Long-Term Monitoring Plan
Pompton Lake Study Area
Pompton Lakes, New Jersey

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Prepared by:

EHS Support
consider it done

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Acronyms

Acronym/Abbreviation	Definition
µm	micrometer
ABD	Acid Brook Delta
ANSP	Academy of Natural Sciences Philadelphia
ASTM	American Society for Testing and Materials
CBR_{NOEC}	critical body residue no observable effect concentration
CCME	Council of Ministers for the Environment
cfs	cubic feet per second
Chemours	The Chemours Company
CMI WP	Corrective Measures Implementation Work Plan
COC	chain-of-custody
CRG	Corporate Remediation Group
CV-AFS	cold vapor atomic fluorescence spectrometry
DC	direct current
DU	Decision Unit
dw	dry weight
EDD	Electronic Data Deliverable
EI	Ecological Investigation
EWI	equal-width-increment
FMeHg	filter-passing methylmercury
FTHg	filter-passing total mercury
HASP	Health and Safety Plan
HSWA	Hazardous and Solid Waste Amendments of 1984
ISM	Incremental Sampling Methodology
LOEC	lowest-observable effect concentration
LRC	Lower Ramapo River Channel
LTM Program	Long-Term Monitoring Program
LTMWP	Long-Term Monitoring Work Plan
MDL	Method Detection Limit
MeHg	methylmercury
mm	millimeters
MS/MSD	matrix spike/matrix spike duplicate
ng/L	nanograms per liter
ng/g	nanograms per gram
NJDEP	New Jersey Department of Environmental Protection
NJDFW	New Jersey Division of Fish and Wildlife
NJSWQS	New Jersey Surface Water Quality Standard
NOECs	no-observed effect concentrations
NRWQC	National Recommended Water Quality Criterion
PDR	Project Data Review
PLSA	Pompton Lake Study Area
PSA	Project Safety Analysis
QA/QC	quality control/quality assurance
RAOs	Remedial Action Objectives
RCRA	Resource Conservation and Recovery Act
RPDs	relative percent differences
RPM	revolutions per minute
SETAC	Society of Environmental Toxicology and Chemistry
SQBs	Sediment Quality Benchmarks
THg	total mercury
TOC	total organic carbon

Acronym/Abbreviation	Definition
TSS	total suspended solids
UCL_{mean}	upper confidence limit of the mean concentration
URC	Upper Ramapo River Channel
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
ww	wet weight
YOY	Young-of-Year

1.0 Introduction

This document presents the *Long-Term Monitoring Work Plan* (LTMP WP) to guide the implementation of a Long-Term Monitoring Program (LTM Program) on behalf of The Chemours Company (Chemours) following the completion of remedial actions and restoration activities within portions of the Pompton Lake Study Area (PLSA) in Pompton Lakes, New Jersey. Remedial actions will be implemented to address mercury concentrations in sediment within portions of the PLSA consistent with the remedy contained in the Permit Modification I to the *Hazardous and Solid Waste Amendments of 1984* (HSWA) Permit (Permit Modification I) for the site under the *Resource Conservation and Recovery Act* (RCRA). Permit Modification I was made effective by the United States Environmental Protection Agency (USEPA) on June 22, 2015.

The remedial approach and corrective measures that will be implemented within portions of the PLSA are detailed in the *Corrective Measures Implementation Work Plan Pompton Lake Study Area* (CMI WP) that was approved by the USEPA on April 18, 2016 (ARCADIS et al., 2016). Sediment and soil removal within portions of the PLSA was the selected remedial approach to achieve the Remedial Action Objectives (RAOs) identified in Permit Modification I. Three general remediation areas were established within the PLSA in Permit Modification I:

- Lake sediments within the portion of Pompton Lake referred to as the Acid Brook Delta (ABD)
- Lake sediments within two areas of Pompton Lake outside of the ABD between the Lakeside Avenue Bridge and the Pompton Lake Dam – Area A and Island Area
- An uplands area (Uplands) defined as the soils between Lakeside Avenue and the edge of water in Pompton Lake.

Remedial actions within Pompton Lake are designed to address mercury concentrations in sediment; remedial actions within the Uplands are designed to address copper, lead, mercury, and zinc concentrations in soil (ARCADIS et al., 2016).

The LTM Program was designed to establish baseline conditions and monitor key indicators of the overall condition of the PLSA over an initial five-year monitoring period, consistent with the requirements of Permit Modification I. The LTMP WP was developed based on the conceptual approach presented to USEPA in a meeting on January 20, 2015. The conceptual approach for the LTM Program was developed based on the findings of numerous investigations conducted in the PLSA, including but not limited to the following documents:

- *Technical Memorandum: Updated Conceptual Site Model* (ARCADIS et al., 2014)
- *2013 Pompton Lake Ecological Investigation Report* (URS, 2014)
- *Pompton Lake Ecological Investigation: Framework Document* (URS, 2013a)

- *Draft Technical Memorandum: Conceptual Site Model* (ARCADIS et al., 2013)
- *Evaluation of the Acid Brook Delta Ecological Investigation and the Onondaga Lake Baseline Ecological Risk Assessment* (URS, 2010)
- *Acid Brook Delta Ecological Investigation Phase 2 Report* (Exponent and Academy of Natural Sciences Philadelphia [ANSP], 2003)
- *Acid Brook Delta Ecological Investigation Reference Area Evaluation and Phase 1 Data Report* (PTI Environmental Science, 1997).

This LTMP WP is being submitted to USEPA and the New Jersey Department of Environmental Protection (NJDEP) within 45 days of the approval of the CMI WP, as specified in Permit Modification I.

1.1 Long-Term Monitoring Program Scope and Objectives

The overall goal of the LTM Program is to establish and monitor baseline exposure conditions for mercury holistically within the PLSA. Specific objectives of the LTM Program are as follows:

- Develop baseline conditions of mercury in surface water such that significant increases in mercury exposure can be identified.
- Develop baseline conditions of mercury bioaccumulation in fish tissue such that significant increases in mercury exposure to fish or piscivorous wildlife can be identified.
- Evaluate the factors that may be contributing to significant increases in mercury exposure and assess whether significant increases in mercury exposure result in an unacceptable risk to human health or the environment.
- Evaluate whether the identified increases in mercury exposure are attributed to changes in sediment conditions within the PLSA.

