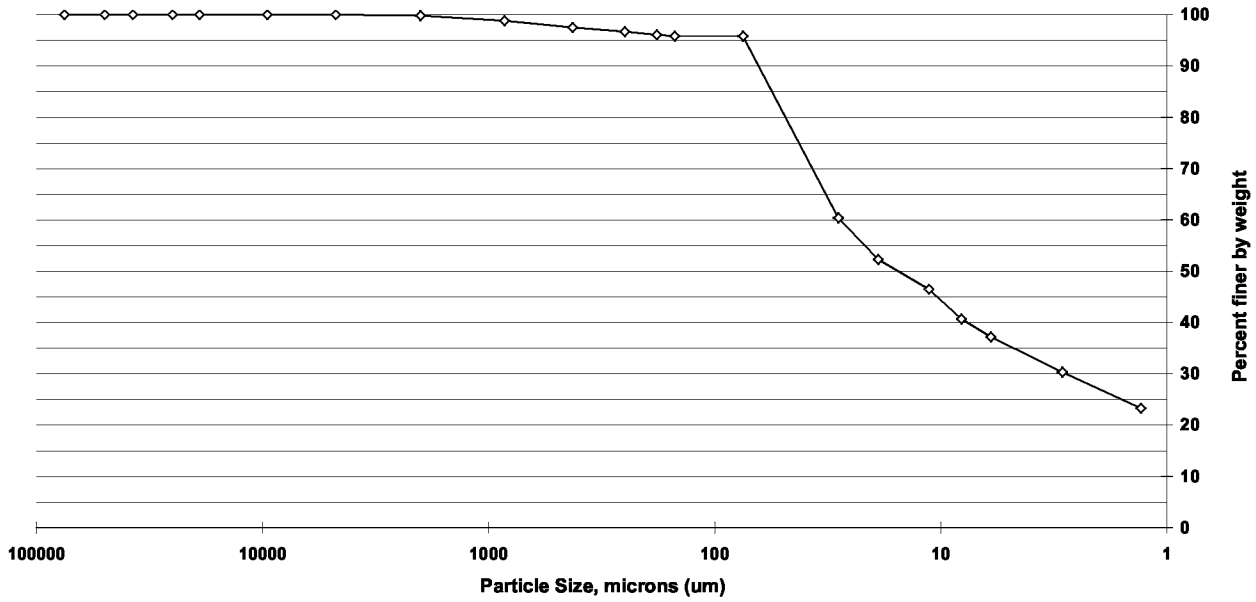
Particle Size of Soils by ASTM D422

Sample ID:	OR19-REF1	**Percent Solids:**	44.2%	**Date Received:**	10/29/2019
Lab ID:	200-51234-E-8	**Specific Gravity:**	2.650	**Start Date:**	11/12/2019
				End Date:	11/20/2019

Shape (> #10): na

Non-soil material: shell

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.8	0.2
#20	850	98.8	1.0
#40	425	97.5	1.3
#60	250	96.7	0.8
#80	180	96.1	0.6
#100	150	95.8	0.3
#200	75	95.8	0.0
Hyd1	28.4	60.4	35.4
Hyd2	18.9	52.3	8.1
Hyd3	11.3	46.5	5.8
Hyd4	8.1	40.7	5.8
Hyd5	6	37.2	3.5
Hyd6	2.9	30.3	6.9
Hyd7	1.3	23.3	7.0

Soil Classification	Percent of sample
Gravel	0.0
Sand	4.2
Coarse Sand	0.2
Medium Sand	2.3
Fine Sand	1.7
Silt	58.6
Clay	37.2

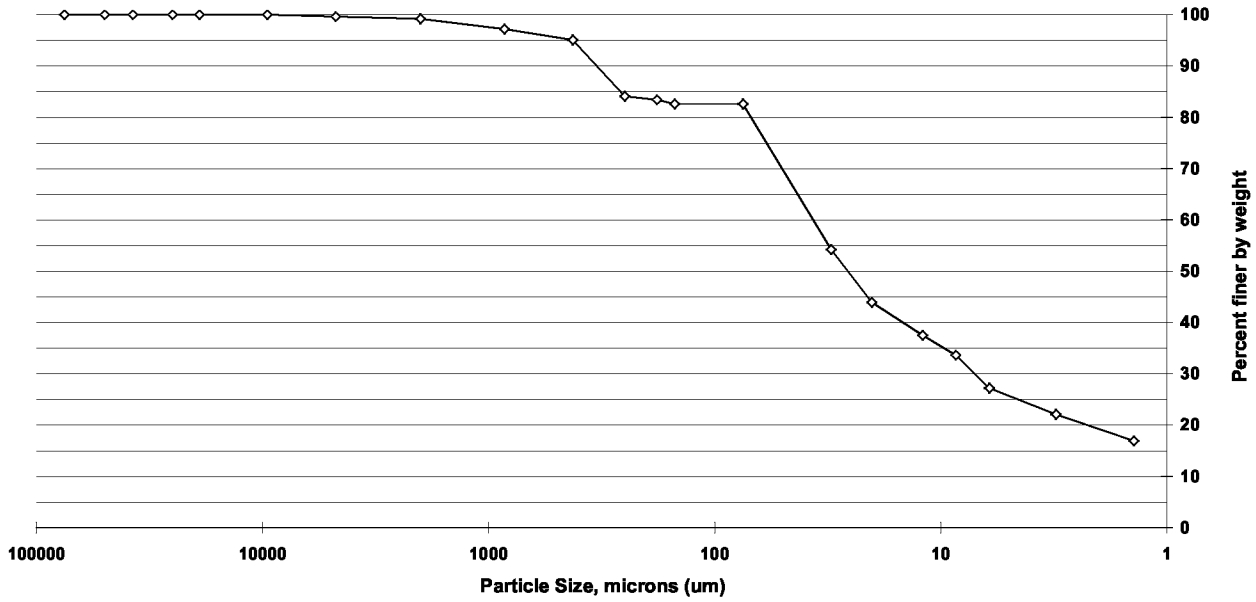
Particle Size of Soils by ASTM D422

Sample ID:	OR19-01-SURF	**Percent Solids:**	31.5%	**Date Received:**	10/25/2019
Lab ID:	200-51169-E-1	**Specific Gravity:**	2.650	**Start Date:**	11/8/2019
				End Date:	11/15/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	99.6	0.4
#10	2000	99.2	0.4
#20	850	97.2	2.0
#40	425	95.1	2.1
#60	250	84.1	11.0
#80	180	83.4	0.7
#100	150	82.6	0.8
#200	75	82.6	0.0
Hyd1	30.5	54.2	28.4
Hyd2	20.2	43.9	10.3
Hyd3	12	37.5	6.4
Hyd4	8.6	33.6	3.9
Hyd5	6.1	27.2	6.4
Hyd6	3.1	22.1	5.1
Hyd7	1.4	16.9	5.2

Soil Classification	Percent of sample
Gravel	0.4
Sand	17.0
Coarse Sand	0.4
Medium Sand	4.1
Fine Sand	12.5
Silt	55.4
Clay	27.2

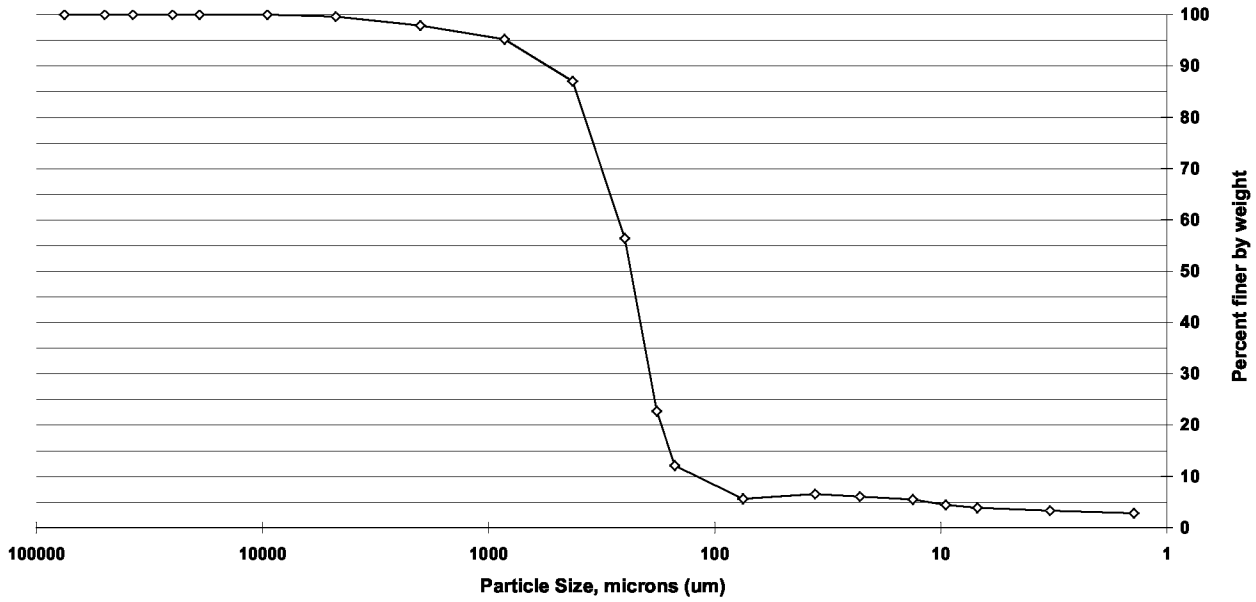
Particle Size of Soils by ASTM D422

Sample ID:	OR19-02-SURF	**Percent Solids:**	71.5%	**Date Received:**	10/25/2019
Lab ID:	200-51169-E-2	**Specific Gravity:**	2.650	**Start Date:**	11/8/2019
				End Date:	11/15/2019

Shape (> #10): angular

Non-soil material: plant, shell

Hardness (> #10): hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	99.6	0.4
#10	2000	97.9	1.7
#20	850	95.2	2.7
#40	425	87.0	8.2
#60	250	56.4	30.6
#80	180	22.7	33.7
#100	150	12.1	10.6
#200	75	5.6	6.5
Hyd1	36	6.6	-1.0
Hyd2	22.8	6.0	0.5
Hyd3	13.3	5.5	0.5
Hyd4	9.5	4.4	1.1
Hyd5	6.9	3.9	0.5
Hyd6	3.3	3.3	0.5
Hyd7	1.4	2.8	0.5

Soil Classification	Percent of sample
Gravel	0.4
Sand	94.0
Coarse Sand	1.7
Medium Sand	10.9
Fine Sand	81.4
Silt	1.7
Clay	3.9

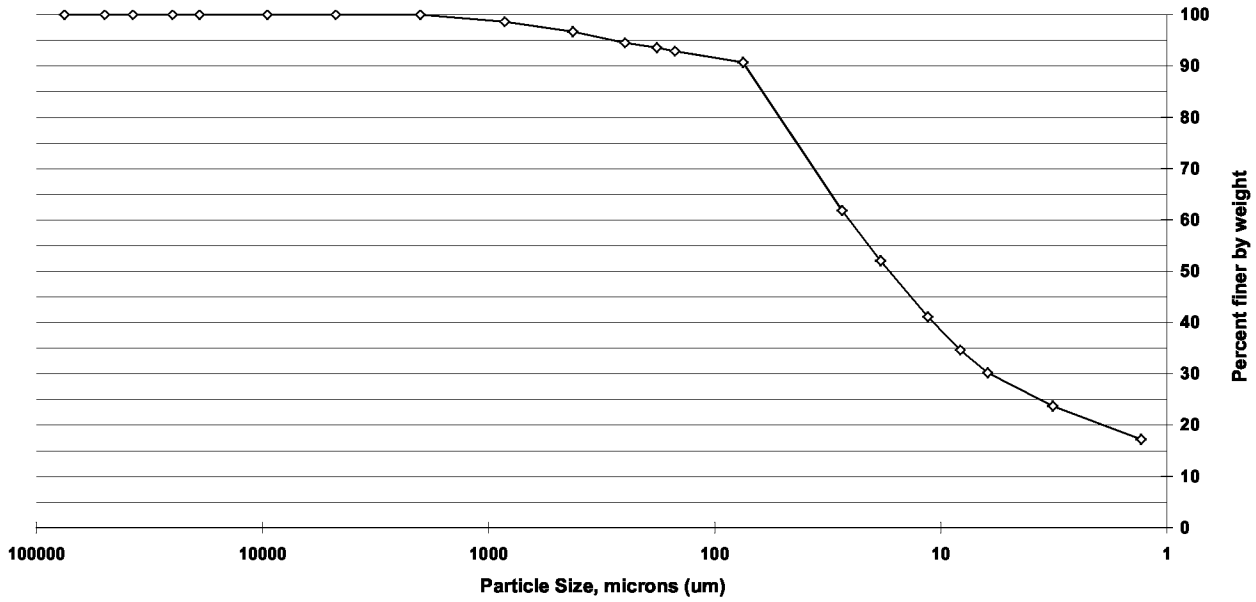
Particle Size of Soils by ASTM D422

Sample ID:	OR19-03-SURF	**Percent Solids:**	42.9%	**Date Received:**	10/29/2019
Lab ID:	200-51234-E-1	**Specific Gravity:**	2.650	**Start Date:**	11/11/2019
				End Date:	11/18/2019

Shape (> #10): na

Non-soil material: na

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	98.6	1.4
#40	425	96.7	1.9
#60	250	94.5	2.2
#80	180	93.6	0.9
#100	150	92.9	0.7
#200	75	90.7	2.2
Hyd1	27.3	61.8	28.9
Hyd2	18.5	52.0	9.8
Hyd3	11.4	41.1	10.9
Hyd4	8.2	34.6	6.5
Hyd5	6.2	30.2	4.4
Hyd6	3.2	23.7	6.5
Hyd7	1.3	17.2	6.5

Soil Classification	Percent of sample
Gravel	0.0
Sand	9.3
Coarse Sand	0.0
Medium Sand	3.3
Fine Sand	6.0
Silt	60.5
Clay	30.2

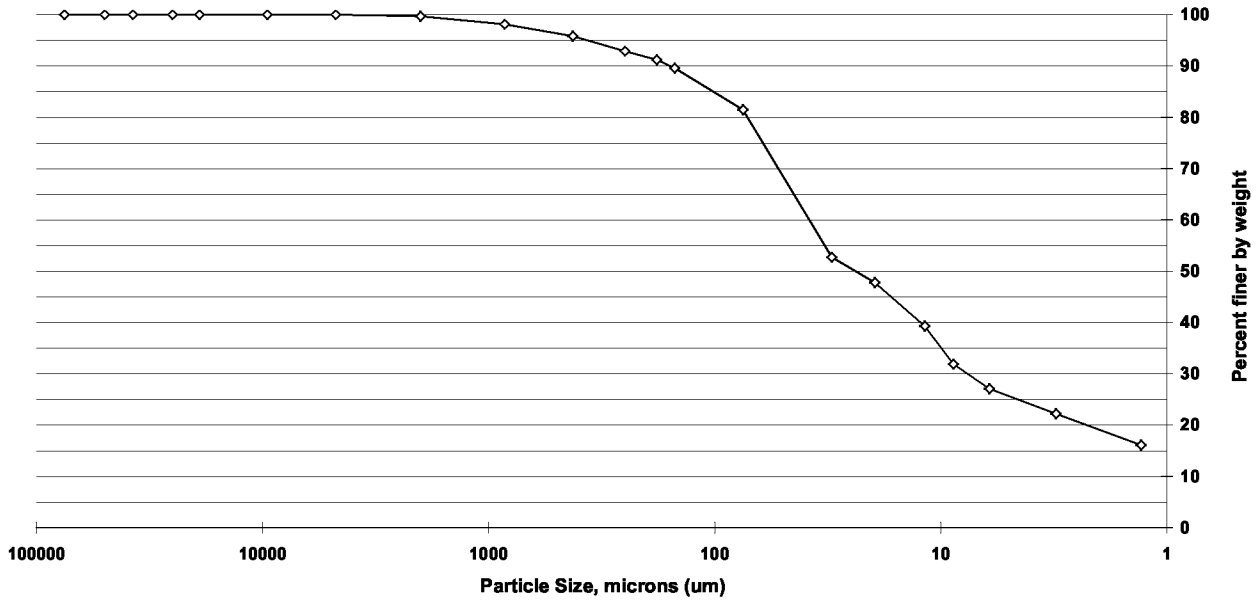
Particle Size of Soils by ASTM D422

Sample ID:	OR19-04-SURF	**Percent Solids:**	42.9%	**Date Received:**	10/29/2019
Lab ID:	200-51234-E-5	**Specific Gravity:**	2.650	**Start Date:**	11/12/2019
				End Date:	11/20/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.7	0.3
#20	850	98.1	1.6
#40	425	95.8	2.3
#60	250	92.9	2.9
#80	180	91.2	1.7
#100	150	89.6	1.6
#200	75	81.5	8.1
Hyd1	30.3	52.7	28.8
Hyd2	19.6	47.8	4.9
Hyd3	11.8	39.3	8.5
Hyd4	8.8	31.9	7.4
Hyd5	6.1	27.1	4.8
Hyd6	3.1	22.2	4.9
Hyd7	1.3	16.1	6.1

Soil Classification	Percent of sample
Gravel	0.0
Sand	18.5
Coarse Sand	0.3
Medium Sand	3.9
Fine Sand	14.3
Silt	54.4
Clay	27.1

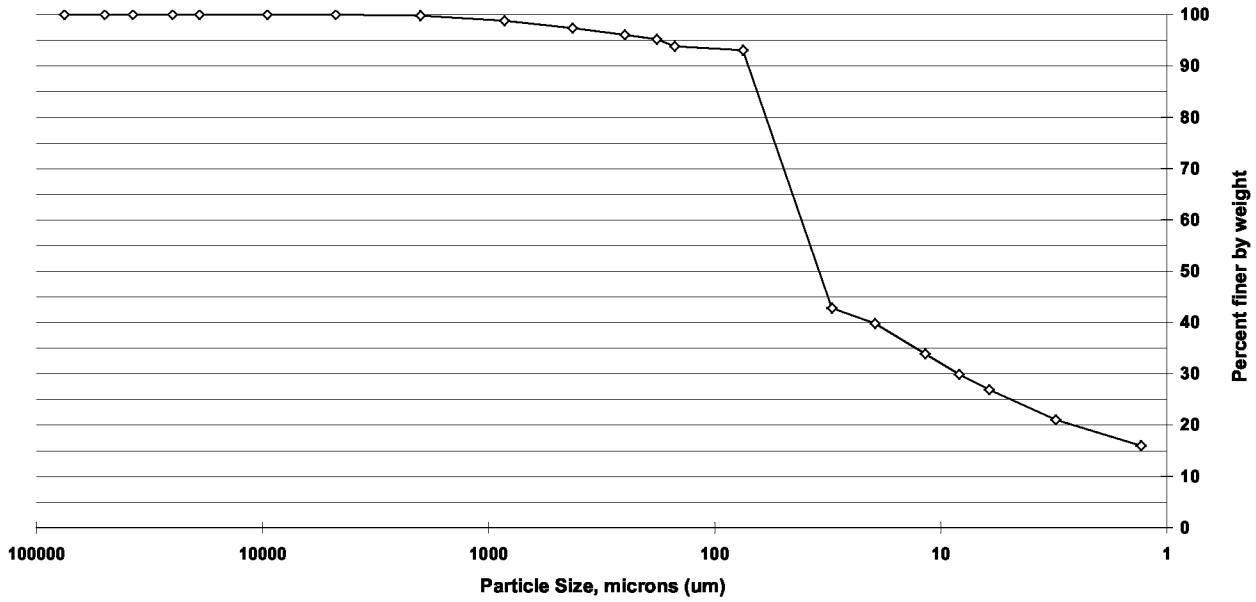
Particle Size of Soils by ASTM D422

Sample ID:	OR19-04-SURFFD	**Percent Solids:**	43.3%	**Date Received:**	10/29/2019
Lab ID:	200-51234-E-6	**Specific Gravity:**	2.650	**Start Date:**	11/12/2019
				End Date:	11/20/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.8	0.2
#20	850	98.8	1.0
#40	425	97.4	1.4
#60	250	96.1	1.3
#80	180	95.2	0.9
#100	150	93.8	1.4
#200	75	93.1	0.7
Hyd1	30.3	42.8	50.3
Hyd2	19.5	39.8	3.0
Hyd3	11.7	33.9	5.9
Hyd4	8.3	29.9	4.0
Hyd5	6.1	26.9	3.0
Hyd6	3.1	21.0	5.9
Hyd7	1.3	16.0	5.0

Soil Classification	Percent of sample
Gravel	0.0
Sand	6.9
Coarse Sand	0.2
Medium Sand	2.4
Fine Sand	4.3
Silt	66.2
Clay	26.9

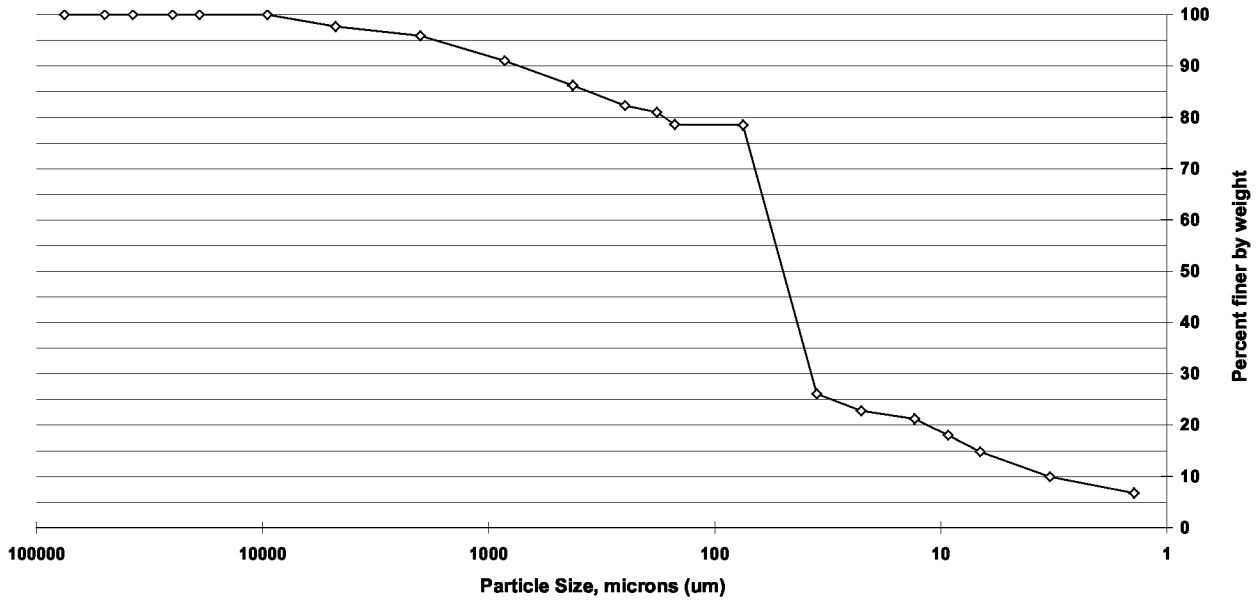
Particle Size of Soils by ASTM D422

Sample ID:	OR19-05-SURF	**Percent Solids:**	26.3%	**Date Received:**	10/29/2019
Lab ID:	200-51234-E-2	**Specific Gravity:**	2.650	**Start Date:**	11/12/2019
				End Date:	11/20/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	97.7	2.3
#10	2000	95.9	1.8
#20	850	91.0	4.9
#40	425	86.2	4.8
#60	250	82.3	3.9
#80	180	81.0	1.3
#100	150	78.6	2.4
#200	75	78.5	0.1
Hyd1	35.3	26.1	52.4
Hyd2	22.5	22.8	3.3
Hyd3	13.1	21.2	1.6
Hyd4	9.3	18.0	3.2
Hyd5	6.7	14.8	3.2
Hyd6	3.3	9.9	4.9
Hyd7	1.4	6.7	3.2

Soil Classification	Percent of sample
Gravel	2.3
Sand	19.2
Coarse Sand	1.8
Medium Sand	9.7
Fine Sand	7.7
Silt	63.7
Clay	14.8

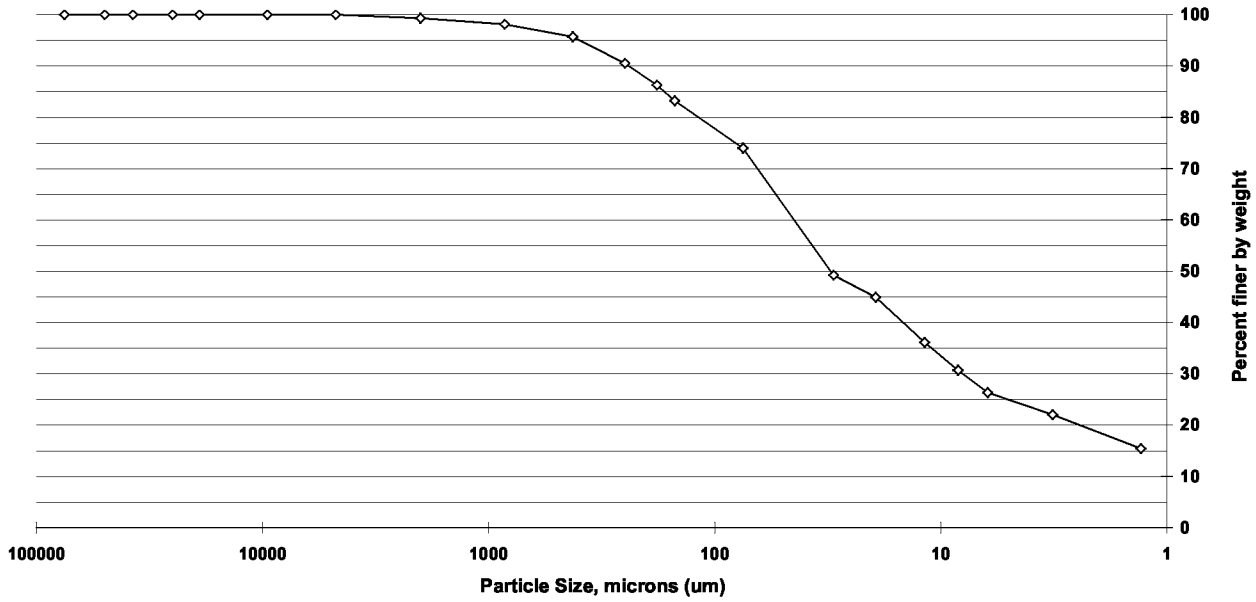
Particle Size of Soils by ASTM D422

Sample ID:	OR19-06-SURF	**Percent Solids:**	44.0%	**Date Received:**	10/29/2019
Lab ID:	200-51234-D-7	**Specific Gravity:**	2.650	**Start Date:**	11/12/2019
				End Date:	11/20/2019

Shape (> #10): angular

Non-soil material: plant

Hardness (> #10): hard



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.3	0.7
#20	850	98.1	1.2
#40	425	95.7	2.4
#60	250	90.5	5.2
#80	180	86.3	4.2
#100	150	83.2	3.1
#200	75	74.0	9.2
Hyd1	29.8	49.2	24.8
Hyd2	19.4	44.9	4.3
Hyd3	11.8	36.1	8.8
Hyd4	8.4	30.7	5.4
Hyd5	6.2	26.3	4.4
Hyd6	3.2	22.0	4.3
Hyd7	1.3	15.4	6.6

Soil Classification	Percent of sample
Gravel	0.0
Sand	26.0
Coarse Sand	0.7
Medium Sand	3.6
Fine Sand	21.7
Silt	47.7
Clay	26.3

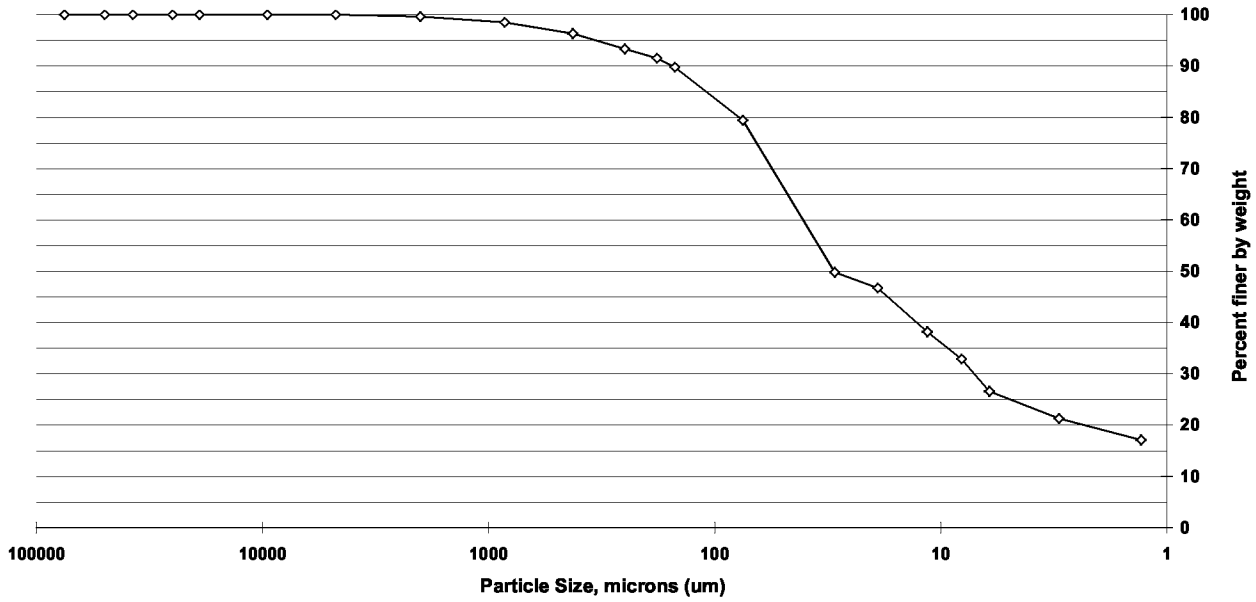
Particle Size of Soils by ASTM D422

Sample ID:	OR19-07-SURF	**Percent Solids:**	45.7%	**Date Received:**	10/29/2019
Lab ID:	200-51234-E-9	**Specific Gravity:**	2.650	**Start Date:**	11/12/2019
				End Date:	11/20/2019

Shape (> #10): na

Non-soil material: plant, shell

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.6	0.4
#20	850	98.5	1.1
#40	425	96.3	2.2
#60	250	93.3	3.0
#80	180	91.5	1.8
#100	150	89.8	1.7
#200	75	79.4	10.4
Hyd1	29.4	49.8	29.6
Hyd2	19	46.7	3.1
Hyd3	11.5	38.2	8.5
Hyd4	8.1	32.9	5.3
Hyd5	6.1	26.6	6.3
Hyd6	3	21.3	5.3
Hyd7	1.3	17.1	4.2

Soil Classification	Percent of sample
Gravel	0.0
Sand	20.6
Coarse Sand	0.4
Medium Sand	3.3
Fine Sand	16.9
Silt	52.8
Clay	26.6

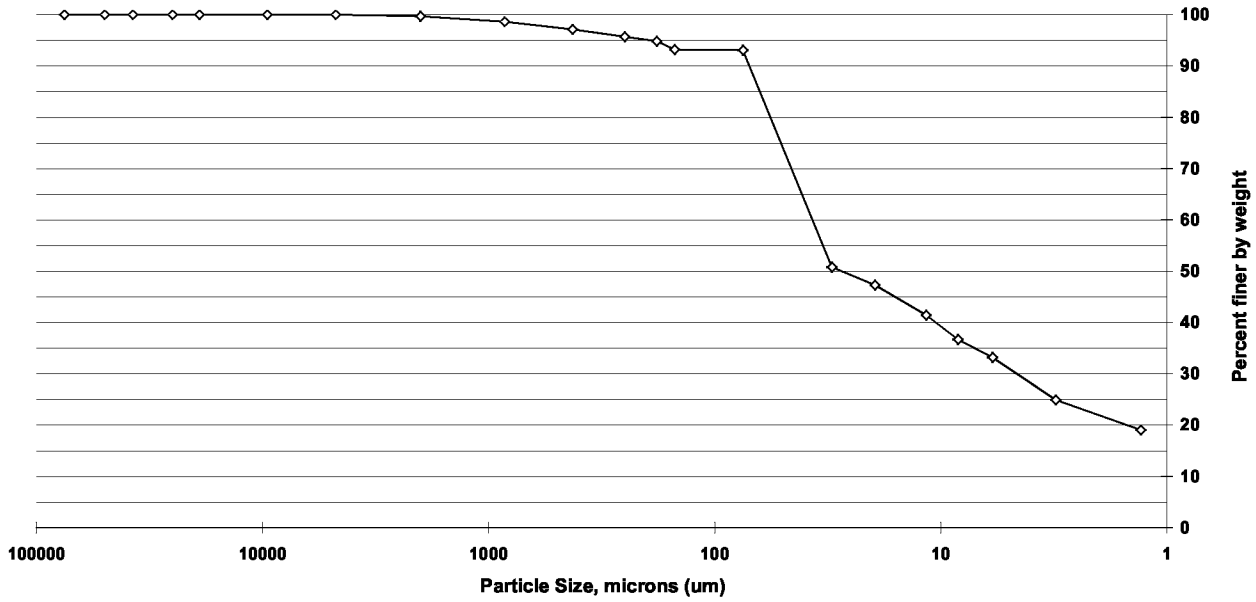
Particle Size of Soils by ASTM D422

Sample ID:	OR19-08-SURF	**Percent Solids:**	38.8%	**Date Received:**	10/29/2019
Lab ID:	200-51234-E-10	**Specific Gravity:**	2.650	**Start Date:**	11/12/2019
				End Date:	11/20/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.7	0.3
#20	850	98.6	1.1
#40	425	97.1	1.5
#60	250	95.7	1.4
#80	180	94.8	0.9
#100	150	93.2	1.6
#200	75	93.1	0.1
Hyd1	30.3	50.8	42.3
Hyd2	19.5	47.3	3.5
Hyd3	11.6	41.4	5.9
Hyd4	8.4	36.7	4.7
Hyd5	5.9	33.2	3.5
Hyd6	3.1	24.9	8.3
Hyd7	1.3	19.0	5.9

Soil Classification	Percent of sample
Gravel	0.0
Sand	6.9
Coarse Sand	0.3
Medium Sand	2.6
Fine Sand	4.0
Silt	59.9
Clay	33.2

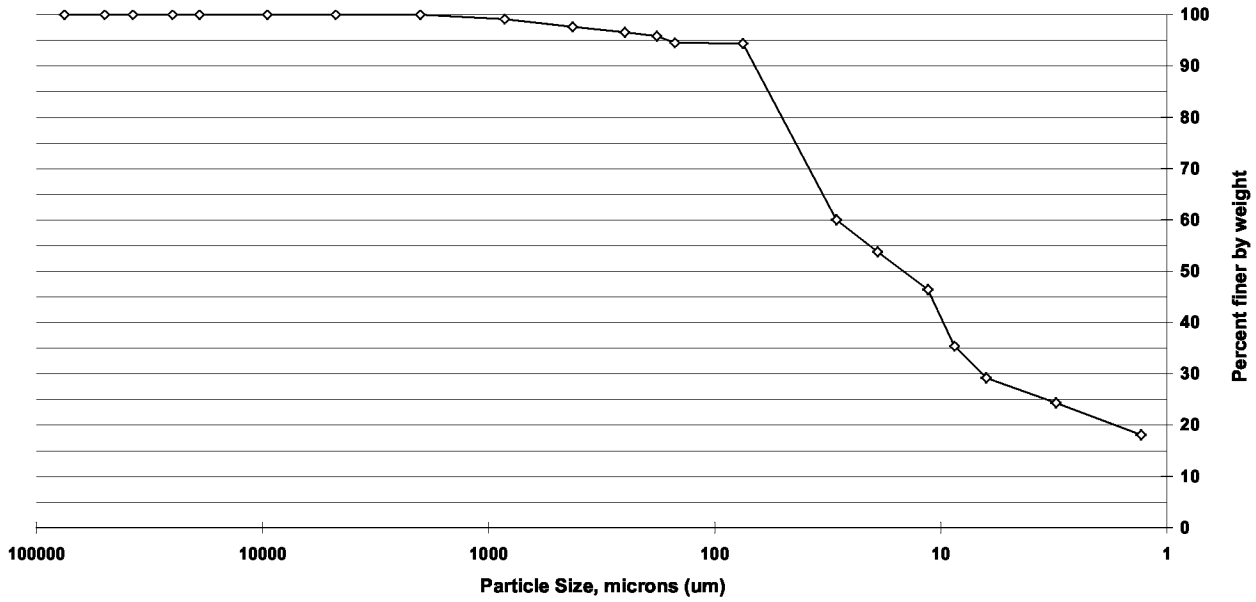
Particle Size of Soils by ASTM D422

Sample ID:	OR19-09-SURF	**Percent Solids:**	43.6%	**Date Received:**	10/25/2019
Lab ID:	200-51169-E-7	**Specific Gravity:**	2.650	**Start Date:**	11/11/2019
				End Date:	11/18/2019

Shape (> #10): na

Non-soil material: na

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	99.1	0.9
#40	425	97.6	1.5
#60	250	96.6	1.0
#80	180	95.8	0.8
#100	150	94.5	1.3
#200	75	94.4	0.1
Hyd1	29	60.0	34.4
Hyd2	19	53.8	6.2
Hyd3	11.4	46.4	7.4
Hyd4	8.7	35.4	11.0
Hyd5	6.3	29.2	6.2
Hyd6	3.1	24.3	4.9
Hyd7	1.3	18.1	6.2

Soil Classification	Percent of sample
Gravel	0.0
Sand	5.6
Coarse Sand	0.0
Medium Sand	2.4
Fine Sand	3.2
Silt	65.2
Clay	29.2

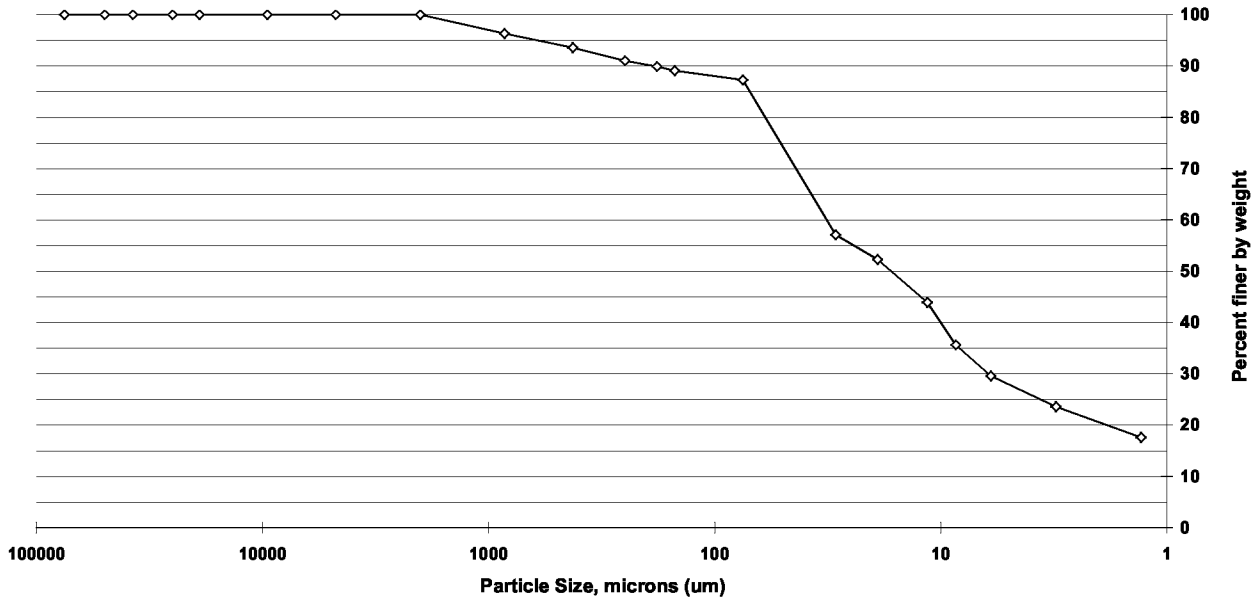
Particle Size of Soils by ASTM D422

Sample ID:	OR19-10-SURF	**Percent Solids:**	41.3%	**Date Received:**	10/25/2019
Lab ID:	200-51169-D-8	**Specific Gravity:**	2.650	**Start Date:**	11/11/2019
				End Date:	11/18/2019

Shape (> #10): na

Non-soil material: na

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	96.3	3.7
#40	425	93.6	2.7
#60	250	91.0	2.6
#80	180	89.9	1.1
#100	150	89.1	0.8
#200	75	87.3	1.8
Hyd1	29.2	57.1	30.2
Hyd2	19	52.3	4.8
Hyd3	11.5	43.9	8.4
Hyd4	8.6	35.6	8.3
Hyd5	6	29.6	6.0
Hyd6	3.1	23.6	6.0
Hyd7	1.3	17.6	6.0

Soil Classification	Percent of sample
Gravel	0.0
Sand	12.7
Coarse Sand	0.0
Medium Sand	6.4
Fine Sand	6.3
Silt	57.7
Clay	29.6

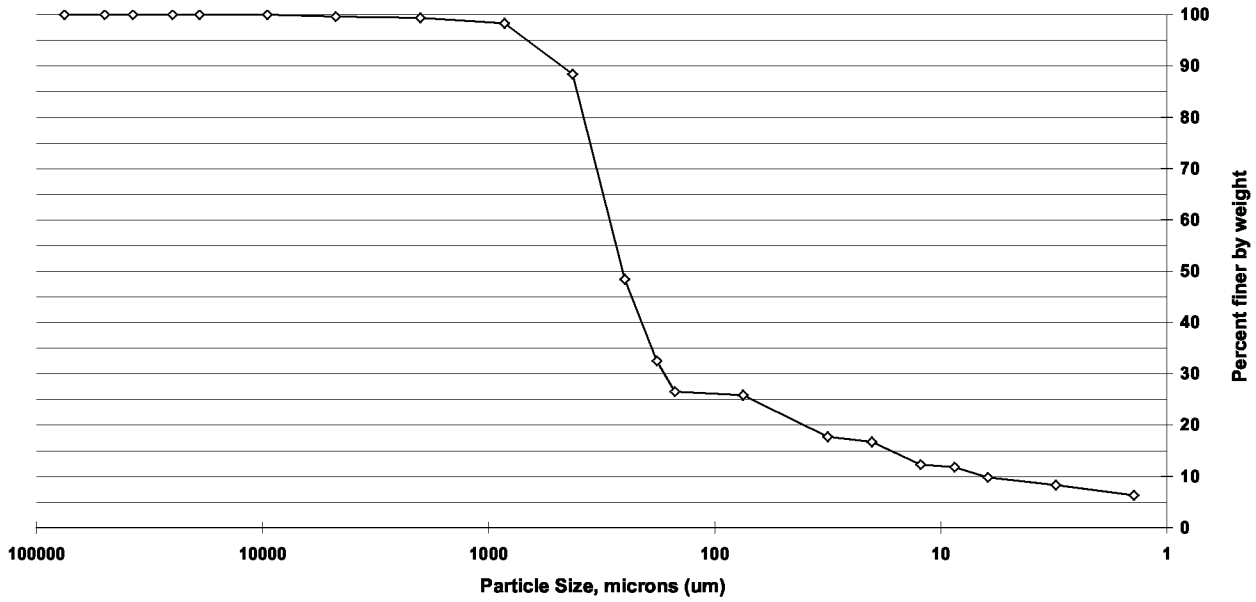
Particle Size of Soils by ASTM D422

Sample ID:	OR19-11-SURF	**Percent Solids:**	68.3%	**Date Received:**	10/25/2019
Lab ID:	200-51169-E-13	**Specific Gravity:**	2.650	**Start Date:**	11/11/2019
				End Date:	11/18/2019

Shape (> #10): na

Non-soil material: shell, plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	99.6	0.4
#10	2000	99.4	0.2
#20	850	98.3	1.1
#40	425	88.4	9.9
#60	250	48.4	40.0
#80	180	32.5	15.9
#100	150	26.5	6.0
#200	75	25.8	0.7
Hyd1	31.6	17.7	8.1
Hyd2	20.2	16.7	1.0
Hyd3	12.3	12.3	4.4
Hyd4	8.7	11.8	0.5
Hyd5	6.2	9.8	2.0
Hyd6	3.1	8.3	1.5
Hyd7	1.4	6.3	2.0

Soil Classification	Percent of sample
Gravel	0.4
Sand	73.8
Coarse Sand	0.2
Medium Sand	11.0
Fine Sand	62.6
Silt	16.0
Clay	9.8

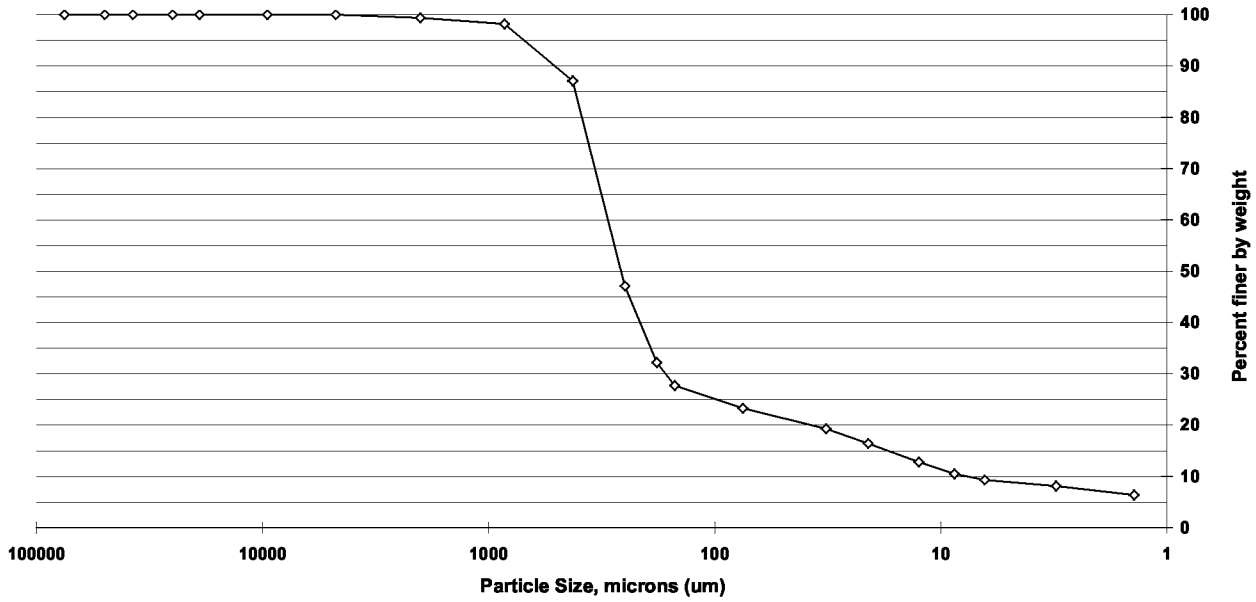
Particle Size of Soils by ASTM D422

Sample ID:	OR19-11-SURFFD	**Percent Solids:**	70.9%	**Date Received:**	10/25/2019
Lab ID:	200-51169-E-12	**Specific Gravity:**	2.650	**Start Date:**	11/11/2019
				End Date:	11/18/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.4	0.6
#20	850	98.2	1.2
#40	425	87.1	11.1
#60	250	47.1	40.0
#80	180	32.2	14.9
#100	150	27.7	4.5
#200	75	23.3	4.4
Hyd1	32.2	19.3	4.0
Hyd2	21	16.4	2.9
Hyd3	12.5	12.8	3.6
Hyd4	8.7	10.5	2.3
Hyd5	6.4	9.3	1.2
Hyd6	3.1	8.1	1.2
Hyd7	1.4	6.4	1.8

Soil Classification	Percent of sample
Gravel	0.0
Sand	76.7
Coarse Sand	0.6
Medium Sand	12.3
Fine Sand	63.8
Silt	14.0
Clay	9.3

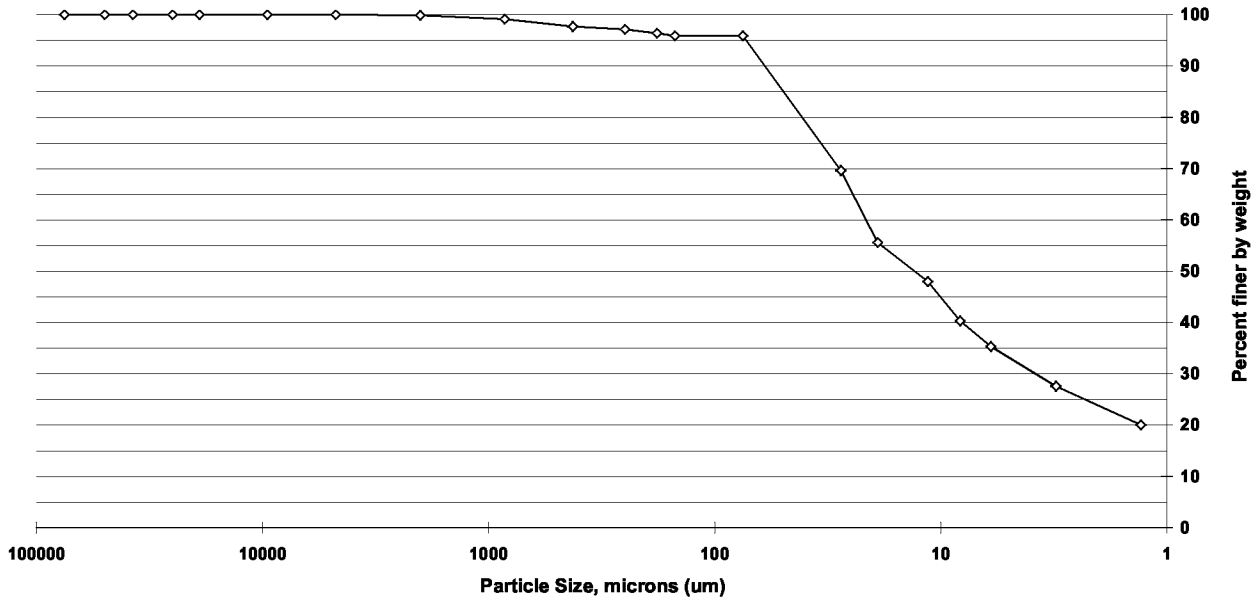
Particle Size of Soils by ASTM D422

Sample ID:	OR19-12-SURF	**Percent Solids:**	37.0%	**Date Received:**	10/25/2019
Lab ID:	200-51169-D-9	**Specific Gravity:**	2.650	**Start Date:**	11/11/2019
				End Date:	11/18/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.9	0.1
#20	850	99.1	0.8
#40	425	97.7	1.4
#60	250	97.1	0.6
#80	180	96.4	0.7
#100	150	95.9	0.5
#200	75	95.9	0.0
Hyd1	27.7	69.6	26.3
Hyd2	19	55.6	14.0
Hyd3	11.4	48.0	7.6
Hyd4	8.2	40.3	7.7
Hyd5	6	35.3	5.0
Hyd6	3.1	27.6	7.7
Hyd7	1.3	20.0	7.6

Soil Classification	Percent of sample
Gravel	0.0
Sand	4.1
Coarse Sand	0.1
Medium Sand	2.2
Fine Sand	1.8
Silt	60.6
Clay	35.3

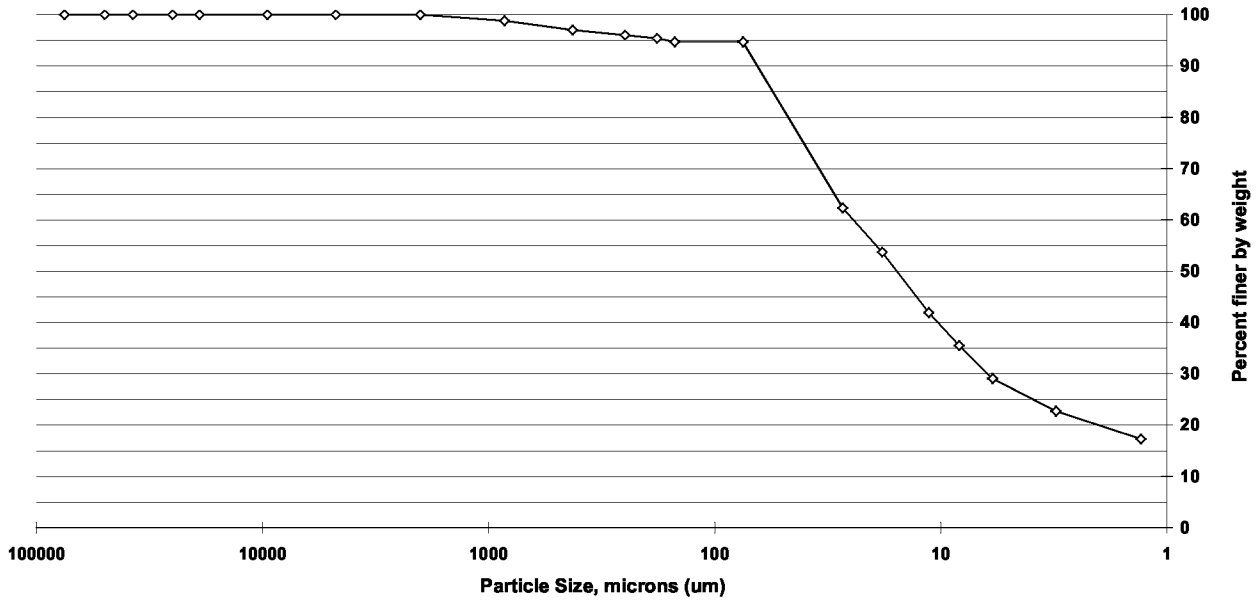
Particle Size of Soils by ASTM D422

Sample ID:	OR19-13-SURF	**Percent Solids:**	41.4%	**Date Received:**	10/25/2019
Lab ID:	200-51169-E-3	**Specific Gravity:**	2.650	**Start Date:**	11/8/2019
				End Date:	11/15/2019

Shape (> #10): na

Non-soil material: na

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	98.8	1.2
#40	425	97.0	1.8
#60	250	96.0	1.0
#80	180	95.4	0.6
#100	150	94.7	0.7
#200	75	94.7	0.0
Hyd1	27.1	62.3	32.4
Hyd2	18.2	53.7	8.6
Hyd3	11.3	41.9	11.8
Hyd4	8.3	35.5	6.4
Hyd5	5.9	29.1	6.4
Hyd6	3.1	22.7	6.4
Hyd7	1.3	17.3	5.4

Soil Classification	Percent of sample
Gravel	0.0
Sand	5.3
Coarse Sand	0.0
Medium Sand	3.0
Fine Sand	2.3
Silt	65.6
Clay	29.1

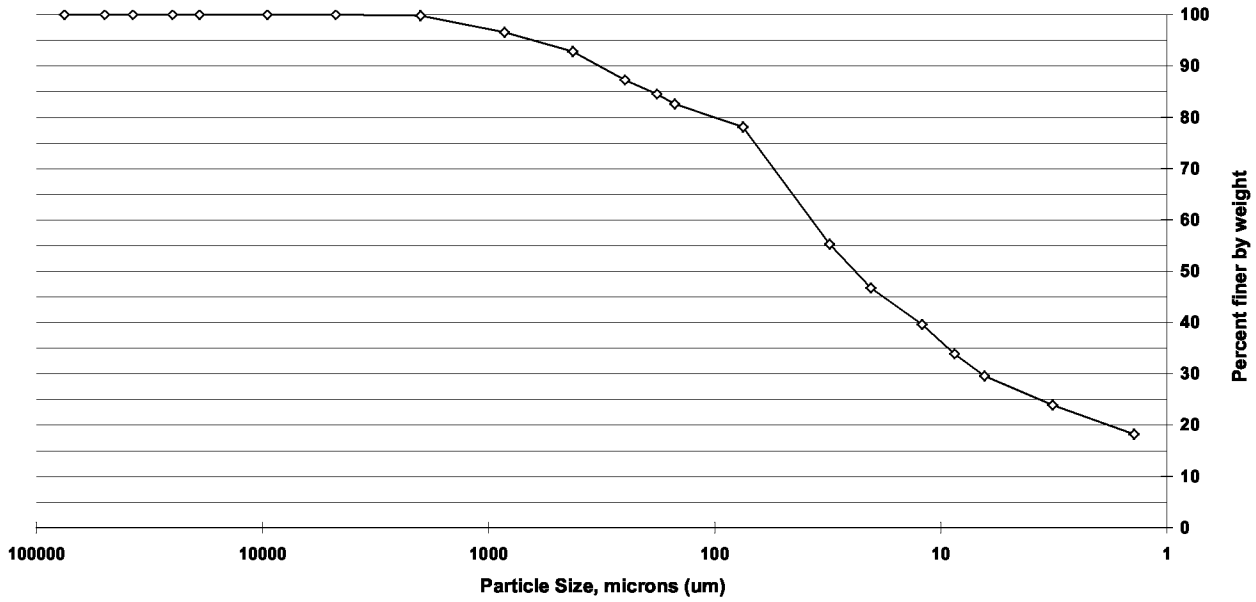
Particle Size of Soils by ASTM D422

Sample ID:	OR19-14-SURF	**Percent Solids:**	38.4%	**Date Received:**	10/25/2019
Lab ID:	200-51169-D-14	**Specific Gravity:**	2.650	**Start Date:**	11/11/2019
				End Date:	11/18/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.8	0.2
#20	850	96.6	3.2
#40	425	92.8	3.8
#60	250	87.3	5.5
#80	180	84.5	2.8
#100	150	82.6	1.9
#200	75	78.1	4.5
Hyd1	31	55.3	22.8
Hyd2	20.4	46.7	8.6
Hyd3	12.1	39.6	7.1
Hyd4	8.7	33.9	5.7
Hyd5	6.4	29.6	4.3
Hyd6	3.2	23.9	5.7
Hyd7	1.4	18.2	5.7

Soil Classification	Percent of sample
Gravel	0.0
Sand	21.9
Coarse Sand	0.2
Medium Sand	7.0
Fine Sand	14.7
Silt	48.5
Clay	29.6

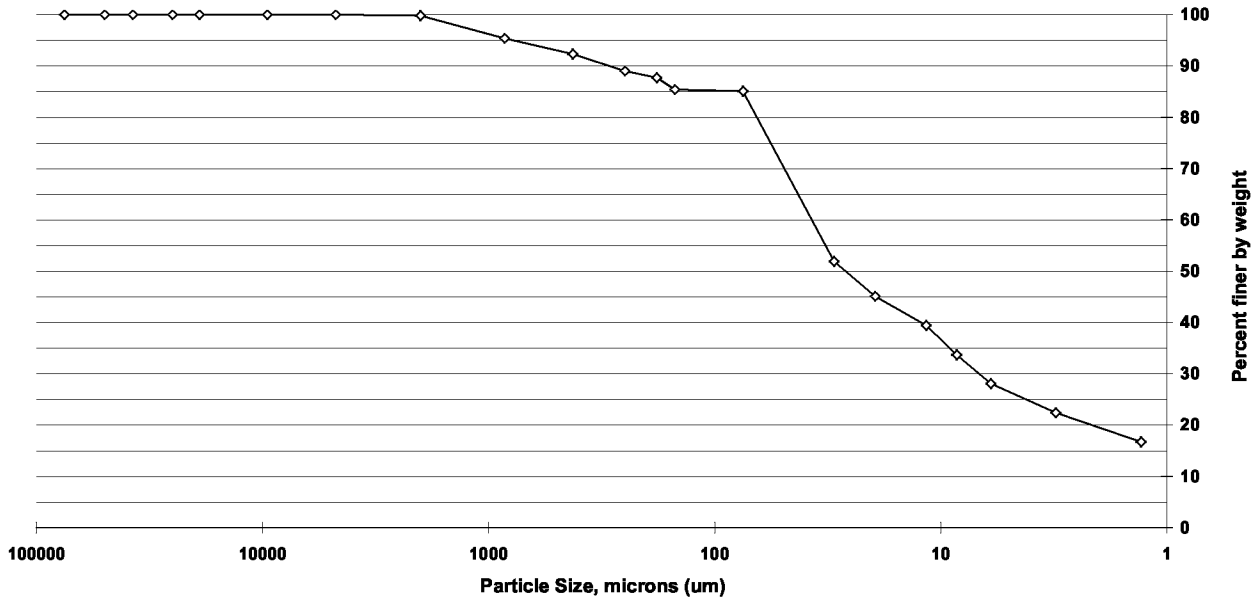
Particle Size of Soils by ASTM D422

Sample ID:	OR19-14-SURFFD	**Percent Solids:**	40.9%	**Date Received:**	10/25/2019
Lab ID:	200-51169-D-15	**Specific Gravity:**	2.650	**Start Date:**	11/11/2019
				End Date:	11/18/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.8	0.2
#20	850	95.4	4.4
#40	425	92.3	3.1
#60	250	89.0	3.3
#80	180	87.7	1.3
#100	150	85.4	2.3
#200	75	85.1	0.3
Hyd1	29.6	51.9	33.2
Hyd2	19.5	45.1	6.8
Hyd3	11.6	39.4	5.7
Hyd4	8.5	33.7	5.7
Hyd5	6	28.1	5.6
Hyd6	3.1	22.4	5.7
Hyd7	1.3	16.7	5.7

Soil Classification	Percent of sample
Gravel	0.0
Sand	14.9
Coarse Sand	0.2
Medium Sand	7.5
Fine Sand	7.2
Silt	57.0
Clay	28.1

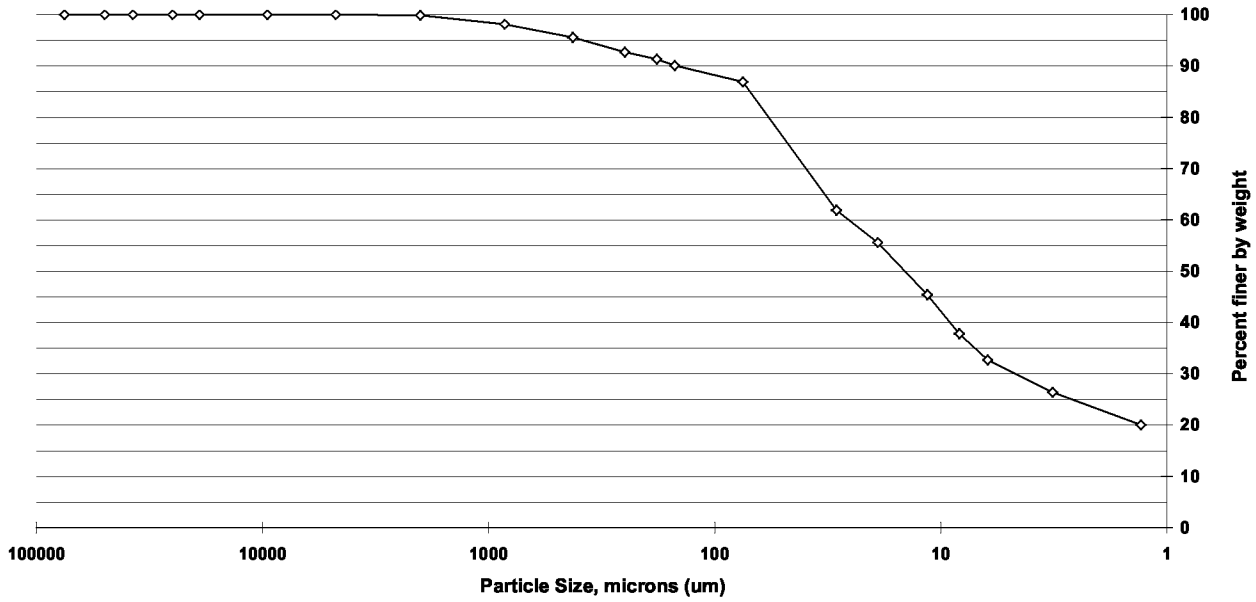
Particle Size of Soils by ASTM D422

Sample ID:	OR19-15-SURF	**Percent Solids:**	40.2%	**Date Received:**	10/25/2019
Lab ID:	200-51169-E-10	**Specific Gravity:**	2.650	**Start Date:**	11/11/2019
				End Date:	11/18/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.9	0.1
#20	850	98.1	1.8
#40	425	95.6	2.5
#60	250	92.7	2.9
#80	180	91.3	1.4
#100	150	90.1	1.2
#200	75	86.9	3.2
Hyd1	29	61.9	25.0
Hyd2	19	55.6	6.3
Hyd3	11.5	45.4	10.2
Hyd4	8.3	37.8	7.6
Hyd5	6.2	32.7	5.1
Hyd6	3.2	26.4	6.3
Hyd7	1.3	20.0	6.4

Soil Classification	Percent of sample
Gravel	0.0
Sand	13.1
Coarse Sand	0.1
Medium Sand	4.3
Fine Sand	8.7
Silt	54.2
Clay	32.7

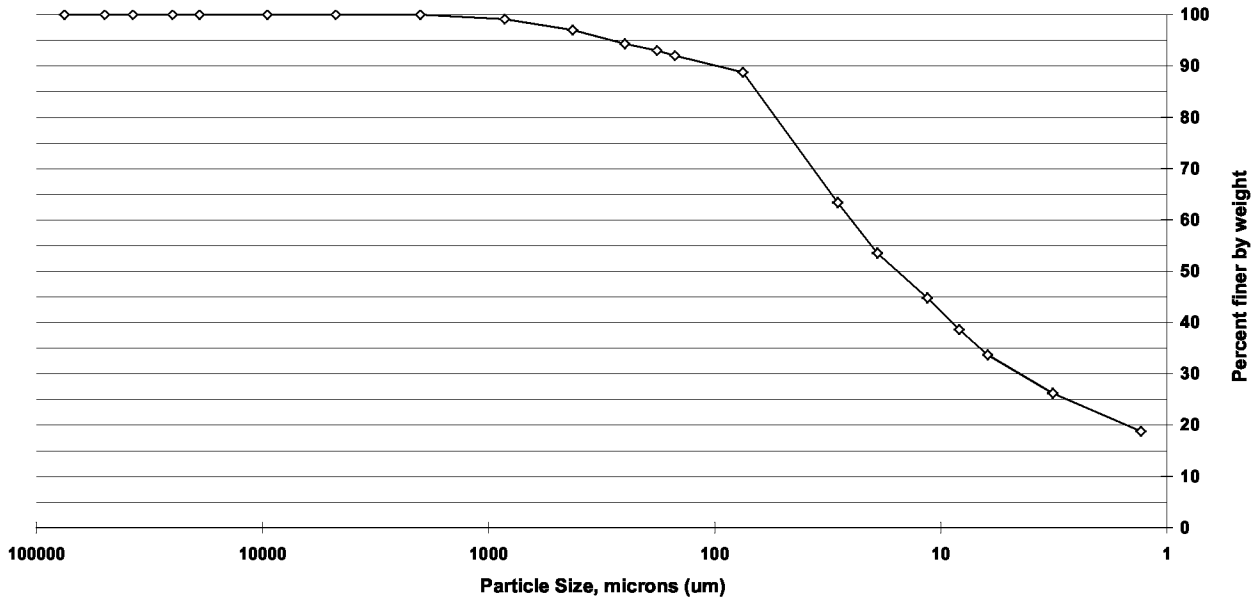
Particle Size of Soils by ASTM D422

Sample ID:	OR19-16-SURF	**Percent Solids:**	39.5%	**Date Received:**	10/25/2019
Lab ID:	200-51169-D-4	**Specific Gravity:**	2.650	**Start Date:**	11/8/2019
				End Date:	11/15/2019

Shape (> #10): na

Non-soil material: na

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	100.0	0.0
#20	850	99.1	0.9
#40	425	97.0	2.1
#60	250	94.3	2.7
#80	180	93.0	1.3
#100	150	92.0	1.0
#200	75	88.8	3.2
Hyd1	28.6	63.4	25.4
Hyd2	19.1	53.5	9.9
Hyd3	11.5	44.8	8.7
Hyd4	8.3	38.6	6.2
Hyd5	6.2	33.7	4.9
Hyd6	3.2	26.2	7.5
Hyd7	1.3	18.8	7.4

Soil Classification	Percent of sample
Gravel	0.0
Sand	11.2
Coarse Sand	0.0
Medium Sand	3.0
Fine Sand	8.2
Silt	55.1
Clay	33.7

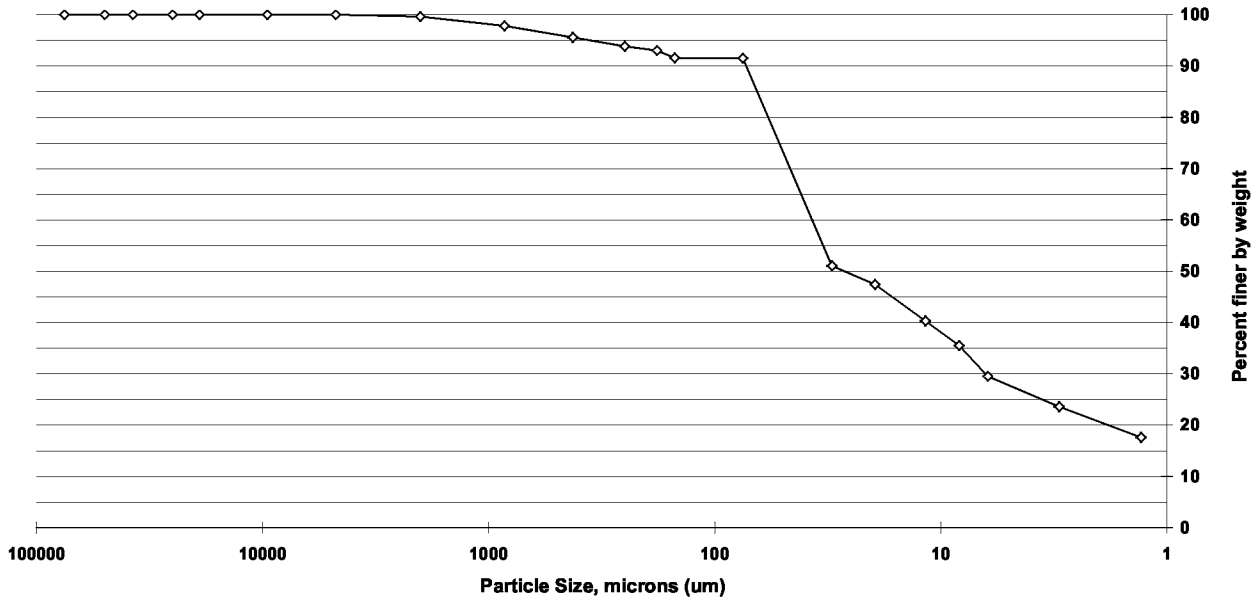
Particle Size of Soils by ASTM D422

Sample ID:	OR19-17-SURF	**Percent Solids:**	40.3%	**Date Received:**	10/25/2019
Lab ID:	200-51169-D-11	**Specific Gravity:**	2.650	**Start Date:**	11/11/2019
				End Date:	11/18/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.6	0.4
#20	850	97.8	1.8
#40	425	95.6	2.2
#60	250	93.8	1.8
#80	180	93.0	0.8
#100	150	91.6	1.4
#200	75	91.5	0.1
Hyd1	30.3	51.0	40.5
Hyd2	19.5	47.4	3.6
Hyd3	11.7	40.3	7.1
Hyd4	8.3	35.5	4.8
Hyd5	6.2	29.5	6.0
Hyd6	3	23.6	5.9
Hyd7	1.3	17.6	6.0

Soil Classification	Percent of sample
Gravel	0.0
Sand	8.5
Coarse Sand	0.4
Medium Sand	4.0
Fine Sand	4.1
Silt	62.0
Clay	29.5

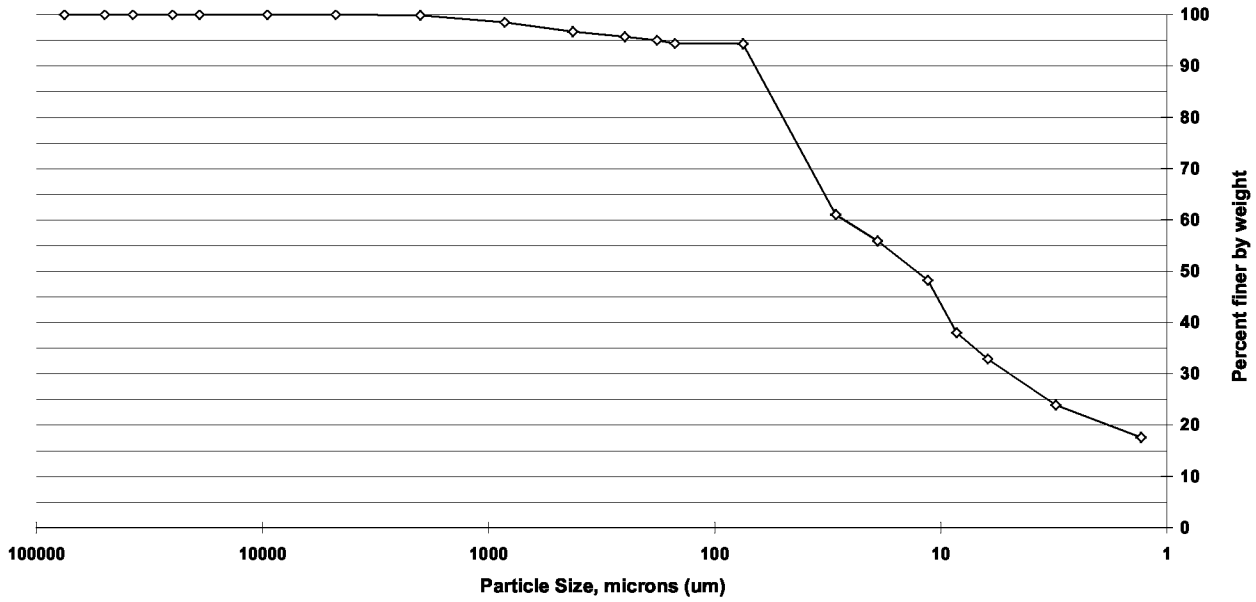
Particle Size of Soils by ASTM D422

Sample ID:	OR19-18-SURF	**Percent Solids:**	38.7%	**Date Received:**	10/25/2019
Lab ID:	200-51169-E-5	**Specific Gravity:**	2.650	**Start Date:**	11/11/2019
				End Date:	11/18/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.9	0.1
#20	850	98.5	1.4
#40	425	96.7	1.8
#60	250	95.7	1.0
#80	180	95.0	0.7
#100	150	94.4	0.6
#200	75	94.3	0.1
Hyd1	29.2	61.0	33.3
Hyd2	19	55.9	5.1
Hyd3	11.4	48.2	7.7
Hyd4	8.5	38.0	10.2
Hyd5	6.2	32.9	5.1
Hyd6	3.1	23.9	9.0
Hyd7	1.3	17.6	6.3

Soil Classification	Percent of sample
Gravel	0.0
Sand	5.7
Coarse Sand	0.1
Medium Sand	3.2
Fine Sand	2.4
Silt	61.4
Clay	32.9

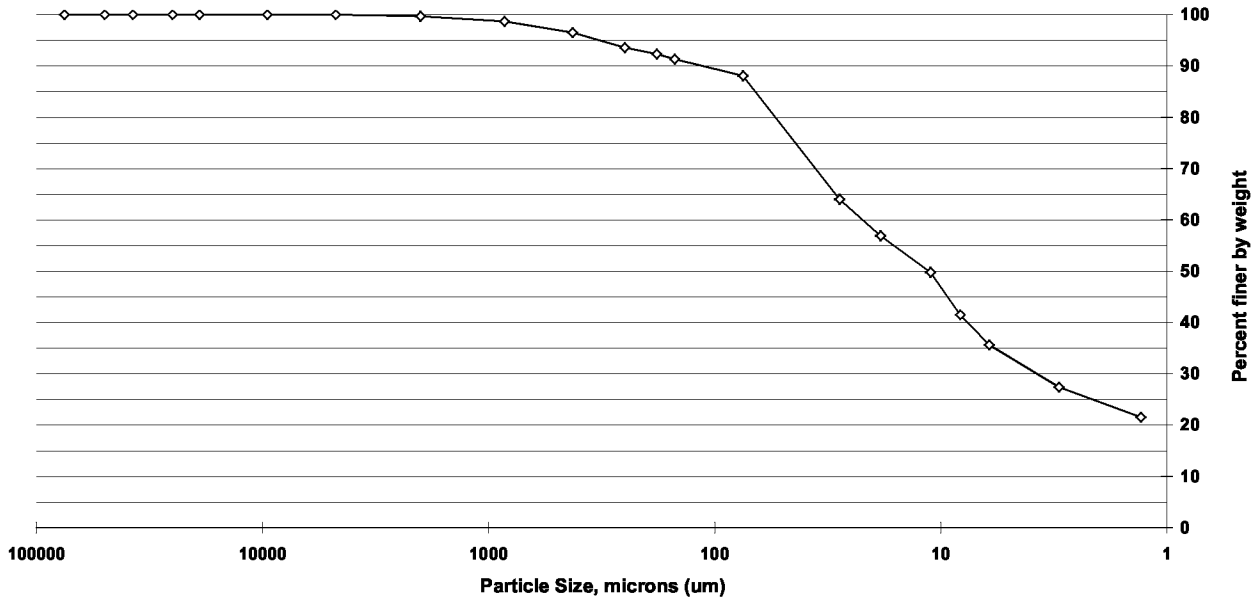
Particle Size of Soils by ASTM D422

Sample ID:	OR19-19-SURF	**Percent Solids:**	37.8%	**Date Received:**	10/29/2019
Lab ID:	200-51234-E-3	**Specific Gravity:**	2.650	**Start Date:**	11/12/2019
				End Date:	11/20/2019

Shape (> #10): na

Non-soil material: plant, shell

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.7	0.3
#20	850	98.7	1.0
#40	425	96.5	2.2
#60	250	93.6	2.9
#80	180	92.3	1.3
#100	150	91.3	1.0
#200	75	88.1	3.2
Hyd1	28	64.0	24.1
Hyd2	18.5	56.9	7.1
Hyd3	11.1	49.8	7.1
Hyd4	8.2	41.5	8.3
Hyd5	6.1	35.6	5.9
Hyd6	3	27.4	8.2
Hyd7	1.3	21.5	5.9

Soil Classification	Percent of sample
Gravel	0.0
Sand	11.9
Coarse Sand	0.3
Medium Sand	3.2
Fine Sand	8.4
Silt	52.5
Clay	35.6

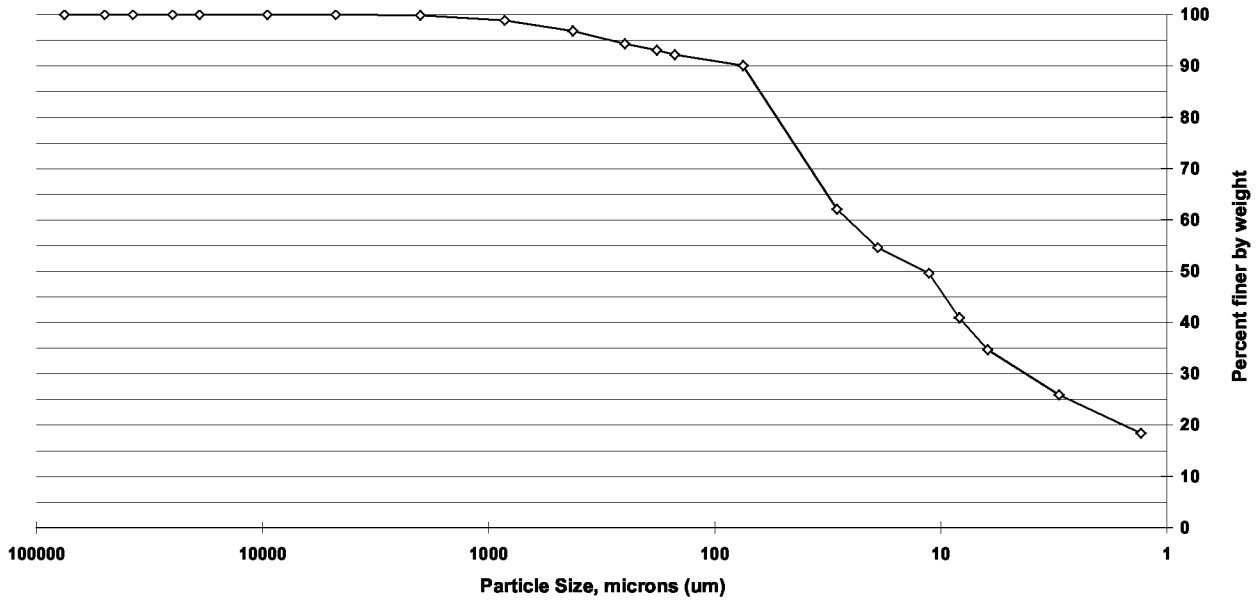
Particle Size of Soils by ASTM D422

Sample ID:	OR19-20-SURF	**Percent Solids:**	38.0%	**Date Received:**	10/25/2019
Lab ID:	200-51169-D-6	**Specific Gravity:**	2.650	**Start Date:**	11/11/2019
				End Date:	11/18/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.9	0.1
#20	850	98.9	1.0
#40	425	96.8	2.1
#60	250	94.3	2.5
#80	180	93.1	1.2
#100	150	92.2	0.9
#200	75	90.1	2.1
Hyd1	28.8	62.1	28.0
Hyd2	19	54.6	7.5
Hyd3	11.3	49.6	5.0
Hyd4	8.3	40.9	8.7
Hyd5	6.2	34.7	6.2
Hyd6	3	25.9	8.8
Hyd7	1.3	18.4	7.5

Soil Classification	Percent of sample
Gravel	0.0
Sand	9.9
Coarse Sand	0.1
Medium Sand	3.1
Fine Sand	6.7
Silt	55.4
Clay	34.7

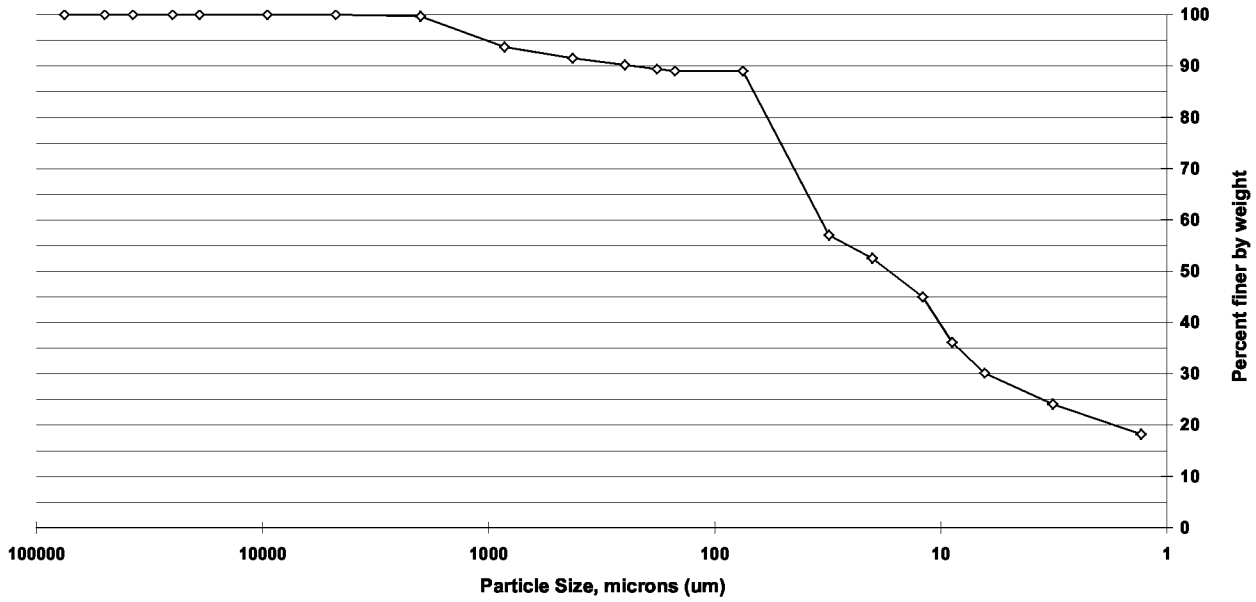
Particle Size of Soils by ASTM D422

Sample ID:	OR19-21-SURF	**Percent Solids:**	36.5%	**Date Received:**	10/29/2019
Lab ID:	200-51234-E-4	**Specific Gravity:**	2.650	**Start Date:**	11/12/2019
				End Date:	11/20/2019

Shape (> #10): na

Non-soil material: plant

Hardness (> #10): na



Sieve size	Particle size, um	Percent finer	Incremental percent
3 inch	75000	100.0	0.0
2 inch	50000	100.0	0.0
1.5 inch	37500	100.0	0.0
1 inch	25000	100.0	0.0
3/4 inch	19000	100.0	0.0
3/8 inch	9500	100.0	0.0
#4	4750	100.0	0.0
#10	2000	99.7	0.3
#20	850	93.7	6.0
#40	425	91.5	2.2
#60	250	90.2	1.3
#80	180	89.4	0.8
#100	150	89.0	0.4
#200	75	89.0	0.0
Hyd1	31.2	57.0	32.0
Hyd2	20.1	52.5	4.5
Hyd3	12	45.0	7.5
Hyd4	8.9	36.1	8.9
Hyd5	6.4	30.1	6.0
Hyd6	3.2	24.1	6.0
Hyd7	1.3	18.2	5.9

Soil Classification	Percent of sample
Gravel	0.0
Sand	11.0
Coarse Sand	0.3
Medium Sand	8.2
Fine Sand	2.5
Silt	58.9
Clay	30.1

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TestAmerica Burlington

Sediment Grain Size - D422

Client	
Client Sample ID	OR19-REF1
Lab Sample ID	200-51234-E-8

Date Received	10/29/2019
Start Date	11/12/2019 17:19
End Date	11/20/2019 10:34

Dry Weight Determination

Tin Weight	1.02	g
Wet Sample + Tin	26.64	g
Dry Sample + Tin	12.35	g
% Moisture	55.78	%

Non-soil material:	shell
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/12/2019 17:20
Date/Time out of oven	11/13/2019 14:54

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.65	201.66	157.01
Sample Weight (Oven Dried)			69.4

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.15
Sample <#10			69.3
% Passing #10			44.1

Hydrometer Data

Serial Number	542325
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0030
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.000166667
Hydrometer Cal Intercept	1.005833333
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000	462.60	462.75	0.15 g	99.8	Sand	Coarse
#20	850	378.48	379.15	0.67 g	98.8	Sand	Medium
#40	425	366.46	367.36	0.90 g	97.5	Sand	Medium
#60	250	348.07	348.65	0.58 g	96.7	Sand	Fine
#80	180	337.36	337.80	0.44 g	96.1	Sand	Fine
#100	150	328.11	328.31	0.20 g	95.8	Sand	Fine
#200	75	322.59	322.61	0.02 g	95.8	Sand	Fine
				0.00 g	95.8		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	69.4