The LTM Program is designed as a tiered monitoring program (Tiers I – III) that adapts the monitoring elements and/or frequency of monitoring events based on the results of previous monitoring events using defined decision criteria. Section 2.0 provides an overview of the tiered monitoring program and describes the monitoring elements and frequency of events for each monitoring tier. Tier I monitoring is designed to generate data necessary to satisfy the overall objectives of the LTM Program, as previously presented. Additional monitoring tiers (Tiers II and III) are designed to increase the frequency of monitoring events and/or supplement additional monitoring elements if data from previous monitoring events indicate significant changes in mercury exposure within the PLSA. If warranted, data from additional monitoring tiers will supplement Tier I monitoring data to support decision-making for the PLSA based on the objectives of the LTM Program. The decision framework, including decision points and criteria, for adapting the LTM Program to include additional monitoring tiers is described in Section 3.0 of the LTM WP.

For the purposes of the LTM Program, the PLSA is spatially defined as the area of Pompton Lake extending upstream to the Lakeside Avenue Bridge and downstream to a safety buffer upstream of the Pompton Lake Dam (Figure 1).

1.2 Document Organization

The LTMP WP is organized into the following sections:

- Section 1.0 presents the introduction and LTM Program objectives.
- Section 2.0 presents an overview of the LTM Program and provides specific details regarding field sampling procedures for monitoring elements.
- Section 3.0 describes the decision framework for the LTM Program.
- Section 4.0 summarizes data quality assurance procedures that will be implemented during the LTM Program.
- Section 5.0 describes the data analysis and reporting procedures for the LTM Program.
- Section 6.0 lists the references cited in this LTMP WP.

An overview of health and safety procedures that will be established during the implementation of the monitoring program is included in Section 2.4. An addendum to the Site-Wide Health and Safety Plan (HASP) will be prepared prior to the implementation of field activities to specifically address health and safety procedures associated with monitoring activities described in the LTM WP.

2.0 Long-Term Monitoring Program

The LTM Program was designed to establish baseline conditions and monitor key indicators of the overall condition of the PLSA over an initial five-year monitoring period that will be initiated one year following the completion of remediation/restoration activities. The following sections present an overview of the LTM Program and provide details regarding specific elements of the monitoring program.

2.1 Long-Term Monitoring Plan Overview

The LTM Program is a tiered monitoring approach that is adaptive based on the results of previous monitoring events using defined decision criteria. Monitoring data collected as part of the LTM Plan will be used to evaluate spatial and temporal changes in mercury exposure within the PLSA, as discussed in detail for each monitoring element in Section 3.0. Spatial comparisons will be made by comparing data from two study areas (Figure 1):

- PLSA: Areas within Pompton Lake extending upstream from the Lakeside Avenue Bridge and downstream to a safety buffer area upstream of the Pompton Lake Dam
- Upstream Ramapo River/Potash Lake Reference Area: Upstream reference area on the Ramapo River extending from Lakeside Avenue Bridge upstream approximately 1,400–2,400 meters to Potash Lake.

Temporal comparisons in mercury concentrations will be made between LTM events and baseline datasets, as described in Section 2.1.2, and between monitoring events within the initial five-year monitoring period, as described in Section 2.1.3.

The following sections describe the tiered monitoring approach, provide the basis for establishing baseline conditions for monitoring elements, and specify the monitoring period and frequency of monitoring events.

2.1.1 Tiered Monitoring Approach

The LTM Program is designed to adapt monitoring elements and the frequency of monitoring events based on the results of previous monitoring events. Three tiers of monitoring are included in the LTM Program:

- Tier I: Regularly scheduled monitoring of basic elements that will provide data to determine if additional monitoring elements/events are warranted.
- Tier II: Increased frequency of select Tier I monitoring elements that is data-driven based on the outcome of Tier I monitoring.
- Tier III: Supplemental monitoring elements that are data-driven based on the outcome of Tier I and II monitoring.

The adaptive monitoring approach is data-driven to provide the necessary information to support decision-making for the PLSA based on the objectives of the LTM Program. Tier I monitoring is designed to generate data necessary to satisfy the overall objectives of the LTM Program (Section 1.1); Tier II and Tier III monitoring is designed to increase the frequency of monitoring events and/or supplement additional monitoring elements if data

from previous monitoring events indicate significant changes in mercury exposure within the PLSA.

Table 1 presents a summary of the elements included for Tier I and II monitoring, and Table 2 presents a summary of the potential elements that may be included in Tier III monitoring. The conceptualized progression of the monitoring program is illustrated in Figure 2. Section 3.0 defines the decision points and decision criteria that will be used to modify the LTM Program based on the progression illustrated in Figure 2.

2.1.2 Baseline Datasets

Baseline or pre-remediation conditions for monitoring elements included in the LTM Program were established based on data collected in 2013 as part of the *Pompton Lake Ecological Investigation* (Pompton Lake EI; URS, 2014). The Pompton Lake EI was conducted between June and September 2013 to evaluate ecological exposure in Pompton Lake outside of the ABD remedial action area previously defined in the 2011 CMI WP (ARCADIS et al., 2011). The investigation approach was presented to USEPA, United States Fish and Wildlife Service (USFWS), and NJDEP in the *Pompton Lake Ecological Investigations Framework Document* submitted on June 26, 2013, and a series of scoping documents submitted between May and August 2013. Data collection activities conducted on Pompton Lake in 2013 that provide representative baseline datasets for the LTM Program include the following (URS, 2014):

- Surface Water Characterization
- Adult and Young-of-Year (YOY) Fish Tissue Survey
- Aquatic and Emergent Invertebrate Tissue Evaluation
- Sediment/Pore Water Characterization.

Table 3 provides summary statistics of mercury concentrations for the 2013 baseline data for the sampling matrices included in the LTM Plan. Summary of analytical results tables for the 2013 baseline data are provided in Appendix A. Further documentation of the sampling procedures and data analysis of the baseline monitoring datasets is provided in the *2013 Pompton Lake Ecological Investigation Report* (URS, 2014).