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0285	20.5	28.4	60.4	Silt	
5	5	1.0250	20.5	18.9	52.3	Silt	
15	15	1.0225	20.5	11.3	46.5	Silt	
30	31	1.0200	20.5	8.1	40.7	Silt	
60	59	1.0185	20.5	6	37.2	Silt	
250	265	1.0155	20.5	2.9	30.3	Clay	
1440	1412	1.0125	20.5	1.3	23.3	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client	
Client Sample ID	OR19-01-SURF
Lab Sample ID	200-51169-E-1

Date Received	10/25/2019
Start Date	11/08/2019 17:18
End Date	11/15/2019 9:59

Dry Weight Determination

Tin Weight	1.05 g
Wet Sample + Tin	17.47 g
Dry Sample + Tin	6.22 g
% Moisture	68.51 %

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/08/2019 17:19
Date/Time out of oven	11/11/2019 15:22

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.07	242.44	198.37
Sample Weight (Oven Dried)			62.5

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.48
Sample <#10			62
% Passing #10			31.3

Hydrometer Data

Serial Number	542325
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0030
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.000166667
Hydrometer Cal Intercept	1.005833333
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750	487.99	488.25	0.26 g	99.6	Gravel	
#10	2000	462.60	462.82	0.22 g	99.2	Sand	Coarse
#20	850	378.48	379.75	1.27 g	97.2	Sand	Medium
#40	425	366.46	367.75	1.29 g	95.1	Sand	Medium
#60	250	348.07	354.92	6.85 g	84.1	Sand	Fine
#80	180	337.36	337.82	0.46 g	83.4	Sand	Fine
#100	150	328.11	328.58	0.47 g	82.6	Sand	Fine
#200	75	322.59	322.61	0.02 g	82.6	Sand	Fine
				0.00 g	82.6		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	62.5

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0235	20.5	30.5	54.2	Silt	
5	5	1.0195	20.5	20.2	43.9	Silt	
15	15	1.0170	20.5	12	37.5	Silt	
30	30	1.0155	20.5	8.6	33.6	Silt	
60	63	1.0130	20.5	6.1	27.2	Silt	
250	253	1.0110	20.5	3.1	22.1	Clay	
1440	1400	1.0090	20.5	1.4	16.9	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client	
Client Sample ID	OR19-02-SURF
Lab Sample ID	200-51169-E-2

Date Received	10/25/2019
Start Date	11/08/2019 17:20
End Date	11/15/2019 10:02

Dry Weight Determination

Tin Weight	1.05	g
Wet Sample + Tin	26.20	g
Dry Sample + Tin	19.04	g
% Moisture	28.47	%

Non-soil material:	plant, shell
Shape (> #10):	angular
Hardness (> #10):	hard

Date/Time in oven	11/08/2019 17:21
Date/Time out of oven	11/11/2019 15:23

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.82	252.95	208.13
Sample Weight (Oven Dried)			149

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			3.19
Sample <#10			146
% Passing #10			70.1

Hydrometer Data

Serial Number	542325
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0030
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.000166667
Hydrometer Cal Intercept	1.005833333
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750	487.99	488.62	0.63 g	99.6	Gravel	
#10	2000	462.60	465.16	2.56 g	97.9	Sand	Coarse
#20	850	374.10	378.12	4.02 g	95.2	Sand	Medium
#40	425	362.07	374.25	12.18 g	87.0	Sand	Medium
#60	250	352.01	397.64	45.63 g	56.4	Sand	Fine
#80	180	318.90	369.18	50.28 g	22.7	Sand	Fine
#100	150	327.89	343.63	15.74 g	12.1	Sand	Fine
#200	75	314.18	323.88	9.70 g	5.6	Sand	Fine
				0.00 g	5.6		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	149

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0085	20.5	36	6.56	Silt	
5	5	1.0080	20.5	22.8	6.02	Silt	
15	15	1.0075	20.5	13.3	5.48	Silt	
30	30	1.0065	20.5	9.5	4.4	Silt	
60	57	1.0060	20.5	6.9	3.86	Silt	
250	247	1.0055	20.5	3.3	3.32	Clay	
1440	1394	1.0050	20.5	1.4	2.78	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client	
Client Sample ID	OR19-03-SURF
Lab Sample ID	200-51234-E-1

Date Received	10/29/2019
Start Date	11/11/2019 17:49
End Date	11/18/2019 12:52

Dry Weight Determination

Tin Weight	1.02	g
Wet Sample + Tin	17.24	g
Dry Sample + Tin	7.97	g
% Moisture	57.15	%

Non-soil material:	na
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/11/2019 17:51
Date/Time out of oven	11/12/2019 15:01

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	47.81	219.86	172.05
Sample Weight (Oven Dried)			73.7

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0
Sample <#10			73.7
% Passing #10			42.8

Hydrometer Data	
Serial Number	542318
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.00025
Hydrometer Cal Intercept	1.00775
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000			0.00 g	100.0	Sand	Coarse
#20	850	374.10	375.10	1.00 g	98.6	Sand	Medium
#40	425	362.07	363.46	1.39 g	96.7	Sand	Medium
#60	250	352.01	353.64	1.63 g	94.5	Sand	Fine
#80	180	318.90	319.60	0.70 g	93.6	Sand	Fine
#100	150	327.89	328.42	0.53 g	92.9	Sand	Fine
#200	75	314.18	315.80	1.62 g	90.7	Sand	Fine
				0.00 g	90.7		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	73.7

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0310	20.5	27.3	61.8	Silt	
5	5	1.0265	20.5	18.5	52	Silt	
15	15	1.0215	20.5	11.4	41.1	Silt	
30	31	1.0185	20.5	8.2	34.6	Silt	
60	57	1.0165	20.5	6.2	30.2	Silt	
250	235	1.0135	20.5	3.2	23.7	Clay	
1440	1382	1.0105	20.5	1.3	17.2	Clay	

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Sediment Grain Size - D422

Client	
Client Sample ID	OR19-04-SURF
Lab Sample ID	200-51234-E-5

Date Received	10/29/2019
Start Date	11/12/2019 16:35
End Date	11/20/2019 10:12

Dry Weight Determination

Tin Weight	1.03	g
Wet Sample + Tin	20.46	g
Dry Sample + Tin	9.36	g
% Moisture	57.13	%

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/12/2019 16:36
Date/Time out of oven	11/13/2019 14:52

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.10	197.52	153.42
Sample Weight (Oven Dried)			65.8

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.17
Sample <#10			65.6
% Passing #10			42.8

Hydrometer Data

Serial Number	542325
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0030
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.000166667
Hydrometer Cal Intercept	1.005833333
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample		% Finer	Classification	Sub Class
3 inch	75000			0.00	g	100.0	Gravel	
2 inch	50000			0.00	g	100.0	Gravel	
1.5 inch	37500			0.00	g	100.0	Gravel	
1 inch	25000			0.00	g	100.0	Gravel	
3/4 inch	19000			0.00	g	100.0	Gravel	
3/8 inch	9500			0.00	g	100.0	Gravel	
#4	4750			0.00	g	100.0	Gravel	
#10	2000	462.60	462.77	0.17	g	99.7	Sand	Coarse
#20	850	374.10	375.12	1.02	g	98.1	Sand	Medium
#40	425	362.07	363.58	1.51	g	95.8	Sand	Medium
#60	250	352.01	353.90	1.89	g	92.9	Sand	Fine
#80	180	318.90	320.00	1.10	g	91.2	Sand	Fine
#100	150	327.89	328.97	1.08	g	89.6	Sand	Fine
#200	75	314.18	319.50	5.32	g	81.5	Sand	Fine
				0.00	g	81.5		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	65.8

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0240	20.5	30.3	52.7	Silt	
5	5	1.0220	20.5	19.6	47.8	Silt	
15	15	1.0185	20.5	11.8	39.3	Silt	
30	29	1.0155	20.5	8.8	31.9	Silt	
60	63	1.0135	20.5	6.1	27.1	Silt	
250	250	1.0115	20.5	3.1	22.2	Clay	
1440	1434	1.0090	20.5	1.3	16.1	Clay	

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Sediment Grain Size - D422

Client	
Client Sample ID	OR19-04-SURFFD
Lab Sample ID	200-51234-E-6

Date Received	10/29/2019
Start Date	11/12/2019 16:39
End Date	11/20/2019 10:21

Dry Weight Determination

Tin Weight	1.06	g
Wet Sample + Tin	15.73	g
Dry Sample + Tin	7.41	g
% Moisture	56.71	%

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/12/2019 16:41
Date/Time out of oven	11/13/2019 14:53

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	50.70	237.87	187.17
Sample Weight (Oven Dried)			81

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.14
Sample <#10			80.9
% Passing #10			43.2

Hydrometer Data

Serial Number	542325
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0030
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.000166667
Hydrometer Cal Intercept	1.005833333
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000	462.60	462.74	0.14 g	99.8	Sand	Coarse
#20	850	378.48	379.28	0.80 g	98.8	Sand	Medium
#40	425	366.46	367.63	1.17 g	97.4	Sand	Medium
#60	250	348.07	349.10	1.03 g	96.1	Sand	Fine
#80	180	337.36	338.05	0.69 g	95.2	Sand	Fine
#100	150	328.11	329.25	1.14 g	93.8	Sand	Fine
#200	75	322.59	323.14	0.55 g	93.1	Sand	Fine
				0.00 g	93.1		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	81

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0240	20.5	30.3	42.8	Silt	
5	5	1.0225	20.5	19.5	39.8	Silt	
15	15	1.0195	20.5	11.7	33.9	Silt	
30	31	1.0175	20.5	8.3	29.9	Silt	
60	60	1.0160	20.5	6.1	26.9	Silt	
250	240	1.0130	20.5	3.1	21	Clay	
1440	1424	1.0105	20.5	1.3	16	Clay	

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Sediment Grain Size - D422

Client	
Client Sample ID	OR19-05-SURF
Lab Sample ID	200-51234-E-2

Date Received	10/29/2019
Start Date	11/12/2019 16:27
End Date	11/20/2019 9:45

Dry Weight Determination

Tin Weight	1.04	g
Wet Sample + Tin	22.60	g
Dry Sample + Tin	6.70	g
% Moisture	73.75	%

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/12/2019 16:29
Date/Time out of oven	11/13/2019 14:46

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.18	233.83	189.65
Sample Weight (Oven Dried)			49.8

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			2.08
Sample <#10			47.7
% Passing #10			25.2

Hydrometer Data

Serial Number	542325
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0030
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.000166667
Hydrometer Cal Intercept	1.005833333
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample		% Finer	Classification	Sub Class
3 inch	75000			0.00	g	100.0	Gravel	
2 inch	50000			0.00	g	100.0	Gravel	
1.5 inch	37500			0.00	g	100.0	Gravel	
1 inch	25000			0.00	g	100.0	Gravel	
3/4 inch	19000			0.00	g	100.0	Gravel	
3/8 inch	9500			0.00	g	100.0	Gravel	
#4	4750	487.98	489.14	1.16	g	97.7	Gravel	
#10	2000	462.60	463.52	0.92	g	95.9	Sand	Coarse
#20	850	378.48	380.90	2.42	g	91.0	Sand	Medium
#40	425	366.46	368.86	2.40	g	86.2	Sand	Medium
#60	250	348.07	350.03	1.96	g	82.3	Sand	Fine
#80	180	337.36	337.99	0.63	g	81.0	Sand	Fine
#100	150	328.11	329.33	1.22	g	78.6	Sand	Fine
#200	75	322.59	322.64	0.05	g	78.5	Sand	Fine
				0.00	g	78.5		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	49.8

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0105	20.5	35.3	26.1	Silt	
5	5	1.0095	20.5	22.5	22.8	Silt	
15	15	1.0090	20.5	13.1	21.2	Silt	
30	30	1.0080	20.5	9.3	18	Silt	
60	59	1.0070	20.5	6.7	14.8	Silt	
250	256	1.0055	20.5	3.3	9.94	Clay	
1440	1440	1.0045	20.5	1.4	6.72	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client	
Client Sample ID	OR19-06-SURF
Lab Sample ID	200-51234-D-7

Date Received	10/29/2019
Start Date	11/12/2019 16:42
End Date	11/20/2019 10:24

Dry Weight Determination

Tin Weight	1.04	g
Wet Sample + Tin	20.57	g
Dry Sample + Tin	9.64	g
% Moisture	55.97	%

Non-soil material:	plant
Shape (> #10):	angular
Hardness (> #10):	hard

Date/Time in oven	11/12/2019 16:44
Date/Time out of oven	11/13/2019 14:53

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.09	211.37	167.28
Sample Weight (Oven Dried)			73.7

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.51
Sample <#10			73.2
% Passing #10			43.8

Hydrometer Data

Serial Number	542325
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0030
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.000166667
Hydrometer Cal Intercept	1.005833333
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000	462.60	463.11	0.51 g	99.3	Sand	Coarse
#20	850	374.10	375.02	0.92 g	98.1	Sand	Medium
#40	425	362.07	363.85	1.78 g	95.7	Sand	Medium
#60	250	352.01	355.82	3.81 g	90.5	Sand	Fine
#80	180	318.90	321.96	3.06 g	86.3	Sand	Fine
#100	150	327.89	330.20	2.31 g	83.2	Sand	Fine
#200	75	314.18	320.96	6.78 g	74.0	Sand	Fine
				0.00 g	74.0		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	73.7

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0250	20.5	29.8	49.2	Silt	
5	5	1.0230	20.5	19.4	44.9	Silt	
15	15	1.0190	20.5	11.8	36.1	Silt	
30	31	1.0165	20.5	8.4	30.7	Silt	
60	59	1.0145	20.5	6.2	26.3	Silt	
250	234	1.0125	20.5	3.2	22	Clay	
1440	1418	1.0095	20.5	1.3	15.4	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client	
Client Sample ID	OR19-07-SURF
Lab Sample ID	200-51234-E-9

Date Received	10/29/2019
Start Date	11/12/2019 17:21
End Date	11/20/2019 10:36

Dry Weight Determination

Tin Weight	1.01	g
Wet Sample + Tin	29.26	g
Dry Sample + Tin	13.93	g
% Moisture	54.27	%

Non-soil material:	plant, shell
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/12/2019 17:22
Date/Time out of oven	11/13/2019 14:54

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.69	210.84	166.15
Sample Weight (Oven Dried)			76

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.32
Sample <#10			75.7
% Passing #10			45.6

Hydrometer Data

Serial Number	542325
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0030
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.000166667
Hydrometer Cal Intercept	1.005833333
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000	462.60	462.92	0.32 g	99.6	Sand	Coarse
#20	850	374.10	374.95	0.85 g	98.5	Sand	Medium
#40	425	362.07	363.74	1.67 g	96.3	Sand	Medium
#60	250	352.01	354.26	2.25 g	93.3	Sand	Fine
#80	180	318.90	320.29	1.39 g	91.5	Sand	Fine
#100	150	327.89	329.18	1.29 g	89.8	Sand	Fine
#200	75	314.18	322.05	7.87 g	79.4	Sand	Fine
				0.00 g	79.4		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	76

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0260	20.5	29.4	49.8	Silt	
5	5	1.0245	20.5	19	46.7	Silt	
15	15	1.0205	20.5	11.5	38.2	Silt	
30	32	1.0180	20.5	8.1	32.9	Silt	
60	60	1.0150	20.5	6.1	26.6	Silt	
250	259	1.0125	20.5	3	21.3	Clay	
1440	1406	1.0105	20.5	1.3	17.1	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client	
Client Sample ID	OR19-08-SURF
Lab Sample ID	200-51234-E-10

Date Received	10/29/2019
Start Date	11/12/2019 17:25
End Date	11/20/2019 10:46

Dry Weight Determination

Tin Weight	1.06	g
Wet Sample + Tin	23.65	g
Dry Sample + Tin	9.83	g
% Moisture	61.18	%

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/12/2019 17:27
Date/Time out of oven	11/13/2019 14:54

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.08	219.74	175.66
Sample Weight (Oven Dried)			68.2

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.2
Sample <#10			68
% Passing #10			38.7

Hydrometer Data

Serial Number	542325
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0030
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.000166667
Hydrometer Cal Intercept	1.005833333
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000	462.60	462.80	0.20 g	99.7	Sand	Coarse
#20	850	378.48	379.20	0.72 g	98.6	Sand	Medium
#40	425	366.46	367.50	1.04 g	97.1	Sand	Medium
#60	250	348.07	349.01	0.94 g	95.7	Sand	Fine
#80	180	337.36	337.99	0.63 g	94.8	Sand	Fine
#100	150	328.11	329.20	1.09 g	93.2	Sand	Fine
#200	75	322.59	322.69	0.10 g	93.1	Sand	Fine
				0.00 g	93.1		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	68.2

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0240	20.5	30.3	50.8	Silt	
5	5	1.0225	20.5	19.5	47.3	Silt	
15	15	1.0200	20.5	11.6	41.4	Silt	
30	30	1.0180	20.5	8.4	36.7	Silt	
60	63	1.0165	20.5	5.9	33.2	Silt	
250	253	1.0130	20.5	3.1	24.9	Clay	
1440	1400	1.0105	20.5	1.3	19	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client	
Client Sample ID	OR19-09-SURF
Lab Sample ID	200-51169-E-7

Date Received	10/25/2019
Start Date	11/11/2019 17:19
End Date	11/18/2019 11:07

Dry Weight Determination

Tin Weight	1.05	g
Wet Sample + Tin	21.85	g
Dry Sample + Tin	10.11	g
% Moisture	56.44	%

Non-soil material:	na
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/11/2019 17:21
Date/Time out of oven	11/12/2019 14:23

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	47.82	197.82	150
Sample Weight (Oven Dried)			65.3

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0
Sample <#10			65.3
% Passing #10			43.5

Hydrometer Data

Serial Number	542318
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.00025
Hydrometer Cal Intercept	1.00775
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000			0.00 g	100.0	Sand	Coarse
#20	850	378.48	379.09	0.61 g	99.1	Sand	Medium
#40	425	366.46	367.45	0.99 g	97.6	Sand	Medium
#60	250	348.07	348.71	0.64 g	96.6	Sand	Fine
#80	180	337.36	337.88	0.52 g	95.8	Sand	Fine
#100	150	328.11	328.99	0.88 g	94.5	Sand	Fine
#200	75	322.59	322.65	0.06 g	94.4	Sand	Fine
				0.00 g	94.4		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	65.3

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0270	20.5	29	60	Silt	
5	5	1.0245	20.5	19	53.8	Silt	
15	15	1.0215	20.5	11.4	46.4	Silt	
30	29	1.0170	20.5	8.7	35.4	Silt	
60	58	1.0145	20.5	6.3	29.2	Silt	
250	250	1.0125	20.5	3.1	24.3	Clay	
1440	1434	1.0100	20.5	1.3	18.1	Clay	

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Sediment Grain Size - D422

Client	
Client Sample ID	OR19-10-SURF
Lab Sample ID	200-51169-D-8

Date Received	10/25/2019
Start Date	11/11/2019 17:21
End Date	11/18/2019 11:10

Dry Weight Determination

Tin Weight	1.01	g
Wet Sample + Tin	26.62	g
Dry Sample + Tin	11.58	g
% Moisture	58.73	%

Non-soil material:	na
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/11/2019 17:23
Date/Time out of oven	11/12/2019 14:23

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	47.85	210.59	162.74
Sample Weight (Oven Dried)			67.2

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0
Sample <#10			67.2
% Passing #10			41.3

Hydrometer Data

Serial Number	542318
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.00025
Hydrometer Cal Intercept	1.00775
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000			0.00 g	100.0	Sand	Coarse
#20	850	374.10	376.57	2.47 g	96.3	Sand	Medium
#40	425	362.07	363.90	1.83 g	93.6	Sand	Medium
#60	250	352.01	353.77	1.76 g	91.0	Sand	Fine
#80	180	318.90	319.64	0.74 g	89.9	Sand	Fine
#100	150	327.89	328.43	0.54 g	89.1	Sand	Fine
#200	75	314.18	315.38	1.20 g	87.3	Sand	Fine
				0.00 g	87.3		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	67.2

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0265	20.5	29.2	57.1	Silt	
5	5	1.0245	20.5	19	52.3	Silt	
15	15	1.0210	20.5	11.5	43.9	Silt	
30	29	1.0175	20.5	8.6	35.6	Silt	
60	63	1.0150	20.5	6	29.6	Silt	
250	250	1.0125	20.5	3.1	23.6	Clay	
1440	1434	1.0100	20.5	1.3	17.6	Clay	

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Sediment Grain Size - D422

Client	
Client Sample ID	OR19-11-SURF
Lab Sample ID	200-51169-E-13

Date Received	10/25/2019
Start Date	11/11/2019 17:41
End Date	11/18/2019 12:18

Dry Weight Determination

Tin Weight	1.05	g
Wet Sample + Tin	31.74	g
Dry Sample + Tin	22.02	g
% Moisture	31.67	%

Non-soil material:	shell, plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/11/2019 17:43
Date/Time out of oven	11/12/2019 14:50

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.10	281.67	237.57
Sample Weight (Oven Dried)			162

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.98
Sample <#10			161
% Passing #10			67.8

Hydrometer Data

Serial Number	542318
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.00025
Hydrometer Cal Intercept	1.00775
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample		% Finer	Classification	Sub Class
3 inch	75000			0.00	g	100.0	Gravel	
2 inch	50000			0.00	g	100.0	Gravel	
1.5 inch	37500			0.00	g	100.0	Gravel	
1 inch	25000			0.00	g	100.0	Gravel	
3/4 inch	19000			0.00	g	100.0	Gravel	
3/8 inch	9500			0.00	g	100.0	Gravel	
#4	4750	487.97	488.56	0.59	g	99.6	Gravel	
#10	2000	462.60	462.99	0.39	g	99.4	Sand	Coarse
#20	850	378.48	380.27	1.79	g	98.3	Sand	Medium
#40	425	366.46	382.42	15.96	g	88.4	Sand	Medium
#60	250	348.07	412.84	64.77	g	48.4	Sand	Fine
#80	180	337.36	363.18	25.82	g	32.5	Sand	Fine
#100	150	328.11	337.85	9.74	g	26.5	Sand	Fine
#200	75	322.59	323.68	1.09	g	25.8	Sand	Fine
				0.00	g	25.8		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	162

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0205	20.5	31.6	17.7	Silt	
5	5	1.0195	20.5	20.2	16.7	Silt	
15	15	1.0150	20.5	12.3	12.3	Silt	
30	30	1.0145	20.5	8.7	11.8	Silt	
60	63	1.0125	20.5	6.2	9.79	Silt	
250	253	1.0110	20.5	3.1	8.3	Clay	
1440	1400	1.0090	20.5	1.4	6.32	Clay	

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Sediment Grain Size - D422

Client	
Client Sample ID	OR19-11-SURFFD
Lab Sample ID	200-51169-E-12

Date Received	10/25/2019
Start Date	11/11/2019 17:37
End Date	11/18/2019 11:33

Dry Weight Determination

Tin Weight	1.06	g
Wet Sample + Tin	31.15	g
Dry Sample + Tin	22.40	g
% Moisture	29.08	%

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/11/2019 17:39
Date/Time out of oven	11/12/2019 14:47

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.72	236.57	191.85
Sample Weight (Oven Dried)			136

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.79
Sample <#10			135
% Passing #10			70.4

Hydrometer Data

Serial Number	542318
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.00025
Hydrometer Cal Intercept	1.00775
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample		% Finer	Classification	Sub Class
3 inch	75000			0.00	g	100.0	Gravel	
2 inch	50000			0.00	g	100.0	Gravel	
1.5 inch	37500			0.00	g	100.0	Gravel	
1 inch	25000			0.00	g	100.0	Gravel	
3/4 inch	19000			0.00	g	100.0	Gravel	
3/8 inch	9500			0.00	g	100.0	Gravel	
#4	4750			0.00	g	100.0	Gravel	
#10	2000	462.60	463.39	0.79	g	99.4	Sand	Coarse
#20	850	374.10	375.69	1.59	g	98.2	Sand	Medium
#40	425	362.07	377.12	15.05	g	87.1	Sand	Medium
#60	250	352.01	406.37	54.36	g	47.1	Sand	Fine
#80	180	318.90	339.23	20.33	g	32.2	Sand	Fine
#100	150	327.89	334.02	6.13	g	27.7	Sand	Fine
#200	75	314.18	320.11	5.93	g	23.3	Sand	Fine
				0.00	g	23.3		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	136

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0190	20.5	32.2	19.3	Silt	
5	5	1.0165	20.5	21	16.4	Silt	
15	15	1.0135	20.5	12.5	12.8	Silt	
30	32	1.0115	20.5	8.7	10.5	Silt	
60	60	1.0105	20.5	6.4	9.3	Silt	
250	259	1.0095	20.5	3.1	8.12	Clay	
1440	1406	1.0080	20.5	1.4	6.35	Clay	

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Sediment Grain Size - D422

Client	
Client Sample ID	OR19-12-SURF
Lab Sample ID	200-51169-D-9

Date Received	10/25/2019
Start Date	11/11/2019 17:25
End Date	11/18/2019 11:18

Dry Weight Determination

Tin Weight	1.04	g
Wet Sample + Tin	22.19	g
Dry Sample + Tin	8.86	g
% Moisture	63.03	%

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/11/2019 17:27
Date/Time out of oven	11/12/2019 14:25

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	47.85	218.66	170.81
Sample Weight (Oven Dried)			63.2

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.06
Sample <#10			63.1
% Passing #10			36.9

Hydrometer Data

Serial Number	542318
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.00025
Hydrometer Cal Intercept	1.00775
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample		% Finer	Classification	Sub Class
3 inch	75000			0.00	g	100.0	Gravel	
2 inch	50000			0.00	g	100.0	Gravel	
1.5 inch	37500			0.00	g	100.0	Gravel	
1 inch	25000			0.00	g	100.0	Gravel	
3/4 inch	19000			0.00	g	100.0	Gravel	
3/8 inch	9500			0.00	g	100.0	Gravel	
#4	4750			0.00	g	100.0	Gravel	
#10	2000	462.60	462.66	0.06	g	99.9	Sand	Coarse
#20	850	378.48	378.97	0.49	g	99.1	Sand	Medium
#40	425	366.46	367.32	0.86	g	97.7	Sand	Medium
#60	250	348.07	348.48	0.41	g	97.1	Sand	Fine
#80	180	337.36	337.78	0.42	g	96.4	Sand	Fine
#100	150	328.11	328.43	0.32	g	95.9	Sand	Fine
#200	75	322.59	322.61	0.02	g	95.9	Sand	Fine
				0.00	g	95.9		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	63.2

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0300	20.5	27.7	69.6	Silt	
5	5	1.0245	20.5	19	55.6	Silt	
15	15	1.0215	20.5	11.4	48	Silt	
30	31	1.0185	20.5	8.2	40.3	Silt	
60	60	1.0165	20.5	6	35.3	Silt	
250	240	1.0135	20.5	3.1	27.6	Clay	
1440	1424	1.0105	20.5	1.3	20	Clay	

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Sediment Grain Size - D422

Client	
Client Sample ID	OR19-13-SURF
Lab Sample ID	200-51169-E-3

Date Received	10/25/2019
Start Date	11/08/2019 17:24
End Date	11/15/2019 10:13

Dry Weight Determination

Tin Weight	1.06	g
Wet Sample + Tin	22.01	g
Dry Sample + Tin	9.74	g
% Moisture	58.57	%

Non-soil material:	na
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/08/2019 17:25
Date/Time out of oven	11/11/2019 15:23

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.84	225.79	180.95
Sample Weight (Oven Dried)			75

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0
Sample <#10			75
% Passing #10			41.4

Hydrometer Data

Serial Number	542325
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0030
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.000166667
Hydrometer Cal Intercept	1.005833333
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000			0.00 g	100.0	Sand	Coarse
#20	850	378.48	379.40	0.92 g	98.8	Sand	Medium
#40	425	366.46	367.79	1.33 g	97.0	Sand	Medium
#60	250	348.07	348.81	0.74 g	96.0	Sand	Fine
#80	180	337.36	337.79	0.43 g	95.4	Sand	Fine
#100	150	328.11	328.60	0.49 g	94.7	Sand	Fine
#200	75	322.59	322.62	0.03 g	94.7	Sand	Fine
				0.00 g	94.7		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	75

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0315	20.5	27.1	62.3	Silt	
5	5	1.0275	20.5	18.2	53.7	Silt	
15	15	1.0220	20.5	11.3	41.9	Silt	
30	30	1.0190	20.5	8.3	35.5	Silt	
60	63	1.0160	20.5	5.9	29.1	Silt	
250	241	1.0130	20.5	3.1	22.7	Clay	
1440	1388	1.0105	20.5	1.3	17.3	Clay	

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Sediment Grain Size - D422

Client	
Client Sample ID	OR19-14-SURF
Lab Sample ID	200-51169-D-14

Date Received	10/25/2019
Start Date	11/11/2019 17:43
End Date	11/18/2019 12:22

Dry Weight Determination

Tin Weight	1.04	g
Wet Sample + Tin	18.43	g
Dry Sample + Tin	7.72	g
% Moisture	61.59	%

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/11/2019 17:45
Date/Time out of oven	11/12/2019 14:52

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	47.84	194.38	146.54
Sample Weight (Oven Dried)			56.3

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.09
Sample <#10			56.2
% Passing #10			38.4

Hydrometer Data

Serial Number	542318
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.00025
Hydrometer Cal Intercept	1.00775
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample		% Finer	Classification	Sub Class
3 inch	75000			0.00	g	100.0	Gravel	
2 inch	50000			0.00	g	100.0	Gravel	
1.5 inch	37500			0.00	g	100.0	Gravel	
1 inch	25000			0.00	g	100.0	Gravel	
3/4 inch	19000			0.00	g	100.0	Gravel	
3/8 inch	9500			0.00	g	100.0	Gravel	
#4	4750			0.00	g	100.0	Gravel	
#10	2000	462.60	462.69	0.09	g	99.8	Sand	Coarse
#20	850	374.10	375.92	1.82	g	96.6	Sand	Medium
#40	425	362.07	364.22	2.15	g	92.8	Sand	Medium
#60	250	352.01	355.10	3.09	g	87.3	Sand	Fine
#80	180	318.90	320.46	1.56	g	84.5	Sand	Fine
#100	150	327.89	328.97	1.08	g	82.6	Sand	Fine
#200	75	314.18	316.70	2.52	g	78.1	Sand	Fine
				0.00	g	78.1		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	56.3

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0220	20.5	31	55.3	Silt	
5	5	1.0190	20.5	20.4	46.7	Silt	
15	15	1.0165	20.5	12.1	39.6	Silt	
30	30	1.0145	20.5	8.7	33.9	Silt	
60	57	1.0130	20.5	6.4	29.6	Silt	
250	247	1.0110	20.5	3.2	23.9	Clay	
1440	1394	1.0090	20.5	1.4	18.2	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client	
Client Sample ID	OR19-14-SURFFD
Lab Sample ID	200-51169-D-15

Date Received	10/25/2019
Start Date	11/11/2019 17:47
End Date	11/18/2019 12:49

Dry Weight Determination

Tin Weight	1.05	g
Wet Sample + Tin	22.52	g
Dry Sample + Tin	9.83	g
% Moisture	59.11	%

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/11/2019 17:49
Date/Time out of oven	11/12/2019 15:00

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	47.82	221.02	173.2
Sample Weight (Oven Dried)			70.8

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.16
Sample <#10			70.6
% Passing #10			40.8

Hydrometer Data

Serial Number	542318
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.00025
Hydrometer Cal Intercept	1.00775
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000	462.60	462.76	0.16 g	99.8	Sand	Coarse
#20	850	378.48	381.60	3.12 g	95.4	Sand	Medium
#40	425	366.46	368.65	2.19 g	92.3	Sand	Medium
#60	250	348.07	350.44	2.37 g	89.0	Sand	Fine
#80	180	337.36	338.26	0.90 g	87.7	Sand	Fine
#100	150	328.11	329.76	1.65 g	85.4	Sand	Fine
#200	75	322.59	322.78	0.19 g	85.1	Sand	Fine
				0.00 g	85.1		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	70.8

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0255	20.5	29.6	51.9	Silt	
5	5	1.0225	20.5	19.5	45.1	Silt	
15	15	1.0200	20.5	11.6	39.4	Silt	
30	30	1.0175	20.5	8.5	33.7	Silt	
60	63	1.0150	20.5	6	28.1	Silt	
250	241	1.0125	20.5	3.1	22.4	Clay	
1440	1388	1.0100	20.5	1.3	16.7	Clay	

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Sediment Grain Size - D422

Client	
Client Sample ID	OR19-15-SURF
Lab Sample ID	200-51169-E-10

Date Received	10/25/2019
Start Date	11/11/2019 17:27
End Date	11/18/2019 11:21

Dry Weight Determination

Tin Weight	1.03	g
Wet Sample + Tin	30.69	g
Dry Sample + Tin	12.94	g
% Moisture	59.84	%

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/11/2019 17:29
Date/Time out of oven	11/12/2019 14:25

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	47.83	205.16	157.33
Sample Weight (Oven Dried)			63.2

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.09
Sample <#10			63.1
% Passing #10			40.1

Hydrometer Data

Serial Number	542318
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.00025
Hydrometer Cal Intercept	1.00775
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000	462.60	462.69	0.09 g	99.9	Sand	Coarse
#20	850	374.10	375.25	1.15 g	98.1	Sand	Medium
#40	425	362.07	363.66	1.59 g	95.6	Sand	Medium
#60	250	352.01	353.82	1.81 g	92.7	Sand	Fine
#80	180	318.90	319.80	0.90 g	91.3	Sand	Fine
#100	150	327.89	328.65	0.76 g	90.1	Sand	Fine
#200	75	314.18	316.21	2.03 g	86.9	Sand	Fine
				0.00 g	86.9		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	63.2

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0270	20.5	29	61.9	Silt	
5	5	1.0245	20.5	19	55.6	Silt	
15	15	1.0205	20.5	11.5	45.4	Silt	
30	31	1.0175	20.5	8.3	37.8	Silt	
60	59	1.0155	20.5	6.2	32.7	Silt	
250	234	1.0130	20.5	3.2	26.4	Clay	
1440	1418	1.0105	20.5	1.3	20	Clay	

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Sediment Grain Size - D422

Client	
Client Sample ID	OR19-16-SURF
Lab Sample ID	200-51169-D-4

Date Received	10/25/2019
Start Date	11/08/2019 17:26
End Date	11/15/2019 10:16

Dry Weight Determination

Tin Weight	1.04	g
Wet Sample + Tin	22.13	g
Dry Sample + Tin	9.38	g
% Moisture	60.46	%

Non-soil material:	na
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/08/2019 17:28
Date/Time out of oven	11/11/2019 15:23

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.11	207.96	163.85
Sample Weight (Oven Dried)			64.8

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0
Sample <#10			64.8
% Passing #10			39.5

Hydrometer Data

Serial Number	542325
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0030
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.000166667
Hydrometer Cal Intercept	1.005833333
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000			0.00 g	100.0	Sand	Coarse
#20	850	374.10	374.71	0.61 g	99.1	Sand	Medium
#40	425	362.07	363.43	1.36 g	97.0	Sand	Medium
#60	250	352.01	353.75	1.74 g	94.3	Sand	Fine
#80	180	318.90	319.76	0.86 g	93.0	Sand	Fine
#100	150	327.89	328.55	0.66 g	92.0	Sand	Fine
#200	75	314.18	316.25	2.07 g	88.8	Sand	Fine
				0.00 g	88.8		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	64.8

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0280	20.5	28.6	63.4	Silt	
5	5	1.0240	20.5	19.1	53.5	Silt	
15	15	1.0205	20.5	11.5	44.8	Silt	
30	31	1.0180	20.5	8.3	38.6	Silt	
60	57	1.0160	20.5	6.2	33.7	Silt	
250	235	1.0130	20.5	3.2	26.2	Clay	
1440	1382	1.0100	20.5	1.3	18.8	Clay	

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Sediment Grain Size - D422

Client	
Client Sample ID	OR19-17-SURF
Lab Sample ID	200-51169-D-11

Date Received	10/25/2019
Start Date	11/11/2019 17:35
End Date	11/18/2019 11:29

Dry Weight Determination

Tin Weight	1.04	g
Wet Sample + Tin	22.26	g
Dry Sample + Tin	9.60	g
% Moisture	59.66	%

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/11/2019 17:37
Date/Time out of oven	11/12/2019 14:47

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	47.86	214.60	166.74
Sample Weight (Oven Dried)			67.3

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.28
Sample <#10			67
% Passing #10			40.2

Hydrometer Data

Serial Number	542318
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.00025
Hydrometer Cal Intercept	1.00775
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000	462.60	462.88	0.28 g	99.6	Sand	Coarse
#20	850	378.48	379.70	1.22 g	97.8	Sand	Medium
#40	425	366.46	367.91	1.45 g	95.6	Sand	Medium
#60	250	348.07	349.27	1.20 g	93.8	Sand	Fine
#80	180	337.36	337.92	0.56 g	93.0	Sand	Fine
#100	150	328.11	329.04	0.93 g	91.6	Sand	Fine
#200	75	322.59	322.66	0.07 g	91.5	Sand	Fine
				0.00 g	91.5		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	67.3

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0240	20.5	30.3	51	Silt	
5	5	1.0225	20.5	19.5	47.4	Silt	
15	15	1.0195	20.5	11.7	40.3	Silt	
30	31	1.0175	20.5	8.3	35.5	Silt	
60	59	1.0150	20.5	6.2	29.5	Silt	
250	265	1.0125	20.5	3	23.6	Clay	
1440	1412	1.0100	20.5	1.3	17.6	Clay	

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Sediment Grain Size - D422

Client	
Client Sample ID	OR19-18-SURF
Lab Sample ID	200-51169-E-5

Date Received	10/25/2019
Start Date	11/11/2019 17:14
End Date	11/18/2019 10:50

Dry Weight Determination

Tin Weight	1.04	g
Wet Sample + Tin	18.88	g
Dry Sample + Tin	7.94	g
% Moisture	61.32	%

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/11/2019 17:15
Date/Time out of oven	11/12/2019 14:22

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.66	207.21	162.55
Sample Weight (Oven Dried)			62.9

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.09
Sample <#10			62.8
% Passing #10			38.6

Hydrometer Data	
Serial Number	542318
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.00025
Hydrometer Cal Intercept	1.00775
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000	462.60	462.69	0.09 g	99.9	Sand	Coarse
#20	850	378.48	379.36	0.88 g	98.5	Sand	Medium
#40	425	366.46	367.61	1.15 g	96.7	Sand	Medium
#60	250	348.07	348.67	0.60 g	95.7	Sand	Fine
#80	180	337.36	337.78	0.42 g	95.0	Sand	Fine
#100	150	328.11	328.50	0.39 g	94.4	Sand	Fine
#200	75	322.59	322.63	0.04 g	94.3	Sand	Fine
				0.00 g	94.3		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	62.9

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0265	20.5	29.2	61	Silt	
5	5	1.0245	20.5	19	55.9	Silt	
15	15	1.0215	20.5	11.4	48.2	Silt	
30	30	1.0175	20.5	8.5	38	Silt	
60	59	1.0155	20.5	6.2	32.9	Silt	
250	256	1.0120	20.5	3.1	23.9	Clay	
1440	1440	1.0095	20.5	1.3	17.6	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client	
Client Sample ID	OR19-19-SURF
Lab Sample ID	200-51234-E-3

Date Received	10/29/2019
Start Date	11/12/2019 16:29
End Date	11/20/2019 9:51

Dry Weight Determination

Tin Weight	1.05	g
Wet Sample + Tin	26.86	g
Dry Sample + Tin	10.80	g
% Moisture	62.22	%

Non-soil material:	plant, shell
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/12/2019 16:30
Date/Time out of oven	11/13/2019 14:46

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	44.69	224.66	179.97
Sample Weight (Oven Dried)			68

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.18
Sample <#10			67.8
% Passing #10			37.7

Hydrometer Data

Serial Number	542325
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0030
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.000166667
Hydrometer Cal Intercept	1.005833333
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000	462.60	462.78	0.18 g	99.7	Sand	Coarse
#20	850	374.10	374.80	0.70 g	98.7	Sand	Medium
#40	425	362.07	363.58	1.51 g	96.5	Sand	Medium
#60	250	352.01	353.96	1.95 g	93.6	Sand	Fine
#80	180	318.90	319.81	0.91 g	92.3	Sand	Fine
#100	150	327.89	328.57	0.68 g	91.3	Sand	Fine
#200	75	314.18	316.39	2.21 g	88.1	Sand	Fine
				0.00 g	88.1		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	68

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0295	20.5	28	64	Silt	
5	5	1.0265	20.5	18.5	56.9	Silt	
15	15	1.0235	20.5	11.1	49.8	Silt	
30	30	1.0200	20.5	8.2	41.5	Silt	
60	58	1.0175	20.5	6.1	35.6	Silt	
250	256	1.0140	20.5	3	27.4	Clay	
1440	1440	1.0115	20.5	1.3	21.5	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client	
Client Sample ID	OR19-20-SURF
Lab Sample ID	200-51169-D-6

Date Received	10/25/2019
Start Date	11/11/2019 17:16
End Date	11/18/2019 10:58

Dry Weight Determination

Tin Weight	1.05	g
Wet Sample + Tin	15.73	g
Dry Sample + Tin	6.63	g
% Moisture	61.99	%

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/11/2019 17:17
Date/Time out of oven	11/12/2019 14:23

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	47.82	217.03	169.21
Sample Weight (Oven Dried)			64.3

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.09
Sample <#10			64.2
% Passing #10			37.9

Hydrometer Data

Serial Number	542318
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0035
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.00025
Hydrometer Cal Intercept	1.00775
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000	462.60	462.69	0.09 g	99.9	Sand	Coarse
#20	850	374.10	374.72	0.62 g	98.9	Sand	Medium
#40	425	362.07	363.42	1.35 g	96.8	Sand	Medium
#60	250	352.01	353.62	1.61 g	94.3	Sand	Fine
#80	180	318.90	319.65	0.75 g	93.1	Sand	Fine
#100	150	327.89	328.46	0.57 g	92.2	Sand	Fine
#200	75	314.18	315.55	1.37 g	90.1	Sand	Fine
				0.00 g	90.1		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	64.3

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0275	20.5	28.8	62.1	Silt	
5	5	1.0245	20.5	19	54.6	Silt	
15	15	1.0225	20.5	11.3	49.6	Silt	
30	30	1.0190	20.5	8.3	40.9	Silt	
60	58	1.0165	20.5	6.2	34.7	Silt	
250	256	1.0130	20.5	3	25.9	Clay	
1440	1440	1.0100	20.5	1.3	18.4	Clay	

TestAmerica Burlington

Sediment Grain Size - D422

Client	
Client Sample ID	OR19-21-SURF
Lab Sample ID	200-51234-E-4

Date Received	10/29/2019
Start Date	11/12/2019 16:33
End Date	11/20/2019 10:10

Dry Weight Determination

Tin Weight	1.06	g
Wet Sample + Tin	24.55	g
Dry Sample + Tin	9.64	g
% Moisture	63.47	%

Non-soil material:	plant
Shape (> #10):	na
Hardness (> #10):	na

Date/Time in oven	11/12/2019 16:34
Date/Time out of oven	11/13/2019 14:50

Sample Weights	Tare (g)	Pan+Samp (g)	Samp (g)
Sample Weight (Wet)	47.84	195.26	147.42
Sample Weight (Oven Dried)			53.8

Sample Split (oven dried)	Tare (g)	Pan+Samp (g)	Samp (g)
Sample >=#10			0.15
Sample <#10			53.7
% Passing #10			36.4

Hydrometer Data

Serial Number	542325
Calib. Date (mm/dd/yyyy)	01/03/2018
Low Temp (C)	17.0
Reading at Low Temp	1.0030
High Temp (C)	23.0
Reading at High Temp	1.0020
Hydrometer Cal Slope	-0.000166667
Hydrometer Cal Intercept	1.005833333
Default Soil Gravity	2.6500

Gravel/Sand Fraction (Sieves)

Sample Fraction	Size (um)	Pan Tare (g)	Pan+Sample (g)	Sample	% Finer	Classification	Sub Class
3 inch	75000			0.00 g	100.0	Gravel	
2 inch	50000			0.00 g	100.0	Gravel	
1.5 inch	37500			0.00 g	100.0	Gravel	
1 inch	25000			0.00 g	100.0	Gravel	
3/4 inch	19000			0.00 g	100.0	Gravel	
3/8 inch	9500			0.00 g	100.0	Gravel	
#4	4750			0.00 g	100.0	Gravel	
#10	2000	462.60	462.75	0.15 g	99.7	Sand	Coarse
#20	850	378.48	381.73	3.25 g	93.7	Sand	Medium
#40	425	366.46	367.67	1.21 g	91.5	Sand	Medium
#60	250	348.07	348.79	0.72 g	90.2	Sand	Fine
#80	180	337.36	337.80	0.44 g	89.4	Sand	Fine
#100	150	328.11	328.30	0.19 g	89.0	Sand	Fine
#200	75	322.59	322.59	0.00 g	89.0	Sand	Fine
				0.00 g	89.0		

Adjusted Hydrometer Sample Mass

Hydrometer Sample Mass (g)	53.8

Silt/Clay Fraction (Hydrometer Test)

Hydrometer Test Time (min)	Actual	Spec. Gravity	Temp C	Particle Size (Micron)	% Finer	Classification	Sub Class
2	2	1.0215	20.5	31.2	57	Silt	
5	5	1.0200	20.5	20.1	52.5	Silt	
15	15	1.0175	20.5	12	45	Silt	
30	29	1.0145	20.5	8.9	36.1	Silt	
60	58	1.0125	20.5	6.4	30.1	Silt	
250	250	1.0105	20.5	3.2	24.1	Clay	
1440	1434	1.0085	20.5	1.3	18.2	Clay	

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Appendix D

Eurofins TestAmerica Laboratory Reports

(*Provided as Separate PDF Due to File Size*)

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Appendix E

Surface Sediment Weighted Average Concentration Calculations

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Ottawa River SWAC Methodology Evaluation

Presentation to Ottawa River Project Team

Biweekly Meeting

February 11, 2020

Mike Powell and Caryn Kiehl-Simpson

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Ottawa River SWACs

Options for Estimating SWAC

- Simple Arithmetic Mean
  - Assumes data are independent and identically distributed
- Nearest Neighbor (aka, Thiessen Polygons)
  - Area weights are based entirely on geometry
  - Does not consider spatial autocorrelation
- Kriging
  - Considers spatial correlation in data
  - Provides minimum variance unbiased estimation of mean and variance
  - Can be used to compute confidence intervals and prediction limits
  - Only more effective than simpler methods if there is spatial autocorrelation
  - Requires fitting a model to the data's variogram

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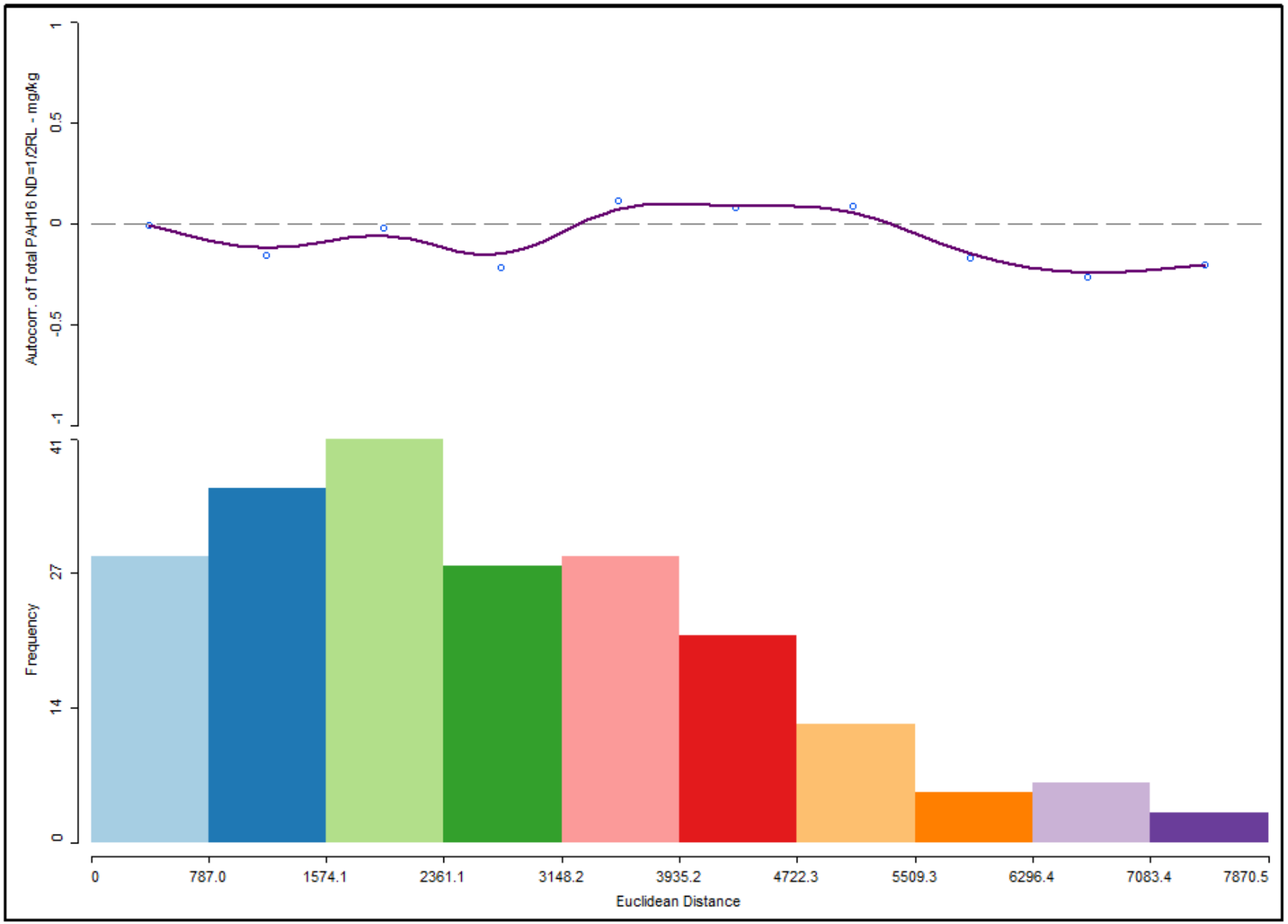
Correlogram for Total PAHs (ND=1/2RL)



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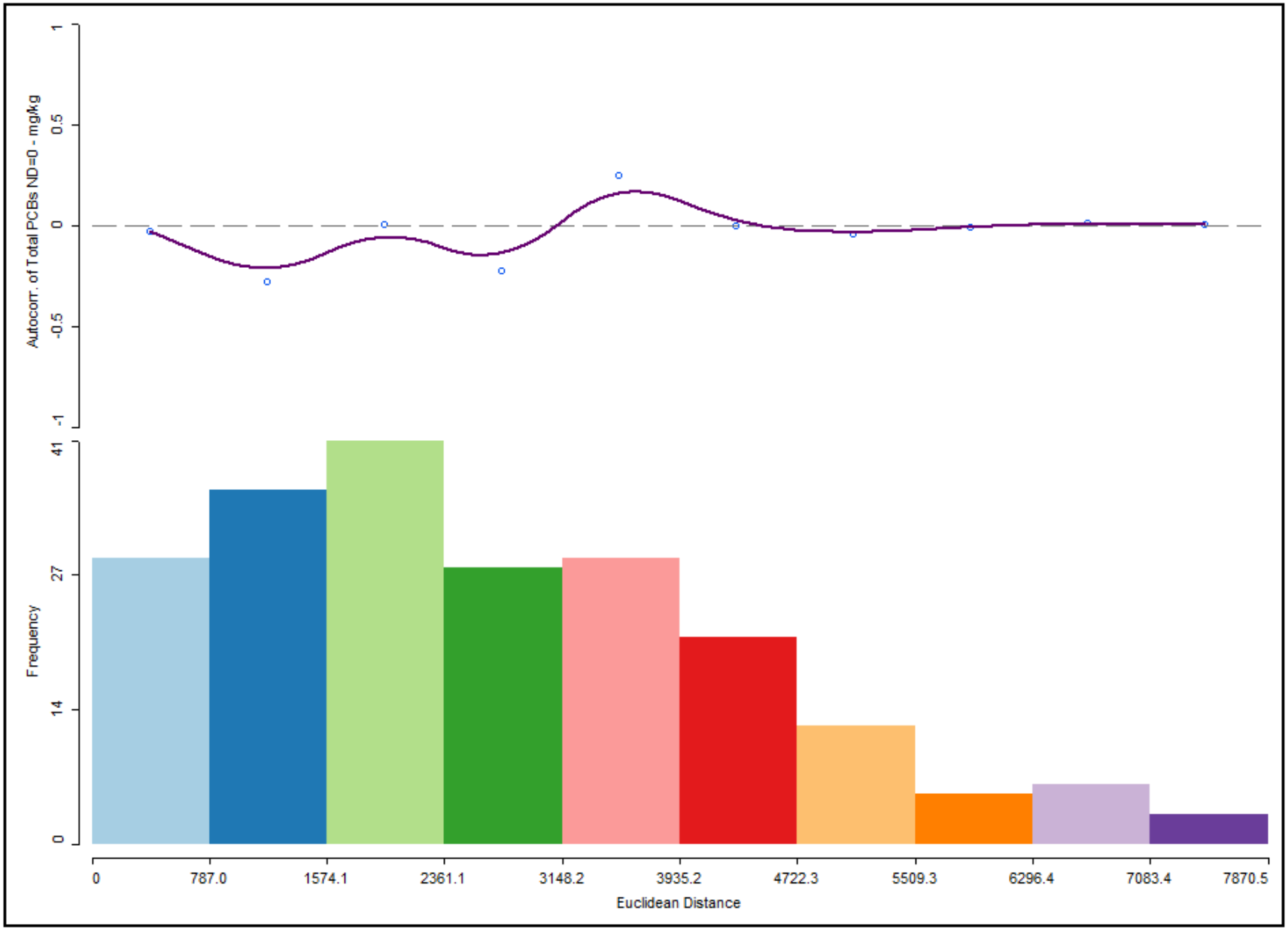
Correlogram for Total PCBs (ND=0)



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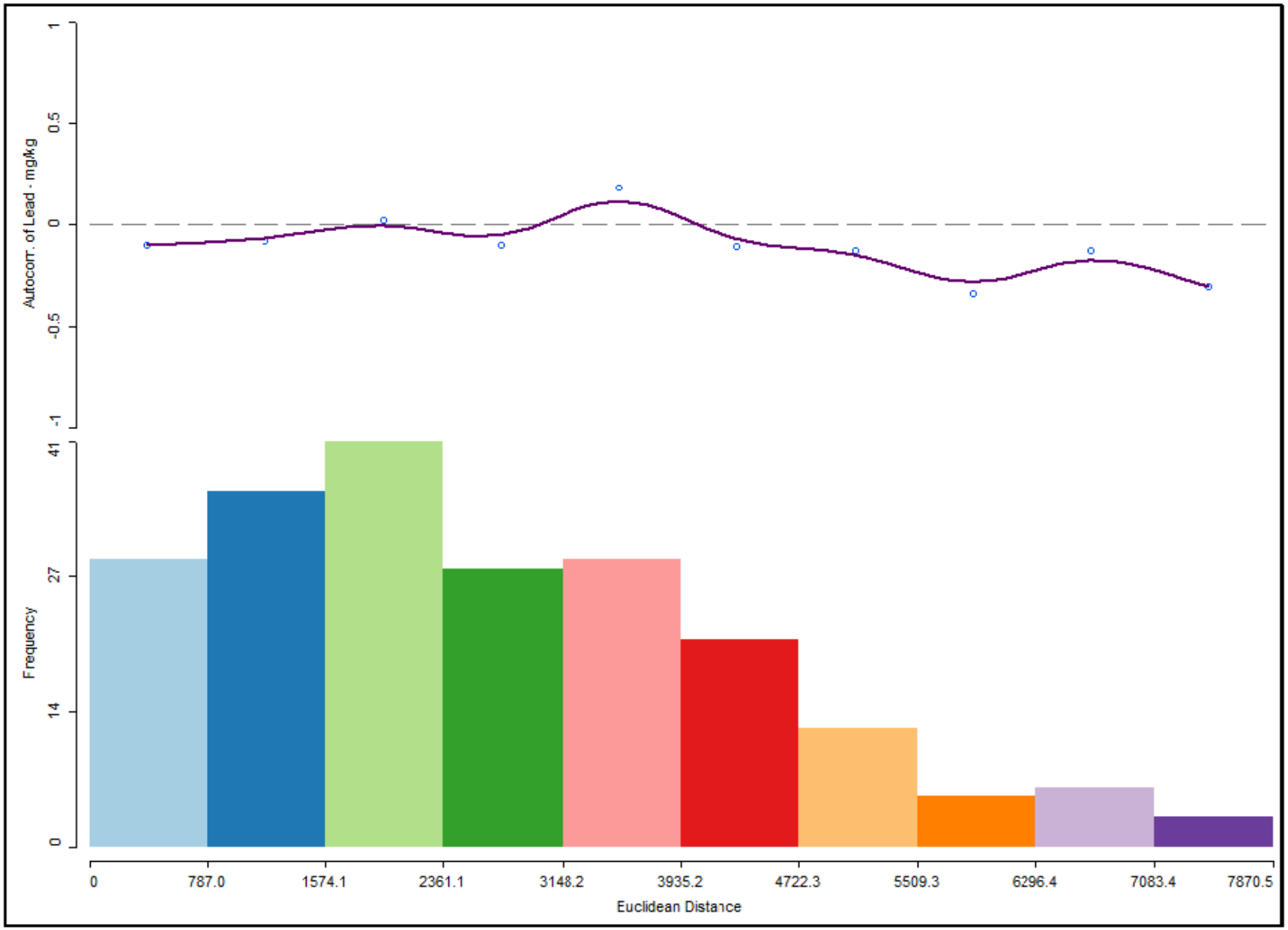
Correlogram for Lead



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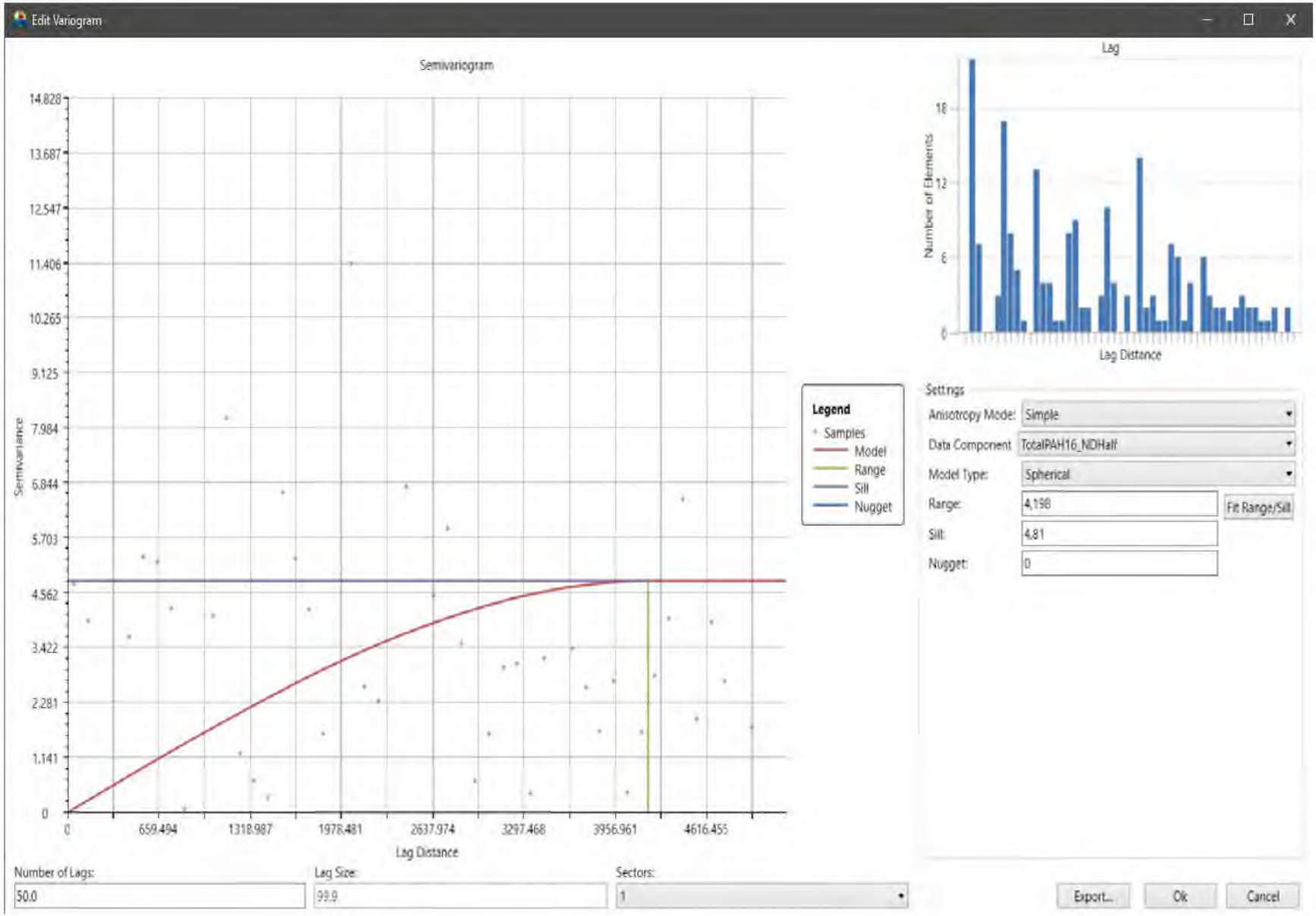
Semivariogram for PAHs



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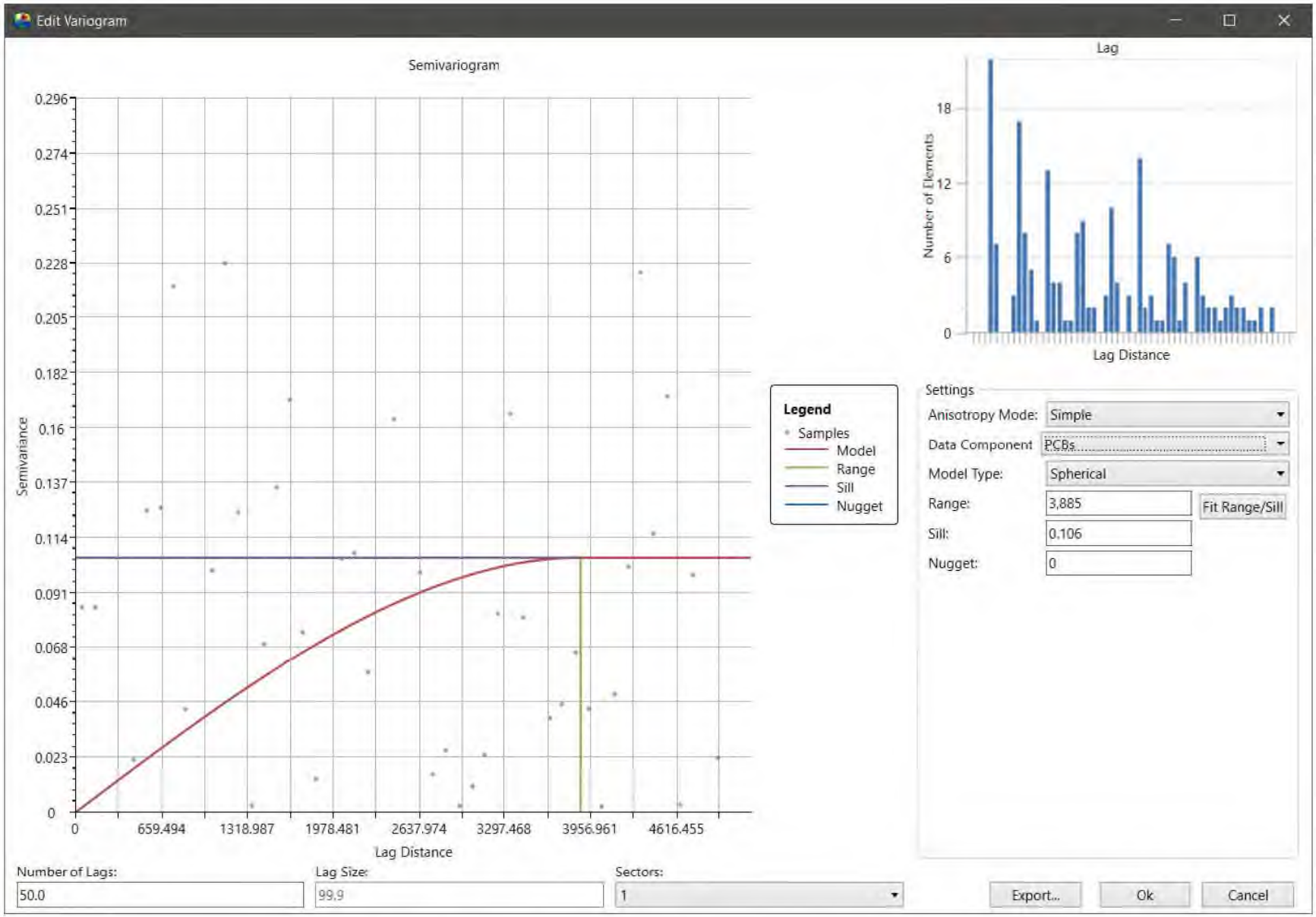
Semivariogram for PCBs



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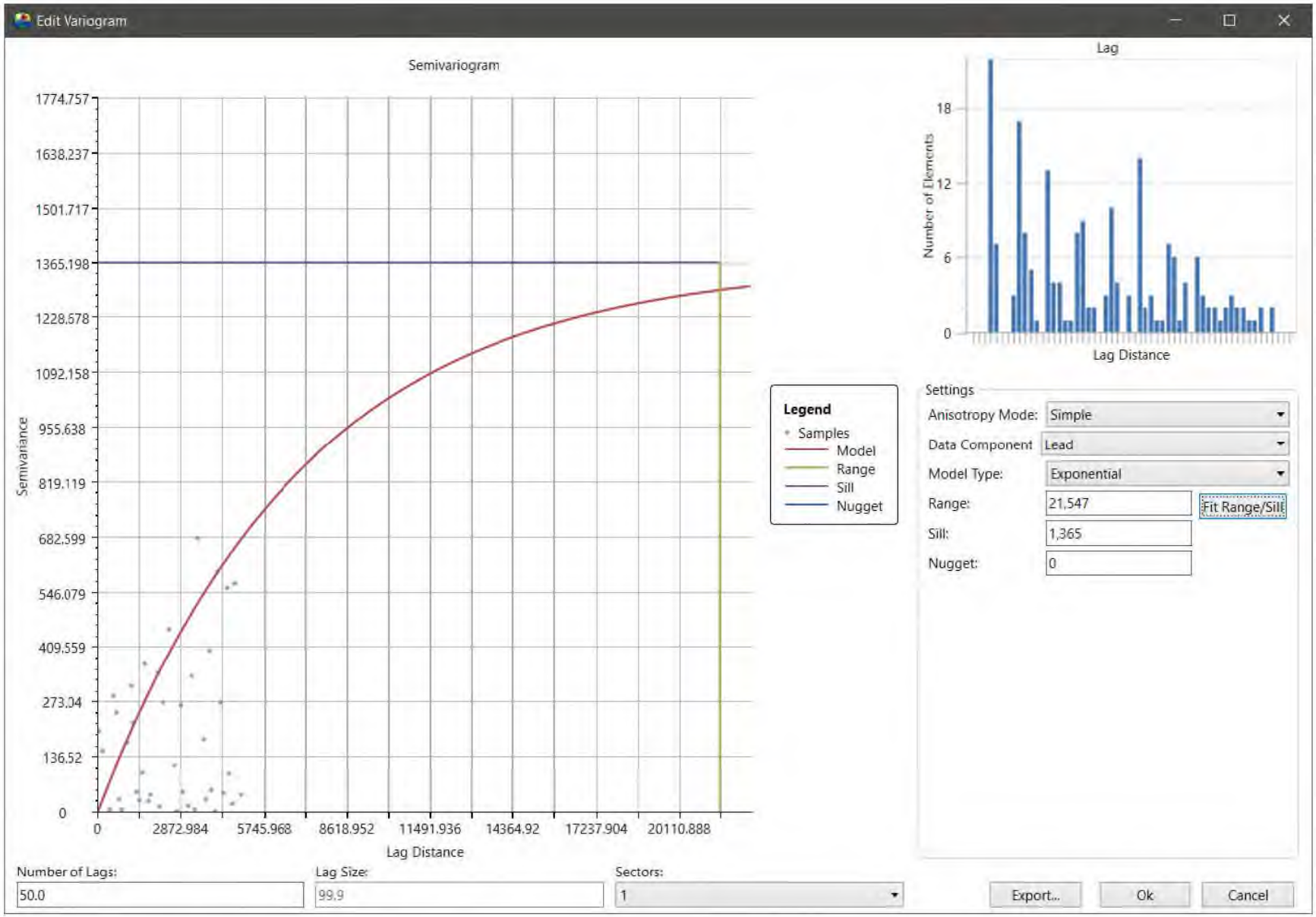
Semivariogram for Lead



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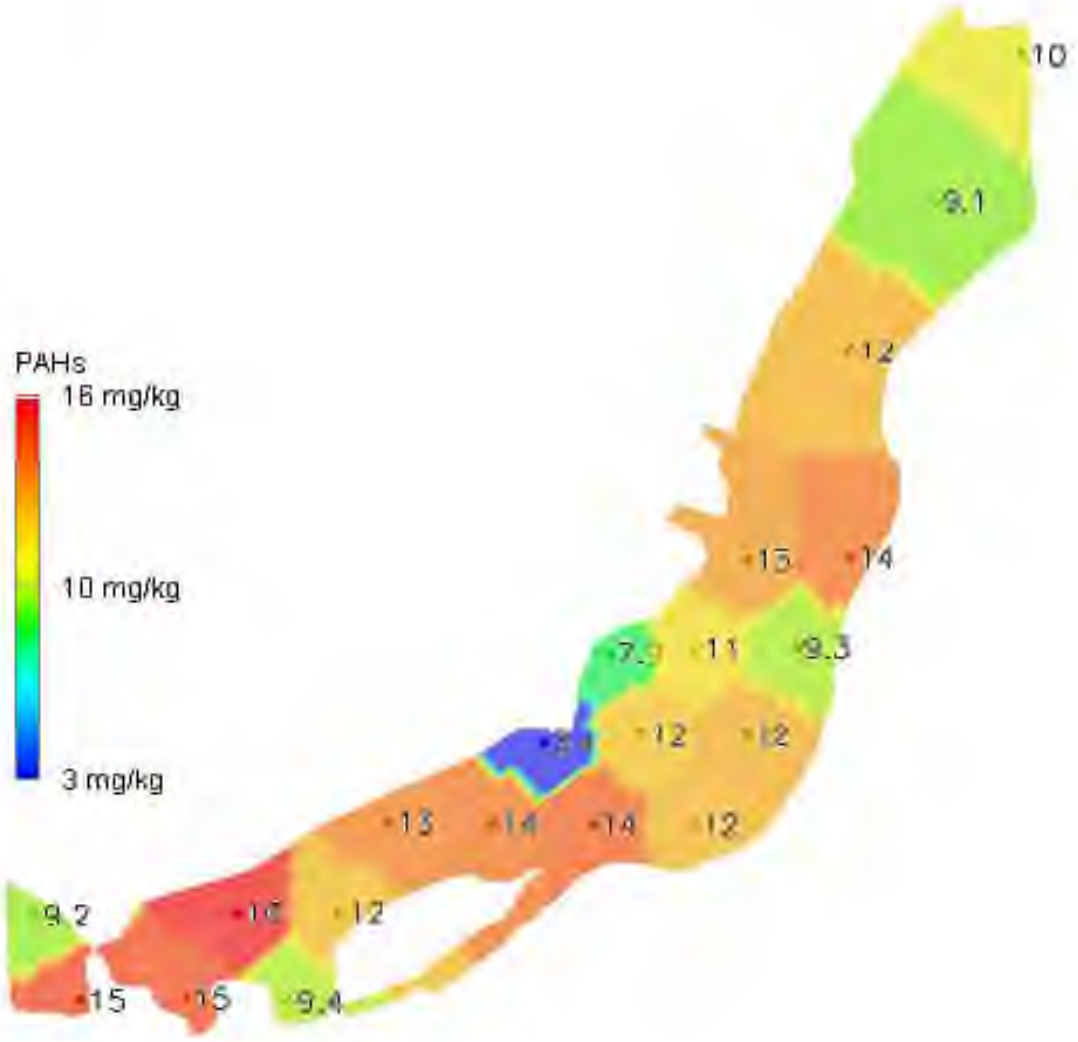
Nearest Neighbor Plume Map for PAHs



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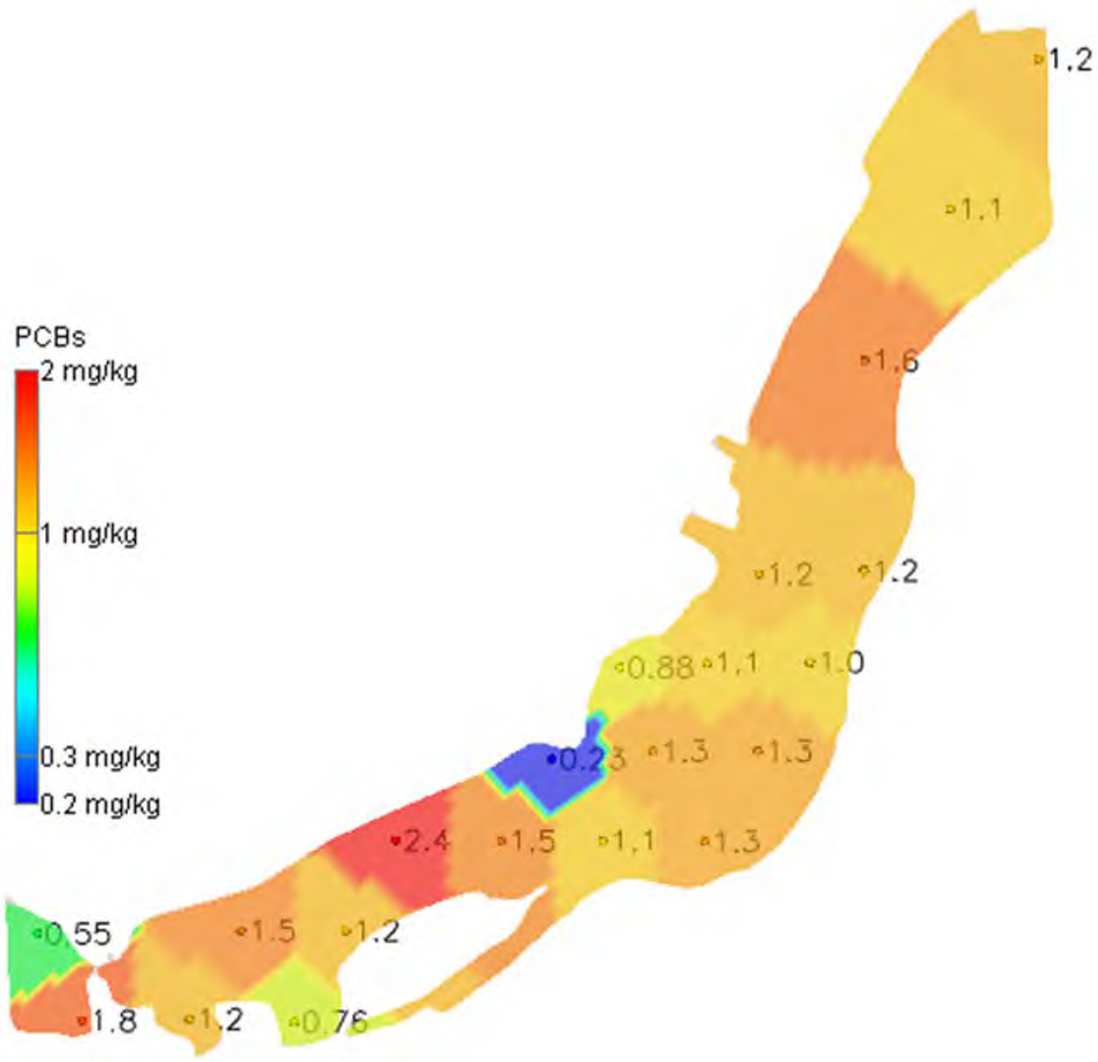
Nearest Neighbor Plume Map for PCBs



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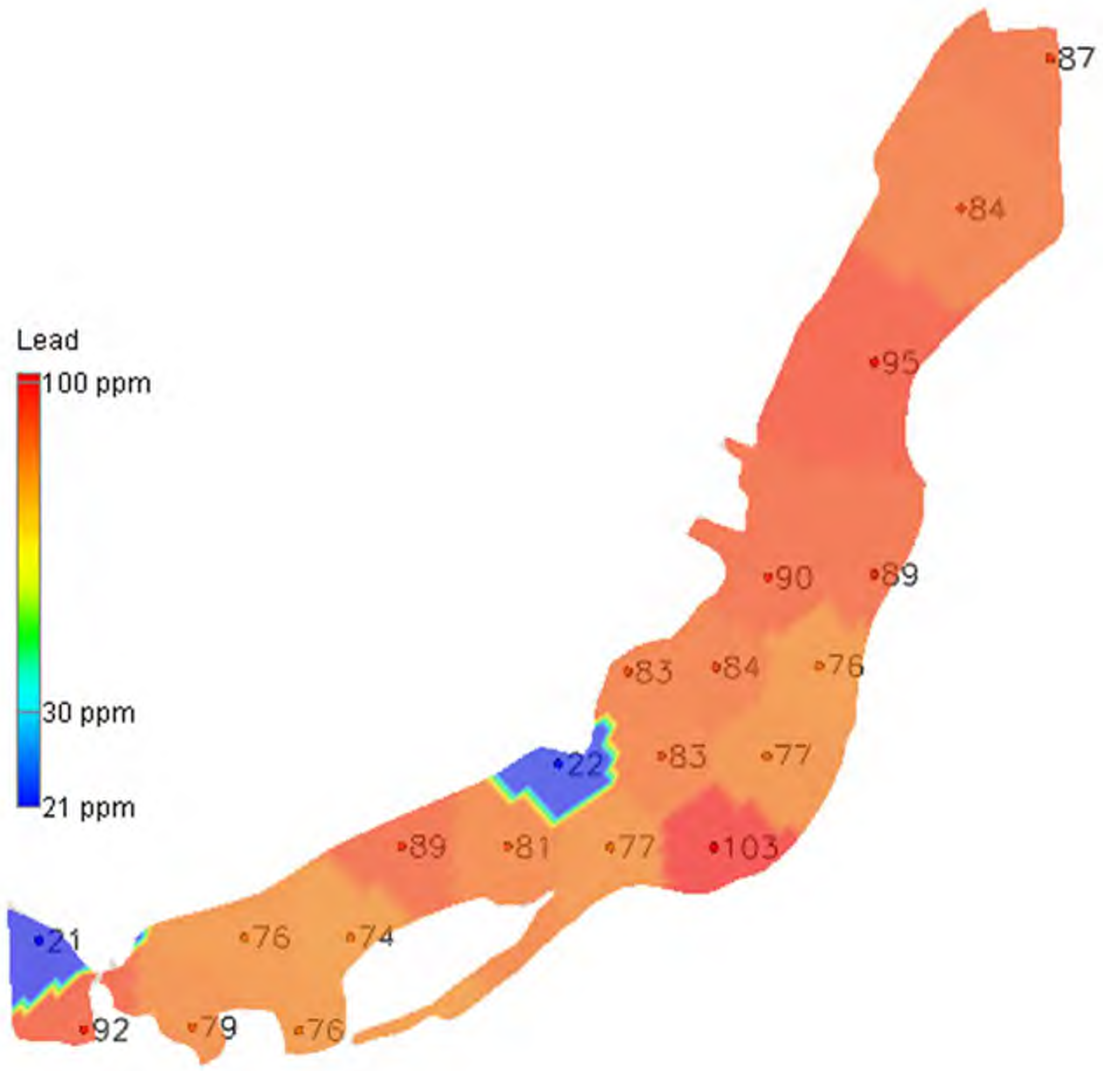
Nearest Neighbor Plume Map for Lead



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Ottawa River SWACs

	Distribution	St. Dev. of Log(X)	Arithmetic Mean (95% UCLM)	Nearest Neighbor	Ordinary Kriging (95%
PCBs (mg/kg)	Normal	0.5	1.20 (1.37)	1.24	NA
PAHs (mg/kg)	Normal	0.3	11.6 (12.7)	11.7	NA
Lead (mg/kg)	Nonparametric	0.4	78.0 (85.6)[1]	81.2	77.8 (86.1)[2]

1. UCLM computed using Student's *t* -distribution. Note that Chebyshev UCLM is 97.1

2. UCLM approximated with Student's *t* -distribution

Recommendations

- Data are spatially independent
  - SWAC can be estimated using arithmetic mean
- PCBs and PAHs are normally distributed
  - UCLM can be computed using Student's *t*-distribution
- Lead data do not fit a theoretical distribution
  - Mildly skewed (standard deviation of logged data, $S_y = 0.4$)
  - Recommend using Student's *t*-distribution to compute UCLM
  - UCLM could be computed using Chebyshev Inequality, but this approach tends be highly conservative

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Table 2-1. Skewness as a Function of σ (or its *MLE*, $s_y = \hat{\sigma}$), *sd* of log(*X*)

Standard Deviation of Logged Data	Skewness
$\sigma < 0.5$	Symmetric to mild skewness
$0.5 \leq \sigma < 1.0$	Mild skewness to moderate skewness
$1.0 \leq \sigma < 1.5$	Moderate skewness to high skewness
$1.5 \leq \sigma < 2.0$	High skewness
$2.0 \leq \sigma < 3.0$	Very high skewness (moderate probability of outliers and/or multiple populations)
$\sigma \geq 3.0$	Extremely high skewness (high probability of outliers and/or multiple populations)

Note: *When data are mildly skewed with* $\sigma < 0.5$, the three distributions considered in ProUCL tend to yield comparable upper limits irrespective of the data distribution.

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Table A-9. Summary Table for the Computation of a 95% *UCL* of the Unknown Mean, μ_1, of a Lognormal Population

$\hat{\sigma}$	*Sample Size, n*	*Suggestions*
$\hat{\sigma} < 0.5$	For all n	Student's t, modified-t, or H-UCL
$0.5 \leq \hat{\sigma} < 1.0$	For all n	H-UCL
$1.0 \leq \hat{\sigma} < 1.5$	$n < 25$	95% Chebyshev *(Mean, Sd)* UCL
	$n \geq 25$	H-UCL
$1.5 \leq \hat{\sigma} < 2.0$	$n < 20$	97.5% or 99% Chebyshev *(Mean, Sd)* UCL
	$20 \leq n < 50$	95% Chebyshev *(Mean, Sd)* UCL
	$n \geq 50$	H-UCL
$2.0 \leq \hat{\sigma} < 2.5$	$n < 20$	99% Chebyshev *(Mean, Sd)* UCL
	$20 \leq n < 50$	97.5% Chebyshev *(Mean, Sd)* UCL
	$50 \leq n < 70$	95% Chebyshev *(Mean, Sd)* UCL
	$n \geq 70$	H-UCL
$2.5 \leq \hat{\sigma} < 3.0$	$n < 30$	99% Chebyshev (*Mean, Sd*)
	$30 \leq n < 70$	97.5% Chebyshev *(Mean, Sd)* UCL
	$70 \leq n < 100$	95% Chebyshev *(Mean, Sd)* UCL
	$n \geq 100$	H-UCL
$3.0 \leq \hat{\sigma} \leq 3.5^{**}$	$n < 15$	Bootstrap-t or Hall's bootstrap method*
	$15 \leq n < 50$	99% Chebyshev(*Mean, Sd*)
	$50 \leq n < 100$	97.5% Chebyshev *(Mean, Sd)* UCL
	$100 \leq n < 150$	95% Chebyshev *(Mean, Sd)* UCL
	$n \geq 150$	H-UCL
$\hat{\sigma} > 3.5^{**}$	For all n	Use nonparametric methods*

*In the case that Hall's bootstrap or bootstrap-t methods yield an erratic unrealistically large UCL value, UCL of the mean may be computed based upon the Chebyshev inequality: Chebyshev *(Mean, Sd) UCL*

S_Y for Lead = 0.4

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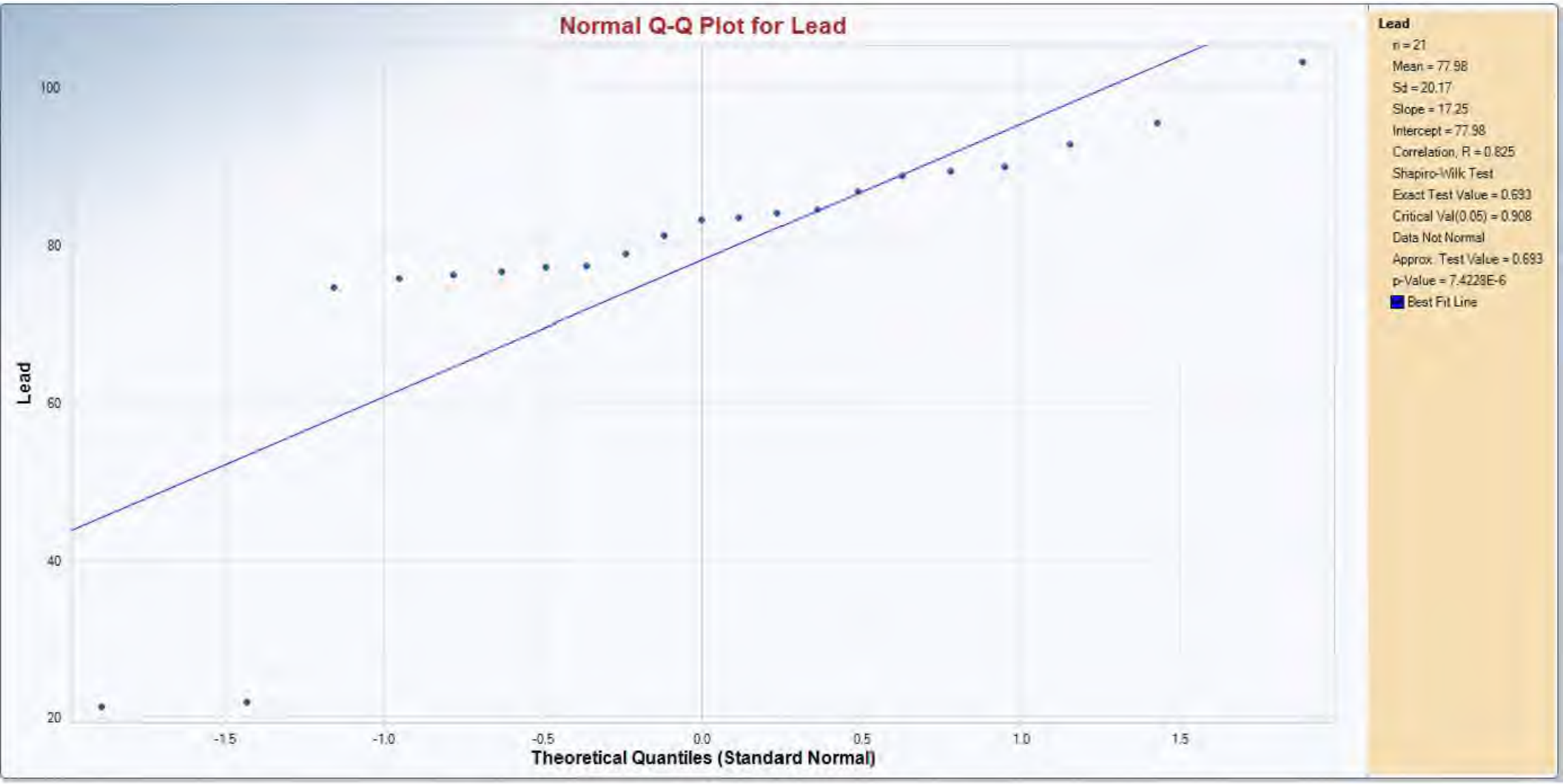
Normal Q-Q Plot for Lead
Lead
n = 21
Mean = 77.98
Sd = 20.17
Slope = 17.25
Intercept = 77.98
Correlation, R = 0.825
Shapiro-Wilk Test
Exact Test Value = 0.693
Critical Val(0.05) = 0.908
Data Not Normal
Approx. Test Value = 0.693
p-Value = 7.4228E-6
Best Fit Line
100
80
60
40
20
Lead
-1.5
-1.0
-0.5
0.0
0.5
1.0
1.5
Theoretical Quantiles (Standard Normal)

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Appendix F

EA Toxicity and Bioaccumulation Testing Report

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RESULTS OF TOXICITY TESTING AND BIOACCUMULATION ANALYSES WITH *Hyalella azteca*, *Chironomus dilutus* and *Lumbriculus variegatus* ON SEDIMENT SAMPLES FROM SEDIMENT REMEDY CONFIRMATION OTTAWA RIVER REACH 1 SITE CHARACTERIZATION MAUMEE AREA OF CONCERN, TOLEDO, OHIO

Great Lakes Architect-Engineer Services
Contract No. 68HE0519D0001

Prepared for:

EA Engineering, Science, and Technology, (MI) PLC
and Its Affiliate EA Science and Technology
5918 Meridian Boulevard, Suite 4
Brighton, Michigan 48116

Prepared by:

EA Engineering, Science, and Technology, Inc., PBC
231 Schilling Circle
Hunt Valley, Maryland 21031
For questions, please contact Michael Chanov
ph: 410-584-7000

Results relate only to the items tested or to the samples as received by the laboratory.