2.1.3 Monitoring Period and Frequency

Long-term monitoring of the PLSA will be initiated one year following the completion of restoration activities and will be conducted over an initial five-year monitoring period. Sampling during the initial five-year period will be conducted in accordance with the Tier I and II monitoring elements outlined in Section 2.2 and as needed, Tier III sampling (Section 2.3)

The frequency of monitoring events in the LTM Program will vary depending on the monitoring element as illustrated in Table 1. Surface water sampling will be conducted on a monthly and/or quarterly basis, depending on the progression of the LTM Program (Figure 2). Sampling of biological tissues, sediment, and pore water (if warranted) will be conducted in the August to September timeframe to maintain seasonal consistency with timing of sampling of the 2013 baseline datasets.

On an annual basis, LTM data collected for that year will be evaluated according to the decision framework presented in Section 3.0 and reported to USEPA (Section 5.0). The

results of the annual data analyses will be used to evaluate the need for modifications to the LTM Program; recommendations for any modifications to the monitoring tier for the following year will be presented in each annual report. Following the fifth year of monitoring, a comprehensive analysis of data collected during the initial five-year LTM monitoring period will be completed. The results of the comprehensive data analysis will be used to re-evaluate LTM Plan objectives and evaluate the need for modifications to the LTM Program.

2.2 Tier I and II Monitoring Elements

Tier I monitoring elements include the analyses of mercury in the following matrices, as summarized in Table 1:

- Surface water
- YOY fish tissue
- Adult fish tissue
- Sediment.

The timing and frequency of these monitoring elements will depend on the monitoring results from the previous year, as illustrated in Figure 2 and discussed in Section 3.0. Tier I monitoring includes surface water monitoring in each year of the LTM program at frequencies ranging from monthly to quarterly, YOY fish tissue monitoring in Years 3 and 5, and adult fish tissue and sediment monitoring in Year 5 (Table 1; Figure 2). Data collected as part of Tier I monitoring will satisfy the objectives of the LTM Program by identifying significant increases in mercury concentrations in abiotic and biotic exposure media within the PLSA. If significant increases in mercury exposure conditions are observed in Tier I monitoring events, the frequency of surface water and YOY fish tissue monitoring will be increased in Tier II monitoring to better define spatial and temporal changes in mercury exposure in abiotic and biotic exposure media. The following sections provide details regarding the monitoring objectives, study design, and sampling and analytical methods for the Tier I and Tier II monitoring elements.

2.2.1 Surface Water

Surface water monitoring is the primary element of the LTM Plan and will be included in each monitoring year at frequencies determined based on monitoring results from the previous year (Figure 2). Surface water sampling is the primary monitoring element because: 1) changes in total mercury (THg) and methylmercury (MeHg) concentrations in the dissolved (filter-passing) phase of surface water may indicate potential changes in mercury exposure within the PLSA; and 2) changes in THg and MeHg concentrations on suspended particles in surface water indicate potential mercury transport within the PLSA. The following sections present the surface water monitoring objectives, provide details regarding the study design, and describe the sampling and analysis methods.

Monitoring Objectives

The purpose of surface water monitoring is to evaluate potential changes in mercury exposure and transport within the PLSA. Specific objectives of the surface water monitoring element are to provide data to:

1) Monitor temporal and spatial patterns in THg and MeHg on suspended particles (pTHg and pMeHg) to evaluate the potential transport of mercury within the PLSA.
2) Evaluate potential changes in mercury concentrations in the Ramapo River from the inflow of Pompton Lake at the Lakeside Avenue Bridge to the outflow near the Pompton Lake Dam.
3) Monitor potential aqueous exposure to THg and MeHg within the PLSA.

The following section details the study design for surface water monitoring to satisfy the monitoring objectives.

Study Design

Surface water monitoring stations were selected from an existing network of surface water sampling stations to enable comparisons with baseline datasets. Eight sampling stations were selected in the PLSA and four sampling stations were selected in the reference area, as illustrated in Figure 3. These stations were sampled during the 2013 Pompton Lake EI based on an evaluation of existing data characterizing the distribution of THg and MeHg in surface water within Pompton Lake (URS, 2013b).

Surface water samples will be collected from the middle depth of the water column at all stations except SW-07, located immediately upstream of the Lakeside Avenue Bridge and SW-10 located immediately upstream of the dam safety stop near the Pompton Lake Dam (Figure 3). Transects will be established at stations SW-07 and SW-10 to collect depth- and width-integrated samples across the channel. Surface water data from these depth- and width-integrated samples will be used to evaluate potential changes in mercury concentrations in the Ramapo River from the inflow of Pompton Lake at the Lakeside Avenue Bridge to the outflow near the Pompton Lake Dam.

The frequency of surface water sampling at monitoring stations will vary in the LTM Program based on the monitoring tier (Figure 2):

- Variable: Variable frequency sampling will include monthly sampling at high-frequency stations (4 PLSA and 2 Reference Area) and quarterly sampling at low-frequency stations (4 PLSA and 2 Reference Area; Figure 3).
- Quarterly: Quarterly frequency sampling will be conducted once during each quarter of the year at each monitoring station.

Variable surface water sampling will be conducted in Years 1 and 2 of the LTM Program; the frequency of surface water monitoring in Years 3 – 5 will be dependent on the results of previous sampling events (Figure 2).

In addition to the Variable and Quarterly monitoring frequencies described above, surface water sampling will be conducted during one high flow event and one low flow event to evaluate mercury exposure and transport within the PLSA under extreme flow conditions. One high and one low flow monitoring event will be sampled, to the extent practicable, over the five-year monitoring period using general criteria based on historical flow conditions at the United States Geological Survey (USGS) gaging station 01388000 (Ramapo River at Pompton Lakes, NJ):

- Low Flow: Less than 35 cubic feet per second (cfs), which represents the 10^{th} percentile of daily discharge data from 1922–2016.

- High Flow: Greater than 643 cfs, which represents the 90th percentile of daily discharge data from 1922–2016.

High and low flow monitoring will be conducted only under conditions where monitoring stations can be safely accessed and the sampling can be completed under safe working conditions (Section 2.4).

Sampling and Analytical Methods

Surface water samples will be collected from the middle depth of the water column at each station, except SW-07 and SW-10, using a closed-system pump (e.g., peristaltic pump). Consistent with previous sampling in Pompton Lake, surface water samples will be collected in accordance with the guidance and principles outlined in *USEPA Method 1669 Sampling Ambient Water for Determination of Metals at USEPA Water Quality Criteria Levels* (July 1996). Samples for THg and MeHg analysis will be collected using the "clean hands-dirty hands" technique, in accordance with USEPA Method 1669. Aliquots for THg and MeHg analyses will be collected from both unfiltered and 0.45 µm-filtered surface water samples. Because mercury species adsorb strongly to suspended sediment in fresh water (Meili, 1997), unfiltered samples will be analyzed for total suspended solids (TSS) to quantify the amount of suspended solids in the sample and to allow the calculation of particulate THg and MeHg concentrations in surface water.

Depth- and width-integrated samples will be collected at inflow and outflow transects at stations SW-07 and SW-10, respectively, using the USGS equal-width-increment (EWI) sampling method (USGS, 2006). A transect will be established across the channel perpendicular to flow at the inflow and outflow stations (Figure 3). Each transect will be divided into a minimum of 10 equal-width increments, and depth-integrated samples will be collected vertically through the water column at the mid-point of each increment with an isokinetic sampler (e.g., USGS D-95). Samples collected at each vertical sampling point will be composited into one representative sample for the transect. The transit rate of the sampler will be held constant in each vertical direction (descent and ascent) at each sampling point to collect a representative depth- and width-integrated sample across the transect[1]. Samples collected at each vertical sampling point across the transect will be thoroughly homogenized; aliquots of the homogenized sample will be filtered for THg and MeHg analyses and unfiltered aliquots will be analyzed for THg, MeHg, and TSS.

Immediately after collection, surface water samples will be carefully packaged and placed on wet ice in a cooler for shipment to the laboratory. Samples will be shipped under proper chain-of-custody via overnight courier and analyzed for THg, MeHg, and TSS by a certified laboratory. Further details regarding quality control/quality assurance procedures (QA/QC) and laboratory analyses, including method detection limits (MDLs) are presented in the Section 4.0.

[1] The transit rate of the sampler will be established using the trial-and-error method at the mid-point of the width increment with greatest discharge on the transect (product of depth times velocity). The minimum transit rate will be estimated at the point of discharge as the transit rate that fills that sampler without overflow. A transit rate greater than the minimum transit rate will be established to collect the total sample volume targeted from compositing samples from all vertical sampling points. See Appendix A-4 in USGS (2006) for guidelines for determining transit rates for collected isokinetic, depth-integrated samples.

Water quality parameters will be measured *in situ* during surface water sample collection. *In situ* water quality parameters include temperature, dissolved oxygen, pH, and specific conductivity. The objectives of the water quality monitoring are to characterize the range of physical and chemical conditions of Pompton Lake surface water during surface water sampling. Vertical profiles of water quality parameters will be collected at stations SW-01, SW-07, SW-22, SW-09 and SW-10 to assess potential stratification of the water column. Water quality parameters at these stations will be recorded at one foot intervals from just below the water surface to approximately one-foot above the sediment-surface water interface.

2.2.2 Young-of-Year Fish Tissue

YOY fish tissue sampling is included as an element in the LTM Program to monitor short-term, localized mercury exposure to fish and potential exposure to upper trophic wildlife that may forage on YOY fish tissue. Home ranges of YOY fish tend to be restricted; therefore, analyses of mercury concentrations in YOY fish tissue indicate the bioavailability and bioaccumulation of mercury in or near the area where the samples are collected. In addition, mercury concentrations in YOY fish represent temporally limited exposure (i.e., within the same year). Due to this limited exposure period, YOY fish are commonly used to monitor short-term responses in bioaccumulation resulting from changes in exposure conditions (e.g., remedial actions). Samples collected as part of 2013 sampling effort will be used as baseline YOY tissue data to evaluate changes in mercury exposure over time.

Monitoring Objectives

The purpose of YOY fish tissue monitoring is to evaluate potential short-term, localized changes in mercury exposure and bioaccumulation within the PLSA. Specific objectives of the YOY fish tissue monitoring element are to provide data to:

1) Monitor temporal and spatial patterns in mercury bioaccumulation by YOY fish
2) Evaluate potential adverse effects associated with mercury bioaccumulation into fish tissue if significant differences in YOY fish tissue concentrations exist between PLSA and reference locations.

The following section details the study design for YOY fish tissue monitoring to satisfy the monitoring objectives.

Study Design

YOY fish tissue monitoring is designed to evaluate potential differences in THg concentrations in representative YOY fish species within trophic groups identified in the PLSA and Reference Area (Figure 4). Target YOY species for the LTM Program will be consistent with species sampled in previous investigations of Pompton Lake (URS, 2014; CRG, 2006; Exponent and ANSP, 2003). The following target species were identified for YOY sampling in the LTM Program:

- Largemouth bass (*Micropterus salmoides*)
- Yellow perch (*Perca flavens*)
- Bluegill (*Lepomis machrochirus*).

Twelve whole-body composite samples of three to five YOY individuals of each target species will be collected from the PLSA and five whole-body composites of approximately three to five individuals of each target species will be collected from the Reference Area (Table 1). Consistent with the 2013 EI, YOY fish tissue samples will be collected from available habitat within three sampling extents established within the PLSA during the 2013 EI: Upper Ramapo River Channel (URC), including the ABD, Lower Ramapo River Channel (LRC-01), and LRC-02 (Figure 4). These sampling extents were established in the 2013 to distribute sample collection equitably throughout the sampling extents to provide spatially representative datasets of fish tissue mercury concentrations throughout the PLSA. One sampling extent will be sampled from the Reference Area and will include available habitat from the Lakeside Avenue Bridge upstream to Potash Lake (Figure 1). Fish tissue samples will be collected from areas with available habitat within defined sampling extents within the PLSA and Reference Area. Fish tissue sampling will be conducted in the August to September timeframe to maintain seasonal consistency with timing of sampling of baseline datasets.

Sampling and Analytical Methods

YOY fish tissue samples for THg analysis will be collected using a boat-mounted electrofishing system unit using pulsed direct current (DC), with supplemental sampling with other targeted equipment as necessary. Sampling will be performed in accordance with the conditions stated in applicable New Jersey Division of Fish and Wildlife (NJDFW) scientific collection permits. Sampling will focus on shorelines and likely habitats (i.e., downed trees/brush piles, docks, submerged, and emergent vegetation beds) within each of the sampling extents. Target fish species will be netted and held in aerated live wells until sample processing. Electrofishing will continue within a given area until the target number of samples has been collected. Previous investigations indicate that target species, with the possible exception of YOY perch, are in sufficient abundance to achieve the target sample sizes (URS, 2014; CRG, 2006; Exponent and ANSP, 2003); however, any proposed deviations to the target taxa or sample size will be communicated to USEPA during field sampling.