This report contains 22 pages plus 5 attachments.

Michael K. Chanov II
Laboratory Director

20 December 2019
Date

EA Project Number 70019.TOX

ACCREDITED IN ACCORDANCE WITH nelac ID# E87550

EA Report Number 8165-REV1

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1. INTRODUCTION

EA Engineering, Science, and Technology performed toxicity testing on sediment samples for the Sediment Remedy Confirmation Ottawa River, Reach 1 Site Characterization, Maumee Area of Concern, Toledo, Ohio Project. The objective of the testing was to evaluate the toxicity and bioaccumulation potential of site sediment samples as compared to control sediment. The testing program consisted of: 1) a 10-day survival and growth toxicity test using the freshwater midge *Chironomus dilutus* (formerly *tentans*); 2) a 10-day survival and growth toxicity test using the freshwater amphipod *Hyalella azteca* and 3) a 28-day bioaccumulation test with the freshwater oligochaete *Lumbriculus variegatus*. At the completion of the bioaccumulation testing, the *L. variegatus* tissue was submitted for selected chemical analyses.

2. METHODS AND MATERIALS

2.1 SAMPLE DESCRIPTIONS

Fourteen sediment samples were collected for the project by EA personnel. The samples were packed on wet ice and transported to EA's Ecotoxicology Laboratory in Hunt Valley, Maryland. Upon receipt at EA, the samples were visually inspected, compared against the chain-of-custody record, and assigned EA laboratory accession numbers. Copies of the chain-of-custody records are included in Attachment I. Table 1 summarizes the collection and receipt data for the site sediments. When not being processed for testing, the samples were stored in the dark at 4°C.

2.2 CONTROL SEDIMENT

The control sediment used in the toxicity tests was a natural sediment from Pretty Boy Reservoir, Maryland which has been routinely utilized in freshwater sediment toxicity testing.

2.3 LABORATORY WATER

Dechlorinated tap water was used as the overlying water for the sediment exposures. The source of the water was the City of Baltimore municipal water system. Upon entering the laboratory, the water passed through a high-capacity, activated-carbon filtration system to remove any possible contaminants such as chlorine and trace organic compounds. This water source has proven safe for aquatic organism toxicity testing at EA as evidenced by maintenance of the multigeneration *Hyalella azteca*, *Lumbriculus variegatus* and fathead minnow cultures with no evident loss of fecundity. Additionally, this water has been routinely utilized in freshwater sediment toxicity testing, which have met test acceptability criteria.

2.4 TEST ORGANISMS

The midges (*Chironomus dilutus*) lot were obtained from Aquatic Research Organisms (Hampton, New Hampshire). Upon receipt at EA, the organisms were gradually acclimated to laboratory water at 23°C. Second to third instar larvae were used in the toxicity testing.

The amphipods (*Hyalella azteca*) were obtained from Aquatic Research Organisms (Hampton, New Hampshire). Organisms were 7 to 8 days old for testing and were gradually acclimated to the testing temperature of 23°C during the holding period.

The oligochaetes, *Lumbriculus variegatus* were obtained from Eastern Aquatics, Lancaster, PA. The organisms were gradually acclimated to laboratory water at 23°C and allowed to depurate prior to test initiation.

2.5 TOXICITY TEST OPERATIONS AND PERFORMANCE

Toxicity test methodologies utilized in this study followed EA's standard toxicity testing protocols (EA 2018), and comply with current NELAC standards where applicable.

2.5.1 *Chironomus dilutus* 10-Day Toxicity Tests

Toxicity testing was conducted in accordance with US EPA guidance (US EPA 2000), and test methodologies followed EA's standard toxicity testing protocol CT-AC-06 (EA 2018).

The test chambers used in the *C. dilutus* 10-day survival and growth toxicity test were 300-ml lipless glass beakers, each containing 100 ml of sediment and 175 ml of overlying water. The tests were performed with eight replicates per sediment. The sediments and overlying water were added to the chambers 7 days prior to introduction of the test organisms. The beakers were left undisturbed for 7 days to allow any suspended sediment particles in the water column to settle. The introduction of the test organisms to the test chambers marked the initiation of the toxicity tests. Ten organisms were randomly introduced into each replicate beaker for a total of 80 organisms per sediment. The test chambers were placed in a water bath to maintain temperatures at a target range of 23±1°C, with a 16-hour light/8-hour dark photoperiod. The *C. dilutus* were fed 1.5 ml per replicate of a 4 g/L slurry of Tetramin flake food daily.

The overlying water in the exposure chambers was renewed a minimum of twice daily using a water delivery system (Zumwalt et al. 1994). Fresh overlying water was slowly added to each

replicate, displacing the water already in the beaker to flow out through a notch cut into the top of the beaker. The notch was sealed with fine mesh screen to prevent loss of organisms during the renewal process.

For the midge toxicity testing, water quality parameters of temperature, pH, dissolved oxygen, and conductivity were recorded daily on the overlying water in one replicate of each sediment. Composite samples of the overlying water of each sediment were also analyzed for alkalinity, hardness, conductivity and ammonia at test initiation and termination.

At the end of the 10-day exposure period, the surviving organisms from each replicate were retrieved from the sediment. The number of surviving organisms from each replicate was recorded. The surviving *C. dilutus* from each replicate were then placed in a dried, pre-weighed ceramic crucible and placed in a drying oven at 100°C for a minimum of 24 hours. The crucibles were then removed from the oven, placed in a desiccator to cool, and weighed. The dry weight of the surviving organisms in each replicate was determined by subtracting the weight of the crucible from the weight of the crucible plus dried organisms. The mean dry weight per organism was obtained by dividing the total organism dry weight per replicate by the number of surviving organisms per replicate.

The ash-free dry weight was determined for the *C. dilutus* by placing the crucibles with oven-dried organisms in a muffle furnace at 550°C for two hours, then weighing the crucibles with organisms following an appropriate cooling period. For each replicate, the weight of the crucible with furnace-dried organisms was subtracted from the weight of the crucible with oven-dried organisms, yielding a total organism ash-free dry weight. A mean ash-free dry weight per organism was obtained by dividing the total organism ash-free dry weight per replicate by the number of surviving organisms per replicate.

The survival and growth results of the *C. dilutus* toxicity tests were statistically analyzed according to US EPA guidance (US EPA 2000) to determine if any of the site sediments were significantly different ($p=0.05$) from the control or reference sediments. If the data were normally distributed, then a t-Test was performed to detect statistically significant differences between test sediments and the control sediment. If the data distribution was non-normal, then a

Wilcoxon Two-Sample Test was used to compare the group means. Shapiro-Wilk's Test was used to determine if the data were normally distributed, and the F-Test was used to test for homogeneity of variance.

Tables, 2 and 3 present the test results and water quality, respectively, for the *C. dilutus* toxicity testing. Copies of the original data sheets and statistical analyses from the sediment toxicity testing are included in Attachment II for *C. dilutus*.

2.5.2 *Hyalella azteca* 10-Day Toxicity Tests

Toxicity testing was conducted in accordance with US EPA guidance (US EPA 2000), and test methodologies followed EA's standard toxicity testing protocol HA-AC-06 (EA 2018).

The test chambers used in the *H. azteca* 10-day survival and growth toxicity test were 300-ml lipless glass beakers, each containing 100 ml of sediment and 175 ml of overlying water (lab water). The tests were performed with eight replicates per sediment. The sediments and overlying water were added to the chambers at least 24 hours prior to introduction of the test organisms. The beakers were left undisturbed overnight to allow any suspended sediment particles in the water column to settle. The introduction of the test organisms to the test chambers marked the initiation of the toxicity tests. Ten organisms were randomly introduced into each replicate beaker for a total of 80 organisms per sediment. The test chambers were placed in a water bath to maintain temperatures at a target range of 23±1°C, with a 16-hour light/8-hour dark photoperiod.

The the *H. azteca* were fed 1.0 ml per replicate of YCT (a suspension of yeast, ground cereal leaves, and trout chow) daily. The overlying water in the exposure chambers was renewed a minimum of twice daily using a water delivery system (Zumwalt et al. 1994). Fresh overlying water was slowly added to each replicate, displacing the water already in the beaker to flow out through a notch cut into the top of the beaker. The notch was sealed with fine mesh screen to prevent loss of organisms during the renewal process.

For the amphipod toxicity testing, water quality parameters of temperature, pH, dissolved oxygen, and conductivity were recorded daily on the overlying water in one replicate of each sediment. Composite samples of the overlying water of each sediment were also analyzed for alkalinity, hardness, and ammonia at test initiation and termination.

At the end of the 10-day (*H. azteca*) exposure period, the surviving organisms from each replicate were retrieved from the sediment. The number of surviving organisms from each replicate was recorded. The surviving *H. azteca* from each replicate were then placed in a dried, pre-weighed aluminum pan, and placed in a drying oven at 100°C for 24 hours. The pans were then removed from the oven, placed in a desiccator to cool, and weighed. The dry weight of the surviving organisms in each replicate was determined by subtracting the weight of the empty pan from the weight of the pan plus dried organisms. The mean dry weight per organism was obtained by dividing the total organism dry weight per replicate by the number of surviving organisms per replicate.

The survival and growth results of the *H. azteca* toxicity tests were statistically analyzed according to US EPA guidance (2000) to determine if any of the site sediments were significantly different ($p=0.05$) from the control or reference sediment. If the data were normally distributed, then a t-Test was performed to detect statistically significant differences between test sediments and the control sediment. If the data distribution was non-normal, then a Wilcoxon Two-Sample Test was used to compare the group means. Shapiro-Wilk's Test was used to determine if the data were normally distributed, and the F-Test was used to test for homogeneity of variance.

Table 4 summarizes the results of the *H. azteca* test and Table 5 provides a summary of the water quality measurements recorded during the *H. azteca* toxicity testing. Copies of the original data sheets and statistical analyses from the sediment toxicity testing are included in Attachment III for *H. azteca*.

2.5.3 *Lumbriculus variegatus* 28-day Bioaccumulation Test

Bioaccumulation testing was conducted in accordance with US EPA guidance (US EPA 2000), and test methodologies followed EA's standard toxicity testing protocol LV-BIO-06 (EA 2018).

The *L. variegatus* bioaccumulation test was conducted in 5-gallon aquaria, with five replicates per test sediment and control. Based on the analytical tissue biomass requirements, approximately 10 g wet weight of *L. variegatus* were loaded into each replicate. Each replicate had 1.5 L of sediment and 6 L of overlying water. Sediment and overlying water were loaded into the test chambers two days prior to test initiation to allow time for the suspended sediments to settle.

The overlying water was replaced daily by siphoning approximately 80 percent of the overlying water from the aquaria and replacing with new overlying water, taking care not to disturb the sediment surface. During the 28-day exposure period, the test chambers were maintained at a target temperature of 23±1°C with a 16-hour light/8-hour dark photoperiod. Measurements of temperature, pH, dissolved oxygen, and conductivity of the overlying water were recorded on one replicate of each sample and control at test initiation, termination and on each intermediate day. Composite samples of the overlying water of each sediment were also analyzed for alkalinity, hardness, and ammonia at test initiation and termination. These water quality measurements are summarized in Table 6. The organisms were not fed during the exposure period.

After 28 days of exposure, the *L. variegatus* were recovered from each sediment and placed into clean laboratory water for 24 hours to purge their digestive tracts. Copies of the original data sheets from the *L. variegatus* testing are included in Attachment IV.

2.6 REFERENCE TOXICANT TESTS

In conformance with EA's quality assurance/quality control program, reference toxicant tests were performed on *H. azteca*, *C. dilutus* and *L. variegatus*. The *H. azteca* were exposed to the

reference toxicant copper sulfate ($CuSO_4$) in a graded concentration series to determine the 96-hour median lethal concentration (LC50). The *C. dilutus* were exposed to sodium dodecyl sulfate (SDS) to determine the 48-hour LC50, while the *L. variegatus* were exposed to copper chloride ($CuCl_2$) to determine the 96-hour LC50. The results of the reference toxicant tests were compared to EA's established control chart limits according to US EPA methodology (US EPA 2002). Reference toxicant test data are presented in Table 7.

2.7 ARCHIVES

Original data sheets, records, memoranda, notes, and computer printouts are archived at EA's Office in Hunt Valley, Maryland. These data will be retained for a period of 5 years unless a longer period of time is requested.

3. RESULTS AND DISCUSSION

3.1 *Chironomus dilutus* SEDIMENT TOXICITY TEST

Table 2 summarizes the results of the *C. dilutus* 10-day survival and growth test. Water quality measurements taken during the test are presented in Table 3. The survival and growth of *C. dilutus* exposed to the site sediments were statistically compared to organisms exposed to the laboratory control and reference sediment (OR19-REF1TOX). The survival results indicated that the organisms exposed to 8 site sediments were statistically different (p=0.05) from the laboratory control and/or a reference sample. Mean ash free dry weight indicated that 10 sediment samples were significantly different from the control and/or a reference sample.

3.2 *Hyalella azteca* SEDIMENT TOXICITY TEST

Table 4 summarizes the results of the *H. azteca* 10-day survival and growth test. Water quality measurements taken during the test are presented in Table 5. The survival and growth of *H. azteca* exposed to the site sediments were statistically compared to organisms exposed to the laboratory control and reference sediment (OR19-REF1TOX). The results indicated that for survival the organisms exposed to 6 site sediments were statistically different (p=0.05) from the laboratory control and/or a reference sample. Mean ash free dry weight indicated that 3 sediment samples were significantly different from the control and/or a reference sample.

3.3 *Lumbriculus variegatus* BIOACCUMULATION TEST

After 28 days of exposure, the *L. variegatus* were recovered from the sediment and placed into clean laboratory water for 24 hours to purge their digestive tracts. After the depuration period, the organisms were collected and submitted for chemical analyses. Statistical comparisons were not conducted on the weights of the organisms recovered from the sediments. A summary of the water quality measurements recorded during the *L. variegatus* bioaccumulation testing is presented in Table 6.

3.4 REFERENCE TOXICANT TESTS

The results of the reference toxicant tests are summarized in Table 7. All of the reference toxicant test results fell within the established laboratory control chart limits.

4. REFERENCES

EA. 2018. EA Ecotoxicology Laboratory Quality Assurance and Standard Operating Procedures Manual. EA Manual ATS-102. Internal document prepared by EA's Ecotoxicology Laboratory, EA Engineering, Science, and Technology, Inc., PBC, Hunt Valley, Maryland.

US EPA. 2000. Methods for Measuring the Toxicity and Bioaccumulation of Sediment-Associated Contaminants with Freshwater Invertebrates. Second Edition. EPA/600/R-99/064. U.S. Environmental Protection Agency, Office of Research and Development, Duluth, Minnesota.

US EPA. 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms. Fifth Edition. EPA-821-R-02-012. U.S. Environmental Protection Agency, Office of Water, Washington, DC.

Zumwalt, D.C., F.J. Dwyer, I.E. Greer, and C.G. Ingersoll. 1994. A water-renewal system that accurately delivers small volumes of water to exposure chamber. Environmental Toxicology and Chemistry. 13:1311-1314.

TABLE 1 SUMMARY OF COLLECTION AND RECEIPT INFORMATION FOR SEDIMENT SAMPLES - SEDIMENT REMEDY CONFIRMATION OTTAWA RIVER, REACH 1 SITE CHARACTERIZATION, MAUMEE AREA OF CONCERN, TOLEDO, OHIO

Sample Identification	EA Accession Number	Sample Date	Receipt Time and Date	Receipt Temperature (°C)
OR19-01-SURFTOX	AT9-870	1010, 10/22/2019	1000, 10/28/2019	1.9
OR19-02-SURFTOX	AT9-871	1110, 10/22/2019	1000, 10/28/2019	1.3
OR19-03-SURFTOX	AT9-872	1555, 10/24/2019	1000, 10/28/2019	1.7
OR19-04-SURFTOX	AT9-873	1635, 10/24/2019	1000, 10/28/2019	1.6
OR19-05-SURFTOX	AT9-874	1500, 10/24/2019	1000, 10/28/2019	1.7
OR19-07-SURFTOX	AT9-875	1120, 10/25/2019	1000, 10/28/2019	1.9
OR19-09-SURFTOX	AT9-876	1040, 10/24/2019	1000, 10/28/2019	1.6
OR19-11-SURFTOX	AT9-877	1120, 10/24/2019	1000, 10/28/2019	1.7
OR19-13-SURFTOX	AT9-878	1610, 10/23/2019	1000, 10/28/2019	1.9
OR19-15-SURFTOX	AT9-879	0930, 10/24/2019	1000, 10/28/2019	1.6
OR19-18-SURFTOX	AT9-880	1200, 10/23/2019	1000, 10/28/2019	1.7
OR19-19-SURFTOX	AT9-881	0845, 10/24/2019	1000, 10/28/2019	1.9
OR19-21-SURFTOX	AT9-882	1730, 10/24/2019	1000, 10/28/2019	1.6
OR19-REF1TOX	AT9-883	0855, 10/25/2019	1000, 10/28/2019	1.3

TABLE 2 RESULTS OF *Chironomus dilutus* 10-DAY TOXICITY TESTING

EA Test Number: TN-19-651
Test Initiation: 22 November 2019
Test Termination: 2 December 2019

Sample Identification	EA Accession Number	10-Day Survival (percent)	Mean Ash Free Dry Weight as mg/Organism (±SD)
Laboratory Control	AT9-730	80	0.652 (±0.117)
OR19-01-SURFTOX	AT9-870	65[a]	0.681 (±0.076)
OR19-02-SURFTOX	AT9-871	78	0.690 (±0.123)
OR19-03-SURFTOX	AT9-872	85	0.553 (±0.076)[ab]
OR19-04-SURFTOX	AT9-873	84	0.526 (±0.122)[ab]
OR19-05-SURFTOX	AT9-874	68[a]	0.575 (±0.085)[b]
OR19-07-SURFTOX	AT9-875	51[ab]	0.332 (±0.063)[ab]
OR19-09-SURFTOX	AT9-876	93	0.748 (±0.164)
OR19-11-SURFTOX	AT9-877	88	0.489 (±0.099)[ab]
OR19-13-SURFTOX	AT9-878	28[ab]	0.222 (±0.076)[ab]
OR19-15-SURFTOX	AT9-879	29[ab]	0.226 (±0.053)[ab]
OR19-18-SURFTOX	AT9-880	16[ab]	0.156 (±0.029)[ab]
OR19-19-SURFTOX	AT9-881	24[ab]	0.276 (±0.168)[ab]
OR19-21-SURFTOX	AT9-882	15[ab]	0.153 (±0.053)[ab]
OR19-REF1TOX	AT9-883	71[a]	0.749 (±0.115)

(a) Significantly different (p=0.05) from laboratory control.
(b) Significantly different (p=0.05) from OR19-REF1TOX (AT9-883).

TABLE 3 WATER QUALITY PARAMETERS MEASURED DURING *Chironomus dilutus* 10-DAY TOXICITY TESTING

EA Test Number: TN-19-651
Test Initiation: 22 November 2019
Test Termination: 2 December 2019

Sample Identification	EA Accession Number	Temperature (°C)		pH (su)		Dissolved Oxygen (mg/L)		Conductivity (µs/cm)	
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Laboratory Control	AT9-730	22.0	22.4	7.3	8.0	7.3	8.8	331	352
OR19-01-SURFTOX	AT9-870	22.0	22.5	7.3	7.9	7.6	8.6	340	384
OR19-02-SURFTOX	AT9-871	22.0	22.4	7.3	7.8	6.4	8.3	349	401
OR19-03-SURFTOX	AT9-872	22.0	22.4	7.3	7.8	6.0	8.3	351	379
OR19-04-SURFTOX	AT9-873	22.0	22.5	7.4	7.8	5.9	8.2	341	386
OR19-05-SURFTOX	AT9-874	22.0	22.5	7.3	7.8	5.8	8.2	358	403
OR19-07-SURFTOX	AT9-875	22.0	22.4	7.3	7.8	5.5	8.0	344	411
OR19-09-SURFTOX	AT9-876	22.0	22.5	7.3	7.8	7.0	7.9	355	397
OR19-11-SURFTOX	AT9-877	22.0	22.5	7.3	7.8	5.9	7.9	368	404
OR19-13-SURFTOX	AT9-878	22.0	22.8	7.4	7.8	5.5	7.9	356	403
OR19-15-SURFTOX	AT9-879	22.0	22.6	7.3	7.8	5.5	7.9	347	370
OR19-18-SURFTOX	AT9-880	22.0	22.6	7.4	7.8	5.5	8.4	352	388
OR19-19-SURFTOX	AT9-881	22.0	22.6	7.3	7.8	7.1	8.0	353	388
OR19-21-SURFTOX	AT9-882	22.0	22.5	7.3	7.8	6.0	8.1	351	397
OR19-REF1TOX	AT9-883	22.0	22.5	7.3	7.8	6.0	8.5	359	382

EA Test Number: TN-19-651
Test Initiation: 22 November 2019
Test Termination: 2 December 2019

Sample Identification	EA Accession Number	Alkalinity (mg/L)		Hardness (mg/L)		Conductivity (µs/cm)		Ammonia (mg/L)	
		Day 0	Day 10	Day 0	Day 10	Day 0	Day 10	Day 0	Day 10
Laboratory Control	AT9-730	68	90	112	140	328	364	2.0	1.0
OR19-01-SURFTOX	AT9-870	128	102	156	124	486	400	1.3	1.0
OR19-02-SURFTOX	AT9-871	112	100	132	128	460	384	0.2	0.9
OR19-03-SURFTOX	AT9-872	140	110	168	132	512	404	2.7	1.2
OR19-04-SURFTOX	AT9-873	136	104	164	136	506	411	3.0	1.6
OR19-05-SURFTOX	AT9-874	130	102	160	116	488	388	1.2	1.4
OR19-07-SURFTOX	AT9-875	120	104	176	144	482	389	1.0	1.7
OR19-09-SURFTOX	AT9-876	114	92	156	124	479	388	0.9	1.0
OR19-11-SURFTOX	AT9-877	124	112	148	124	455	408	0.7	0.5
OR19-13-SURFTOX	AT9-878	112	102	160	156	489	384	1.0	0.9
OR19-15-SURFTOX	AT9-879	130	98	152	124	484	386	1.0	1.3
OR19-18-SURFTOX	AT9-880	124	94	152	124	483	391	0.7	0.5
OR19-19-SURFTOX	AT9-881	116	96	152	136	477	385	1.0	0.5
OR19-21-SURFTOX	AT9-882	128	98	144	116	489	383	1.0	0.7
OR19-REF1TOX	AT9-883	112	100	148	128	403	388	<0.1	0.3

EA Test Number: TN-19-644
Test Initiation: 15 November 2019
Test Termination: 25 November 2019

Sample Identification	EA Accession Number	10-Day Survival (percent)	Mean Dry Weight as mg/Organism (±SD)
Laboratory Control	AT9-730	90	0.110 (±0.015)
OR19-01-SURFTOX	AT9-870	88	0.101 (±0.020)[b]
OR19-02-SURFTOX	AT9-871	89	0.119 (±0.023)
OR19-03-SURFTOX	AT9-872	79	0.105 (±0.017)
OR19-04-SURFTOX	AT9-873	78[a]	0.109 (±0.015)
OR19-05-SURFTOX	AT9-874	89	0.102 (±0.022)
OR19-07-SURFTOX	AT9-875	71[a]	0.095 (±0.018)[ab]
OR19-09-SURFTOX	AT9-876	76[a]	0.103 (±0.031)
OR19-11-SURFTOX	AT9-877	86	0.129 (±0.016)
OR19-13-SURFTOX	AT9-878	76	0.096 (±0.022)[b]
OR19-15-SURFTOX	AT9-879	79	0.114 (±0.025)
OR19-18-SURFTOX	AT9-880	79[a]	0.122 (±0.026)
OR19-19-SURFTOX	AT9-881	76[a]	0.119 (±0.011)
OR19-21-SURFTOX	AT9-882	61[a]	0.115 (±0.020)
OR19-REF1TOX	AT9-883	73[a]	0.118 (±0.015)

(a) Significantly different (p=0.05) from laboratory control.
(b) Significantly different (p=0.05) from OR19-REF1TOX (AT9-883).

TABLE 5 WATER QUALITY PARAMETERS MEASURED DURING *Hyalella azteca* 10-DAY TOXICITY TESTING

EA Test Number: TN-19-644
Test Initiation: 15 November 2019
Test Termination: 25 November 2019

Sample Identification	EA Accession Number	Temperature (°C)		pH (su)		Dissolved Oxygen (mg/L)		Conductivity (µs/cm)	
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Laboratory Control	AT9-730	22.0	22.9	7.4	8.1	6.0	8.6	330	372
OR19-01-SURFTOX	AT9-870	22.0	22.6	7.4	8.0	6.6	8.5	352	416
OR19-02-SURFTOX	AT9-871	22.0	22.6	7.4	7.9	6.6	8.1	346	386
OR19-03-SURFTOX	AT9-872	22.0	22.6	7.4	7.9	6.6	8.4	342	432
OR19-04-SURFTOX	AT9-873	22.0	22.6	7.5	7.9	5.7	8.3	351	508
OR19-05-SURFTOX	AT9-874	22.0	22.6	7.5	7.9	5.4	8.2	357	490
OR19-07-SURFTOX	AT9-875	22.0	22.6	7.3	7.8	6.0	8.1	347	518
OR19-09-SURFTOX	AT9-876	22.0	22.6	7.4	7.9	6.2	8.2	352	415
OR19-11-SURFTOX	AT9-877	22.0	22.7	7.5	7.9	6.9	8.3	349	415
OR19-13-SURFTOX	AT9-878	22.0	22.8	7.5	7.9	7.1	8.2	348	400
OR19-15-SURFTOX	AT9-879	22.0	22.8	7.5	7.9	7.1	8.0	348	400
OR19-18-SURFTOX	AT9-880	22.0	22.8	7.5	7.8	7.0	8.5	340	410
OR19-19-SURFTOX	AT9-881	22.0	22.8	7.5	7.8	6.6	8.3	349	417
OR19-21-SURFTOX	AT9-882	22.0	22.9	7.6	7.9	6.9	8.3	352	424
OR19-REF1TOX	AT9-883	22.0	22.8	7.6	7.8	7.1	8.1	351	383

TABLE 5 CONTINUED

EA Test Number: TN-19-644
Test Initiation: 15 November 2019
Test Termination: 25 November 2019

Sample Identification	EA Accession Number	Alkalinity (mg/L)		Hardness (mg/L)		Conductivity (µs/cm)		Ammonia (mg/L)	
		Day 0	Day 10	Day 0	Day 10	Day 0	Day 10	Day 0	Day 10
Laboratory Control	AT9-730	62	72	112	112	316	349	0.8	0.2
OR19-01-SURFTOX	AT9-870	102	90	136	128	436	378	0.4	0.4
OR19-02-SURFTOX	AT9-871	98	90	144	124	412	375	<0.1	0.2
OR19-03-SURFTOX	AT9-872	108	92	140	116	447	381	0.9	0.9
OR19-04-SURFTOX	AT9-873	94	86	140	144	415	380	0.7	0.8
OR19-05-SURFTOX	AT9-874	100	92	160	128	415	383	0.5	1.1
OR19-07-SURFTOX	AT9-875	110	94	128	128	434	391	0.6	1.6
OR19-09-SURFTOX	AT9-876	108	88	124	112	431	378	0.7	1.2
OR19-11-SURFTOX	AT9-877	100	100	136	116	403	380	0.3	0.8
OR19-13-SURFTOX	AT9-878	106	92	144	132	425	383	0.5	1.2
OR19-15-SURFTOX	AT9-879	100	90	132	140	408	376	0.5	0.4
OR19-18-SURFTOX	AT9-880	110	88	128	120	438	380	1.2	0.4
OR19-19-SURFTOX	AT9-881	96	94	132	148	413	389	0.4	0.3
OR19-21-SURFTOX	AT9-882	98	96	144	116	407	380	0.7	0.4
OR19-REF1TOX	AT9-883	104	90	140	120	395	380	<0.1	0.2

TABLE 6 WATER QUALITY PARAMETERS MEASURED DURING *Lumbriculus variegatus* 28-DAY BIOACCUMULATION TESTING

EA Test Number: TN-19-643
Test Initiation: 14 November 2019
Test Termination: 12 December 2019

Sample Identification	EA Accession Number	Temperature (°C)		pH (su)		Dissolved Oxygen (mg/L)		Conductivity (µs/cm)	
		MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
Laboratory Control	AT9-730	22.0	23.9	7.2	8.3	3.5	7.7	310	363
OR19-01-SURFTOX	AT9-870	22.0	23.7	7.1	8.1	3.4	7.3	359	401
OR19-02-SURFTOX	AT9-871	22.0	23.6	7.2	8.1	3.3	6.9	359	395
OR19-03-SURFTOX	AT9-872	22.0	23.5	7.2	8.0	3.0	6.9	363	427
OR19-04-SURFTOX	AT9-873	22.0	23.6	7.2	8.0	3.0	6.8	356	416
OR19-05-SURFTOX	AT9-874	22.0	23.5	7.2	8.0	3.1	6.7	352	415
OR19-07-SURFTOX	AT9-875	22.0	23.5	6.7	7.9	3.0	6.9	356	417
OR19-09-SURFTOX	AT9-876	22.0	23.5	7.1	8.0	3.2	6.8	354	405
OR19-11-SURFTOX	AT9-877	22.0	23.5	7.2	7.9	3.1	7.0	360	409
OR19-13-SURFTOX	AT9-878	22.0	23.5	7.3	8.0	3.4	6.7	356	420
OR19-15-SURFTOX	AT9-879	22.0	23.6	6.4	8.0	3.5	7.5	339	413
OR19-18-SURFTOX	AT9-880	22.0	23.6	7.3	8.0	3.7	6.8	360	419
OR19-19-SURFTOX	AT9-881	22.0	23.6	7.3	8.0	3.2	6.9	357	406
OR19-21-SURFTOX	AT9-882	22.0	23.3	7.3	8.0	3.0	6.8	359	409
OR19-REF1TOX	AT9-883	22.0	23.3	7.3	7.9	3.5	7.0	346	385

TABLE 6 CONTINUED

EA Test Number: TN-19-643
Test Initiation: 14 November 2019
Test Termination: 12 December 2019

Sample Identification	EA Accession Number	Alkalinity (mg/L)		Hardness (mg/L)		Conductivity (µs/cm)		Ammonia (mg/L)	
		Day 0	Day 28	Day 0	Day 28	Day 0	Day 28	Day 0	Day 28
Laboratory Control	AT9-730	62	70	100	104	324	348	0.6	0.3
OR19-01-SURFTOX	AT9-870	92	90	128	136	394	385	0.4	0.3
OR19-02-SURFTOX	AT9-871	88	86	128	132	375	380	<0.1	0.2
OR19-03-SURFTOX	AT9-872	108	88	140	128	383	386	0.8	0.2
OR19-04-SURFTOX	AT9-873	86	90	132	116	393	384	0.7	0.3
OR19-05-SURFTOX	AT9-874	100	84	120	120	391	378	0.3	0.3
OR19-07-SURFTOX	AT9-875	84	82	120	124	391	377	0.6	0.3
OR19-09-SURFTOX	AT9-876	92	84	120	124	390	379	0.5	0.2
OR19-11-SURFTOX	AT9-877	94	90	116	120	391	378	0.3	0.2
OR19-13-SURFTOX	AT9-878	94	86	128	128	378	378	0.3	0.3
OR19-15-SURFTOX	AT9-879	94	86	124	120	391	386	0.4	0.2
OR19-18-SURFTOX	AT9-880	110	86	128	116	382	382	1.0	0.2
OR19-19-SURFTOX	AT9-881	84	92	132	128	390	383	0.3	0.2
OR19-21-SURFTOX	AT9-882	98	94	144	140	375	385	0.6	0.3
OR19-REF1TOX	AT9-883	76	90	112	112	363	378	<0.1	0.1

TABLE 7 RESULTS OF REFERENCE TOXICANT TESTING

Test Species	Reference Toxicant	EA Test Number	Test Result	Acceptable Control Chart Limits
Chironomus dilutus (midge)	Sodium dodecyl sulfate (SDS)	RT-19-215	48-Hour LC50: 48 mg/L SDS	12 – 82 mg/L SDS
Hyalella azteca (amphipod)	Copper sulfate ($CuSO_4$)	RT-19-154	96-Hour LC50: 168 µg/L Cu	32 – 243 µg/L Cu
Lumbriculus variegatus (oligochaete)	Copper chloride ($CuCl_2$)	RT-19-212	96-Hour LC50: 69 µg/L Cu	0 – 143 µg/L Cu

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ATTACHMENT I

Chain-of-Custody Record
(3 pages)

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USEPA
Lab Contact: Mike Chanov
CarrierName: N/A
AirbillNo:

CHAIN OF CUSTODY RECORD
Site #: 48564
Contact Name: Diane Shimshock
Contact Phone: 517-507-1006

No: 5-102519-103458-0008
Cooler #:
Case #: 48564
Lab Phone: 802-660-1990

Lab #	Sample #	Location	Analyses	Matrix	Sample Date	Sample Time	Numb Cont	Container	Preservative	Lab QC
ATA 870	OR19-01-SURFTOX	OR19-01	Lab Bioassays	Sediment	10/22/2019	10:10	1	5 gallon bucket		1.9°C
871	OR19-02-SURFTOX	OR19-02	Lab Bioassays	Sediment	10/22/2019	11:10	1	5 gallon bucket		1.3°C
872	OR19-03-SURFTOX	OR19-03	Lab Bioassays	Sediment	10/24/2019	15:55	1	5 gallon bucket		1.7°C
873	OR19-04-SURFTOX	OR19-04	Lab Bioassays	Sediment	10/24/2019	16:35	1	5 gallon bucket		1.6°C
874	OR19-05-SURFTOX	OR19-05	Lab Bioassays	Sediment	10/24/2019	15:00	1	5 gallon bucket		1.7°C
875	OR19-07-SURFTOX	OR19-07	Lab Bioassays	Sediment	10/25/2019	11:20	1	5 gallon bucket		1.9°C
876	OR19-09-SURFTOX	OR19-09	Lab Bioassays	Sediment	10/24/2019	10:40	1	5 gallon bucket		1.6°C
877	OR19-11-SURFTOX	OR19-11	Lab Bioassays	Sediment	10/24/2019	11:20	1	5 gallon bucket		1.7°C
878	OR19-13-SURFTOX	OR19-13	Lab Bioassays	Sediment	10/23/2019	16:10	1	5 gallon bucket		1.9°C
879	OR19-15-SURFTOX	OR19-15	Lab Bioassays	Sediment	10/24/2019	09:30	1	5 gallon bucket		1.6°C

Special Instructions:	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
	Mike Chanov EA	10/28/19 1000		10/28/19 1000	Good

USEPA
Lab Contact: Mike Chanov
CarrierName: N/A
AirbillNo:

CHAIN OF CUSTODY RECORD
Site #: 48564
Contact Name: Diane Shimshock
Contact Phone: 517-507-1006

No: 5-102519-103458-0008
Cooler #:
Case #: 48564
Lab Phone: 802-660-1990

Lab #	Sample #	Location	Analyses	Matrix	Sample Date	Sample Time	Numb Cont	Container	Preservative	Lab QC
ATS-880	OR19-18-SURFTOX	OR19-18	Lab Bioassays	Sediment	10/23/2019	12:00	1	5 gallon bucket		1.7°C
881	OR19-19-SURFTOX	OR19-19	Lab Bioassays	Sediment	10/24/2019	08:45	1	5 gallon bucket		1.9°C
882	OR19-21-SURFTOX	OR19-21	Lab Bioassays	Sediment	10/24/2019	17:30	1	5 gallon bucket		1.6°C
883	OR19-REF1TOX	OR19-RE	Lab Bioassays	Sediment	10/25/2019	08:55	1	5 gallon bucket		1.3°C

Special Instructions:

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
	[signature] EA	10/25/19 1002	[signature]	10/25/19 1003	Good

ATTACHMENT II

Data Sheets and Statistical Analyses
from *Chironomus dilutus* Toxicity Tests
(86 pages)

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SEDIMENT TOXICITY TEST SET-UP BENCH SHEET

Project Number: 70019.TOX

Client: OTTOWA RIVER

QC Test Number: TN-19-651

TEST ORGANISM INFORMATION

Common Name: Midge

Scientific Name: *C. dilutus*

Lot Number: CH-072

Source: ABC

Adults Isolated (Time, Date): _____

Neonates Pulled (Time, Date): ___

Acclimation: <24hrs Age: 2nd instar

Culture Water (T/S): 23.7 °C — ppt

TEST INITIATION

Date	Time	Initials	Activity
11/19/19	1350	MJ/MF	Sediment Added to Chambers
↓	↓	↓	Overlying Water Added to Chambers
11/22/19	1500	MKC/MJ	Organisms Transferred

TEST SET-UP

Sample Number(s): AT9-730 (Control), AT9-870 → 883

Overyling Water Number: Dechlor

Treatment	Volume Test Sediment	Volume Overlying Water
Pretty Boy Control (AT9- 730)	100 ml	175 ml
AT9-870	↓	↓
↓		
AT9-883		

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C. dilutus - 5/21/2020 MKC

ASH-FREE DRY WEIGHT DATA (Test Species: ~~*C. tentans*~~)

Project Number: 70019.TOX Client: OTTOWA RIVER QC Test Number: TN-19-651

	Date	Time	Initials		Date	Time	Initials
Loaded pans in oven:	12/2/19	1630	mkc	Loaded pans in furnace:	12/19/19	1034	mkc
Loaded pans out oven:	12/9/19	0800	mkc	Loaded pans out furnace:	12/19/19	1300	mkc
Loaded pans weighed:	12/19/19	0945	mkc	Loaded pans weighed:	12/19/19	1600	mkc

Oven Temp (°C): 100 Furnace Temp (°C): 550

Test Concentration	Rep	Pan #	A Weight of Pan (mg)	B Weight of Pan and Oven-Dried Organisms (mg)	C Weight of Pan and Furnace-Dried Organisms (mg)	B-C Total Ash-Free Dry Weight (mg)	D Number of Organisms Weighed	(B-C)/D Mean Ash-Free Dry Organism Weight (mg)
Control	A	171	5131.67	5137.53	5131.95	5.58	8	0.698
(AT9-730)	B	52	4710.81	4718.22	4712.00	6.22	8	0.778
	C	165	5007.02	5011.52	5007.94	3.58	8	0.448
	D	288	5029.37	5035.15	5029.93	5.22	8	0.653
	E	314	5337.07	5345.86	5340.75	5.11	8	0.639
	F	126	4775.54	4782.99	4777.92	5.07	8	0.634
	G	130	5123.80	5130.98	5125.29	5.69	7	0.813
	H	5	5188.98	5197.79	5192.78	5.01	9	0.557
AT9-870	A	262	4880.52	4890.22	4885.24	4.98	7	0.711
	B	34	4588.34	4602.11	4597.80	4.31	7	0.~~554~~ 616
	C	203	4595.34	4599.86	4595.97	3.89	6	0.648
	D	8	4985.71	4995.19	4991.06	4.12	7	0.589
	E	153	5357.04	5362.84	5358.33	4.51	6	0.752
	F	59	4754.76	4759.22	4755.45	3.77	6	0.628
	G	377	4798.00	4804.22	4799.42	4.80	7	0.686
	H	309	4854.38	4860.27	4855.38	4.89	6	0.815

Dry wt. calculations checked (date, initials): 12/20/19 MM Ash-Free calculations checked (date, initials): 12/20/19 MM

ATS-T51
01/26/12

C. dilutus - 5/21/2020 MKC

ASH-FREE DRY WEIGHT DATA (Test Species: ~~*C. tentans*~~)

Project Number: 70019.TOX Client: OTTOWA RIVER QC Test Number: TN-19-651

	Date	Time	Initials		Date	Time	Initials
Loaded pans in oven:	12/2/19	1630		Loaded pans in furnace:	12/9/19	1034	
Loaded pans out oven:	12/9/19	0800		Loaded pans out furnace:	12/10/19	1300	
Loaded pans weighed:	12/9/19	0845		Loaded pans weighed:	12/10/19	1600	

Oven Temp (°C): 100 Furnace Temp (°C): 550

Test Concentration	Rep	Pan #	A Weight of Pan (mg)	B Weight of Pan and Oven-Dried Organisms (mg)	C Weight of Pan and Furnace-Dried Organisms (mg)	B-C Total Ash-Free Dry Weight (mg)	D Number of Organisms Weighed	(B-C)/D Mean Ash-Free Dry Organism Weight (mg)
AT9-871	A	177	5118.97	5125.88	5119.36	6.52	7	0.931
	B	W	3680.24	3687.42	3681.20	6.22	8	0.778
	C	220	4472.26	4478.44	4473.55	~~4.89~~	8	~~0.680~~ 0.611
	D	259	4256.01	4261.46	4256.51	4.95	8	0.619
	E	55	5220.55	5228.06	5223.13	4.93	7	0.704
	F	311	4950.44	4958.22	4953.36	4.86	9	0.540
	G	217	5577.10	5585.93	5581.61	4.32	6	0.720
	H	106	5229.09	5236.14	5230.58	5.56	9	0.618
AT9-872	A	41	5003.12	5009.22	5003.67	5.55	9	0.617
	B	143	5480.33	5486.50	5480.68	5.82	9	~~0.656~~ 0.647
	C	68	4516.96	4523.23	4518.41	4.81	8	0.601
	D	79	5143.94	5151.59	5147.70	3.89	9	0.432
	E	280	4677.57	4682.77	4678.70	3.99	8	0.499
	F	71	4730.70	4736.24	4731.35	4.89	8	0.611
	G	175	4907.36	4917.00	4912.59	4.41	9	0.490
	H	148	5397.37	5402.36	5398.14	4.22	8	0.528

Dry wt. calculations checked (date, initials): 12/20/19 MM Ash-Free calculations checked (date, initials): 12/20/19 MM

C. dilutus - 5/21/2020 MKC

ASH-FREE DRY WEIGHT DATA (Test Species: ~~*C. tentans*~~)

Project Number: 70019.TOX Client: OTTOWA RIVER QC Test Number: TN-19-651

	Date	Time	Initials		Date	Time	Initials
Loaded pans in oven:	12/2/19	1630		Loaded pans in furnace:	12/19/19	1034	
Loaded pans out oven:	12/9/19	0800		Loaded pans out furnace:	12/19/19	1300	
Loaded pans weighed:	12/19/19	0845		Loaded pans weighed:	12/19/19	1666	

Oven Temp (°C): 100 Furnace Temp (°C): 550

Test Concentration	Rep	Pan #	A Weight of Pan (mg)	B Weight of Pan and Oven-Dried Organisms (mg)	C Weight of Pan and Furnace-Dried Organisms (mg)	B-C Total Ash-Free Dry Weight (mg)	D Number of Organisms Weighed	(B-C)/D Mean Ash-Free Dry Organism Weight (mg)
AT9-873	A	133	4689.87	4694.22	4691.21	3.01	8	0.376
	B	284	4882.17	4886.85	4883.06	3.89	9	0.432
	C	95	4577.42	4582.34	~~4578.12~~ 4578.12	4.22	8	0.528
	D	139	4532.96	4537.17	4533.87	3.30	8	0.413
	E	12	4818.12	4826.16	4821.27	4.89	9	0.543
	F	30	4929.90	4935.55	4931.83	3.72	7	0.531
	G	287	4883.55	4894.06	4887.42	6.66	9	0.740
	H	18	4886.39	4893.11	4887.30	5.81	9	0.646
AT9-874	A	61	4860.29	4866.27	~~4861.28~~ 4861.28	4.99	8	0.624
	B	41	3731.10	3736.23	3732.26	3.97	7	0.567
	C	190	4710.38	4716.22	4711.40	4.82	7	0.689
	D	128	5334.38	5339.26	5335.04	4.22	7	0.603
	E	71	4804.30	4810.22	4806.33	3.89	6	0.648
	F	129	5756.26	5763.14	5760.42	2.72	6	0.453
	G	231	4925.91	4929.23	4926.49	2.74	6	0.457
	H	305	5123.27	5128.14	5124.25	3.89	7	0.556

12/19 DJ

Dry wt. calculations checked (date, initials): 12/20/19 MD

Ash-Free calculations checked (date, initials): 12/20/19 MD

C. dilutus - 5/21/2020 MKC

ASH-FREE DRY WEIGHT DATA (Test Species: ~~*C. tentans*~~)

Project Number: 70019.TOX Client: OTTOWA RIVER QC Test Number: TN-19-651

	Date	Time	Initials		Date	Time	Initials
Loaded pans in oven:	12/2/19	1620		Loaded pans in furnace:	12/19/19	1624	
Loaded pans out oven:	12/19/19	0800		Loaded pans out furnace:	12/19/19	1300	
Loaded pans weighed:	12/19/19	0845		Loaded pans weighed:	12/19/19	1600	

Oven Temp (°C): 100 Furnace Temp (°C): 550

Test Concentration	Rep	Pan #	A Weight of Pan (mg)	B Weight of Pan and Oven-Dried Organisms (mg)	C Weight of Pan and Furnace-Dried Organisms (mg)	B-C Total Ash-Free Dry Weight (mg)	D Number of Organisms Weighed	(B-C)/D Mean Ash-Free Dry Organism Weight (mg)
AT9-875	A	250	4823.07	4826.14	4824.58	1.56	5	0.312
	B	152	5453.93	5456.52	5454.78	1.74	6	0.290
	C	209	5063.55	5065.93	5064.46	1.47	5	0.294
	D	120	4988.40	4989.47	4988.72	0.75	3	0.250
	E	86	4142.56	4146.14	4144.25	1.89	6	0.315
	F	3	4861.29	4863.93	4861.93	2.00	5	0.400
	G	267	5095.45	5101.80	5099.78	2.12	6	0.353
	H	137	4922.29	4926.88	4924.66	2.22	5	0.444
AT9-876	A	109	5467.45	5476.00	5469.11	6.89	9	0.766
	B	200	4521.07	4530.69	4523.92	7.22	10	0.722
	C	271	5136.57	5144.66	~~5318.84~~ 5138.44	6.22	8	0.778
	D	186	4715.23	4727.77	4719.69	8.08	10	0.808
	E	304	4962.52	4973.23	4967.32	5.86	9	0.651
	F	109	5283.99	5290.26	5285.62	4.64	9	0.516
	G	221	4157.01	4168.13	4162.14	5.99	9	0.666
	H	285	4723.54	4740.25	4729.43	10.82	10	1.082

Dry wt. calculations checked (date, initials): 12/20/19 MD Ash-Free calculations checked (date, initials): 12/20/19 MD

C. dilutus - 5/21/2020 MKC

ASH-FREE DRY WEIGHT DATA (Test Species: ~~*C. tentans*~~)

Project Number: 70019.TOX Client: OTTOWA RIVER QC Test Number: TN-19-651

	Date	Time	Initials		Date	Time	Initials
Loaded pans in oven:	12/2/19	1630		Loaded pans in furnace:	12/11/19	1034	
Loaded pans out oven:	12/9/19	0800		Loaded pans out furnace:	12/11/19	1300	
Loaded pans weighed:	12/9/19	0848		Loaded pans weighed:	12/11/19	1600	

Oven Temp (°C): 100 Furnace Temp (°C): 550

Test Concentration	Rep	Pan #	A Weight of Pan (mg)	B Weight of Pan and Oven-Dried Organisms (mg)	C Weight of Pan and Furnace-Dried Organisms (mg)	B-C Total Ash-Free Dry Weight (mg)	D Number of Organisms Weighed	(B-C)/D Mean Ash-Free Dry Organism Weight (mg)
AT9-877	A	272	4567.70	4574.47	4568.90	5.57	9	0.619
	B	160	4808.36	4818.43	4813.23	5.20	9	0.578
	C	37	4646.16	4652.83	4648.14	3.99	8	0.498
	D	254	4800.56	4807.39	4802.36	5.03	9	0.559
	E	227	5163.31	5170.47	5166.96	3.51	10	0.351
	F	17	5705.43	5710.05	5706.71	3.34	9	0.371
	G	200	5240.42	5425.18	~~5240.96~~ 5420.96	4.22	8	0.528
	H	156	4616.23	4620.56	4617.22	3.36	8	0.420
AT9-878	A	57	5294.53	5295.97	5295.08	0.89	3	0.297
	B	316	5007.39	5007.54	5007.28	0.26	2	0.130
	C	163	4559.35	4560.47	4559.68	0.79	3	0.263
	D	335	4672.00	4973.20	4972.70	0.50	3	0.167
	E	123	5481.92	5482.85	5482.19	0.66	2	0.330
	F	136	5637.26	5639.87	5639.10	0.77	3	0.257
	G	89	5397.33	5398.66	5398.14	0.52	4	0.130
	H	207	4884.50	4885.02	4884.62	0.40	2	0.200

12/11/19

Dry wt. calculations checked (date, initials): 12/10/19 MD

Ash-Free calculations checked (date, initials): 12/10/19 MD

C. dilutus - 5/21/2020 MKC

ASH-FREE DRY WEIGHT DATA (Test Species: ~~*C. tentans*~~)

Project Number: 70019.TOX Client: OTTOWA RIVER QC Test Number: TN-19-651

	Date	Time	Initials		Date	Time	Initials
Loaded pans in oven:	12/2/19	1630		Loaded pans in furnace:	12/19/19	1034	
Loaded pans out oven:	12/19/19	0900		Loaded pans out furnace:	12/19/19	1300	
Loaded pans weighed:	12/19/19	0945		Loaded pans weighed:	12/19/19	1600	

Oven Temp (°C): 100 Furnace Temp (°C): 550

Test Concentration	Rep	Pan #	A Weight of Pan (mg)	B Weight of Pan and Oven-Dried Organisms (mg)	C Weight of Pan and Furnace-Dried Organisms (mg)	B-C Total Ash-Free Dry Weight (mg)	D Number of Organisms Weighed	(B-C)/D Mean Ash-Free Dry Organism Weight (mg)
AT9-879	A	263	4656.58	4661.99	4661.55	0.44	2	0.220
	B	208	4752.24	4753.14	4752.64	0.50	3	0.167
	C	F	3861.46	3862.32	3861.66	0.66	2	0.330
	D	191	4946.06	4946.91	4946.04	0.87	4	0.218
	E	212	4742.98	4748.09	4747.67	0.42	2	0.210
	F	121	5172.90	5177.59	5176.71	0.88	5	0.176
	G	56	4616.89	4618.13	4617.50	0.63	3	0.210
	H	269	4809.26	4810.44	4809.89	0.55	2	0.275
AT9-880	A	230	4860.02	4862.72	4862.36	0.36	2	0.180
	B	95	5291.15	5291.55	5291.13	0.42	3	0.140
	C	88	4328.50	4328.75	4328.60	0.15	1	0.150
	D	53	4914.65	—	—	—	0	—
	E	116	5556.89	5557.36	5557.14	0.22	2	0.110
	F	333	4623.56	4624.02	4623.59	0.43	3	0.143
	G	275	5205.38	5206.12	5205.94	0.18	1	0.180
	H	213	5026.19	5026.99	5026.80	0.19	1	0.190

Dry wt. calculations checked (date, initials): 12/20/19 MM Ash-Free calculations checked (date, initials): 12/30/19 MM

C. dilutus - 5/21/2020 MKC

ASH-FREE DRY WEIGHT DATA (Test Species: ~~*C. tentans*~~)

Project Number: 70019.TOX Client: OTTOWA RIVER QC Test Number: TN-19-651

	Date	Time	Initials		Date	Time	Initials
Loaded pans in oven:	12/2/19	1630		Loaded pans in furnace:	12/19/19	1034	
Loaded pans out oven:	12/19/19	0800		Loaded pans out furnace:	12/19/19	1300	
Loaded pans weighed:	12/19/19	0845		Loaded pans weighed:	12/19/19	1600	

Oven Temp (°C): 100 Furnace Temp (°C): 550

Test Concentration	Rep	Pan #	A Weight of Pan (mg)	B Weight of Pan and Oven-Dried Organisms (mg)	C Weight of Pan and Furnace-Dried Organisms (mg)	B-C Total Ash-Free Dry Weight (mg)	D Number of Organisms Weighed	(B-C)/D Mean Ash-Free Dry Organism Weight (mg)
AT9-881	A	98	5563.01	5563.99	5563.60	0.39	3	0.130
	B	293	5058.86	5059.69	5059.23	0.46	3	0.153
	C	277	4802.80	4803.69	4803.10	0.59	3	0.590 197
	D	252	5104.93	5108.59	5108.01	0.583	2	0.290265
	E	298	4940.05	4941.47	4940.64	0.83	4	0.208
	F	I	3658.35	3659.11	3658.32	0.79	2	0.395
	G	100	4928.78	4929.87	4929.23	0.64	1	0.640
	H	180	4933.06	4933.58	4933.36	0.22	1	0.220
AT9-882	A	229	5257.23	5258.13	5257.99	0.14	1	0.140
	B	L	3762.37	—	—	—	0	—
	C	290	5134.82	5135.79	5135.60	0.39	2	0.195
	D	73	4967.01	4968.01	4967.77	0.24	1	0.240
	E	72	4924.05	4925.03	4924.67	0.36	3	0.120
	F	193	4616.83	—	—	—	0	—
	G	341	4541.20	4541.66	4541.44	0.22	2	0.110
	H	160	5210.68	5211.06	5210.72	0.34	3	0.113

Dry wt. calculations checked (date, initials): 12/20/19 MD Ash-Free calculations checked (date, initials): 12/20/19 MD

C. dilutus - 5/21/2020 MKC

ASH-FREE DRY WEIGHT DATA (Test Species: ~~*C. tentans*~~)

Project Number: 70019.TOX Client: OTTOWA RIVER QC Test Number: TN-19-651

	Date	Time	Initials		Date	Time	Initials
Loaded pans in oven:	12/2/19	1630		Loaded pans in furnace:	12/19/19	1034	
Loaded pans out oven:	12/19/19	0800		Loaded pans out furnace:	12/19/19	1300	
Loaded pans weighed:	12/19/19	0845		Loaded pans weighed:	12/19/19	1600	

Oven Temp (°C): 100 Furnace Temp (°C): 550

Test Concentration	Rep	Pan #	A Weight of Pan (mg)	B Weight of Pan and Oven-Dried Organisms (mg)	C Weight of Pan and Furnace-Dried Organisms (mg)	B-C Total Ash-Free Dry Weight (mg)	D Number of Organisms Weighed	(B-C)/D Mean Ash-Free Dry Organism Weight (mg)
AT9-883	A	97	5674.93	5680.22	5675.10	5.12	7	0.731
	B	295	5324.38	5338.85	5333.03	5.82	6	0.970
	C	270	4451.45	4458.31	4453.69	4.62	8	0.578
	D	244	5116.78	5125.65	5121.08	4.57	6	0.762
	E	51	5398.26	5404.75	5398.86	5.89	8	0.736
	F	228	5390.36	5396.73	5390.94	5.79	8	0.749
	G	268	4444.56	4450.06	4445.20	4.86	6	0.810
	H	JK	3761.61	3766.98	3761.76	5.22	8	0.653

Dry wt. calculations checked (date, initials): 12/20/19 MD Ash-Free calculations checked (date, initials): 12/20/19 MD

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: OTTOWA RIVER
QC Test Number: TN-19-651
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Midge
Scientific Name: *C. dilutus*

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/22/19 Time: 1500
Ending Date: 12/2/19 Time: 1500

Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/22	Day Date	Day 10 Date 12/2	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
Control	A	10		8								
(AT9-730)	B	10		8								
	C	10		8								
	D	10		8								
	E	10		8								
	F	10		8								
	G	10		7								
	H	10		9								
AT9-870	A	10		7								
	B	10		7								
	C	10		6								
	D	10		7								
	E	10		6								
	F	10		6								
	G	10		7								
	H	10		6								
Time / Initials		1500 MKC/MJ		1500 MKC								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) _____ Chironomus (100.2) X Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: OTTOWA RIVER
QC Test Number: TN-19-651
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Midge
Scientific Name: *C. dilutus*

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/22/19 Time: 1500
Ending Date: 12/2/19 Time: 1500

Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms											
		Day 0 Date 11/22	Day Date	Day 10 Date 12/2	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-871	A	10		7									
	B	10		8									
	C	10		8									
	D	10		8									
	E	10		7									
	F	10		9									
	G	10		6									
	H	10		9									
AT9-872	A	10		9									
	B	10		9									
	C	10		8									
	D	10		9									
	E	10		8									
	F	10		8									
	G	10		9									
	H	10		8									
Time / Initials		1500 MKC/MS		1500 MKC									

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) _____ Chironomus (100.2) X Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: OTTOWA RIVER
QC Test Number: TN-I9-651
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Midge
Scientific Name: *C. dilutus*

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/22/19 Time: 1500
Ending Date: 12/2/19 Time: 1500
Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/22	Day Date	Day 10 Date 12/2	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-873	A	10		8								
	B	10		9								
	C	10		8								
	D	10		8								
	E	10		9								
	F	10		7								
	G	10		9								
	H	10		9								
AT9-874	A	10		8								
	B	10		7								
	C	10		7								
	D	10		7								
	E	10		6								
	F	10		6								
	G	10		6								
	H	10		7								
Time / Initials		1500 MKC/MJ		1500 MKC								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) _____ Chironomus (100.2) X Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: OTTOWA RIVER
QC Test Number: TN-19-651
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Midge
Scientific Name: *C. dilutus*

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/22/19 Time: 1500
Ending Date: 12/2/19 Time: 1520

Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/22	Day Date	Day 10 Date 12/2	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-875	A	10		5								
	B	10		6								
	C	10		5								
	D	10		3								
	E	10		6								
	F	10		5								
	G	10		6								
	H	10		5								
AT9-876	A	10		9								
	B	10		10								
	C	10		8								
	D	10		10								
	E	10		9								
	F	10		9								
	G	10		9								
	H	10		10								
Time / Initials		1500 MKyM		1500 MKC								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) _____ Chironomus (100.2) X Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: OTTOWA RIVER
QC Test Number: TN-19-651
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Midge
Scientific Name: *C. dilutus*

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/22/19 Time: 1500
Ending Date: 12/2/19 Time: 1500

Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/22	Day Date	Day 10 Date 12/2	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-877	A	10		9								
	B	10		9								
	C	10		8								
	D	10		9								
	E	10		10								
	F	10		9								
	G	10		8								
	H	10		8								
AT9-878	A	10		3								
	B	10		2								
	C	10		3								
	D	10		3								
	E	10		2								
	F	10		3								
	G	10		4								
	H	10		2								
Time / Initials		1500 MKC/MT		1500 MKC								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) _____ Chironomus (100.2) X Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: OTTOWA RIVER
QC Test Number: TN-19-651
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Midge
Scientific Name: *C. dilutus*

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/22/19 Time: 1500
Ending Date: 12/2/19 Time: 1500

Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/22	Day Date	Day 10 Date 12/2	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-879	A	10		2								
	B	10		3								
	C	10		2								
	D	10		4								
	E	10		2								
	F	10		5								
	G	10		3								
	H	10		2								
AT9-880	A	10		2								
	B	10		3								
	C	10		1								
	D	10		0								
	E	10		2								
	F	10		3								
	G	10		1								
	H	10		1								
Time / Initials		1500 MKC/MJ		1500 MKC								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) _____ Chironomus (100.2) X Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: OTTOWA RIVER
QC Test Number: TN-19-651
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Midge
Scientific Name: *C. dilutus*

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/22/19 Time: 1500
Ending Date: 12/2/19 Time: 1500

Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/22	Day Date	Day 10 Date 12/2	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-881	A	10		3								
	B	10		3								
	C	10		3								
	D	10		2								
	E	10		4								
	F	10		2								
	G	10		1								
	H	10		1								
AT9-882	A	10		1								
	B	10		0								
	C	10		2								
	D	10		1								
	E	10		3								
	F	10		0								
	G	10		2								
	H	10		3								
Time / Initials		1500 MKC/MJ		1500 MKC								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) _____ Chironomus (100.2) X Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: OTTOWA RIVER
QC Test Number: TN-19-651
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Midge
Scientific Name: *C. dilutus*

TEST TYPE: (Static) / Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/22/19 Time: 1500
Ending Date: 12/2/19 Time: 1500

Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/22	Day Date	Day 10 Date 12/2	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-883	A	10		7								
	B	10		6								
	C	10		8								
	D	10		6								
	E	10		8								
	F	10		8								
	G	10		6								
	H	10		8								
Time / Initials		MKC/MJ 1500		MKC 1500								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) _____ Chironomus (100.2) X Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

TOXICITY TEST WATER QUALITY DATA SHEET - NEW SOLUTIONS

Project Number: 70019.TOX | TEST ORGANISM | Beginning Date: 11/22/19 Time: 1320

Client: OTTOWA RIVER | Common Name: Midge | Ending Date: 12/2/19 Time: 1520

QC Test Number: TN-19-651 | Scientific Name: *C. dilutus*

TARGET VALUES Temp: 23±1 °C pH: 6.0 - 9.0 DO: ≥4.0 mg/L Salinity: 0 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Test Conc	Rep	Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (µS/cm)						
		0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6
Control (AT9-730)		22.4							7.3							8.8							348						
AT9-870		22.5							7.3							8.6							384						
AT9-871		22.4							7.3							8.3							378						
AT9-872		22.4							7.3							8.3							378						
AT9-873		22.5							7.4							8.2							386						
AT9-874		22.5							7.4							8.2							403						
AT9-875		22.4							7.4							8.0							411						
AT9-876		22.4							7.4							7.9							383						
AT9-877		22.5							7.4							7.9							404						
AT9-878		22.8							7.4							7.9							403						
AT9-879		22.6							7.5							7.9							370						
AT9-880		22.6							7.5							8.1							388						
AT9-881		22.6							7.5							8.0							388						
AT9-882		22.5							7.5							8.1							397						
AT9-883		22.5							7.6							8.1							364						
Meter Number		678							678							678							678						
Time		0920							0920							0920							0920						
Initials		MS MF							MS MF							MS MF							MS MF						

(6)

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: 70019.TOX | TEST ORGANISM | Beginning Date: 11/22/19 | Time: 1500

Client: OTTOWA RIVER | Common Name: Midge | Ending Date: 12/2/19 | Time: 1520

QC Test Number: TN-19-651 | Scientific Name: *C. dilutus*

TARGET VALUES Temp: 23±1 °C pH: 6.0 - 9.0 DO: ≥4.0 mg/L Salinity: 0 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Test Conc	Rep	Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (µS/cm)						
		8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14
Control (AT9-730)		22.1	22.0	22.0					7.7	7.6	7.7					8.2	8.0	8.0					352	340	331				
AT9-870		22.1	22.0	22.0					7.7	7.6	7.7					8.2	7.6	8.0					361	353	351				
AT9-871		22.1	22.0	22.0					7.6	7.5	7.6					7.5	7.3	7.5					362	354	352				
AT9-872		22.1	22.0	22.0					7.6	7.5	7.6					7.1	7.1	7.5					361	351	353				
AT9-873		22.1	22.0	22.0					7.7	7.5	7.7					7.3	7.4	7.4					357	376	341				
AT9-874		22.0	22.0	22.0					7.6	7.3	7.6					7.6	7.3	7.6					367	358	362				
AT9-875		22.0	22.0	22.0					7.6	7.3	7.6					6.7	7.0	7.0					358	349	344				
AT9-876		22.1	22.0	22.0					7.6	7.3	7.6					7.3	7.2	7.0					365	360	361				
AT9-877		22.2	22.0	22.0					7.6	7.3	7.6					7.4	7.3	7.2					381	371	370				
AT9-878		22.2	22.0	22.0					7.6	7.4	7.6					6.9	6.7	7.0					366	359	361				
AT9-879		22.1	22.0	22.0					7.7	7.3	7.7					7.1	6.7	7.0					357	347	352				
AT9-880		22.0	22.0	22.0					7.7	7.4	7.7					7.5	7.4	7.1					358	352	357				
AT9-881		22.0	22.1	22.0					7.7	7.4	7.7					7.5	7.5	7.5					358	353	353				
AT9-882		22.1	22.0	22.0					7.5	7.4	7.5					6.0	7.4	7.4					371	353	351				
AT9-883		22.0	22.1	22.0					7.5	7.4	7.5					6.0	7.2	7.3					367	382	381				
Meter Number		679	680	680					679	680	680					679	680	680					679	680	680				
Time		0902	0900	1200					0902	0900	1200					0902	0900	1200					0902	0900	1200				
Initials		MF	AT	✓					MF	AT	✓					MF	AT	✓					MF	AT	✓				

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: 70019.TOX | TEST ORGANISM | Beginning Date: 11/22/19 Time: 1500

Client: OTTOWA RIVER | Common Name: Midge | Ending Date: 12/2/19 Time: 1520

QC Test Number: TN-19-651 | Scientific Name: *C. dilutus*

TARGET VALUES Temp: 23±1 °C pH: 6.0 - 9.0 DO: ≥4.0 mg/L Salinity: 0 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Test Conc	Rep	Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (µS/cm)						
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Control (AT9-730)		22.0	22.0	22.0	22.0	22.0	22.0	22.1	7.7	7.8	7.3	7.6	7.9	7.7	8.0	8.4	8.5	8.2	8.2	8.0	7.3	8.1	347	347	353	350	352	338	342
AT9-870		22.0	22.0	22.0	22.0	22.0	22.0	22.0	7.7	7.8	7.3	7.6	7.9	7.7	7.9	8.1	8.0	7.9	8.0	7.9	7.8	7.7	377	361	367	362	364	352	340
AT9-871		22.1	22.0	22.3	22.0	22.0	22.0	22.0	7.7	7.8	7.3	7.6	7.6	7.7	7.8	7.5	7.3	7.7	7.7	7.8	7.2	6.4	401	385	370	383	376	349	359
AT9-872		22.2	22.1	22.3	22.0	22.0	22.0	22.0	7.8	7.8	7.3	7.6	7.5	7.7	7.8	7.5	7.5	7.7	7.2	7.7	7.4	6.0	367	354	361	379	375	352	366
AT9-873		22.3	22.0	22.4	22.0	22.0	22.0	22.0	7.8	7.8	7.4	7.6	7.5	7.7	7.7	7.8	8.0	7.9	7.4	7.2	8.1	5.9	366	354	364	384	374	348	358
AT9-874		22.3	22.1	22.4	22.0	22.0	22.0	22.0	7.7	7.8	7.3	7.6	7.5	7.7	7.7	7.6	7.8	7.5	7.0	7.1	7.6	5.8	389	371	376	374	364	359	359
AT9-875		22.4	22.2	22.4	22.0	22.0	22.0	22.0	7.7	7.8	7.3	7.6	7.7	7.7	7.7	7.4	7.5	7.1	7.0	7.2	7.0	5.5	396	357	366	383	374	350	362
AT9-876		22.5	22.1	22.3	22.0	22.0	22.0	22.0	7.8	7.8	7.4	7.7	7.7	7.7	7.7	7.2	7.9	7.7	7.4	7.0	7.5	7.4	360	357	376	368	397	355	367
AT9-877		22.3	22.2	22.4	22.0	22.0	22.0	22.0	7.7	7.8	7.3	7.6	7.8	7.7	7.7	7.4	7.8	7.3	7.3	7.0	7.4	5.9	396	382	384	387	370	368	369
AT9-878		22.3	22.2	22.4	22.0	22.0	22.0	22.0	7.8	7.8	7.4	7.7	7.8	7.7	7.7	7.2	7.4	7.1	7.2	7.2	7.2	5.5	385	369	377	370	357	356	361
AT9-879		22.2	22.2	22.4	22.0	22.0	22.0	22.0	7.8	7.8	7.4	7.7	7.8	7.7	7.7	7.3	7.4	7.1	7.1	7.9	7.4	5.5	361	349	360	355	365	352	358
AT9-880		22.1	22.2	22.3	22.0	22.0	22.0	22.0	7.8	7.8	7.4	7.7	7.8	7.6	7.7	7.4	7.8	7.6	8.0	7.8	8.4	5.5	369	354	370	365	363	357	362
AT9-881		22.0	22.1	22.4	22.0	22.0	22.0	22.0	7.8	7.8	7.3	7.7	7.8	7.7	7.7	7.6	7.9	7.4	7.7	7.6	8.0	7.1	370	357	367	366	376	356	359
AT9-882		22.0	22.1	22.3	22.1	22.0	22.0	22.0	7.8	7.8	7.3	7.7	7.8	7.7	7.7	7.6	7.8	7.5	7.7	7.2	7.5	6.7	374	361	373	381	370	356	361
AT9-883		22.0	22.2	22.4	22.1	22.0	22.0	22.0	7.8	7.8	7.3	7.7	7.8	7.7	7.7	8.5	7.6	7.4	7.5	7.3	7.5	6.5	363	359	372	374	367	363	366
Meter Number		680	678	679	680	679	678	678	680	678	679	680	679	678	678	680	678	679	680	679	678	678	680	678	679	680	679	678	678
Time		1110	0930	0902	0840	0843	0810	1310	1110	0930	0902	0840	0843	0810	1310	1110	0930	0902	0840	0843	0810	1310	1110	0930	0902	0840	0843	0810	1310
Initials		MJ	AT	AT	ATP	ATP	RSB	MF	MJ	AT	AT	ATP	ATP	RSB	MF	MJ	AT	AT	ATP	ATP	RSB	MF	MJ	AT	AT	ATP	ATP	RSB	MF

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TOXICOLOGY LABORATORY BENCH SHEET - RENEWAL RECORD

Project Number: 70019.TOX

Client: OTTOWA RIVER

QC Test Number: TN-19-651

Day	Date	Time	Initials
0	11/22/19	AM 0905	MJ
		PM —	—
1	11/23/19	AM 0825	TP
		PM 1350	TP
2	11/24/19	AM 0844	AT
		PM 1440	AT
3	11/25/19	AM 0840	AT
		PM 1545	RSB
4	11/26/19	AM 0814	AT
		PM 1445	MF
5	11/27/19	AM 0825	TP
		PM 1315	TP
6	11/28/19	AM 0724	RSB
		PM 1250	RSB
7	11/29/19	AM 1100	MF
		PM 1330	MF
8	11/30/19	AM 0835	TP
		PM 1355	TP
9	12/1/19	AM 0838	AT
		PM 1452	AT
10	/	AM	/
		PM /	/

TOXICOLOGY LABORATORY BENCH SHEET - FEEDING RECORD

Project Number: 70019.TOX

Client: OTTOWA RIVER

QC Test Number: TN-19-651

Food: 1.5 ml Tetramin Slurry

Day	Date	Time	Initials	
0	11/22/19	1600	MO	
1	11/23/19	1905	TP	
2	11/24/19	1447	AT	
3	11/25/19	1555	ASA	
4	11/26/19	1515 (b)	TP	(b) 11/26 TP
5	11/27/19	1335	TP	
6	11/28/19	1335	BSB	
7	11/29/19	1500	MV	
8	11/30/19	1400	TP	
9	12/1/19	1526	AT	
10	~~12/2/19~~	~~1500~~	~~M~~	12/2/19 BJ M
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: 70019.TOX

Client: OTTOWA RIVER

QC Test Number: TN-19-651

Day	Testing Location	Date	Time	Initials
0	4	11/22/19	0905	MJ
1	4	11/23/19	0825	TP
2	4	11/24/19	0905	AT
3	4	11/25/19	0826	AT
4	4	11/26/19	0840	AT
5	4	11/27/19	0825	TP
6	4	11/28/19	0724	KS
7	4	11/29/19	0835	TP
8	4	11/30/19	0835	TP
9	4	12/1/19	0847	AT
10	4	12/2/19	1520	M
11				
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TOXICOLOGY LABORATORY BENCH SHEET

Project Number: 70019.TOX

Client: OTTOWA RIVER

QC Test Number: TN-19-651

Date/Time/Initials	Comments/Activity

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: 70019.TOX

Client: OTTOWA RIVER

QC Test Number: TN-19-651

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
*AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8	3.145	2.744	0.1498
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8	0.447	2.744	0.1498
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8	-1.240	2.744	0.1498
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8	-0.974	2.744	0.1498
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8	2.639	2.744	0.1498
*AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8	5.731	2.744	0.1498
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8	-3.333	2.744	0.1498
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8	-1.938	2.744	0.1498
*AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8	10.275	2.744	0.1498
*AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8	10.070	2.744	0.1498
*AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8	12.984	2.744	0.1498
*AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8	11.190	2.744	0.1498
*AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8	13.357	2.744	0.1498
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8	1.843	2.744	0.1498

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.01)	0.72383	1.035	-0.0979	-0.4007
Bartlett's Test indicates equal variances (p = 0.32)	15.8456	29.1412		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test indicates significant differences	0.13099	0.16321	0.80963	0.01193	0.0E+00	14, 105

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
*AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8	5.452	1.761	0.0555
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8			
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92722	0.844	0.32784	0.88127
F-Test indicates equal variances (p = 0.60)	1.51721	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.04595	0.05725	0.11802	0.00397	8.5E-05	1, 14

ToxCalc v5.0.23

Reviewed by: KMD

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8	0.478	1.761	0.0899
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8			
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9063	0.844	-0.0021	0.23121
F-Test indicates equal variances (p = 0.13)	3.35679	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.07608	0.0948	0.00238	0.01043	0.64015	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8	-1.866	1.761	0.0639
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8			
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9226	0.844	0.21443	-0.519
F-Test indicates equal variances (p = 0.81)	1.20189	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.05322	0.06632	0.01834	0.00527	0.0832	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8	-1.247	1.761	0.0752
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8			
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9327	0.844	-0.2991	-0.0469
F-Test indicates equal variances (p = 0.37)	2.04449	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.06303	0.07854	0.01133	0.00729	0.23294	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8			
*AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8	3.935	1.761	0.0645
AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8			
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.88116	0.844	0.49093	0.62648
F-Test indicates equal variances (p = 0.78)	1.24211	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.05373	0.06694	0.0831	0.00537	0.00149	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8		
AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8		
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8		
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8		
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8		
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8		
*AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8	36.00	51.00
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8		
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8		
AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8		
AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8		
AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8		
AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8		
AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8		
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.83187	0.844	-0.9455	2.39487
F-Test indicates equal variances (p = 0.34)	2.13659	8.88539		

Hypothesis Test (1-tail, 0.05)

Wilcoxon Two-Sample Test indicates significant differences

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8	-3.961	1.761	0.0809
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8			
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.89246	0.844	-0.0636	0.10245
F-Test indicates equal variances (p = 0.24)	2.52978	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.06811	0.08487	0.13255	0.00845	0.00142	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8	-2.368	1.761	0.0787
AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8			
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.87549	0.844	0.55963	0.71946
F-Test indicates equal variances (p = 0.28)	2.33803	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.06615	0.08242	0.04479	0.00799	0.03283	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8			
*AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8	15.080	1.761	0.0655
AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8			
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.89274	0.844	0.34518	0.29233
F-Test indicates equal variances (p = 0.73)	1.31411	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.05462	0.06806	1.25937	0.00554	4.7E-10	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8			
*AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8	11.086	1.761	0.0874
AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8			
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.87138	0.844	0.92126	0.68536
F-Test indicates equal variances (p = 0.16)	3.11188	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.0738	0.09195	1.20951	0.00984	2.6E-08	1, 14

Reviewed by:

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8			
*AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8	12.414	1.761	0.1006
AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8			
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.93701	0.844	-0.1693	0.45892
F-Test indicates equal variances (p = 0.07)	4.4526	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.08565	0.10672	2.01107	0.01305	6.0E-09	1, 14

Reviewed by: MD

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8			
*AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8	11.697	1.761	0.0920
AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8			
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9306	0.844	-0.1767	0.00468
F-Test indicates equal variances (p = 0.12)	3.56166	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.07795	0.09712	1.49369	0.01092	1.3E-08	1, 14

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Reviewed by: 

Survival and Growth Test-Survival

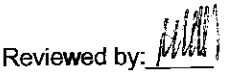
Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8			
*AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8	11.336	1.761	0.1133
AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92978	0.844	-0.1808	-0.0896
F-Test indicates equal variances (p = 0.03)	5.92033	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.09719	0.1211	2.12829	0.01656	1.9E-08	1, 14

Reviewed by: 

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.8000	1.0000	1.1104	0.9912	1.2490	6.231	8			
AT9-870	0.6500	0.8125	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	0.9688	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.0625	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.0469	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.8438	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.6406	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.1563	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.0938	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3438	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.3594	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2031	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.2969	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.1875	0.3810	0.1588	0.5796	44.188	8			
*AT9-883	0.7125	0.8906	1.0097	0.8861	1.1071	10.860	8	2.195	1.761	0.0807

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.86953	0.844	-0.1112	-1.0644
F-Test indicates equal variances (p = 0.25)	2.51236	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.06794	0.08465	0.04051	0.00841	0.04549	1, 14

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID: TN-19-651	Sample ID: Ottawa River
End Date:	12/2/2019	Lab ID:	Sample Type: SEDIMENT
Sample Date:		Protocol:	Test Species: CT-Chrionomus dilutus
Comments:			

Conc-	1	2	3	4	5	6	7	8	S.D.
Control	0.6975	0.7775	0.4475	0.6525	0.6387	0.6337	0.8129	0.5567	0.11657
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150	0.0761
AT9-871	0.9314	0.7775	0.6112	0.6187	0.7043	0.5400	0.7200	0.6178	0.12308
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6112	0.4900	0.5275	0.07625
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456	0.1222
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557	0.08508
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440	0.06352
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820	0.16354
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200	0.09916
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000	0.07618
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750	0.05326
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900		0.02851
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200	0.16787
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133			0.05294
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525	0.11459

			Transform: Untransformed					Rank	1-Tailed
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8		
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8	71.00	47.00
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8	69.50	47.00
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8	49.00	47.00
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8	49.00	47.00
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8	54.00	47.00
*AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8	36.00	47.00
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8	79.50	47.00
*AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8	44.00	47.00
*AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8	36.00	47.00
*AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8	36.00	47.00
*AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7	28.00	37.00
*AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8	40.00	47.00
*AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6	21.00	27.00
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8	82.00	47.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.01)	0.73828	1.035	0.82567	2.09247
Bartlett's Test indicates unequal variances (p = 4.51E-03)	31.6394	29.1412		

Hypothesis Test (1-tail, 0.05)

Wilcoxon Rank Sum Test indicates significant differences

Reviewed by: MW

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8	-0.578	1.761	0.0867
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6			
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97482	0.844	-0.1455	0.19661
F-Test indicates equal variances (p = 0.28)	2.34599	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.08669	0.13293	0.00324	0.00969	0.57219	1, 14

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8	-0.634	1.761	0.1056
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6			
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.98466	0.844	0.33854	0.0612
F-Test indicates equal variances (p = 0.89)	1.11491	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.10556	0.16187	0.00577	0.01437	0.53632	1, 14

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8			
*AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8	2.012	1.761	0.0867
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6			
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.98468	0.844	-0.3567	0.06295
F-Test indicates equal variances (p = 0.29)	2.33707	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.08674	0.13301	0.03928	0.0097	0.06386	1, 14

ToxCalc v5.0.23

Reviewed by:

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8			
*AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8	2.111	1.761	0.1052
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6			
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97225	0.844	0.12942	-0.446
F-Test indicates equal variances (p = 0.90)	1.09894	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.10516	0.16126	0.06353	0.01426	0.05326	1, 14

Reviewed by: MW

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8	1.521	1.761	0.0899
AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6			
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96983	0.844	-0.3682	-0.1545
F-Test indicates equal variances (p = 0.43)	1.87724	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.08986	0.1378	0.02408	0.01041	0.15063	1, 14

ToxCalc v5.0.23

Reviewed by:

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8			
*AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8	6.815	1.761	0.0827
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6			
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96524	0.844	-0.2267	0.68667
F-Test indicates equal variances (p = 0.13)	3.36761	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.08267	0.12676	0.40918	0.00881	8.4E-06	1, 14

Reviewed by:

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8	-1.356	1.761	0.1251
AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6			
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.95516	0.844	0.59007	1.41781
F-Test indicates equal variances (p = 0.39)	1.96844	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.12506	0.19178	0.03708	0.02017	0.19657	1, 14

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8			
*AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8	3.016	1.761	0.0953
AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6			
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97376	0.844	-0.3015	-0.6176
F-Test indicates equal variances (p = 0.68)	1.38186	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.0953	0.14614	0.10654	0.01171	0.00925	1, 14

Reviewed by: 

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8			
*AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8	8.743	1.761	0.0867
AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6			
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97849	0.844	-0.2778	0.03842
F-Test indicates equal variances (p = 0.28)	2.3414	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.08671	0.13297	0.74119	0.0097	4.8E-07	1, 14

ToxCalc v5.0.23

Reviewed by: 

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8			
*AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8	9.412	1.761	0.0798
AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6			
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.94308	0.844	-0.2623	1.2062
F-Test indicates equal variances (p = 0.06)	4.78997	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.07981	0.12238	0.72755	0.00821	2.0E-07	1, 14

ToxCalc v5.0.23

Reviewed by:

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8			
*AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7	11.642	1.895	0.0807
AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6			
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.91861	0.835	-0.4465	2.18053
F-Test indicates unequal variances (p = 3.05E-03)	16.7191	10.7859		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Heteroscedastic t Test indicates significant differences	0.0807	0.12376	0.91823	0.00769	6.4E-08	1, 13

Reviewed by:

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7			
*AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8	5.206	1.761	0.1273
AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6			
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92573	0.844	1.14132	1.87023
F-Test indicates equal variances (p = 0.36)	2.07399	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.12727	0.19516	0.56608	0.02088	1.3E-04	1, 14

Reviewed by:

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8			
*AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6	9.690	1.782	0.0918
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.95667	0.825	-0.3128	1.06112
F-Test indicates equal variances (p = 0.10)	4.84805	14.2004		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.09179	0.14075	0.85397	0.00909	5.0E-07	1, 12

Reviewed by:

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.6521	1.0000	0.6521	0.4475	0.8129	17.875	8			
AT9-870	0.6806	1.0437	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	1.0583	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.8481	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.8067	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.8810	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.5095	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	1.1476	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.7497	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.3399	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3460	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2395	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.4231	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2347	0.1531	0.1100	0.2400	34.589	6			
AT9-883	0.7485	1.1478	0.7485	0.5775	0.9700	15.309	8	-1.668	1.761	0.1018

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96192	0.844	0.10816	0.21106
F-Test indicates equal variances (p = 0.97)	1.03478	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.10179	0.15609	0.03716	0.01336	0.11756	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8			
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8	1.303	2.744	0.1498
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8	-1.396	2.744	0.1498
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8	-3.083	2.744	0.1498
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8	-2.817	2.744	0.1498
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8	0.797	2.744	0.1498
*AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8	3.888	2.744	0.1498
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8	-5.176	2.744	0.1498
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8	-3.781	2.744	0.1498
*AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8	8.432	2.744	0.1498
*AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8	8.227	2.744	0.1498
*AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8	11.142	2.744	0.1498
*AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8	9.347	2.744	0.1498
*AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8	11.515	2.744	0.1498
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8	-1.843	2.744	0.1498

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.01)	0.72383	1.035	-0.0979	-0.4007
Bartlett's Test indicates equal variances (p = 0.32)	15.8456	29.1412		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test indicates significant differences	0.14266	0.199	0.80963	0.01193	0.0E+00	14, 105

Reviewed by: MM

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8			
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8	1.633	1.761	0.0767
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8			
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.86231	0.844	-0.2536	-1.4795
F-Test indicates equal variances (p = 0.10)	3.81177	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.07141	0.0996	0.02024	0.00759	0.12476	1, 14

Survival and Growth Test-Survival

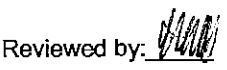
Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8			
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8	-1.287	1.761	0.1044
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8			
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9226	0.844	-0.1513	-1.2535
F-Test indicates equal variances (p = 0.71)	1.33611	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.09807	0.13679	0.02325	0.01405	0.21909	1, 14

Reviewed by: 

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8		
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8		
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8		
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8	92.00	51.00
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8		
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8		
AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8		
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8		
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8		
AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8		
AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8		
AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8		
AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8		
AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8		
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.8118	0.844	-0.2001	-1.8783
F-Test indicates equal variances (p = 0.35)	2.09033	8.88539		

Hypothesis Test (1-tail, 0.05)

Wilcoxon Two-Sample Test indicates no significant differences

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8		
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8		
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8		
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8		
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8	89.50	51.00
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8		
AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8		
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8		
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8		
AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8		
AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8		
AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8		
AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8		
AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8		
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.8162	0.844	-0.3826	-1.6028
F-Test indicates equal variances (p = 0.79)	1.22884	8.88539		