Samples will be shipped frozen on dry ice under proper chain-of-custody (COC) via overnight courier to a certified laboratory. Whole body YOY tissue samples will be prepared, digested and analyzed for THg in accordance with USEPA Method 1631. Quality control/quality assurance procedures including, analytical methods, sample mass requirements, and associated MDLs are presented in Section 4.0.

2.2.3 Adult Fish Tissue

Adult fish tissue sampling will be conducted as part of the LTM Program to evaluate mercury exposure to adult fish and consumers of adult fish tissue. The following sections specify the monitoring objectives, study design, and sampling/analytical methodologies for the sampling of adult fish tissue.

Monitoring Objectives

The purpose of adult fish tissue monitoring is to evaluate potential changes in mercury exposure and bioaccumulation within the PLSA. Specific objectives of the adult fish tissue monitoring element are to provide data to:

1) Monitor temporal and spatial patterns in mercury bioaccumulation into adult fish of a similar age class.
2) Evaluate the potential for adverse effects associated with mercury bioaccumulation into fish tissue if significant differences in adult fish tissue concentrations exist.
3) Evaluate potential exposure to piscivorous wildlife receptors foraging on adult fish.

Study Design

Fish tissue monitoring is designed to evaluate THg concentrations in representative "target" fish species within trophic groups identified in the PLSA and Reference Area (Figure 4). The following target species were identified to represent mercury bioaccumulation within two trophic groups:

- Piscivorous fish: Largemouth bass will be used as a target species to evaluate the piscivorous fish exposure pathway because it is a top trophic species that is commonly monitored for bioaccumulation of mercury and other contaminants. Largemouth bass tissue data have been collected in multiple studies evaluating mercury uptake in Pompton Lake (Horwitz et al., 1999; Horwitz et al., 2005; Exponent and ANSP, 2003; CRG, 2006; URS, 2014).
- Demersal benthic invertivorous fish: Brown bullhead will be the preferred target species to represent demersal benthic invertivorous fish. If brown bullhead cannot be obtained, yellow bullhead will be collected, if available. Bullhead are common bottom-dwelling species throughout the region and may serve as prey for larger piscivorous fish and avian piscivores.

Twelve individual samples of each species will be targeted for collection from the PLSA and 12 individual samples will be collected from the Reference Area (Table 1). To the extent practicable, adult fish tissue samples will be collected from available habitat within three sampling extents established within the PLSA during the 2013 EI: URC (including the ABD), LRC-01, and LRC-02 (Figure 4). These sampling extents were established in the 2013 to distribute sample collection equitably throughout the sampling extents to provide spatially representative datasets of fish tissue mercury concentrations throughout the PLSA. Fish tissue sampling will be conducted in the August to September timeframe to maintain seasonal consistency with timing of sampling of baseline datasets.

Samples of adult fish will be collected from consistent size classes to represent fish tissue concentrations over a consistent period of exposure (i.e., larger fish have a greater exposure duration). Samples of target species will be similarly sized, with the smallest fish generally >75 percent of the length of the largest fish. Total length (mm) and weight (g) of each fish will be recorded in the field to evaluate the size distribution of fish sampled in each monitoring event. Sampling of largemouth bass will target individuals of approximately 150 to 250 mm for consistency with the average size fish sampled in the baseline dataset (URS, 2014). Assuming adult fish tissue samples are not collected prior to Year 4 of the LTM Program (Figure 2), largemouth bass within this size class will likely be less than three years old and will have been exposed only to post-remediation and restoration conditions in Pompton Lake. Sampling of bullhead species will target individuals 150 to 250 mm for consistency with the average size fish sampled in the baseline dataset (URS, 2014). Previous investigations indicate that target species are in

sufficient abundance to achieve the target sample sizes (URS, 2014; Exponent and ANSP, 2003); however, any proposed deviations to the target taxa or sample size will be communicated to USEPA during field sampling.

Individual samples will be filleted; fillet and carcass samples will be submitted for mercury analysis (Table 1). Submittal of fillet plus carcass samples will enable and evaluation of mercury concentrations in fillet and whole body fish tissue.

Sampling and Analytical Methods

Adult fish tissue for THg analyses will be collected using a boat-mounted electrofishing system using pulsed DC, with supplemental sampling gill nets and/or trot lines as necessary. Shorelines and likely habitats (i.e., downed trees/brush piles, docks, submerged and emergent vegetation beds) will be targeted within each of the study areas. Target fish species will be netted and held in aerated live wells until sample processing. Sampling will be performed in accordance with the conditions stated in applicable NJDFW scientific collection permits.

Gill netting and/or trot lining will be used, as warranted, as additional sampling methods in the event that target species cannot be obtained by electrofishing. Experimental gillnets (with ½-inch x 1-inch x 2-inch x 3-inch mesh sections) and anchored trotlines will be set in shallow nearshore habitats and tended at least once every eight hours. It is anticipated that trot line sampling will be necessary to obtain samples of bullhead species.

Adult fish tissue samples will be prepared, digested and analyzed for THg in accordance with USEPA Method 1631. Quality control/quality assurance procedures including, analytical methods, sample volumes, and associated MDLs are presented in Section 4.0.

2.2.4 Sediment

Sediment sampling will be conducted in Year 5 as part of Tier I monitoring to evaluate overall changes in sediment mercury concentrations within the PLSA outside of remediated and restored areas. Sediment sampling will not be conducted in restored areas to maintain the integrity of the ecological-layer that will be placed following sediment removal (ARCADIS et al., 2016). Sediment data collected as part of the LTM Program will be evaluated relative to August 2013 data to evaluate overall changes from baseline concentrations (ARCADIS et al., 2014). The following sections present the objectives of the sediment monitoring element and provide details regarding the study design and sampling and analysis methods.

Monitoring Objective

The objective of sediment sampling during Tier I monitoring is to evaluate potential changes in overall sediment mercury concentrations relative to 2013 baseline data.