Hypothesis Test (1-tail, 0.05)

Wilcoxon Two-Sample Test indicates no significant differences

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8			
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8	0.918	1.761	0.0835
AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8			
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.89479	0.844	-0.0666	-1.4683
F-Test indicates equal variances (p = 0.37)	2.02266	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.07788	0.10864	0.00757	0.00899	0.37429	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8		
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8		
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8		
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8		
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8		
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8		
*AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8	40.50	51.00
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8		
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8		
AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8		
AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8		
AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8		
AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8		
AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8		
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.84269	0.844	-0.7368	-0.4775
F-Test indicates equal variances (p = 0.84)	1.17587	8.88539		

Hypothesis Test (1-tail, 0.05)

Wilcoxon Two-Sample Test indicates significant differences

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8			
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8	-5.147	1.761	0.0967
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8			
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.86251	0.844	-0.2256	-1.456
F-Test indicates equal variances (p = 0.99)	1.00693	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.09067	0.12647	0.31962	0.01207	1.5E-04	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8			
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8	-3.832	1.761	0.0949
AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8			
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.87555	0.844	0.11982	-1.1954
F-Test indicates equal variances (p = 0.93)	1.07456	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.08887	0.12397	0.1705	0.01161	0.00183	1, 14

Reviewed by: 

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8			
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8			
*AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8	9.624	1.761	0.0843
AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8			
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.88062	0.844	-0.1226	-1.5769
F-Test indicates equal variances (p = 0.41)	1.91183	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.07865	0.1097	0.84813	0.00916	1.5E-07	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8			
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8			
*AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8	7.745	1.761	0.1022
AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8			
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.87663	0.844	0.41598	-1.0507
F-Test indicates equal variances (p = 0.78)	1.23863	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.09593	0.13381	0.8073	0.01346	2.0E-06	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8			
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8			
*AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8	9.425	1.761	0.1137
AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8			
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92311	0.844	-0.2333	-0.9527
F-Test indicates equal variances (p = 0.47)	1.77228	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.10715	0.14946	1.48071	0.01667	1.9E-07	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8			
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8			
*AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8	8.467	1.761	0.1062
AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8			
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.88771	0.844	-0.2575	-1.349
F-Test indicates equal variances (p = 0.66)	1.41765	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.09982	0.13924	1.04221	0.01454	7.0E-07	1, 14

Reviewed by: MM

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID: TN-19-651	Sample ID: Ottawa River
End Date:	12/2/2019	Lab ID:	Sample Type: SEDIMENT
Sample Date:		Protocol:	Test Species: CT-Chironomus dilutus
Comments:			

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8			
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8			
*AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8	8.852	1.761	0.1251
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.91329	0.844	-0.2215	-1.1337
F-Test indicates equal variances (p = 0.28)	2.35648	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.1183	0.16502	1.58152	0.02018	4.1E-07	1, 14

Survival and Growth Test-Survival

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7000	0.6000	0.8000	0.6000	0.8000	0.8000	0.6000	0.8000
AT9-870	0.7000	0.7000	0.6000	0.7000	0.6000	0.6000	0.7000	0.6000
AT9-871	0.7000	0.8000	0.8000	0.8000	0.7000	0.9000	0.6000	0.9000
AT9-872	0.9000	0.9000	0.8000	0.9000	0.8000	0.8000	0.9000	0.8000
AT9-873	0.8000	0.9000	0.8000	0.8000	0.9000	0.7000	0.9000	0.9000
AT9-874	0.8000	0.7000	0.7000	0.7000	0.6000	0.6000	0.6000	0.7000
AT9-875	0.5000	0.6000	0.5000	0.3000	0.6000	0.5000	0.6000	0.5000
AT9-876	0.9000	1.0000	0.8000	1.0000	0.9000	0.9000	0.9000	1.0000
AT9-877	0.9000	0.9000	0.8000	0.9000	1.0000	0.9000	0.8000	0.8000
AT9-878	0.3000	0.2000	0.3000	0.3000	0.2000	0.3000	0.4000	0.2000
AT9-879	0.2000	0.3000	0.2000	0.4000	0.2000	0.5000	0.3000	0.2000
AT9-880	0.2000	0.3000	0.1000	0.0000	0.2000	0.3000	0.1000	0.1000
AT9-881	0.3000	0.3000	0.3000	0.2000	0.4000	0.2000	0.1000	0.1000
AT9-882	0.1000	0.0000	0.2000	0.1000	0.3000	0.0000	0.2000	0.3000
Control	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000	0.7000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7125	1.0000	1.0097	0.8861	1.1071	10.860	8			
AT9-870	0.6500	0.9123	0.9386	0.8861	0.9912	5.984	8			
AT9-871	0.7750	1.0877	1.0860	0.8861	1.2490	11.672	8			
AT9-872	0.8500	1.1930	1.1781	1.1071	1.2490	6.438	8			
AT9-873	0.8375	1.1754	1.1636	0.9912	1.2490	8.502	8			
AT9-874	0.6750	0.9474	0.9663	0.8861	1.1071	7.980	8			
AT9-875	0.5125	0.7193	0.7974	0.5796	0.8861	12.682	8			
AT9-876	0.9250	1.2982	1.2924	1.1071	1.4120	8.514	8			
AT9-877	0.8750	1.2281	1.2162	1.1071	1.4120	8.698	8			
AT9-878	0.2750	0.3860	0.5493	0.4636	0.6847	14.439	8			
AT9-879	0.2875	0.4035	0.5605	0.4636	0.7854	21.774	8			
AT9-880	0.1625	0.2281	0.4013	0.1588	0.5796	36.376	8			
AT9-881	0.2375	0.3333	0.4993	0.3218	0.6847	26.150	8			
AT9-882	0.1500	0.2105	0.3810	0.1588	0.5796	44.188	8			
Control	0.8000	1.1228	1.1104	0.9912	1.2490	6.231	8	-2.195	1.761	0.0807

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.86953	0.844	-0.1112	-1.0644
F-Test indicates equal variances (p = 0.25)	2.51236	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.07526	0.10497	0.04051	0.00841	0.04549	1, 14

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed					Rank	1-Tailed
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8		
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8	56.00	47.00
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8	56.00	47.00
*AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8	40.00	47.00
*AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8	41.00	47.00
*AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8	41.00	47.00
*AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8	36.00	47.00
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8	67.00	47.00
*AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8	38.00	47.00
*AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8	36.00	47.00
*AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8	36.00	47.00
*AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7	28.00	37.00
*AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8	37.00	47.00
*AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6	21.00	27.00
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8	54.50	47.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.01)	0.73828	1.035	0.82567	2.09247
Bartlett's Test indicates unequal variances (p = 4.51E-03)	31.6394	29.1412		

Hypothesis Test (1-tail, 0.05)

Wilcoxon Rank Sum Test indicates significant differences

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8	1.396	1.761	0.0857
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6			
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9677	0.844	0.62387	1.16175
F-Test indicates equal variances (p = 0.30)	2.26715	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.08566	0.11444	0.01845	0.00946	0.18432	1, 14

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8	0.982	1.761	0.1047
AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6			
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.93231	0.844	0.77081	0.53065
F-Test indicates equal variances (p = 0.86)	1.15368	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.10472	0.1399	0.01364	0.01414	0.34275	1, 14

Reviewed by: _____

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8			
*AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8	4.017	1.761	0.0857
AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6			
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9725	0.844	0.40366	1.01955
F-Test indicates equal variances (p = 0.30)	2.25852	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.08571	0.11451	0.15284	0.00947	0.00127	1, 14

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8			
*AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8	3.755	1.761	0.1043
AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6			
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.93077	0.844	0.56155	0.01317
F-Test indicates equal variances (p = 0.87)	1.13715	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.10432	0.13937	0.19787	0.01403	0.00213	1, 14

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8			
*AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8	3.448	1.761	0.0889
AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6			
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96411	0.844	0.313	0.67502
F-Test indicates equal variances (p = 0.45)	1.81415	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.08887	0.11873	0.12106	0.01018	0.00392	1, 14

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8			
*AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8	8.985	1.761	0.0816
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6			
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.94968	0.844	0.6608	1.86466
F-Test indicates equal variances (p = 0.14)	3.25444	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.08159	0.109	0.69296	0.00858	3.5E-07	1, 14

Reviewed by: 

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8	0.001	1.761	0.1244
AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6			
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92574	0.844	0.85347	1.71026
F-Test indicates equal variances (p = 0.37)	2.03689	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.12435	0.16613	4.2E-08	0.01994	0.99887	1, 14

Reviewed by: MMD

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8			
*AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8	4.845	1.761	0.0944
AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6			
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97997	0.844	0.269	0.03237
F-Test indicates equal variances (p = 0.71)	1.33542	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.09437	0.12607	0.26954	0.01148	2.6E-04	1, 14

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8			
*AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8	10.829	1.761	0.0857
AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6			
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97301	0.844	0.48605	0.9948
F-Test indicates equal variances (p = 0.30)	2.26271	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.08569	0.11448	1.11026	0.00947	3.5E-08	1, 14

Reviewed by: MAH

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8			
*AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8	11.704	1.761	0.0787
AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6			
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.91946	0.844	0.72584	2.57888
F-Test indicates equal variances (p = 0.06)	4.62899	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.07869	0.10513	1.09356	0.00798	1.3E-08	1, 14

Reviewed by: MD

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8			
*AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7	14.129	1.895	0.0794
AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6			
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.8694	0.835	0.74087	3.97335
F-Test indicates unequal variances (p = 3.35E-03)	16.1572	10.7859		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Heteroscedastic t Test indicates significant differences	0.07942	0.10611	1.30982	0.00745	6.2E-09	1, 13

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7			
*AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8	6.576	1.761	0.1266
AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6			
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.8851	0.844	1.40046	2.15672
F-Test indicates equal variances (p = 0.34)	2.14611	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.12657	0.16909	0.89331	0.02066	1.2E-05	1, 14

Reviewed by:

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8			
*AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6	11.735	1.782	0.0904
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.93224	0.825	0.70245	2.4785
F-Test indicates equal variances (p = 0.11)	4.68512	14.2004		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.09044	0.12082	1.21566	0.00883	6.2E-08	1, 12

Reviewed by:

Survival and Growth Test-Growth

Start Date:	11/22/2019	Test ID:	TN-19-651	Sample ID:	Ottawa River
End Date:	12/2/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	CT-Chironomus dilutus
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.7314	0.9700	0.5775	0.7617	0.7363	0.7488	0.8100	0.6525
AT9-870	0.7114	0.6157	0.6483	0.5886	0.7517	0.6283	0.6857	0.8150
AT9-871	0.9314	0.7775	0.6113	0.6188	0.7043	0.5400	0.7200	0.6178
AT9-872	0.6167	0.6467	0.6013	0.4322	0.4988	0.6113	0.4900	0.5275
AT9-873	0.3763	0.4322	0.5275	0.4125	0.5433	0.5314	0.7400	0.6456
AT9-874	0.6238	0.5671	0.6886	0.6029	0.6483	0.4533	0.4567	0.5557
AT9-875	0.3120	0.2900	0.2940	0.2500	0.3150	0.4000	0.3533	0.4440
AT9-876	0.7656	0.7220	0.7775	0.8080	0.6511	0.5156	0.6656	1.0820
AT9-877	0.6189	0.5778	0.4863	0.5589	0.3510	0.3711	0.5275	0.4200
AT9-878	0.2967	0.1300	0.2633	0.1667	0.3300	0.2567	0.1300	0.2000
AT9-879	0.2200	0.1667	0.3300	0.2175	0.2100	0.1760	0.2100	0.2750
AT9-880	0.1800	0.1400	0.1500	0.1100	0.1433	0.1800	0.1900	
AT9-881	0.1300	0.1533	0.1967	0.2650	0.2075	0.3950	0.6400	0.2200
AT9-882	0.1400	0.1950	0.2400	0.1200	0.1100	0.1133		
Control	0.6975	0.7775	0.4475	0.6525	0.6388	0.6338	0.8129	0.5567

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7485	1.0000	0.7485	0.5775	0.9700	15.309	8			
AT9-870	0.6806	0.9093	0.6806	0.5886	0.8150	11.182	8			
AT9-871	0.6901	0.9220	0.6901	0.5400	0.9314	17.835	8			
AT9-872	0.5530	0.7389	0.5530	0.4322	0.6467	13.787	8			
AT9-873	0.5261	0.7029	0.5261	0.3763	0.7400	23.227	8			
AT9-874	0.5745	0.7676	0.5745	0.4533	0.6886	14.808	8			
AT9-875	0.3323	0.4439	0.3323	0.2500	0.4440	19.116	8			
AT9-876	0.7484	0.9999	0.7484	0.5156	1.0820	21.852	8			
AT9-877	0.4889	0.6532	0.4889	0.3510	0.6189	20.281	8			
AT9-878	0.2217	0.2961	0.2217	0.1300	0.3300	34.366	8			
AT9-879	0.2256	0.3015	0.2256	0.1667	0.3300	23.604	8			
AT9-880	0.1562	0.2087	0.1562	0.1100	0.1900	18.252	7			
AT9-881	0.2759	0.3686	0.2759	0.1300	0.6400	60.836	8			
AT9-882	0.1531	0.2045	0.1531	0.1100	0.2400	34.589	6			
Control	0.6521	0.8712	0.6521	0.4475	0.8129	17.875	8	1.668	1.761	0.1018

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96192	0.844	0.10816	0.21106
F-Test indicates equal variances (p = 0.97)	1.03478	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.10179	0.13599	0.03716	0.01336	0.11756	1, 14

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ATTACHMENT III

Data Sheets and Statistical Analyses
from *Hyalella azteca* Toxicity Tests
(86 pages)

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SEDIMENT TOXICITY TEST SET-UP BENCH SHEET

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-644

TEST ORGANISM INFORMATION

Common Name: Amphipod

Scientific Name: *H. azteca*

Lot Number: HA-041

Source: ARO

Adults Isolated (Time, Date): _____

Neonates Pulled (Time, Date): _____

Acclimation: <24hrs Age: 8 days

Culture Water (T/S): 23.2 °C — ppt

TEST INITIATION

Date	Time	Initials	Activity
11/12/19	1200	MJ/MF/TP	Sediment Added to Chambers
↓	↓	↓	Overlying Water Added to Chambers
11/15/19	1352	MJ/MF	Organisms Transferred

TEST SET-UP

Sample Number(s): AT9-730, AT9-870 → 883

Overyling Water Number: Dechlor

Treatment	Volume Test Sediment	Volume Overlying Water
Pretty Boy Control (AT9-730)	100 ml	175 ml
AT9-870	↓	↓
↓		
AT9-883		

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SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: Ottowa River
QC Test Number: TN-19-644
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Amphipod
Scientific Name: *H. azteca*

TEST TYPE: (Static) Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/15/19 Time: 1352
Ending Date: 11/25/19 Time: 1450

Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/15	Day Date	Day 10 Date 11/25/19	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
Control	A	10		9								
(AT9-730)	B	10		10								
	C	10		8								
	D	10		9								
	E	10		9								
	F	10		9								
	G	10		9								
	H	10		9								
AT9-870	A	10		9								
	B	10		9								
	C	10		9								
	D	10		9								
	E	10		9								
	F	10		9								
	G	10		7								
	H	10		9								
Time / Initials		1352 MS/MF		1450 JR/MF/AT RSB								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) X Chironomus (100.2) _____ Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: Ottowa River
QC Test Number: TN-19-644
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Amphipod
Scientific Name: *H. azteca*

TEST TYPE: (Static) Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/15/19 Time: 1352
Ending Date: 11/25/19 Time: 1450
Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/15	Day Date	Day 10 Date 11/25/19	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-871	A	10		9								
	B	10		8								
	C	10		9								
	D	10		9								
	E	10		10								
	F	10		9								
	G	10		7								
	H	10		10								
AT9-872	A	10		7								
	B	10		4								
	C	10		7								
	D	10		9								
	E	10		10								
	F	10		9								
	G	10		8								
	H	10		9								
Time / Initials		1352 WCS/INF		1450 JR SA AT RSB								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) X Chironomus (100.2) _____ Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: Ottowa River
QC Test Number: TN-19-644
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Amphipod
Scientific Name: *H. azteca*

TEST TYPE: (Static) Flowthrough
(Renewal) / Non-renewal

Beginning Date: 11/15/19 Time: 1352
Ending Date: 11/25/19 Time: 1450

Test Container: 300ml lipless beakers
Test Volume: 100ml sediment

Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/15	Day Date	Day 10 Date 11/25/19	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-873	A	10		7								
	B	10		8								
	C	10		10								
	D	10		4								
	E	10		8								
	F	10		9								
	G	10		7								
	H	10		9								
AT9-874	A	10		9								
	B	10		8								
	C	10		10								
	D	10		9								
	E	10		8								
	F	10		7								
	G	10		10								
	H	10		10								
Time / Initials		1352 MJ/MK		1450 RSB/JR/SA/AT								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) X Chironomus (100.2) _____ Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: Ottowa River
QC Test Number: TN-19-644
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Amphipod
Scientific Name: *H. azteca*

TEST TYPE: (Static) Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/15/19 Time: 1352
Ending Date: 11/25/19 Time: 1450
Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/15	Day Date	Day 10 Date 11/25/19	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-875	A	10		8								
	B	10		9								
	C	10		6								
	D	10		7								
	E	10		6								
	F	10		6								
	G	10		6								
	H	10		9								
AT9-876	A	10		4								
	B	10		6								
	C	10		9								
	D	10		8								
	E	10		7								
	F	10		8								
	G	10		9								
	H	10		10								
Time / Initials		1352 NJS/MF		1450 JRS/MF RJB								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) X Chironomus (100.2) _____ Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: Ottowa River
QC Test Number: TN-19-644
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Amphipod
Scientific Name: *H. azteca*

Beginning Date: 11/15/19 Time: 1352
Ending Date: 11/25/19 Time: 1450

TEST TYPE: (Static) Flowthrough
(Renewal) / Non-renewal

Test Container: 300ml lipless beakers
Test Volume: 100ml sediment

Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/15	Day Date	Day 10 Date 11/25/19	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-877	A	10		9								
	B	10		10								
	C	10		8								
	D	10		9								
	E	10		9								
	F	10		8								
	G	10		8								
	H	10		8								
AT9-878	A	10		7								
	B	10		10								
	C	10		6								
	D	10		4								
	E	10		9								
	F	10		10								
	G	10		8								
	H	10		7								
Time / Initials		1352 MG/MF		1450 JR/JA/NS/RSB								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) X Chironomus (100.2) _____ Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: Ottowa River
QC Test Number: TN-19-644
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Amphipod
Scientific Name: *H. azteca*

TEST TYPE: (Static) Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/15/19 Time: 1352
Ending Date: 11/25/19 Time: 1450
Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/15	Day Date	Day 10 Date 11/25/19	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-879	A	10		7								
	B	10		8								
	C	10		8								
	D	10		5								
	E	10		8								
	F	10		10								
	G	10		7								
	H	10		10								
AT9-880	A	10		7								
	B	10		6								
	C	10		9								
	D	10		9								
	E	10		10								
	F	10		7								
	G	10		7								
	H	10		8								
Time / Initials		1352 NMS/MK		1450 JR JA AT RSB								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) X Chironomus (100.2) _____ Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: Ottowa River
QC Test Number: TN-19-644
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Amphipod
Scientific Name: *H. azteca*

TEST TYPE: (Static) Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/15/19 Time: 1352
Ending Date: 11/25/19 Time: 1450

Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms											
		Day 0 Date 11/15	Day Date	Day 10 Date 11/25/19	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-881	A	10		8								
	B	10		7								
	C	10		8								
	D	10		10								
	E	10		6								
	F	10		8								
	G	10		6								
	H	10		8								
AT9-882	A	10		7								
	B	10		5								
	C	10		2								
	D	10		5								
	E	10		6								
	F	10		10								
	G	10		8								
	H	10		6								
Time / Initials		1352 MS/MF		1450 JR/SA ATR/SB								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) X Chironomus (100.2) _____ Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

SEDIMENT TOXICITY TEST OBSERVATION DATA SHEET

Project Number: 70019.TOX
Client: Ottowa River
QC Test Number: TN-19-644
Test Material(s): Sediment
Accession Number(s): Multiple
Overlying Water: Dechlor
Accession Number: N/A

TEST ORGANISM
Common Name: Amphipod
Scientific Name: *H. azteca*

TEST TYPE: (Static) Flowthrough
(Renewal) / Non-renewal
Photoperiod: 16l, 8d Light Intensity: 50 - 100 fc

Beginning Date: 11/15/19 Time: 1352
Ending Date: 11/25/19 Time: 1450
Test Container: 300ml lipless beakers
Test Volume: 100ml sediment
Test Duration: 10 days

Treatment	Rep	Number of Surviving Organisms										
		Day 0 Date 11/15	Day Date	Day 10 Date 11/25/19	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date	Day Date
AT9-883	A	10		6								
	B	10		7								
	C	10		8								
	D	10		7								
	E	10		9								
	F	10		7								
	G	10		6								
	H	10		8								
Time / Initials		1352 MS/MAF		1450 JRJA AT RSB								

EPA Test Method: (FW) EPA 600-R-99-064/SW EPA-600-R-94-025 (CHECK ONE)

Hyalella: (100.1) X Chironomus (100.2) _____ Lumbriculus (100.3) _____ Leptocheirus, Eohaustorius & Ampelisca (100.4) _____

ATS-T12
06/15/10

WEIGHT DATA (Test Species: *H. azteca*)

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-644

Tin Lot: Black 226

Oven Temp (°C): Start: 100 End: 94

	Date	Time	Initials
Loaded tins placed in oven:	11/25/19	1519	RSB
Loaded tins removed from oven:	12/9/19	1353	JR
Loaded tins weighed:	12/9/19	1527	JR

Oven Number: BLM-01 / G4-009646 Balance Number: TS-L-225-C / P0115825

Test Concentration	Rep	Tin #	A Weight of Tin (mg)	B Weight of Tin and Dried Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Mean Dry Organism Weight (mg)	(if applicable) Mean Biomass (mg/exposed org.)
Control	A	477	28.12	29.32	1.20	9	0.133	0.120
(AT9-730)	B	490	30.19	31.18	0.99	10	0.099	0.099
	C	105	28.10	29.05	0.95	8	0.119	0.095
	D	139	25.66	26.70	1.04	9	0.116	0.104
	E	282	22.49	23.59	1.10	9	0.122	0.110
	F	100	29.86	30.84	0.98	9	0.109	0.098
	G	292	31.54	32.41	0.87	9	0.097	0.087
	H	150	25.23	26.03	0.80	9	0.089	0.080
AT9-870	A	478	29.66	30.69	1.03	9	0.114	0.103
	B	291	28.46	29.17	0.71	9	0.079	0.071
	C	226	32.40	33.43	~~0.73~~ 1.03	9	~~0.081~~ 0.114	~~0.073~~ 0.103
	D	336	30.55	31.34	0.79	9	0.088	0.079
	E	13	27.43	28.56	1.13	9	0.126	0.113
	F	356	29.48	30.37	0.89	9	0.099	0.089
	G	104	29.74	30.54	0.80	7	0.114	0.080
	H	502	30.01	30.64	0.63	9	0.070	0.063

12/20/19 JR (for)

Dry wt. calculations checked (date, initials): 12/20/19 JR

Biomass calculations checked (date, initials): 12/20/19 JR

WEIGHT DATA (Test Species: *H. azteca*)

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-644

Tin Lot: Black 226

Oven Temp (°C): Start: 100 End: 94

	Date	Time	Initials
Loaded tins placed in oven:	11/25/19	1519	RSB
Loaded tins removed from oven:	12/9/19	1353	JR
Loaded tins weighed:	12/9/19	1522	JR

Oven Number: BLM-01 / G4-009646 Balance Number: TS-L-225.0 / P0115825

Test Concentration	Rep	Tin #	A Weight of Tin (mg)	B Weight of Tin and Dried Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Mean Dry Organism Weight (mg)	(if applicable) Mean Biomass (mg/exposed org.)
AT9-871	A	117	30.37	31.39	1.02	9	0.113	0.102
	B	376	31.74	32.75	1.01	8	0.126	0.101
	C	426	29.50	30.78	1.28	9	0.142	0.128
	D	428	27.40	28.13	0.73	9	0.081	0.073
	E	319	24.87	26.10	1.23	10	0.123	0.123
	F	462	28.38	29.18	0.80	9	0.089	0.080
	G	518	28.39	29.37	0.98	7	0.140	0.098
	H	335	33.03	34.36	1.33	10	0.133	0.133
AT9-872	A	331	26.80	27.52	0.72	7	0.103	0.072
	B	374	32.41	32.74	0.33	4	0.083	0.033
	C	407	30.01	30.90	0.89	7	0.127	0.089
	D	50	28.72	29.58	0.86	9	0.096	0.080
	E	421	29.37	30.20	0.83	10	0.083	0.083
	F	476	28.09	29.04	0.95	9	0.106	0.095
	G	380	29.14	30.09	0.95	8	0.119	0.095
	H	375	31.29	32.40	1.11	9	0.123	0.111

Dry wt. calculations checked (date, initials): 12/20/19 JR

Biomass calculations checked (date, initials): 12/20/19 JR

WEIGHT DATA (Test Species: *H. azteca*)

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-644

Tin Lot: Black 226

Oven Temp (°C): Start: 100 End: 94

	Date	Time	Initials
Loaded tins placed in oven:	11/25/19	1519	RSB
Loaded tins removed from oven:	12/9/19	1353	JR
Loaded tins weighed:	12/9/19	1522	JR

Oven Number: BLM-01 / G4-009646 Balance Number: TS-L-225.0 / P0115825

Test Concentration	Rep	Tin #	A Weight of Tin (mg)	B Weight of Tin and Dried Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Mean Dry Organism Weight (mg)	(if applicable) Mean Biomass (mg/exposed org.)
AT9-873	A	321	30.07	30.91	0.84	7	0.120	0.084
	B	368	28.54	29.52	0.98	8	0.123	0.098
	C	491	33.52	34.79	1.27	10	0.127	0.127
	D	608	29.71	30.07	0.36	4	0.090	0.036
	E	367	28.04	28.87	0.83	8	0.104	0.083
	F	441	28.50	29.49	0.99	9	0.110	0.099
	G	359	30.26	30.87	0.61	7	0.087	0.061
	H	510	28.73	29.75	1.02	9	0.113	0.102
AT9-874	A	360	28.95	29.82	0.87	9	0.097	0.087
	B	414	28.72	29.24	0.52	8	0.065	0.052
	C	65	30.23	31.53	1.30	10	0.130	0.130
	D	341	27.90	28.76	0.86	9	0.096	0.086
	E	387	26.95	27.87	0.92	8	0.115	0.092
	F	304	33.45	34.32	0.87	7	0.124	0.087
	G	311	33.45	34.50	1.05	10	0.105	0.105
	H	373	33.43	34.24	0.81	10	0.081	0.081

Dry wt. calculations checked (date, initials): 12/20/19 JR

Biomass calculations checked (date, initials): 12/20/19 JR

WEIGHT DATA (Test Species: *H. azteca*)

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-644

Tin Lot: Black 2216

Oven Temp (°C): Start: 100 End: 94

	Date	Time	Initials
Loaded tins placed in oven:	11/25/19	1519	RSB
Loaded tins removed from oven:	12/9/19	1353	JR
Loaded tins weighed:	12/9/19	1522	JR

Oven Number: BLM-01 / G4-009646 Balance Number: TS-L-225.C / P0115825

Test Concentration	Rep	Tin #	A Weight of Tin (mg)	B Weight of Tin and Dried Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Mean Dry Organism Weight (mg)	(if applicable) Mean Biomass (mg/exposed org.)
AT9-875	A	~~522~~	30.65	31.52	0.87	8	0.109	0.087
	B	423	29.36	29.99	0.63	9	0.070	0.063
	C	513	31.20	31.73	0.~~47~~53	6	0.02~~8~~8	0.0~~27~~25
	D	96	28.67	29.51	0.84	7	0.120	0.084
	E	180	31.13	31.73	0.60	6	0.100	0.060
	F	379	30.73	31.29	0.56	6	0.093	0.056
	G	446	30.98	31.40	0.42	6	0.070	0.042
	H	271	26.80	27.75	0.95	9	0.106	0.095
AT9-876	A	142	28.68	29.30	0.62	4	0.155	0.062
	B	357	30.29	30.67	0.38	6	0.063	0.038
	C	342	28.85	29.91	1.06	9	0.118	0.106
	D	386	28.11	29.05	0.94	8	0.118	0.094
	E	~~494~~	28.31	29.13	0.82	~~6~~ 7	0.117	0.082
	F	364	27.73	28.31	0.58	8	0.073	0.058
	G	406	28.33	29.30	0.97	9	0.108	0.097
	H	473	30.26	31.02	0.76	10	0.076	0.076

12/10/19 JR (a)

Dry wt. calculations checked (date, initials): 12/20/19 JR

11/25/19 JR (a)

Biomass calculations checked (date, initials): 12/20/19 JR

@ RSB 11/25/19

WEIGHT DATA (Test Species: *H. azteca*)

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-644

Tin Lot: Black 226

Oven Temp (°C): Start: 100 End: 94

	Date	Time	Initials
Loaded tins placed in oven:	11/25/19	1519	RSB
Loaded tins removed from oven:	12/9/19	1353	JR
Loaded tins weighed:	12/9/19	1522	JR

Oven Number: BLM-01 / G4-009646 Balance Number: TS-L-225.C / P0115825

Test Concentration	Rep	Tin #	A Weight of Tin (mg)	B Weight of Tin and Dried Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Mean Dry Organism Weight (mg)	(if applicable) Mean Biomass (mg/exposed org.)
AT9-877	A	372	29.64	30.83	1.19	9	0.132	0.119
	B	451	30.13	31.66	1.53	10	0.153	0.153
	C	467	32.37	33.49	1.12	8	0.140	0.112
	D	488	28.75	29.85	1.10	9	0.122	0.110
	E	294	22.50	23.45	0.95	9	0.106	0.095
	F	408	28.80	29.70	0.90	8	0.113	0.090
	G	432	29.48	30.49	1.01	8	0.126	0.101
	H	524	29.14	30.26	1.12	8	0.140	0.112
AT9-878	A	71	28.33	28.91	0.58	7	0.083	0.058
	B	422	30.45	31.30	0.85	10	0.085	0.085
	C	344	29.53	30.25	0.72	66	0.120	0.072
	D	350	28.57	29.10	0.53	4	0.133	0.053
	E	409	25.47	26.03	0.56	9	0.062	0.056
	F	332	28.11	29.03	0.92	10	0.092	0.092
	G	40	30.56	31.31	0.75	8	0.094	0.075
	H	474	30.47	31.16	0.69	7	0.099	0.069

Dry wt. calculations checked (date, initials): 12/20/19 JR

Biomass calculations checked (date, initials): 11/25/19 JR 12/20/19 JR

WEIGHT DATA (Test Species: *H. azteca*)

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-644

Tin Lot: Block 226

Oven Temp (°C): Start: 100 End: 94

	Date	Time	Initials
Loaded tins placed in oven:	11/25/19	1549	RSB
Loaded tins removed from oven:	12/9/19	1353	JR
Loaded tins weighed:	12/9/19	1522	JR

Oven Number: BLM-01 / G4-009646 Balance Number: TS-L-225.C / P0115825

Test Concentration	Rep	Tin #	A Weight of Tin (mg)	B Weight of Tin and Dried Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Mean Dry Organism Weight (mg)	(if applicable) Mean Biomass (mg/exposed org.)
AT9-879	A	~~429~~ 427	31.15	32.02	0.87	~~7~~ 7	0.124	0.087
	B	493	26.83	27.48	0.65	8	0.081	0.065
	C	434	27.93	29.17	1.24	8	0.155	0.124
	D	413	28.68	29.16	0.48	5	0.096	0.048
	E	433	27.40	28.27	0.87	8	0.109	0.087
	F	416	28.75	29.80	1.05	10	0.105	0.105
	G	471	26.56	27.56	1.00	7	0.143	0.100
	H	273	29.30	30.28	0.98	10	0.098	0.098
AT9-880	A	210	26.44	27.12	0.68	7	0.097	0.068
	B	222	23.69	24.28	0.59	6	0.098	0.059
	C	417	30.65	31.51	0.86	9	0.096	0.086
	D	363	28.28	29.70	1.42	9	0.158	0.142
	E	305	27.85	29.37	1.52	10	0.152	0.152
	F	349	30.97	31.74	0.77	7	0.110	0.077
	G	370	29.59	30.48	0.89	7	0.127	0.089
	H	315	27.61	28.73	1.12	8	0.140	0.112

Dry wt. calculations checked (date, initials): 12/20/19 JR

Biomass calculations checked (date, initials): 12/20/19 JR

11/25/19

WEIGHT DATA (Test Species: *H. azteca*)

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-644

Tin Lot: Black 226

Oven Temp (°C): Start: 100 End: 94

	Date	Time	Initials
Loaded tins placed in oven:	11/25/19	1579	RSB
Loaded tins removed from oven:	12/9/19	1353	JR
Loaded tins weighed:	12/9/19	1522	JR

Oven Number: BLM-01 G4-009646 Balance Number: TS-L-225.C P0115825

Test Concentration	Rep	Tin #	A Weight of Tin (mg)	B Weight of Tin and Dried Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Mean Dry Organism Weight (mg)	(if applicable) Mean Biomass (mg/exposed org.)
AT9-881	A	481	30.01	30.99	0.98	8	0.123	0.098
	B	498	28.91	29.65	0.74	7	0.106	0.074
	C	440	28.37	29.49	1.12	8	0.140	0.112
	D	445	27.94	29.13	1.19	10	0.119	0.119
	E	386	32.80	33.43	0.63	6	0.105	0.063
	F	418	31.49	32.41	0.92	8	0.115	0.092
	G	495	25.83	26.58	0.75	6	0.125	0.075
	H	442	28.11	29.05	0.94	8	0.118	0.094
AT9-882	A	211	24.70	25.29	0.59	7	0.084	0.059
	B	214	30.03	30.52	0.49	5	0.098	0.049
	C	154	30.11	30.41	0.30	2	0.150	0.030
	D	394	29.59	30.14	0.55	5	0.110	0.055
	E	492	30.52	31.30	0.78	6	0.130	0.078
	F	457	26.40	27.50	1.10	10	0.110	0.110
	G	395	31.31	32.25	0.94	~~8~~ 8	0.118	0.094
	H	204	26.43	27.16	0.73	6	0.122	0.073

Dry wt. calculations checked (date, initials): 12/20/19 JR

Biomass calculations checked (date, initials): JR 11/25/19 12/20/19 JR

WEIGHT DATA (Test Species: *H. azteca*)

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-644

Tin Lot: Black 226

Oven Temp (°C): Start: 100 End: 94

	Date	Time	Initials
Loaded tins placed in oven:	11/25/19	1519	RSB
Loaded tins removed from oven:	12/9/19	1353	JR
Loaded tins weighed:	12/9/19	1522	JR

Oven Number: BLM-01 / G4-009646 Balance Number: TS-L-225.C / P0115825

Test Concentration	Rep	Tin #	A Weight of Tin (mg)	B Weight of Tin and Dried Organisms (mg)	B-A Total Dry Organism Weight (mg)	C Number of Organisms Weighed	(B-A)/C Mean Dry Organism Weight (mg)	(if applicable) Mean Biomass (mg/exposed org.)
AT9-883	A	415	29.64	30.36	0.72	6	0.120	0.072
	B	411	26.63	27.38	0.75	7	0.107	0.075
	C	452	30.49	31.43	0.94	8	0.118	0.094
	D	369	30.54	31.50	0.96	7	0.137	0.096
	E	310	32.54	~~27.71~~ 33.71	1.17	9	0.130	0.117
	F	399	30.46	31.13	0.67	7	0.096	0.067
	G	447	26.79	27.60	0.81	6	0.135	0.081
	H	405	32.05	32.87	0.82	8	0.103	0.082

Dry wt. calculations checked (date, initials): 12/20/19 JR 12/9/19 JR(9)

Biomass calculations checked (date, initials): 12/20/19 JR

TOXICITY TEST WATER QUALITY DATA SHEET - NEW SOLUTIONS

Project Number: 70019.TOX | TEST ORGANISM | Beginning Date: 11/15/19 Time: 1352

Client: Ottowa River | Common Name: Amphipod | Ending Date: 11/25/19 Time: 1450

QC Test Number: TN-19-644 | Scientific Name: *H. azteca*

TARGET VALUES: Temp: 23±1 °C pH: 6.0 - 9.0 DO: >4.0 mg/L Salinity: 0 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Test Conc	Rep	Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (µS/cm)						
		0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6
Control (AT9-730)		22.7							7.5							8.2							741						
AT9-870		22.5							7.5							8.0							416						
AT9-871		22.4							7.5							8.0							706						
AT9-872		22.3							7.6							8.4							386						
AT9-873		22.3							7.5							5.7							387						
AT9-874		22.5							7.5							5.4							490						
AT9-875		22.5							7.3							6.3							518						
AT9-876		22.3							7.4							7.6							415						
AT9-877		22.3							7.5							8.0							415						
AT9-878		22.2							7.5							8.0							396						
AT9-879		22.2							7.5							7.9							400						
AT9-880		22.3							7.5							8.3							410						
AT9-881		22.2							7.5							8.0							417						
AT9-882		22.3							7.7							8.2							424						
AT9-883		22.6							7.6							8.1							387						
Meter Number		678							678							678							678						
Time		1030							1030							1030							1030						
Initials		KH							KH							KH							KH						

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: 70019.TOX | TEST ORGANISM | Beginning Date: 11/15/19 | Time: 1352

Client: Ottowa River | Common Name: Amphipod | Ending Date: 11/25/19 | Time: 1450

QC Test Number: TN-19-644 | Scientific Name: *H. azteca*

TARGET VALUES Temp: 23±1 °C pH: 6.0 - 9.0 DO: ≥4.0 mg/L Salinity: 0 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Test Conc	Rep	Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (µS/cm)						
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
Control (AT9-730)		22.4	22.1	22.1	22.4	/	22.1	22.2	7.6	7.7	7.4	7.5	/	7.5	7.5	6.6	8.2	8.2	8.1	/	8.2	8.6	337	372	336	340	/	330	346
AT9-870		22.5	22.2	22.1	22.5	/	22.0	22.3	7.6	7.7	7.4	7.5	/	7.5	7.5	6.6	7.8	8.2	8.0	/	8.0	8.5	392	354	368	362	/	359	363
AT9-871		22.5	22.1	22.2	22.6	/	22.0	22.2	7.6	7.7	7.4	7.5	/	7.5	7.5	6.6	7.7	8.1	7.5	/	8.0	8.1	373	353	351	374	/	346	355
AT9-872		22.4	22.1	22.2	22.6	/	22.0	22.3	7.6	7.7	7.4	7.5	/	7.6	7.6	7.2	7.8	7.9	7.8	/	8.0	7.8	432	373	353	354	/	342	354
AT9-873		22.4	22.1	22.1	22.6	/	22.0	22.4	7.7	7.7	7.5	7.5	/	7.7	7.6	7.2	7.8	7.9	7.9	/	8.3	7.7	408	367	361	357	/	351	364
AT9-874		22.4	22.1	22.2	22.5	/	22.0	22.5	7.7	7.7	7.5	7.5	/	7.7	7.6	7.1	7.8	7.6	7.4	/	8.2	7.5	387	376	368	365	/	356	370
AT9-875		22.5	22.1	22.2	22.5	/	22.0	22.6	7.6	7.8	7.5	7.5	/	7.7	7.6	6.0	7.7	7.5	7.6	/	8.1	7.0	411	354	348	350	/	347	364
AT9-876		22.5	22.1	22.2	22.6	/	22.0	22.6	7.7	7.8	7.5	7.6	/	7.7	7.6	6.2	7.9	7.6	7.8	/	8.2	7.3	402	364	357	355	/	352	361
AT9-877		22.5	22.2	22.2	22.7	/	22.0	22.7	7.7	7.8	7.5	7.6	/	7.7	7.6	6.9	8.2	7.6	7.9	/	8.3	7.3	371	364	358	358	/	351	361
AT9-878		22.6	22.3	22.3	22.7	/	22.0	22.8	7.7	7.8	7.5	7.6	/	7.8	7.6	7.3	7.8	7.6	7.6	/	8.2	7.5	400	366	361	358	/	356	359
AT9-879		22.6	22.3	22.3	22.7	/	22.0	22.8	7.7	7.8	7.5	7.6	/	7.8	7.6	7.1	7.5	7.3	7.6	/	8.0	7.7	400	363	359	358	/	350	366
AT9-880		22.7	22.3	22.3	22.7	/	22.0	22.8	7.7	7.8	7.5	7.6	/	7.8	7.6	7.0	7.9	7.2	8.0	/	8.0	7.3	403	346	343	348	/	340	363
AT9-881		22.7	22.3	22.3	22.8	/	22.0	22.8	7.8	7.9	7.6	7.6	/	7.8	7.6	7.8	7.9	7.4	8.2	/	8.3	7.4	383	363	349	360	/	351	365
AT9-882		22.7	22.4	22.3	22.8	/	22.0	22.9	7.7	7.8	7.6	7.6	/	7.8	7.6	7.3	7.8	7.8	7.9	/	8.3	8.3	406	372	364	360	/	352	375
AT9-883		22.7	22.6	22.4	22.9	/	22.0	22.8	7.8	7.8	7.6	7.6	/	7.8	7.6	7.4	7.5	8.1	7.4	/	8.1	7.5	360	361	360	359	/	351	359
Meter Number		679	680	676	678	/	680	678	679	680	676	678	/	680	678	679	680	678	678	/	680	678	679	680	678	678	/	680	678
Time		1356	0955	0933	0853	/	0727	1008	1356	0955	0933	0853	/	0727	1008	1356	0955	0933	0853	/	0727	1008	1356	0955	0933	0853	/	0727	1008
Initials		TP MF	AT	AT	AT MF	/	AT MF	MF	TP MC	AT	AT	AT MF	/	AT MF	MF	TP MC	AT	AT	AT MF	/	AT MF	MC	TP MF	AT	AT	AT MF	/	AT MF	MC

* * * *

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: 70019.TOX | TEST ORGANISM | Beginning Date: 11/15/19 Time: 1352

Client: Ottowa River | Common Name: Amphipod | Ending Date: 11/25/19 Time: 1450

QC Test Number: TN-19-644 | Scientific Name: *H. azteca*

TARGET VALUES Temp: 23±1 °C pH: 6.0 - 9.0 DO: ≥4.0 mg/L Salinity: 0 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Test Conc	Rep	Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (µS/cm)						
		8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14
Control (AT9-730)		22.1	22.0	22.9					7.7	7.6	8.1					8.2	8.2	6.0					339	344	341				
AT9-870		22.2	22.0	22.6					7.7	7.6	8.0					8.2	8.1	6.8					352	355	389				
AT9-871		22.1	22.0	22.5					7.7	7.6	7.9					8.0	7.5	7.3					347	350	378				
AT9-872		22.1	22.1	22.6					7.7	7.6	7.9					7.9	7.6	6.6					347	356	380				
AT9-873		22.1	22.1	22.6					7.8	7.6	7.9					7.8	7.8	6.7					352	355	379				
AT9-874		22.1	22.1	22.6					7.7	7.6	7.9					7.7	7.8	7.1					357	360	376				
AT9-875		22.2	22.1	22.6					7.7	7.6	7.8					7.6	7.3	6.6					351	354	384				
AT9-876		22.1	22.1	22.3					7.8	7.7	7.9					7.4	7.3	7.0					355	356	380				
AT9-877		22.2	22.0	22.6					7.7	7.7	7.9					8.0	7.4	7.0					348	354	370				
AT9-878		22.2	22.0	22.6					7.7	7.7	7.9					7.9	7.3	7.1					348	354	368				
AT9-879		22.3	22.1	22.7					7.8	7.7	7.9					7.9	7.4	7.1					348	354	371				
AT9-880		22.1	22.2	22.8					7.8	7.7	7.8					8.5	7.4	7.0					348	353	381				
AT9-881		22.3	22.1	22.8					7.8	7.7	7.8					8.1	7.6	6.6					352	355	383				
AT9-882		22.3	22.2	22.7					7.8	7.7	7.9					7.7	7.6	6.9					353	358	379				
AT9-883		22.4	22.2	22.8					7.8	7.7	7.8					7.5	7.3	7.1					356	360	373				
Meter Number		680	678	680					680	678	680					680	678	680					680	678	1080				
Time		1126	1002	1005					1126	1002	1005					1126	1002	1005					1126	1002	1005				
Initials		MF	AT	JA					MF	AT	JA					MF	AT	JA					MF	AT	JA				

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TOXICOLOGY LABORATORY BENCH SHEET - RENEWAL RECORD

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-644

Day	Date	Time	Initials
0	11/15/19	AM 0810	RSB
		PM —	—
1	11/16/19	AM 0845	TP
		PM 1500	TP
2	11/17/19	AM 0905	AT
		PM 1345	AT
3	11/18/19	AM 0848	AT
		PM 1620	AT
4	11/19/19	AM 0820	AT
		PM 1430	TP
5	11/20/19	AM 0820	TP
		PM	
6	11/21/19	AM 0710	AT
		PM 1510	AT
7	11/22/19	AM 0845	TP
		PM 1600	MO
8	11/23/19	AM 0900	TP
		PM 1445	TP
9	11/24/19	AM 0855	AT
		PM 1315	AT
10		AM	
		PM	

TOXICOLOGY LABORATORY BENCH SHEET - FEEDING RECORD

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-644

Food: 1 ml YCT per beaker daily

Day	Date	Time	Initials
0	11/15/19 ~~1541~~ 11/15/19	1541	MKJ
1	11/16/19	1511	TR
2	11/17/19	1404	AT
3	11/18/19	1625	AT
4	11/19/19	1500	AT
5	11/20/19	1500	AT
6	11/21/19	1527	KSB
7	11/22/19	1600	~~MB~~ TR
8	11/23/19	1440	TR
9	11/24/19	1525	AT
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			
21			
22			
23			
24			
25			
26			
27			
28			

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: 70019.TOX

Client: OTTOWA RIVER

QC Test Number: TN-19-644

Day	Testing Location	Date	Time	Initials
0	16,17	11/15/19	1423	MT
1	16,17	11/16/19	0845	TP
2	16,17	11/17/19	0905	AT
3	16,17	11/18/19	0848	AT
4	16,17	11/19/19	0820	AT
5	16,17	11/20/19	0820	TP
6	16,17	11/21/19	0710	AT
7	16,17	11/22/19	0845	TP
8	16,17	11/23/19	1440	TP
9	16,17	11/24/19	1300	SA
10	16,17	11/25/19	1400	JR
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-644

Date/Time/Initials	Comments/Activity

*- WQ not taken due to tech error

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-644

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8		
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8	64.00	47.00
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8	67.50	47.00
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8	56.00	47.00
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8	52.50	47.00
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8	67.50	47.00
*AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8	44.50	47.00
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8	52.50	47.00
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8	57.50	47.00
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8	55.50	47.00
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8	52.50	47.00
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8	52.00	47.00
*AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8	45.50	47.00
*AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8	44.00	47.00
*AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8	41.00	47.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.01)	1.20986	1.035	-0.0504	0.45762
Bartlett's Test indicates equal variances (p = 0.08)	22.1461	29.1412		

Hypothesis Test (1-tail, 0.05)

Wilcoxon Rank Sum Test indicates significant differences

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8		
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8	64.00	51.00
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8		
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8		
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8		
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8		
AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8		
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8		
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8		
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8		
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8		
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8		
AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8		
AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8		
AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.74875	0.844	-1.324	3.83376
F-Test indicates equal variances (p = 0.78)	1.24775	8.88539		

Hypothesis Test (1-tail, 0.05)

Wilcoxon Two-Sample Test indicates no significant differences

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8			
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8	0.206	1.761	0.1014
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8			
AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.84767	0.844	-0.3535	0.83359
F-Test indicates equal variances (p = 0.17)	2.98205	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.06825	0.0757	0.00056	0.01327	0.83973	1, 14

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8			
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8	1.588	1.761	0.1497
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8			
AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.90036	0.844	-0.8723	2.44428
F-Test indicates equal variances (p = 0.02)	7.67559	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.10574	0.11728	0.07291	0.0289	0.13453	1, 14

Reviewed by: JR

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8			
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8			
*AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8	1.843	1.761	0.1460
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8			
AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.8918	0.844	-0.6495	2.56759
F-Test indicates equal variances (p = 0.02)	7.24782	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.10273	0.11395	0.09333	0.02748	0.0866	1, 14

Reviewed by: SR

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8			
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8	0.143	1.761	0.1135
AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8			
AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.88001	0.844	-0.2007	-0.3007
F-Test indicates equal variances (p = 0.09)	3.99039	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.07738	0.08583	0.00034	0.01662	0.88819	1, 14

Reviewed by: JR

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8			
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8			
*AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8	3.639	1.761	0.1133
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8			
AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.86241	0.844	0.69476	-0.3265
F-Test indicates equal variances (p = 0.09)	3.96765	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.07718	0.08561	0.2192	0.01655	0.00268	1, 14

ToxCalc v5.0.23

Reviewed by: _____

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8			
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8			
*AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8	1.922	1.761	0.1520
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8			
AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92202	0.844	-0.4733	1.62788
F-Test indicates equal variances (p = 0.01)	7.94062	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.10757	0.11931	0.11007	0.02978	0.07514	1, 14

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8			
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8	1.091	1.761	0.0859
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8			
AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.90691	0.844	0.74445	0.6767
F-Test indicates equal variances (p = 0.43)	1.85756	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.05685	0.06306	0.01133	0.00952	0.2938	1, 14

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8			
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8	1.685	1.860	0.1766
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8			
AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92759	0.844	-0.0908	0.87941
F-Test indicates unequal variances (p = 7.41E-03)	9.82734	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Heteroscedastic t Test indicates no significant differences	0.12781	0.14177	0.10242	0.03607	0.11413	1, 14

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8			
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8	1.709	1.761	0.1417
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8			
AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.8602	0.844	0.29818	1.23327
F-Test indicates equal variances (p = 0.02)	6.77396	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.09933	0.11018	0.07566	0.0259	0.10947	1, 14

Reviewed by: JR

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8			
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8			
*AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8	2.050	1.761	0.1221
AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8			
AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92188	0.844	0.5719	0.41168
F-Test indicates equal variances (p = 0.06)	4.7686	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.08392	0.09309	0.08075	0.01922	0.0596	1, 14

Reviewed by: JR

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8			
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8			
*AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8	2.676	1.761	0.1160
AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8			
AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.85766	0.844	0.93067	2.58718
F-Test indicates equal variances (p = 0.08)	4.20522	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.07923	0.08787	0.12417	0.01734	0.01809	1, 14

Reviewed by: JR

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8			
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8			
*AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8	3.325	1.860	0.1885
AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.87523	0.844	0.3618	3.44449
F-Test indicates unequal variances (p = 4.80E-03)	11.3368	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Heteroscedastic t Test indicates significant differences	0.13785	0.1529	0.45445	0.0411	0.005	1, 14

Reviewed by: JR

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.9000	1.0000	1.2517	1.1071	1.4120	6.521	8			
AT9-870	0.8750	0.9722	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	0.9861	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	0.8750	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	0.8611	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	0.9861	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.7917	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	0.8472	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	0.9583	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	0.8472	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	0.8750	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	0.8750	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	0.8472	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.6806	0.9146	0.4636	1.4120	30.049	8			
*AT9-883	0.7250	0.8056	1.0261	0.8861	1.2490	11.976	8	4.324	1.761	0.0919

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.90225	0.844	0.56742	0.56644
F-Test indicates equal variances (p = 0.30)	2.26676	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.06119	0.06787	0.20351	0.01088	7.0E-04	1, 14

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8		
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8	92.00	47.00
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8	91.50	47.00
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8	79.50	47.00
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8	78.00	47.00
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8	90.50	47.00
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8	64.50	47.00
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8	75.50	47.00
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8	90.50	47.00
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8	73.50	47.00
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8	77.00	47.00
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8	76.50	47.00
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8	73.50	47.00
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8	55.50	47.00
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8	95.00	47.00

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates non-normal distribution (p <= 0.01)	1.20986	1.035	-0.0504	0.45762
Bartlett's Test indicates equal variances (p = 0.08)	22.1461	29.1412		

Hypothesis Test (1-tail, 0.05)

Wilcoxon Rank Sum Test indicates no significant differences

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8			
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8	-3.525	1.761	0.0953
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8			
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.90323	0.844	-0.3158	1.23908
F-Test indicates equal variances (p = 0.45)	1.81667	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.08814	0.12049	0.14545	0.01171	0.00337	1, 14

Reviewed by: JR

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8			
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8	-3.232	1.761	0.1165
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8			
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96153	0.844	-0.0356	-0.2593
F-Test indicates equal variances (p = 0.73)	1.31556	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.10853	0.14837	0.18266	0.01749	0.00602	1, 14

Reviewed by: JR

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8			
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8	-0.995	1.761	0.1603
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8			
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9456	0.844	-0.6351	1.20898
F-Test indicates equal variances (p = 0.13)	3.38615	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.15143	0.207	0.03279	0.03312	0.3366	1, 14

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8			
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8	-0.818	1.761	0.1568
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8			
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.95997	0.844	-0.4431	1.26173
F-Test indicates equal variances (p = 0.15)	3.19744	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.14799	0.2023	0.0212	0.0317	0.42711	1, 14

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8			
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8	-2.997	1.761	0.1271
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8			
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9446	0.844	0.00915	-0.9533
F-Test indicates equal variances (p = 0.47)	1.76039	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.11893	0.16257	0.18719	0.02084	0.00961	1, 14

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root					Rank	1-Tailed
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	Sum	Critical
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8		
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8		
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8		
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8		
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8		
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8		
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8	64.50	51.00
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8		
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8		
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8		
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8		
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8		
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8		
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8		
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8		

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates non-normal distribution (p <= 0.01)	0.84233	0.844	0.64712	-0.9694
F-Test indicates equal variances (p = 0.48)	1.75036	8.88539		

Hypothesis Test (1-tail, 0.05)

Wilcoxon Two-Sample Test indicates no significant differences

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8			
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8	-0.647	1.761	0.1624
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8			
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.98151	0.844	-0.315	0.6063
F-Test indicates equal variances (p = 0.12)	3.50307	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.15352	0.20986	0.01424	0.034	0.52796	1, 14

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8			
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8	-2.941	1.761	0.1032
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8			
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9022	0.844	0.71362	-0.251
F-Test indicates equal variances (p = 0.80)	1.22029	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.09576	0.1309	0.11881	0.01374	0.01074	1, 14

Reviewed by: JR

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8			
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8	-0.653	1.761	0.1768
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8			
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96411	0.844	-0.0203	0.12589
F-Test indicates equal variances (p = 0.07)	4.33541	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.16775	0.22931	0.01719	0.04029	0.52427	1, 14

Reviewed by: JR

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8			
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8	-1.014	1.761	0.1528
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8			
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.93086	0.844	0.32535	0.22685
F-Test indicates equal variances (p = 0.17)	2.98839	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.14409	0.19697	0.031	0.03012	0.32757	1, 14

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8			
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8	-1.091	1.761	0.1348
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8			
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.94429	0.844	0.55222	-0.4737
F-Test indicates equal variances (p = 0.35)	2.10371	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.12642	0.17281	0.02788	0.02344	0.29387	1, 14

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8			
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8	-0.672	1.761	0.1293
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8			
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.92678	0.844	0.8159	0.91303
F-Test indicates equal variances (p = 0.43)	1.85517	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.12104	0.16546	0.00975	0.02156	0.51224	1, 14

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8			
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8	1.048	1.761	0.1875
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.924	0.844	0.35992	2.29861
F-Test indicates equal variances (p = 0.05)	5.0013	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.17838	0.24385	0.04973	0.04532	0.31257	1, 14

Survival and Growth Test-Survival

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	11/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.6000	0.7000	0.8000	0.7000	0.9000	0.7000	0.6000	0.8000
AT9-870	0.9000	0.9000	0.9000	0.9000	0.9000	0.9000	0.7000	0.9000
AT9-871	0.9000	0.8000	0.9000	0.9000	1.0000	0.9000	0.7000	1.0000
AT9-872	0.7000	0.4000	0.7000	0.9000	1.0000	0.9000	0.8000	0.9000
AT9-873	0.7000	0.8000	1.0000	0.4000	0.8000	0.9000	0.7000	0.9000
AT9-874	0.9000	0.8000	1.0000	0.9000	0.8000	0.7000	1.0000	1.0000
AT9-875	0.8000	0.9000	0.6000	0.7000	0.6000	0.6000	0.6000	0.9000
AT9-876	0.4000	0.6000	0.9000	0.8000	0.7000	0.8000	0.9000	1.0000
AT9-877	0.9000	1.0000	0.8000	0.9000	0.9000	0.8000	0.8000	0.8000
AT9-878	0.7000	1.0000	0.6000	0.4000	0.9000	1.0000	0.8000	0.7000
AT9-879	0.7000	0.8000	0.8000	0.5000	0.8000	1.0000	0.7000	1.0000
AT9-880	0.7000	0.6000	0.9000	0.9000	1.0000	0.7000	0.7000	0.8000
AT9-881	0.8000	0.7000	0.8000	1.0000	0.6000	0.8000	0.6000	0.8000
AT9-882	0.7000	0.5000	0.2000	0.5000	0.6000	1.0000	0.8000	0.6000
Control	0.9000	1.0000	0.8000	0.9000	0.9000	0.9000	0.9000	0.9000

			Transform: Arcsin Square Root						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.7250	1.0000	1.0261	0.8861	1.2490	11.976	8			
AT9-870	0.8750	1.2069	1.2168	0.9912	1.2490	7.493	8			
AT9-871	0.8875	1.2241	1.2398	0.9912	1.4120	11.369	8			
AT9-872	0.7875	1.0862	1.1167	0.6847	1.4120	20.251	8			
AT9-873	0.7750	1.0690	1.0989	0.6847	1.4120	19.997	8			
AT9-874	0.8875	1.2241	1.2424	0.9912	1.4120	13.124	8			
AT9-875	0.7125	0.9828	1.0176	0.8861	1.2490	15.978	8			
AT9-876	0.7625	1.0517	1.0858	0.6847	1.4120	21.184	8			
AT9-877	0.8625	1.1897	1.1985	1.1071	1.4120	9.283	8			
AT9-878	0.7625	1.0517	1.0917	0.6847	1.4120	23.440	8			
AT9-879	0.7875	1.0862	1.1141	0.7854	1.4120	19.068	8			
AT9-880	0.7875	1.0862	1.1096	0.8861	1.4120	16.064	8			
AT9-881	0.7625	1.0517	1.0755	0.8861	1.4120	15.564	8			
AT9-882	0.6125	0.8448	0.9146	0.4636	1.4120	30.049	8			
Control	0.9000	1.2414	1.2517	1.1071	1.4120	6.521	8	-4.324	1.761	0.0919

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.90225	0.844	0.56742	0.56644
F-Test indicates equal variances (p = 0.30)	2.26676	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.08487	0.11601	0.20351	0.01088	7.0E-04	1, 14

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8	S.D.
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889	0.01486
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700	0.01989
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330	0.02273
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233	0.01732
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133	0.0147
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810	0.02183
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056	0.01791
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760	0.03068
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400	0.0156
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986	0.02194
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980	0.02502
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400	0.0255
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175	0.01121
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217	0.01994
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025	0.01539

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8	0.976	2.744	0.0278
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8	-0.796	2.744	0.0278
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8	0.551	2.744	0.0278
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8	0.118	2.744	0.0278
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8	0.874	2.744	0.0278
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8	1.572	2.744	0.0278
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8	0.695	2.744	0.0278
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8	-1.833	2.744	0.0278
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8	1.437	2.744	0.0278
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8	-0.344	2.744	0.0278
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8	-1.169	2.744	0.0278
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8	-0.820	2.744	0.0278
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8	-0.471	2.744	0.0278
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8	-0.762	2.744	0.0278

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.01)	0.63521	1.035	0.04144	-0.4801
Bartlett's Test indicates equal variances (p = 0.57)	12.4948	29.1412		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test indicates no significant differences	0.02778	0.25157	0.00082	0.00041	0.02436	14, 105

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8	1.125	1.761	0.0155
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8			
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.94764	0.844	-0.261	-1.0754
F-Test indicates equal variances (p = 0.46)	1.79121	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01546	0.14001	0.00039	0.00031	0.27935	1, 14

Reviewed by:

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8	-0.840	1.761	0.0169
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8			
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.94332	0.844	-0.607	-0.4574
F-Test indicates equal variances (p = 0.28)	2.34022	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01691	0.15316	0.00026	0.00037	0.41518	1, 14

Reviewed by: SR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8	0.691	1.761	0.0142
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8			
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.93738	0.844	-0.0382	-1.2555
F-Test indicates equal variances (p = 0.70)	1.35846	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01421	0.1287	0.00012	0.00026	0.50076	1, 14

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8	0.162	1.761	0.0130
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8			
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.94949	0.844	-0.2192	-1.1018
F-Test indicates equal variances (p = 0.98)	1.02157	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01302	0.11789	5.7E-06	0.00022	0.8736	1, 14

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8	0.948	1.761	0.0164
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8			
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97971	0.844	-0.2643	-0.4276
F-Test indicates equal variances (p = 0.33)	2.15913	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01645	0.14895	0.00031	0.00035	0.35933	1, 14

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8			
*AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8	1.934	1.761	0.0145
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8			
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.95285	0.844	-0.1572	-0.9481
F-Test indicates equal variances (p = 0.63)	1.45297	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.01449	0.13125	0.00101	0.00027	0.07353	1, 14

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8	0.584	1.761	0.0212
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8			
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96099	0.844	0.19437	0.30123
F-Test indicates equal variances (p = 0.07)	4.26185	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.02123	0.19224	0.0002	0.00058	0.5687	1, 14

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8	-2.436	1.761	0.0134
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8			
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96053	0.844	-0.0164	-0.9323
F-Test indicates equal variances (p = 0.90)	1.10235	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01342	0.12151	0.00138	0.00023	0.02881	1, 14

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8	1.553	1.761	0.0165
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8			
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.98193	0.844	0.28233	0.03222
F-Test indicates equal variances (p = 0.33)	2.1807	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.0165	0.14946	0.00085	0.00035	0.14273	1, 14

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8	-0.338	1.761	0.0181
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8			
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97313	0.844	0.48378	-0.2313
F-Test indicates equal variances (p = 0.19)	2.83425	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01812	0.1641	4.8E-05	0.00042	0.74019	1, 14

Reviewed by:

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8	-1.134	1.761	0.0184
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8			
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.94249	0.844	0.25048	-1.1155
F-Test indicates equal variances (p = 0.18)	2.94473	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01838	0.16645	0.00056	0.00044	0.2759	1, 14

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8	-1.261	1.761	0.0116
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8			
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.96458	0.844	0.2024	-0.5085
F-Test indicates equal variances (p = 0.47)	1.75762	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01159	0.10497	0.00028	0.00017	0.22775	1, 14

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8	-0.542	1.761	0.0155
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.99385	0.844	0.17489	-0.014
F-Test indicates equal variances (p = 0.46)	1.80049	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01548	0.14024	9.1E-05	0.00031	0.59609	1, 14

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
Control	0.1104	1.0000	0.1104	0.0889	0.1333	13.458	8			
AT9-870	0.1005	0.9105	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0730	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.9495	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9892	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.9198	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8558	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.9363	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.1681	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8682	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	1.0315	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.1072	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0752	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	1.0432	0.1152	0.0843	0.1500	17.310	8			
AT9-883	0.1181	1.0698	0.1181	0.0957	0.1371	13.030	8	-1.020	1.761	0.0133

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.94983	0.844	-0.0656	-1.2487
F-Test indicates equal variances (p = 0.93)	1.07297	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01332	0.12066	0.00024	0.00023	0.32524	1, 14

Reviewed by: SR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8	1.738	2.744	0.0278
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8	-0.035	2.744	0.0278
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8	1.313	2.744	0.0278
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8	0.880	2.744	0.0278
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8	1.636	2.744	0.0278
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8	2.334	2.744	0.0278
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8	1.457	2.744	0.0278
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8	-1.071	2.744	0.0278
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8	2.199	2.744	0.0278
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8	0.418	2.744	0.0278
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8	-0.407	2.744	0.0278
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8	-0.058	2.744	0.0278
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8	0.291	2.744	0.0278
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8	0.762	2.744	0.0278

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.01)	0.63521	1.035	0.04144	-0.4801
Bartlett's Test indicates equal variances (p = 0.57)	12.4948	29.1412		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Bonferroni t Test indicates no significant differences	0.02778	0.23514	0.00082	0.00041	0.02436	14, 105

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
*AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8	1.978	1.761	0.0157
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8			
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.93548	0.844	-0.3018	-1.2194
F-Test indicates equal variances (p = 0.52)	1.6694	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.01566	0.13257	0.00124	0.00032	0.06792	1, 14

Reviewed by: SR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8	-0.036	1.761	0.0171
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8			
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.93977	0.844	-0.6266	-0.603
F-Test indicates equal variances (p = 0.33)	2.18107	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01709	0.14472	4.9E-07	0.00038	0.97169	1, 14

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8	1.622	1.761	0.0144
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8			
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.91589	0.844	-0.1013	-1.4166
F-Test indicates equal variances (p = 0.76)	1.26608	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01443	0.12215	0.00071	0.00027	0.12707	1, 14

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8	1.184	1.761	0.0133
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8			
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.91971	0.844	-0.2912	-1.3064
F-Test indicates equal variances (p = 0.91)	1.0961	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01325	0.11221	0.00032	0.00023	0.25617	1, 14

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8	1.754	1.761	0.0166
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8			
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97716	0.844	-0.2977	-0.5832
F-Test indicates equal variances (p = 0.38)	2.0123	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01664	0.14083	0.0011	0.00036	0.10137	1, 14

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8			
*AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8	2.830	1.761	0.0147
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8			
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.94614	0.844	-0.2116	-1.1201
F-Test indicates equal variances (p = 0.70)	1.35416	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.01471	0.1245	0.00223	0.00028	0.01337	1, 14

ToxCalc v5.0.23

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8	1.215	1.761	0.0214
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8			
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.95287	0.844	0.17046	0.18896
F-Test indicates equal variances (p = 0.09)	3.97202	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.02137	0.18093	0.00087	0.00059	0.24437	1, 14

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed					1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8	-1.399	1.761	0.0136
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8			
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.95726	0.844	-0.0922	-1.1354
F-Test indicates equal variances (p = 0.97)	1.02738	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01365	0.11553	0.00047	0.00024	0.18344	1, 14

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8			
*AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8	2.349	1.761	0.0167
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8			
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.98597	0.844	0.23102	-0.1426
F-Test indicates equal variances (p = 0.37)	2.0324	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates significant differences	0.01669	0.1413	0.00198	0.00036	0.03401	1, 14

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8	0.408	1.761	0.0183
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8			
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.97426	0.844	0.43848	-0.3662
F-Test indicates equal variances (p = 0.22)	2.64151	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01829	0.15484	7.2E-05	0.00043	0.68977	1, 14

Reviewed by: DR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed					1-Tailed		
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8	-0.391	1.761	0.0185
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8			
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.93594	0.844	0.21318	-1.2147
F-Test indicates equal variances (p = 0.21)	2.74448	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01855	0.15701	6.8E-05	0.00044	0.70157	1, 14

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed					1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8	-0.088	1.761	0.0119
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8			
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.9647	0.844	0.07227	-0.8217
F-Test indicates equal variances (p = 0.42)	1.88587	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01186	0.10037	1.4E-06	0.00018	0.93148	1, 14

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8	0.331	1.761	0.0157
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8			

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.99028	0.844	0.11782	-0.2108
F-Test indicates equal variances (p = 0.51)	1.67805	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01569	0.13278	3.5E-05	0.00032	0.7459	1, 14

Reviewed by: JR

Survival and Growth Test-Growth

Start Date:	11/15/2019	Test ID:	TN-19-644	Sample ID:	Ottawa River
End Date:	12/25/2019	Lab ID:		Sample Type:	SEDIMENT
Sample Date:		Protocol:		Test Species:	HA-Hyalella azteca
Comments:					

Conc-	1	2	3	4	5	6	7	8
AT9-883	0.1200	0.1071	0.1175	0.1371	0.1300	0.0957	0.1350	0.1025
AT9-870	0.1144	0.0789	0.1144	0.0878	0.1256	0.0989	0.1143	0.0700
AT9-871	0.1133	0.1263	0.1422	0.0811	0.1230	0.0889	0.1400	0.1330
AT9-872	0.1029	0.0825	0.1271	0.0956	0.0830	0.1056	0.1188	0.1233
AT9-873	0.1200	0.1225	0.1270	0.0900	0.1038	0.1100	0.0871	0.1133
AT9-874	0.0967	0.0650	0.1300	0.0956	0.1150	0.1243	0.1050	0.0810
AT9-875	0.1088	0.0700	0.0883	0.1200	0.1000	0.0933	0.0700	0.1056
AT9-876	0.1550	0.0633	0.1178	0.1175	0.1171	0.0725	0.1078	0.0760
AT9-877	0.1322	0.1530	0.1400	0.1222	0.1056	0.1125	0.1263	0.1400
AT9-878	0.0829	0.0850	0.1200	0.1325	0.0622	0.0920	0.0938	0.0986
AT9-879	0.1243	0.0813	0.1550	0.0960	0.1088	0.1050	0.1429	0.0980
AT9-880	0.0971	0.0983	0.0956	0.1578	0.1520	0.1100	0.1271	0.1400
AT9-881	0.1225	0.1057	0.1400	0.1190	0.1050	0.1150	0.1250	0.1175
AT9-882	0.0843	0.0980	0.1500	0.1100	0.1300	0.1100	0.1175	0.1217
Control	0.1333	0.0990	0.1188	0.1156	0.1222	0.1089	0.0967	0.0889

			Transform: Untransformed						1-Tailed	
Conc-	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
AT9-883	0.1181	1.0000	0.1181	0.0957	0.1371	13.030	8			
AT9-870	0.1005	0.8511	0.1005	0.0700	0.1256	19.781	8			
AT9-871	0.1185	1.0030	0.1185	0.0811	0.1422	19.186	8			
AT9-872	0.1048	0.8875	0.1048	0.0825	0.1271	16.520	8			
AT9-873	0.1092	0.9246	0.1092	0.0871	0.1270	13.461	8			
AT9-874	0.1016	0.8598	0.1016	0.0650	0.1300	21.498	8			
AT9-875	0.0945	0.8000	0.0945	0.0700	0.1200	18.954	8			
AT9-876	0.1034	0.8752	0.1034	0.0633	0.1550	29.673	8			
AT9-877	0.1290	1.0918	0.1290	0.1056	0.1530	12.097	8			
AT9-878	0.0959	0.8115	0.0959	0.0622	0.1325	22.890	8			
AT9-879	0.1139	0.9642	0.1139	0.0813	0.1550	21.964	8			
AT9-880	0.1222	1.0349	0.1222	0.0956	0.1578	20.859	8			
AT9-881	0.1187	1.0050	0.1187	0.1050	0.1400	9.441	8			
AT9-882	0.1152	0.9751	0.1152	0.0843	0.1500	17.310	8			
Control	0.1104	0.9347	0.1104	0.0889	0.1333	13.458	8	1.020	1.761	0.0133

Auxiliary Tests	Statistic	Critical	Skew	Kurt
Shapiro-Wilk's Test indicates normal distribution (p > 0.01)	0.94983	0.844	-0.0656	-1.2487
F-Test indicates equal variances (p = 0.93)	1.07297	8.88539		

Hypothesis Test (1-tail, 0.05)	MSDu	MSDp	MSB	MSE	F-Prob	df
Homoscedastic t Test indicates no significant differences	0.01332	0.11278	0.00024	0.00023	0.32524	1, 14

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ATTACHMENT IV

Data Sheets from *Lumbriculus variegatus* Toxicity Tests
(15 pages)

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SEDIMENT TOXICITY TEST SET-UP BENCH SHEET

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-643

TEST ORGANISM INFORMATION	
Common Name: Oligochaete	Adults Isolated (Time, Date): __
Scientific Name: *Lumbriculus variegatus*	Neonates Pulled (Time, Date): __
Lot Number: LV-022	Acclimation: <24 hours Age: Adult
Source: Eastern Aquatics	Culture Water (T/S): 23.1 °C Ø ppt

TEST INITIATION

Date	Time	Initials	Activity
11/13/19	1200	MJ/MF/TP	Sediment Added to Chambers
↓	↓	↓	Overlying Water Added to Chambers
11/14/19	1413	[illegible]	Organisms Transferred

TEST SET-UP

Sample Number(s): AT9-730 (Lab Control), AT9-870 → 883

Overyling Water: Dechlor

Treatment	Volume Test Sediment	Volume Overlying Water
AT9-730 (Lab Control)	1.5 L	6L
AT8-870	↓	↓
↓		
AT9-883		

ATS-T28
03/01/00

TOXICOLOGY LABORATORY BENCH SHEET - ORGANISM RECOVERY RECORD

Project Number: 70019.TOX

Client: OTTOWA RIVER

QC Test Number: TN-19-643

Organisms Recovered (date, time, initials): 12/12/19 1300 MC

TEST ORGANISM

Common Name: Oligochaete

Scientific Name: *Lumbriculus variegatus*

Treatment	Replicate	Weight of Organisms Loaded	Weight of Organisms Recovered
AT9-730	A	10.1	10.1
(Lab Control)	B	10.0	10.3
	C	10.1	10.2
	D	10.1	10.3
	E	10.3	10.0
AT9-870	A	10.2	10.0
	B	10.1	10.1
	C	10.3	10.2
	D	10.3	10.3
	E	10.1	10.7
AT9-871	A	10.2	8.2
	B	10.2	7.1
	C	10.3	6.9
	D	10.3	7.3
	E	10.0	7.0
AT9-872	A	10.0	10.4
	B	10.1	10.2
	C	10.1	10.1
	D	10.0	10.6
	E	10.3	10.4
AT9-873	A	10.2	10.3
	B	10.1	10.2
	C	10.1	10.0
	D	10.0	10.2
	E	10.1	10.0
AT9-874	A	10.3	10.3
	B	10.2	10.2
	C	10.2	10.1
	D	10.2	10.1
	E	10.2	10.6

TOXICOLOGY LABORATORY BENCH SHEET - ORGANISM RECOVERY RECORD

Project Number: 70019.TOX

Client: OTTOWA RIVER

QC Test Number: TN-19-643

TEST ORGANISM

Common Name: Oligochaete

Scientific Name: *Lumbriculus variegatus*

Organisms Recovered (date, time, initials): 12/12/19 1300 M

Treatment	Replicate	Weight of Organisms Loaded	Weight of Organisms Recovered
AT9-875	A	10.1	10.1
	B	10.1	10.1
	C	10.1	10.1
	D	10.3	10.2
	E	10.2	10.1
AT9-876	A	10.3	10.3
	B	10.2	10.1
	C	10.3	10.1
	D	10.1	10.1
	E	10.1	10.0
AT9-877	A	10.3	10.1
	B	10.2	10.0
	C	10.1	10.0
	D	10.1	10.0
	E	10.1	10.1
AT9-878	A	10.3	10.0
	B	10.2	10.0
	C	10.2	10.0
	D	10.1	10.0
	E	10.3	10.0
AT9-879	A	10.2	10.0
	B	10.1	10.0
	C	10.1	10.0
	D	10.3	10.1
	E	10.6	10.1
AT9-880	A	10.3	10.0
	B	10.2	10.0
	C	10.1	10.1
	D	10.6	10.1
	E	10.3	10.0

TOXICOLOGY LABORATORY BENCH SHEET - ORGANISM RECOVERY RECORD

Project Number: 70019.TOX

Client: OTTOWA RIVER

QC Test Number: TN-19-643

TEST ORGANISM

Common Name: Oligochaete

Scientific Name: *Lumbriculus variegatus*

Organisms Recovered (date, time, initials): 12/12/19 1300 [illegible]

Treatment	Replicate	Weight of Organisms Loaded	Weight of Organisms Recovered
AT9-881	A	10.3	10.0
	B	10.1	10.0
	C	10.3	9.9
	D	10.2	10.2
	E	10.3	10.0
AT9-882	A	10.3	10.0
	B	10.2	10.1
	C	10.4	10.1
	D	10.2	10.1
	E	10.3	10.2
AT9-883	A	10.2	10.0
	B	10.3	10.0
	C	10.4	10.0
	D	10.4	10.0
	E	10.3	10.2

TOXICITY TEST WATER QUALITY DATA SHEET - NEW SOLUTIONS

Project Number: 70019.TOX
Client: Ottowa River
QC Test Number: TN-19-643

TEST ORGANISM
Common Name: Oligochaete
Scientific Name: *Lumbriculus variegatus*

Beginning Date: 11/14/19 Time: 1413
Ending Date: 12/2/19 Time: 1300

TARGET VALUES: Temp: 23 °C pH: 6.0 - 9.0 DO: ≥4.0 mg/L Salinity: 0 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (µS/cm)						
		0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6	0	1	2	3	4	5	6
AT9-730	Control	23.7							7.8							5.7							310						
AT9-870		23.6							7.6							5.6							376						
AT9-871		23.4							7.6							5.8							359						
AT9-872		23.4							7.6							5.9							383						
AT9-873		23.3							7.7							5.7							377						
AT9-874		23.3							7.6							5.9							379						
AT9-875		23.3							7.6							5.7							374						
AT9-876		23.3							7.6							5.7							372						
AT9-877		23.3							7.6							5.9							374						
AT9-878		23.3							7.6							5.5							374						
AT9-879		23.4							7.6							5.8							375						
AT9-880		23.4							7.6							5.8							382						
AT9-881		23.4							7.6							5.9							373						
AT9-882		23.2							7.6							5.8							375						
AT9-883		23.1							7.6							5.9							376						
Meter Number		678							678							678							678						
Time		1400							1400							1400							1400						
Initials		RSB							RSB							RSB							RSB						

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: 70019.TOX | TEST ORGANISM | Beginning Date: 12/14/19 Time: 1413

Client: Ottowa River | Common Name: Oligochaete | Ending Date: 12/12/19 Time: 1300

QC Test Number: TN-19-643 | Scientific Name: *Lumbriculus variegatus*

TARGET VALUES Temp: 23 °C pH: 6.0 - 9.0 DO: >4.0 mg/L Salinity: 0 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (µS/cm)						
		1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7	1	2	3	4	5	6	7
AT9-730	Control	23.3	23.7	23.0	22.9	23.7	22.4	23.1	8.3	8.1	7.8	7.5	7.7	8.2	7.7	5.3	4.1	4.5	5.6	4.0	6.2	6.5	329	316	328	330	332	363	332
AT9-870		23.2	23.7	23.3	23.2	23.6	22.4	23.4	8.1	7.8	7.5	7.4	7.5	8.1	7.6	4.1	3.8	4.9	5.0	4.0	6.0	5.2	401	399	399	394	387	373	365
AT9-871		23.1	23.5	23.3	23.3	23.6	22.4	23.4	8.0	7.8	7.6	7.4	7.5	8.1	7.6	4.2	3.1	4.8	4.3	4.0	5.6	4.8	390	384	389	384	383	371	362
AT9-872		23.0	23.5	23.3	23.4	23.5	22.3	23.3	7.8	7.7	7.5	7.4	7.4	8.0	7.6	4.2	3.0	4.0	4.0	4.0	5.1	4.5	427	405	408	404	398	363	368
AT9-873		23.0	23.5	23.2	23.4	23.5	22.3	23.3	7.7	7.6	7.5	7.4	7.4	8.0	7.6	4.1	3.0	4.0	4.0	4.0	5.7	4.2	416	388	358	398	397	369	363
AT9-874		23.1	23.5	23.2	23.4	23.5	22.1	23.3	7.7	7.6	7.5	7.4	7.4	7.9	7.6	4.1	3.5	4.0	4.0	4.0	6.1	4.2	415	393	402	401	396	358	363
AT9-875		23.2	23.5	23.2	23.4	23.5	22.1	23.3	7.6	7.6	7.5	7.4	7.4	7.9	7.6	4.3	3.7	4.0	4.0	4.0	6.9	4.1	417	392	400	397	391	354	360
AT9-876		23.0	23.4	23.3	23.4	23.5	22.0	23.3	7.7	7.7	7.6	7.4	7.4	8.0	7.5	5.1	3.5	4.0	4.0	4.0	6.8	4.4	405	395	396	398	388	354	357
AT9-877		23.1	23.4	23.3	23.3	23.5	22.0	23.3	7.6	7.6	7.5	7.4	7.4	7.9	7.6	5.0	3.1	4.0	4.0	4.0	7.0	4.3	409	393	396	401	389	360	367
AT9-878		23.3	23.4	23.3	23.4	23.6	22.0	23.3	7.6	7.7	7.5	7.4	7.3	7.9	7.6	4.0	3.5	4.0	4.0	4.0	6.4	4.1	426	394	392	387	384	363	356
AT9-879		22.8	23.6	23.3	23.4	23.6	22.0	23.4	7.6	7.7	7.5	7.4	7.4	7.9	7.6	5.1	3.6	4.0	4.0	4.0	6.9	4.6	413	391	395	395	391	358	359
AT9-880		23.5	23.5	23.4	23.4	23.6	22.0	23.4	7.5	7.6	7.6	7.4	7.4	7.9	7.6	3.9	4.0	4.3	4.5	4.0	6.7	5.1	419	395	403	407	399	362	365
AT9-881		23.5	23.6	23.4	23.4	23.4	22.0	23.4	7.6	7.6	7.6	7.4	7.4	7.9	7.7	4.1	4.1	4.4	4.4	4.2	6.9	5.0	406	386	393	390	380	360	357
AT9-882		23.3	23.3	23.3	23.3	23.3	22.0	23.2	7.5	7.6	7.5	7.4	7.4	7.8	7.6	4.0	4.0	4.3	4.1	4.3	6.4	5.0	407	389	393	389	380	361	359
AT9-883		23.3	23.2	23.1	23.2	23.3	22.1	23.1	7.6	7.7	7.6	7.4	7.4	7.9	7.6	4.0	4.4	4.4	4.1	4.1	6.9	4.8	371	361	371	369	368	350	353
Meter Number		680	679	680	678	680	680	680	680	679	680	678	680	680	680	680	679	680	678	680	680	680	680	679	680	678	680	680	680
Time		0845	1150	1002	0940	0826	0800	0730	0845	1150	1002	0940	0826	0800	0730	0845	1150	1002	0940	0826	0800	0730	0845	1150	1002	0940	0826	0800	0730
Initials		MF	MF	AT	AT	MF	DH	ATTP	MF	MF	AT	AT	MF	DH	ATTP	MF	MF	AT	AT	MF	DH	ATTP	MF	MF	AT	AT	MF	DH	ATTP

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: 70019.TOX | TEST ORGANISM | Beginning Date: 11/14/19 Time: 1413

Client: Ottowa River | Common Name: Oligochaete | Ending Date: 12/12/19 Time: 1300

QC Test Number: TN-19-643 | Scientific Name: *Lumbriculus variegatus*

TARGET VALUES Temp: 23 °C pH: 6.0 - 9.0 DO: >4.0 mg/L Salinity: 0 ppt Photoperiod: 16 l, 8 d Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (µS/cm)						
		8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14	8	9	10	11	12	13	14
AT9-730	Control	23.6	23.9	23.1	22.8	23.7	22.2	22.0	7.4	8.1	7.7	8.1	7.3	7.7	7.6	3.7	5.6	4.7	7.7	~~4.0~~ 4.0	5.2	3.5	341	331	336	342	342	343	338
AT9-870		22.6	23.5	23.2	22.0	23.5	22.3	22.1	7.3	7.9	7.6	8.0	7.3	7.6	7.5	3.4	6.1	4.5	7.3	4.0	4.5	3.4	375	372	365	362	372	379	372
AT9-871		23.4	23.4	23.2	22.1	23.4	22.2	22.1	7.4	7.8	7.6	8.0	7.4	7.5	7.5	3.6	6.9	4.7	6.9	4.3	5.0	3.3	376	371	363	368	373	374	371
AT9-872		23.4	23.3	23.2	22.0	23.4	22.4	22.2	7.3	7.7	7.6	8.0	7.4	7.5	7.5	3.7	6.5	4.0	6.9	4.0	4.0	3.0	379	372	365	364	376	371	372
AT9-873		23.4	23.3	23.2	22.0	23.4	22.4	22.4	7.4	7.7	7.6	8.0	7.4	7.5	7.5	3.3	6.8	4.0	6.7	4.0	4.0	3.2	376	369	363	360	373	380	374
AT9-874		23.3	23.3	23.2	22.0	23.3	22.7	22.0	7.4	7.7	7.5	8.0	7.4	7.6	7.6	3.4	6.6	4.1	6.6	4.0	4.2	4.1	375	366	362	361	370	372	362
AT9-875		23.3	23.3	23.2	22.0	23.3	22.0	22.0	7.4	7.7	7.5	7.9	7.5	6.7	7.5	3.6	6.0	4.2	6.7	4.0	4.4	4.2	373	367	363	364	370	374	366
AT9-876		23.3	23.3	23.2	22.0	23.3	22.0	22.0	7.4	7.7	7.5	7.9	7.5	7.1	7.6	3.7	6.4	4.4	6.6	4.1	4.4	4.6	374	367	362	360	368	373	362
AT9-877		23.3	23.2	23.2	22.0	23.3	22.0	22.0	7.4	7.7	7.5	7.9	7.4	7.3	7.6	3.7	6.7	4.3	6.8	4.1	4.8	4.4	382	373	367	363	372	376	370
AT9-878		23.3	23.3	23.2	22.0	23.3	22.0	22.0	7.4	7.7	7.5	8.0	7.5	7.4	7.6	3.6	6.0	4.5	6.7	4.0	4.7	4.5	372	366	361	359	367	374	367
AT9-879		23.3	23.3	23.3	22.0	23.4	22.0	22.0	7.4	7.7	7.5	8.0	7.5	6.4	7.6	4.2	7.5	4.6	6.8	4.5	4.9	4.7	375	370	363	363	370	372	378
AT9-880		23.4	23.3	23.3	22.0	23.4	22.0	22.0	7.4	7.7	7.6	8.0	7.5	7.4	7.6	4.5	6.8	4.9	6.8	4.4	4.9	5.1	376	367	362	363	371	373	373
AT9-881		23.4	23.2	23.3	22.0	23.5	22.0	22.0	7.4	7.7	7.6	8.0	7.5	7.5	7.6	4.7	6.7	4.9	6.8	4.9	4.9	4.7	371	364	360	360	369	376	372
AT9-882		23.3	23.2	23.2	22.0	23.2	22.0	22.0	7.4	7.7	7.6	7.9	7.5	7.4	7.6	4.8	6.5	4.9	6.8	4.6	4.9	4.9	372	365	360	361	369	374	364
AT9-883		23.1	23.1	23.1	22.9	23.1	22.0	22.0	7.4	7.7	7.6	7.9	7.5	7.5	7.6	4.6	7.0	4.7	6.9	4.5	4.9	5.1	366	361	356	358	366	371	371
Meter Number		678	679	678	680	680	679	678	678	679	678	680	680	679	678	678	679	678	680	680	679	678	678	679	678	680	680	679	678
Time		1012	0910	1010	1110	0904	0910	1040	1012	0910	1010	1110	0904	0910	1040	1012	0910	1010	1110	0904	0910	1040	1012	0910	1010	1110	0904	0910	1040
Initials		MF	TP	AT	JA	ATP	ATP	RSB	MF	TP	AT	JA	ATP	ATP	RSB	MF	TP	AT	JA	ATP	ATP	RSB	MF	TP	AT	JA	ATP	ATP	RSB