Study Design

Tier I sediment sampling within the LTM Program will be conducted using an incremental sampling methodology (ISM) approach to provide an estimate of the overall average sediment THg concentration within the PLSA. Developed originally for the investigations of soils, the ISM approach includes compositing a large number of discrete samples within a designated decision unit (DU) to estimate a true mean concentration for

that DU (ITRC, 2012). An overall average for the study area can be calculated based on the concentrations measured in the composite samples from individual DUs.

Three DUs will be established within the PLSA in areas outside of remedial actions and restoration activities based on predominant sediment types identified by a 2013 side scan sonar survey (Figure 5). A sampling grid will be established within each DU and a minimum of 30 discrete samples will be collected within each DU from the surface interval (0-0.5 foot). Aliquots with an equal volume of sediment from each discrete sample will be composited for each DU. Triplicates of the composite samples will be analyzed within each DU to obtain an estimate of the variance on the mean THg concentration. Concentrations from the analyses of all samples within the three DUs sampled within the PLSA will be averaged to provide a representative overall average THg concentration for the PLSA. The overall average THg concentration measured in ISM samples collected from the three DUs will be compared to the overall average THg concentration for surface sediment estimated based on the August 2013 sediment investigation (ARCADIS et al., 2014).

One DU will be established in the Reference Area. A minimum of 30 discrete samples from the surface interval (0-0.5 foot) will be collected within the Reference Area DU and composited using the same procedures used in the PLSA. Triplicates of the composite sample will be analyzed to obtain an estimate of the variance on the mean THg concentration for the Reference Area. The overall average concentration for the Reference Area will be compared to the overall average concentration for the PLSA.

Sampling and Analytical Methods

Samples for bulk sediment analyses will be collected to support the ISM study design described in the preceding section. A sampling grid will be established within each designated DU and a minimum of 30 discrete samples will be collected from the surface interval (0-0.5 foot) using a sediment core or equivalent device. Aliquots of each discrete sample will be composited within each DU. Composites samples for each DU will be processed by the analytical laboratory consistent with ISM guidance for soils (ITRC, 2012), with the exception of using wet sieving instead of drying/milling or grinding during compositing (Ecology, 2015). Composite samples will be analyzed for:

- THg (USEPA Method 1631)
- Total organic carbon (TOC) (USEPA Method 9060)
- Sediment grain size distribution (American Society for Testing and Materials [ASTM] Method D422).

Quality control/quality assurance procedures including, analytical methods, sample volumes, and associated MDLs are presented in Section 4.0.

2.3 Potential Tier III Monitoring Elements

Tier III monitoring elements are included in the LTM Program to provide additional matrices to evaluate potential changes in mercury exposure conditions within the PLSA identified based on the results of Tier I and II monitoring events (Figure 2). In addition to the Tier I and II monitoring elements described in the preceding sections, potential Tier III monitoring elements include:

- Larval and emergent invertebrate tissue analyses
- Sediment/pore water analyses.

The following sections provide details regarding the monitoring objectives, study design, and sampling and analytical methods for potential Tier III monitoring elements.

2.3.1 Larval and Emergent Invertebrate Tissue

Aquatic invertebrates were identified as a potential Tier III monitoring element to evaluate the potential bioaccumulation of mercury from sediments. Larval stages will be used to evaluate the bioaccumulation of mercury from sediments and emergent stages will be used to evaluate the potential export of mercury from sediments during emergence. Non-biting midges (Chironomidae) were selected as the preferential target species for the potential sampling of aquatic- (e.g., larval) and emergent-stage (e.g., adult) tissue samples. Previous investigations of the benthic invertebrate community within the PLSA and reference area indicate that non-biting midges area predominant invertebrate taxonomic group in benthic samples (URS, 2014; Exponent and ANSP, 2003; CRG, 2006). Non-biting midges are important in the transfer of energy in aquatic systems due to their relatively short life cycles and large total biomass (Merritt et al., 2008). Furthermore, non-biting midges can emerge throughout the year, with greater emergence in mid-May and July-September; therefore, non-biting midges provide a continued source of food to aerial insectivores (e.g., tree swallow [*Tachycineta bicolor*] and little brown bat [*Myotis lucifugus*]) and predatory terrestrial invertebrates (e.g., spiders) that may be prey of songbirds. The monitoring of mercury concentrations in emergent invertebrate tissues provides an indicator of potential changes in exposure to these upper trophic receptors.

Monitoring Objectives

The purpose of larval and emergent invertebrate tissue sampling is to evaluate potential mercury bioaccumulation from sediments and potential export from sediments within the PLSA. Specific objectives of the larval and emergent invertebrate tissue monitoring element are to provide data to:

1) Monitor temporal and spatial patterns in mercury bioaccumulation from sediments by larval invertebrates.
2) Monitor temporal and spatial patterns in mercury export from sediments via emerging invertebrates.
3) Monitor potential exposure to terrestrial receptors foraging on emerging invertebrates (e.g., aerial insectivorous birds/mammals, spiders).

Study Design

The design of larval and emergent invertebrate monitoring will be determined based on the results of Tier I and II monitoring events that trigger Tier III monitoring (Figure 2). Larval and emergent invertebrate tissue sampling will be spatially- and temporally-paired with sediment and pore water sampling to evaluate THg and MeHg exposure conditions in sediment that may be related to concentrations accumulated in invertebrate tissues (Section 2.3.2). The number and placement of sampling stations will be based on a

holistic review of the results of Tier I and Tier II monitoring events and the sampling design for larval and emergent invertebrate tissue sampling will be provided as a recommendation in the annual monitoring report that identifies the need for Tier III monitoring (Section 5.1). Sampling of larval invertebrates will not be conducted within areas restored with the placement of ecological-layer following sediment removal; multiple grab samples required to obtain a sufficient sample mass of larval invertebrates would greatly impact the integrity of the integrity of the ecological-layer placed during restoration (ARCADIS et al., 2016).

Sampling and Analytical Methods

Sediment grab samples will be collected using a Ponar grab sampler or equivalent and sieved to collect aquatic-stage invertebrate tissue samples. Sediment samples will be sieved using a tray with 500-micrometer (µm) mesh to remove fine-grained sediment. The material remaining on the sieve will be manually sorted to collect samples of aquatic-stage non-biting midges. To the extent possible, similarly-sized larvae will be collected to ensure comparability among sample locations. At each station, one composite sample of sufficient sample-mass to satisfy minimum laboratory requirements will be collected for THg and MeHg analyses. Prior to shipment to the analytical laboratory, aquatic-stage samples will be depurated for a minimum of six hours and a maximum of 24 hours in clean water to clear the digestive tract. In addition, one sample will be composited from a subset of aquatic-stage invertebrates collected at each sampling location to obtain sufficient sample mass for analysis of total solids; the results of this analysis will be used to represent total solids for aquatic-stage invertebrates collected during the monitoring event.