AT⑥
11/26/19

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: 70019.TOX | TEST ORGANISM | Beginning Date: 11/14/19 Time: 1413

Client: Ottowa River | Common Name: Oligochaete | Ending Date: 12/12/19 Time: 1300

QC Test Number: TN-19-643 | Scientific Name: *Lumbriculus variegatus*

TARGET VALUES Temp: 23 °C pH: 6.0 - 9.0 DO: >4.0 mg/L Salinity: 0 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (µS/cm)						
		15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21	15	16	17	18	19	20	21
AT9-730	Control	22.0	22.0	22.0	22.1	22.2	22.0	22.0	8.3	8.0	7.4	7.3	7.9	8.2	7.5	5.9	5.9	4.5	4.8	4.0	6.1	4.2	337	343	340	361	351	345	350
AT9-870		22.0	22.0	22.0	22.5	22.2	22.8	22.7	8.1	7.8	7.3	7.3	7.7	7.9	7.4	4.5	5.1	4.1	4.6	4.0	5.8	6.0	374	377	380	398	389	383	389
AT9-871		22.0	22.0	22.0	22.9	23.1	22.8	22.8	8.0	7.8	7.3	7.3	7.7	7.9	7.5	4.0	5.0	4.0	4.1	4.0	5.3	5.8	373	384	376	395	385	378	389
AT9-872		22.0	22.0	22.0	22.9	23.0	22.9	22.9	7.9	7.8	7.3	7.3	7.7	7.8	7.4	3.0	5.1	4.0	4.1	4.0	4.2	5.0	375	389	379	397	387	388	391
AT9-873		22.2	22.0	22.0	22.9	23.2	23.0	23.2	7.9	7.7	7.4	7.3	7.7	7.8	7.4	3.1	5.3	4.0	4.0	4.0	5.0	3.0	375	394	382	400	390	391	413
AT9-874		22.0	22.0	22.2	22.6	22.6	23.0	22.0	7.9	7.7	7.4	7.4	7.7	7.8	7.5	3.7	4.4	4.0	4.5	4.0	6.7	6.5	359	392	367	386	372	375	378
AT9-875		22.0	22.0	22.0	22.0	22.0	22.3	22.0	7.8	7.7	7.4	7.4	7.7	7.8	7.5	3.9	5.3	4.1	4.4	4.0	5.2	4.9	364	381	369	386	376	384	401
AT9-876		22.0	22.0	22.0	22.0	22.0	22.0	22.0	7.8	7.7	7.4	7.4	7.7	7.8	7.5	4.2	4.8	4.4	4.3	4.0	6.1	5.2	362	380	371	386	375	380	401
AT9-877		22.0	22.0	22.0	22.0	22.0	22.0	22.0	7.8	7.7	7.4	7.4	7.7	7.8	7.5	4.4	4.7	4.3	4.1	4.0	5.1	4.4	369	378	379	395	381	378	401
AT9-878		22.0	22.0	22.0	22.0	22.0	22.0	22.0	7.8	7.7	7.4	7.4	7.7	7.7	7.5	4.5	4.8	4.1	4.1	4.0	5.8	4.5	366	376	374	390	383	379	407
AT9-879		22.0	22.0	22.0	22.0	22.0	22.0	22.0	7.8	7.7	7.5	7.5	7.7	7.8	7.5	5.1	4.9	5.0	4.8	4.1	6.5	4.7	356	378	367	383	375	368	387
AT9-880		22.0	22.0	22.0	22.0	22.0	22.0	22.0	7.8	7.7	7.5	7.5	7.7	7.8	7.5	4.9	5.0	4.7	4.5	4.2	5.5	4.3	360	377	367	385	376	367	406
AT9-881		22.0	22.0	22.0	22.0	22.0	22.0	22.0	7.7	7.7	7.5	7.5	7.7	7.7	7.5	4.7	5.0	4.6	4.6	4.1	5.3	4.1	363	376	374	391	386	377	~~404~~ 406
AT9-882		22.0	22.0	22.0	22.0	22.0	22.0	22.0	7.7	7.7	7.5	7.5	7.7	7.7	7.5	4.9	4.4	4.5	4.3	4.1	5.1	3.5	367	379	374	391	380	379	409
AT9-883		22.0	22.0	22.0	22.0	22.0	22.0	22.0	7.7	7.7	7.5	7.5	7.7	7.7	7.5	4.9	4.2	4.3	4.4	4.1	4.8	3.8	364	374	370	385	373	371	375
Meter Number		678	680	680	679	678	678	678	678	680	680	679	678	678	678	678	680	680	679	678	678	678	678	680	680	679	678	678	678
Time		0932	0837	0930	1020	0840	0841	0818	0932	0837	0930	1020	0840	0841	0818	0932	0837	0930	1020	0840	0841	0818	0932	0837	0930	1020	0840	0841	0818
Initials		MC	MS	AT	AT	ATTP	JA	ATTP	MC	MS	AT	AT	ATTP	JA	ATTP	MC	MS	AT	AT	ATTP	JA	ATTP	MC	MS	AT	AT	ATTP	JA	ATTP

A1(6) 12/18/19

TOXICITY TEST WATER QUALITY DATA SHEET - OLD SOLUTIONS

Project Number: 70019.TOX | TEST ORGANISM | Beginning Date: 11/14/19 Time: 1413

Client: Ottowa River | Common Name: Oligochaete | Ending Date: 12/12/19 Time: 1300

QC Test Number: TN-19-643 | Scientific Name: *Lumbriculus variegatus*

TARGET VALUES Temp: 23 °C pH: 6.0 - 9.0 DO: >4.0 mg/L Salinity: 0 ppt Photoperiod: 16 *l*, 8 *d* Light Intensity: 50 - 100 fc

Sample #		Temperature (°C)							pH							Dissolved Oxygen (mg/L)							Conductivity (µS/cm)						
		22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28	22	23	24	25	26	27	28
AT9-730	Control	22.7	23.0	22.1	23.1	23.7	22.1	22.0	7.3	7.8	7.5	7.3	7.2	8.2	8.2	5.6	4.3	4.8	6.1	4.0	4.0	5.9	340	343	342	349	352	352	355
AT9-870		22.3	23.0	22.0	22.3	23.6	23.1	22.0	7.3	7.7	7.4	7.3	7.1	7.9	8.0	5.9	3.5	4.5	4.5	3.8	4.0	4.9	376	380	359	374	382	379	374
AT9-871		22.5	23.0	22.0	22.8	23.5	23.0	22.0	7.3	7.7	7.4	7.3	7.2	7.8	8.0	6.6	5.2	3.9	4.0	4.8	4.0	4.1	377	378	360	370	379	374	366
AT9-872		22.5	22.9	22.0	23.1	23.5	23.1	22.0	7.3	7.7	7.3	7.3	7.2	7.7	7.9	4.7	3.5	3.9	4.0	4.2	4.0	3.7	380	381	363	374	385	381	368
AT9-873		22.9	22.9	22.0	23.3	23.6	23.5	22.1	7.3	7.6	7.3	7.3	7.2	7.6	7.8	4.4	3.8	3.8	3.5	3.5	4.0	3.5	392	388	356	376	386	374	373
AT9-874		22.0	22.2	22.0	22.7	23.0	22.0	22.1	7.3	7.6	7.3	7.3	7.2	7.5	7.8	5.5	3.5	3.8	3.9	4.0	4.0	3.1	368	372	352	364	378	379	364
AT9-875		22.6	22.0	22.0	22.3	22.5	22.0	22.0	7.3	7.6	7.3	7.3	7.2	7.5	7.8	5.8	3.4	3.6	3.5	3.5	4.0	3.0	380	377	357	362	374	373	374
AT9-876		22.6	22.0	22.0	22.0	22.2	22.0	22.0	7.3	7.6	7.3	7.3	7.2	7.5	7.8	5.8	3.2	3.6	3.7	3.2	4.0	3.7	384	382	364	370	380	376	372
AT9-877		22.0	22.0	22.0	22.0	22.1	22.0	22.0	7.3	7.6	7.3	7.4	7.2	7.5	7.8	6.0	4.9	3.7	3.7	4.2	4.0	3.8	381	382	361	376	379	377	364
AT9-878		22.0	22.0	22.0	22.0	22.2	22.0	22.0	7.3	7.6	7.3	7.4	7.3	7.5	7.8	5.7	3.4	3.5	3.5	3.6	4.0	3.4	388	385	361	371	378	374	368
AT9-879		22.6	22.0	22.0	22.0	22.3	22.0	22.0	7.3	7.6	7.3	7.4	7.3	7.5	7.8	6.8	4.3	5.6	4.5	4.2	5.4	3.5	375	380	339	367	377	386	367
AT9-880		22.0	22.0	22.0	22.0	22.0	22.0	22.0	7.3	7.6	7.3	7.4	7.3	7.5	7.8	6.1	3.8	4.5	4.4	4.3	4.3	3.7	386	384	364	370	379	380	362
AT9-881		22.6	22.0	22.0	22.0	22.0	22.0	22.0	7.3	7.6	7.3	7.4	7.3	7.5	7.8	5.9	3.2	4.2	4.0	4.1	4.0	4.0	378	380	364	372	383	384	364
AT9-882		22.6	22.0	22.0	22.0	22.0	22.0	22.0	7.3	7.6	7.3	7.4	7.3	7.4	7.7	5.9	3.0	3.8	4.0	3.8	4.0	6.1	383	383	362	373	385	387	383
AT9-883		22.0	22.0	22.0	22.0	22.0	22.0	22.0	7.3	7.6	7.3	7.4	7.4	7.4	7.8	6.9	3.5	4.2	4.0	3.6	4.0	5.5	364	369	357	365	378	378	374
Meter Number		678	680	678	678	678	680	678	679	680	678	678	678	680	678	679	680	678	678	678	680	678	678	680	678	678	678	680	678
Time		0905	1050	1606	1120	0805	0846	0808	0905	1050	1606	1120	0805	0846	0808	0905	1050	1606	1120	0805	0846	0808	0905	1050	1606	1120	0805	0846	0808
Initials		TP	TP	AT	AT	ATM	MF	ATMJ	TP	TP	AT	AT	ATM	MF	ATMJ	TP	TP	AT	AT	ATM	MF	ATMJ	TP	TP	AT	AT	ATM	MF	ATMJ

ATS-T14
06/21/06

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TOXICOLOGY LABORATORY BENCH SHEET - RENEWAL RECORD

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-643

Date		Time	Initials
11/15/19	AM	1120	MF/RSB
	PM	—	—
11/16/19	AM	1055	TP MF
	PM	—	—
11/17/19	AM	1200	JA
	PM	—	—
11/18/19	AM	1210	JA
	PM	—	—
11/19/19	AM	0949	JA
	PM	—	—
11/20/19	AM	0906	JA
	PM	—	—
11/21/19	AM	0842	MO
	PM	—	—
11/22/19	AM	1030	MF
	PM	—	—
11/23/19	AM	0955	TP
	PM	—	—
11/24/19	AM	1200	JA
	PM	—	—
11/25/19	AM	1109	JA
	PM	—	—
11/26/19	AM	1040	TP
	PM	—	—
11/27/19	AM	1000	MO
	PM	—	—
11/28/19	AM	1140	RSB
	PM	—	—
11/29/19	AM	—	MP
	PM	1430	MF

TOXICOLOGY LABORATORY BENCH SHEET - RENEWAL RECORD

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-643

Date		Time	Initials
11/30/19	AM	0955	MJ
	PM	~~1055~~	— AT ⑤ 12/1/19
12/1/19	AM	1055	AT
	PM	"	—
12/2/19	AM	1320	RSB
	PM	—	—
12/3/19	AM	1000	JA
	PM	—	—
12/4/19	AM	1005	JA
	PM	—	—
12/5/19	AM	0915	JA
	PM	—	—
12/6/19	AM	1100	MJ
	PM	—	—
12/7/19	AM	1100	TP
	PM	—	—
12/8/19	AM	1000	JA
	PM	—	—
12/9/19	AM	1520	JA
	PM	—	—
12/10/19	AM	1507	RSB/MF
	PM	—	—
12/11/19	AM	1400	JA
	PM		
	AM		
	PM		
	AM		
	PM		
	AM		
	PM		

TOXICOLOGY LABORATORY BENCH SHEET - TESTING LOCATION

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-643

Day	Testing Location	Date	Time	Initials
0	19A-B, 20A-B, 22A-B, 23A-B	11/14/19	1510	RJB
1	19, 20, 22, 23	11/15/19	0810	RJB
2	19, 20, 22, 23 A-B	11/16/19	1150	MF
3	19, 20, 22, 23 A-B	11/17/19	1002	AT
4	19, 20, 22, 23 A-B	11/18/19	0940	AT
5	19, 20, 22, 23 A-B	11/19/19	0949	JA
6	19, 20, 22, 23 A-B	11/20/19	0906	JA
7	19, 20, 22, 23 A-B	11/21/19	0741	MJ
8	19, 20, 22, 23 A-B	11/22/19	1400	TP
9	19, 20, 22, 23 A-B	11/23/19	1430	TP
10	19, 20, 22, 23 A-B	11/27/19	1457	AT
11	19, 20, 22, 23 A-B	11/25/19	1109	JA
12	57 - 59	11/26/19	1200	TP
13	57 - 59	11/27/19	0910	AT
14	57 - 59	11/28/19	1040	RJB
15	57 - 59	11/29/19	1430	MC
16	57 - 59	11/30/19	0955	MJ
17	57 - 59	12/1/19	1055	AT
18	57 - 59	12/2/19	1130	RJB
19	57 - 59	12/3/19	1000	JA
20	57 - 59	12/4/19	1005	JA
21	57 - 59	12/5/19	0915	JA
22	57 - 59	12/6/19	0900	TP
23	57 - 59	12/7/19	1100	TP
24	57 - 59	12/8/19	1200	
25	57 - 59	12/9/19	1200	
26	57 - 59	12/10/19	1507	RJB
27	57 - 59	12/11/19	0835	MF
28	57 - 59	12/12/19	0808	AT
29				
30				

TOXICOLOGY LABORATORY BENCH SHEET

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-643

Date/Time/Initials	Comments/Activity

TOXICOLOGY LABORATORY CORRECTION BENCH SHEET

Project Number: 70019.TOX

Client: Ottowa River

QC Test Number: TN-19-643

Correction Explanations

(a) Technician Error-Mathematical

(b) Technician Error-Manual Data Recording

(c) Technician Error-Head Count Observation

(d) Technician Error-Overwrite

(e) Technician Error-Missing Data

(f) Technician Error-Lost Organism

(g) Technician Error-Transcription Error

(h) Technician Error-Other:

(i) Meter Malfunction

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ATTACHMENT V

Report Quality Assurance Record
(2 pages)

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REPORT QUALITY ASSURANCE RECORD

Client: Ottawa River Project Number: 70019.TOX

Author: M. Chanov EA Report Number: 9165

REPORT CHECKLIST

QA/QC ITEM	REVIEWER	DATE
1. Samples collected, transported, and received according to study plan requirements.		12/19/19
2. Samples prepared and processed according to study plan requirements.		12/19/19
3. Data collected using calibrated instruments and equipment.		12/19/19
4. Calculations checked: - Hand calculations checked		12/19/19
- Documented and verified statistical procedure used.		12/19/19
5. Data input/statistical analyses complete and correct.	Jess M Redfern	12/20/19
6. Reported results and facts checked against original sources.	Jess M Redfern	12/20/19
7. Data presented in figures and tables correct and in agreement with text.	Jess M Redfern	12/20/19
8. Results reviewed for compliance with study plan requirements.		12/19/19

	AUTHOR	DATE
9. Commentary reviewed and resolved.		12/20/19

10. All study plan and quality assurance/control requirements have been met and the report is approved:

	12/20/19
PROJECT MANAGER	DATE
Jess M Redfern	12/20/19
QUALITY CONTROL OFFICER	DATE
	12/20/19
SENIOR TECHNICAL REVIEWER	DATE

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Appendix G

Replicate *Lumbriculus variegatus* Tissue PCB Congener Concentrations

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Table G-1A. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-01-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-01-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.2 J	1.4 J	1.5 J	1.1 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	**0.099**	**0.19**	**0.18**	**0.21**	**0.14**
PCB-2	µg/kg	0.018	**0.018 J**	**0.03**	**0.03**	**0.031**	**0.022**
PCB-3	µg/kg	0.018	**0.17**	**0.25**	**0.28**	**0.32**	**0.21**
PCB-4	µg/kg	0.037	**2.6**	**3.7**	**3.9**	**4.5**	**2.8**
PCB-5	µg/kg	0.018	0.017 U	**0.072**	**0.071**	**0.079 J**	**0.051**
PCB-6	µg/kg	0.018	**2.1**	**2.7**	**2.8**	**3.4**	**2**
PCB-7	µg/kg	0.018	**0.31**	**0.39**	**0.41**	**0.48**	**0.3**
PCB-8	µg/kg	0.037	**4.2**	**5.4**	**5.5**	**7**	**4.1**
PCB-9	µg/kg	0.018	**0.24**	**0.31**	**0.32**	**0.38**	**0.24**
PCB-10	µg/kg	0.018	**0.093**	**0.11 J**	**0.13**	**0.17**	**0.092**
PCB-11	µg/kg	0.037	**0.064**	**0.086**	**0.084**	**0.092 J**	**0.049 J**
PCB-12	µg/kg	0.037	**0.55**	**0.7**	0.039 U	**0.79**	**0.55**
PCB-13	µg/kg	0.037	**0.55**	**0.7**	0.039 U	**0.79**	**0.55**
PCB-14	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U
PCB-15	µg/kg	0.018	**3.5**	**4.2**	**4.6**	**5.1**	**3.4**
PCB-16	µg/kg	0.018	**2.4**	**2.6**	**3.1**	**3.5**	**2.3**
PCB-17	µg/kg	0.018	**11**	**11**	**12**	**15**	**9.3**
PCB-18	µg/kg	0.037	**8.8**	**9.8**	**11**	**13**	**7.6**
PCB-19	µg/kg	0.018	**1.8**	**2.1**	**2.5**	**2.9**	**1.8**
PCB-20	µg/kg	0.037	**20**	**23**	**24**	**28**	**17**
PCB-21	µg/kg	0.037	**2.6**	**3**	**3.3**	**3.7**	**2.2**
PCB-22	µg/kg	0.018	**4.8**	**5.3**	**5.7**	**6.5**	**4.1**
PCB-23	µg/kg	0.018	0.017 U	**0.019 J**	**0.019 J**	**0.024 J**	**0.011 J**
PCB-24	µg/kg	0.018	**0.14**	**0.18**	**0.21**	**0.24**	**0.16**
PCB-25	µg/kg	0.018	**5**	**5.5**	**6**	**6.9**	**4.2**
PCB-26	µg/kg	0.037	**6.1**	**6.8**	**7.4**	**8.5**	**5.3**
PCB-27	µg/kg	0.018	**1.7**	**1.9**	**2.2**	**2.6**	**1.7**
PCB-28	µg/kg	0.037	**20**	**23**	**24**	**28**	**17**
PCB-29	µg/kg	0.037	**6.1**	**6.8**	**7.4**	**8.5**	**5.3**
PCB-30	µg/kg	0.037	**8.8**	**9.8**	**11**	**13**	**7.6**
PCB-31	µg/kg	0.037	**16**	**18**	**19**	**22**	**14**
PCB-32	µg/kg	0.018	**6.5**	**6.8**	**8**	**9.9**	**5.8**
PCB-33	µg/kg	0.037	**2.6**	**3**	**3.3**	**3.7**	**2.2**
PCB-34	µg/kg	0.018	**0.24**	**0.28**	**0.3**	**0.34**	**0.22**
PCB-35	µg/kg	0.018	0.017 U	**0.046**	**0.041**	**0.043 J**	**0.034**
PCB-36	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U
PCB-37	µg/kg	0.018	**1.7**	**1.8**	**1.9**	**2.2**	**1.4**
PCB-38	µg/kg	0.018	0.017 U	**0.024**	**0.019 J**	**0.029 J**	**0.015**
PCB-39	µg/kg	0.018	0.017 U	**0.088**	**0.089**	**0.092**	**0.055 J**
PCB-40	µg/kg	0.062	**10**	**10**	**11**	**13**	**8.9**
PCB-41	µg/kg	0.062	**10**	**10**	**11**	**13**	**8.9**
PCB-42	µg/kg	0.049	**5.9**	**6**	**6.4**	**7.5**	**5.1**
PCB-43	µg/kg	0.051	**1.1**	**1.1**	**1.2**	**1.1 J**	**0.93**
PCB-44	µg/kg	0.059	**20**	**19**	**21**	**25**	**17**
PCB-45	µg/kg	0.055	**4.2**	**4.6**	**5**	**5.7**	**3.9**
PCB-46	µg/kg	0.061	**1.1**	**1.2**	**1.3**	**1.5**	**1**
PCB-47	µg/kg	0.059	**20**	**19**	**21**	**25**	**17**
PCB-48	µg/kg	0.049	**2.2**	**2.3**	**2.4**	**2.9**	**2**
PCB-49	µg/kg	0.047	**15**	**14**	**16**	**19**	**13**
PCB-50	µg/kg	0.052	**3.4**	**3.6**	**3.9**	**4.5**	**3**
PCB-51	µg/kg	0.055	**4.2**	**4.6**	**5**	**5.7**	**3.9**
PCB-52	µg/kg	0.048	**20**	**20**	**22**	**27**	**18**
PCB-53	µg/kg	0.052	**3.4**	**3.6**	**3.9**	**4.5**	**3**
PCB-54	µg/kg	0.018	**0.06**	**0.075**	**0.085**	**0.085**	**0.053 J**
PCB-55	µg/kg	0.036	**0.13**	**0.18**	**0.16**	**0.18 J**	**0.13**
PCB-56	µg/kg	0.037	**3.4**	**3.2**	**3.5**	**4.2**	**2.9**
PCB-57	µg/kg	0.037	**0.21**	**0.22**	**0.2**	**0.27**	**0.18**
PCB-58	µg/kg	0.037	**0.085**	**0.095**	**0.077**	**0.082 J**	**0.069**
PCB-59	µg/kg	0.056	**2.1**	**2.1**	**2.3**	**2.7**	**1.9**
PCB-60	µg/kg	0.037	**1.4**	**1.3**	**1.4**	**1.7**	**1.2**
PCB-61	µg/kg	0.073	**13**	**12**	**13**	**16**	**11**

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Table G-1A. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-01-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-01-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.2 J	1.4 J	1.5 J	1.1 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	**2.1**	**2.1**	**2.3**	**2.7**	**1.9**
PCB-63	µg/kg	0.034	**1**	**0.98**	**1**	**1.2**	**0.89**
PCB-64	µg/kg	0.034	**8.1**	**8**	**8.8**	**10**	**7**
PCB-65	µg/kg	0.059	**20**	**19**	**21**	**25**	**17**
PCB-66	µg/kg	0.035	**7.8**	**7.4**	**8**	**9.6**	**6.5**
PCB-67	µg/kg	0.033	**0.37**	**0.38**	**0.35**	**0.42 J**	**0.32**
PCB-68	µg/kg	0.033	**0.17**	**0.18**	**0.16**	**0.19 J**	**0.15**
PCB-69	µg/kg	0.047	**15**	**14**	**16**	**19**	**13**
PCB-70	µg/kg	0.073	**13**	**12**	**13**	**16**	**11**
PCB-71	µg/kg	0.062	**10**	**10**	**11**	**13**	**8.9**
PCB-72	µg/kg	0.036	**0.26**	**0.28**	**0.26**	**0.32**	**0.21**
PCB-73	µg/kg	0.051	**1.1**	**1.1**	**1.2**	**1.1 J**	**0.93**
PCB-74	µg/kg	0.073	**13**	**12**	**13**	**16**	**11**
PCB-75	µg/kg	0.056	**2.1**	**2.1**	**2.3**	**2.7**	**1.9**
PCB-76	µg/kg	0.073	**13**	**12**	**13**	**16**	**11**
PCB-77	µg/kg	0.036	**0.39**	**0.44**	**0.45**	**0.47**	**0.38**
PCB-78	µg/kg	0.037	0.049 U	0.016 U	0.047 U	0.058 U	0.0099 U
PCB-79	µg/kg	0.033	0.042 U	**0.069**	**0.086**	**0.088**	**0.055**
PCB-80	µg/kg	0.032	0.042 U	0.016 U	0.04 U	0.05 U	0.0099 U
PCB-81	µg/kg	0.034	0.044 U	0.016 U	0.042 U	0.054 U	0.0099 U
PCB-82	µg/kg	0.018	**1.1**	**1.1**	**1.1**	**1.4**	**0.92**
PCB-83	µg/kg	0.037	**5.7**	**5.3**	**5.8**	**7**	**4.7**
PCB-84	µg/kg	0.018	**2.6**	**2.5**	**2.9**	**3.3**	**2.2**
PCB-85	µg/kg	0.055	**2.1**	**1.9**	**2**	**2.6**	**1.7**
PCB-86	µg/kg	0.110	**5**	**4.7**	**5.2**	**6.2**	**4.1**
PCB-87	µg/kg	0.110	**5**	**4.7**	**5.2**	**6.2**	**4.1**
PCB-88	µg/kg	0.037	**2.5**	**2.4**	**2.5**	**3.1**	**2.1**
PCB-89	µg/kg	0.018	**0.27**	**0.25**	**0.27**	**0.33**	**0.23**
PCB-90	µg/kg	0.055	**7.5**	**6.8**	**7.5**	**9.5**	**5.9**
PCB-91	µg/kg	0.037	**2.5**	**2.4**	**2.5**	**3.1**	**2.1**
PCB-92	µg/kg	0.018	**2.1**	**1.9**	**2.1**	**2.6**	**1.7**
PCB-93	µg/kg	0.037	**0.28**	**0.27**	**0.3**	**0.35**	**0.23**
PCB-94	µg/kg	0.018	**0.15**	**0.15**	**0.13 J**	**0.18**	**0.13**
PCB-95	µg/kg	0.018	**7.9**	**7.5**	**8.3**	**10**	**6.5**
PCB-96	µg/kg	0.018	**0.2**	**0.21**	**0.21**	**0.25**	**0.17**
PCB-97	µg/kg	0.110	**5**	**4.7**	**5.2**	**6.2**	**4.1**
PCB-98	µg/kg	0.037	**0.71**	**0.7**	**0.76**	**0.93**	**0.63**
PCB-99	µg/kg	0.037	**5.7**	**5.3**	**5.8**	**7**	**4.7**
PCB-100	µg/kg	0.037	**0.28**	**0.27**	**0.3**	**0.35**	**0.23**
PCB-101	µg/kg	0.055	**7.5**	**6.8**	**7.5**	**9.5**	**5.9**
PCB-102	µg/kg	0.037	**0.71**	**0.7**	**0.76**	**0.93**	**0.63**
PCB-103	µg/kg	0.018	**0.13 J**	**0.13**	**0.14 J**	**0.18**	**0.12**
PCB-104	µg/kg	0.018	0.017 U	0.016 U	**0.0061 J**	0.027 U	0.0099 U
PCB-105	µg/kg	0.018	**1.6**	**1.6**	**1.6**	**2.1**	**1.4**
PCB-106	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U
PCB-107	µg/kg	0.018	**0.58**	**0.52**	**0.52**	**0.66**	**0.46**
PCB-108	µg/kg	0.037	**0.18**	**0.17**	**0.17**	**0.22**	**0.15**
PCB-109	µg/kg	0.110	**5**	**4.7**	**5.2**	**6.2**	**4.1**
PCB-110	µg/kg	0.037	**9.7**	**8.9**	**9.9**	**12**	**7.8**
PCB-111	µg/kg	0.018	0.017 U	0.016 U	**0.016 J**	0.027 U	0.0099 U
PCB-112	µg/kg	0.018	**0.11**	**0.017**	0.02 UJ	**0.14**	**0.053**
PCB-113	µg/kg	0.055	**7.5**	**6.8**	**7.5**	**9.5**	**5.9**
PCB-114	µg/kg	0.018	**0.16**	**0.15**	**0.14**	**0.19**	**0.13**
PCB-115	µg/kg	0.037	**9.7**	**8.9**	**9.9**	**12**	**7.8**
PCB-116	µg/kg	0.055	**2.1**	**1.9**	**2**	**2.6**	**1.7**
PCB-117	µg/kg	0.055	**2.1**	**1.9**	**2**	**2.6**	**1.7**
PCB-118	µg/kg	0.018	**4.5**	**3.9**	**4.2**	**5.3**	**3.6**
PCB-119	µg/kg	0.110	**5**	**4.7**	**5.2**	**6.2**	**4.1**
PCB-120	µg/kg	0.018	0.017 U	**0.018 J**	**0.025**	**0.034 J**	**0.026**
PCB-121	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U

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Table G-1A. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-01-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-01-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.2 J	1.4 J	1.5 J	1.1 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.09**	**0.097**	**0.094**	**0.11**	**0.077**
PCB-123	µg/kg	0.018	**0.12**	**0.12 J**	**0.097 J**	**0.17**	**0.11**
PCB-124	µg/kg	0.037	**0.18**	**0.17**	**0.17**	**0.22**	**0.15**
PCB-125	µg/kg	0.110	**5**	**4.7**	**5.2**	**6.2**	**4.1**
PCB-126	µg/kg	0.018	0.017 UJ	**0.02 J**	0.02 U	0.027 U	**0.012**
PCB-127	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U
PCB-128	µg/kg	0.037	**0.55**	**0.5**	**0.48**	**0.62**	**0.47**
PCB-129	µg/kg	0.073	**4.6**	**4**	**4**	**5.2**	**3.9**
PCB-130	µg/kg	0.018	**0.25**	**0.25**	**0.23**	**0.29**	**0.22**
PCB-131	µg/kg	0.018	0.017 U	**0.052**	**0.044 J**	**0.051**	**0.037**
PCB-132	µg/kg	0.018	**1.3**	**1.2**	**1.2**	**1.4**	**1.1**
PCB-133	µg/kg	0.018	**0.086**	**0.078**	**0.078**	**0.095**	**0.068**
PCB-134	µg/kg	0.037	**0.23**	**0.24**	**0.2 J**	**0.24**	**0.18**
PCB-135	µg/kg	0.037	**2**	**1.8**	**1.8**	**2.3**	**1.6**
PCB-136	µg/kg	0.018	**0.48**	**0.42**	**0.46**	**0.6**	**0.39**
PCB-137	µg/kg	0.018	**0.11**	**0.11**	**0.11**	**0.13**	**0.09 J**
PCB-138	µg/kg	0.073	**4.6**	**4**	**4**	**5.2**	**3.9**
PCB-139	µg/kg	0.037	**0.075**	**0.075**	**0.07**	**0.082**	**0.063**
PCB-140	µg/kg	0.037	**0.075**	**0.075**	**0.07**	**0.082**	**0.063**
PCB-141	µg/kg	0.018	**0.45**	**0.44**	**0.44**	**0.51**	**0.42**
PCB-142	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U
PCB-143	µg/kg	0.037	**0.23**	**0.24**	**0.2 J**	**0.24**	**0.18**
PCB-144	µg/kg	0.018	**0.14**	**0.14**	**0.14**	**0.18**	**0.12**
PCB-145	µg/kg	0.018	0.017 U	**0.0028 J**	**0.0021 J**	**0.0051 J**	0.0099 U
PCB-146	µg/kg	0.018	**0.81**	**0.7**	**0.69**	**0.85**	**0.68**
PCB-147	µg/kg	0.037	**5.3**	**4.6**	**4.5**	**5.9**	**4.4**
PCB-148	µg/kg	0.018	**0.0077 J**	**0.0071 J**	**0.0081 J**	**0.0066 J**	**0.0055 J**
PCB-149	µg/kg	0.037	**5.3**	**4.6**	**4.5**	**5.9**	**4.4**
PCB-150	µg/kg	0.018	**0.0077 J**	**0.0061 J**	**0.0057 J**	**0.0092 J**	**0.0051 J**
PCB-151	µg/kg	0.037	**2**	**1.8**	**1.8**	**2.3**	**1.6**
PCB-152	µg/kg	0.018	**0.0055 J**	**0.0059 J**	**0.0044 J**	**0.0047 J**	**0.0036 J**
PCB-153	µg/kg	0.037	**3.7**	**3.2**	**3.1**	**4.1**	**3.1**
PCB-154	µg/kg	0.018	**0.052**	**0.062**	**0.055**	**0.077**	**0.047**
PCB-155	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U
PCB-156	µg/kg	0.037	**0.31**	**0.28**	**0.28**	**0.35**	**0.26**
PCB-157	µg/kg	0.037	**0.31**	**0.28**	**0.28**	**0.35**	**0.26**
PCB-158	µg/kg	0.018	**0.32**	**0.29**	**0.29**	**0.38**	**0.28**
PCB-159	µg/kg	0.018	0.017 U	**0.029**	**0.024**	**0.032**	**0.018**
PCB-160	µg/kg	0.073	**4.6**	**4**	**4**	**5.2**	**3.9**
PCB-161	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U
PCB-162	µg/kg	0.018	0.017 U	0.016 UJ	0.02 U	0.027 U	0.0099 UJ
PCB-163	µg/kg	0.073	**4.6**	**4**	**4**	**5.2**	**3.9**
PCB-164	µg/kg	0.018	**0.3**	**0.27**	**0.26**	**0.35**	**0.27**
PCB-165	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U
PCB-166	µg/kg	0.037	**0.55**	**0.5**	**0.48**	**0.62**	**0.47**
PCB-167	µg/kg	0.018	**0.11**	**0.11**	**0.1**	**0.12 J**	**0.099**
PCB-168	µg/kg	0.037	**3.7**	**3.2**	**3.1**	**4.1**	**3.1**
PCB-169	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U
PCB-170	µg/kg	0.018	**0.6**	**0.57**	**0.59**	**0.75**	**0.5**
PCB-171	µg/kg	0.037	**0.21**	**0.19**	**0.16**	**0.23**	**0.17**
PCB-172	µg/kg	0.018	**0.11**	**0.11**	**0.11**	**0.14**	**0.1**
PCB-173	µg/kg	0.037	**0.21**	**0.19**	**0.16**	**0.23**	**0.17**
PCB-174	µg/kg	0.018	**0.69**	**0.65**	**0.64**	**0.81**	**0.61**
PCB-175	µg/kg	0.018	**0.031**	**0.034**	**0.027**	**0.032 J**	**0.024**
PCB-176	µg/kg	0.018	**0.12**	**0.11**	**0.11**	**0.12**	**0.095**
PCB-177	µg/kg	0.018	**0.48**	**0.45**	**0.44**	**0.53**	**0.41**
PCB-178	µg/kg	0.018	**0.2**	**0.18**	**0.16**	**0.22**	**0.16**
PCB-179	µg/kg	0.018	**0.43**	**0.39**	**0.38**	**0.49**	**0.38**
PCB-180	µg/kg	0.037	**0.59**	**0.62**	**0.6**	**0.76**	**0.55**
PCB-181	µg/kg	0.018	0.017 U	0.016 UJ	0.02 U	0.027 U	0.0099 UJ

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Table G-1A. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-01-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-01-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.2 J	1.4 J	1.5 J	1.1 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	0.017 U	**0.0082 J**	**0.02**	**0.011 J**	**0.012 J**
PCB-183	µg/kg	0.037	**0.57**	**0.5**	**0.48**	**0.65**	**0.5**
PCB-184	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U
PCB-185	µg/kg	0.037	**0.57**	**0.5**	**0.48**	**0.65**	**0.5**
PCB-186	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U
PCB-187	µg/kg	0.018	**2.9**	**2.4**	**2.4**	**3.1**	**2.4**
PCB-188	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U
PCB-189	µg/kg	0.018	**0.021**	**0.021**	0.02 UJ	0.027 U	**0.015**
PCB-190	µg/kg	0.018	**0.094**	**0.1**	**0.1**	**0.14**	**0.067**
PCB-191	µg/kg	0.018	**0.019**	**0.019 J**	0.02 UJ	0.027 U	**0.016**
PCB-192	µg/kg	0.018	0.017 U	0.016 U	0.02 U	0.027 U	0.0099 U
PCB-193	µg/kg	0.037	**0.59**	**0.62**	**0.6**	**0.76**	**0.55**
PCB-194	µg/kg	0.018	**0.16**	**0.19**	**0.16**	**0.18**	**0.15**
PCB-195	µg/kg	0.018	**0.099**	**0.11**	**0.086**	**0.089**	**0.095**
PCB-196	µg/kg	0.018	**0.051**	**0.066**	**0.059**	**0.06**	**0.04**
PCB-197	µg/kg	0.018	0.017 U	0.016 U	0.02 UJ	0.027 U	0.0099 UJ
PCB-198	µg/kg	0.037	**0.32**	**0.3**	**0.33**	**0.37**	**0.23**
PCB-199	µg/kg	0.037	**0.32**	**0.3**	**0.33**	**0.37**	**0.23**
PCB-200	µg/kg	0.018	**0.029 J**	**0.025 J**	**0.031**	**0.035**	**0.026**
PCB-201	µg/kg	0.018	**0.029 J**	**0.036**	**0.03**	**0.036 J**	**0.029**
PCB-202	µg/kg	0.018	**0.065**	**0.063**	**0.062**	**0.063**	**0.058**
PCB-203	µg/kg	0.018	**0.15**	**0.15 J**	**0.14 J**	**0.2**	**0.11**
PCB-204	µg/kg	0.018	0.017 U	0.016 U	0.02 UJ	0.027 U	0.0099 U
PCB-205	µg/kg	0.018	0.017 UJ	**0.018**	0.02 U	0.027 U	**0.012**
PCB-206	µg/kg	0.018	**0.078**	**0.072 J**	**0.071**	**0.093**	**0.061**
PCB-207	µg/kg	0.018	**0.0085 J**	**0.012 J**	**0.0078 J**	**0.017 J**	**0.0098 J**
PCB-208	µg/kg	0.018	**0.028**	**0.028 J**	**0.024 J**	**0.033**	**0.021 J**
PCB 209	µg/kg	0.018	**0.039**	**0.037**	**0.074**	**0.1**	**0.032**
TOTAL PCB (ND=0)	µg/kg	---	**564**	**560**	**604**	**725**	**483**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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Table G-1B. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-02-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-02-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.2 J	1.4 J	1.4 J	1.3 J	1.2 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	**0.11**	**0.074**	**0.14**	**0.097**	**0.1 J**
PCB-2	µg/kg	0.018	**0.017 J**	**0.013**	**0.015 J**	**0.015**	**0.017**
PCB-3	µg/kg	0.018	**0.083 J**	**0.068**	**0.11**	**0.083**	**0.09**
PCB-4	µg/kg	0.037	**2.7**	**2.1**	**3.3**	**2.6**	**2.7**
PCB-5	µg/kg	0.018	**0.027 J**	**0.029 J**	**0.047**	**0.03**	**0.024 J**
PCB-6	µg/kg	0.018	**1.3**	**1.1**	**1.5**	**1.2**	**1.3**
PCB-7	µg/kg	0.018	**0.17**	**0.15**	**0.2**	**0.16**	**0.17**
PCB-8	µg/kg	0.037	**2.8**	**2.5**	**3.4**	**2.6**	**2.8**
PCB-9	µg/kg	0.018	**0.15**	**0.13**	**0.17**	**0.14**	**0.14**
PCB-10	µg/kg	0.018	**0.11**	**0.079**	**0.12**	**0.094**	**0.11**
PCB-11	µg/kg	0.037	**0.093**	**0.087**	**0.12**	**0.1**	**0.14**
PCB-12	µg/kg	0.037	**0.66**	**0.58**	**0.73**	**0.61**	**0.62**
PCB-13	µg/kg	0.037	**0.66**	**0.58**	**0.73**	**0.61**	**0.62**
PCB-14	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-15	µg/kg	0.018	**3.2**	**2.9**	**3.5**	**2.9**	**3.3**
PCB-16	µg/kg	0.018	**1.6**	**1.7**	**1.9**	**1.6**	**1.8**
PCB-17	µg/kg	0.018	**7.8**	**8.5**	**8.3**	**7.5**	**7.8**
PCB-18	µg/kg	0.037	**5.8**	**6.2**	**6.2**	**6.2**	**6**
PCB-19	µg/kg	0.018	**1.8**	**1.6**	**2**	**1.7**	**1.8**
PCB-20	µg/kg	0.037	**13**	**15**	**11**	**13**	**13**
PCB-21	µg/kg	0.037	**1.4**	**1.6**	**1.5**	**1.3**	**1.7**
PCB-22	µg/kg	0.018	**3.3**	**3.7**	**3.5**	**3.2**	**3.5**
PCB-23	µg/kg	0.018	**0.007 J**	**0.011 J**	**0.0093 J**	0.012 U	**0.0092 J**
PCB-24	µg/kg	0.018	**0.095 J**	**0.11**	**0.11**	**0.091 J**	**0.11**
PCB-25	µg/kg	0.018	**3.6**	**4**	**3.6**	**3.4**	**3.5**
PCB-26	µg/kg	0.037	**4.8**	**5.4**	**4.8**	**4.5**	**4.7**
PCB-27	µg/kg	0.018	**1.4**	**1.5**	**1.5**	**1.4**	**1.4**
PCB-28	µg/kg	0.037	**13**	**15**	**11**	**13**	**13**
PCB-29	µg/kg	0.037	**4.8**	**5.4**	**4.8**	**4.5**	**4.7**
PCB-30	µg/kg	0.037	**5.8**	**6.2**	**6.2**	**6.2**	**6**
PCB-31	µg/kg	0.037	**12**	**13**	**12**	**11**	**12**
PCB-32	µg/kg	0.018	**5.2**	**5.7**	**5.7**	**5.2**	**5.5**
PCB-33	µg/kg	0.037	**1.4**	**1.6**	**1.5**	**1.3**	**1.7**
PCB-34	µg/kg	0.018	**0.16**	**0.19**	**0.17**	**0.17**	**0.16**
PCB-35	µg/kg	0.018	**0.048**	**0.05 J**	**0.046**	0.012 U	0.013 U
PCB-36	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-37	µg/kg	0.018	**1**	**1.2**	**1.1**	**1**	**1.2**
PCB-38	µg/kg	0.018	**0.013**	**0.018 J**	**0.012 J**	0.012 U	0.013 U
PCB-39	µg/kg	0.018	**0.053**	**0.072**	**0.055 J**	0.012 U	0.013 U
PCB-40	µg/kg	0.062	**6.7**	**8.9**	**7.4**	**6.7**	**7.3**
PCB-41	µg/kg	0.062	**6.7**	**8.9**	**7.4**	**6.7**	**7.3**
PCB-42	µg/kg	0.049	**3.9**	**5.2**	**4.2**	**4**	**4.1**
PCB-43	µg/kg	0.051	**0.66**	**0.85**	**0.73**	**0.71**	**0.68**
PCB-44	µg/kg	0.059	**13**	**17**	**14**	**13**	**14**
PCB-45	µg/kg	0.055	**3.1**	**4**	**3.5**	**3.1**	**3.3**
PCB-46	µg/kg	0.061	**0.85**	**0.98**	**0.97**	**0.79**	**0.87**
PCB-47	µg/kg	0.059	**13**	**17**	**14**	**13**	**14**
PCB-48	µg/kg	0.049	**1.4**	**1.9**	**1.6**	**1.4**	**1.6**
PCB-49	µg/kg	0.047	**9.3**	**13**	**10**	**9.5**	**9.8**
PCB-50	µg/kg	0.052	**2.4**	**2.9**	**2.6**	**2.3**	**2.5**
PCB-51	µg/kg	0.055	**3.1**	**4**	**3.5**	**3.1**	**3.3**
PCB-52	µg/kg	0.048	**13**	**18**	**14**	**13**	**14**
PCB-53	µg/kg	0.052	**2.4**	**2.9**	**2.6**	**2.3**	**2.5**
PCB-54	µg/kg	0.018	**0.061**	**0.064**	**0.063**	**0.052**	**0.054**
PCB-55	µg/kg	0.036	**0.11**	**0.13 J**	**0.094 J**	**0.088**	**0.1**
PCB-56	µg/kg	0.037	**2.1**	**2.9**	**2.2**	**2**	**2.2**
PCB-57	µg/kg	0.037	**0.14**	**0.2**	**0.14**	**0.13**	**0.14**
PCB-58	µg/kg	0.037	**0.044 J**	**0.056 J**	**0.054 J**	**0.053**	**0.064**
PCB-59	µg/kg	0.056	**1.4**	**1.8**	**1.5**	**1.4**	**1.5**
PCB-60	µg/kg	0.037	**0.84**	**1.2**	**0.9**	**0.86**	**0.91**
PCB-61	µg/kg	0.073	**8**	**11**	**8.5**	**8.2**	**8.7**

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Table G-1B. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-02-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-02-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.2 J	1.4 J	1.4 J	1.3 J	1.2 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	1.4	1.8	1.5	1.4	1.5
PCB-63	µg/kg	0.034	0.62	0.91	0.68	0.64	0.67
PCB-64	µg/kg	0.034	5.2	6.9	5.6	5.2	5.5
PCB-65	µg/kg	0.059	13	17	14	13	14
PCB-66	µg/kg	0.035	4.6	6.6	4.9	4.7	5
PCB-67	µg/kg	0.033	0.25	0.34	0.26	0.24	0.26
PCB-68	µg/kg	0.033	0.11	0.16	0.12	0.11	0.12
PCB-69	µg/kg	0.047	9.3	13	10	9.5	9.8
PCB-70	µg/kg	0.073	8	11	8.5	8.2	8.7
PCB-71	µg/kg	0.062	6.7	8.9	7.4	6.7	7.3
PCB-72	µg/kg	0.036	0.17	0.24	0.18	0.18	0.18
PCB-73	µg/kg	0.051	0.66	0.85	0.73	0.71	0.68
PCB-74	µg/kg	0.073	8	11	8.5	8.2	8.7
PCB-75	µg/kg	0.056	1.4	1.8	1.5	1.4	1.5
PCB-76	µg/kg	0.073	8	11	8.5	8.2	8.7
PCB-77	µg/kg	0.036	0.31	0.43	0.32	0.29	0.31
PCB-78	µg/kg	0.037	0.012 U	0.031 U	0.018 U	0.018 U	0.018 U
PCB-79	µg/kg	0.033	0.041	0.058	0.041 J	0.015 U	0.015 U
PCB-80	µg/kg	0.032	0.012 U	0.027 U	0.015 U	0.015 U	0.015 U
PCB-81	µg/kg	0.034	0.012 U	0.029 U	0.016 U	0.016 U	0.016 U
PCB-82	µg/kg	0.018	0.65	0.94	0.65	0.64	0.67
PCB-83	µg/kg	0.037	3.3	5.2	3.3	3.3	3.5
PCB-84	µg/kg	0.018	1.7	2.4	1.8	1.6	1.8
PCB-85	µg/kg	0.055	1.2	1.8	1.2	1.2	1.3
PCB-86	µg/kg	0.110	3	4.4	3	2.9	3.1
PCB-87	µg/kg	0.110	3	4.4	3	2.9	3.1
PCB-88	µg/kg	0.037	1.6	2.3	1.6	1.5	1.6
PCB-89	µg/kg	0.018	0.17	0.22	0.16	0.16	0.16
PCB-90	µg/kg	0.055	4.3	6.3	4.2	4.2	4.6
PCB-91	µg/kg	0.037	1.6	2.3	1.6	1.5	1.6
PCB-92	µg/kg	0.018	1.2	1.9	1.2	1.2	1.3
PCB-93	µg/kg	0.037	0.17	0.28	0.19	0.18	0.19
PCB-94	µg/kg	0.018	0.09 J	0.15	0.1	0.1	0.11
PCB-95	µg/kg	0.018	4.8	6.8	4.8	4.7	5.1
PCB-96	µg/kg	0.018	0.13	0.16	0.14	0.13	0.13
PCB-97	µg/kg	0.110	3	4.4	3	2.9	3.1
PCB-98	µg/kg	0.037	0.44	0.67	0.45	0.45	0.47
PCB-99	µg/kg	0.037	3.3	5.2	3.3	3.3	3.5
PCB-100	µg/kg	0.037	0.17	0.28	0.19	0.18	0.19
PCB-101	µg/kg	0.055	4.3	6.3	4.2	4.2	4.6
PCB-102	µg/kg	0.037	0.44	0.67	0.45	0.45	0.47
PCB-103	µg/kg	0.018	0.092	0.13	0.09	0.086	0.093
PCB-104	µg/kg	0.018	0.012 U	0.0039 J	0.0023 J	0.012 U	0.013 U
PCB-105	µg/kg	0.018	0.99	1.5	1	0.99	1.1
PCB-106	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-107	µg/kg	0.018	0.3 J	0.52	0.32	0.33	0.34
PCB-108	µg/kg	0.037	0.11	0.17	0.1	0.1 J	0.11
PCB-109	µg/kg	0.110	3	4.4	3	2.9	3.1
PCB-110	µg/kg	0.037	5.8	8.5	5.7	5.7	6
PCB-111	µg/kg	0.018	0.011 J	0.014	0.007 J	0.012 U	0.013 U
PCB-112	µg/kg	0.018	0.046	0.011 U	0.01 UJ	0.061	0.052 J
PCB-113	µg/kg	0.055	4.3	6.3	4.2	4.2	4.6
PCB-114	µg/kg	0.018	0.087	0.14	0.093	0.084 J	0.094
PCB-115	µg/kg	0.037	5.8	8.5	5.7	5.7	6
PCB-116	µg/kg	0.055	1.2	1.8	1.2	1.2	1.3
PCB-117	µg/kg	0.055	1.2	1.8	1.2	1.2	1.3
PCB-118	µg/kg	0.018	2.6	4	2.6	2.6	2.7
PCB-119	µg/kg	0.110	3	4.4	3	2.9	3.1
PCB-120	µg/kg	0.018	0.021	0.022	0.014	0.012 U	0.013 U
PCB-121	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U

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Table G-1B. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-02-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-02-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.2 J	1.4 J	1.4 J	1.3 J	1.2 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.057**	**0.082**	**0.059**	**0.053 J**	**0.063**
PCB-123	µg/kg	0.018	**0.059 J**	**0.098**	**0.068**	**0.059**	**0.08**
PCB-124	µg/kg	0.037	**0.11**	**0.17**	**0.1**	**0.1 J**	**0.11**
PCB-125	µg/kg	0.110	**3**	**4.4**	**3**	**2.9**	**3.1**
PCB-126	µg/kg	0.018	0.012 UJ	**0.014 J**	0.01 U	0.012 U	0.013 UJ
PCB-127	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-128	µg/kg	0.037	**0.3**	**0.52**	**0.32**	**0.32**	**0.35**
PCB-129	µg/kg	0.073	**2.6**	**4.4**	**2.7**	**2.7**	**2.9**
PCB-130	µg/kg	0.018	**0.15**	**0.26**	**0.16**	**0.16**	**0.18**
PCB-131	µg/kg	0.018	**0.032**	**0.041 J**	**0.026 J**	**0.033**	0.013 U
PCB-132	µg/kg	0.018	**0.77**	**1.2**	**0.8**	**0.78**	**0.87**
PCB-133	µg/kg	0.018	**0.044**	**0.078**	**0.048**	**0.048**	**0.054**
PCB-134	µg/kg	0.037	**0.14**	**0.19**	**0.13**	**0.15**	**0.16**
PCB-135	µg/kg	0.037	**1.1**	**1.8**	**1.1**	**1.1**	**1.2**
PCB-136	µg/kg	0.018	**0.29**	**0.45**	**0.31**	**0.29**	**0.32**
PCB-137	µg/kg	0.018	**0.048**	**0.07**	**0.037 J**	**0.043**	**0.048**
PCB-138	µg/kg	0.073	**2.6**	**4.4**	**2.7**	**2.7**	**2.9**
PCB-139	µg/kg	0.037	**0.043**	**0.075**	**0.042**	**0.045**	**0.054**
PCB-140	µg/kg	0.037	**0.043**	**0.075**	**0.042**	**0.045**	**0.054**
PCB-141	µg/kg	0.018	**0.17**	**0.24**	**0.15**	**0.18**	**0.17**
PCB-142	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-143	µg/kg	0.037	**0.14**	**0.19**	**0.13**	**0.15**	**0.16**
PCB-144	µg/kg	0.018	**0.089**	**0.12**	**0.083**	**0.084**	**0.092**
PCB-145	µg/kg	0.018	**0.0025 J**	**0.0031 J**	**0.0016 J**	**0.002 J**	0.013 U
PCB-146	µg/kg	0.018	**0.44**	**0.75**	**0.44**	**0.47**	**0.48**
PCB-147	µg/kg	0.037	**2.9**	**5**	**3**	**3.2**	**3.3**
PCB-148	µg/kg	0.018	**0.0032 J**	**0.0073 J**	**0.0039 J**	**0.0038 J**	**0.0029 J**
PCB-149	µg/kg	0.037	**2.9**	**5**	**3**	**3.2**	**3.3**
PCB-150	µg/kg	0.018	**0.0063 J**	**0.0079 J**	**0.0033 J**	**0.0026 J**	**0.0048 J**
PCB-151	µg/kg	0.037	**1.1**	**1.8**	**1.1**	**1.1**	**1.2**
PCB-152	µg/kg	0.018	**0.0044 J**	**0.0064 J**	**0.0035 J**	**0.0029 J**	0.013 U
PCB-153	µg/kg	0.037	**2**	**3.4**	**2**	**2.1**	**2.3**
PCB-154	µg/kg	0.018	**0.03 J**	**0.054**	**0.034**	**0.031**	**0.032**
PCB-155	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-156	µg/kg	0.037	**0.17**	**0.28**	**0.17**	**0.17**	**0.19**
PCB-157	µg/kg	0.037	**0.17**	**0.28**	**0.17**	**0.17**	**0.19**
PCB-158	µg/kg	0.018	**0.17**	**0.28**	**0.18**	**0.18**	**0.19**
PCB-159	µg/kg	0.018	**0.014**	**0.025**	**0.014**	0.012 U	0.013 U
PCB-160	µg/kg	0.073	**2.6**	**4.4**	**2.7**	**2.7**	**2.9**
PCB-161	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-162	µg/kg	0.018	0.012 UJ	**0.015**	0.01 UJ	0.012 U	0.013 U
PCB-163	µg/kg	0.073	**2.6**	**4.4**	**2.7**	**2.7**	**2.9**
PCB-164	µg/kg	0.018	**0.17**	**0.3**	**0.17**	**0.18**	**0.19**
PCB-165	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-166	µg/kg	0.037	**0.3**	**0.52**	**0.32**	**0.32**	**0.35**
PCB-167	µg/kg	0.018	**0.058**	**0.11**	**0.061**	**0.067**	**0.069**
PCB-168	µg/kg	0.037	**2**	**3.4**	**2**	**2.1**	**2.3**
PCB-169	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-170	µg/kg	0.018	**0.3**	**0.53**	**0.32**	**0.3**	**0.33**
PCB-171	µg/kg	0.037	**0.12**	**0.19**	**0.12**	**0.12**	**0.13**
PCB-172	µg/kg	0.018	**0.054**	**0.089**	**0.059**	**0.054 J**	**0.058**
PCB-173	µg/kg	0.037	**0.12**	**0.19**	**0.12**	**0.12**	**0.13**
PCB-174	µg/kg	0.018	**0.34**	**0.55**	**0.34**	**0.33**	**0.36**
PCB-175	µg/kg	0.018	**0.019**	**0.028**	**0.017**	**0.015**	**0.017**
PCB-176	µg/kg	0.018	**0.064**	**0.12**	**0.072**	**0.068**	**0.075**
PCB-177	µg/kg	0.018	**0.27**	**0.47**	**0.28**	**0.29**	**0.3**
PCB-178	µg/kg	0.018	**0.11**	**0.19**	**0.12**	**0.11**	**0.12**
PCB-179	µg/kg	0.018	**0.24**	**0.43**	**0.25**	**0.26**	**0.28**
PCB-180	µg/kg	0.037	**0.23**	**0.32**	**0.23**	**0.23**	**0.24**
PCB-181	µg/kg	0.018	0.012 UJ	0.011 UJ	0.01 UJ	0.012 U	0.013 U

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Table G-1B. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-02-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-02-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.2 J	1.4 J	1.4 J	1.3 J	1.2 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	**0.0057 J**	**0.012**	**0.0081 J**	**0.0075 J**	**0.0091 J**
PCB-183	µg/kg	0.037	**0.3**	**0.49**	**0.29**	**0.3**	**0.33**
PCB-184	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-185	µg/kg	0.037	**0.3**	**0.49**	**0.29**	**0.3**	**0.33**
PCB-186	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-187	µg/kg	0.018	**1.4**	**2.5**	**1.4**	**1.5**	**1.6**
PCB-188	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-189	µg/kg	0.018	0.012 U	**0.018**	**0.011**	**0.012**	0.013 UJ
PCB-190	µg/kg	0.018	**0.052 J**	**0.086**	**0.052**	**0.055**	**0.057**
PCB-191	µg/kg	0.018	0.012 UJ	**0.016**	0.01 UJ	0.012 UJ	0.013 UJ
PCB-192	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-193	µg/kg	0.037	**0.23**	**0.32**	**0.23**	**0.23**	**0.24**
PCB-194	µg/kg	0.018	**0.081**	**0.12**	**0.093**	**0.082**	**0.091**
PCB-195	µg/kg	0.018	**0.065**	**0.11**	**0.071**	**0.07**	**0.068**
PCB-196	µg/kg	0.018	**0.027**	**0.041**	**0.027**	**0.028**	**0.025**
PCB-197	µg/kg	0.018	0.012 UJ	0.011 UJ	0.01 UJ	0.012 UJ	0.013 UJ
PCB-198	µg/kg	0.037	**0.17**	**0.28**	**0.16**	**0.18**	**0.17**
PCB-199	µg/kg	0.037	**0.17**	**0.28**	**0.16**	**0.18**	**0.17**
PCB-200	µg/kg	0.018	**0.017 J**	**0.028 J**	**0.015 J**	**0.017 J**	**0.021**
PCB-201	µg/kg	0.018	**0.016 J**	**0.041**	**0.021**	**0.016 J**	**0.027**
PCB-202	µg/kg	0.018	**0.027 J**	**0.067**	**0.032**	**0.041**	**0.043**
PCB-203	µg/kg	0.018	**0.078**	**0.13**	**0.072**	**0.073**	**0.083**
PCB-204	µg/kg	0.018	0.012 U	0.011 U	0.01 U	0.012 U	0.013 U
PCB-205	µg/kg	0.018	0.012 UJ	**0.015 J**	0.01 UJ	0.012 UJ	0.013 UJ
PCB-206	µg/kg	0.018	**0.042**	**0.086**	**0.046**	**0.044**	**0.046 J**
PCB-207	µg/kg	0.018	**0.0076 J**	**0.012**	0.01 U	0.012 U	**0.0087 J**
PCB-208	µg/kg	0.018	**0.015 J**	**0.036**	**0.015**	**0.018 J**	**0.017 J**
PCB 209	µg/kg	0.018	**0.022 J**	**0.032 J**	**0.024**	**0.024**	**0.034 J**
TOTAL PCB (ND=0)	µg/kg	---	**361**	**479**	**375**	**359**	**382**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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Table G-1C. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-03-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-03-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.5 J	0.93 J	1.7 J	1.1 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	**0.12 J**	**0.16**	**0.11**	**0.17**	**0.12**
PCB-2	µg/kg	0.018	**0.022 J**	**0.033**	**0.022**	**0.028 J**	**0.024**
PCB-3	µg/kg	0.018	**0.15**	**0.2**	**0.13**	**0.18 J**	**0.15**
PCB-4	µg/kg	0.037	**3.1**	**3.6**	**2.7**	**4.1**	**2.8**
PCB-5	µg/kg	0.018	**0.04 J**	**0.056**	**0.038**	**0.059**	**0.038 J**
PCB-6	µg/kg	0.018	**1.8**	**2.4**	**1.8**	**2.2**	**1.7**
PCB-7	µg/kg	0.018	**0.24**	**0.29**	**0.23**	**0.3**	**0.22**
PCB-8	µg/kg	0.037	**3.7**	**4.8**	**3.3**	**4.6**	**3.5**
PCB-9	µg/kg	0.018	**0.21**	**0.27**	**0.19**	**0.28**	**0.21**
PCB-10	µg/kg	0.018	**0.1**	**0.12**	**0.1**	**0.14**	**0.1**
PCB-11	µg/kg	0.037	**0.086**	**0.092**	**0.096**	**0.089**	**0.08**
PCB-12	µg/kg	0.037	**0.69**	**0.88**	**0.64**	**0.85**	**0.65**
PCB-13	µg/kg	0.037	**0.69**	**0.88**	**0.64**	**0.85**	**0.65**
PCB-14	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-15	µg/kg	0.018	**3.6**	**4.3**	**3.2**	**4.2**	**3.3**
PCB-16	µg/kg	0.018	**2.4**	**2.8**	**2**	**2.8**	**2.1**
PCB-17	µg/kg	0.018	**9.7**	**12**	**8.9**	**11**	**8.7**
PCB-18	µg/kg	0.037	**8.7**	**9.8**	**7.7**	**9.3**	**7.8**
PCB-19	µg/kg	0.018	**2**	**2.4**	**1.8**	**2.6**	**1.9**
PCB-20	µg/kg	0.037	**19**	**20**	**16**	**16**	**15**
PCB-21	µg/kg	0.037	**2.1**	**2.4**	**1.8**	**2.1**	**1.7**
PCB-22	µg/kg	0.018	**4.5**	**5.1**	**3.7**	**4.6**	**3.7**
PCB-23	µg/kg	0.018	**0.018 J**	**0.016 J**	**0.013 J**	0.01 U	**0.013 J**
PCB-24	µg/kg	0.018	**0.14**	**0.17**	**0.14**	**0.18**	**0.13**
PCB-25	µg/kg	0.018	**4.7**	**5.3**	**4**	**4.8**	**4**
PCB-26	µg/kg	0.037	**6.2**	**7**	**5.4**	**6.4**	**5.3**
PCB-27	µg/kg	0.018	**1.6**	**2**	**1.5**	**2**	**1.5**
PCB-28	µg/kg	0.037	**19**	**20**	**16**	**16**	**15**
PCB-29	µg/kg	0.037	**6.2**	**7**	**5.4**	**6.4**	**5.3**
PCB-30	µg/kg	0.037	**8.7**	**9.8**	**7.7**	**9.3**	**7.8**
PCB-31	µg/kg	0.037	**16**	**18**	**13**	**17**	**13**
PCB-32	µg/kg	0.018	**6.4**	**7.1**	**5.7**	**7.3**	**5.6**
PCB-33	µg/kg	0.037	**2.1**	**2.4**	**1.8**	**2.1**	**1.7**
PCB-34	µg/kg	0.018	**0.23**	**0.26**	**0.19**	**0.23**	**0.19**
PCB-35	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-36	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-37	µg/kg	0.018	**1.5**	**1.8**	**1.2**	**1.5**	**1.3**
PCB-38	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-39	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-40	µg/kg	0.062	**8.9**	**11**	**7.5**	**9.4**	**7.9**
PCB-41	µg/kg	0.062	**8.9**	**11**	**7.5**	**9.4**	**7.9**
PCB-42	µg/kg	0.049	**5.1**	**6.3**	**4.1**	**5.3**	**4.5**
PCB-43	µg/kg	0.051	**0.86**	**1.1**	**0.84**	**0.91**	**0.81**
PCB-44	µg/kg	0.059	**16**	**21**	**14**	**18**	**15**
PCB-45	µg/kg	0.055	**4.1**	**5.1**	**3.4**	**4.6**	**3.6**
PCB-46	µg/kg	0.061	**1.1**	**1.4**	**0.86**	**1.2**	**0.96**
PCB-47	µg/kg	0.059	**16**	**21**	**14**	**18**	**15**
PCB-48	µg/kg	0.049	**1.9**	**2.5**	**1.6**	**2.1**	**1.7**
PCB-49	µg/kg	0.047	**12**	**16**	**11**	**13**	**11**
PCB-50	µg/kg	0.052	**3.2**	**3.8**	**2.6**	**3.5**	**2.8**
PCB-51	µg/kg	0.055	**4.1**	**5.1**	**3.4**	**4.6**	**3.6**
PCB-52	µg/kg	0.048	**17**	**22**	**15**	**19**	**15**
PCB-53	µg/kg	0.052	**3.2**	**3.8**	**2.6**	**3.5**	**2.8**
PCB-54	µg/kg	0.018	**0.068**	**0.082**	**0.056**	**0.078**	**0.055**
PCB-55	µg/kg	0.036	0.02 U	**0.2**	**0.088 J**	**0.1**	**0.093**
PCB-56	µg/kg	0.037	**2.7**	**3.5**	**2.3**	**2.7**	**2.4**
PCB-57	µg/kg	0.037	**0.18**	**0.23**	**0.14**	**0.16**	**0.16**
PCB-58	µg/kg	0.037	**0.065 J**	**0.09**	**0.056**	**0.058**	**0.063**
PCB-59	µg/kg	0.056	**1.8**	**2.3**	**1.5**	**1.9**	**1.6**
PCB-60	µg/kg	0.037	**1.1**	**1.4**	**0.93**	**1.1**	**0.96**
PCB-61	µg/kg	0.073	**11**	**13**	**9.1**	**11**	**9.1**

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Table G-1C. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-03-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-03-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.5 J	0.93 J	1.7 J	1.1 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	1.8	2.3	1.5	1.9	1.6
PCB-63	µg/kg	0.034	0.82	1.1	0.69	0.81	0.7
PCB-64	µg/kg	0.034	7	8.7	5.9	7.1	6.1
PCB-65	µg/kg	0.059	16	21	14	18	15
PCB-66	µg/kg	0.035	6.3	7.9	5.3	6.1	5.4
PCB-67	µg/kg	0.033	0.3	0.42	0.26	0.31	0.27
PCB-68	µg/kg	0.033	0.16	0.2	0.11	0.13	0.13
PCB-69	µg/kg	0.047	12	16	11	13	11
PCB-70	µg/kg	0.073	11	13	9.1	11	9.1
PCB-71	µg/kg	0.062	8.9	11	7.5	9.4	7.9
PCB-72	µg/kg	0.036	0.22	0.27	0.19	0.21	0.18
PCB-73	µg/kg	0.051	0.86	1.1	0.84	0.91	0.81
PCB-74	µg/kg	0.073	11	13	9.1	11	9.1
PCB-75	µg/kg	0.056	1.8	2.3	1.5	1.9	1.6
PCB-76	µg/kg	0.073	11	13	9.1	11	9.1
PCB-77	µg/kg	0.036	0.41	0.52	0.29	0.32	0.32
PCB-78	µg/kg	0.037	0.02 U	0.011 U	0.036 U	0.042 U	0.019 U
PCB-79	µg/kg	0.033	0.02 U	0.011 U	0.031 U	0.036 U	0.017 U
PCB-80	µg/kg	0.032	0.02 U	0.011 U	0.03 U	0.036 U	0.016 U
PCB-81	µg/kg	0.034	0.02 U	0.011 U	0.032 U	0.039 U	0.018 U
PCB-82	µg/kg	0.018	0.85	1.1	0.72	0.79	0.74
PCB-83	µg/kg	0.037	4.5	5.4	3.9	3.9	3.7
PCB-84	µg/kg	0.018	2.1	2.7	1.8	2.2	1.8
PCB-85	µg/kg	0.055	1.6	2	1.4	1.4	1.3
PCB-86	µg/kg	0.110	3.9	4.8	3.3	3.6	3.2
PCB-87	µg/kg	0.110	3.9	4.8	3.3	3.6	3.2
PCB-88	µg/kg	0.037	2	2.5	1.7	1.9	1.6
PCB-89	µg/kg	0.018	0.19	0.27	0.18	0.2	0.15 J
PCB-90	µg/kg	0.055	5.8	7	5	5.1	4.8
PCB-91	µg/kg	0.037	2	2.5	1.7	1.9	1.6
PCB-92	µg/kg	0.018	1.6	2.1	1.4	1.5	1.3
PCB-93	µg/kg	0.037	0.088 J	0.29	0.2	0.22	0.19
PCB-94	µg/kg	0.018	0.13	0.15	0.1	0.1 J	0.11
PCB-95	µg/kg	0.018	6.4	7.8	5.6	6	5.3
PCB-96	µg/kg	0.018	0.15 J	0.22	0.14	0.18	0.15
PCB-97	µg/kg	0.110	3.9	4.8	3.3	3.6	3.2
PCB-98	µg/kg	0.037	0.58	0.75	0.51	0.55	0.48
PCB-99	µg/kg	0.037	4.5	5.4	3.9	3.9	3.7
PCB-100	µg/kg	0.037	0.088 J	0.29	0.2	0.22	0.19
PCB-101	µg/kg	0.055	5.8	7	5	5.1	4.8
PCB-102	µg/kg	0.037	0.58	0.75	0.51	0.55	0.48
PCB-103	µg/kg	0.018	0.1 J	0.13	0.097	0.1	0.09
PCB-104	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-105	µg/kg	0.018	1.4	1.7	1.1	1.2	1.1
PCB-106	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-107	µg/kg	0.018	0.42	0.55	0.36	0.39	0.35
PCB-108	µg/kg	0.037	0.14	0.19	0.12	0.13	0.12
PCB-109	µg/kg	0.110	3.9	4.8	3.3	3.6	3.2
PCB-110	µg/kg	0.037	7.8	9.2	6.6	6.7	6.3
PCB-111	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-112	µg/kg	0.018	0.072	0.087	0.042 J	0.068	0.063
PCB-113	µg/kg	0.055	5.8	7	5	5.1	4.8
PCB-114	µg/kg	0.018	0.12	0.15	0.1	0.1	0.1
PCB-115	µg/kg	0.037	7.8	9.2	6.6	6.7	6.3
PCB-116	µg/kg	0.055	1.6	2	1.4	1.4	1.3
PCB-117	µg/kg	0.055	1.6	2	1.4	1.4	1.3
PCB-118	µg/kg	0.018	3.4	4.3	2.8	3	2.8
PCB-119	µg/kg	0.110	3.9	4.8	3.3	3.6	3.2
PCB-120	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-121	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U

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Table G-1C. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-03-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-03-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.5 J	0.93 J	1.7 J	1.1 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.077**	**0.09**	**0.061**	**0.061**	**0.06 J**
PCB-123	µg/kg	0.018	**0.091 J**	**0.11**	**0.086**	**0.081**	**0.071 J**
PCB-124	µg/kg	0.037	**0.14**	**0.19**	**0.12**	**0.13**	**0.12**
PCB-125	µg/kg	0.110	**3.9**	**4.8**	**3.3**	**3.6**	**3.2**
PCB-126	µg/kg	0.018	0.02 U	**0.014**	0.016 U	0.01 UJ	0.016 U
PCB-127	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-128	µg/kg	0.037	**0.41**	**0.54**	**0.34**	**0.36**	**0.34**
PCB-129	µg/kg	0.073	**3.6**	**4.6**	**2.9**	**3.1**	**3**
PCB-130	µg/kg	0.018	**0.21**	**0.25**	**0.16**	**0.17**	**0.16**
PCB-131	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-132	µg/kg	0.018	**0.97**	**1.3**	**0.83**	**0.93**	**0.85**
PCB-133	µg/kg	0.018	**0.065**	**0.08**	**0.05**	**0.053**	**0.05 J**
PCB-134	µg/kg	0.037	**0.16**	**0.23**	**0.14**	**0.16**	**0.15**
PCB-135	µg/kg	0.037	**1.6**	**1.9**	**1.2**	**1.3**	**1.3**
PCB-136	µg/kg	0.018	**0.37**	**0.51**	**0.32**	**0.34**	**0.32**
PCB-137	µg/kg	0.018	**0.091**	**0.11**	**0.076**	**0.068**	**0.071**
PCB-138	µg/kg	0.073	**3.6**	**4.6**	**2.9**	**3.1**	**3**
PCB-139	µg/kg	0.037	**0.062**	**0.072 J**	**0.041**	**0.052**	**0.05**
PCB-140	µg/kg	0.037	**0.062**	**0.072 J**	**0.041**	**0.052**	**0.05**
PCB-141	µg/kg	0.018	**0.37**	**0.43**	**0.3**	**0.29**	**0.3**
PCB-142	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-143	µg/kg	0.037	**0.16**	**0.23**	**0.14**	**0.16**	**0.15**
PCB-144	µg/kg	0.018	**0.11**	**0.14**	**0.092**	**0.085 J**	**0.097**
PCB-145	µg/kg	0.018	0.02 U	0.011 U	0.016 U	**0.0019 J**	0.016 U
PCB-146	µg/kg	0.018	**0.6**	**0.75**	**0.47**	**0.52**	**0.5**
PCB-147	µg/kg	0.037	**4.1**	**5.3**	**3.5**	**3.7**	**3.5**
PCB-148	µg/kg	0.018	0.02 U	**0.0093 J**	**0.0065 J**	**0.0035 J**	**0.0053 J**
PCB-149	µg/kg	0.037	**4.1**	**5.3**	**3.5**	**3.7**	**3.5**
PCB-150	µg/kg	0.018	**0.0049 J**	**0.006 J**	**0.0035 J**	**0.0063 J**	**0.0028 J**
PCB-151	µg/kg	0.037	**1.6**	**1.9**	**1.2**	**1.3**	**1.3**
PCB-152	µg/kg	0.018	**0.0026 J**	**0.0041 J**	**0.0037 J**	**0.0042 J**	**0.0045 J**
PCB-153	µg/kg	0.037	**2.9**	**3.6**	**2.3**	**2.5**	**2.3**
PCB-154	µg/kg	0.018	**0.052**	**0.044 J**	**0.038**	**0.03 J**	**0.038**
PCB-155	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-156	µg/kg	0.037	**0.24**	**0.3**	**0.21**	**0.2**	**0.19**
PCB-157	µg/kg	0.037	**0.24**	**0.3**	**0.21**	**0.2**	**0.19**
PCB-158	µg/kg	0.018	**0.25**	**0.33**	**0.22**	**0.23**	**0.21**
PCB-159	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-160	µg/kg	0.073	**3.6**	**4.6**	**2.9**	**3.1**	**3**
PCB-161	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-162	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-163	µg/kg	0.073	**3.6**	**4.6**	**2.9**	**3.1**	**3**
PCB-164	µg/kg	0.018	**0.25**	**0.32**	**0.19**	**0.21**	**0.19**
PCB-165	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-166	µg/kg	0.037	**0.41**	**0.54**	**0.34**	**0.36**	**0.34**
PCB-167	µg/kg	0.018	**0.082 J**	**0.1 J**	**0.066 J**	**0.068**	**0.073**
PCB-168	µg/kg	0.037	**2.9**	**3.6**	**2.3**	**2.5**	**2.3**
PCB-169	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-170	µg/kg	0.018	**0.47**	**0.56**	**0.37**	**0.38**	**0.37**
PCB-171	µg/kg	0.037	**0.16**	**0.2**	**0.12**	**0.13**	**0.13**
PCB-172	µg/kg	0.018	**0.086 J**	**0.11**	**0.062 J**	**0.072**	**0.073**
PCB-173	µg/kg	0.037	**0.16**	**0.2**	**0.12**	**0.13**	**0.13**
PCB-174	µg/kg	0.018	**0.55**	**0.68**	**0.43**	**0.46**	**0.44**
PCB-175	µg/kg	0.018	**0.022 J**	**0.025**	**0.017 J**	**0.02**	**0.017 J**
PCB-176	µg/kg	0.018	**0.09**	**0.12**	**0.076**	**0.077**	**0.07 J**
PCB-177	µg/kg	0.018	**0.38**	**0.5**	**0.31**	**0.31**	**0.31**
PCB-178	µg/kg	0.018	**0.16**	**0.2**	**0.12**	**0.13**	**0.13**
PCB-179	µg/kg	0.018	**0.34**	**0.46**	**0.28**	**0.31**	**0.28**
PCB-180	µg/kg	0.037	**0.47**	**0.56**	**0.41**	**0.4**	**0.39**
PCB-181	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U

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Table G-1C. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-03-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-03-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.5 J	0.93 J	1.7 J	1.1 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	**0.0066 J**	0.011 U	0.016 U	0.01 U	0.016 U
PCB-183	µg/kg	0.037	**0.47**	**0.58**	**0.36**	**0.36**	**0.36**
PCB-184	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-185	µg/kg	0.037	**0.47**	**0.58**	**0.36**	**0.36**	**0.36**
PCB-186	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-187	µg/kg	0.018	**2.2**	**2.7**	**1.8**	**1.8**	**1.7**
PCB-188	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-189	µg/kg	0.018	0.02 U	**0.022**	0.016 UJ	**0.015**	0.016 U
PCB-190	µg/kg	0.018	**0.081**	**0.091**	**0.06**	**0.063**	**0.048 J**
PCB-191	µg/kg	0.018	0.02 U	**0.019**	0.016 U	**0.014**	0.016 U
PCB-192	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-193	µg/kg	0.037	**0.47**	**0.56**	**0.41**	**0.4**	**0.39**
PCB-194	µg/kg	0.018	**0.14**	**0.15**	**0.11**	**0.1**	**0.1**
PCB-195	µg/kg	0.018	**0.094**	**0.098**	**0.058 J**	**0.067**	**0.074**
PCB-196	µg/kg	0.018	**0.044 J**	**0.051**	**0.034 J**	**0.033**	**0.039**
PCB-197	µg/kg	0.018	0.02 UJ	0.011 UJ	0.016 UJ	0.01 UJ	0.016 UJ
PCB-198	µg/kg	0.037	**0.25**	**0.28**	**0.19**	**0.17**	**0.19**
PCB-199	µg/kg	0.037	**0.25**	**0.28**	**0.19**	**0.17**	**0.19**
PCB-200	µg/kg	0.018	**0.022 J**	**0.034**	**0.02 J**	**0.021 J**	**0.019 J**
PCB-201	µg/kg	0.018	**0.027 J**	**0.032 J**	**0.025**	**0.022**	**0.024**
PCB-202	µg/kg	0.018	**0.048 J**	**0.067**	**0.037 J**	**0.038 J**	**0.04**
PCB-203	µg/kg	0.018	**0.13**	**0.13**	**0.093**	**0.08**	**0.1**
PCB-204	µg/kg	0.018	0.02 U	0.011 U	0.016 U	0.01 U	0.016 U
PCB-205	µg/kg	0.018	0.02 UJ	**0.015**	0.016 U	**0.011**	0.016 U
PCB-206	µg/kg	0.018	**0.065**	**0.07**	**0.055**	**0.04 J**	**0.048 J**
PCB-207	µg/kg	0.018	**0.0091 J**	**0.011**	0.016 U	**0.0065 J**	**0.0082 J**
PCB-208	µg/kg	0.018	**0.025**	**0.027**	**0.015 J**	**0.019**	**0.018**
PCB 209	µg/kg	0.018	**0.032**	**0.039**	**0.021**	**0.028**	**0.032**
TOTAL PCB (ND=0)	µg/kg	---	**481**	**587**	**411**	**484**	**413**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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Table G-1D. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-04-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-04-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	0.89 J	0.81 J	2.9 U	1.2 J	1.4 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	0.3	0.18	0.17	0.13	0.39 J-
PCB-2	µg/kg	0.018	0.039	0.037	0.032	0.028	0.085 J-
PCB-3	µg/kg	0.018	0.21	0.2	0.15	0.15	0.39
PCB-4	µg/kg	0.037	5.1	3.7	3.3	3	6.1
PCB-5	µg/kg	0.018	0.083	0.058	0.056	0.043	0.1
PCB-6	µg/kg	0.018	2.8	2.1	2	1.8	4
PCB-7	µg/kg	0.018	0.38	0.29	0.27	0.24	0.53
PCB-8	µg/kg	0.037	5.7	4.4	4.2	3.7	8.1
PCB-9	µg/kg	0.018	0.35	0.26	0.25	0.22	0.47
PCB-10	µg/kg	0.018	0.19	0.14	0.1 J	0.12	0.18
PCB-11	µg/kg	0.037	0.14	0.098	0.12	0.14	0.18 J
PCB-12	µg/kg	0.037	1.1	0.83	0.87	0.7	1.8
PCB-13	µg/kg	0.037	1.1	0.83	0.87	0.7	1.8
PCB-14	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.0099 U	0.026 U
PCB-15	µg/kg	0.018	4.6	3.8	3.6	3.3	7
PCB-16	µg/kg	0.018	2.8	2.5	2.2	2	4
PCB-17	µg/kg	0.018	12	10	10	8.7	17
PCB-18	µg/kg	0.037	9.5	8.4	8.4	7.2	15
PCB-19	µg/kg	0.018	2.6	2.2	1.8	2	3.3
PCB-20	µg/kg	0.037	19	17	18	14	26
PCB-21	µg/kg	0.037	2.1	1.9	2.1	1.6	2.8
PCB-22	µg/kg	0.018	4.7	4.1	4.2	3.5	6.2
PCB-23	µg/kg	0.018	0.0099 U	0.0098 U	0.016 J	0.013	0.019 J
PCB-24	µg/kg	0.018	0.2	0.16	0.16	0.16	0.26
PCB-25	µg/kg	0.018	4.7	4.1	4.5	3.5	6.9
PCB-26	µg/kg	0.037	6.4	5.5	5.9	4.8	9
PCB-27	µg/kg	0.018	2.1	1.9	1.8	1.6	3
PCB-28	µg/kg	0.037	19	17	18	14	26
PCB-29	µg/kg	0.037	6.4	5.5	5.9	4.8	9
PCB-30	µg/kg	0.037	9.5	8.4	8.4	7.2	15
PCB-31	µg/kg	0.037	16	14	15	12	23
PCB-32	µg/kg	0.018	7.2	6.5	6.6	5.7	11
PCB-33	µg/kg	0.037	2.1	1.9	2.1	1.6	2.8
PCB-34	µg/kg	0.018	0.23	0.21	0.22	0.18	0.31
PCB-35	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.036	0.069 J
PCB-36	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.0099 U	0.026 U
PCB-37	µg/kg	0.018	1.5	1.4	1.4	1.1	2.2
PCB-38	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.019	0.031 J
PCB-39	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.067	0.1
PCB-40	µg/kg	0.062	10	9.7	9.5	8.3	14
PCB-41	µg/kg	0.062	10	9.7	9.5	8.3	14
PCB-42	µg/kg	0.049	5.6	5.6	5.4	4.8	7.6
PCB-43	µg/kg	0.051	0.96	0.97	0.9	0.88	1.3
PCB-44	µg/kg	0.059	19	19	18	16	25
PCB-45	µg/kg	0.055	4.6	4.4	4	1.7 J	6.2
PCB-46	µg/kg	0.061	1.3	1.2	1.1	1	1.7
PCB-47	µg/kg	0.059	19	19	18	16	25
PCB-48	µg/kg	0.049	2.1	2.1	2	1.9	2.9
PCB-49	µg/kg	0.047	14	14	14	12	19
PCB-50	µg/kg	0.052	3.4	3.1	3	2.8	4.6
PCB-51	µg/kg	0.055	4.6	4.4	4	1.7 J	6.2
PCB-52	µg/kg	0.048	20	19	19	17	27
PCB-53	µg/kg	0.052	3.4	3.1	3	2.8	4.6
PCB-54	µg/kg	0.018	0.088	0.073 J	0.072	0.071	0.11
PCB-55	µg/kg	0.036	0.16	0.18 J	0.18 J	0.12 J	0.24
PCB-56	µg/kg	0.037	2.8	2.8	3	2.4	4.1
PCB-57	µg/kg	0.037	0.2	0.19 J	0.21	0.17	0.25
PCB-58	µg/kg	0.037	0.082	0.049 J	0.057 U	0.066	0.062
PCB-59	µg/kg	0.056	2.1	2	2	1.8	2.8
PCB-60	µg/kg	0.037	1.1	1.2	1.3	0.96	1.9
PCB-61	µg/kg	0.073	11	11	12	9.3	16

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Table G-1D. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-04-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-04-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	0.89 J	0.81 J	2.9 U	1.2 J	1.4 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	**2.1**	**2**	**2**	**1.8**	**2.8**
PCB-63	µg/kg	0.034	**0.88**	**0.92**	**0.97**	**0.77**	**1.2**
PCB-64	µg/kg	0.034	**7.6**	**7.4**	**7.4**	**6.3**	**10**
PCB-65	µg/kg	0.059	**19**	**19**	**18**	**16**	**25**
PCB-66	µg/kg	0.035	**6.3**	**6.6**	**7**	**5.4**	**9.2**
PCB-67	µg/kg	0.033	**0.35**	**0.35**	**0.36**	**0.3**	**0.47**
PCB-68	µg/kg	0.033	**0.16**	**0.15 J**	**0.18**	**0.14**	**0.21**
PCB-69	µg/kg	0.047	**14**	**14**	**14**	**12**	**19**
PCB-70	µg/kg	0.073	**11**	**11**	**12**	**9.3**	**16**
PCB-71	µg/kg	0.062	**10**	**9.7**	**9.5**	**8.3**	**14**
PCB-72	µg/kg	0.036	**0.23**	**0.24 J**	**0.25**	**0.2**	**0.3**
PCB-73	µg/kg	0.051	**0.96**	**0.97**	**0.9**	**0.88**	**1.3**
PCB-74	µg/kg	0.073	**11**	**11**	**12**	**9.3**	**16**
PCB-75	µg/kg	0.056	**2.1**	**2**	**2**	**1.8**	**2.8**
PCB-76	µg/kg	0.073	**11**	**11**	**12**	**9.3**	**16**
PCB-77	µg/kg	0.036	**0.38**	**0.35 J**	**0.44**	**0.28 J**	**0.57 J**
PCB-78	µg/kg	0.037	0.043 U	0.03 U	0.057 U	0.022 U	0.039 U
PCB-79	µg/kg	0.033	0.037 U	0.026 U	0.049 U	**0.048**	**0.076 J**
PCB-80	µg/kg	0.032	0.037 U	0.026 U	0.048 U	0.019 U	0.033 U
PCB-81	µg/kg	0.034	0.039 U	0.028 U	0.05 U	0.02 U	0.035 U
PCB-82	µg/kg	0.018	**0.82**	**0.89 J**	**1**	**0.66**	**1.3**
PCB-83	µg/kg	0.037	**3.8**	**4.2 J**	**5**	**3.4**	**5.5**
PCB-84	µg/kg	0.018	**2.3**	**2.2 J**	**2.4**	**1.9**	**3.3**
PCB-85	µg/kg	0.055	**1.4**	**1.6 J**	**1.8**	**1.2**	**2.1**
PCB-86	µg/kg	0.110	**3.5**	**3.8 J**	**4.4**	**3**	**5.2**
PCB-87	µg/kg	0.110	**3.5**	**3.8 J**	**4.4**	**3**	**5.2**
PCB-88	µg/kg	0.037	**1.9**	**2 J**	**2.2**	**1.7**	**2.7**
PCB-89	µg/kg	0.018	**0.23**	**0.24 J**	**0.26**	**0.17**	**0.3**
PCB-90	µg/kg	0.055	**4.8**	**5.2 J**	**6.3**	**4.2**	**6.9**
PCB-91	µg/kg	0.037	**1.9**	**2 J**	**2.2**	**1.7**	**2.7**
PCB-92	µg/kg	0.018	**1.5**	**1.6 J**	**1.9**	**1.3**	**2**
PCB-93	µg/kg	0.037	**0.24**	**0.22 J**	**0.27**	**0.21**	**0.33**
PCB-94	µg/kg	0.018	**0.14**	**0.14 J**	**0.16**	**0.11**	**0.18**
PCB-95	µg/kg	0.018	**5.9**	**5.8 J**	**6.6**	**5.1**	**7.7**
PCB-96	µg/kg	0.018	**0.2**	**0.2 J**	**0.2**	**0.16**	**0.27**
PCB-97	µg/kg	0.110	**3.5**	**3.8 J**	**4.4**	**3**	**5.2**
PCB-98	µg/kg	0.037	**0.58**	**0.63 J**	**0.69**	**0.51**	**0.79**
PCB-99	µg/kg	0.037	**3.8**	**4.2 J**	**5**	**3.4**	**5.5**
PCB-100	µg/kg	0.037	**0.24**	**0.22 J**	**0.27**	**0.21**	**0.33**
PCB-101	µg/kg	0.055	**4.8**	**5.2 J**	**6.3**	**4.2**	**6.9**
PCB-102	µg/kg	0.037	**0.58**	**0.63 J**	**0.69**	**0.51**	**0.79**
PCB-103	µg/kg	0.018	**0.12**	**0.12 J**	**0.15**	**0.096**	**0.14**
PCB-104	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	**0.0031 J**	**0.0057 J**
PCB-105	µg/kg	0.018	**1.1**	**1.3**	**1.5**	**1**	**1.7**
PCB-106	µg/kg	0.018	0.0099 U	0.0098 UJ	0.014 U	**0.0064 J**	0.026 U
PCB-107	µg/kg	0.018	**0.38**	**0.44 J**	**0.51**	**0.34 J**	**0.5**
PCB-108	µg/kg	0.037	**0.13**	**0.15 J**	**0.17**	**0.11**	**0.18**
PCB-109	µg/kg	0.110	**3.5**	**3.8 J**	**4.4**	**3**	**5.2**
PCB-110	µg/kg	0.037	**6.6**	**7.2 J**	**8.5**	**5.7**	**9.5**
PCB-111	µg/kg	0.018	0.0099 U	0.0098 UJ	0.014 U	**0.0089 J**	0.026 U
PCB-112	µg/kg	0.018	**0.073**	**0.08 J**	**0.12**	0.0099 U	**0.014 J**
PCB-113	µg/kg	0.055	**4.8**	**5.2 J**	**6.3**	**4.2**	**6.9**
PCB-114	µg/kg	0.018	**0.11**	**0.15 J**	**0.15**	**0.097**	**0.17**
PCB-115	µg/kg	0.037	**6.6**	**7.2 J**	**8.5**	**5.7**	**9.5**
PCB-116	µg/kg	0.055	**1.4**	**1.6 J**	**1.8**	**1.2**	**2.1**
PCB-117	µg/kg	0.055	**1.4**	**1.6 J**	**1.8**	**1.2**	**2.1**
PCB-118	µg/kg	0.018	**2.8**	**3.2**	**3.8**	**2.6**	**4.2**
PCB-119	µg/kg	0.110	**3.5**	**3.8 J**	**4.4**	**3**	**5.2**
PCB-120	µg/kg	0.018	0.0099 U	0.0098 UJ	0.014 U	**0.014 J**	**0.025 J**
PCB-121	µg/kg	0.018	0.0099 U	0.0098 UJ	0.014 U	0.0099 U	0.026 U

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Table G-1D. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-04-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-04-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	0.89 J	0.81 J	2.9 U	1.2 J	1.4 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.069**	**0.078 J**	**0.098**	**0.058 J**	**0.11**
PCB-123	µg/kg	0.018	**0.088**	**0.1**	**0.11 J**	**0.074**	**0.13**
PCB-124	µg/kg	0.037	**0.13**	**0.15 J**	**0.17**	**0.11**	**0.18**
PCB-125	µg/kg	0.110	**3.5**	**3.8 J**	4.4	**3**	**5.2**
PCB-126	µg/kg	0.018	**0.0097 J**	**0.0099**	0.014 U	**0.0054 J**	**0.014 J**
PCB-127	µg/kg	0.018	0.0099 U	0.0098 UJ	0.014 U	0.0099 U	0.026 U
PCB-128	µg/kg	0.037	**0.36**	**0.43**	**0.53**	**0.32**	**0.5**
PCB-129	µg/kg	0.073	**2.9**	**3.5**	**4.1**	**2.6**	**3.8**
PCB-130	µg/kg	0.018	**0.18**	**0.21**	**0.25**	**0.16**	**0.24**
PCB-131	µg/kg	0.018	**0.042**	**0.043**	**0.046 J**	**0.03 J**	**0.06**
PCB-132	µg/kg	0.018	**0.91**	**1.1**	**1.2**	**0.74**	**1.3**
PCB-133	µg/kg	0.018	**0.057**	**0.061**	**0.076**	**0.046**	**0.074**
PCB-134	µg/kg	0.037	**0.17**	**0.2**	**0.23**	**0.12 J**	**0.22**
PCB-135	µg/kg	0.037	**1.3**	**1.6**	**1.8**	**1.2**	**1.6**
PCB-136	µg/kg	0.018	**0.36**	**0.42**	**0.48**	**0.32**	**0.5**
PCB-137	µg/kg	0.018	**0.076**	**0.092**	**0.11**	**0.062 J**	**0.13**
PCB-138	µg/kg	0.073	**2.9**	**3.5**	**4.1**	**2.6**	**3.8**
PCB-139	µg/kg	0.037	**0.058**	**0.07**	**0.074**	**0.045**	**0.069**
PCB-140	µg/kg	0.037	**0.058**	**0.07**	**0.074**	**0.045**	**0.069**
PCB-141	µg/kg	0.018	**0.3**	**0.39**	**0.44**	**0.26**	**0.52**
PCB-142	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.0099 U	0.026 U
PCB-143	µg/kg	0.037	**0.17**	**0.2**	**0.23**	**0.12 J**	**0.22**
PCB-144	µg/kg	0.018	**0.11**	**0.13**	**0.15**	**0.092**	**0.15**
PCB-145	µg/kg	0.018	**0.0022 J**	**0.0035 J**	**0.003 J**	**0.0021 J**	**0.0028 J**
PCB-146	µg/kg	0.018	**0.51**	**0.6**	**0.7**	**0.43**	**0.6**
PCB-147	µg/kg	0.037	**3.4**	**3.9**	**4.6**	**2.9**	**4.1**
PCB-148	µg/kg	0.018	**0.004 J**	**0.0088 J**	**0.0089 J**	**0.0038 J**	**0.0046 J**
PCB-149	µg/kg	0.037	**3.4**	**3.9**	**4.6**	**2.9**	**4.1**
PCB-150	µg/kg	0.018	**0.0031 J**	**0.0072 J**	**0.0086 J**	**0.0055 J**	**0.0079 J**
PCB-151	µg/kg	0.037	**1.3**	**1.6**	**1.8**	**1.2**	**1.6**
PCB-152	µg/kg	0.018	**0.0043 J**	**0.0062 J**	**0.007 J**	**0.0043 J**	**0.0059 J**
PCB-153	µg/kg	0.037	**2.2**	**2.7**	**3.3**	**2**	**3**
PCB-154	µg/kg	0.018	**0.042**	**0.051**	**0.054 J**	**0.041**	**0.043 J**
PCB-155	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.0099 U	0.026 U
PCB-156	µg/kg	0.037	**0.21**	**0.26**	**0.3**	**0.18**	**0.31**
PCB-157	µg/kg	0.037	**0.21**	**0.26**	**0.3**	**0.18**	**0.31**
PCB-158	µg/kg	0.018	**0.22**	**0.27**	**0.32**	**0.2**	**0.31**
PCB-159	µg/kg	0.018	0.0099 U	**0.021 J**	0.014 U	**0.013 J**	**0.028**
PCB-160	µg/kg	0.073	**2.9**	**3.5**	**4.1**	**2.6**	**3.8**
PCB-161	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.0099 U	0.026 U
PCB-162	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	**0.0094 J**	**0.011 J**
PCB-163	µg/kg	0.073	**2.9**	**3.5**	**4.1**	**2.6**	**3.8**
PCB-164	µg/kg	0.018	**0.2**	**0.25**	**0.29**	**0.18**	**0.25**
PCB-165	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.0099 U	0.026 U
PCB-166	µg/kg	0.037	**0.36**	**0.43**	**0.53**	**0.32**	**0.5**
PCB-167	µg/kg	0.018	**0.075**	**0.095**	**0.12**	**0.07**	**0.11**
PCB-168	µg/kg	0.037	**2.2**	**2.7**	**3.3**	**2**	**3**
PCB-169	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.0099 U	0.026 U
PCB-170	µg/kg	0.018	**0.37**	**0.48**	**0.58**	**0.34**	**0.64**
PCB-171	µg/kg	0.037	**0.14**	**0.17**	**0.2**	**0.12**	**0.21**
PCB-172	µg/kg	0.018	**0.075**	**0.093**	**0.11**	**0.072**	**0.12**
PCB-173	µg/kg	0.037	**0.14**	**0.17**	**0.2**	**0.12**	**0.21**
PCB-174	µg/kg	0.018	**0.44**	**0.56**	**0.64**	**0.39**	**0.72**
PCB-175	µg/kg	0.018	**0.025**	**0.025**	**0.011 J**	**0.018**	**0.029**
PCB-176	µg/kg	0.018	**0.074**	**0.091**	**0.11**	**0.069**	**0.11**
PCB-177	µg/kg	0.018	**0.28**	**0.37**	**0.46**	**0.28**	**0.45**
PCB-178	µg/kg	0.018	**0.12**	**0.16**	**0.18**	**0.11**	**0.17**
PCB-179	µg/kg	0.018	**0.28**	**0.35**	**0.41**	**0.26**	**0.4**
PCB-180	µg/kg	0.037	**0.38**	**0.58**	**0.63**	**0.36**	**1.1**
PCB-181	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.0099 U	0.026 U

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Table G-1D. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-04-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-04-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	0.89 J	0.81 J	2.9 U	1.2 J	1.4 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	0.0099 U	**0.012**	**0.011 J**	**0.0035 J**	**0.012 J**
PCB-183	µg/kg	0.037	**0.34**	**0.44**	**0.54**	**0.32**	**0.55**
PCB-184	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.0099 U	0.026 U
PCB-185	µg/kg	0.037	**0.34**	**0.44**	**0.54**	**0.32**	**0.55**
PCB-186	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.0099 U	0.026 U
PCB-187	µg/kg	0.018	**1.5**	**1.9**	**2.4**	**1.5**	**1.8**
PCB-188	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.0099 U	0.026 U
PCB-189	µg/kg	0.018	**0.015**	**0.017**	**0.023**	**0.012**	0.026 U
PCB-190	µg/kg	0.018	**0.066**	**0.093**	**0.12**	**0.067**	**0.13**
PCB-191	µg/kg	0.018	0.0099 U	**0.019**	0.014 U	**0.013**	0.026 UJ
PCB-192	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.0099 U	0.026 U
PCB-193	µg/kg	0.037	**0.38**	**0.58**	**0.63**	**0.36**	**1.1**
PCB-194	µg/kg	0.018	**0.12**	**0.16**	**0.19**	**0.094**	**0.25**
PCB-195	µg/kg	0.018	**0.069 J**	**0.1**	**0.12**	**0.07**	**0.13**
PCB-196	µg/kg	0.018	**0.053**	**0.069**	**0.078**	**0.042**	**0.11**
PCB-197	µg/kg	0.018	**0.0051 J**	**0.0095 J**	**0.014**	**0.0068 J**	**0.0092 J**
PCB-198	µg/kg	0.037	**0.23**	**0.29**	**0.36**	**0.21**	**0.36**
PCB-199	µg/kg	0.037	**0.23**	**0.29**	**0.36**	**0.21**	**0.36**
PCB-200	µg/kg	0.018	**0.022**	**0.03**	**0.034**	**0.017 J**	**0.038**
PCB-201	µg/kg	0.018	**0.029**	**0.033**	**0.04**	**0.026**	**0.039**
PCB-202	µg/kg	0.018	**0.042 J**	**0.059**	**0.073**	**0.039**	**0.067**
PCB-203	µg/kg	0.018	**0.12**	**0.14**	**0.18**	**0.097**	**0.19**
PCB-204	µg/kg	0.018	0.0099 U	0.0098 U	0.014 U	0.0099 U	0.026 U
PCB-205	µg/kg	0.018	0.0099 UJ	**0.013**	**0.015 J**	0.0099 U	0.026 U
PCB-206	µg/kg	0.018	**0.049**	**0.075**	**0.087**	**0.041**	**0.1**
PCB-207	µg/kg	0.018	**0.0077 J**	**0.0098**	**0.0097 J**	**0.0035 J**	**0.0065 J**
PCB-208	µg/kg	0.018	**0.019**	**0.026 J**	**0.033**	**0.015 J**	**0.032**
PCB 209	µg/kg	0.018	**0.027 J**	**0.038**	**0.041**	**0.021**	**0.058**
TOTAL PCB (ND=0)	µg/kg	---	**501**	**406**	**516**	**401**	**699**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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Table G-1E. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-05-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-05-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.4 J	1.8 J	0.69 J	0.68 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	**0.073 J-**	**0.08**	**0.065 J-**	**0.065**	**0.069 J-**
PCB-2	µg/kg	0.018	**0.02 J**	**0.02 J**	**0.017 J**	**0.019**	**0.023 J-**
PCB-3	µg/kg	0.018	**0.078**	**0.086**	**0.071**	**0.072**	**0.067**
PCB-4	µg/kg	0.037	**2.1**	**2.2**	**1.6**	**1.8**	**1.8**
PCB-5	µg/kg	0.018	**0.023 J**	**0.033**	**0.018 J**	**0.027**	**0.026 J**
PCB-6	µg/kg	0.018	**1.3**	**1.4**	**1.1**	**1.1**	**1.2**
PCB-7	µg/kg	0.018	**0.16**	**0.17**	**0.13**	**0.14**	**0.14**
PCB-8	µg/kg	0.037	**2.6**	**2.7**	**2.2**	**2.2**	**2.4**
PCB-9	µg/kg	0.018	**0.14**	**0.15**	**0.12**	**0.12**	**0.14**
PCB-10	µg/kg	0.018	**0.061 J**	**0.071 J**	**0.052**	**0.061**	**0.054**
PCB-11	µg/kg	0.037	**0.1 J**	**0.1**	**0.069**	**0.089**	**0.1**
PCB-12	µg/kg	0.037	**0.56**	**0.62**	**0.51**	**0.48**	**0.53**
PCB-13	µg/kg	0.037	**0.56**	**0.62**	**0.51**	**0.48**	**0.53**
PCB-14	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-15	µg/kg	0.018	**2.6**	**3**	**2.3**	**2.4**	**2.2**
PCB-16	µg/kg	0.018	**1.7**	**1.6**	**1.3**	**1.4**	**1.5**
PCB-17	µg/kg	0.018	**7.7**	**7.3**	**6.1**	**6**	**7.1**
PCB-18	µg/kg	0.037	**6.5**	**6.1**	**4.8**	**5.3**	**6.3**
PCB-19	µg/kg	0.018	**1.4**	**1.4**	**1.2**	**1.3**	**1.2**
PCB-20	µg/kg	0.037	**11**	**12**	**9.4**	**10**	**9.9**
PCB-21	µg/kg	0.037	**1.2**	**1.2**	**0.97**	**1**	**1**
PCB-22	µg/kg	0.018	**2.7**	**2.8**	**2.3**	**2.3**	**2.3**
PCB-23	µg/kg	0.018	0.017 U	**0.011 J**	**0.0056 J**	0.016 U	0.016 U
PCB-24	µg/kg	0.018	**0.11**	**0.11**	**0.081**	**0.093**	**0.11 J**
PCB-25	µg/kg	0.018	**2.7**	**2.7**	**2.2**	**2.4**	**2.3**
PCB-26	µg/kg	0.037	**3.7**	**3.8**	**2.9**	**3.2**	**3.1**
PCB-27	µg/kg	0.018	**1.5**	**1.4**	**1.2**	**1.2**	**1.4**
PCB-28	µg/kg	0.037	**11**	**12**	**9.4**	**10**	**9.9**
PCB-29	µg/kg	0.037	**3.7**	**3.8**	**2.9**	**3.2**	**3.1**
PCB-30	µg/kg	0.037	**6.5**	**6.1**	**4.8**	**5.3**	**6.3**
PCB-31	µg/kg	0.037	**9.3**	**9.4**	**7.6**	**8**	**7.8**
PCB-32	µg/kg	0.018	**4.7**	**4.4**	**3.6**	**3.8**	**4.5**
PCB-33	µg/kg	0.037	**1.2**	**1.2**	**0.97**	**1**	**1**
PCB-34	µg/kg	0.018	**0.13**	**0.13**	**0.11**	**0.11**	**0.11**
PCB-35	µg/kg	0.018	**0.034**	**0.034**	**0.032**	**0.028**	**0.018 J**
PCB-36	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-37	µg/kg	0.018	**0.95**	**1**	**0.88**	**0.9**	**0.86**
PCB-38	µg/kg	0.018	**0.014 J**	**0.022 J**	**0.015**	**0.017**	**0.021**
PCB-39	µg/kg	0.018	**0.05**	**0.058 J**	**0.049**	**0.046**	**0.038 J**
PCB-40	µg/kg	0.062	**6.6**	**6.9**	**5.9**	**5.8**	**5.5**
PCB-41	µg/kg	0.062	**6.6**	**6.9**	**5.9**	**5.8**	**5.5**
PCB-42	µg/kg	0.049	**4**	**4.2**	**3.5**	**3.5**	**3.3**
PCB-43	µg/kg	0.051	**0.64**	**0.69**	**0.56**	**0.58**	**0.53**
PCB-44	µg/kg	0.059	**14**	**14**	**12**	**12**	**11**
PCB-45	µg/kg	0.055	**2.8**	**2.9**	**2.4**	**1 J**	**2.4**
PCB-46	µg/kg	0.061	**0.75**	**0.78**	**0.66**	**0.64**	**0.61**
PCB-47	µg/kg	0.059	**14**	**14**	**12**	**12**	**11**
PCB-48	µg/kg	0.049	**1.4**	**1.4**	**1.2**	**1.2**	**1.2**
PCB-49	µg/kg	0.047	**10**	**11**	**9.1**	**8.7**	**8.4**
PCB-50	µg/kg	0.052	**2.1**	**2.1**	**1.8**	**1.8**	**1.8**
PCB-51	µg/kg	0.055	**2.8**	**2.9**	**2.4**	**1 J**	**2.4**
PCB-52	µg/kg	0.048	**14**	**15**	**13**	**12**	**12**
PCB-53	µg/kg	0.052	**2.1**	**2.1**	**1.8**	**1.8**	**1.8**
PCB-54	µg/kg	0.018	**0.05 J**	**0.052 J**	**0.046**	**0.045**	**0.043**
PCB-55	µg/kg	0.036	**0.13**	**0.15**	**0.071 J**	**0.13**	**0.11**
PCB-56	µg/kg	0.037	**2.1**	**2.2**	**1.9**	**1.9**	**1.8**
PCB-57	µg/kg	0.037	**0.13**	**0.12 J**	**0.1**	**0.12**	**0.072 J**
PCB-58	µg/kg	0.037	**0.053 J**	**0.054**	**0.047**	**0.058 J**	**0.033 J**
PCB-59	µg/kg	0.056	**1.5**	**1.5**	**1.3**	**1.3**	**1.2**
PCB-60	µg/kg	0.037	**0.81**	**0.84**	**0.71**	**0.72**	**0.68**
PCB-61	µg/kg	0.073	**7.9**	**8.4**	**7**	**7**	**6.7**

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Table G-1E. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-05-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-05-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.4 J	1.8 J	0.69 J	0.68 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	1.5	1.5	1.3	1.3	1.2
PCB-63	µg/kg	0.034	0.61	0.63	0.53	0.54	0.51
PCB-64	µg/kg	0.034	5.2	5.4	4.5	4.6	4.4
PCB-65	µg/kg	0.059	14	14	12	12	11
PCB-66	µg/kg	0.035	5.2	5.5	4.6	4.6	4.4
PCB-67	µg/kg	0.033	0.23	0.23	0.2	0.21	0.18
PCB-68	µg/kg	0.033	0.13	0.13	0.1	0.12 J	0.11
PCB-69	µg/kg	0.047	10	11	9.1	8.7	8.4
PCB-70	µg/kg	0.073	7.9	8.4	7	7	6.7
PCB-71	µg/kg	0.062	6.6	6.9	5.9	5.8	5.5
PCB-72	µg/kg	0.036	0.18	0.19	0.16	0.15 J	0.15
PCB-73	µg/kg	0.051	0.64	0.69	0.56	0.58	0.53
PCB-74	µg/kg	0.073	7.9	8.4	7	7	6.7
PCB-75	µg/kg	0.056	1.5	1.5	1.3	1.3	1.2
PCB-76	µg/kg	0.073	7.9	8.4	7	7	6.7
PCB-77	µg/kg	0.036	0.29	0.27 J	0.27	0.28	0.23
PCB-78	µg/kg	0.037	0.025 U	0.025 U	0.034 U	0.016 U	0.018 U
PCB-79	µg/kg	0.033	0.045 J	0.05	0.034	0.036 J	0.038
PCB-80	µg/kg	0.032	0.022 U	0.022 U	0.029 U	0.016 U	0.016 U
PCB-81	µg/kg	0.034	0.023 U	0.023 U	0.03 U	0.016 U	0.016 U
PCB-82	µg/kg	0.018	0.49 J	0.69	0.49	0.59	0.57
PCB-83	µg/kg	0.037	3.3	3.6	3	3.1	3
PCB-84	µg/kg	0.018	1.6	1.7	1.4	1.5	1.5
PCB-85	µg/kg	0.055	1.2	1.3	1.1	1.1	1.1
PCB-86	µg/kg	0.110	2.8	3.1	2.6	2.7	2.6
PCB-87	µg/kg	0.110	2.8	3.1	2.6	2.7	2.6
PCB-88	µg/kg	0.037	1.5	1.6	1.4	1.4	1.3
PCB-89	µg/kg	0.018	0.16	0.18	0.14	0.12 J	0.15
PCB-90	µg/kg	0.055	4	4.4	3.6	3.8	3.7
PCB-91	µg/kg	0.037	1.5	1.6	1.4	1.4	1.3
PCB-92	µg/kg	0.018	1.2	1.3	1.1	1.1	1.1
PCB-93	µg/kg	0.037	0.16 J	0.19	0.16	0.17	0.16
PCB-94	µg/kg	0.018	0.1	0.11	0.088	0.089	0.074 J
PCB-95	µg/kg	0.018	4.6	4.9	4.1	4.3	4.1
PCB-96	µg/kg	0.018	0.13	0.14	0.11	0.11	0.11
PCB-97	µg/kg	0.110	2.8	3.1	2.6	2.7	2.6
PCB-98	µg/kg	0.037	0.42	0.46	0.4	0.39	0.38
PCB-99	µg/kg	0.037	3.3	3.6	3	3.1	3
PCB-100	µg/kg	0.037	0.16 J	0.19	0.16	0.17	0.16
PCB-101	µg/kg	0.055	4	4.4	3.6	3.8	3.7
PCB-102	µg/kg	0.037	0.42	0.46	0.4	0.39	0.38
PCB-103	µg/kg	0.018	0.081	0.093	0.08	0.079	0.077
PCB-104	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-105	µg/kg	0.018	0.94	1	0.88	0.87	0.79
PCB-106	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-107	µg/kg	0.018	0.31 J	0.35 J	0.3 J	0.28 J	0.28 J
PCB-108	µg/kg	0.037	0.11	0.12	0.096	0.097	0.084 J
PCB-109	µg/kg	0.110	2.8	3.1	2.6	2.7	2.6
PCB-110	µg/kg	0.037	5.6	6.1	4.9	5.2	5
PCB-111	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-112	µg/kg	0.018	0.039	0.055	0.031 J	0.046 J	0.03 J
PCB-113	µg/kg	0.055	4	4.4	3.6	3.8	3.7
PCB-114	µg/kg	0.018	0.086	0.096	0.085	0.085	0.076
PCB-115	µg/kg	0.037	5.6	6.1	4.9	5.2	5
PCB-116	µg/kg	0.055	1.2	1.3	1.1	1.1	1.1
PCB-117	µg/kg	0.055	1.2	1.3	1.1	1.1	1.1
PCB-118	µg/kg	0.018	2.5	2.7	2.3	2.2	2.1
PCB-119	µg/kg	0.110	2.8	3.1	2.6	2.7	2.6
PCB-120	µg/kg	0.018	0.018 J	0.016 J	0.018 J	0.019	0.021
PCB-121	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U

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Table G-1E. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-05-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-05-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.4 J	1.8 J	0.69 J	0.68 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.063**	**0.068**	**0.056**	**0.059**	**0.051**
PCB-123	µg/kg	0.018	**0.073 J**	**0.069 J**	**0.067 J**	**0.078**	**0.066**
PCB-124	µg/kg	0.037	**0.11**	**0.12**	**0.096**	**0.097**	**0.084 J**
PCB-125	µg/kg	0.110	**2.8**	**3.1**	**2.6**	**2.7**	**2.6**
PCB-126	µg/kg	0.018	**0.0078 J**	**0.014 J**	**0.0076 J**	**0.011 J**	**0.01 J**
PCB-127	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-128	µg/kg	0.037	**0.32**	**0.34**	**0.28**	**0.28**	**0.27**
PCB-129	µg/kg	0.073	**2.6**	**2.7**	**2.3**	**2.4**	**2.1**
PCB-130	µg/kg	0.018	**0.14 J**	**0.16**	**0.14**	**0.14**	**0.12 J**
PCB-131	µg/kg	0.018	**0.024 J**	**0.036**	**0.029**	**0.023**	**0.022**
PCB-132	µg/kg	0.018	**0.71**	**0.76**	**0.63**	**0.64**	**0.61**
PCB-133	µg/kg	0.018	**0.045 J**	**0.046**	**0.043**	**0.043**	**0.043**
PCB-134	µg/kg	0.037	**0.12**	**0.14**	**0.11**	**0.11**	**0.11**
PCB-135	µg/kg	0.037	**1.1**	**1.2**	**1**	**0.98**	**0.94**
PCB-136	µg/kg	0.018	**0.28**	**0.3**	**0.26**	**0.26**	**0.24**
PCB-137	µg/kg	0.018	**0.069**	**0.074**	**0.063**	**0.068**	**0.068**
PCB-138	µg/kg	0.073	**2.6**	**2.7**	**2.3**	**2.4**	**2.1**
PCB-139	µg/kg	0.037	**0.04 J**	**0.05**	**0.04**	**0.042**	**0.037**
PCB-140	µg/kg	0.037	**0.04 J**	**0.05**	**0.04**	**0.042**	**0.037**
PCB-141	µg/kg	0.018	**0.25 J**	**0.29**	**0.25**	**0.26**	**0.23**
PCB-142	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-143	µg/kg	0.037	**0.12**	**0.14**	**0.11**	**0.11**	**0.11**
PCB-144	µg/kg	0.018	**0.094**	**0.094**	**0.075**	**0.075**	**0.07 J**
PCB-145	µg/kg	0.018	**0.0019 J**	**0.0036 J**	**0.0019 J**	**0.002 J**	**0.002 J**
PCB-146	µg/kg	0.018	**0.45**	**0.46**	**0.38**	**0.41**	**0.37**
PCB-147	µg/kg	0.037	**2.8**	**3**	**2.5**	**2.5**	**2.3**
PCB-148	µg/kg	0.018	**0.0052 J**	**0.0038 J**	**0.0041 J**	0.016 U	**0.0034 J**
PCB-149	µg/kg	0.037	**2.8**	**3**	**2.5**	**2.5**	**2.3**
PCB-150	µg/kg	0.018	**0.0039 J**	**0.0054 J**	**0.0043 J**	**0.0041 J**	**0.0036 J**
PCB-151	µg/kg	0.037	**1.1**	**1.2**	**1**	**0.98**	**0.94**
PCB-152	µg/kg	0.018	**0.004 J**	**0.0037 J**	**0.0031 J**	**0.0027 J**	**0.0022 J**
PCB-153	µg/kg	0.037	**2**	**2.2**	**1.8**	**1.9**	**1.7**
PCB-154	µg/kg	0.018	**0.036**	**0.041**	**0.031**	**0.036**	**0.03**
PCB-155	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-156	µg/kg	0.037	**0.19**	**0.2**	**0.17**	**0.17**	**0.15**
PCB-157	µg/kg	0.037	**0.19**	**0.2**	**0.17**	**0.17**	**0.15**
PCB-158	µg/kg	0.018	**0.18 J**	**0.2**	**0.17**	**0.18**	**0.17**
PCB-159	µg/kg	0.018	**0.015 J**	**0.013 J**	**0.014**	**0.019**	**0.015 J**
PCB-160	µg/kg	0.073	**2.6**	**2.7**	**2.3**	**2.4**	**2.1**
PCB-161	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-162	µg/kg	0.018	**0.0075 J**	**0.0079 J**	**0.011**	**0.0046 J**	**0.0077 J**
PCB-163	µg/kg	0.073	**2.6**	**2.7**	**2.3**	**2.4**	**2.1**
PCB-164	µg/kg	0.018	**0.18**	**0.18**	**0.15**	**0.16**	**0.15**
PCB-165	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-166	µg/kg	0.037	**0.32**	**0.34**	**0.28**	**0.28**	**0.27**
PCB-167	µg/kg	0.018	**0.068**	**0.08**	**0.069**	**0.067**	**0.058**
PCB-168	µg/kg	0.037	**2**	**2.2**	**1.8**	**1.9**	**1.7**
PCB-169	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-170	µg/kg	0.018	**0.35**	**0.39**	**0.31**	**0.33**	**0.27**
PCB-171	µg/kg	0.037	**0.11**	**0.13**	**0.11**	**0.11**	**0.086 J**
PCB-172	µg/kg	0.018	**0.066**	**0.079**	**0.06**	**0.07 J**	**0.061**
PCB-173	µg/kg	0.037	**0.11**	**0.13**	**0.11**	**0.11**	**0.086 J**
PCB-174	µg/kg	0.018	**0.39**	**0.43**	**0.35**	**0.36**	**0.33**
PCB-175	µg/kg	0.018	**0.013 J**	**0.019**	**0.013**	**0.016**	**0.013 J**
PCB-176	µg/kg	0.018	**0.063**	**0.066**	**0.056**	**0.057**	**0.048**
PCB-177	µg/kg	0.018	**0.27**	**0.3**	**0.24**	**0.26**	**0.24**
PCB-178	µg/kg	0.018	**0.11**	**0.13**	**0.1**	**0.1**	**0.086**
PCB-179	µg/kg	0.018	**0.24**	**0.26**	**0.21**	**0.22**	**0.21**
PCB-180	µg/kg	0.037	**0.39**	**0.43**	**0.36**	**0.36**	**0.33**
PCB-181	µg/kg	0.018	0.017 U	0.019 UJ	0.01 UJ	0.016 U	0.016 U

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Table G-1E. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-05-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-05-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.4 J	1.8 J	0.69 J	0.68 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	**0.012 J**	**0.0075 J**	**0.0075 J**	**0.0077 J**	0.016 U
PCB-183	µg/kg	0.037	**0.3**	**0.33**	**0.27**	**0.28**	**0.26**
PCB-184	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-185	µg/kg	0.037	**0.3**	**0.33**	**0.27**	**0.28**	**0.26**
PCB-186	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-187	µg/kg	0.018	**1.4**	**1.5**	**1.3**	**1.3**	**1.2**
PCB-188	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-189	µg/kg	0.018	0.017 UJ	0.019 U	**0.013**	0.016 UJ	0.016 UJ
PCB-190	µg/kg	0.018	**0.072**	**0.065**	**0.065**	**0.066**	**0.054**
PCB-191	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-192	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-193	µg/kg	0.037	**0.39**	**0.43**	**0.36**	**0.36**	**0.33**
PCB-194	µg/kg	0.018	**0.11**	**0.13**	**0.087 J**	**0.11**	**0.09**
PCB-195	µg/kg	0.018	**0.064**	**0.074**	**0.064**	**0.061**	**0.06**
PCB-196	µg/kg	0.018	**0.045**	**0.051**	**0.039**	**0.039**	**0.031**
PCB-197	µg/kg	0.018	**0.009 J**	**0.0088 J**	**0.0059 J**	**0.0071 J**	**0.003 J**
PCB-198	µg/kg	0.037	**0.22**	**0.23**	**0.2**	**0.19**	**0.17**
PCB-199	µg/kg	0.037	**0.22**	**0.23**	**0.2**	**0.19**	**0.17**
PCB-200	µg/kg	0.018	**0.016 J**	**0.019 J**	**0.02**	**0.02**	**0.019**
PCB-201	µg/kg	0.018	**0.019 J**	**0.026**	**0.023**	**0.018**	**0.02**
PCB-202	µg/kg	0.018	**0.041**	**0.046**	**0.038**	**0.035 J**	**0.036**
PCB-203	µg/kg	0.018	**0.1**	**0.11**	**0.096**	**0.095**	**0.085**
PCB-204	µg/kg	0.018	0.017 U	0.019 U	0.01 U	0.016 U	0.016 U
PCB-205	µg/kg	0.018	0.017 U	0.019 UJ	0.01 U	0.016 UJ	0.016 UJ
PCB-206	µg/kg	0.018	**0.051**	**0.047**	**0.042**	**0.038**	**0.041**
PCB-207	µg/kg	0.018	**0.0056 J**	**0.0076 J**	**0.0069 J**	**0.0078 J**	0.016 U
PCB-208	µg/kg	0.018	**0.017**	**0.019**	**0.018**	**0.016**	**0.012 J**
PCB 209	µg/kg	0.018	**0.02 J**	**0.027 J**	**0.025**	**0.02 J**	**0.021**
TOTAL PCB (ND=0)	µg/kg	---	**349**	**367**	**305**	**305**	**301**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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Table G-1F. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-07-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-07-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	0.94 J	2.2 J	1.7 J	1.4 J	3.1 U
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	0.34	0.44	0.43	0.6	0.24 J-
PCB-2	µg/kg	0.018	0.053	0.07	0.096	0.065	0.052 J-
PCB-3	µg/kg	0.018	0.3	0.36	0.42	0.33	0.24
PCB-4	µg/kg	0.037	8.3	11	8.9	10	6.1
PCB-5	µg/kg	0.018	0.11	0.13 J	0.11	0.17	0.09
PCB-6	µg/kg	0.018	3.9	5.1	4.5	5.1	3.1
PCB-7	µg/kg	0.018	0.53	0.69	0.62	0.73	0.43
PCB-8	µg/kg	0.037	8.1	11	9.5	11	6.3
PCB-9	µg/kg	0.018	0.51	0.67	0.6	0.7	0.42
PCB-10	µg/kg	0.018	0.26	0.33	0.24	0.33	0.19
PCB-11	µg/kg	0.037	0.17	0.2	0.23	0.21 J	0.12 J
PCB-12	µg/kg	0.037	1.5	1.9	2	2	1.2
PCB-13	µg/kg	0.037	1.5	1.9	2	2	1.2
PCB-14	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-15	µg/kg	0.018	6	7.8	7.5	7.4	4.8
PCB-16	µg/kg	0.018	5	6.8	6.2	5.8	4.1
PCB-17	µg/kg	0.018	19	26	24	21	15
PCB-18	µg/kg	0.037	16	23	21	19	13
PCB-19	µg/kg	0.018	4.2	5.6	4.7	5	3.4
PCB-20	µg/kg	0.037	29	39	35	33	23
PCB-21	µg/kg	0.037	3.4	5	4.3	4.2	2.8
PCB-22	µg/kg	0.018	7	9.7	8.6	8.3	5.8
PCB-23	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-24	µg/kg	0.018	0.32	0.51	0.43	0.38 J	0.29
PCB-25	µg/kg	0.018	6.9	9.3	8	7.6	5.1
PCB-26	µg/kg	0.037	9.3	12	11	10	7
PCB-27	µg/kg	0.018	3.2	4.3	4	3.7	2.6
PCB-28	µg/kg	0.037	29	39	35	33	23
PCB-29	µg/kg	0.037	9.3	12	11	10	7
PCB-30	µg/kg	0.037	16	23	21	19	13
PCB-31	µg/kg	0.037	25	34	30	29	20
PCB-32	µg/kg	0.018	11	16	14	13	8.9
PCB-33	µg/kg	0.037	3.4	5	4.3	4.2	2.8
PCB-34	µg/kg	0.018	0.35	0.53	0.39	0.38	0.26
PCB-35	µg/kg	0.018	0.016 U	0.14	0.14	0.019 U	0.015 U
PCB-36	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-37	µg/kg	0.018	2.4	3.3	3.2	2.7	2
PCB-38	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-39	µg/kg	0.018	0.016 U	0.18	0.37	0.019 U	0.015 U
PCB-40	µg/kg	0.062	15	20	17	17	12
PCB-41	µg/kg	0.062	15	20	17	17	12
PCB-42	µg/kg	0.049	8.3	11	10	9.4	6.7
PCB-43	µg/kg	0.051	1.4	2	1.8	1.6	1.2
PCB-44	µg/kg	0.059	27	38	33	31	22
PCB-45	µg/kg	0.055	6.8	9.3	8	7.8	5.6
PCB-46	µg/kg	0.061	1.9	2.5	2.2	2.1	1.5
PCB-47	µg/kg	0.059	27	38	33	31	22
PCB-48	µg/kg	0.049	3.5	4.9	4.3	4.1	3
PCB-49	µg/kg	0.047	20	28	24	23	16
PCB-50	µg/kg	0.052	5.1	6.9	5.9	5.5	3.8
PCB-51	µg/kg	0.055	6.8	9.3	8	7.8	5.6
PCB-52	µg/kg	0.048	29	39	34	33	20
PCB-53	µg/kg	0.052	5.1	6.9	5.9	5.5	3.8
PCB-54	µg/kg	0.018	0.12	0.17	0.14	0.14	0.1
PCB-55	µg/kg	0.036	0.19 J	0.087 U	0.085 U	0.077 U	0.21 J
PCB-56	µg/kg	0.037	4.7	6.4	5.6	5.1	3.8
PCB-57	µg/kg	0.037	0.28	0.38	0.33	0.29	0.23
PCB-58	µg/kg	0.037	0.11	0.13	0.14	0.12	0.089
PCB-59	µg/kg	0.056	3.1	4.1	3.7	3.5	2.5
PCB-60	µg/kg	0.037	1.7	2.3	2.1	1.9	1.4
PCB-61	µg/kg	0.073	18	25	22	20	14

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Table G-1F. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-07-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-07-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	0.94 J	2.2 J	1.7 J	1.4 J	3.1 U
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	3.1	4.1	3.7	3.5	2.5
PCB-63	µg/kg	0.034	1.4	1.8	1.6	1.5	1.1
PCB-64	µg/kg	0.034	11	16	14	13	9.2
PCB-65	µg/kg	0.059	27	38	33	31	22
PCB-66	µg/kg	0.035	10	14	13	11	8.5
PCB-67	µg/kg	0.033	0.53	0.7	0.65	0.59	0.44
PCB-68	µg/kg	0.033	0.21	0.27 J	0.34	0.23	0.19
PCB-69	µg/kg	0.047	20	28	24	23	16
PCB-70	µg/kg	0.073	18	25	22	20	14
PCB-71	µg/kg	0.062	15	20	17	17	12
PCB-72	µg/kg	0.036	0.34	0.48	0.4	0.36	0.26
PCB-73	µg/kg	0.051	1.4	2	1.8	1.6	1.2
PCB-74	µg/kg	0.073	18	25	22	20	14
PCB-75	µg/kg	0.056	3.1	4.1	3.7	3.5	2.5
PCB-76	µg/kg	0.073	18	25	22	20	14
PCB-77	µg/kg	0.036	0.62	0.83	0.75	0.6	0.52
PCB-78	µg/kg	0.037	0.069 U	0.09 U	0.088 U	0.079 U	0.015 U
PCB-79	µg/kg	0.033	0.06 U	0.13	0.1 J	0.069 U	0.015 U
PCB-80	µg/kg	0.032	0.059 U	0.076 U	0.075 U	0.067 U	0.015 U
PCB-81	µg/kg	0.034	0.062 U	0.078 U	0.078 U	0.073 U	0.015 U
PCB-82	µg/kg	0.018	1.3	1.7	1.5	1.4	1
PCB-83	µg/kg	0.037	6.2	8.6	7	6.7	4.9
PCB-84	µg/kg	0.018	3.3	4.5	3.9	3.8	2.8
PCB-85	µg/kg	0.055	2.3	3.1	2.6	2.4	1.8
PCB-86	µg/kg	0.110	5.6	7.7	6.5	6.1	4.5
PCB-87	µg/kg	0.110	5.6	7.7	6.5	6.1	4.5
PCB-88	µg/kg	0.037	3	4.1	3.3	3.3	2.4
PCB-89	µg/kg	0.018	0.33	0.48	0.4	0.39	0.28
PCB-90	µg/kg	0.055	7.8	11	9	8.3	6.1
PCB-91	µg/kg	0.037	3	4.1	3.3	3.3	2.4
PCB-92	µg/kg	0.018	2.3	3.2	2.6	2.5	1.8
PCB-93	µg/kg	0.037	0.34	0.48	0.4	0.39	0.3
PCB-94	µg/kg	0.018	0.2	0.27	0.2 J	0.23	0.16
PCB-95	µg/kg	0.018	9.3	13	11	10	7.2
PCB-96	µg/kg	0.018	0.28	0.38	0.33	0.32	0.24
PCB-97	µg/kg	0.110	5.6	7.7	6.5	6.1	4.5
PCB-98	µg/kg	0.037	0.88	1.3	1	1	0.72
PCB-99	µg/kg	0.037	6.2	8.6	7	6.7	4.9
PCB-100	µg/kg	0.037	0.34	0.48	0.4	0.39	0.3
PCB-101	µg/kg	0.055	7.8	11	9	8.3	6.1
PCB-102	µg/kg	0.037	0.88	1.3	1	1	0.72
PCB-103	µg/kg	0.018	0.18	0.24	0.19	0.019 U	0.14
PCB-104	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-105	µg/kg	0.018	1.7	2.4	2.1	1.9	1.4
PCB-106	µg/kg	0.018	0.016 U	0.031 U	0.019 J	0.019 U	0.015 U
PCB-107	µg/kg	0.018	0.59 J	0.84	0.63	0.63	0.48
PCB-108	µg/kg	0.037	0.19	0.27	0.22	0.22	0.17
PCB-109	µg/kg	0.110	5.6	7.7	6.5	6.1	4.5
PCB-110	µg/kg	0.037	10	15	12	11	8.3
PCB-111	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-112	µg/kg	0.018	0.086 J	0.19	0.16	0.15	0.087 J
PCB-113	µg/kg	0.055	7.8	11	9	8.3	6.1
PCB-114	µg/kg	0.018	0.18	0.24	0.2	0.19	0.14
PCB-115	µg/kg	0.037	10	15	12	11	8.3
PCB-116	µg/kg	0.055	2.3	3.1	2.6	2.4	1.8
PCB-117	µg/kg	0.055	2.3	3.1	2.6	2.4	1.8
PCB-118	µg/kg	0.018	4.6	6.4	5.3	5	3.7
PCB-119	µg/kg	0.110	5.6	7.7	6.5	6.1	4.5
PCB-120	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-121	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U

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Table G-1F. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-07-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-07-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	0.94 J	2.2 J	1.7 J	1.4 J	3.1 U
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.11**	**0.14 J**	**0.15**	**0.13**	**0.095**
PCB-123	µg/kg	0.018	**0.14**	**0.17 J**	**0.16**	**0.16**	**0.11**
PCB-124	µg/kg	0.037	**0.19**	**0.27**	**0.22**	**0.22**	**0.17**
PCB-125	µg/kg	0.110	**5.6**	**7.7**	**6.5**	**6.1**	**4.5**
PCB-126	µg/kg	0.018	**0.015 J**	**0.022 J**	**0.024 J**	**0.019**	**0.016**
PCB-127	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-128	µg/kg	0.037	**0.55**	**0.71**	**0.6**	**0.6**	**0.45**
PCB-129	µg/kg	0.073	**4.6**	**5.9**	**4.8**	**4.9**	**3.6**
PCB-130	µg/kg	0.018	**0.26**	**0.36**	**0.29**	**0.31**	**0.22**
PCB-131	µg/kg	0.018	0.016 U	0.031 U	0.031 U	**0.069**	**0.044**
PCB-132	µg/kg	0.018	**1.4**	**1.8**	**1.5**	**1.5**	**1.1**
PCB-133	µg/kg	0.018	**0.083**	**0.1**	**0.085**	**0.093**	**0.068**
PCB-134	µg/kg	0.037	**0.24**	0.062 U	**0.25**	**0.28**	**0.2**
PCB-135	µg/kg	0.037	**2**	**2.9**	**2.3**	**2.2**	**1.7**
PCB-136	µg/kg	0.018	**0.54**	**0.76**	**0.61**	**0.59**	**0.44**
PCB-137	µg/kg	0.018	**0.12**	**0.16**	**0.14**	**0.13**	**0.11**
PCB-138	µg/kg	0.073	**4.6**	**5.9**	**4.8**	**4.9**	**3.6**
PCB-139	µg/kg	0.037	**0.084**	**0.1**	**0.086**	**0.097**	**0.07**
PCB-140	µg/kg	0.037	**0.084**	**0.1**	**0.086**	**0.097**	**0.07**
PCB-141	µg/kg	0.018	**0.49**	**0.64**	**0.53**	**0.52**	**0.39**
PCB-142	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-143	µg/kg	0.037	**0.24**	0.062 U	**0.25**	**0.28**	**0.2**
PCB-144	µg/kg	0.018	**0.16**	**0.22**	**0.18**	**0.19**	**0.13**
PCB-145	µg/kg	0.018	0.016 U	0.031 U	**0.0036 J**	**0.0052 J**	**0.0047 J**
PCB-146	µg/kg	0.018	**0.77**	**1**	**0.82**	**0.81**	**0.62**
PCB-147	µg/kg	0.037	**5.3**	**7**	**5.7**	**5.6**	**4.1**
PCB-148	µg/kg	0.018	**0.0059 J**	**0.01 J**	**0.0068 J**	**0.0092 J**	**0.0062 J**
PCB-149	µg/kg	0.037	**5.3**	**7**	**5.7**	**5.6**	**4.1**
PCB-150	µg/kg	0.018	**0.0093 J**	**0.0086 J**	**0.009 J**	**0.0099 J**	**0.007 J**
PCB-151	µg/kg	0.037	**2**	**2.9**	**2.3**	**2.2**	**1.7**
PCB-152	µg/kg	0.018	**0.0062 J**	0.031 U	**0.0071 J**	**0.0083 J**	**0.0066 J**
PCB-153	µg/kg	0.037	**3.6**	**4.7**	**3.8**	**3.9**	**2.8**
PCB-154	µg/kg	0.018	**0.067**	**0.083**	**0.067**	**0.076**	**0.054**
PCB-155	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-156	µg/kg	0.037	**0.33**	**0.44**	**0.38**	**0.34**	**0.27**
PCB-157	µg/kg	0.037	**0.33**	**0.44**	**0.38**	**0.34**	**0.27**
PCB-158	µg/kg	0.018	**0.35**	**0.44**	**0.38**	**0.37**	**0.28**
PCB-159	µg/kg	0.018	**0.03 J**	0.031 U	0.031 U	0.019 U	0.015 U
PCB-160	µg/kg	0.073	**4.6**	**5.9**	**4.8**	**4.9**	**3.6**
PCB-161	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-162	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-163	µg/kg	0.073	**4.6**	**5.9**	**4.8**	**4.9**	**3.6**
PCB-164	µg/kg	0.018	**0.32**	**0.41**	**0.33**	**0.35**	**0.25**
PCB-165	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-166	µg/kg	0.037	**0.55**	**0.71**	**0.6**	**0.6**	**0.45**
PCB-167	µg/kg	0.018	**0.11**	**0.16**	**0.13**	**0.13**	**0.1**
PCB-168	µg/kg	0.037	**3.6**	**4.7**	**3.8**	**3.9**	**2.8**
PCB-169	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-170	µg/kg	0.018	**0.63**	**0.83**	**0.7**	**0.64**	**0.52**
PCB-171	µg/kg	0.037	**0.22**	**0.27**	**0.23**	**0.23**	**0.18**
PCB-172	µg/kg	0.018	**0.12**	**0.16**	**0.14**	**0.12**	**0.11**
PCB-173	µg/kg	0.037	**0.22**	**0.27**	**0.23**	**0.23**	**0.18**
PCB-174	µg/kg	0.018	**0.71**	**0.93**	**0.78**	**0.75**	**0.6**
PCB-175	µg/kg	0.018	**0.029**	**0.037**	**0.036**	**0.032**	**0.027**
PCB-176	µg/kg	0.018	**0.12**	**0.15**	**0.13**	**0.13**	**0.096**
PCB-177	µg/kg	0.018	**0.47**	**0.66**	**0.55**	**0.5**	**0.41**
PCB-178	µg/kg	0.018	**0.2**	**0.26**	**0.22**	**0.21**	**0.17**
PCB-179	µg/kg	0.018	**0.44**	**0.61**	**0.47**	**0.48**	**0.36**
PCB-180	µg/kg	0.037	**0.76**	**0.95**	**0.88**	**0.76**	**0.66**
PCB-181	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U

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Table G-1F. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-07-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-07-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	0.94 J	2.2 J	1.7 J	1.4 J	3.1 U
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	**0.016**	0.031 U	0.031 U	0.019 U	0.015 U
PCB-183	µg/kg	0.037	**0.57**	**0.75**	**0.6**	**0.59**	**0.47**
PCB-184	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-185	µg/kg	0.037	**0.57**	**0.75**	**0.6**	**0.59**	**0.47**
PCB-186	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-187	µg/kg	0.018	**2.6**	**3.6**	**2.8**	**2.7**	**2**
PCB-188	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-189	µg/kg	0.018	**0.024**	**0.034**	0.031 U	**0.025 J**	**0.022**
PCB-190	µg/kg	0.018	**0.11**	**0.17**	**0.14**	**0.13**	**0.1**
PCB-191	µg/kg	0.018	**0.018 J**	0.031 U	0.031 U	**0.023**	**0.023**
PCB-192	µg/kg	0.018	0.016 U	0.031 U	0.031 U	0.019 U	0.015 U
PCB-193	µg/kg	0.037	**0.76**	**0.95**	**0.88**	**0.76**	**0.66**
PCB-194	µg/kg	0.018	**0.23**	**0.25**	**0.21**	**0.21**	**0.18**
PCB-195	µg/kg	0.018	**0.14**	**0.17**	**0.14**	**0.13 J**	**0.11**
PCB-196	µg/kg	0.018	**0.08**	**0.11 J**	**0.093**	**0.089**	**0.071**
PCB-197	µg/kg	0.018	**0.013 J**	**0.013 J**	**0.015 J**	**0.014 J**	**0.0093 J**
PCB-198	µg/kg	0.037	**0.36**	**0.55**	**0.43**	**0.37**	**0.3**
PCB-199	µg/kg	0.037	**0.36**	**0.55**	**0.43**	**0.37**	**0.3**
PCB-200	µg/kg	0.018	**0.034**	**0.041 J**	**0.038 J**	**0.037 J**	**0.036**
PCB-201	µg/kg	0.018	**0.043**	**0.056**	**0.046**	**0.043**	**0.035**
PCB-202	µg/kg	0.018	**0.072**	**0.1**	**0.081**	**0.081**	**0.063**
PCB-203	µg/kg	0.018	**0.17**	**0.26**	**0.22**	**0.18**	**0.15**
PCB-204	µg/kg	0.018	0.016 U	0.031 UJ	0.031 UJ	0.019 U	0.015 U
PCB-205	µg/kg	0.018	**0.018**	0.031 U	0.031 U	0.019 UJ	0.015 U
PCB-206	µg/kg	0.018	**0.088**	**0.12**	**0.11**	**0.097**	**0.14**
PCB-207	µg/kg	0.018	**0.013 J**	**0.013 J**	0.031 U	**0.015 J**	**0.013 J**
PCB-208	µg/kg	0.018	**0.034**	**0.043**	**0.036**	**0.03 J**	**0.046 J**
PCB 209	µg/kg	0.018	**0.079**	**0.066**	**0.052**	**0.048**	**0.14**
TOTAL PCB (ND=0)	µg/kg	---	**766**	**1052**	**914**	**865**	**609**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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Table G-1G. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-09-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-09-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	2.2 J	1.6 J	1.3 J	2.3 J	2.3 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	**0.3**	**0.22 J-**	**0.21**	**0.29**	**0.33 J-**
PCB-2	µg/kg	0.018	**0.054**	**0.046 J-**	**0.043**	**0.062**	**0.056 J**
PCB-3	µg/kg	0.018	**0.37**	**0.25**	**0.25**	**0.33**	**0.35**
PCB-4	µg/kg	0.037	**7.6**	**5.8**	**5.3**	**7.2**	**8**
PCB-5	µg/kg	0.018	**0.09 J**	**0.08**	**0.074**	**0.097 J**	**0.098**
PCB-6	µg/kg	0.018	**3.7**	**2.9**	**2.6**	**3.6**	**4**
PCB-7	µg/kg	0.018	**0.52**	**0.41**	**0.38**	**0.5**	**0.56**
PCB-8	µg/kg	0.037	**7.8**	**5.9**	**5.6**	**7.5**	**8.3**
PCB-9	µg/kg	0.018	**0.45**	**0.35**	**0.34**	**0.44**	**0.49**
PCB-10	µg/kg	0.018	**0.24**	**0.19**	**0.17**	**0.22**	**0.24**
PCB-11	µg/kg	0.037	**0.14**	**0.11 J**	**0.1**	**0.14**	**0.14 J**
PCB-12	µg/kg	0.037	**1.2**	**0.94**	**0.87**	**1.2**	**1.3**
PCB-13	µg/kg	0.037	**1.2**	**0.94**	**0.87**	**1.2**	**1.3**
PCB-14	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U
PCB-15	µg/kg	0.018	**6.3**	**4.7**	**4.3**	**5.9**	**6.4**
PCB-16	µg/kg	0.018	**4.3**	**3.2**	**3.2**	**4.3**	**4.5**
PCB-17	µg/kg	0.018	**19**	**14**	**14**	**18**	**20**
PCB-18	µg/kg	0.037	**15**	**11**	**11**	**14**	**16**
PCB-19	µg/kg	0.018	**4.3**	**3.3**	**3.2**	**4.3**	**4.3**
PCB-20	µg/kg	0.037	**26**	**20**	**20**	**26**	**28**
PCB-21	µg/kg	0.037	**3.2**	**2.4**	**2.3**	**2.9**	**3.4**
PCB-22	µg/kg	0.018	**6.7**	**5**	**4.9**	**6.6**	**6.9**
PCB-23	µg/kg	0.018	**0.023 J**	0.016 U	0.014 U	0.017 U	**0.024 J**
PCB-24	µg/kg	0.018	**0.34**	**0.23**	**0.21**	**0.31**	**0.32 J**
PCB-25	µg/kg	0.018	**6**	**4.7**	**4.7**	**6**	**6.9**
PCB-26	µg/kg	0.037	**7.7**	**6.1**	**6.1**	**7.9**	**8.9**
PCB-27	µg/kg	0.018	**3.4**	**2.6**	**2.5**	**3.3**	**3.6**
PCB-28	µg/kg	0.037	**26**	**20**	**20**	**26**	**28**
PCB-29	µg/kg	0.037	**7.7**	**6.1**	**6.1**	**7.9**	**8.9**
PCB-30	µg/kg	0.037	**15**	**11**	**11**	**14**	**16**
PCB-31	µg/kg	0.037	**21**	**16**	**16**	**21**	**23**
PCB-32	µg/kg	0.018	**12**	**8.8**	**8.6**	**11**	**12**
PCB-33	µg/kg	0.037	**3.2**	**2.4**	**2.3**	**2.9**	**3.4**
PCB-34	µg/kg	0.018	**0.3**	**0.24**	**0.25**	**0.31**	**0.35**
PCB-35	µg/kg	0.018	**0.062**	0.016 U	0.014 U	**0.098**	**0.056 J**
PCB-36	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U
PCB-37	µg/kg	0.018	**2.1**	**1.7**	**1.6**	**2.3**	**2.2**
PCB-38	µg/kg	0.018	**0.035 J**	0.016 U	0.014 U	0.017 U	**0.04 J**
PCB-39	µg/kg	0.018	**0.13**	0.016 U	**0.1 J**	**0.15**	**0.13**
PCB-40	µg/kg	0.062	**14**	**12**	**11**	**16**	**16**
PCB-41	µg/kg	0.062	**14**	**12**	**11**	**16**	**16**
PCB-42	µg/kg	0.049	**8.2**	**6.6**	**6.2**	**9.2**	**9**
PCB-43	µg/kg	0.051	**1.4 J**	**1.4**	**1**	**1.7**	**1.5**
PCB-44	µg/kg	0.059	**28**	**22**	**21**	**31**	**30**
PCB-45	µg/kg	0.055	**6.4**	**5.1**	**2.3 J**	**7**	**7.1**
PCB-46	µg/kg	0.061	**1.8**	**1.5**	**1.4**	**2**	**1.9**
PCB-47	µg/kg	0.059	**28**	**22**	**21**	**31**	**30**
PCB-48	µg/kg	0.049	**3.2**	**2.6**	**2.3**	**3.7**	**3.3**
PCB-49	µg/kg	0.047	**21**	**16**	**15**	**23**	**22**
PCB-50	µg/kg	0.052	**4.4**	**3.7**	**3.6**	**4.9**	**5.3**
PCB-51	µg/kg	0.055	**6.4**	**5.1**	**2.3 J**	**7**	**7.1**
PCB-52	µg/kg	0.048	**29**	**23**	**21**	**32**	**31**
PCB-53	µg/kg	0.052	**4.4**	**3.7**	**3.6**	**4.9**	**5.3**
PCB-54	µg/kg	0.018	**0.15**	**0.11**	**0.1**	**0.14**	**0.14**
PCB-55	µg/kg	0.036	**0.26**	**0.24**	**0.16 J**	0.059 U	**0.31 J**
PCB-56	µg/kg	0.037	**4.3**	**3.4**	**3.1**	**4.6**	**4.6**
PCB-57	µg/kg	0.037	**0.28**	**0.21**	**0.2**	**0.29**	**0.3**
PCB-58	µg/kg	0.037	**0.13**	**0.072 J**	**0.076**	**0.1 J**	**0.11 J**
PCB-59	µg/kg	0.056	**3**	**2.4**	**2.2**	**3.5**	**3.2**
PCB-60	µg/kg	0.037	**1.6**	**1.2**	**1.1**	**1.6**	**1.7**
PCB-61	µg/kg	0.073	**16**	**13**	**12**	**18**	**18**

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Table G-1G. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-09-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-09-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	2.2 J	1.6 J	1.3 J	2.3 J	2.3 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	**3**	**2.4**	**2.2**	**3.5**	**3.2**
PCB-63	µg/kg	0.034	**1.3**	**1**	**0.94**	**1.4**	**1.4**
PCB-64	µg/kg	0.034	**11**	**8.8**	**8.3**	**12**	**12**
PCB-65	µg/kg	0.059	**28**	**22**	**21**	**31**	**30**
PCB-66	µg/kg	0.035	**9.8**	**7.6**	**7.1**	**11**	**10**
PCB-67	µg/kg	0.033	**0.51**	**0.38**	**0.35**	**0.54**	**0.53**
PCB-68	µg/kg	0.033	**0.22**	**0.18**	**0.16**	**0.25**	**0.23**
PCB-69	µg/kg	0.047	**21**	**16**	**15**	**23**	**22**
PCB-70	µg/kg	0.073	**16**	**13**	**12**	**18**	**18**
PCB-71	µg/kg	0.062	**14**	**12**	**11**	**16**	**16**
PCB-72	µg/kg	0.036	**0.34**	**0.25**	**0.24**	**0.35**	**0.37**
PCB-73	µg/kg	0.051	**1.4 J**	**1.4**	**1**	**1.7**	**1.5**
PCB-74	µg/kg	0.073	**16**	**13**	**12**	**18**	**18**
PCB-75	µg/kg	0.056	**3**	**2.4**	**2.2**	**3.5**	**3.2**
PCB-76	µg/kg	0.073	**16**	**13**	**12**	**18**	**18**
PCB-77	µg/kg	0.036	**0.5**	**0.36 J**	**0.4**	**0.48**	**0.53**
PCB-78	µg/kg	0.037	0.067 U	0.051 U	0.045 U	0.06 U	0.069 U
PCB-79	µg/kg	0.033	**0.086**	0.044 U	**0.071 J**	**0.094**	**0.099**
PCB-80	µg/kg	0.032	0.057 U	0.044 U	0.038 U	0.051 U	0.059 U
PCB-81	µg/kg	0.034	0.06 U	0.045 U	0.04 U	0.052 U	0.06 U
PCB-82	µg/kg	0.018	**1.3**	**0.94**	**0.94**	**1.1**	**1.3**
PCB-83	µg/kg	0.037	**6.5**	**4.7**	**4.5**	**5.8**	**6.8**
PCB-84	µg/kg	0.018	**3.4**	**2.7**	**2.5**	**3.4**	**3.7**
PCB-85	µg/kg	0.055	**2.3**	**1.7**	**1.6**	**2**	**2.5**
PCB-86	µg/kg	0.110	**5.7**	**4.2**	**3.9**	**5.3**	**6.2**
PCB-87	µg/kg	0.110	**5.7**	**4.2**	**3.9**	**5.3**	**6.2**
PCB-88	µg/kg	0.037	**3**	**2.3**	**2.2**	**3**	**3.4**
PCB-89	µg/kg	0.018	**0.29 J**	**0.27**	**0.25**	**0.35**	**0.35**
PCB-90	µg/kg	0.055	**8**	**5.9**	**5.6**	**7.2**	**8.6**
PCB-91	µg/kg	0.037	**3**	**2.3**	**2.2**	**3**	**3.4**
PCB-92	µg/kg	0.018	**2.3**	**1.8**	**1.7**	**2.3**	**2.6**
PCB-93	µg/kg	0.037	**0.39**	**0.28**	**0.24 J**	**0.39**	**0.41**
PCB-94	µg/kg	0.018	**0.21**	**0.16**	**0.16**	**0.21**	**0.22**
PCB-95	µg/kg	0.018	**9.3**	**7.2**	**6.7**	**8.9**	**10**
PCB-96	µg/kg	0.018	**0.31**	**0.23**	**0.21**	**0.3**	**0.32**
PCB-97	µg/kg	0.110	**5.7**	**4.2**	**3.9**	**5.3**	**6.2**
PCB-98	µg/kg	0.037	**0.95**	**0.71**	**0.67**	**0.91**	**1**
PCB-99	µg/kg	0.037	**6.5**	**4.7**	**4.5**	**5.8**	**6.8**
PCB-100	µg/kg	0.037	**0.39**	**0.28**	**0.24 J**	**0.39**	**0.41**
PCB-101	µg/kg	0.055	**8**	**5.9**	**5.6**	**7.2**	**8.6**
PCB-102	µg/kg	0.037	**0.95**	**0.71**	**0.67**	**0.91**	**1**
PCB-103	µg/kg	0.018	**0.18**	**0.14**	**0.13**	**0.18**	**0.22**
PCB-104	µg/kg	0.018	**0.0085 J**	0.016 U	0.014 U	0.017 U	**0.0084 J**
PCB-105	µg/kg	0.018	**1.7**	**1.3**	**1.3**	**1.7**	**1.8**
PCB-106	µg/kg	0.018	**0.017 J**	0.016 U	**0.01 J**	**0.01 J**	**0.01 J**
PCB-107	µg/kg	0.018	**0.59 J**	**0.41**	**0.4**	**0.53**	**0.61 J**
PCB-108	µg/kg	0.037	**0.21**	**0.15**	**0.15**	**0.2**	**0.23**
PCB-109	µg/kg	0.110	**5.7**	**4.2**	**3.9**	**5.3**	**6.2**
PCB-110	µg/kg	0.037	**11**	**7.9**	**7.5**	**9.7**	**11**
PCB-111	µg/kg	0.018	**0.039**	0.016 U	0.014 U	0.017 U	**0.027 J**
PCB-112	µg/kg	0.018	**0.013 J**	**0.081**	0.014 U	**0.096 J**	0.031 U
PCB-113	µg/kg	0.055	**8**	**5.9**	**5.6**	**7.2**	**8.6**
PCB-114	µg/kg	0.018	**0.19**	**0.14**	**0.12**	**0.17**	**0.19**
PCB-115	µg/kg	0.037	**11**	**7.9**	**7.5**	**9.7**	**11**
PCB-116	µg/kg	0.055	**2.3**	**1.7**	**1.6**	**2**	**2.5**
PCB-117	µg/kg	0.055	**2.3**	**1.7**	**1.6**	**2**	**2.5**
PCB-118	µg/kg	0.018	**4.6**	**3.3**	**3.3**	**4.5**	**4.9**
PCB-119	µg/kg	0.110	**5.7**	**4.2**	**3.9**	**5.3**	**6.2**
PCB-120	µg/kg	0.018	**0.042**	0.016 U	0.014 U	0.017 U	**0.036**
PCB-121	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U

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Table G-1G. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-09-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-09-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	2.2 J	1.6 J	1.3 J	2.3 J	2.3 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.13**	**0.083**	**0.084**	**0.12**	**0.13**
PCB-123	µg/kg	0.018	**0.14**	**0.11**	**0.11**	**0.14**	**0.16**
PCB-124	µg/kg	0.037	**0.21**	**0.15**	**0.15**	**0.2**	**0.23**
PCB-125	µg/kg	0.110	**5.7**	**4.2**	**3.9**	**5.3**	**6.2**
PCB-126	µg/kg	0.018	**0.018 J**	**0.012 J**	**0.011 J**	**0.014 J**	**0.02 J**
PCB-127	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U
PCB-128	µg/kg	0.037	**0.56**	**0.39**	**0.41**	**0.55**	**0.6**
PCB-129	µg/kg	0.073	**4.4**	**3.3**	**3.3**	**4.4**	**4.7**
PCB-130	µg/kg	0.018	**0.27**	**0.19**	**0.21**	**0.27**	**0.29**
PCB-131	µg/kg	0.018	**0.058**	**0.042**	**0.05**	**0.052 J**	**0.046**
PCB-132	µg/kg	0.018	**1.3**	**0.98**	**1**	**1.3**	**1.4**
PCB-133	µg/kg	0.018	**0.089**	**0.065**	**0.065**	**0.087**	**0.084**
PCB-134	µg/kg	0.037	**0.24**	**0.18**	**0.19**	**0.24**	**0.26**
PCB-135	µg/kg	0.037	**2.2**	**1.6**	**1.5**	**2.1**	**2.2**
PCB-136	µg/kg	0.018	**0.58**	**0.43**	**0.42**	**0.58**	**0.61**
PCB-137	µg/kg	0.018	**0.12**	**0.093**	**0.089**	**0.11**	**0.13**
PCB-138	µg/kg	0.073	**4.4**	**3.3**	**3.3**	**4.4**	**4.7**
PCB-139	µg/kg	0.037	**0.084**	**0.062**	**0.06 J**	**0.08**	**0.092**
PCB-140	µg/kg	0.037	**0.084**	**0.062**	**0.06 J**	**0.08**	**0.092**
PCB-141	µg/kg	0.018	**0.45**	**0.33**	**0.36**	**0.45**	**0.49**
PCB-142	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U
PCB-143	µg/kg	0.037	**0.24**	**0.18**	**0.19**	**0.24**	**0.26**
PCB-144	µg/kg	0.018	**0.18**	**0.13**	**0.13**	**0.17**	**0.17 J**
PCB-145	µg/kg	0.018	**0.0048 J**	**0.0039 J**	**0.003 J**	**0.0058 J**	**0.0048 J**
PCB-146	µg/kg	0.018	**0.74**	**0.53**	**0.56**	**0.72**	**0.78**
PCB-147	µg/kg	0.037	**5**	**3.7**	**3.7**	**5**	**5.4**
PCB-148	µg/kg	0.018	**0.0094 J**	**0.0079 J**	**0.0048 J**	**0.0082 J**	**0.011 J**
PCB-149	µg/kg	0.037	**5**	**3.7**	**3.7**	**5**	**5.4**
PCB-150	µg/kg	0.018	**0.0096 J**	**0.0094 J**	**0.0075 J**	**0.0083 J**	**0.0052 J**
PCB-151	µg/kg	0.037	**2.2**	**1.6**	**1.5**	**2.1**	**2.2**
PCB-152	µg/kg	0.018	**0.0078 J**	**0.0071 J**	**0.0065 J**	**0.0091 J**	**0.0062 J**
PCB-153	µg/kg	0.037	**3.5**	**2.6**	**2.6**	**3.5**	**3.7**
PCB-154	µg/kg	0.018	**0.081**	**0.053**	**0.045 J**	**0.078**	**0.078**
PCB-155	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U
PCB-156	µg/kg	0.037	**0.33**	**0.23**	**0.24**	**0.32**	**0.35**
PCB-157	µg/kg	0.037	**0.33**	**0.23**	**0.24**	**0.32**	**0.35**
PCB-158	µg/kg	0.018	**0.34**	**0.25**	**0.26**	**0.34**	**0.37**
PCB-159	µg/kg	0.018	**0.031**	0.016 U	0.014 U	**0.034**	**0.029 J**
PCB-160	µg/kg	0.073	**4.4**	**3.3**	**3.3**	**4.4**	**4.7**
PCB-161	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U
PCB-162	µg/kg	0.018	**0.012 J**	0.016 U	0.014 U	0.017 U	**0.014 J**
PCB-163	µg/kg	0.073	**4.4**	**3.3**	**3.3**	**4.4**	**4.7**
PCB-164	µg/kg	0.018	**0.31**	**0.22**	**0.24**	**0.33**	**0.34**
PCB-165	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U
PCB-166	µg/kg	0.037	**0.56**	**0.39**	**0.41**	**0.55**	**0.6**
PCB-167	µg/kg	0.018	**0.13**	**0.094**	**0.095**	**0.12 J**	**0.13**
PCB-168	µg/kg	0.037	**3.5**	**2.6**	**2.6**	**3.5**	**3.7**
PCB-169	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U
PCB-170	µg/kg	0.018	**0.62**	**0.46**	**0.46**	**0.61**	**0.64**
PCB-171	µg/kg	0.037	**0.22**	**0.17**	**0.17**	**0.22**	**0.23**
PCB-172	µg/kg	0.018	**0.13**	**0.099**	**0.11**	**0.13**	**0.13**
PCB-173	µg/kg	0.037	**0.22**	**0.17**	**0.17**	**0.22**	**0.23**
PCB-174	µg/kg	0.018	**0.71**	**0.53**	**0.52**	**0.69**	**0.74**
PCB-175	µg/kg	0.018	**0.032**	**0.024**	**0.025**	**0.034**	**0.033**
PCB-176	µg/kg	0.018	**0.13**	**0.092**	**0.095**	**0.12**	**0.13**
PCB-177	µg/kg	0.018	**0.53**	**0.37**	**0.37**	**0.49**	**0.54**
PCB-178	µg/kg	0.018	**0.21**	**0.16**	**0.16**	**0.22**	**0.23**
PCB-179	µg/kg	0.018	**0.45**	**0.33**	**0.34**	**0.45**	**0.47**
PCB-180	µg/kg	0.037	**0.69**	**0.5**	**0.53**	**0.68**	**0.72**
PCB-181	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U

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Table G-1G. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-09-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-09-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	2.2 J	1.6 J	1.3 J	2.3 J	2.3 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	**0.013 J**	0.016 U	0.014 U	0.017 U	**0.019 J**
PCB-183	µg/kg	0.037	**0.59**	**0.42**	**0.42**	**0.57**	**0.63**
PCB-184	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U
PCB-185	µg/kg	0.037	**0.59**	**0.42**	**0.42**	**0.57**	**0.63**
PCB-186	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U
PCB-187	µg/kg	0.018	**2.7**	**1.9**	**1.9**	**2.6**	**2.7**
PCB-188	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U
PCB-189	µg/kg	0.018	0.03 U	**0.019**	**0.019 J**	**0.025 J**	**0.032**
PCB-190	µg/kg	0.018	**0.14**	**0.065 J**	**0.097**	**0.13 J**	**0.14**
PCB-191	µg/kg	0.018	0.03 U	**0.019**	**0.019 J**	**0.022**	0.031 U
PCB-192	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U
PCB-193	µg/kg	0.037	**0.69**	**0.5**	**0.53**	**0.68**	**0.72**
PCB-194	µg/kg	0.018	**0.21**	**0.15**	**0.16**	**0.22**	**0.21**
PCB-195	µg/kg	0.018	**0.13**	**0.095**	**0.089 J**	**0.14**	**0.13**
PCB-196	µg/kg	0.018	**0.084**	**0.066**	**0.061**	**0.088**	**0.083 J**
PCB-197	µg/kg	0.018	**0.012 J**	**0.0098 J**	**0.011 J**	**0.016 J**	**0.014 J**
PCB-198	µg/kg	0.037	**0.4**	**0.3**	**0.29**	**0.4**	**0.43**
PCB-199	µg/kg	0.037	**0.4**	**0.3**	**0.29**	**0.4**	**0.43**
PCB-200	µg/kg	0.018	**0.04**	**0.031 J**	**0.033**	**0.041**	**0.041**
PCB-201	µg/kg	0.018	**0.042 J**	**0.036**	**0.039**	**0.031**	**0.053**
PCB-202	µg/kg	0.018	**0.076**	**0.056**	**0.057**	**0.08**	**0.085**
PCB-203	µg/kg	0.018	**0.2**	**0.14**	**0.15**	**0.19**	**0.21**
PCB-204	µg/kg	0.018	0.03 U	0.016 U	0.014 U	0.017 U	0.031 U
PCB-205	µg/kg	0.018	0.03 U	0.016 UJ	0.014 UJ	0.017 UJ	0.031 UJ
PCB-206	µg/kg	0.018	**0.094**	**0.09**	**0.068**	**0.11**	**0.093**
PCB-207	µg/kg	0.018	**0.011 J**	**0.011 J**	**0.012 J**	**0.013 J**	**0.018 J**
PCB-208	µg/kg	0.018	**0.028 J**	**0.037 J**	**0.026**	**0.039**	**0.035**
PCB 209	µg/kg	0.018	**0.045**	**0.096**	**0.035**	**0.049**	**0.038 J**
TOTAL PCB (ND=0)	µg/kg	---	**738**	**572**	**536**	**763**	**798**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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Table G-1H. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-11-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-11-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.2 J	1.4 J	1.9 J	1.4 J	1.6 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	0.087	0.11	0.11	0.099	0.092
PCB-2	µg/kg	0.018	0.023	0.022 J	0.027 J	0.021 J	0.029
PCB-3	µg/kg	0.018	0.11	0.13	0.15	0.13	0.12
PCB-4	µg/kg	0.037	2.2	2.6	2.7	2.5	2.4
PCB-5	µg/kg	0.018	0.039	0.045	0.041 J	0.035 J	0.032 J
PCB-6	µg/kg	0.018	1.3	1.5	1.6	1.5	1.4
PCB-7	µg/kg	0.018	0.17	0.2	0.22	0.2	0.19 J
PCB-8	µg/kg	0.037	2.6	3	3.2	3	2.8
PCB-9	µg/kg	0.018	0.15	0.17	0.18 J	0.17	0.16
PCB-10	µg/kg	0.018	0.08	0.11	0.1 J	0.11	0.091
PCB-11	µg/kg	0.037	0.094	0.092	0.096 J	0.092	0.1
PCB-12	µg/kg	0.037	0.51	0.6	0.64	0.59	0.55
PCB-13	µg/kg	0.037	0.51	0.6	0.64	0.59	0.55
PCB-14	µg/kg	0.018	0.023 U	0.018 U	0.032 U	0.022 U	0.025 U
PCB-15	µg/kg	0.018	2.9	3.2	3.6	3.2	3.1
PCB-16	µg/kg	0.018	1.6	1.8	2	1.8	1.8
PCB-17	µg/kg	0.018	6.8	7.9	8.4	7.6	7.4
PCB-18	µg/kg	0.037	5.8	6.5	7.2	6.3	6.5
PCB-19	µg/kg	0.018	1.4	1.6	1.7	1.6	1.5
PCB-20	µg/kg	0.037	13	14	16	14	14
PCB-21	µg/kg	0.037	1.5	1.6	1.9	1.7	1.6
PCB-22	µg/kg	0.018	3	3.4	3.7	3.4	3.3
PCB-23	µg/kg	0.018	0.01 J	0.018 U	0.012 J	0.022 U	0.011 J
PCB-24	µg/kg	0.018	0.11 J	0.15	0.14	0.13	0.16
PCB-25	µg/kg	0.018	3	3.3	3.8	3.4	3.3
PCB-26	µg/kg	0.037	4.1	4.4	5	4.5	4.4
PCB-27	µg/kg	0.018	1.3	1.4	1.6	1.4	1.4
PCB-28	µg/kg	0.037	13	14	16	14	14
PCB-29	µg/kg	0.037	4.1	4.4	5	4.5	4.4
PCB-30	µg/kg	0.037	5.8	6.5	7.2	6.3	6.5
PCB-31	µg/kg	0.037	10	11	13	11	11
PCB-32	µg/kg	0.018	4.6	5.1	5.5	4.9	5
PCB-33	µg/kg	0.037	1.5	1.6	1.9	1.7	1.6
PCB-34	µg/kg	0.018	0.15	0.17	0.18	0.16	0.17
PCB-35	µg/kg	0.018	0.028 J	0.033	0.033	0.027	0.041
PCB-36	µg/kg	0.018	0.023 U	0.018 U	0.032 U	0.022 U	0.025 U
PCB-37	µg/kg	0.018	1.1	1.2	1.3	1.2	1.1
PCB-38	µg/kg	0.018	0.022 J	0.023 J	0.021 J	0.021 J	0.019 J
PCB-39	µg/kg	0.018	0.06	0.06 J	0.07	0.067	0.066
PCB-40	µg/kg	0.062	7.4	8.5	8.9	8.2	7.9
PCB-41	µg/kg	0.062	7.4	8.5	8.9	8.2	7.9
PCB-42	µg/kg	0.049	4.3	4.9	5.1	4.7	4.5
PCB-43	µg/kg	0.051	0.7	0.78	0.83	0.76	0.82
PCB-44	µg/kg	0.059	14	16	17	16	15
PCB-45	µg/kg	0.055	3.1	1.6 J	3.6	3.4	3.2
PCB-46	µg/kg	0.061	0.82	0.94	1	0.95	0.87
PCB-47	µg/kg	0.059	14	16	17	16	15
PCB-48	µg/kg	0.049	1.6	1.8	1.9	1.7	1.7
PCB-49	µg/kg	0.047	10	12	12	11	11
PCB-50	µg/kg	0.052	2.3	2.6	2.8	2.5	2.4
PCB-51	µg/kg	0.055	3.1	1.6 J	3.6	3.4	3.2
PCB-52	µg/kg	0.048	15	17	17	16	15
PCB-53	µg/kg	0.052	2.3	2.6	2.8	2.5	2.4
PCB-54	µg/kg	0.018	0.054	0.066	0.072	0.056 J	0.057
PCB-55	µg/kg	0.036	0.11 J	0.17	0.19	0.18 J	0.13 J
PCB-56	µg/kg	0.037	2.4	2.8	2.8	2.5	2.5
PCB-57	µg/kg	0.037	0.15	0.18	0.17	0.17	0.15
PCB-58	µg/kg	0.037	0.041 J	0.069 J	0.054 J	0.049 J	0.064 J
PCB-59	µg/kg	0.056	1.6	1.8	1.8	1.7	1.7
PCB-60	µg/kg	0.037	0.89	1.1	1.1	0.98	0.95
PCB-61	µg/kg	0.073	8.8	10	10	9.6	9.3

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Table G-1H. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-11-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-11-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.2 J	1.4 J	1.9 J	1.4 J	1.6 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	**1.6**	**1.8**	**1.8**	**1.7**	**1.7**
PCB-63	µg/kg	0.034	**0.69**	**0.82**	**0.81**	**0.75**	**0.72**
PCB-64	µg/kg	0.034	**5.8**	**6.7**	**6.9**	**6.4**	**6.2**
PCB-65	µg/kg	0.059	**14**	**16**	**17**	**16**	**15**
PCB-66	µg/kg	0.035	**5.5**	**6.4**	**6.4**	**5.9**	**5.7**
PCB-67	µg/kg	0.033	**0.24 J**	**0.3**	**0.3**	**0.29**	**0.27**
PCB-68	µg/kg	0.033	**0.13**	**0.14**	**0.16**	**0.15**	**0.14**
PCB-69	µg/kg	0.047	**10**	**12**	**12**	**11**	**11**
PCB-70	µg/kg	0.073	**8.8**	**10**	**10**	**9.6**	**9.3**
PCB-71	µg/kg	0.062	**7.4**	**8.5**	**8.9**	**8.2**	**7.9**
PCB-72	µg/kg	0.036	**0.18**	**0.21**	**0.21**	**0.19**	**0.21**
PCB-73	µg/kg	0.051	**0.7**	**0.78**	**0.83**	**0.76**	**0.82**
PCB-74	µg/kg	0.073	**8.8**	**10**	**10**	**9.6**	**9.3**
PCB-75	µg/kg	0.056	**1.6**	**1.8**	**1.8**	**1.7**	**1.7**
PCB-76	µg/kg	0.073	**8.8**	**10**	**10**	**9.6**	**9.3**
PCB-77	µg/kg	0.036	**0.29**	**0.32**	**0.31**	**0.33**	**0.27 J**
PCB-78	µg/kg	0.037	0.04 U	0.043 U	0.047 U	0.024 U	0.027 U
PCB-79	µg/kg	0.033	**0.049 J**	**0.067**	**0.065**	**0.059**	**0.047 J**
PCB-80	µg/kg	0.032	0.034 U	0.037 U	0.04 U	0.022 U	0.025 U
PCB-81	µg/kg	0.034	0.036 U	0.038 U	0.041 U	0.022 U	0.025 U
PCB-82	µg/kg	0.018	**0.77 J**	**0.85 J**	**0.93 J**	**0.81 J**	**0.84**
PCB-83	µg/kg	0.037	**3.9**	**4.4**	**4.8**	**4**	**4**
PCB-84	µg/kg	0.018	**1.8**	**2.1**	**2.3**	**2**	**1.9**
PCB-85	µg/kg	0.055	**1.4**	**1.6**	**1.6**	**1.5**	**1.5**
PCB-86	µg/kg	0.110	**3.3**	**3.8**	**4**	**3.5**	**3.5**
PCB-87	µg/kg	0.110	**3.3**	**3.8**	**4**	**3.5**	**3.5**
PCB-88	µg/kg	0.037	**1.7**	**2**	**2**	**1.8**	**1.8**
PCB-89	µg/kg	0.018	**0.2**	**0.23**	**0.25**	**0.2**	**0.2**
PCB-90	µg/kg	0.055	**4.9**	**5.5**	**5.8**	**5.1**	**5.2**
PCB-91	µg/kg	0.037	**1.7**	**2**	**2**	**1.8**	**1.8**
PCB-92	µg/kg	0.018	**1.4**	**1.6**	**1.7**	**1.5**	**1.5**
PCB-93	µg/kg	0.037	**0.21**	**0.24**	**0.25**	**0.22**	**0.21 J**
PCB-94	µg/kg	0.018	**0.12**	**0.14**	**0.14**	**0.12**	**0.12**
PCB-95	µg/kg	0.018	**5.3**	**6.1**	**6.4**	**5.4**	**5.6**
PCB-96	µg/kg	0.018	**0.16**	**0.18**	**0.17**	**0.17**	**0.16**
PCB-97	µg/kg	0.110	**3.3**	**3.8**	**4**	**3.5**	**3.5**
PCB-98	µg/kg	0.037	**0.52**	**0.58**	**0.6**	**0.56**	**0.55**
PCB-99	µg/kg	0.037	**3.9**	**4.4**	**4.8**	**4**	**4**
PCB-100	µg/kg	0.037	**0.21**	**0.24**	**0.25**	**0.22**	**0.21 J**
PCB-101	µg/kg	0.055	**4.9**	**5.5**	**5.8**	**5.1**	**5.2**
PCB-102	µg/kg	0.037	**0.52**	**0.58**	**0.6**	**0.56**	**0.55**
PCB-103	µg/kg	0.018	**0.11**	**0.11**	**0.11 J**	**0.1**	**0.11**
PCB-104	µg/kg	0.018	0.023 U	**0.0049 J**	**0.0065 J**	0.022 U	0.025 U
PCB-105	µg/kg	0.018	**1.1**	**1.2**	**1.3**	**1.1**	**1.1**
PCB-106	µg/kg	0.018	**0.0077 J**	**0.0057 J**	**0.01 J**	**0.0093 J**	**0.01 J**
PCB-107	µg/kg	0.018	**0.37**	**0.4**	**0.42**	**0.37**	**0.37**
PCB-108	µg/kg	0.037	**0.12**	**0.15**	**0.15**	**0.13**	**0.14**
PCB-109	µg/kg	0.110	**3.3**	**3.8**	**4**	**3.5**	**3.5**
PCB-110	µg/kg	0.037	**6.5**	**7.4**	**7.8**	**6.7**	**6.9**
PCB-111	µg/kg	0.018	0.023 U	0.018 U	**0.039**	0.022 U	0.025 U
PCB-112	µg/kg	0.018	**0.064**	**0.068 J**	**0.023 J**	**0.077**	**0.06 J**
PCB-113	µg/kg	0.055	**4.9**	**5.5**	**5.8**	**5.1**	**5.2**
PCB-114	µg/kg	0.018	**0.12**	**0.12**	**0.12**	**0.12**	**0.11**
PCB-115	µg/kg	0.037	**6.5**	**7.4**	**7.8**	**6.7**	**6.9**
PCB-116	µg/kg	0.055	**1.4**	**1.6**	**1.6**	**1.5**	**1.5**
PCB-117	µg/kg	0.055	**1.4**	**1.6**	**1.6**	**1.5**	**1.5**
PCB-118	µg/kg	0.018	**2.8**	**3.2**	**3.3**	**3**	**2.8**
PCB-119	µg/kg	0.110	**3.3**	**3.8**	**4**	**3.5**	**3.5**
PCB-120	µg/kg	0.018	**0.022 J**	**0.03 J**	**0.025 J**	**0.021 J**	**0.029**
PCB-121	µg/kg	0.018	0.023 U	0.018 U	0.032 U	0.022 U	0.025 U