Emerging adult midges will be collected using floating emergence traps similar to those used in the collection of the 2013 baseline datasets, as described in other studies (URS, 2014; Davies, 1984; LeSage and Harrison, 1979; Tweedy, et al., 2012). Traps will be monitored daily for up to 20 days or until a targeted sample mass has been obtained. Adult emergent non-biting midges captured in the collection bottle or attached to the mesh on the inside of the trap will be removed using an aspirator and added to a sampling vial. Any predators (e.g., spiders, dragonflies, etc.) found inside of the trap will be removed during daily monitoring to minimize incidental mortality of target organisms. A dedicated sample vial will be used for each day of sampling to minimize the potential for contamination due to repeated opening of the sample vial. Following each day of collection, the sealed sampling vials will be frozen and held until a sufficient sample mass has been obtained to satisfy minimum laboratory requirements for THg and MeHg analyses. Sample vials will be composited at the analytical laboratory and one composite sample per station will be analyzed for THg (USEPA Method 1631) and MeHg (Modified USEPA Method 1630[2]). Consistent with the analysis of aquatic-stage invertebrates, one composite sample will be obtained from emergent-stage invertebrates collected at each sampling locations to obtain sufficient sample mass for analysis of total solids; the results of this analysis will be used to represent total solids for emergent-stage invertebrates collected during the monitoring event.

[2] Modified from USEPA 1630 based on cold vapor atomic fluorescence spectrometry technology (CV-AFS) following Bloom (1992).

2.3.2 Sediment/Pore Water

Focused evaluation of THg and MeHg concentrations in sediment and pore water is included in Tier III monitoring to evaluate sediment conditions that may influence mercury bioavailability and bioaccumulation into larval and emergent invertebrates and other sediment-associated biota. Numerous studies indicate that the bioavailability and toxicity of constituents in sediments, particularly metals, are correlated with the bioavailable fraction of constituents in pore water rather than total constituent concentrations in bulk sediment (Ankley et al., 2006; Di Toro et al., 2005; Hansen et al., 1996; Di Toro et al., 1992; Ankley et al., 1991; and Luoma, 1989).

Monitoring Objective

The purpose of sediment and pore water sampling is to provide a focused evaluation of potential changes in mercury bioavailability in sediment within the PLSA where Tier I and II monitoring results indicate the potential for mercury bioaccumulation in biota.

Study Design

The design of sediment and pore water sampling to evaluate potential changes in mercury bioavailability in sediments will be determined based on the results of Tier I and II monitoring events that trigger Tier III monitoring (Figure 2). Sediment and pore water sampling will be spatially- and temporally-paired with the monitoring of larval and emergent invertebrates to evaluate THg and MeHg exposure conditions in sediment that may be related to concentrations in invertebrate tissues (Section 2.3.1). The number and placement of sampling stations will be based on a holistic review of the results of Tier I and Tier II monitoring events and the sampling design will be provided as a recommendation in the annual monitoring report that identifies the need for Tier III monitoring (Section 5.1).

Sampling and Analytical Methods

Bulk sediment samples will be collected using a Ponar dredge or equivalent grab sampler and subsampled for bulk sediment and pore water analyses. Aliquots of the undisturbed grab sample will be collected for bulk sediment analyses of MeHg (Modified USEPA Method 1630) and THg (USEPA Method 1631) to minimize changes in sediment redox conditions that may result from sample manipulation and homogenization. A separate aliquot of bulk sediment will be collected and submitted to the analytical laboratory for *ex situ* extraction of pore water. Aliquots for bulk sediment and *ex situ* pore water analyses will be collected from the top of the closed grab ampler with a small diameter coring device that will be inserted at the midpoint of the sampler. Aliquots removed from the undisturbed sample will be transferred immediately to laboratory-supplied bottleware and filled to zero headspace.

Pore water samples will be extracted from non-homogenized bulk sediment samples in the analytical laboratory via centrifugation, consistent with methods used to collect 2013 baseline pore water data (URS, 2014). *Ex situ* extraction of pore water via centrifugation is a standard method and is the generally preferred laboratory method for the collection of pore water (USEPA, 2001; Society of Environmental Toxicology and Chemistry [SETAC], 2001; Mason et al., 1998; Besser et al., 2009; Marvin-DiPasquale et al., 2009). *Ex situ* extraction of pore water via centrifugation is the preferred method for the

collection of pore water samples in the study based on the following constraints for the LTM Program within the PLSA:

- Collection methods must be consistent for all stations sampled in the study so that appropriate comparisons can be made between samples (USEPA, 2001).
- Water depths of selected stations (maximum water depths greater than 18 feet) and water quality conditions may preclude the use of standard *in situ* methods of pore water collection using peeper and suction methods (USEPA, 2001).

Bulk sediment samples will be prepared for pore water extraction in a nitrogen environment to minimize alterations in sediment redox conditions. Centrifuge tubes will be prepared in a nitrogen glove box that has been purged for at least 30 minutes; centrifuge tubes will be purged for a minimum of 10 minutes. Once purged, centrifuge tubes will be filled with sediment in the glove box. Filled tubes will be removed from the glove box and centrifuged at 3000 revolutions per minute (RPM) for 20 minutes. Centrifuge tubes will be returned to the glove box and separated pore water will be poured off and filtered with an acid-cleaned 0.45 µm disposable filter unit. Filtered samples will then be prepped for THg and MeHg analyses according to USEPA Method 1631 and Modified USEPA Method 1630, respectively. The centrifugation protocol will remain consistent for all samples in the LTM Program to ensure consistency in methods and comparability of data.

2.4 Health and Safety Procedures

Field activities to support the LTM Program will be conducted in accordance with an addendum to the Site-Wide HASP that will be prepared prior to the implementation of the monitoring program to specifically address the monitoring activities described in the LTM WP. Prior to mobilization into the field, a project safety analysis (PSA) will be conducted to review safety procedures outlined in the HASP addendum. In addition, daily safety tailgate meetings will be held at the start of each sampling day to review the scope of work and associated hazards.