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Table G-1H. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-11-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-11-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.2 J	1.4 J	1.9 J	1.4 J	1.6 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.06 J**	**0.084**	**0.096**	**0.085**	**0.081**
PCB-123	µg/kg	0.018	**0.091**	**0.087 J**	0.032 U	**0.083 J**	**0.078**
PCB-124	µg/kg	0.037	**0.12**	**0.15**	**0.15**	**0.13**	**0.14**
PCB-125	µg/kg	0.110	**3.3**	**3.8**	**4**	**3.5**	**3.5**
PCB-126	µg/kg	0.018	**0.011 J**	**0.014 J**	**0.012 J**	**0.011 J**	**0.013 J**
PCB-127	µg/kg	0.018	0.023 U	0.018 U	0.032 U	0.022 U	0.025 U
PCB-128	µg/kg	0.037	**0.39**	**0.43**	**0.44**	**0.39**	**0.41**
PCB-129	µg/kg	0.073	**3**	**3.4**	**3.4**	**3.1**	**3.2**
PCB-130	µg/kg	0.018	**0.18**	**0.21**	**0.22**	**0.17**	**0.19 J**
PCB-131	µg/kg	0.018	**0.039**	**0.043**	**0.043**	**0.029 J**	**0.037 J**
PCB-132	µg/kg	0.018	**0.88**	**0.99**	**0.98**	**0.89**	**0.92**
PCB-133	µg/kg	0.018	**0.058**	**0.071**	**0.062**	**0.058**	**0.068**
PCB-134	µg/kg	0.037	**0.16**	**0.18**	**0.17 J**	**0.17**	**0.17**
PCB-135	µg/kg	0.037	**1.4**	**1.5**	**1.5**	**1.4**	**1.4**
PCB-136	µg/kg	0.018	**0.37**	**0.4**	**0.41**	**0.37**	**0.36**
PCB-137	µg/kg	0.018	**0.075**	**0.076 J**	**0.088**	**0.085**	**0.086**
PCB-138	µg/kg	0.073	**3**	**3.4**	**3.4**	**3.1**	**3.2**
PCB-139	µg/kg	0.037	**0.054**	**0.062**	**0.06 J**	**0.053**	**0.063**
PCB-140	µg/kg	0.037	**0.054**	**0.062**	**0.06 J**	**0.053**	**0.063**
PCB-141	µg/kg	0.018	**0.32**	**0.33**	**0.36**	**0.31**	**0.32**
PCB-142	µg/kg	0.018	0.023 U	0.018 U	0.032 U	0.022 U	0.025 U
PCB-143	µg/kg	0.037	**0.16**	**0.18**	**0.17 J**	**0.17**	**0.17**
PCB-144	µg/kg	0.018	**0.1 J**	**0.13**	**0.12**	**0.12**	**0.12**
PCB-145	µg/kg	0.018	**0.0035 J**	**0.004 J**	**0.0027 J**	**0.003 J**	**0.0033 J**
PCB-146	µg/kg	0.018	**0.5**	**0.57**	**0.6**	**0.52**	**0.53**
PCB-147	µg/kg	0.037	**3.4**	**3.9**	**3.8**	**3.5**	**3.6**
PCB-148	µg/kg	0.018	**0.0061 J**	**0.0075 J**	**0.0054 J**	**0.0049 J**	**0.0058 J**
PCB-149	µg/kg	0.037	**3.4**	**3.9**	**3.8**	**3.5**	**3.6**
PCB-150	µg/kg	0.018	**0.0044 J**	**0.0063 J**	**0.0061 J**	**0.0057 J**	**0.0046 J**
PCB-151	µg/kg	0.037	**1.4**	**1.5**	**1.5**	**1.4**	**1.4**
PCB-152	µg/kg	0.018	**0.0047 J**	**0.0063 J**	**0.0038 J**	**0.0045 J**	**0.0076 J**
PCB-153	µg/kg	0.037	**2.4**	**2.7**	**2.7**	**2.5**	**2.5**
PCB-154	µg/kg	0.018	**0.047**	**0.054**	**0.042 J**	**0.046**	**0.038 J**
PCB-155	µg/kg	0.018	0.023 U	0.018 U	0.032 U	0.022 U	0.025 U
PCB-156	µg/kg	0.037	**0.22**	**0.25**	**0.26**	**0.23**	**0.24**
PCB-157	µg/kg	0.037	**0.22**	**0.25**	**0.26**	**0.23**	**0.24**
PCB-158	µg/kg	0.018	**0.23**	**0.25**	**0.27**	**0.23**	**0.24**
PCB-159	µg/kg	0.018	**0.017 J**	**0.027**	**0.026 J**	**0.022**	**0.018 J**
PCB-160	µg/kg	0.073	**3**	**3.4**	**3.4**	**3.1**	**3.2**
PCB-161	µg/kg	0.018	0.023 U	0.018 U	0.032 U	0.022 U	0.025 U
PCB-162	µg/kg	0.018	**0.013 J**	**0.01 J**	**0.013 J**	**0.0098 J**	**0.011 J**
PCB-163	µg/kg	0.073	**3**	**3.4**	**3.4**	**3.1**	**3.2**
PCB-164	µg/kg	0.018	**0.22**	**0.24**	**0.25**	**0.22**	**0.23**
PCB-165	µg/kg	0.018	0.023 U	0.018 U	0.032 U	0.022 U	0.025 U
PCB-166	µg/kg	0.037	**0.39**	**0.43**	**0.44**	**0.39**	**0.41**
PCB-167	µg/kg	0.018	**0.091**	**0.097**	**0.095**	**0.085**	**0.092**
PCB-168	µg/kg	0.037	**2.4**	**2.7**	**2.7**	**2.5**	**2.5**
PCB-169	µg/kg	0.018	0.023 U	0.018 U	0.032 U	0.022 U	0.025 U
PCB-170	µg/kg	0.018	**0.43**	**0.46**	**0.5**	**0.42**	**0.43**
PCB-171	µg/kg	0.037	**0.093 J**	**0.17**	**0.13 J**	**0.15**	**0.15**
PCB-172	µg/kg	0.018	**0.088**	**0.099**	**0.11**	**0.092**	**0.09**
PCB-173	µg/kg	0.037	**0.093 J**	**0.17**	**0.13 J**	**0.15**	**0.15**
PCB-174	µg/kg	0.018	**0.47**	**0.52**	**0.54**	**0.5**	**0.48**
PCB-175	µg/kg	0.018	**0.018 J**	**0.025**	**0.026 J**	**0.022**	**0.017 J**
PCB-176	µg/kg	0.018	**0.082**	**0.092**	**0.091**	**0.088**	**0.083**
PCB-177	µg/kg	0.018	**0.34**	**0.39**	**0.39**	**0.32**	**0.37**
PCB-178	µg/kg	0.018	**0.14**	**0.16**	**0.16**	**0.15**	**0.14**
PCB-179	µg/kg	0.018	**0.29**	**0.34**	**0.35**	**0.31**	**0.32**
PCB-180	µg/kg	0.037	**0.45**	**0.49**	**0.52**	**0.45**	**0.43**
PCB-181	µg/kg	0.018	0.023 U	**0.0056 J**	0.032 U	0.022 U	**0.0072 J**

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Table G-1H. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-11-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-11-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.2 J	1.4 J	1.9 J	1.4 J	1.6 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	**0.0098 J**	**0.011 J**	0.032 U	**0.013 J**	**0.015 J**
PCB-183	µg/kg	0.037	**0.39**	**0.43**	**0.43**	**0.4**	**0.41**
PCB-184	µg/kg	0.018	0.023 U	0.018 U	0.032 U	0.022 U	0.025 U
PCB-185	µg/kg	0.037	**0.39**	**0.43**	**0.43**	**0.4**	**0.41**
PCB-186	µg/kg	0.018	0.023 U	0.018 U	0.032 U	0.022 U	0.025 U
PCB-187	µg/kg	0.018	**1.8**	**2**	**2**	**1.8**	**1.9**
PCB-188	µg/kg	0.018	0.023 U	0.018 U	0.032 U	0.022 U	0.025 U
PCB-189	µg/kg	0.018	**0.016 J**	**0.022**	**0.02 J**	**0.017 J**	**0.016 J**
PCB-190	µg/kg	0.018	**0.083**	**0.085**	**0.097**	**0.093**	**0.09**
PCB-191	µg/kg	0.018	**0.016 J**	**0.014 J**	**0.02 J**	**0.015 J**	**0.014 J**
PCB-192	µg/kg	0.018	0.023 U	0.018 U	0.032 U	0.022 U	0.025 U
PCB-193	µg/kg	0.037	**0.45**	**0.49**	**0.52**	**0.45**	**0.43**
PCB-194	µg/kg	0.018	**0.16**	**0.15**	**0.15**	**0.15**	**0.14**
PCB-195	µg/kg	0.018	**0.095**	**0.098**	**0.096**	**0.09**	**0.088**
PCB-196	µg/kg	0.018	**0.058**	**0.063**	**0.063 J**	**0.053**	**0.052**
PCB-197	µg/kg	0.018	**0.01 J**	**0.01 J**	**0.0058 J**	**0.0086 J**	**0.0096 J**
PCB-198	µg/kg	0.037	**0.26**	**0.31**	**0.33**	**0.28**	**0.28**
PCB-199	µg/kg	0.037	**0.26**	**0.31**	**0.33**	**0.28**	**0.28**
PCB-200	µg/kg	0.018	**0.027 J**	**0.03**	**0.035 J**	**0.022**	**0.027**
PCB-201	µg/kg	0.018	**0.036**	**0.041**	**0.04**	**0.029**	**0.03 J**
PCB-202	µg/kg	0.018	**0.056**	**0.063**	**0.069**	**0.055**	**0.058**
PCB-203	µg/kg	0.018	**0.13**	**0.16**	**0.15**	**0.13**	**0.14**
PCB-204	µg/kg	0.018	0.023 U	0.018 U	0.032 U	**0.0011 J**	0.025 U
PCB-205	µg/kg	0.018	**0.013 J**	**0.015 J**	**0.012 J**	**0.012 J**	**0.012 J**
PCB-206	µg/kg	0.018	**0.067**	**0.077**	**0.062 J**	**0.067**	**0.07**
PCB-207	µg/kg	0.018	**0.014 J**	**0.01 J**	**0.012 J**	**0.016 J**	**0.012 J**
PCB-208	µg/kg	0.018	**0.026**	**0.028**	**0.024 J**	**0.024**	**0.022 J**
PCB 209	µg/kg	0.018	**0.037 J**	**0.043**	**0.034 J**	**0.029 J**	0.025 UJ
TOTAL PCB (ND=0)	µg/kg	---	**383**	**428**	**456**	**415**	**408**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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Table G-1I. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-13-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-13-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.7 J	1.4 J	1.7 J	1.4 J	1.4 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	0.2	0.14	0.19	0.17	0.18
PCB-2	µg/kg	0.018	0.044	0.03	0.045	0.028 J	0.045
PCB-3	µg/kg	0.018	0.27	0.22	0.25 J	0.24	0.26
PCB-4	µg/kg	0.037	4.8	3.9	5.2	3.9	4.8
PCB-5	µg/kg	0.018	0.09	0.048 J	0.077	0.07	0.085
PCB-6	µg/kg	0.018	2.7	2.3	3	2.3	2.7
PCB-7	µg/kg	0.018	0.38	0.3	0.41	0.31	0.37
PCB-8	µg/kg	0.037	5.4	4.5	6	4.6	5.5
PCB-9	µg/kg	0.018	0.33	0.26	0.36	0.27	0.33
PCB-10	µg/kg	0.018	0.17 J	0.15	0.19	0.13	0.17
PCB-11	µg/kg	0.037	0.094	0.06 J	0.1	0.069	0.072 J
PCB-12	µg/kg	0.037	0.84	0.7	0.92	0.73	0.84
PCB-13	µg/kg	0.037	0.84	0.7	0.92	0.73	0.84
PCB-14	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-15	µg/kg	0.018	4.5	4	5.4	4.3	4.8
PCB-16	µg/kg	0.018	3.3	2.7	3.4	2.8	3.1
PCB-17	µg/kg	0.018	14	11	14	12	14
PCB-18	µg/kg	0.037	12	9.7	12	11	11
PCB-19	µg/kg	0.018	2.9	2.4	3.1	2.5	2.9
PCB-20	µg/kg	0.037	24	20	26	21	24
PCB-21	µg/kg	0.037	2.9	2.4	3.1	2.5	2.9
PCB-22	µg/kg	0.018	5.5	4.8	6.3	5.1	5.8
PCB-23	µg/kg	0.018	0.017 J	0.018 J	0.014 J	0.015 J	0.022 J
PCB-24	µg/kg	0.018	0.24	0.2	0.24	0.22	0.23
PCB-25	µg/kg	0.018	5.7	4.9	6.2	5.2	5.8
PCB-26	µg/kg	0.037	7.4	6.3	8	6.8	7.3
PCB-27	µg/kg	0.018	2.5	2.1	2.6	2.1	2.6
PCB-28	µg/kg	0.037	24	20	26	21	24
PCB-29	µg/kg	0.037	7.4	6.3	8	6.8	7.3
PCB-30	µg/kg	0.037	12	9.7	12	11	11
PCB-31	µg/kg	0.037	19	16	20	17	19
PCB-32	µg/kg	0.018	9	7.6	9.9	8	9.2
PCB-33	µg/kg	0.037	2.9	2.4	3.1	2.5	2.9
PCB-34	µg/kg	0.018	0.3	0.25	0.31	0.25	0.3
PCB-35	µg/kg	0.018	0.044	0.044 J	0.092	0.026 U	0.054 J
PCB-36	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-37	µg/kg	0.018	1.8	1.7	2.1	1.7	2
PCB-38	µg/kg	0.018	0.031	0.031	0.042 J	0.026 U	0.03 J
PCB-39	µg/kg	0.018	0.1	0.095	0.12 J	0.083	0.11 J
PCB-40	µg/kg	0.062	15	12	15	13	15
PCB-41	µg/kg	0.062	15	12	15	13	15
PCB-42	µg/kg	0.049	8.7	6.9	8.8	7.4	8.8
PCB-43	µg/kg	0.051	1.5	1.2	1.5	1.2	1.5
PCB-44	µg/kg	0.059	28	23	29	25	29
PCB-45	µg/kg	0.055	6.3	5.2	6.4	5.5	6.4
PCB-46	µg/kg	0.061	1.7	1.4	1.7	1.4	1.7
PCB-47	µg/kg	0.059	28	23	29	25	29
PCB-48	µg/kg	0.049	3.3	2.6	3.3	2.8	3.3
PCB-49	µg/kg	0.047	21	17	22	18	22
PCB-50	µg/kg	0.052	4.6	3.8	4.9	4	4.6
PCB-51	µg/kg	0.055	6.3	5.2	6.4	5.5	6.4
PCB-52	µg/kg	0.048	29	24	31	25	30
PCB-53	µg/kg	0.052	4.6	3.8	4.9	4	4.6
PCB-54	µg/kg	0.018	0.11	0.076	0.096 J	0.081	0.089
PCB-55	µg/kg	0.036	0.37	0.18	0.29	0.23 J	0.31
PCB-56	µg/kg	0.037	4.5	3.7	4.6	3.9	4.6
PCB-57	µg/kg	0.037	0.3	0.22	0.29	0.25	0.3
PCB-58	µg/kg	0.037	0.11 J	0.086 J	0.11	0.11	0.1 J
PCB-59	µg/kg	0.056	3.2	2.5	3.2	2.7	3.2
PCB-60	µg/kg	0.037	1.6	1.2	1.6	1.4	1.6
PCB-61	µg/kg	0.073	17	14	17	15	17

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Table G-1I. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-13-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-13-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.7 J	1.4 J	1.7 J	1.4 J	1.4 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	**3.2**	**2.5**	**3.2**	**2.7**	**3.2**
PCB-63	µg/kg	0.034	**1.4**	**1.1**	**1.3**	**1.2**	**1.3**
PCB-64	µg/kg	0.034	**12**	**9.5**	**12**	**10**	**12**
PCB-65	µg/kg	0.059	**28**	**23**	**29**	**25**	**29**
PCB-66	µg/kg	0.035	**10**	**8.6**	**11**	**8.9**	**11**
PCB-67	µg/kg	0.033	**0.54**	**0.42**	**0.52**	**0.45**	**0.53**
PCB-68	µg/kg	0.033	**0.27**	**0.19 J**	**0.23 J**	**0.19 J**	**0.26**
PCB-69	µg/kg	0.047	**21**	**17**	**22**	**18**	**22**
PCB-70	µg/kg	0.073	**17**	**14**	**17**	**15**	**17**
PCB-71	µg/kg	0.062	**15**	**12**	**15**	**13**	**15**
PCB-72	µg/kg	0.036	**0.38**	**0.26 J**	**0.35**	**0.29**	**0.35**
PCB-73	µg/kg	0.051	**1.5**	**1.2**	**1.5**	**1.2**	**1.5**
PCB-74	µg/kg	0.073	**17**	**14**	**17**	**15**	**17**
PCB-75	µg/kg	0.056	**3.2**	**2.5**	**3.2**	**2.7**	**3.2**
PCB-76	µg/kg	0.073	**17**	**14**	**17**	**15**	**17**
PCB-77	µg/kg	0.036	**0.49**	**0.39**	**0.46**	**0.4**	**0.45**
PCB-78	µg/kg	0.037	0.037 U	0.051 U	0.06 U	0.058 U	0.061 U
PCB-79	µg/kg	0.033	**0.11**	**0.076 J**	**0.11**	**0.089**	**0.097**
PCB-80	µg/kg	0.032	0.032 U	0.043 U	0.051 U	0.049 U	0.052 U
PCB-81	µg/kg	0.034	0.032 U	0.045 U	0.052 U	0.049 U	0.054 U
PCB-82	µg/kg	0.018	**1.3**	**1.2 J**	**1.3 J**	**1.2 J**	**1.3 J**
PCB-83	µg/kg	0.037	**6.8**	**6**	**7**	**6**	**6.7**
PCB-84	µg/kg	0.018	**3.5**	**3**	**3.5**	**3**	**3.4**
PCB-85	µg/kg	0.055	**2.4**	**2.1**	**2.5**	**2.1**	**2.4**
PCB-86	µg/kg	0.110	**5.9**	**5.2**	**6**	**5.1**	**5.8**
PCB-87	µg/kg	0.110	**5.9**	**5.2**	**6**	**5.1**	**5.8**
PCB-88	µg/kg	0.037	**3.2**	**2.8**	**3.2**	**2.7**	**3**
PCB-89	µg/kg	0.018	**0.38**	**0.33**	**0.36**	**0.31**	**0.31 J**
PCB-90	µg/kg	0.055	**8.5**	**7.5**	**8.9**	**7.4**	**8.4**
PCB-91	µg/kg	0.037	**3.2**	**2.8**	**3.2**	**2.7**	**3**
PCB-92	µg/kg	0.018	**2.6**	**2.2**	**2.7**	**2.2**	**2.5**
PCB-93	µg/kg	0.037	**0.4**	**0.33**	**0.38**	**0.35**	**0.38**
PCB-94	µg/kg	0.018	**0.22**	**0.19**	**0.22**	**0.17**	**0.21**
PCB-95	µg/kg	0.018	**9.7**	**8.5**	**10**	**8.4**	**9.6**
PCB-96	µg/kg	0.018	**0.29**	**0.24**	**0.3**	**0.24**	**0.27**
PCB-97	µg/kg	0.110	**5.9**	**5.2**	**6**	**5.1**	**5.8**
PCB-98	µg/kg	0.037	**0.95**	**0.87**	**0.99**	**0.83**	**0.95**
PCB-99	µg/kg	0.037	**6.8**	**6**	**7**	**6**	**6.7**
PCB-100	µg/kg	0.037	**0.4**	**0.33**	**0.38**	**0.35**	**0.38**
PCB-101	µg/kg	0.055	**8.5**	**7.5**	**8.9**	**7.4**	**8.4**
PCB-102	µg/kg	0.037	**0.95**	**0.87**	**0.99**	**0.83**	**0.95**
PCB-103	µg/kg	0.018	**0.2**	**0.15 J**	**0.2**	**0.17**	**0.19**
PCB-104	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-105	µg/kg	0.018	**1.7**	**1.5**	**1.9**	**1.5**	**1.8**
PCB-106	µg/kg	0.018	**0.017 J**	0.023 U	0.028 U	**0.018 J**	0.026 U
PCB-107	µg/kg	0.018	**0.63**	**0.52 J**	**0.64 J**	**0.54 J**	**0.6 J**
PCB-108	µg/kg	0.037	**0.22**	**0.19**	**0.23**	**0.19**	**0.22**
PCB-109	µg/kg	0.110	**5.9**	**5.2**	**6**	**5.1**	**5.8**
PCB-110	µg/kg	0.037	**11**	**10**	**12**	**9.7**	**11**
PCB-111	µg/kg	0.018	0.026 U	0.023 UJ	0.028 UJ	0.026 UJ	0.026 UJ
PCB-112	µg/kg	0.018	**0.11**	**0.14**	**0.14**	**0.11**	**0.15**
PCB-113	µg/kg	0.055	**8.5**	**7.5**	**8.9**	**7.4**	**8.4**
PCB-114	µg/kg	0.018	**0.18**	**0.16**	**0.19**	**0.17**	**0.17 J**
PCB-115	µg/kg	0.037	**11**	**10**	**12**	**9.7**	**11**
PCB-116	µg/kg	0.055	**2.4**	**2.1**	**2.5**	**2.1**	**2.4**
PCB-117	µg/kg	0.055	**2.4**	**2.1**	**2.5**	**2.1**	**2.4**
PCB-118	µg/kg	0.018	**4.8**	**4.2**	**5.1**	**4.2**	**5**
PCB-119	µg/kg	0.110	**5.9**	**5.2**	**6**	**5.1**	**5.8**
PCB-120	µg/kg	0.018	**0.055**	**0.032 J**	**0.03 J**	**0.019 J**	**0.044 J**
PCB-121	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U

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Table G-1I. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-13-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-13-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.7 J	1.4 J	1.7 J	1.4 J	1.4 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.12**	**0.12**	**0.15**	**0.12**	**0.14**
PCB-123	µg/kg	0.018	**0.12 J**	**0.13**	**0.17**	**0.11**	**0.17**
PCB-124	µg/kg	0.037	**0.22**	**0.19**	**0.23**	**0.19**	**0.22**
PCB-125	µg/kg	0.110	**5.9**	**5.2**	**6**	**5.1**	**5.8**
PCB-126	µg/kg	0.018	**0.018 J**	**0.013 J**	0.028 U	0.026 U	**0.018 J**
PCB-127	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-128	µg/kg	0.037	**0.61**	**0.55**	**0.65**	**0.54**	**0.63**
PCB-129	µg/kg	0.073	**5**	**4.4**	**5.2**	**4.2**	**5.1**
PCB-130	µg/kg	0.018	**0.32**	**0.26**	**0.35**	**0.27**	**0.31**
PCB-131	µg/kg	0.018	**0.056 J**	**0.052**	**0.059**	**0.041 J**	**0.058**
PCB-132	µg/kg	0.018	**1.5**	**1.3**	**1.5**	**1.3**	**1.5**
PCB-133	µg/kg	0.018	**0.099**	**0.079**	**0.087 J**	**0.076**	**0.097**
PCB-134	µg/kg	0.037	**0.28**	**0.23**	**0.29**	**0.22**	**0.26**
PCB-135	µg/kg	0.037	**2.2**	**1.9**	**2.3**	**1.9**	**2.3**
PCB-136	µg/kg	0.018	**0.62**	**0.51**	**0.62**	**0.52**	**0.63**
PCB-137	µg/kg	0.018	**0.12**	**0.1**	**0.12 J**	**0.11**	**0.13**
PCB-138	µg/kg	0.073	**5**	**4.4**	**5.2**	**4.2**	**5.1**
PCB-139	µg/kg	0.037	**0.09 J**	**0.078**	**0.084 J**	**0.072 J**	**0.076 J**
PCB-140	µg/kg	0.037	**0.09 J**	**0.078**	**0.084 J**	**0.072 J**	**0.076 J**
PCB-141	µg/kg	0.018	**0.47**	**0.41**	**0.48**	**0.41**	**0.48**
PCB-142	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-143	µg/kg	0.037	**0.28**	**0.23**	**0.29**	**0.22**	**0.26**
PCB-144	µg/kg	0.018	**0.19**	**0.16**	**0.17**	**0.13 J**	**0.17**
PCB-145	µg/kg	0.018	**0.0055 J**	**0.0055 J**	**0.0047 J**	**0.0034 J**	**0.0038 J**
PCB-146	µg/kg	0.018	**0.86**	**0.75**	**0.88**	**0.75**	**0.86**
PCB-147	µg/kg	0.037	**5.7**	**5**	**6**	**4.9**	**5.9**
PCB-148	µg/kg	0.018	**0.011 J**	**0.0055 J**	**0.0094 J**	**0.0082 J**	**0.0095 J**
PCB-149	µg/kg	0.037	**5.7**	**5**	**6**	**4.9**	**5.9**
PCB-150	µg/kg	0.018	**0.01 J**	**0.0048 J**	**0.0067 J**	**0.0072 J**	**0.0057 J**
PCB-151	µg/kg	0.037	**2.2**	**1.9**	**2.3**	**1.9**	**2.3**
PCB-152	µg/kg	0.018	**0.009 J**	**0.0068 J**	**0.0049 J**	**0.0089 J**	**0.0058 J**
PCB-153	µg/kg	0.037	**4**	**3.5**	**4.2**	**3.5**	**4.1**
PCB-154	µg/kg	0.018	**0.08**	**0.072**	**0.071 J**	**0.063**	**0.074**
PCB-155	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-156	µg/kg	0.037	**0.36**	**0.31**	**0.38**	**0.31**	**0.37**
PCB-157	µg/kg	0.037	**0.36**	**0.31**	**0.38**	**0.31**	**0.37**
PCB-158	µg/kg	0.018	**0.36**	**0.33**	**0.38**	**0.33**	**0.38**
PCB-159	µg/kg	0.018	**0.031 J**	**0.027**	**0.032 J**	0.026 U	**0.033**
PCB-160	µg/kg	0.073	**5**	**4.4**	**5.2**	**4.2**	**5.1**
PCB-161	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-162	µg/kg	0.018	**0.02 J**	**0.012 J**	0.028 U	0.026 U	0.026 U
PCB-163	µg/kg	0.073	**5**	**4.4**	**5.2**	**4.2**	**5.1**
PCB-164	µg/kg	0.018	**0.36**	**0.3**	**0.38**	**0.3**	**0.35**
PCB-165	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-166	µg/kg	0.037	**0.61**	**0.55**	**0.65**	**0.54**	**0.63**
PCB-167	µg/kg	0.018	**0.14**	**0.11**	**0.14**	**0.11**	**0.14**
PCB-168	µg/kg	0.037	**4**	**3.5**	**4.2**	**3.5**	**4.1**
PCB-169	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-170	µg/kg	0.018	**0.67**	**0.58**	**0.67**	**0.57**	**0.66**
PCB-171	µg/kg	0.037	**0.23**	**0.2**	**0.23**	**0.19 J**	**0.23**
PCB-172	µg/kg	0.018	**0.13**	**0.12**	**0.13**	**0.11**	**0.13**
PCB-173	µg/kg	0.037	**0.23**	**0.2**	**0.23**	**0.19 J**	**0.23**
PCB-174	µg/kg	0.018	**0.73**	**0.64**	**0.79**	**0.63**	**0.75**
PCB-175	µg/kg	0.018	**0.031**	**0.025**	**0.03**	**0.025 J**	**0.025 J**
PCB-176	µg/kg	0.018	**0.13**	**0.12**	**0.13**	**0.12**	**0.13**
PCB-177	µg/kg	0.018	**0.54**	**0.47**	**0.58**	**0.46**	**0.57**
PCB-178	µg/kg	0.018	**0.21 J**	**0.18**	**0.23**	**0.19**	**0.24**
PCB-179	µg/kg	0.018	**0.5**	**0.44**	**0.5**	**0.43**	**0.51**
PCB-180	µg/kg	0.037	**0.63**	**0.52**	**0.62**	**0.55**	**0.63**
PCB-181	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U

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Table G-1I. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-13-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-13-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.7 J	1.4 J	1.7 J	1.4 J	1.4 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	**0.016 J**	**0.017 J**	**0.013 J**	0.026 U	**0.015 J**
PCB-183	µg/kg	0.037	**0.62**	**0.53**	**0.62**	**0.51**	**0.63**
PCB-184	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-185	µg/kg	0.037	**0.62**	**0.53**	**0.62**	**0.51**	**0.63**
PCB-186	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-187	µg/kg	0.018	**2.8**	**2.4**	**2.9**	**2.3**	**2.9**
PCB-188	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-189	µg/kg	0.018	**0.027**	**0.018 J**	**0.03**	**0.018 J**	**0.028**
PCB-190	µg/kg	0.018	**0.15**	**0.13**	**0.11 J**	**0.11**	**0.13**
PCB-191	µg/kg	0.018	**0.025 J**	**0.02 J**	**0.022 J**	**0.015 J**	**0.02 J**
PCB-192	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-193	µg/kg	0.037	**0.63**	**0.52**	**0.62**	**0.55**	**0.63**
PCB-194	µg/kg	0.018	**0.19**	**0.17**	**0.18**	**0.17**	**0.18**
PCB-195	µg/kg	0.018	**0.12 J**	**0.11**	**0.13**	**0.11**	**0.12**
PCB-196	µg/kg	0.018	**0.078**	**0.068**	**0.091**	**0.063**	**0.078**
PCB-197	µg/kg	0.018	**0.01 J**	**0.0093 J**	**0.014 J**	**0.011 J**	**0.011 J**
PCB-198	µg/kg	0.037	**0.42**	**0.36**	**0.44**	**0.37**	**0.42**
PCB-199	µg/kg	0.037	**0.42**	**0.36**	**0.44**	**0.37**	**0.42**
PCB-200	µg/kg	0.018	**0.041**	**0.029 J**	**0.044**	**0.033**	**0.039**
PCB-201	µg/kg	0.018	**0.046 J**	**0.035 J**	**0.036 J**	**0.037**	**0.044**
PCB-202	µg/kg	0.018	**0.087**	**0.069**	**0.078**	**0.068**	**0.081**
PCB-203	µg/kg	0.018	**0.21**	**0.17**	**0.21**	**0.18**	**0.19**
PCB-204	µg/kg	0.018	0.026 U	0.023 U	0.028 U	0.026 U	0.026 U
PCB-205	µg/kg	0.018	**0.011 J**	**0.0098 J**	**0.017 J**	**0.015 J**	**0.016 J**
PCB-206	µg/kg	0.018	**0.083 J**	**0.068**	**0.069 J**	**0.074**	**0.07**
PCB-207	µg/kg	0.018	**0.019 J**	**0.012 J**	0.028 U	0.026 U	0.026 U
PCB-208	µg/kg	0.018	**0.029 J**	**0.025**	**0.033**	**0.024 J**	**0.038**
PCB 209	µg/kg	0.018	**0.045**	**0.026 J**	**0.036**	**0.032**	**0.037**
TOTAL PCB (ND=0)	µg/kg	---	**726**	**606**	**753**	**632**	**730**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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Table G-1J. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-15-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-15-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.6 J	1.7 J	1.2 J	1.6 J	1.4 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	0.15	0.16	0.1	0.11	0.12
PCB-2	µg/kg	0.018	0.035	0.052	0.028	0.031	0.028
PCB-3	µg/kg	0.018	0.21	0.23	0.16	0.18	0.17
PCB-4	µg/kg	0.037	3.2	3.4	2.7	3	3
PCB-5	µg/kg	0.018	0.052	0.041 J	0.039 J	0.039 J	0.041 J
PCB-6	µg/kg	0.018	2	2.2	1.6	1.7	1.8
PCB-7	µg/kg	0.018	0.27	0.28	0.23	0.22	0.24
PCB-8	µg/kg	0.037	4.1	4.3	3.2	3.5	3.5
PCB-9	µg/kg	0.018	0.24	0.24	0.2	0.2	0.21
PCB-10	µg/kg	0.018	0.12	0.12	0.11	0.11 J	0.11
PCB-11	µg/kg	0.037	0.082	0.1	0.069 J	0.075	0.074
PCB-12	µg/kg	0.037	0.69	0.72	0.53	0.57	0.57
PCB-13	µg/kg	0.037	0.69	0.72	0.53	0.57	0.57
PCB-14	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-15	µg/kg	0.018	3.7	4	3	3.2	3.4
PCB-16	µg/kg	0.018	2.4	2.8	2.2	2.3	2.4
PCB-17	µg/kg	0.018	9.5	11	8	9	9.3
PCB-18	µg/kg	0.037	8	9.9	7.3	8.4	7.9
PCB-19	µg/kg	0.018	2	2.2	1.7	1.8	1.9
PCB-20	µg/kg	0.037	17	19	15	16	16
PCB-21	µg/kg	0.037	2	2.3	1.9	2	2
PCB-22	µg/kg	0.018	4.3	4.8	3.7	3.7	3.9
PCB-23	µg/kg	0.018	0.012 J	0.016	0.017	0.011 J	0.01 J
PCB-24	µg/kg	0.018	0.16 J	0.21	0.17	0.16 J	0.17
PCB-25	µg/kg	0.018	3.7	4.4	3.5	3.9	3.6
PCB-26	µg/kg	0.037	4.9	5.8	4.5	5	4.6
PCB-27	µg/kg	0.018	1.7	2	1.5	1.7	1.7
PCB-28	µg/kg	0.037	17	19	15	16	16
PCB-29	µg/kg	0.037	4.9	5.8	4.5	5	4.6
PCB-30	µg/kg	0.037	8	9.9	7.3	8.4	7.9
PCB-31	µg/kg	0.037	13	15	12	13	13
PCB-32	µg/kg	0.018	6	7.3	5.3	6.1	5.8
PCB-33	µg/kg	0.037	2	2.3	1.9	2	2
PCB-34	µg/kg	0.018	0.19	0.23	0.18	0.2	0.18
PCB-35	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.038	0.032
PCB-36	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-37	µg/kg	0.018	1.6	1.8	1.4	1.4	1.3
PCB-38	µg/kg	0.018	0.013 U	0.037	0.022 J	0.02 J	0.022 J
PCB-39	µg/kg	0.018	0.086	0.11 J	0.073 J	0.08 J	0.079
PCB-40	µg/kg	0.062	12	12	9.7	10	12
PCB-41	µg/kg	0.062	12	12	9.7	10	12
PCB-42	µg/kg	0.049	6.6	7.3	5.5	5.9	6.6
PCB-43	µg/kg	0.051	1.2	1.3	0.94	0.88	1.2
PCB-44	µg/kg	0.059	22	23	18	20	22
PCB-45	µg/kg	0.055	4.6	5.2	4.1	4.3	4.7
PCB-46	µg/kg	0.061	1.3	1.4	1.1	1.2	1.3
PCB-47	µg/kg	0.059	22	23	18	20	22
PCB-48	µg/kg	0.049	2.7	2.9	2.1	2.2	2.6
PCB-49	µg/kg	0.047	16	18	14	15	16
PCB-50	µg/kg	0.052	3.1	3.7	2.9	3.2	3.2
PCB-51	µg/kg	0.055	4.6	5.2	4.1	4.3	4.7
PCB-52	µg/kg	0.048	23	25	19	21	23
PCB-53	µg/kg	0.052	3.1	3.7	2.9	3.2	3.2
PCB-54	µg/kg	0.018	0.076	0.082	0.067	0.063	0.079
PCB-55	µg/kg	0.036	0.21	0.29	0.2	0.24	0.19 J
PCB-56	µg/kg	0.037	3.6	4	3	3.2	3.6
PCB-57	µg/kg	0.037	0.21	0.23	0.18	0.19	0.21
PCB-58	µg/kg	0.037	0.23	0.085 J	0.075	0.07	0.068 J
PCB-59	µg/kg	0.056	2.5	2.7	2.1	2.1	2.5
PCB-60	µg/kg	0.037	1.3	1.4	1	1.2	1.3
PCB-61	µg/kg	0.073	13	15	11	12	13

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Table G-1J. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-15-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-15-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.6 J	1.7 J	1.2 J	1.6 J	1.4 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	2.5	2.7	2.1	2.1	2.5
PCB-63	µg/kg	0.034	1	1.1	0.87	0.88	1
PCB-64	µg/kg	0.034	8.7	9.7	7.3	7.9	8.6
PCB-65	µg/kg	0.059	22	23	18	20	22
PCB-66	µg/kg	0.035	8.3	9.1	6.9	7.4	8.2
PCB-67	µg/kg	0.033	0.4	0.44	0.33	0.35	0.38
PCB-68	µg/kg	0.033	0.19	0.22	0.17	0.15	0.2
PCB-69	µg/kg	0.047	16	18	14	15	16
PCB-70	µg/kg	0.073	13	15	11	12	13
PCB-71	µg/kg	0.062	12	12	9.7	10	12
PCB-72	µg/kg	0.036	0.24	0.28	0.21	0.25	0.25
PCB-73	µg/kg	0.051	1.2	1.3	0.94	0.88	1.2
PCB-74	µg/kg	0.073	13	15	11	12	13
PCB-75	µg/kg	0.056	2.5	2.7	2.1	2.1	2.5
PCB-76	µg/kg	0.073	13	15	11	12	13
PCB-77	µg/kg	0.036	0.37	0.39	0.37	0.31	0.32
PCB-78	µg/kg	0.037	0.049 U	0.055 U	0.044 U	0.043 U	0.044 U
PCB-79	µg/kg	0.033	0.078	0.068 J	0.063 J	0.07	0.072
PCB-80	µg/kg	0.032	0.041 U	0.047 U	0.038 U	0.037 U	0.037 U
PCB-81	µg/kg	0.034	0.042 U	0.048 U	0.038 U	0.038 U	0.038 U
PCB-82	µg/kg	0.018	0.86	1.1	0.72	0.84 J	0.79
PCB-83	µg/kg	0.037	4.6	5.5	4	4.4	4.3
PCB-84	µg/kg	0.018	2.4	2.8	2.1	2.3	2.3
PCB-85	µg/kg	0.055	1.7	2	1.4	1.6	1.5
PCB-86	µg/kg	0.110	4.2	4.9	3.6	3.9	3.9
PCB-87	µg/kg	0.110	4.2	4.9	3.6	3.9	3.9
PCB-88	µg/kg	0.037	2.3	2.6	1.9	2.1	2.1
PCB-89	µg/kg	0.018	0.25	0.29	0.21	0.22 J	0.24
PCB-90	µg/kg	0.055	5.7	6.9	5.1	5.8	5.3
PCB-91	µg/kg	0.037	2.3	2.6	1.9	2.1	2.1
PCB-92	µg/kg	0.018	1.8	2.1	1.5	1.7	1.7
PCB-93	µg/kg	0.037	0.28	0.29	0.22	0.26	0.26
PCB-94	µg/kg	0.018	0.15	0.18	0.13	0.14	0.14
PCB-95	µg/kg	0.018	6.8	8	5.9	6.6	6.4
PCB-96	µg/kg	0.018	0.21	0.23	0.17	0.19	0.19
PCB-97	µg/kg	0.110	4.2	4.9	3.6	3.9	3.9
PCB-98	µg/kg	0.037	0.69	0.79	0.57	0.63	0.65
PCB-99	µg/kg	0.037	4.6	5.5	4	4.4	4.3
PCB-100	µg/kg	0.037	0.28	0.29	0.22	0.26	0.26
PCB-101	µg/kg	0.055	5.7	6.9	5.1	5.8	5.3
PCB-102	µg/kg	0.037	0.69	0.79	0.57	0.63	0.65
PCB-103	µg/kg	0.018	0.13	0.14	0.11	0.13	0.12
PCB-104	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-105	µg/kg	0.018	1.4	1.6	1.2	1.3	1.3
PCB-106	µg/kg	0.018	0.011 J	0.013 J	0.014 U	0.008 J	0.01 J
PCB-107	µg/kg	0.018	0.45	0.53	0.38	0.42 J	0.42
PCB-108	µg/kg	0.037	0.17	0.2	0.15	0.15	0.16
PCB-109	µg/kg	0.110	4.2	4.9	3.6	3.9	3.9
PCB-110	µg/kg	0.037	7.6	9	6.5	7.5	7
PCB-111	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 UJ	0.013 U
PCB-112	µg/kg	0.018	0.11	0.13	0.074 J	0.088 J	0.087
PCB-113	µg/kg	0.055	5.7	6.9	5.1	5.8	5.3
PCB-114	µg/kg	0.018	0.14	0.18	0.13	0.13	0.14
PCB-115	µg/kg	0.037	7.6	9	6.5	7.5	7
PCB-116	µg/kg	0.055	1.7	2	1.4	1.6	1.5
PCB-117	µg/kg	0.055	1.7	2	1.4	1.6	1.5
PCB-118	µg/kg	0.018	3.7	4.3	3.1	3.3	3.6
PCB-119	µg/kg	0.110	4.2	4.9	3.6	3.9	3.9
PCB-120	µg/kg	0.018	0.013 U	0.026 J	0.014 U	0.027 J	0.021 J
PCB-121	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U

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Table G-1J. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-15-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-15-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.6 J	1.7 J	1.2 J	1.6 J	1.4 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.11**	**0.12**	**0.1**	**0.097**	**0.1**
PCB-123	µg/kg	0.018	**0.11 J**	**0.13**	**0.092**	**0.083 J**	**0.12**
PCB-124	µg/kg	0.037	**0.17**	**0.2**	**0.15**	**0.15**	**0.16**
PCB-125	µg/kg	0.110	**4.2**	**4.9**	**3.6**	**3.9**	**3.9**
PCB-126	µg/kg	0.018	**0.011 J**	**0.011 J**	**0.011 J**	**0.019 J**	**0.012 J**
PCB-127	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-128	µg/kg	0.037	**0.5**	**0.56**	**0.43**	**0.44**	**0.45**
PCB-129	µg/kg	0.073	**4**	**4.6**	**3.3**	**3.6**	**3.7**
PCB-130	µg/kg	0.018	**0.25**	**0.29**	**0.22**	**0.21**	**0.23**
PCB-131	µg/kg	0.018	**0.042 J**	**0.05**	**0.036 J**	**0.034**	**0.037 J**
PCB-132	µg/kg	0.018	**1.2**	**1.3**	**0.96**	**1**	**1.1**
PCB-133	µg/kg	0.018	**0.081**	**0.098**	**0.067**	**0.058**	**0.075**
PCB-134	µg/kg	0.037	**0.21**	**0.25**	**0.16**	**0.17**	**0.19**
PCB-135	µg/kg	0.037	**1.8**	**2**	**1.4**	**1.6**	**1.6**
PCB-136	µg/kg	0.018	**0.45**	**0.52**	**0.39**	**0.42**	**0.44**
PCB-137	µg/kg	0.018	**0.099 J**	**0.13**	**0.097**	**0.097**	**0.093**
PCB-138	µg/kg	0.073	**4**	**4.6**	**3.3**	**3.6**	**3.7**
PCB-139	µg/kg	0.037	**0.068**	**0.081**	**0.057**	**0.052 J**	**0.065**
PCB-140	µg/kg	0.037	**0.068**	**0.081**	**0.057**	**0.052 J**	**0.065**
PCB-141	µg/kg	0.018	**0.41**	**0.45**	**0.34**	**0.34**	**0.38**
PCB-142	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-143	µg/kg	0.037	**0.21**	**0.25**	**0.16**	**0.17**	**0.19**
PCB-144	µg/kg	0.018	**0.13**	**0.16**	**0.12**	**0.12**	**0.13**
PCB-145	µg/kg	0.018	0.013 U	**0.0043 J**	**0.002 J**	0.02 U	**0.0034 J**
PCB-146	µg/kg	0.018	**0.62**	**0.75**	**0.55**	**0.56**	**0.59**
PCB-147	µg/kg	0.037	**4.5**	**5.3**	**3.8**	**4.1**	**4.3**
PCB-148	µg/kg	0.018	0.013 U	**0.0088 J**	**0.0046 J**	**0.0038 J**	**0.0072 J**
PCB-149	µg/kg	0.037	**4.5**	**5.3**	**3.8**	**4.1**	**4.3**
PCB-150	µg/kg	0.018	**0.0072 J**	**0.0059 J**	**0.0043 J**	**0.0068 J**	**0.0089 J**
PCB-151	µg/kg	0.037	**1.8**	**2**	**1.4**	**1.6**	**1.6**
PCB-152	µg/kg	0.018	**0.0055 J**	**0.0054 J**	**0.0053 J**	**0.0038 J**	**0.0039 J**
PCB-153	µg/kg	0.037	**3.2**	**3.7**	**2.7**	**2.8**	**3**
PCB-154	µg/kg	0.018	**0.06**	**0.079**	**0.046**	**0.047**	**0.054**
PCB-155	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-156	µg/kg	0.037	**0.29**	**0.33**	**0.24**	**0.25**	**0.27**
PCB-157	µg/kg	0.037	**0.29**	**0.33**	**0.24**	**0.25**	**0.27**
PCB-158	µg/kg	0.018	**0.3**	**0.35**	**0.25**	**0.26**	**0.25**
PCB-159	µg/kg	0.018	0.013 U	**0.029 J**	**0.02 J**	**0.023**	**0.023**
PCB-160	µg/kg	0.073	**4**	**4.6**	**3.3**	**3.6**	**3.7**
PCB-161	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-162	µg/kg	0.018	0.013 U	0.016 U	**0.01 J**	**0.012 J**	**0.0078 J**
PCB-163	µg/kg	0.073	**4**	**4.6**	**3.3**	**3.6**	**3.7**
PCB-164	µg/kg	0.018	**0.29**	**0.34**	**0.24**	**0.25**	**0.27**
PCB-165	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-166	µg/kg	0.037	**0.5**	**0.56**	**0.43**	**0.44**	**0.45**
PCB-167	µg/kg	0.018	**0.11**	**0.12**	**0.089**	**0.093**	**0.099 J**
PCB-168	µg/kg	0.037	**3.2**	**3.7**	**2.7**	**2.8**	**3**
PCB-169	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-170	µg/kg	0.018	**0.53**	**0.63**	**0.45**	**0.49**	**0.5**
PCB-171	µg/kg	0.037	**0.19**	**0.22**	**0.15**	**0.15**	**0.17**
PCB-172	µg/kg	0.018	**0.11**	**0.13**	**0.085**	**0.088**	**0.1**
PCB-173	µg/kg	0.037	**0.19**	**0.22**	**0.15**	**0.15**	**0.17**
PCB-174	µg/kg	0.018	**0.62**	**0.68**	**0.49**	**0.55**	**0.56**
PCB-175	µg/kg	0.018	**0.026**	**0.028**	**0.022**	**0.022**	**0.021 J**
PCB-176	µg/kg	0.018	**0.11**	**0.12**	**0.095**	**0.098**	**0.099**
PCB-177	µg/kg	0.018	**0.44**	**0.49**	**0.37**	**0.39**	**0.43**
PCB-178	µg/kg	0.018	**0.18**	**0.21**	**0.16**	**0.17**	**0.17**
PCB-179	µg/kg	0.018	**0.4**	**0.45**	**0.34**	**0.36**	**0.38**
PCB-180	µg/kg	0.037	**0.55**	**0.6**	**0.46**	**0.49**	**0.52**
PCB-181	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U

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Table G-1J. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-15-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-15-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.6 J	1.7 J	1.2 J	1.6 J	1.4 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	**0.012 J**	**0.018 J**	0.014 U	**0.013 J**	0.013 U
PCB-183	µg/kg	0.037	**0.52**	**0.56**	**0.42**	**0.42**	**0.48**
PCB-184	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-185	µg/kg	0.037	**0.52**	**0.56**	**0.42**	**0.42**	**0.48**
PCB-186	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-187	µg/kg	0.018	**2.4**	**2.7**	**2**	**2.2**	**2.3**
PCB-188	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-189	µg/kg	0.018	**0.022**	**0.024**	**0.017**	**0.018 J**	**0.022**
PCB-190	µg/kg	0.018	**0.1**	**0.12**	**0.093**	**0.097**	**0.081**
PCB-191	µg/kg	0.018	**0.02**	**0.022**	**0.015**	**0.017 J**	**0.017**
PCB-192	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-193	µg/kg	0.037	**0.55**	**0.6**	**0.46**	**0.49**	**0.52**
PCB-194	µg/kg	0.018	**0.18**	**0.2**	**0.14**	**0.17**	**0.17**
PCB-195	µg/kg	0.018	**0.1**	**0.12 J**	**0.094**	**0.083**	**0.11**
PCB-196	µg/kg	0.018	**0.065**	**0.069**	**0.054**	**0.062**	**0.056**
PCB-197	µg/kg	0.018	**0.011 J**	**0.0093 J**	**0.0046 J**	**0.011 J**	**0.011 J**
PCB-198	µg/kg	0.037	**0.32**	**0.38**	**0.28**	**0.33**	**0.33**
PCB-199	µg/kg	0.037	**0.32**	**0.38**	**0.28**	**0.33**	**0.33**
PCB-200	µg/kg	0.018	**0.035 J**	**0.035**	**0.029 J**	**0.031**	**0.037**
PCB-201	µg/kg	0.018	**0.041**	**0.046**	**0.031 J**	**0.035**	**0.041**
PCB-202	µg/kg	0.018	**0.064**	**0.08**	**0.054**	**0.064**	**0.07**
PCB-203	µg/kg	0.018	**0.15 J**	**0.17**	**0.14**	**0.15**	**0.15**
PCB-204	µg/kg	0.018	0.013 U	0.016 U	0.014 U	0.02 U	0.013 U
PCB-205	µg/kg	0.018	**0.017**	**0.012 J**	**0.013 J**	**0.0087 J**	**0.012 J**
PCB-206	µg/kg	0.018	**0.065**	**0.096**	**0.071**	**0.08 J**	**0.058 J**
PCB-207	µg/kg	0.018	**0.01 J**	0.016 U	0.014 U	**0.012 J**	**0.01 J**
PCB-208	µg/kg	0.018	**0.033**	**0.023 J**	**0.018**	**0.028 J**	**0.022 J**
PCB 209	µg/kg	0.018	**0.04**	**0.041**	**0.033**	**0.033**	**0.03**
TOTAL PCB (ND=0)	µg/kg	---	**541**	**608**	**460**	**499**	**524**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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Table G-1K. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-18-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-18-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.9 J	0.98 J	1.9 J	1.3 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	0.25	0.28	0.18	0.24 J-	0.18
PCB-2	µg/kg	0.018	0.047	0.054	0.049	0.047 J	0.035 J
PCB-3	µg/kg	0.018	0.37	0.48	0.28	0.41	0.27
PCB-4	µg/kg	0.037	5.1	6.2	3.7	5.5	3.8
PCB-5	µg/kg	0.018	0.023 U	0.091 J	0.068	0.086	0.067
PCB-6	µg/kg	0.018	3.1	3.8	2.3	3.5	2.6
PCB-7	µg/kg	0.018	0.45	0.53	0.33	0.48	0.36
PCB-8	µg/kg	0.037	6.3	7.9	4.8	7.3	5.4
PCB-9	µg/kg	0.018	0.36	0.46	0.28	0.41	0.32
PCB-10	µg/kg	0.018	0.18	0.23	0.12	0.16	0.11
PCB-11	µg/kg	0.037	0.1	0.096 J	0.085	0.1	0.063
PCB-12	µg/kg	0.037	0.82	1	0.65	0.92	0.65
PCB-13	µg/kg	0.037	0.82	1	0.65	0.92	0.65
PCB-14	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U
PCB-15	µg/kg	0.018	5.3	6.6	3.9	5.5	4.1
PCB-16	µg/kg	0.018	3.2	4.2	2.7	3.9	2.6
PCB-17	µg/kg	0.018	14	18	11	17	12
PCB-18	µg/kg	0.037	12	15	9.2	14	10
PCB-19	µg/kg	0.018	2.8	3.7	2.2	3.1	2.2
PCB-20	µg/kg	0.037	24	30	18	25	17
PCB-21	µg/kg	0.037	3.1	4.1	2.3	3.4	2.4
PCB-22	µg/kg	0.018	5.9	7.6	4.2	6.4	4.2
PCB-23	µg/kg	0.018	0.017 J	0.032	0.013	0.016 J	0.013 J
PCB-24	µg/kg	0.018	0.22	0.29	0.19	0.27	0.23
PCB-25	µg/kg	0.018	5.5	7.4	4.1	5.8	3.5
PCB-26	µg/kg	0.037	7	9.3	5.3	7.3	4.4
PCB-27	µg/kg	0.018	2.5	3.2	2	3.1	2.2
PCB-28	µg/kg	0.037	24	30	18	25	17
PCB-29	µg/kg	0.037	7	9.3	5.3	7.3	4.4
PCB-30	µg/kg	0.037	12	15	9.2	14	10
PCB-31	µg/kg	0.037	18	23	14	20	12
PCB-32	µg/kg	0.018	9	11	7.1	11	8
PCB-33	µg/kg	0.037	3.1	4.1	2.3	3.4	2.4
PCB-34	µg/kg	0.018	0.28	0.39	0.2	0.29	0.18
PCB-35	µg/kg	0.018	0.059	0.068	0.034	0.04	0.036
PCB-36	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U
PCB-37	µg/kg	0.018	2	2.6	1.4	2.2	1.5
PCB-38	µg/kg	0.018	0.037 J	0.037 J	0.024 J	0.04	0.029
PCB-39	µg/kg	0.018	0.1 J	0.15	0.084	0.11	0.083
PCB-40	µg/kg	0.062	14	17	11	15	10
PCB-41	µg/kg	0.062	14	17	11	15	10
PCB-42	µg/kg	0.049	8	10	6.5	8.8	5.9
PCB-43	µg/kg	0.051	1.4	1.7	1.1	1.5	0.93
PCB-44	µg/kg	0.059	26	32	21	29	19
PCB-45	µg/kg	0.055	5.6	7.1	4.6	6	4.1
PCB-46	µg/kg	0.061	1.6	1.9	1.3	1.7	1.1
PCB-47	µg/kg	0.059	26	32	21	29	19
PCB-48	µg/kg	0.049	2.9	3.7	2.4	3.2	2.2
PCB-49	µg/kg	0.047	19	24	16	22	14
PCB-50	µg/kg	0.052	4.2	5.5	3.3	4.2	2.7
PCB-51	µg/kg	0.055	5.6	7.1	4.6	6	4.1
PCB-52	µg/kg	0.048	27	34	22	30	20
PCB-53	µg/kg	0.052	4.2	5.5	3.3	4.2	2.7
PCB-54	µg/kg	0.018	0.1	0.11	0.084	0.1	0.06 J
PCB-55	µg/kg	0.036	0.23 J	0.32 J	0.2 J	0.24 J	0.24
PCB-56	µg/kg	0.037	4.1	5.1	3.3	4.4	3
PCB-57	µg/kg	0.037	0.26	0.32	0.21	0.26	0.18
PCB-58	µg/kg	0.037	0.077 J	0.12 J	0.081 J	0.091 J	0.074
PCB-59	µg/kg	0.056	2.8	3.6	2.3	3.2	2.1
PCB-60	µg/kg	0.037	1.4	1.8	1.1	1.5	1
PCB-61	µg/kg	0.073	15	19	12	16	11

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Table G-1K. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-18-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-18-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.9 J	0.98 J	1.9 J	1.3 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	**2.8**	**3.6**	**2.3**	**3.2**	**2.1**
PCB-63	µg/kg	0.034	**1.2**	**1.5**	**0.97**	**1.3**	**0.88**
PCB-64	µg/kg	0.034	**11**	**14**	**8.4**	**12**	**8**
PCB-65	µg/kg	0.059	**26**	**32**	**21**	**29**	**19**
PCB-66	µg/kg	0.035	**9.5**	**12**	**7.7**	**10**	**6.9**
PCB-67	µg/kg	0.033	**0.41 J**	**0.6**	**0.38**	**0.5**	**0.31**
PCB-68	µg/kg	0.033	**0.25**	**0.25 J**	**0.2**	**0.24**	**0.17**
PCB-69	µg/kg	0.047	**19**	**24**	**16**	**22**	**14**
PCB-70	µg/kg	0.073	**15**	**19**	**12**	**16**	**11**
PCB-71	µg/kg	0.062	**14**	**17**	**11**	**15**	**10**
PCB-72	µg/kg	0.036	**0.32**	**0.43**	**0.24**	**0.34**	**0.26**
PCB-73	µg/kg	0.051	**1.4**	**1.7**	**1.1**	**1.5**	**0.93**
PCB-74	µg/kg	0.073	**15**	**19**	**12**	**16**	**11**
PCB-75	µg/kg	0.056	**2.8**	**3.6**	**2.3**	**3.2**	**2.1**
PCB-76	µg/kg	0.073	**15**	**19**	**12**	**16**	**11**
PCB-77	µg/kg	0.036	**0.4**	**0.63**	**0.34**	**0.43**	**0.29**
PCB-78	µg/kg	0.037	0.056 U	0.074 U	0.041 U	0.061 U	0.041 U
PCB-79	µg/kg	0.033	**0.087**	**0.097 J**	**0.07**	**0.083**	**0.055 J**
PCB-80	µg/kg	0.032	0.048 U	0.063 U	0.035 U	0.051 U	0.035 U
PCB-81	µg/kg	0.034	0.048 U	0.065 U	0.036 U	0.054 U	0.036 U
PCB-82	µg/kg	0.018	**1.2 J**	**1.5 J**	**0.81**	**1.2 J**	**0.9 J**
PCB-83	µg/kg	0.037	**6.1**	**7.8**	**4.5**	**6.4**	**4.5**
PCB-84	µg/kg	0.018	**3.1**	**3.9**	**2.4**	**3.4**	**2.3**
PCB-85	µg/kg	0.055	**2.2**	**2.8**	**1.5**	**2.3**	**1.6**
PCB-86	µg/kg	0.110	**5.3**	**6.7**	**3.9**	**5.6**	**3.9**
PCB-87	µg/kg	0.110	**5.3**	**6.7**	**3.9**	**5.6**	**3.9**
PCB-88	µg/kg	0.037	**2.8**	**3.6**	**2.2**	**3.2**	**2.1**
PCB-89	µg/kg	0.018	**0.31**	**0.34 J**	**0.25**	**0.33**	**0.24**
PCB-90	µg/kg	0.055	**7.7**	**10**	**5.4**	**8.1**	**5.6**
PCB-91	µg/kg	0.037	**2.8**	**3.6**	**2.2**	**3.2**	**2.1**
PCB-92	µg/kg	0.018	**2.3**	**3**	**1.7**	**2.5**	**1.6**
PCB-93	µg/kg	0.037	**0.35**	**0.46**	**0.27**	**0.39**	**0.25**
PCB-94	µg/kg	0.018	**0.2**	**0.24**	**0.15**	**0.2**	**0.13 J**
PCB-95	µg/kg	0.018	**8.9**	**11**	**6.5**	**9.5**	**6.6**
PCB-96	µg/kg	0.018	**0.25**	**0.32**	**0.19**	**0.28**	**0.18**
PCB-97	µg/kg	0.110	**5.3**	**6.7**	**3.9**	**5.6**	**3.9**
PCB-98	µg/kg	0.037	**0.86**	**1.1**	**0.66**	**0.94**	**0.62**
PCB-99	µg/kg	0.037	**6.1**	**7.8**	**4.5**	**6.4**	**4.5**
PCB-100	µg/kg	0.037	**0.35**	**0.46**	**0.27**	**0.39**	**0.25**
PCB-101	µg/kg	0.055	**7.7**	**10**	**5.4**	**8.1**	**5.6**
PCB-102	µg/kg	0.037	**0.86**	**1.1**	**0.66**	**0.94**	**0.62**
PCB-103	µg/kg	0.018	**0.15 J**	**0.23**	**0.12**	**0.2**	**0.12 J**
PCB-104	µg/kg	0.018	0.023 U	0.03 U	**0.0047 J**	0.02 U	0.023 U
PCB-105	µg/kg	0.018	**1.6**	**2**	**1.2**	**1.7**	**1.2**
PCB-106	µg/kg	0.018	**0.026**	**0.022 J**	**0.011 J**	0.02 UJ	0.023 U
PCB-107	µg/kg	0.018	**0.55 J**	**0.71 J**	**0.42**	**0.63 J**	**0.42 J**
PCB-108	µg/kg	0.037	**0.17**	**0.25**	**0.14**	**0.2**	**0.13 J**
PCB-109	µg/kg	0.110	**5.3**	**6.7**	**3.9**	**5.6**	**3.9**
PCB-110	µg/kg	0.037	**10**	**13**	**7.4**	**11**	**7.6**
PCB-111	µg/kg	0.018	0.023 UJ	0.03 UJ	0.013 U	**0.025 J**	0.023 UJ
PCB-112	µg/kg	0.018	**0.12**	**0.18**	**0.0078 J**	**0.099**	**0.055 J**
PCB-113	µg/kg	0.055	**7.7**	**10**	**5.4**	**8.1**	**5.6**
PCB-114	µg/kg	0.018	**0.18**	**0.19 J**	**0.13**	**0.18**	**0.12**
PCB-115	µg/kg	0.037	**10**	**13**	**7.4**	**11**	**7.6**
PCB-116	µg/kg	0.055	**2.2**	**2.8**	**1.5**	**2.3**	**1.6**
PCB-117	µg/kg	0.055	**2.2**	**2.8**	**1.5**	**2.3**	**1.6**
PCB-118	µg/kg	0.018	**4.3**	**5.2**	**3.3**	**4.7**	**3.1**
PCB-119	µg/kg	0.110	**5.3**	**6.7**	**3.9**	**5.6**	**3.9**
PCB-120	µg/kg	0.018	**0.033 J**	**0.044 J**	**0.024**	**0.032 J**	**0.031 J**
PCB-121	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U

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Table G-1K. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-18-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-18-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.9 J	0.98 J	1.9 J	1.3 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.12**	**0.16**	**0.083**	**0.13**	**0.092 J**
PCB-123	µg/kg	0.018	**0.11**	**0.14 J**	**0.099**	**0.13**	**0.093**
PCB-124	µg/kg	0.037	**0.17**	**0.25**	**0.14**	**0.2**	**0.13 J**
PCB-125	µg/kg	0.110	**5.3**	**6.7**	**3.9**	**5.6**	**3.9**
PCB-126	µg/kg	0.018	0.023 U	0.03 U	**0.013**	**0.025**	0.023 U
PCB-127	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U
PCB-128	µg/kg	0.037	**0.54**	**0.62**	**0.42**	**0.62**	**0.38**
PCB-129	µg/kg	0.073	**4.2**	**5.1**	**3.4**	**4.9**	**3**
PCB-130	µg/kg	0.018	**0.28**	**0.29 J**	**0.22**	**0.31**	**0.19**
PCB-131	µg/kg	0.018	**0.045**	**0.064**	**0.044**	**0.067**	**0.042**
PCB-132	µg/kg	0.018	**1.2**	**1.5**	**1**	**1.5**	**0.91**
PCB-133	µg/kg	0.018	**0.081**	**0.096 J**	**0.074**	**0.097**	**0.053**
PCB-134	µg/kg	0.037	**0.21**	**0.28**	**0.19**	**0.25**	**0.17**
PCB-135	µg/kg	0.037	**1.9**	**2.3**	**1.5**	**2.3**	**1.4**
PCB-136	µg/kg	0.018	**0.54**	**0.61**	**0.42**	**0.58**	**0.38**
PCB-137	µg/kg	0.018	**0.089 J**	**0.12 J**	**0.091**	**0.14**	**0.06 J**
PCB-138	µg/kg	0.073	**4.2**	**5.1**	**3.4**	**4.9**	**3**
PCB-139	µg/kg	0.037	**0.081**	**0.094**	**0.067**	**0.083 J**	**0.065**
PCB-140	µg/kg	0.037	**0.081**	**0.094**	**0.067**	**0.083 J**	**0.065**
PCB-141	µg/kg	0.018	**0.4**	**0.5**	**0.32**	**0.46**	**0.28**
PCB-142	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U
PCB-143	µg/kg	0.037	**0.21**	**0.28**	**0.19**	**0.25**	**0.17**
PCB-144	µg/kg	0.018	**0.14**	**0.18**	**0.11**	**0.18**	**0.09 J**
PCB-145	µg/kg	0.018	**0.0044 J**	**0.0041 J**	**0.0046 J**	**0.0038 J**	0.023 U
PCB-146	µg/kg	0.018	**0.76**	**0.91**	**0.58**	**0.89**	**0.55**
PCB-147	µg/kg	0.037	**4.9**	**5.9**	**3.9**	**5.7**	**3.4**
PCB-148	µg/kg	0.018	**0.0095 J**	**0.0073 J**	**0.0063 J**	**0.0079 J**	**0.0065 J**
PCB-149	µg/kg	0.037	**4.9**	**5.9**	**3.9**	**5.7**	**3.4**
PCB-150	µg/kg	0.018	**0.0074 J**	**0.0074 J**	**0.0078 J**	**0.01 J**	**0.0049 J**
PCB-151	µg/kg	0.037	**1.9**	**2.3**	**1.5**	**2.3**	**1.4**
PCB-152	µg/kg	0.018	**0.0038 J**	**0.007 J**	**0.0057 J**	0.02 UJ	0.023 UJ
PCB-153	µg/kg	0.037	**3.4**	**4.1**	**2.7**	**3.9**	**2.4**
PCB-154	µg/kg	0.018	**0.067 J**	**0.066 J**	**0.056**	**0.081**	**0.049**
PCB-155	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U
PCB-156	µg/kg	0.037	**0.31**	**0.35**	**0.24**	**0.34**	**0.21**
PCB-157	µg/kg	0.037	**0.31**	**0.35**	**0.24**	**0.34**	**0.21**
PCB-158	µg/kg	0.018	**0.31**	**0.38**	**0.25**	**0.34**	**0.22**
PCB-159	µg/kg	0.018	**0.026 J**	**0.032**	0.013 U	**0.028 J**	0.023 U
PCB-160	µg/kg	0.073	**4.2**	**5.1**	**3.4**	**4.9**	**3**
PCB-161	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U
PCB-162	µg/kg	0.018	**0.014 J**	0.03 U	0.013 U	0.02 U	0.023 U
PCB-163	µg/kg	0.073	**4.2**	**5.1**	**3.4**	**4.9**	**3**
PCB-164	µg/kg	0.018	**0.3**	**0.35**	**0.25**	**0.35**	**0.21**
PCB-165	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U
PCB-166	µg/kg	0.037	**0.54**	**0.62**	**0.42**	**0.62**	**0.38**
PCB-167	µg/kg	0.018	**0.12**	**0.14**	**0.094**	**0.13**	**0.08**
PCB-168	µg/kg	0.037	**3.4**	**4.1**	**2.7**	**3.9**	**2.4**
PCB-169	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U
PCB-170	µg/kg	0.018	**0.55**	**0.64**	**0.43**	**0.62**	**0.39**
PCB-171	µg/kg	0.037	**0.2**	**0.24**	**0.15**	**0.22**	**0.14**
PCB-172	µg/kg	0.018	**0.12**	**0.12 J**	**0.09**	**0.13**	**0.089**
PCB-173	µg/kg	0.037	**0.2**	**0.24**	**0.15**	**0.22**	**0.14**
PCB-174	µg/kg	0.018	**0.62**	**0.69**	**0.49**	**0.71**	**0.45**
PCB-175	µg/kg	0.018	**0.029**	**0.028 J**	**0.024**	**0.032 J**	**0.014 J**
PCB-176	µg/kg	0.018	**0.11**	**0.14**	**0.093**	**0.13**	**0.071**
PCB-177	µg/kg	0.018	**0.45**	**0.55**	**0.38**	**0.53**	**0.34**
PCB-178	µg/kg	0.018	**0.19**	**0.22**	**0.16**	**0.22**	**0.14**
PCB-179	µg/kg	0.018	**0.4**	**0.49**	**0.33**	**0.47**	**0.3**
PCB-180	µg/kg	0.037	**0.54**	**0.63**	**0.43**	**0.61**	**0.36**
PCB-181	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U

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Table G-1K. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-18-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-18-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.4 J	1.9 J	0.98 J	1.9 J	1.3 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	0.023 U	0.03 U	**0.015**	**0.019 J**	0.023 U
PCB-183	µg/kg	0.037	**0.5**	**0.61**	**0.42**	**0.58**	**0.37**
PCB-184	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U
PCB-185	µg/kg	0.037	**0.5**	**0.61**	**0.42**	**0.58**	**0.37**
PCB-186	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U
PCB-187	µg/kg	0.018	**2.3**	**2.7**	**1.9**	**2.7**	**1.6**
PCB-188	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U
PCB-189	µg/kg	0.018	**0.018 J**	**0.029 J**	**0.012 J**	0.02 UJ	0.023 U
PCB-190	µg/kg	0.018	**0.12**	**0.15**	**0.088**	**0.13**	**0.081**
PCB-191	µg/kg	0.018	**0.018 J**	**0.023 J**	**0.017**	**0.025**	0.023 UJ
PCB-192	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U
PCB-193	µg/kg	0.037	**0.54**	**0.63**	**0.43**	**0.61**	**0.36**
PCB-194	µg/kg	0.018	**0.15**	**0.18**	**0.13**	**0.16**	**0.11**
PCB-195	µg/kg	0.018	**0.088 J**	**0.094 J**	**0.088**	**0.12**	**0.058 J**
PCB-196	µg/kg	0.018	**0.062 J**	**0.072 J**	**0.052**	**0.058 J**	**0.052**
PCB-197	µg/kg	0.018	**0.0083 J**	**0.014 J**	**0.01 J**	0.02 U	0.023 UJ
PCB-198	µg/kg	0.037	**0.36**	**0.43**	**0.26**	**0.4**	**0.25**
PCB-199	µg/kg	0.037	**0.36**	**0.43**	**0.26**	**0.4**	**0.25**
PCB-200	µg/kg	0.018	**0.034**	**0.041**	**0.029**	**0.034**	0.023 UJ
PCB-201	µg/kg	0.018	**0.041**	**0.049**	**0.031**	**0.043**	**0.03**
PCB-202	µg/kg	0.018	**0.071**	**0.084**	**0.059**	**0.073**	**0.039 J**
PCB-203	µg/kg	0.018	**0.16**	**0.22**	**0.13**	**0.18**	**0.1**
PCB-204	µg/kg	0.018	0.023 U	0.03 U	0.013 U	0.02 U	0.023 U
PCB-205	µg/kg	0.018	**0.0096 J**	**0.012 J**	**0.01 J**	0.02 UJ	0.023 U
PCB-206	µg/kg	0.018	**0.07**	**0.062 J**	**0.05 J**	**0.066 J**	**0.047**
PCB-207	µg/kg	0.018	**0.01 J**	0.03 U	**0.012 J**	**0.012 J**	0.023 U
PCB-208	µg/kg	0.018	**0.027**	**0.024 J**	**0.022 J**	**0.028**	**0.017 J**
PCB 209	µg/kg	0.018	**0.029 J**	**0.044**	**0.024**	**0.031 J**	0.023 UJ
TOTAL PCB (ND=0)	µg/kg	---	**672**	**843**	**526**	**739**	**494**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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Table G-1L. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-19-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-19-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.5	1.5	1.5	1.8	1.4
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	**0.23**	**0.25**	**0.26**	**0.3**	**0.23**
PCB-2	µg/kg	0.018	**0.029 J**	**0.034 J**	**0.041**	**0.048**	**0.034**
PCB-3	µg/kg	0.018	**0.29**	**0.33**	**0.33**	**0.38**	**0.31**
PCB-4	µg/kg	0.037	**6.2**	**6.7**	**6.7**	**7.8**	**6.5**
PCB-5	µg/kg	0.018	**0.096**	**0.12**	**0.1**	**0.11**	**0.11**
PCB-6	µg/kg	0.018	**2.7**	**3.1**	**3.1**	**3.5**	**3**
PCB-7	µg/kg	0.018	**0.43**	**0.47**	**0.47**	**0.55**	**0.46**
PCB-8	µg/kg	0.037	**6.5**	**7.2**	**7.2**	**7.9**	**6.9**
PCB-9	µg/kg	0.018	**0.38**	**0.44**	**0.42**	**0.48**	**0.42**
PCB-10	µg/kg	0.018	**0.22**	**0.24**	**0.23**	**0.27**	**0.24**
PCB-11	µg/kg	0.037	**0.066 J**	**0.073 J**	**0.088**	**0.074 J**	**0.074**
PCB-12	µg/kg	0.037	**0.76**	**0.89**	**0.92**	**1**	**0.81**
PCB-13	µg/kg	0.037	**0.76**	**0.89**	**0.92**	**1**	**0.81**
PCB-14	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U
PCB-15	µg/kg	0.018	**4.7**	**5.4**	**5.4**	**6**	**5.1**
PCB-16	µg/kg	0.018	**3.9**	**4**	**4**	**4.5**	**3.9**
PCB-17	µg/kg	0.018	**14**	**15**	**15**	**17**	**15**
PCB-18	µg/kg	0.037	**12**	**13**	**13**	**14**	**13**
PCB-19	µg/kg	0.018	**3.4**	**3.7**	**3.6**	**4.1**	**3.5**
PCB-20	µg/kg	0.037	**22**	**23**	**23**	**26**	**23**
PCB-21	µg/kg	0.037	**3.7**	**3.7**	**3.9**	**4**	**3.7**
PCB-22	µg/kg	0.018	**5.7**	**5.9**	**5.8**	**6.5**	**5.4**
PCB-23	µg/kg	0.018	**0.016 J**	**0.014 J**	**0.015 J**	**0.014 J**	**0.017 J**
PCB-24	µg/kg	0.018	**0.28**	**0.28**	**0.28 J**	**0.37**	**0.3**
PCB-25	µg/kg	0.018	**4.7**	**4.7**	**4.8**	**5.2**	**4.7**
PCB-26	µg/kg	0.037	**5.9**	**5.9**	**6.1**	**6.6**	**6**
PCB-27	µg/kg	0.018	**2.6**	**2.7**	**2.7**	**3**	**2.7**
PCB-28	µg/kg	0.037	**22**	**23**	**23**	**26**	**23**
PCB-29	µg/kg	0.037	**5.9**	**5.9**	**6.1**	**6.6**	**6**
PCB-30	µg/kg	0.037	**12**	**13**	**13**	**14**	**13**
PCB-31	µg/kg	0.037	**17**	**17**	**17**	**19**	**17**
PCB-32	µg/kg	0.018	**8.6**	**9.1**	**9.4**	**10**	**9.1**
PCB-33	µg/kg	0.037	**3.7**	**3.7**	**3.9**	**4**	**3.7**
PCB-34	µg/kg	0.018	**0.24**	**0.21 J**	**0.25**	**0.26**	**0.25**
PCB-35	µg/kg	0.018	**0.054**	**0.056**	**0.051**	**0.054 J**	**0.044 J**
PCB-36	µg/kg	0.018	0.027 U	**0.011 J**	0.023 U	0.026 U	0.026 U
PCB-37	µg/kg	0.018	**2.1**	**2**	**2**	**2.5**	**1.9**
PCB-38	µg/kg	0.018	**0.027 J**	**0.039 J**	**0.034**	**0.042**	**0.029 J**
PCB-39	µg/kg	0.018	**0.096**	**0.11**	**0.099**	**0.12 J**	**0.097**
PCB-40	µg/kg	0.062	**13**	**15**	**14**	**16**	**14**
PCB-41	µg/kg	0.062	**13**	**15**	**14**	**16**	**14**
PCB-42	µg/kg	0.049	**7.4**	**8.8**	**8.2**	**9.4**	**7.8**
PCB-43	µg/kg	0.051	**1.2**	**1.5**	**1.3**	**1.6**	**1.3**
PCB-44	µg/kg	0.059	**24**	**28**	**27**	**30**	**25**
PCB-45	µg/kg	0.055	**5.5**	**2.6 J**	**5.9**	**6.6**	**5.7**
PCB-46	µg/kg	0.061	**1.6**	**1.8**	**1.6**	**1.9**	**1.6**
PCB-47	µg/kg	0.059	**24**	**28**	**27**	**30**	**25**
PCB-48	µg/kg	0.049	**3.1**	**3.7**	**3.4**	**4**	**3.2**
PCB-49	µg/kg	0.047	**18**	**21**	**20**	**22**	**19**
PCB-50	µg/kg	0.052	**3.9**	**4.1**	**4.1**	**4.3**	**4**
PCB-51	µg/kg	0.055	**5.5**	**2.6 J**	**5.9**	**6.6**	**5.7**
PCB-52	µg/kg	0.048	**25**	**29**	**27**	**31**	**26**
PCB-53	µg/kg	0.052	**3.9**	**4.1**	**4.1**	**4.3**	**4**
PCB-54	µg/kg	0.018	**0.095**	**0.11**	**0.083 J**	**0.11**	**0.099**
PCB-55	µg/kg	0.036	**0.26 J**	**0.33 J**	**0.27**	**0.39**	**0.27**
PCB-56	µg/kg	0.037	**4.3**	**4.7**	**4.6**	**5.2**	**4.3**
PCB-57	µg/kg	0.037	**0.2 J**	**0.29**	**0.25**	**0.29**	**0.25**
PCB-58	µg/kg	0.037	**0.094**	**0.12**	**0.1**	**0.091 J**	0.062 U
PCB-59	µg/kg	0.056	**2.7**	**3.2**	**3**	**3.5**	**2.8**
PCB-60	µg/kg	0.037	**1.5**	**1.6**	**1.6**	**1.7**	**1.5**
PCB-61	µg/kg	0.073	**16**	**17**	**17**	**19**	**16**

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Table G-1L. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-19-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-19-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.5	1.5	1.5	1.8	1.4
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	2.7	3.2	3	3.5	2.8
PCB-63	µg/kg	0.034	1.1	1.3	1.2	1.4	1.2
PCB-64	µg/kg	0.034	10	12	11	13	11
PCB-65	µg/kg	0.059	24	28	27	30	25
PCB-66	µg/kg	0.035	9.7	11	10	12	9.9
PCB-67	µg/kg	0.033	0.44	0.52	0.49	0.52	0.46
PCB-68	µg/kg	0.033	0.2	0.22	0.2 J	0.23	0.19
PCB-69	µg/kg	0.047	18	21	20	22	19
PCB-70	µg/kg	0.073	16	17	17	19	16
PCB-71	µg/kg	0.062	13	15	14	16	14
PCB-72	µg/kg	0.036	0.28	0.35	0.32	0.37	0.32
PCB-73	µg/kg	0.051	1.2	1.5	1.3	1.6	1.3
PCB-74	µg/kg	0.073	16	17	17	19	16
PCB-75	µg/kg	0.056	2.7	3.2	3	3.5	2.8
PCB-76	µg/kg	0.073	16	17	17	19	16
PCB-77	µg/kg	0.036	0.42	0.53	0.47	0.5	0.44
PCB-78	µg/kg	0.037	0.06 U	0.034 U	0.061 U	0.066 U	0.062 U
PCB-79	µg/kg	0.033	0.096	0.073 J	0.076 J	0.074 J	0.082
PCB-80	µg/kg	0.032	0.051 U	0.029 U	0.052 U	0.056 U	0.053 U
PCB-81	µg/kg	0.034	0.052 U	0.029 U	0.054 U	0.058 U	0.054 U
PCB-82	µg/kg	0.018	1.2 J	1.2 J	1.2 J	1.3 J	1 J
PCB-83	µg/kg	0.037	5.8	6	6	6.6	5.8
PCB-84	µg/kg	0.018	2.9	3.2	3.2	3.5	3.1
PCB-85	µg/kg	0.055	2	2.1	2.2	2.3	2
PCB-86	µg/kg	0.110	5.2	5.4	5.4	5.9	5.1
PCB-87	µg/kg	0.110	5.2	5.4	5.4	5.9	5.1
PCB-88	µg/kg	0.037	2.6	2.9	2.8	3.2	2.7
PCB-89	µg/kg	0.018	0.3	0.3	0.32	0.35	0.3
PCB-90	µg/kg	0.055	8.1	8.1	8.3	8.7	7.7
PCB-91	µg/kg	0.037	2.6	2.9	2.8	3.2	2.7
PCB-92	µg/kg	0.018	2.2	2.3	2.3	2.5	2.1
PCB-93	µg/kg	0.037	0.34	0.37	0.36	0.4	0.32
PCB-94	µg/kg	0.018	0.17	0.19	0.18	0.2 J	0.18
PCB-95	µg/kg	0.018	9.1	9.6	9.5	10	9
PCB-96	µg/kg	0.018	0.24	0.28	0.26	0.3	0.25
PCB-97	µg/kg	0.110	5.2	5.4	5.4	5.9	5.1
PCB-98	µg/kg	0.037	0.8	0.88	0.86	0.95	0.84
PCB-99	µg/kg	0.037	5.8	6	6	6.6	5.8
PCB-100	µg/kg	0.037	0.34	0.37	0.36	0.4	0.32
PCB-101	µg/kg	0.055	8.1	8.1	8.3	8.7	7.7
PCB-102	µg/kg	0.037	0.8	0.88	0.86	0.95	0.84
PCB-103	µg/kg	0.018	0.17	0.18	0.18	0.2	0.17
PCB-104	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U
PCB-105	µg/kg	0.018	1.8	1.7	1.7	1.9	1.7
PCB-106	µg/kg	0.018	0.027 U	0.02 UJ	0.023 UJ	0.026 UJ	0.026 UJ
PCB-107	µg/kg	0.018	0.56 J	0.6 J	0.58 J	0.64 J	0.59 J
PCB-108	µg/kg	0.037	0.2 J	0.2 J	0.21 J	0.23 J	0.19 J
PCB-109	µg/kg	0.110	5.2	5.4	5.4	5.9	5.1
PCB-110	µg/kg	0.037	10	10	10	11	10
PCB-111	µg/kg	0.018	0.027 UJ	0.02 UJ	0.023 UJ	0.026 UJ	0.026 UJ
PCB-112	µg/kg	0.018	0.11 J	0.11 J	0.13	0.1 J	0.13 J
PCB-113	µg/kg	0.055	8.1	8.1	8.3	8.7	7.7
PCB-114	µg/kg	0.018	0.18	0.18	0.17	0.19	0.17
PCB-115	µg/kg	0.037	10	10	10	11	10
PCB-116	µg/kg	0.055	2	2.1	2.2	2.3	2
PCB-117	µg/kg	0.055	2	2.1	2.2	2.3	2
PCB-118	µg/kg	0.018	4.5	4.7	4.5	5.2	4.4
PCB-119	µg/kg	0.110	5.2	5.4	5.4	5.9	5.1
PCB-120	µg/kg	0.018	0.039 J	0.042 J	0.03 J	0.026 UJ	0.03 J
PCB-121	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U

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Table G-1L. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-19-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-19-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.5	1.5	1.5	1.8	1.4
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.13**	**0.11**	**0.12**	**0.13 J**	**0.11**
PCB-123	µg/kg	0.018	**0.13**	**0.13 J**	**0.11 J**	**0.16**	**0.14 J**
PCB-124	µg/kg	0.037	**0.2 J**	**0.2 J**	**0.21 J**	**0.23 J**	**0.19 J**
PCB-125	µg/kg	0.110	**5.2**	**5.4**	**5.4**	**5.9**	**5.1**
PCB-126	µg/kg	0.018	0.027 U	0.02 UJ	0.023 U	0.026 UJ	0.026 UJ
PCB-127	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U
PCB-128	µg/kg	0.037	**0.71**	**0.71**	**0.74**	**0.76**	**0.64**
PCB-129	µg/kg	0.073	**6.4**	**6.3**	**6.6**	**6.5**	**5.8**
PCB-130	µg/kg	0.018	**0.32**	**0.34**	**0.33**	**0.37**	**0.31**
PCB-131	µg/kg	0.018	**0.061**	**0.061**	**0.07**	**0.063 J**	**0.067**
PCB-132	µg/kg	0.018	**2**	**1.9**	**2**	**1.9**	**1.7**
PCB-133	µg/kg	0.018	**0.091**	**0.11**	**0.11**	**0.11 J**	**0.093**
PCB-134	µg/kg	0.037	**0.32**	**0.32**	**0.33**	**0.34**	**0.29**
PCB-135	µg/kg	0.037	**3.2**	**3**	**3**	**2.9**	**2.6**
PCB-136	µg/kg	0.018	**0.87**	**0.81**	**0.84**	**0.82**	**0.76**
PCB-137	µg/kg	0.018	**0.091 J**	**0.14**	**0.15**	**0.15**	**0.12**
PCB-138	µg/kg	0.073	**6.4**	**6.3**	**6.6**	**6.5**	**5.8**
PCB-139	µg/kg	0.037	**0.073**	**0.083**	**0.089**	**0.097**	**0.096**
PCB-140	µg/kg	0.037	**0.073**	**0.083**	**0.089**	**0.097**	**0.096**
PCB-141	µg/kg	0.018	**1.2**	**1**	**1.2**	**1**	**0.93**
PCB-142	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U
PCB-143	µg/kg	0.037	**0.32**	**0.32**	**0.33**	**0.34**	**0.29**
PCB-144	µg/kg	0.018	**0.31**	**0.27**	**0.3**	**0.27**	**0.24**
PCB-145	µg/kg	0.018	**0.0048 J**	**0.0047 J**	**0.0025 J**	**0.0046 J**	**0.0065 J**
PCB-146	µg/kg	0.018	**1.1**	**1**	**1.1**	**1.1**	**0.99**
PCB-147	µg/kg	0.037	**7.7**	**7.5**	**7.7**	**7.6**	**6.7**
PCB-148	µg/kg	0.018	0.027 U	**0.0065 J**	**0.0098 J**	**0.0069 J**	**0.006 J**
PCB-149	µg/kg	0.037	**7.7**	**7.5**	**7.7**	**7.6**	**6.7**
PCB-150	µg/kg	0.018	**0.0064 J**	**0.008 J**	**0.0093 J**	**0.0084 J**	**0.0073 J**
PCB-151	µg/kg	0.037	**3.2**	**3**	**3**	**2.9**	**2.6**
PCB-152	µg/kg	0.018	0.027 U	0.02 UJ	0.023 U	0.026 UJ	0.026 UJ
PCB-153	µg/kg	0.037	**5.8**	**5.6**	**5.9**	**5.7**	**5.1**
PCB-154	µg/kg	0.018	**0.061 J**	**0.074 J**	**0.068**	**0.082**	**0.07**
PCB-155	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U
PCB-156	µg/kg	0.037	**0.45**	**0.44**	**0.43**	**0.43**	**0.4**
PCB-157	µg/kg	0.037	**0.45**	**0.44**	**0.43**	**0.43**	**0.4**
PCB-158	µg/kg	0.018	**0.52**	**0.49**	**0.51**	**0.51**	**0.45**
PCB-159	µg/kg	0.018	**0.089**	**0.07**	**0.08**	**0.056 J**	**0.061**
PCB-160	µg/kg	0.073	**6.4**	**6.3**	**6.6**	**6.5**	**5.8**
PCB-161	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U
PCB-162	µg/kg	0.018	0.027 UJ	0.02 U	0.023 U	0.026 U	0.026 UJ
PCB-163	µg/kg	0.073	**6.4**	**6.3**	**6.6**	**6.5**	**5.8**
PCB-164	µg/kg	0.018	**0.48**	**0.46**	**0.47**	**0.46**	**0.41**
PCB-165	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U
PCB-166	µg/kg	0.037	**0.71**	**0.71**	**0.74**	**0.76**	**0.64**
PCB-167	µg/kg	0.018	**0.17**	**0.16**	**0.16**	**0.16**	**0.15**
PCB-168	µg/kg	0.037	**5.8**	**5.6**	**5.9**	**5.7**	**5.1**
PCB-169	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U
PCB-170	µg/kg	0.018	**1.7**	**1.4**	**1.6**	**1.4**	**1.3**
PCB-171	µg/kg	0.037	**0.54**	**0.48**	**0.53**	**0.44**	**0.42**
PCB-172	µg/kg	0.018	**0.32**	**0.28**	**0.3**	**0.27**	**0.24**
PCB-173	µg/kg	0.037	**0.54**	**0.48**	**0.53**	**0.44**	**0.42**
PCB-174	µg/kg	0.018	**2.1**	**1.7**	**1.9**	**1.6**	**1.5**
PCB-175	µg/kg	0.018	**0.073**	**0.07**	**0.075**	**0.063**	**0.061**
PCB-176	µg/kg	0.018	**0.28**	**0.25**	**0.26**	**0.24**	**0.22**
PCB-177	µg/kg	0.018	**1.2**	**1.1**	**1.1**	**1**	**0.9**
PCB-178	µg/kg	0.018	**0.45**	**0.4**	**0.42**	**0.39**	**0.34**
PCB-179	µg/kg	0.018	**1**	**0.92**	**0.99**	**0.92**	**0.81**
PCB-180	µg/kg	0.037	**3.4**	**2.7**	**3**	**2.5**	**2.3**
PCB-181	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U

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Table G-1L. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-19-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-19-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.5	1.5	1.5	1.8	1.4
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	**0.021 J**	**0.03**	**0.021 J**	**0.018 J**	**0.018 J**
PCB-183	µg/kg	0.037	**1.5**	**1.3**	**1.4**	**1.2**	**1.1**
PCB-184	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U
PCB-185	µg/kg	0.037	**1.5**	**1.3**	**1.4**	**1.2**	**1.1**
PCB-186	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U
PCB-187	µg/kg	0.018	**4.1**	**4**	**3.9**	**4**	**3.5**
PCB-188	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U
PCB-189	µg/kg	0.018	**0.051**	**0.045**	**0.056**	**0.044**	**0.037**
PCB-190	µg/kg	0.018	**0.33**	**0.27**	**0.28**	**0.26**	**0.23**
PCB-191	µg/kg	0.018	**0.065**	**0.059**	**0.071**	**0.061**	**0.059**
PCB-192	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U
PCB-193	µg/kg	0.037	**3.4**	**2.7**	**3**	**2.5**	**2.3**
PCB-194	µg/kg	0.018	**0.89**	**0.69**	**0.77**	**0.63**	**0.61**
PCB-195	µg/kg	0.018	**0.47**	**0.37**	**0.41**	**0.35**	**0.34**
PCB-196	µg/kg	0.018	**0.38**	**0.29**	**0.32**	**0.25**	**0.25**
PCB-197	µg/kg	0.018	**0.031 J**	**0.029**	**0.034**	**0.031**	0.026 UJ
PCB-198	µg/kg	0.037	**0.96**	**0.82**	**0.9**	**0.79**	**0.74**
PCB-199	µg/kg	0.037	**0.96**	**0.82**	**0.9**	**0.79**	**0.74**
PCB-200	µg/kg	0.018	**0.11**	**0.097**	**0.11**	**0.088**	**0.075**
PCB-201	µg/kg	0.018	**0.12**	**0.092**	**0.11**	**0.092**	**0.087**
PCB-202	µg/kg	0.018	**0.16 J**	**0.15**	**0.17**	**0.15**	**0.14**
PCB-203	µg/kg	0.018	**0.54**	**0.43**	**0.46**	**0.4**	**0.38**
PCB-204	µg/kg	0.018	0.027 U	0.02 U	0.023 U	0.026 U	0.026 U
PCB-205	µg/kg	0.018	**0.044 J**	**0.034 J**	**0.043**	**0.038**	**0.036 J**
PCB-206	µg/kg	0.018	**0.21**	**0.17**	**0.19**	**0.17**	**0.16**
PCB-207	µg/kg	0.018	**0.023 J**	**0.021 J**	**0.024 J**	**0.027**	**0.02 J**
PCB-208	µg/kg	0.018	**0.046**	**0.048**	**0.045**	**0.048**	**0.037**
PCB 209	µg/kg	0.018	**0.039**	**0.041 J**	**0.051**	**0.053**	**0.045**
TOTAL PCB (ND=0)	µg/kg	---	**698**	**734**	**738**	**806**	**700**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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Table G-1M. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-21-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-21-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.7	2	1.6	1.8	1.5
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	**0.12**	**0.14**	**0.1**	**0.11**	**0.1**
PCB-2	µg/kg	0.018	**0.03**	**0.029 J**	0.029 UJ	0.029 U	0.033 UJ
PCB-3	µg/kg	0.018	**0.23**	**0.25**	**0.2**	**0.24**	**0.21 J**
PCB-4	µg/kg	0.037	**2.7**	**3.1**	**2.5**	**2.7**	**2.7**
PCB-5	µg/kg	0.018	**0.049 J**	**0.066**	**0.035 J**	**0.035 J**	**0.041 J**
PCB-6	µg/kg	0.018	**1.9**	**2.1**	**1.7**	**1.8**	**1.8**
PCB-7	µg/kg	0.018	**0.27**	**0.31**	**0.24**	**0.28**	**0.27**
PCB-8	µg/kg	0.037	**4.1**	**4.7**	**3.4**	**3.7**	**3.6**
PCB-9	µg/kg	0.018	**0.23**	**0.27**	**0.2**	**0.21**	**0.23**
PCB-10	µg/kg	0.018	**0.1**	**0.11 J**	**0.085**	**0.086 J**	**0.082 J**
PCB-11	µg/kg	0.037	**0.042 J**	**0.063 J**	**0.056 J**	**0.054 J**	**0.051 J**
PCB-12	µg/kg	0.037	**0.52**	**0.61**	**0.47**	**0.52**	**0.5**
PCB-13	µg/kg	0.037	**0.52**	**0.61**	**0.47**	**0.52**	**0.5**
PCB-14	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-15	µg/kg	0.018	**3.8**	**4.2**	**3.2**	**3.8**	**3.5**
PCB-16	µg/kg	0.018	**2.5**	**2.7**	**1.9**	**2.2**	**2**
PCB-17	µg/kg	0.018	**9.4**	**10**	**7.5**	**8.7**	**8.1**
PCB-18	µg/kg	0.037	**8.8**	**9.2**	**6.6**	**7.8**	**7**
PCB-19	µg/kg	0.018	**1.8**	**1.9**	**1.5**	**1.6**	**1.5**
PCB-20	µg/kg	0.037	**17**	**20**	**15**	**19**	**16**
PCB-21	µg/kg	0.037	**2.6**	**3.1**	**1.8**	**2.3**	**2**
PCB-22	µg/kg	0.018	**4**	**4.5**	**3.2**	**4.1**	**3.6**
PCB-23	µg/kg	0.018	**0.011 J**	**0.016 J**	**0.012 J**	0.029 U	**0.017 J**
PCB-24	µg/kg	0.018	**0.17**	**0.18**	**0.13**	**0.16**	**0.15**
PCB-25	µg/kg	0.018	**3.4**	**4.2**	**3.3**	**4.3**	**3.5**
PCB-26	µg/kg	0.037	**4.2**	**5.1**	**4**	**5.4**	**4.3**
PCB-27	µg/kg	0.018	**1.8**	**1.9**	**1.4**	**1.6**	**1.5**
PCB-28	µg/kg	0.037	**17**	**20**	**15**	**19**	**16**
PCB-29	µg/kg	0.037	**4.2**	**5.1**	**4**	**5.4**	**4.3**
PCB-30	µg/kg	0.037	**8.8**	**9.2**	**6.6**	**7.8**	**7**
PCB-31	µg/kg	0.037	**11**	**14**	**10**	**13**	**11**
PCB-32	µg/kg	0.018	**5.9**	**6.7**	**4.9**	**6**	**5.5**
PCB-33	µg/kg	0.037	**2.6**	**3.1**	**1.8**	**2.3**	**2**
PCB-34	µg/kg	0.018	**0.16**	**0.22**	**0.17**	**0.22**	**0.18**
PCB-35	µg/kg	0.018	**0.031 J**	**0.044 J**	**0.033**	**0.029 J**	**0.033**
PCB-36	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-37	µg/kg	0.018	**1.6**	**1.6**	**1.4**	**1.6**	**1.5**
PCB-38	µg/kg	0.018	**0.036 J**	**0.037 J**	**0.019 J**	**0.016 J**	0.033 U
PCB-39	µg/kg	0.018	**0.082 J**	**0.083**	**0.055**	**0.065 J**	**0.071**
PCB-40	µg/kg	0.062	**11**	**12**	**8.7**	**10**	**9.3**
PCB-41	µg/kg	0.062	**11**	**12**	**8.7**	**10**	**9.3**
PCB-42	µg/kg	0.049	**6.4**	**7.2**	**5.2**	**6**	**5.6**
PCB-43	µg/kg	0.051	**1**	**1.1**	**0.87**	**1**	**0.85**
PCB-44	µg/kg	0.059	**20**	**23**	**17**	**20**	**18**
PCB-45	µg/kg	0.055	**4**	**4.7**	**3.4**	**4.2**	**3.5**
PCB-46	µg/kg	0.061	**1.1**	**1.3**	**0.93**	**1.1**	**0.99**
PCB-47	µg/kg	0.059	**20**	**23**	**17**	**20**	**18**
PCB-48	µg/kg	0.049	**2.4**	**2.7**	**2**	**2.2**	**2**
PCB-49	µg/kg	0.047	**15**	**17**	**13**	**15**	**13**
PCB-50	µg/kg	0.052	**2.7**	**3.4**	**2.5**	**3.2**	**2.6**
PCB-51	µg/kg	0.055	**4**	**4.7**	**3.4**	**4.2**	**3.5**
PCB-52	µg/kg	0.048	**21**	**24**	**17**	**20**	**18**
PCB-53	µg/kg	0.052	**2.7**	**3.4**	**2.5**	**3.2**	**2.6**
PCB-54	µg/kg	0.018	**0.066**	**0.07 J**	**0.049 J**	**0.056 J**	**0.066**
PCB-55	µg/kg	0.036	**0.27**	**0.32 J**	**0.12 J**	**0.18**	**0.24**
PCB-56	µg/kg	0.037	**3.6**	**4**	**2.9**	**3.4**	**3.1**
PCB-57	µg/kg	0.037	**0.21**	**0.22**	**0.15 J**	**0.21**	**0.19**
PCB-58	µg/kg	0.037	**0.068 J**	**0.093**	**0.067 J**	**0.059 J**	**0.066 J**
PCB-59	µg/kg	0.056	**2.3**	**2.6**	**1.9**	**2.1**	**2**
PCB-60	µg/kg	0.037	**1.2**	**1.4**	**0.95**	**1.1**	**0.99**
PCB-61	µg/kg	0.073	**13**	**14**	**10**	**12**	**11**

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Table G-1M. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-21-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-21-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.7	2	1.6	1.8	1.5
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	**2.3**	**2.6**	**1.9**	**2.1**	**2**
PCB-63	µg/kg	0.034	**0.92**	**1.1**	**0.76**	**0.91**	**0.82**
PCB-64	µg/kg	0.034	**8.7**	**9.9**	**7.2**	**8.4**	**7.6**
PCB-65	µg/kg	0.059	**20**	**23**	**17**	**20**	**18**
PCB-66	µg/kg	0.035	**8.3**	**9.3**	**6.7**	**7.9**	**7**
PCB-67	µg/kg	0.033	**0.35**	**0.38**	**0.3**	**0.36**	**0.31**
PCB-68	µg/kg	0.033	**0.18 J**	**0.19**	**0.14**	**0.17**	**0.14 J**
PCB-69	µg/kg	0.047	**15**	**17**	**13**	**15**	**13**
PCB-70	µg/kg	0.073	**13**	**14**	**10**	**12**	**11**
PCB-71	µg/kg	0.062	**11**	**12**	**8.7**	**10**	**9.3**
PCB-72	µg/kg	0.036	**0.29**	**0.31**	**0.2 J**	**0.26**	**0.21 J**
PCB-73	µg/kg	0.051	**1**	**1.1**	**0.87**	**1**	**0.85**
PCB-74	µg/kg	0.073	**13**	**14**	**10**	**12**	**11**
PCB-75	µg/kg	0.056	**2.3**	**2.6**	**1.9**	**2.1**	**2**
PCB-76	µg/kg	0.073	**13**	**14**	**10**	**12**	**11**
PCB-77	µg/kg	0.036	**0.34**	**0.42**	**0.37**	**0.42**	**0.35**
PCB-78	µg/kg	0.037	0.048 U	0.058 U	0.029 U	0.03 U	0.046 U
PCB-79	µg/kg	0.033	**0.06 J**	**0.078 J**	**0.056**	**0.064 J**	**0.059 J**
PCB-80	µg/kg	0.032	0.041 U	0.049 U	0.029 U	0.029 U	0.039 U
PCB-81	µg/kg	0.034	0.043 U	0.05 U	0.029 U	0.029 U	0.043 U
PCB-82	µg/kg	0.018	**0.98 J**	**1.1 J**	**0.87**	**1.1**	**0.93**
PCB-83	µg/kg	0.037	**5.1**	**5.7**	**4.5**	**6**	**4.9**
PCB-84	µg/kg	0.018	**2.4**	**2.7**	**2.1**	**2.6**	**2.4**
PCB-85	µg/kg	0.055	**1.8**	**2**	**1.6**	**2.1**	**1.8**
PCB-86	µg/kg	0.110	**4.4**	**4.9**	**3.8**	**5.1**	**4.2**
PCB-87	µg/kg	0.110	**4.4**	**4.9**	**3.8**	**5.1**	**4.2**
PCB-88	µg/kg	0.037	**2.3**	**2.5**	**2**	**2.6**	**2.2**
PCB-89	µg/kg	0.018	**0.25**	**0.28**	**0.21**	**0.28**	**0.23**
PCB-90	µg/kg	0.055	**6.7**	**7.7**	**5.7**	**7.6**	**6.1**
PCB-91	µg/kg	0.037	**2.3**	**2.5**	**2**	**2.6**	**2.2**
PCB-92	µg/kg	0.018	**1.9**	**2.1**	**1.7**	**2.1**	**1.8**
PCB-93	µg/kg	0.037	**0.28**	**0.31**	**0.22**	**0.32**	**0.26**
PCB-94	µg/kg	0.018	**0.15**	**0.16**	**0.13**	**0.17**	**0.13 J**
PCB-95	µg/kg	0.018	**7.4**	**8.4**	**6.4**	**8.2**	**6.9**
PCB-96	µg/kg	0.018	**0.2**	**0.22**	**0.18**	**0.21**	**0.18**
PCB-97	µg/kg	0.110	**4.4**	**4.9**	**3.8**	**5.1**	**4.2**
PCB-98	µg/kg	0.037	**0.7**	**0.67 J**	**0.6**	**0.74**	**0.65**
PCB-99	µg/kg	0.037	**5.1**	**5.7**	**4.5**	**6**	**4.9**
PCB-100	µg/kg	0.037	**0.28**	**0.31**	**0.22**	**0.32**	**0.26**
PCB-101	µg/kg	0.055	**6.7**	**7.7**	**5.7**	**7.6**	**6.1**
PCB-102	µg/kg	0.037	**0.7**	**0.67 J**	**0.6**	**0.74**	**0.65**
PCB-103	µg/kg	0.018	**0.14**	**0.16**	**0.13**	**0.18**	**0.14**
PCB-104	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-105	µg/kg	0.018	**1.5**	**1.7**	**1.3**	**1.5**	**1.3**
PCB-106	µg/kg	0.018	0.02 U	0.023 U	0.029 UJ	0.029 U	0.033 UJ
PCB-107	µg/kg	0.018	**0.52 J**	**0.55 J**	**0.42 J**	**0.52 J**	**0.45 J**
PCB-108	µg/kg	0.037	**0.16 J**	**0.19 J**	**0.14**	**0.17**	**0.15**
PCB-109	µg/kg	0.110	**4.4**	**4.9**	**3.8**	**5.1**	**4.2**
PCB-110	µg/kg	0.037	**8.8**	**9.6**	**7.6**	**9.9**	**8.2**
PCB-111	µg/kg	0.018	0.02 UJ	0.023 UJ	0.029 U	0.029 U	0.033 U
PCB-112	µg/kg	0.018	**0.1 J**	**0.11 J**	**0.066 J**	**0.11**	**0.057 J**
PCB-113	µg/kg	0.055	**6.7**	**7.7**	**5.7**	**7.6**	**6.1**
PCB-114	µg/kg	0.018	**0.15**	**0.16**	**0.11**	**0.15**	**0.13**
PCB-115	µg/kg	0.037	**8.8**	**9.6**	**7.6**	**9.9**	**8.2**
PCB-116	µg/kg	0.055	**1.8**	**2**	**1.6**	**2.1**	**1.8**
PCB-117	µg/kg	0.055	**1.8**	**2**	**1.6**	**2.1**	**1.8**
PCB-118	µg/kg	0.018	**3.8**	**4.4**	**3.2**	**4**	**3.5**
PCB-119	µg/kg	0.110	**4.4**	**4.9**	**3.8**	**5.1**	**4.2**
PCB-120	µg/kg	0.018	**0.053 J**	**0.045 J**	0.029 UJ	0.029 UJ	**0.036**
PCB-121	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U

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Table G-1M. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-21-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-21-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.7	2	1.6	1.8	1.5
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.11**	**0.11**	**0.08**	**0.1**	**0.068 J**
PCB-123	µg/kg	0.018	**0.11**	**0.13**	**0.094 J**	**0.11 J**	**0.12**
PCB-124	µg/kg	0.037	**0.16 J**	**0.19 J**	**0.14**	**0.17**	**0.15**
PCB-125	µg/kg	0.110	**4.4**	**4.9**	**3.8**	**5.1**	**4.2**
PCB-126	µg/kg	0.018	0.02 UJ	0.023 UJ	0.029 U	0.029 U	0.033 UJ
PCB-127	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-128	µg/kg	0.037	**0.63**	**0.71**	**0.43**	**0.52**	**0.48**
PCB-129	µg/kg	0.073	**5.2**	**6.2**	**3.4**	**4.2**	**3.7**
PCB-130	µg/kg	0.018	**0.3**	**0.34**	**0.22**	**0.28**	**0.23**
PCB-131	µg/kg	0.018	**0.051**	**0.064**	**0.035**	**0.042**	**0.048**
PCB-132	µg/kg	0.018	**1.5**	**1.8**	**0.96**	**1.2**	**1**
PCB-133	µg/kg	0.018	**0.088**	**0.1**	**0.071**	**0.073**	**0.073**
PCB-134	µg/kg	0.037	**0.27**	**0.31**	**0.18**	**0.21**	**0.2**
PCB-135	µg/kg	0.037	**2.3**	**2.8**	**1.7**	**2.1**	**1.8**
PCB-136	µg/kg	0.018	**0.62**	**0.77**	**0.43**	**0.49**	**0.45**
PCB-137	µg/kg	0.018	**0.12**	**0.15**	**0.091**	**0.12**	**0.11**
PCB-138	µg/kg	0.073	**5.2**	**6.2**	**3.4**	**4.2**	**3.7**
PCB-139	µg/kg	0.037	**0.083**	**0.082**	**0.062**	**0.064 J**	**0.064 J**
PCB-140	µg/kg	0.037	**0.083**	**0.082**	**0.062**	**0.064 J**	**0.064 J**
PCB-141	µg/kg	0.018	**0.77**	**0.98**	**0.34**	**0.39**	**0.36 J**
PCB-142	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-143	µg/kg	0.037	**0.27**	**0.31**	**0.18**	**0.21**	**0.2**
PCB-144	µg/kg	0.018	**0.2**	**0.25**	**0.13**	**0.14**	**0.13**
PCB-145	µg/kg	0.018	**0.0065 J**	**0.0087 J**	**0.0045 J**	**0.0041 J**	0.033 U
PCB-146	µg/kg	0.018	**0.88**	**1**	**0.63**	**0.75**	**0.72**
PCB-147	µg/kg	0.037	**5.9**	**7.1**	**3.8**	**5**	**4.2**
PCB-148	µg/kg	0.018	**0.0071 J**	**0.0097 J**	**0.0048 J**	**0.0061 J**	**0.0056 J**
PCB-149	µg/kg	0.037	**5.9**	**7.1**	**3.8**	**5**	**4.2**
PCB-150	µg/kg	0.018	**0.0061 J**	**0.0083 J**	**0.0034 J**	**0.0081 J**	**0.0056 J**
PCB-151	µg/kg	0.037	**2.3**	**2.8**	**1.7**	**2.1**	**1.8**
PCB-152	µg/kg	0.018	0.02 UJ	0.023 UJ	0.029 UJ	0.029 UJ	0.033 UJ
PCB-153	µg/kg	0.037	**4.4**	**5.4**	**2.7**	**3.3**	**3**
PCB-154	µg/kg	0.018	**0.064**	**0.078**	**0.053 J**	**0.068**	**0.069**
PCB-155	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-156	µg/kg	0.037	**0.37**	**0.42**	**0.27**	**0.31**	**0.28**
PCB-157	µg/kg	0.037	**0.37**	**0.42**	**0.27**	**0.31**	**0.28**
PCB-158	µg/kg	0.018	**0.39**	**0.48**	**0.23**	**0.3**	**0.25**
PCB-159	µg/kg	0.018	**0.051**	**0.069**	0.029 UJ	0.029 UJ	0.033 U
PCB-160	µg/kg	0.073	**5.2**	**6.2**	**3.4**	**4.2**	**3.7**
PCB-161	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-162	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 UJ
PCB-163	µg/kg	0.073	**5.2**	**6.2**	**3.4**	**4.2**	**3.7**
PCB-164	µg/kg	0.018	**0.38**	**0.44**	**0.25**	**0.31**	**0.25**
PCB-165	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-166	µg/kg	0.037	**0.63**	**0.71**	**0.43**	**0.52**	**0.48**
PCB-167	µg/kg	0.018	**0.14**	**0.16**	**0.096**	**0.13**	**0.1**
PCB-168	µg/kg	0.037	**4.4**	**5.4**	**2.7**	**3.3**	**3**
PCB-169	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-170	µg/kg	0.018	**1.1**	**1.4**	**0.46**	**0.62**	**0.54**
PCB-171	µg/kg	0.037	**0.38**	**0.45**	**0.17**	**0.2**	**0.17 J**
PCB-172	µg/kg	0.018	**0.21**	**0.26**	**0.11**	**0.13**	**0.1 J**
PCB-173	µg/kg	0.037	**0.38**	**0.45**	**0.17**	**0.2**	**0.17 J**
PCB-174	µg/kg	0.018	**1.3**	**1.6**	**0.54**	**0.65**	**0.6**
PCB-175	µg/kg	0.018	**0.05**	**0.067**	**0.03**	**0.024 J**	**0.024 J**
PCB-176	µg/kg	0.018	**0.19**	**0.24**	**0.095**	**0.1**	**0.11**
PCB-177	µg/kg	0.018	**0.79**	**0.97**	**0.42**	**0.46**	**0.45**
PCB-178	µg/kg	0.018	**0.3**	**0.39**	**0.17**	**0.2 J**	**0.17**
PCB-179	µg/kg	0.018	**0.69**	**0.87**	**0.34**	**0.41**	**0.39**
PCB-180	µg/kg	0.037	**1.9**	**2.5**	**0.48**	**0.62**	**0.59**
PCB-181	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U

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Table G-1M. *Lumbriculus variegatus:* Replicate Tissue Concentrations For OR19-21-SURF
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			OR19-21-SURF				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.7	2	1.6	1.8	1.5
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	**0.023 J**	0.023 U	**0.011 J**	**0.019 J**	**0.012 J**
PCB-183	µg/kg	0.037	**0.94**	**1.2**	**0.44**	**0.53**	**0.47**
PCB-184	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-185	µg/kg	0.037	**0.94**	**1.2**	**0.44**	**0.53**	**0.47**
PCB-186	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-187	µg/kg	0.018	**3.3**	**3.9**	**2.3**	**2.8**	**2.4**
PCB-188	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-189	µg/kg	0.018	**0.036**	**0.037 J**	0.029 U	0.029 UJ	0.033 UJ
PCB-190	µg/kg	0.018	**0.19**	**0.26**	**0.096**	**0.11 J**	**0.11**
PCB-191	µg/kg	0.018	**0.047**	**0.061**	0.029 UJ	0.029 U	0.033 UJ
PCB-192	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-193	µg/kg	0.037	**1.9**	**2.5**	**0.48**	**0.62**	**0.59**
PCB-194	µg/kg	0.018	**0.46**	**0.61**	**0.15**	**0.2**	**0.2**
PCB-195	µg/kg	0.018	**0.25**	**0.36**	**0.089 J**	**0.11**	**0.097 J**
PCB-196	µg/kg	0.018	**0.21**	**0.26**	**0.059 J**	**0.06 J**	**0.073**
PCB-197	µg/kg	0.018	0.02 UJ	0.023 UJ	0.029 U	0.029 UJ	0.033 UJ
PCB-198	µg/kg	0.037	**0.65**	**0.78**	**0.31**	**0.43**	**0.38**
PCB-199	µg/kg	0.037	**0.65**	**0.78**	**0.31**	**0.43**	**0.38**
PCB-200	µg/kg	0.018	**0.071**	**0.081**	**0.032**	**0.032 J**	**0.036 J**
PCB-201	µg/kg	0.018	**0.081**	**0.092**	**0.04**	**0.048**	**0.041**
PCB-202	µg/kg	0.018	**0.13**	**0.14**	**0.051 J**	**0.077**	**0.059 J**
PCB-203	µg/kg	0.018	**0.33**	**0.39**	**0.15**	**0.19**	**0.18**
PCB-204	µg/kg	0.018	0.02 U	0.023 U	0.029 U	0.029 U	0.033 U
PCB-205	µg/kg	0.018	**0.024 J**	**0.037**	0.029 UJ	0.029 UJ	0.033 UJ
PCB-206	µg/kg	0.018	**0.13**	**0.15 J**	**0.065**	**0.083**	**0.073**
PCB-207	µg/kg	0.018	**0.023**	**0.019 J**	**0.0098 J**	**0.0073 J**	**0.012 J**
PCB-208	µg/kg	0.018	**0.038**	**0.054**	**0.028 J**	**0.027 J**	**0.038**
PCB 209	µg/kg	0.018	**0.044**	**0.041**	**0.041 J**	**0.048 J**	**0.053**
TOTAL PCB (ND=0)	µg/kg	---	**550**	**625**	**444**	**543**	**475**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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Table G-1N. *Lumbriculus variegatus:* Replicate Tissue Concentrations For Laboratory Control Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			CONTROL SITE				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.8 J	1.6 J	1.9 J	1.6 J	1.7 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	0.015 U	0.0098 U	**0.0013 J**	0.0099 U	0.0098 U
PCB-2	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-3	µg/kg	0.018	0.015 U	0.0098 U	**0.0018 J**	0.0099 U	0.0098 U
PCB-4	µg/kg	0.037	**0.0084 J**	**0.0061 J**	**0.0048 J**	**0.0067 J**	**0.0076 J**
PCB-5	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-6	µg/kg	0.018	0.015 U	**0.0036 J**	**0.0054 J**	**0.0035 J**	**0.0056 J**
PCB-7	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-8	µg/kg	0.037	**0.014 J**	**0.0057 J**	**0.011 J**	**0.0074 J**	**0.012 J**
PCB-9	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-10	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-11	µg/kg	0.037	**0.028 J**	**0.025 J**	**0.031**	**0.027 J**	**0.034**
PCB-12	µg/kg	0.037	0.029 U	**0.0021 J**	**0.0023 J**	0.02 U	0.02 U
PCB-13	µg/kg	0.037	0.029 U	**0.0021 J**	**0.0023 J**	0.02 U	0.02 U
PCB-14	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-15	µg/kg	0.018	**0.0074 J**	**0.007 J**	**0.0055 J**	**0.0051 J**	**0.0074 J**
PCB-16	µg/kg	0.018	**0.007 J**	**0.0084 J**	**0.0076 J**	**0.0079 J**	**0.011**
PCB-17	µg/kg	0.018	0.015 U	0.0098 U	**0.011**	0.0099 UJ	**0.011 J**
PCB-18	µg/kg	0.037	**0.019 J**	**0.027**	**0.022 J**	**0.018 J**	**0.024**
PCB-19	µg/kg	0.018	0.015 U	**0.0016 J**	**0.0029 J**	0.0099 U	0.0098 U
PCB-20	µg/kg	0.037	**0.032 J**	**0.045**	**0.039 J**	**0.023 J**	**0.038 J**
PCB-21	µg/kg	0.037	0.029 U	0.02 U	0.02 U	0.02 UJ	0.02 U
PCB-22	µg/kg	0.018	0.015 UJ	**0.013**	**0.012**	0.0099 U	**0.015**
PCB-23	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-24	µg/kg	0.018	0.015 U	0.0098 U	**0.00097 J**	0.0099 U	0.0098 U
PCB-25	µg/kg	0.018	**0.004 J**	**0.006 J**	**0.0038 J**	**0.0036 J**	**0.0051 J**
PCB-26	µg/kg	0.037	0.029 U	0.02 U	0.02 U	0.02 UJ	0.02 UJ
PCB-27	µg/kg	0.018	0.015 U	**0.0012 J**	**0.0024 J**	**0.0018 J**	0.0098 U
PCB-28	µg/kg	0.037	**0.032 J**	**0.045**	**0.039 J**	**0.023 J**	**0.038 J**
PCB-29	µg/kg	0.037	0.029 U	0.02 U	0.02 U	0.02 UJ	0.02 UJ
PCB-30	µg/kg	0.037	**0.019 J**	**0.027**	**0.022 J**	**0.018 J**	**0.024**
PCB-31	µg/kg	0.037	**0.029**	**0.034**	**0.027**	**0.021 J**	**0.027 J**
PCB-32	µg/kg	0.018	0.015 UJ	0.0098 UJ	0.01 U	0.0099 UJ	0.0098 UJ
PCB-33	µg/kg	0.037	0.029 U	0.02 U	0.02 U	0.02 UJ	0.02 U
PCB-34	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-35	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-36	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-37	µg/kg	0.018	0.015 UJ	0.0098 UJ	**0.01**	0.0099 UJ	0.0098 UJ
PCB-38	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-39	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-40	µg/kg	0.062	**0.014 J**	**0.015 J**	**0.021 J**	**0.013 J**	**0.018 J**
PCB-41	µg/kg	0.062	**0.014 J**	**0.015 J**	**0.021 J**	**0.013 J**	**0.018 J**
PCB-42	µg/kg	0.049	**0.0087 J**	**0.0081 J**	**0.01 J**	**0.0068 J**	**0.009 J**
PCB-43	µg/kg	0.051	0.029 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-44	µg/kg	0.059	**0.071**	**0.049**	**0.049**	0.03 UJ	**0.045**
PCB-45	µg/kg	0.055	0.029 U	**0.0049 J**	**0.0054 J**	0.02 U	0.02 U
PCB-46	µg/kg	0.061	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-47	µg/kg	0.059	**0.071**	**0.049**	**0.049**	0.03 UJ	**0.045**
PCB-48	µg/kg	0.049	**0.0057 J**	**0.0053 J**	**0.0078 J**	**0.0052 J**	**0.006 J**
PCB-49	µg/kg	0.047	**0.03 J**	**0.032**	**0.035**	**0.026**	**0.029 J**
PCB-50	µg/kg	0.052	0.029 U	**0.0031 J**	**0.0035 J**	**0.0039 J**	0.02 U
PCB-51	µg/kg	0.055	0.029 U	**0.0049 J**	**0.0054 J**	0.02 U	0.02 U
PCB-52	µg/kg	0.048	**0.08 J**	**0.064**	**0.078**	**0.062**	**0.066**
PCB-53	µg/kg	0.052	0.029 U	**0.0031 J**	**0.0035 J**	**0.0039 J**	0.02 U
PCB-54	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-55	µg/kg	0.036	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-56	µg/kg	0.037	**0.016**	**0.016**	**0.02**	**0.013**	**0.014 J**
PCB-57	µg/kg	0.037	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-58	µg/kg	0.037	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-59	µg/kg	0.056	**0.0051 J**	**0.0046 J**	**0.0058 J**	**0.0031 J**	**0.0047 J**
PCB-60	µg/kg	0.037	0.015 UJ	0.0098 UJ	0.01 U	0.0099 UJ	0.0098 U
PCB-61	µg/kg	0.073	**0.081**	**0.063**	**0.093**	**0.062**	**0.068**

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Table G-1N. *Lumbriculus variegatus:* Replicate Tissue Concentrations For Laboratory Control
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			CONTROL SITE				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.8 J	1.6 J	1.9 J	1.6 J	1.7 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	**0.0051 J**	**0.0046 J**	**0.0058 J**	**0.0031 J**	**0.0047 J**
PCB-63	µg/kg	0.034	0.015 U	**0.0021 J**	0.01 U	0.0099 U	0.0098 U
PCB-64	µg/kg	0.034	**0.02**	**0.014 J**	**0.021**	**0.012 J**	**0.019**
PCB-65	µg/kg	0.059	**0.071**	**0.049**	**0.049**	0.03 UJ	**0.045**
PCB-66	µg/kg	0.035	**0.049**	**0.04**	**0.055**	**0.038**	**0.045**
PCB-67	µg/kg	0.033	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-68	µg/kg	0.033	0.015 U	**0.0028 J**	0.01 U	0.0099 U	0.0098 U
PCB-69	µg/kg	0.047	**0.03 J**	**0.032**	**0.035**	**0.026**	**0.029 J**
PCB-70	µg/kg	0.073	**0.081**	**0.063**	**0.093**	**0.062**	**0.068**
PCB-71	µg/kg	0.062	**0.014 J**	**0.015 J**	**0.021 J**	**0.013 J**	**0.018 J**
PCB-72	µg/kg	0.036	0.015 U	**0.0021 J**	**0.0019 J**	0.0099 U	0.0098 U
PCB-73	µg/kg	0.051	0.029 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-74	µg/kg	0.073	**0.081**	**0.063**	**0.093**	**0.062**	**0.068**
PCB-75	µg/kg	0.056	**0.0051 J**	**0.0046 J**	**0.0058 J**	**0.0031 J**	**0.0047 J**
PCB-76	µg/kg	0.073	**0.081**	**0.063**	**0.093**	**0.062**	**0.068**
PCB-77	µg/kg	0.036	0.015 U	**0.0035 J**	**0.0047 J**	**0.0051 J**	0.0098 U
PCB-78	µg/kg	0.037	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-79	µg/kg	0.033	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-80	µg/kg	0.032	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-81	µg/kg	0.034	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-82	µg/kg	0.018	0.015 U	**0.01**	**0.012 J**	0.0099 UJ	**0.01**
PCB-83	µg/kg	0.037	**0.087**	**0.071**	**0.11**	**0.065**	**0.081**
PCB-84	µg/kg	0.018	**0.017 J**	**0.014**	**0.024**	**0.016**	**0.014**
PCB-85	µg/kg	0.055	0.044 U	0.029 UJ	0.03 UJ	0.03 U	0.03 UJ
PCB-86	µg/kg	0.110	0.088 U	0.059 U	**0.075 J**	**0.059**	**0.064**
PCB-87	µg/kg	0.110	0.088 U	0.059 U	**0.075 J**	**0.059**	**0.064**
PCB-88	µg/kg	0.037	**0.012 J**	**0.009 J**	**0.01 J**	**0.0084 J**	**0.0086 J**
PCB-89	µg/kg	0.018	0.015 U	0.0098 U	**0.002 J**	0.0099 U	0.0098 U
PCB-90	µg/kg	0.055	**0.14**	**0.11**	**0.17**	**0.1 J**	**0.13**
PCB-91	µg/kg	0.037	**0.012 J**	**0.009 J**	**0.01 J**	**0.0084 J**	**0.0086 J**
PCB-92	µg/kg	0.018	**0.031**	**0.02 J**	**0.03 J**	**0.019 J**	**0.029**
PCB-93	µg/kg	0.037	0.029 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-94	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-95	µg/kg	0.018	**0.098**	**0.075**	**0.11**	**0.073**	**0.096**
PCB-96	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-97	µg/kg	0.110	0.088 U	0.059 U	**0.075 J**	**0.059**	**0.064**
PCB-98	µg/kg	0.037	0.029 U	0.02 U	0.02 U	0.02 U	0.02 UJ
PCB-99	µg/kg	0.037	**0.087**	**0.071**	**0.11**	**0.065**	**0.081**
PCB-100	µg/kg	0.037	0.029 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-101	µg/kg	0.055	**0.14**	**0.11**	**0.17**	**0.1 J**	**0.13**
PCB-102	µg/kg	0.037	0.029 U	0.02 U	0.02 U	0.02 U	0.02 UJ
PCB-103	µg/kg	0.018	0.015 U	0.0098 U	**0.0024 J**	0.0099 U	**0.0023 J**
PCB-104	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-105	µg/kg	0.018	**0.035**	**0.019**	**0.041**	**0.024**	**0.023**
PCB-106	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-107	µg/kg	0.018	0.015 UJ	**0.01**	**0.017**	0.0099 UJ	**0.012**
PCB-108	µg/kg	0.037	0.029 U	0.02 U	0.02 UJ	0.02 U	0.02 U
PCB-109	µg/kg	0.110	0.088 U	0.059 U	**0.075 J**	**0.059**	**0.064**
PCB-110	µg/kg	0.037	**0.14**	**0.11**	**0.17**	**0.1**	**0.12**
PCB-111	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-112	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-113	µg/kg	0.055	**0.14**	**0.11**	**0.17**	**0.1 J**	**0.13**
PCB-114	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-115	µg/kg	0.037	**0.14**	**0.11**	**0.17**	**0.1**	**0.12**
PCB-116	µg/kg	0.055	0.044 U	0.029 UJ	0.03 UJ	0.03 U	0.03 UJ
PCB-117	µg/kg	0.055	0.044 U	0.029 UJ	0.03 UJ	0.03 U	0.03 UJ
PCB-118	µg/kg	0.018	**0.12**	**0.083**	**0.15**	**0.089**	**0.094**
PCB-119	µg/kg	0.110	0.088 U	0.059 U	**0.075 J**	**0.059**	**0.064**
PCB-120	µg/kg	0.018	0.015 U	0.0098 UJ	0.01 UJ	0.0099 U	0.0098 UJ
PCB-121	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U

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Table G-1N. *Lumbriculus variegatus:* Replicate Tissue Concentrations For Laboratory Control
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			CONTROL SITE				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.8 J	1.6 J	1.9 J	1.6 J	1.7 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-123	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-124	µg/kg	0.037	0.029 U	0.02 U	0.02 UJ	0.02 U	0.02 U
PCB-125	µg/kg	0.110	0.088 U	0.059 U	**0.075 J**	**0.059**	**0.064**
PCB-126	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-127	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-128	µg/kg	0.037	0.029 U	**0.023**	**0.036**	0.02 UJ	**0.022 J**
PCB-129	µg/kg	0.073	**0.21**	**0.18**	**0.28**	**0.15**	**0.19**
PCB-130	µg/kg	0.018	**0.016**	**0.011 J**	**0.016 J**	**0.011**	**0.017**
PCB-131	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-132	µg/kg	0.018	**0.039**	**0.035**	**0.052**	**0.03**	**0.039**
PCB-133	µg/kg	0.018	0.015 U	**0.0045 J**	**0.006 J**	0.0099 U	**0.0046 J**
PCB-134	µg/kg	0.037	**0.0055 J**	**0.0058 J**	**0.0069 J**	0.02 U	0.02 U
PCB-135	µg/kg	0.037	**0.046 J**	**0.048**	**0.068**	**0.035 J**	**0.054**
PCB-136	µg/kg	0.018	0.015 UJ	**0.01**	**0.015**	0.0099 UJ	**0.012**
PCB-137	µg/kg	0.018	**0.0034 J**	0.0098 U	**0.0044 J**	0.0099 U	**0.0024 J**
PCB-138	µg/kg	0.073	**0.21**	**0.18**	**0.28**	**0.15**	**0.19**
PCB-139	µg/kg	0.037	0.029 U	0.02 U	**0.0031 J**	0.02 U	0.02 U
PCB-140	µg/kg	0.037	0.029 U	0.02 U	**0.0031 J**	0.02 U	0.02 U
PCB-141	µg/kg	0.018	0.015 UJ	**0.011 J**	**0.014 J**	**0.0099**	**0.013**
PCB-142	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-143	µg/kg	0.037	**0.0055 J**	**0.0058 J**	**0.0069 J**	0.02 U	0.02 U
PCB-144	µg/kg	0.018	0.015 UJ	0.0098 U	0.01 UJ	0.0099 UJ	0.0098 UJ
PCB-145	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-146	µg/kg	0.018	**0.045 J**	**0.044**	**0.064**	**0.036**	**0.046**
PCB-147	µg/kg	0.037	**0.18**	**0.15**	**0.19**	**0.13**	**0.15**
PCB-148	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-149	µg/kg	0.037	**0.18**	**0.15**	**0.19**	**0.13**	**0.15**
PCB-150	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-151	µg/kg	0.037	**0.046 J**	**0.048**	**0.068**	**0.035 J**	**0.054**
PCB-152	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-153	µg/kg	0.037	**0.22**	**0.18**	**0.27**	**0.14**	**0.18**
PCB-154	µg/kg	0.018	**0.0024 J**	**0.0022 J**	**0.0035 J**	**0.0015 J**	**0.0026 J**
PCB-155	µg/kg	0.018	0.015 U	0.0098 U	**0.00042 J**	0.0099 U	0.0098 U
PCB-156	µg/kg	0.037	0.029 U	0.02 U	**0.022**	0.02 U	0.02 UJ
PCB-157	µg/kg	0.037	0.029 U	0.02 U	**0.022**	0.02 U	0.02 UJ
PCB-158	µg/kg	0.018	**0.012 J**	**0.0097 J**	**0.017**	**0.0093 J**	**0.0094 J**
PCB-159	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-160	µg/kg	0.073	**0.21**	**0.18**	**0.28**	**0.15**	**0.19**
PCB-161	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-162	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-163	µg/kg	0.073	**0.21**	**0.18**	**0.28**	**0.15**	**0.19**
PCB-164	µg/kg	0.018	0.015 U	**0.0099**	**0.017**	**0.01**	**0.013**
PCB-165	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-166	µg/kg	0.037	0.029 U	**0.023**	**0.036**	0.02 UJ	**0.022 J**
PCB-167	µg/kg	0.018	0.015 U	0.0098 U	**0.01**	0.0099 U	0.0098 UJ
PCB-168	µg/kg	0.037	**0.22**	**0.18**	**0.27**	**0.14**	**0.18**
PCB-169	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-170	µg/kg	0.018	**0.026**	**0.023**	**0.03**	**0.017 J**	**0.022 J**
PCB-171	µg/kg	0.037	0.029 U	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ
PCB-172	µg/kg	0.018	0.015 UJ	0.0098 U	0.01 UJ	0.0099 UJ	0.0098 U
PCB-173	µg/kg	0.037	0.029 U	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ
PCB-174	µg/kg	0.018	**0.026**	**0.018 J**	**0.034**	**0.02**	**0.026**
PCB-175	µg/kg	0.018	0.015 U	**0.00073 J**	0.01 U	0.0099 U	0.0098 U
PCB-176	µg/kg	0.018	0.015 UJ	0.0098 U	0.01 U	0.0099 U	0.0098 UJ
PCB-177	µg/kg	0.018	**0.022 J**	**0.02**	**0.032**	**0.017**	**0.022**
PCB-178	µg/kg	0.018	**0.016**	**0.011**	**0.019**	**0.0071 J**	**0.014**
PCB-179	µg/kg	0.018	**0.019**	**0.015**	**0.024**	**0.012**	**0.02**
PCB-180	µg/kg	0.037	0.029 UJ	**0.021**	**0.033**	**0.02**	**0.024**
PCB-181	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U

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Table G-1N. *Lumbriculus variegatus:* Replicate Tissue Concentrations For Laboratory Control Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			CONTROL SITE				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	1.8 J	1.6 J	1.9 J	1.6 J	1.7 J
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-183	µg/kg	0.037	**0.022 J**	**0.016 J**	**0.03**	**0.015 J**	**0.021**
PCB-184	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-185	µg/kg	0.037	**0.022 J**	**0.016 J**	**0.03**	**0.015 J**	**0.021**
PCB-186	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-187	µg/kg	0.018	**0.12**	**0.096**	**0.15**	**0.082 J**	**0.11**
PCB-188	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-189	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-190	µg/kg	0.018	0.015 U	0.0098 UJ	0.01 U	0.0099 UJ	0.0098 U
PCB-191	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-192	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-193	µg/kg	0.037	0.029 UJ	**0.021**	**0.033**	**0.02**	**0.024**
PCB-194	µg/kg	0.018	0.015 U	0.0098 UJ	**0.01 J**	**0.011**	**0.011 J**
PCB-195	µg/kg	0.018	0.015 UJ	0.0098 U	0.01 UJ	0.0099 UJ	0.0098 U
PCB-196	µg/kg	0.018	0.015 U	0.0098 U	**0.0031 J**	**0.0018 J**	**0.0018 J**
PCB-197	µg/kg	0.018	0.015 UJ	0.0098 U	0.01 U	0.0099 UJ	0.0098 U
PCB-198	µg/kg	0.037	0.029 UJ	**0.022**	**0.026**	0.02 U	**0.035**
PCB-199	µg/kg	0.037	0.029 UJ	**0.022**	**0.026**	0.02 U	**0.035**
PCB-200	µg/kg	0.018	0.015 U	0.0098 UJ	0.01 UJ	0.0099 U	0.0098 UJ
PCB-201	µg/kg	0.018	0.015 U	**0.0026 J**	**0.0043 J**	**0.0018 J**	**0.0024 J**
PCB-202	µg/kg	0.018	**0.009 J**	**0.0058 J**	**0.0099 J**	**0.0059 J**	**0.0094 J**
PCB-203	µg/kg	0.018	**0.015 J**	**0.011**	**0.011**	**0.01**	**0.016**
PCB-204	µg/kg	0.018	0.015 U	0.0098 U	0.01 UJ	0.0099 U	0.0098 U
PCB-205	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 UJ
PCB-206	µg/kg	0.018	**0.017 J**	**0.014 J**	**0.023**	**0.014 J**	**0.018**
PCB-207	µg/kg	0.018	0.015 U	0.0098 U	0.01 U	0.0099 U	0.0098 U
PCB-208	µg/kg	0.018	**0.0075 J**	**0.0051 J**	**0.011 J**	**0.0067 J**	**0.01**
PCB 209	µg/kg	0.018	**0.019**	**0.011**	**0.019**	**0.012 J**	**0.016**
TOTAL PCB (ND=0)	µg/kg	---	**3.73**	**3.57**	**5.25**	**2.65**	**4.18**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.

µg/kg = Microgram(s) per kilogram

ND = Non-detect

PCB = Polychlorinated biphenyl

Results are not lipid-normalized

RL = average reporting limit

B = detected in the laboratory method blank

J = compound was detected, but below the reporting limit (value is estimated)

Q = estimated maximum possible concentration

U = compound was analyzed, but not detected

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Table G-1O. *Lumbriculus variegatus:* Replicate Tissue Concentrations For Maumee Bay Reference Site Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			MAUMEE BAY REFERENCE SITE				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	2.1	1.9	1.8	1.4	2.4
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-2	µg/kg	0.018	0.017 UJ	0.017 U	0.017 U	0.014 U	0.021 U
PCB-3	µg/kg	0.018	0.017 UJ	0.017 U	0.017 U	0.014 U	0.021 UJ
PCB-4	µg/kg	0.037	**0.1**	**0.11 J**	**0.072**	**0.083**	**0.062**
PCB-5	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-6	µg/kg	0.018	**0.073**	**0.063**	**0.047 J**	**0.038 J**	**0.044 J**
PCB-7	µg/kg	0.018	0.017 U	0.017 U	**0.008 J**	**0.0041 J**	0.021 U
PCB-8	µg/kg	0.037	**0.14 J**	**0.13**	**0.11**	**0.092**	**0.079 J**
PCB-9	µg/kg	0.018	0.017 U	**0.0082 J**	**0.0056 J**	**0.0063 J**	0.021 U
PCB-10	µg/kg	0.018	0.017 U	**0.0093 J**	0.017 U	**0.0033 J**	0.021 U
PCB-11	µg/kg	0.037	**0.051 J**	**0.037**	**0.04**	**0.026 J**	**0.044 J**
PCB-12	µg/kg	0.037	**0.024 J**	**0.024 J**	**0.023 J**	**0.014 J**	**0.017 J**
PCB-13	µg/kg	0.037	**0.024 J**	**0.024 J**	**0.023 J**	**0.014 J**	**0.017 J**
PCB-14	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-15	µg/kg	0.018	**0.14**	**0.13**	**0.11**	**0.088**	**0.098 J**
PCB-16	µg/kg	0.018	**0.1**	**0.096**	**0.08**	**0.064**	**0.062**
PCB-17	µg/kg	0.018	**0.29 J**	**0.31**	**0.25**	**0.2**	**0.19**
PCB-18	µg/kg	0.037	**0.36**	**0.35**	**0.3**	**0.21**	**0.22**
PCB-19	µg/kg	0.018	**0.063 J**	**0.069**	**0.056**	**0.045**	**0.038 J**
PCB-20	µg/kg	0.037	**0.72**	**0.74**	**0.65**	**0.46**	**0.5**
PCB-21	µg/kg	0.037	**0.13**	**0.13**	**0.12**	**0.082**	**0.099**
PCB-22	µg/kg	0.018	**0.16**	**0.16**	**0.14**	**0.1**	**0.11**
PCB-23	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-24	µg/kg	0.018	**0.0046 J**	**0.0073 J**	**0.0051 J**	**0.0027 J**	0.021 U
PCB-25	µg/kg	0.018	**0.14**	**0.15**	**0.11**	**0.094**	**0.091**
PCB-26	µg/kg	0.037	**0.18**	**0.19**	**0.15**	**0.13**	**0.12**
PCB-27	µg/kg	0.018	**0.071**	**0.068**	**0.052 J**	**0.043**	**0.038**
PCB-28	µg/kg	0.037	**0.72**	**0.74**	**0.65**	**0.46**	**0.5**
PCB-29	µg/kg	0.037	**0.18**	**0.19**	**0.15**	**0.13**	**0.12**
PCB-30	µg/kg	0.037	**0.36**	**0.35**	**0.3**	**0.21**	**0.22**
PCB-31	µg/kg	0.037	**0.49**	**0.51**	**0.42**	**0.33**	**0.33**
PCB-32	µg/kg	0.018	**0.24**	**0.23**	**0.17 J**	**0.15**	**0.13**
PCB-33	µg/kg	0.037	**0.13**	**0.13**	**0.12**	**0.082**	**0.099**
PCB-34	µg/kg	0.018	**0.0063 J**	**0.0085 J**	**0.0047 J**	0.014 U	0.021 U
PCB-35	µg/kg	0.018	**0.0046 J**	**0.0056 J**	0.017 U	0.014 U	0.021 U
PCB-36	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-37	µg/kg	0.018	**0.11**	**0.1**	**0.1**	**0.064**	**0.092**
PCB-38	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-39	µg/kg	0.018	0.017 U	0.017 UJ	0.017 U	0.014 U	0.021 U
PCB-40	µg/kg	0.062	**0.74**	**0.74**	**0.63**	**0.44**	**0.62**
PCB-41	µg/kg	0.062	**0.74**	**0.74**	**0.63**	**0.44**	**0.62**
PCB-42	µg/kg	0.049	**0.37**	**0.4**	**0.34**	**0.24**	**0.33**
PCB-43	µg/kg	0.051	**0.046 J**	**0.049**	**0.046**	**0.035**	**0.048**
PCB-44	µg/kg	0.059	**1.3**	**1.4**	**1.2**	**0.83**	**1.1**
PCB-45	µg/kg	0.055	**0.25**	**0.28**	**0.24**	**0.16**	**0.2**
PCB-46	µg/kg	0.061	**0.094**	**0.1**	**0.082**	**0.052**	**0.085**
PCB-47	µg/kg	0.059	**1.3**	**1.4**	**1.2**	**0.83**	**1.1**
PCB-48	µg/kg	0.049	**0.16**	**0.14**	**0.13**	**0.091**	**0.13**
PCB-49	µg/kg	0.047	**0.92**	**0.94**	**0.82**	**0.57**	**0.78**
PCB-50	µg/kg	0.052	**0.2**	**0.22**	**0.18**	**0.14**	**0.16**
PCB-51	µg/kg	0.055	**0.25**	**0.28**	**0.24**	**0.16**	**0.2**
PCB-52	µg/kg	0.048	**1.8**	**1.8**	**1.6**	**1.1**	**1.6**
PCB-53	µg/kg	0.052	**0.2**	**0.22**	**0.18**	**0.14**	**0.16**
PCB-54	µg/kg	0.018	**0.0027 J**	**0.0035 J**	**0.0014 J**	**0.00092 J**	**0.0032 J**
PCB-55	µg/kg	0.036	**0.012 J**	**0.017 J**	**0.023**	0.014 U	**0.019 J**
PCB-56	µg/kg	0.037	**0.32**	**0.33**	**0.31**	**0.19**	**0.29**
PCB-57	µg/kg	0.037	**0.0067 J**	**0.0095 J**	0.017 U	0.014 U	0.021 U
PCB-58	µg/kg	0.037	**0.0074 J**	0.017 U	**0.0076 J**	**0.0062 J**	**0.011 J**
PCB-59	µg/kg	0.056	**0.14**	**0.16**	**0.14**	**0.087**	**0.12**
PCB-60	µg/kg	0.037	**0.11**	**0.11**	**0.11**	**0.063**	**0.099**
PCB-61	µg/kg	0.073	**1**	**1**	**0.97**	**0.62**	**0.9**

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Table G-1O. *Lumbriculus variegatus:* Replicate Tissue Concentrations For Maumee Bay Reference Site Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			MAUMEE BAY REFERENCE SITE				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	2.1	1.9	1.8	1.4	2.4
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	**0.14**	**0.16**	**0.14**	**0.087**	**0.12**
PCB-63	µg/kg	0.034	**0.057**	**0.047**	**0.046**	**0.03**	**0.035 J**
PCB-64	µg/kg	0.034	**0.58**	**0.6**	**0.55**	**0.36**	**0.51**
PCB-65	µg/kg	0.059	**1.3**	**1.4**	**1.2**	**0.83**	**1.1**
PCB-66	µg/kg	0.035	**0.67**	**0.69**	**0.63**	**0.4**	**0.6**
PCB-67	µg/kg	0.033	**0.021 J**	**0.016 J**	**0.015 J**	**0.013 J**	**0.017 J**
PCB-68	µg/kg	0.033	**0.012 J**	**0.013 J**	0.017 U	0.014 U	0.021 U
PCB-69	µg/kg	0.047	**0.92**	**0.94**	**0.82**	**0.57**	**0.78**
PCB-70	µg/kg	0.073	**1**	**1**	**0.97**	**0.62**	**0.9**
PCB-71	µg/kg	0.062	**0.74**	**0.74**	**0.63**	**0.44**	**0.62**
PCB-72	µg/kg	0.036	**0.018 J**	**0.02**	**0.018**	**0.011 J**	**0.019 J**
PCB-73	µg/kg	0.051	**0.046 J**	**0.049**	**0.046**	**0.035**	**0.048**
PCB-74	µg/kg	0.073	**1**	**1**	**0.97**	**0.62**	**0.9**
PCB-75	µg/kg	0.056	**0.14**	**0.16**	**0.14**	**0.087**	**0.12**
PCB-76	µg/kg	0.073	**1**	**1**	**0.97**	**0.62**	**0.9**
PCB-77	µg/kg	0.036	**0.051**	**0.059**	**0.056**	**0.032**	**0.049**
PCB-78	µg/kg	0.037	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-79	µg/kg	0.033	**0.017**	**0.012 J**	**0.012 J**	**0.0075 J**	0.021 U
PCB-80	µg/kg	0.032	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-81	µg/kg	0.034	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-82	µg/kg	0.018	**0.21**	**0.21**	**0.18 J**	**0.14**	**0.22**
PCB-83	µg/kg	0.037	**1**	**1.1**	**1.2**	**0.69**	**1.1**
PCB-84	µg/kg	0.018	**0.5**	**0.59**	**0.53**	**0.33**	**0.54**
PCB-85	µg/kg	0.055	**0.32**	**0.34**	**0.34**	**0.21**	**0.33**
PCB-86	µg/kg	0.110	**0.89**	**0.95**	**0.96**	**0.61**	**0.92**
PCB-87	µg/kg	0.110	**0.89**	**0.95**	**0.96**	**0.61**	**0.92**
PCB-88	µg/kg	0.037	**0.44**	**0.46**	**0.44**	**0.27**	**0.45**
PCB-89	µg/kg	0.018	**0.031 J**	**0.037**	**0.031 J**	**0.017 J**	**0.032**
PCB-90	µg/kg	0.055	**1.6**	**1.7**	**1.7**	**1.1**	**1.6**
PCB-91	µg/kg	0.037	**0.44**	**0.46**	**0.44**	**0.27**	**0.45**
PCB-92	µg/kg	0.018	**0.44**	**0.46**	**0.47**	**0.28**	**0.45**
PCB-93	µg/kg	0.037	**0.028 J**	**0.044 J**	**0.05**	**0.023 J**	**0.042 J**
PCB-94	µg/kg	0.018	**0.017 J**	**0.026**	0.017 U	**0.012 J**	0.021 U
PCB-95	µg/kg	0.018	**1.8**	**2**	**2**	**1.2**	**2**
PCB-96	µg/kg	0.018	**0.024 J**	**0.024 J**	**0.025**	**0.017**	**0.024**
PCB-97	µg/kg	0.110	**0.89**	**0.95**	**0.96**	**0.61**	**0.92**
PCB-98	µg/kg	0.037	**0.1**	**0.11**	**0.11**	**0.065**	**0.11**
PCB-99	µg/kg	0.037	**1**	**1.1**	**1.2**	**0.69**	**1.1**
PCB-100	µg/kg	0.037	**0.028 J**	**0.044 J**	**0.05**	**0.023 J**	**0.042 J**
PCB-101	µg/kg	0.055	**1.6**	**1.7**	**1.7**	**1.1**	**1.6**
PCB-102	µg/kg	0.037	**0.1**	**0.11**	**0.11**	**0.065**	**0.11**
PCB-103	µg/kg	0.018	**0.033**	**0.042 J**	**0.033 J**	**0.02 J**	**0.037**
PCB-104	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-105	µg/kg	0.018	**0.29**	**0.3**	**0.3**	**0.2**	**0.31**
PCB-106	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-107	µg/kg	0.018	**0.099 J**	**0.091 J**	**0.099 J**	**0.067 J**	**0.1 J**
PCB-108	µg/kg	0.037	**0.041**	**0.041**	**0.044**	**0.029**	**0.045**
PCB-109	µg/kg	0.110	**0.89**	**0.95**	**0.96**	**0.61**	**0.92**
PCB-110	µg/kg	0.037	**2**	**2.2**	**2.3**	**1.4**	**2.2**
PCB-111	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-112	µg/kg	0.018	**0.018**	0.017 U	0.017 U	0.014 UJ	0.021 U
PCB-113	µg/kg	0.055	**1.6**	**1.7**	**1.7**	**1.1**	**1.6**
PCB-114	µg/kg	0.018	0.017 UJ	**0.02**	0.017 UJ	**0.015**	0.021 UJ
PCB-115	µg/kg	0.037	**2**	**2.2**	**2.3**	**1.4**	**2.2**
PCB-116	µg/kg	0.055	**0.32**	**0.34**	**0.34**	**0.21**	**0.33**
PCB-117	µg/kg	0.055	**0.32**	**0.34**	**0.34**	**0.21**	**0.33**
PCB-118	µg/kg	0.018	**0.74**	**0.77**	**0.77**	**0.5**	**0.78**
PCB-119	µg/kg	0.110	**0.89**	**0.95**	**0.96**	**0.61**	**0.92**
PCB-120	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 UJ	0.021 U
PCB-121	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U

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Table G-1O. *Lumbriculus variegatus:* Replicate Tissue Concentrations For Maumee Bay Reference Site Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			MAUMEE BAY REFERENCE SITE				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	2.1	1.9	1.8	1.4	2.4
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	**0.017**	**0.019**	**0.018 J**	0.014 UJ	0.021 UJ
PCB-123	µg/kg	0.018	**0.023**	**0.023**	**0.027**	0.014 UJ	**0.024 J**
PCB-124	µg/kg	0.037	**0.041**	**0.041**	**0.044**	**0.029**	**0.045**
PCB-125	µg/kg	0.110	**0.89**	**0.95**	**0.96**	**0.61**	**0.92**
PCB-126	µg/kg	0.018	0.017 UJ	0.017 U	0.017 U	0.014 U	0.021 U
PCB-127	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-128	µg/kg	0.037	**0.36**	**0.38**	**0.34**	**0.24**	**0.39**
PCB-129	µg/kg	0.073	**2.5**	**2.8**	**2.4**	**1.6**	**2.7**
PCB-130	µg/kg	0.018	**0.18**	**0.2**	**0.17**	**0.12**	**0.2**
PCB-131	µg/kg	0.018	**0.025 J**	**0.023 J**	0.017 U	0.014 U	0.021 U
PCB-132	µg/kg	0.018	**0.72**	**0.82**	**0.7**	**0.48**	**0.77**
PCB-133	µg/kg	0.018	**0.068**	**0.076**	**0.06**	**0.042**	**0.073**
PCB-134	µg/kg	0.037	**0.11 J**	**0.13**	**0.11**	**0.083**	**0.11 J**
PCB-135	µg/kg	0.037	**1.2**	**1.3**	**1.5**	**0.87**	**1.4**
PCB-136	µg/kg	0.018	**0.31**	**0.34**	**0.34 J**	**0.22**	**0.31 J**
PCB-137	µg/kg	0.018	**0.04**	**0.05**	**0.041**	**0.027 J**	**0.046**
PCB-138	µg/kg	0.073	**2.5**	**2.8**	**2.4**	**1.6**	**2.7**
PCB-139	µg/kg	0.037	**0.04 J**	**0.045**	**0.041**	**0.027 J**	**0.045 J**
PCB-140	µg/kg	0.037	**0.04 J**	**0.045**	**0.041**	**0.027 J**	**0.045 J**
PCB-141	µg/kg	0.018	**0.17**	**0.16**	**0.16**	**0.12**	**0.18**
PCB-142	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-143	µg/kg	0.037	**0.11 J**	**0.13**	**0.11**	**0.083**	**0.11 J**
PCB-144	µg/kg	0.018	**0.072**	**0.085**	**0.1**	**0.056**	**0.09**
PCB-145	µg/kg	0.018	0.017 U	**0.0034 J**	0.017 U	0.014 U	0.021 U
PCB-146	µg/kg	0.018	**0.55**	**0.6**	**0.53**	**0.37**	**0.61**
PCB-147	µg/kg	0.037	**3.3**	**3.6**	**2.8**	**2.1**	**3.5**
PCB-148	µg/kg	0.018	**0.006 J**	**0.0075 J**	**0.0052 J**	**0.0035 J**	**0.0074 J**
PCB-149	µg/kg	0.037	**3.3**	**3.6**	**2.8**	**2.1**	**3.5**
PCB-150	µg/kg	0.018	**0.0069 J**	**0.0037 J**	**0.0046 J**	**0.0015 J**	**0.0058 J**
PCB-151	µg/kg	0.037	**1.2**	**1.3**	**1.5**	**0.87**	**1.4**
PCB-152	µg/kg	0.018	0.017 U	0.017 UJ	0.017 UJ	0.014 U	0.021 UJ
PCB-153	µg/kg	0.037	**2.2**	**2.5**	**2.1**	**1.4**	**2.5**
PCB-154	µg/kg	0.018	**0.053**	**0.056**	**0.051 J**	**0.037**	**0.061**
PCB-155	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-156	µg/kg	0.037	**0.14**	**0.15**	**0.14**	**0.086**	**0.16**
PCB-157	µg/kg	0.037	**0.14**	**0.15**	**0.14**	**0.086**	**0.16**
PCB-158	µg/kg	0.018	**0.14**	**0.16**	**0.14**	**0.097**	**0.15**
PCB-159	µg/kg	0.018	**0.018 J**	**0.029**	0.017 UJ	0.014 UJ	**0.025**
PCB-160	µg/kg	0.073	**2.5**	**2.8**	**2.4**	**1.6**	**2.7**
PCB-161	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-162	µg/kg	0.018	0.017 U	0.017 UJ	0.017 U	0.014 U	0.021 U
PCB-163	µg/kg	0.073	**2.5**	**2.8**	**2.4**	**1.6**	**2.7**
PCB-164	µg/kg	0.018	**0.21**	**0.22**	**0.19**	**0.13**	**0.21**
PCB-165	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-166	µg/kg	0.037	**0.36**	**0.38**	**0.34**	**0.24**	**0.39**
PCB-167	µg/kg	0.018	**0.063**	**0.062 J**	**0.066**	**0.038 J**	**0.074**
PCB-168	µg/kg	0.037	**2.2**	**2.5**	**2.1**	**1.4**	**2.5**
PCB-169	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-170	µg/kg	0.018	**0.48**	**0.51**	**0.51**	**0.28**	**0.51**
PCB-171	µg/kg	0.037	**0.19**	**0.17**	**0.19**	**0.098 J**	**0.21**
PCB-172	µg/kg	0.018	**0.12**	**0.1 J**	**0.13**	**0.069**	**0.12**
PCB-173	µg/kg	0.037	**0.19**	**0.17**	**0.19**	**0.098 J**	**0.21**
PCB-174	µg/kg	0.018	**0.53**	**0.55**	**0.57**	**0.33**	**0.59**
PCB-175	µg/kg	0.018	**0.032**	**0.028 J**	**0.024**	**0.017 J**	**0.035**
PCB-176	µg/kg	0.018	**0.12**	**0.12**	**0.12**	**0.075**	**0.13**
PCB-177	µg/kg	0.018	**0.48**	**0.5**	**0.49**	**0.3**	**0.53**
PCB-178	µg/kg	0.018	**0.19 J**	**0.23**	**0.23**	**0.14**	**0.24**
PCB-179	µg/kg	0.018	**0.46**	**0.48**	**0.48**	**0.28**	**0.52**
PCB-180	µg/kg	0.037	**0.36**	**0.35**	**0.38**	**0.21**	**0.4**
PCB-181	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U

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Table G-1O. *Lumbriculus variegatus:* Replicate Tissue Concentrations For Maumee Bay Reference Site Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			MAUMEE BAY REFERENCE SITE				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	2.1	1.9	1.8	1.4	2.4
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	**0.0085 J**	**0.017 J**	0.017 U	0.014 U	**0.014 J**
PCB-183	µg/kg	0.037	**0.46**	**0.46**	**0.46**	**0.27**	**0.5**
PCB-184	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-185	µg/kg	0.037	**0.46**	**0.46**	**0.46**	**0.27**	**0.5**
PCB-186	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-187	µg/kg	0.018	**2.5**	**2.6**	**2.6**	**1.6**	**2.8**
PCB-188	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-189	µg/kg	0.018	**0.017 J**	**0.022 J**	**0.022**	0.014 UJ	0.021 UJ
PCB-190	µg/kg	0.018	**0.093**	**0.08 J**	**0.1**	**0.057**	**0.092**
PCB-191	µg/kg	0.018	0.017 U	0.017 UJ	0.017 U	0.014 UJ	0.021 U
PCB-192	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-193	µg/kg	0.037	**0.36**	**0.35**	**0.38**	**0.21**	**0.4**
PCB-194	µg/kg	0.018	**0.18**	**0.2**	**0.2**	**0.12**	**0.22**
PCB-195	µg/kg	0.018	**0.15**	**0.16**	**0.17**	**0.098**	**0.16**
PCB-196	µg/kg	0.018	**0.06**	**0.069**	**0.087**	**0.042**	**0.071**
PCB-197	µg/kg	0.018	0.017 U	**0.018**	**0.018**	0.014 U	0.021 U
PCB-198	µg/kg	0.037	**0.44**	**0.47**	**0.53**	**0.29**	**0.55**
PCB-199	µg/kg	0.037	**0.44**	**0.47**	**0.53**	**0.29**	**0.55**
PCB-200	µg/kg	0.018	**0.045**	**0.048**	**0.052**	**0.031**	**0.048 J**
PCB-201	µg/kg	0.018	**0.055**	**0.067**	**0.066**	**0.036**	**0.07**
PCB-202	µg/kg	0.018	**0.12**	**0.11**	**0.11**	**0.064**	**0.12**
PCB-203	µg/kg	0.018	**0.2**	**0.21**	**0.24**	**0.13**	**0.24**
PCB-204	µg/kg	0.018	0.017 U	0.017 U	0.017 U	0.014 U	0.021 U
PCB-205	µg/kg	0.018	**0.026**	**0.024 J**	**0.019**	0.014 U	0.021 UJ
PCB-206	µg/kg	0.018	**0.11**	**0.1**	**0.14**	**0.067**	**0.11 J**
PCB-207	µg/kg	0.018	**0.025**	**0.024**	**0.022 J**	**0.014**	**0.025**
PCB-208	µg/kg	0.018	**0.053**	**0.055**	**0.054 J**	**0.033**	**0.065**
PCB 209	µg/kg	0.018	**0.1**	**0.099**	**0.099**	**0.063**	**0.12**
TOTAL PCB (ND=0)	µg/kg	---	**80.1**	**86.4**	**79.9**	**52.2**	**80.9**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.

µg/kg = Microgram(s) per kilogram

ND = Non-detect

PCB = Polychlorinated biphenyl

Results are not lipid-normalized

RL = average reporting limit

B = detected in the laboratory method blank

J = compound was detected, but below the reporting limit (value is estimated)

Q = estimated maximum possible concentration

U = compound was analyzed, but not detected

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Table G-1P. *Lumbriculus variegatus:* Replicate Tissue Concentrations For Pretest Tissue
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			PRETEST				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	3.2	3.1	3.5	3	3.1
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-1	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 UJ
PCB-2	µg/kg	0.018	0.01 UJ	0.01 U	0.01 U	0.0099 UJ	0.01 U
PCB-3	µg/kg	0.018	0.01 UJ	0.01 U	0.01 U	0.0099 UJ	0.01 UJ
PCB-4	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	**0.0023 J**
PCB-5	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-6	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-7	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-8	µg/kg	0.037	**0.0039 J**	**0.0032 J**	0.02 U	**0.0024 J**	**0.0037 J**
PCB-9	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-10	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-11	µg/kg	0.037	0.02 U	0.02 U	**0.02**	0.02 UJ	0.02 U
PCB-12	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-13	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-14	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-15	µg/kg	0.018	0.01 UJ	0.01 U	0.01 UJ	0.0099 U	0.01 U
PCB-16	µg/kg	0.018	**0.0032 J**	**0.0017 J**	**0.0024 J**	**0.0022 J**	**0.0026 J**
PCB-17	µg/kg	0.018	**0.0029 J**	**0.0021 J**	**0.0018 J**	**0.0025 J**	**0.0024 J**
PCB-18	µg/kg	0.037	0.02 UJ	0.02 UJ	0.02 U	0.02 UJ	0.02 U
PCB-19	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-20	µg/kg	0.037	0.02 UJ	0.02 UJ	0.02 UJ	0.02 U	0.02 UJ
PCB-21	µg/kg	0.037	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ
PCB-22	µg/kg	0.018	0.01 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.01 U
PCB-23	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-24	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-25	µg/kg	0.018	**0.0011 J**	**0.001 J**	**0.0014 J**	0.0099 U	**0.0011 J**
PCB-26	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-27	µg/kg	0.018	**0.00069 J**	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-28	µg/kg	0.037	0.02 UJ	0.02 UJ	0.02 UJ	0.02 U	0.02 UJ
PCB-29	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-30	µg/kg	0.037	0.02 UJ	0.02 UJ	0.02 U	0.02 UJ	0.02 U
PCB-31	µg/kg	0.037	0.02 UJ	0.02 U	0.02 UJ	0.02 UJ	0.02 U
PCB-32	µg/kg	0.018	**0.0023 J**	**0.0019 J**	**0.0016 J**	**0.0015 J**	**0.002 J**
PCB-33	µg/kg	0.037	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ	0.02 UJ
PCB-34	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-35	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-36	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-37	µg/kg	0.018	**0.0014 J**	**0.002 J**	**0.0013 J**	**0.0013 J**	**0.0012 J**
PCB-38	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-39	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-40	µg/kg	0.062	0.03 UJ	0.03 U	0.03 U	0.03 U	0.03 U
PCB-41	µg/kg	0.062	0.03 UJ	0.03 U	0.03 U	0.03 U	0.03 U
PCB-42	µg/kg	0.049	0.01 UJ	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-43	µg/kg	0.051	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-44	µg/kg	0.059	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
PCB-45	µg/kg	0.055	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-46	µg/kg	0.061	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-47	µg/kg	0.059	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
PCB-48	µg/kg	0.049	**0.0011 J**	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-49	µg/kg	0.047	0.02 U	0.02 U	0.02 UJ	0.02 UJ	0.02 UJ
PCB-50	µg/kg	0.052	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-51	µg/kg	0.055	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-52	µg/kg	0.048	0.01 UJ	**0.01**	**0.011**	0.0099 UJ	0.01 UJ
PCB-53	µg/kg	0.052	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-54	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-55	µg/kg	0.036	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-56	µg/kg	0.037	0.01 U	0.01 UJ	0.01 U	0.0099 U	0.01 U
PCB-57	µg/kg	0.037	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-58	µg/kg	0.037	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-59	µg/kg	0.056	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
PCB-60	µg/kg	0.037	0.01 U	0.01 UJ	0.01 UJ	0.0099 U	0.01 UJ
PCB-61	µg/kg	0.073	0.04 U	0.04 U	0.04 U	0.039 U	0.04 UJ

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Table G-1P. *Lumbriculus variegatus:* Replicate Tissue Concentrations For Pretest Tissue
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			PRETEST				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	3.2	3.1	3.5	3	3.1
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-62	µg/kg	0.056	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
PCB-63	µg/kg	0.034	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-64	µg/kg	0.034	**0.0016 J**	**0.0024 J**	**0.0024 J**	**0.0021 J**	**0.0022 J**
PCB-65	µg/kg	0.059	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
PCB-66	µg/kg	0.035	0.01 UJ	0.01 U	0.01 UJ	0.0099 UJ	0.01 U
PCB-67	µg/kg	0.033	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-68	µg/kg	0.033	0.01 U	0.01 U	0.01 UJ	0.0099 U	0.01 U
PCB-69	µg/kg	0.047	0.02 U	0.02 U	0.02 UJ	0.02 UJ	0.02 UJ
PCB-70	µg/kg	0.073	0.04 U	0.04 U	0.04 U	0.039 U	0.04 UJ
PCB-71	µg/kg	0.062	0.03 UJ	0.03 U	0.03 U	0.03 U	0.03 U
PCB-72	µg/kg	0.036	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-73	µg/kg	0.051	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-74	µg/kg	0.073	0.04 U	0.04 U	0.04 U	0.039 U	0.04 UJ
PCB-75	µg/kg	0.056	0.03 U	0.03 U	0.03 U	0.03 U	0.03 U
PCB-76	µg/kg	0.073	0.04 U	0.04 U	0.04 U	0.039 U	0.04 UJ
PCB-77	µg/kg	0.036	0.01 U	0.01 U	0.01 UJ	0.0099 U	0.01 U
PCB-78	µg/kg	0.037	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-79	µg/kg	0.033	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-80	µg/kg	0.032	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-81	µg/kg	0.034	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-82	µg/kg	0.018	**0.0014 J**	**0.00095 J**	0.01 U	0.0099 U	0.01 U
PCB-83	µg/kg	0.037	**0.0069 J**	**0.0073 J**	**0.0073 J**	**0.0067 J**	**0.0069 J**
PCB-84	µg/kg	0.018	**0.0022 J**	**0.0021 J**	**0.0026 J**	**0.0016 J**	**0.0027 J**
PCB-85	µg/kg	0.055	**0.0023 J**	**0.0026 J**	**0.0034 J**	**0.0021 J**	**0.0032 J**
PCB-86	µg/kg	0.110	0.06 U	0.06 U	0.06 U	0.059 U	0.06 U
PCB-87	µg/kg	0.110	0.06 U	0.06 U	0.06 U	0.059 U	0.06 U
PCB-88	µg/kg	0.037	**0.0013 J**	**0.0014 J**	**0.0013 J**	**0.001 J**	**0.0013 J**
PCB-89	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-90	µg/kg	0.055	**0.011 J**	**0.013 J**	**0.014 J**	**0.016 J**	**0.01 J**
PCB-91	µg/kg	0.037	**0.0013 J**	**0.0014 J**	**0.0013 J**	**0.001 J**	**0.0013 J**
PCB-92	µg/kg	0.018	**0.0024 J**	**0.003 J**	**0.0031 J**	**0.0021 J**	**0.0017 J**
PCB-93	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-94	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-95	µg/kg	0.018	**0.011**	**0.0091 J**	**0.012**	**0.01 J**	**0.01**
PCB-96	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-97	µg/kg	0.110	0.06 U	0.06 U	0.06 U	0.059 U	0.06 U
PCB-98	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-99	µg/kg	0.037	**0.0069 J**	**0.0073 J**	**0.0073 J**	**0.0067 J**	**0.0069 J**
PCB-100	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-101	µg/kg	0.055	**0.011 J**	**0.013 J**	**0.014 J**	**0.016 J**	**0.01 J**
PCB-102	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-103	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-104	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-105	µg/kg	0.018	0.01 U	0.01 U	0.01 UJ	0.0099 UJ	0.01 U
PCB-106	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-107	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-108	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-109	µg/kg	0.110	0.06 U	0.06 U	0.06 U	0.059 U	0.06 U
PCB-110	µg/kg	0.037	0.02 UJ	0.02 U	0.02 U	0.02 UJ	0.02 UJ
PCB-111	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-112	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-113	µg/kg	0.055	**0.011 J**	**0.013 J**	**0.014 J**	**0.016 J**	**0.01 J**
PCB-114	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-115	µg/kg	0.037	0.02 UJ	0.02 U	0.02 U	0.02 UJ	0.02 UJ
PCB-116	µg/kg	0.055	**0.0023 J**	**0.0026 J**	**0.0034 J**	**0.0021 J**	**0.0032 J**
PCB-117	µg/kg	0.055	**0.0023 J**	**0.0026 J**	**0.0034 J**	**0.0021 J**	**0.0032 J**
PCB-118	µg/kg	0.018	**0.01**	**0.01**	0.01 U	**0.011**	0.01 U
PCB-119	µg/kg	0.110	0.06 U	0.06 U	0.06 U	0.059 U	0.06 U
PCB-120	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-121	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U

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Table G-1P. *Lumbriculus variegatus:* Replicate Tissue Concentrations For Pretest Tissue
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			PRETEST				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	3.2	3.1	3.5	3	3.1
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-122	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-123	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-124	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-125	µg/kg	0.110	0.06 U	0.06 U	0.06 U	0.059 U	0.06 U
PCB-126	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-127	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-128	µg/kg	0.037	0.02 U	0.02 UJ	0.02 U	0.02 U	0.02 UJ
PCB-129	µg/kg	0.073	0.04 U	0.04 U	0.04 U	0.039 U	0.04 U
PCB-130	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-131	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-132	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 UJ
PCB-133	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-134	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-135	µg/kg	0.037	**0.0083 J**	**0.0064 J**	**0.0065 J**	**0.0077 J**	**0.0067 J**
PCB-136	µg/kg	0.018	**0.0016 J**	**0.0013 J**	**0.0012 J**	**0.00089 J**	**0.001 J**
PCB-137	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-138	µg/kg	0.073	0.04 U	0.04 U	0.04 U	0.039 U	0.04 U
PCB-139	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-140	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-141	µg/kg	0.018	0.01 U	0.01 U	**0.0014 J**	0.0099 U	0.01 U
PCB-142	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-143	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 U	0.02 U
PCB-144	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-145	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-146	µg/kg	0.018	**0.003 J**	**0.0027 J**	**0.0033 J**	**0.003 J**	**0.0022 J**
PCB-147	µg/kg	0.037	0.02 UJ	0.02 U	**0.02 J**	**0.02**	0.02 UJ
PCB-148	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-149	µg/kg	0.037	0.02 UJ	0.02 U	**0.02 J**	**0.02**	0.02 UJ
PCB-150	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-151	µg/kg	0.037	**0.0083 J**	**0.0064 J**	**0.0065 J**	**0.0077 J**	**0.0067 J**
PCB-152	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-153	µg/kg	0.037	**0.021**	0.02 UJ	**0.023**	0.02 U	**0.02**
PCB-154	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	**0.00035 J**
PCB-155	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-156	µg/kg	0.037	0.02 UJ	0.02 U	0.02 U	0.02 UJ	0.02 U
PCB-157	µg/kg	0.037	0.02 UJ	0.02 U	0.02 U	0.02 UJ	0.02 U
PCB-158	µg/kg	0.018	0.01 U	0.01 U	0.01 UJ	0.0099 U	0.01 U
PCB-159	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-160	µg/kg	0.073	0.04 U	0.04 U	0.04 U	0.039 U	0.04 U
PCB-161	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-162	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-163	µg/kg	0.073	0.04 U	0.04 U	0.04 U	0.039 U	0.04 U
PCB-164	µg/kg	0.018	0.01 U	0.01 U	**0.0012 J**	**0.0016 J**	**0.0012 J**
PCB-165	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-166	µg/kg	0.037	0.02 U	0.02 UJ	0.02 U	0.02 U	0.02 UJ
PCB-167	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-168	µg/kg	0.037	**0.021**	0.02 UJ	**0.023**	0.02 U	**0.02**
PCB-169	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-170	µg/kg	0.018	0.01 UJ	0.01 UJ	0.01 UJ	0.0099 U	0.01 UJ
PCB-171	µg/kg	0.037	0.02 UJ	0.02 U	0.02 UJ	0.02 U	0.02 U
PCB-172	µg/kg	0.018	0.01 UJ	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-173	µg/kg	0.037	0.02 UJ	0.02 U	0.02 UJ	0.02 U	0.02 U
PCB-174	µg/kg	0.018	**0.0024 J**	**0.0022 J**	**0.0028 J**	**0.003 J**	**0.0022 J**
PCB-175	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-176	µg/kg	0.018	0.01 U	0.01 UJ	0.01 UJ	0.0099 U	0.01 U
PCB-177	µg/kg	0.018	**0.0034 J**	**0.0032 J**	**0.0041 J**	**0.003 J**	**0.0039 J**
PCB-178	µg/kg	0.018	**0.0017 J**	**0.0017 J**	**0.0018 J**	**0.0016 J**	**0.0017 J**
PCB-179	µg/kg	0.018	**0.003 J**	**0.0025 J**	**0.0021 J**	**0.0021 J**	**0.0028 J**
PCB-180	µg/kg	0.037	0.02 U	0.02 UJ	0.02 U	0.02 UJ	0.02 U
PCB-181	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U

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Table G-1P. *Lumbriculus variegatus:* Replicate Tissue Concentrations For Pretest Tissue
Ottawa River-Reach 1, Maumee Area Of Concern, Toledo, Ohio (December 2019)

			PRETEST				
			Replicate A	Replicate B	Replicate C	Replicate D	Replicate E
		% lipids	3.2	3.1	3.5	3	3.1
PCB CONGENERS							
ANALYTE	**UNITS**	**RL**					
PCB-182	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-183	µg/kg	0.037	0.02 UJ	0.02 U	0.02 UJ	0.02 U	0.02 UJ
PCB-184	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-185	µg/kg	0.037	0.02 UJ	0.02 U	0.02 UJ	0.02 U	0.02 UJ
PCB-186	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-187	µg/kg	0.018	**0.016**	**0.014 J**	**0.018**	**0.018**	**0.018**
PCB-188	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-189	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-190	µg/kg	0.018	0.01 UJ	0.01 UJ	0.01 UJ	0.0099 UJ	0.01 UJ
PCB-191	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-192	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-193	µg/kg	0.037	0.02 U	0.02 UJ	0.02 U	0.02 UJ	0.02 U
PCB-194	µg/kg	0.018	0.01 U	0.01 UJ	0.01 UJ	0.0099 U	0.01 UJ
PCB-195	µg/kg	0.018	0.01 UJ	0.01 U	0.01 U	0.0099 UJ	0.01 U
PCB-196	µg/kg	0.018	0.01 U	0.01 UJ	0.01 UJ	0.0099 U	0.01 UJ
PCB-197	µg/kg	0.018	0.01 UJ	0.01 UJ	0.01 U	0.0099 U	0.01 U
PCB-198	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 UJ	0.02 UJ
PCB-199	µg/kg	0.037	0.02 U	0.02 U	0.02 U	0.02 UJ	0.02 UJ
PCB-200	µg/kg	0.018	0.01 UJ	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-201	µg/kg	0.018	0.01 UJ	0.01 U	0.01 U	0.0099 U	0.01 UJ
PCB-202	µg/kg	0.018	0.01 UJ	0.01 UJ	0.01 U	0.0099 UJ	0.01 UJ
PCB-203	µg/kg	0.018	0.01 UJ	0.01 U	0.01 UJ	0.0099 UJ	0.01 U
PCB-204	µg/kg	0.018	0.01 U	0.01 U	0.01 UJ	0.0099 U	0.01 U
PCB-205	µg/kg	0.018	0.01 UJ	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-206	µg/kg	0.018	**0.0026 J**	0.01 U	**0.0033 J**	0.0099 U	0.01 U
PCB-207	µg/kg	0.018	0.01 U	0.01 U	0.01 U	0.0099 U	0.01 U
PCB-208	µg/kg	0.018	**0.00066 J**	0.01 U	0.01 U	0.0099 U	0.01 U
PCB 209	µg/kg	0.018	0.01 UJ	0.01 U	0.01 UJ	0.0099 U	0.01 UJ
TOTAL PCB (ND=0)	µg/kg	---	**0.079**	**0.02**	**0.107**	**0.069**	**0.068**

NOTES: **Bold values** represent detected concentrations. Results reported on a wet weight basis.
µg/kg = Microgram(s) per kilogram
ND = Non-detect
PCB = Polychlorinated biphenyl
Results are not lipid-normalized
RL = average reporting limit
B = detected in the laboratory method blank
J = compound was detected, but below the reporting limit (value is estimated)
Q = estimated maximum possible concentration
U = compound was analyzed, but not detected

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