Sampling to support the LTM Program will be conducted only under conditions where monitoring stations can be safely accessed and the sampling can be safely completed. The implementation of field monitoring activities outlined in this LTM WP may be inhibited due to health and safety concerns by extreme weather conditions (e.g., winter monitoring of surface water) or flow conditions (e.g., high flow surface water sampling event). USEPA will be notified in the event that implementation of a specific monitoring cannot be implemented due to health and safety concerns.

3.0 Long-Term Monitoring Decision Framework

The LTM Program is designed to provide a holistic long-term evaluation of mercury exposure with the PLSA following remediation and restoration activities in the context of: 1) baseline (pre-remediation/restoration) conditions, 2) regional background conditions, and 3) applicable regulatory or other screening criteria. As described in the preceding section, the monitoring elements and frequency of monitoring events are designed to be adaptable based on the findings of previous monitoring events using defined decision criteria (Figure 2). This section presents the framework for adapting the monitoring program to include additional monitoring elements if the Tier I monitoring results indicate significant changes in mercury exposure within the PLSA.

The framework presented in this section will guide decisions regarding the potential progression of the LTM Program during the initial five-year monitoring period, as illustrated in Figure 2. Recommendations for modifications to the monitoring tiers will be presented to USEPA in annual monitoring reports (Section 5.1).

The LTM Program decision framework has two main components: decision points and decision criteria. Figure 2 illustrates the potential progression of the LTM Program over time and the relationship between decision points, decision criteria, and monitoring elements. Decision points denote events within the LTM Program where monitoring data from the previous year are analyzed to determine if implementation of additional monitoring tiers is necessary (Section 3.1). Within each decision point, there are decision criteria to determine if there has been a meaningful change that may warrant modifications to the LTM Program. Decision criteria incorporate pre-defined criteria for comparisons to LTM data, including baseline conditions, regulatory and screening criteria, and regional reference conditions (Section 3.2).

3.1 Decision Points

Decision points are events in the process where the data collected during the previous monitoring year are analyzed and evaluated to determine if additional monitoring is warranted. There are three decision points in the LTM Program that may occur depending on the year or tier of data being collected. Decision points are identified in Figure 2 (diamonds) and listed in Table 4. Decision points contain two or more decision criteria that, if satisfied, indicate that higher tiers of monitoring may be warranted. Decision criteria are described in detail in Section 3.2 and are shown in Table 4.

Monitoring elements may include both abiotic exposure media (surface water, sediment, and pore water) and biotic components that are important ecological receptors and potential exposure media for wildlife. As a result, the data generated by the LTM Program will inform both the system response to remediation/restoration, as well as potential ecological exposure within the PLSA.

3.2 Decision Criteria

LTM data within the PLSA will be evaluated relative to decision criteria to determine if there has been a meaningful or significant change in any of the monitoring elements. There are three primary types of decision criteria:

- Comparisons of LTM data within the PLSA with 2013 baseline mercury concentrations.
- Comparisons of LTM data within the PLSA with applicable screening criteria.
- Comparisons of LTM data within the PLSA with Reference Area data within a given monitoring event.

Decision criteria are listed in Table 4 and described in the following sections.

For each monitoring element, two decision criteria must be satisfied to progress to the next monitoring tier. The first decision criterion is that the average concentration measured in the PLSA throughout the monitoring year must be greater than the UCL_{mean} concentration of the baseline dataset and the UCL_{mean} concentration of the Reference Area dataset for that monitoring year. The second decision criterion is if concentrations are detected above any applicable regulatory or screening criteria and exceed the UCL_{mean} of the reference area concentration. This will ensure that increases in average concentrations of a monitoring element within the PLSA are not the result of changes in regional conditions. Baseline datasets, applicable regulatory or screening criteria, and reference area data are described further in the following sections. As described in Section 3.2.2, screening criteria were developed for all monitoring elements with the exception of sediment.

The UCL_{mean} is used in the decision framework as a statistic to identify significant change from baseline and/or reference datasets. The UCL_{mean} value is the concentration at which it can be estimated that the true mean is less than that value at a given level of confidence (e.g., 95 percent confidence level). An average concentration for a given monitoring element within the PLSA that exceeds the UCL_{mean} concentration for the baseline and/or reference datasets indicates that the average concentration for the PLSA likely exceeds the true mean for the baseline and/or reference datasets. Average concentrations in the PLSA that exceed UCL_{mean} concentrations for baseline and reference datasets indicate that concentrations have increased relative to baseline and that the increases are not related to regional conditions.

The number of decision criteria increase with the monitoring tiers (Table 4). In the case of contradicting results between monitoring elements in a given tier, a weight of evidence approach shall be used to determine if additional monitoring is warranted. The weight of evidence approach will evaluate data quality and biogeochemical significance of the findings. Data quality considerations may include issues such as sample size and detection limits, including the effects of small sample mass. Biogeochemical significance of findings includes the relationships between mercury concentrations in exposure media (e.g., surface water) and mercury in biological tissues.

3.2.1 Baseline

Comparison of the PLSA monitoring data with the 2013 baseline data is a critical element to determine if there has been a change and how changes compare to the PLSA prior to remediation and restoration activities. The premise is that concentrations in abiotic and biotic monitoring elements collected from the PLSA should not increase following remedial action and restoration.

Baseline data collected in 2013 prior to restoration activities include each of the abiotic and biotic media included in the LTM Program. UCL_{mean} concentrations representing baseline concentrations for each monitoring element were calculated based on the methods recommended by USEPA ProUCL software Version 5.0 (USEPA, 2013). Data points from the ABD were removed from the data sets prior to calculation of the UCL_{mean}. Summary statistics for the 2013 baseline datasets, including representative UCL_{mean} concentrations, are presented in Table 3.

3.2.2 Screening Criteria

In addition to comparison to baseline, monitoring data will also be compared to screening criteria. Where available, the screening criteria selected were criteria/standards promulgated by the NJDEP or USEPA. For those monitoring elements where promulgated criteria were not available, screening criteria were developed based on toxicology literature and that correspond to no-observed effect concentrations (NOECs), where possible (i.e., concentrations below which an adverse effect is not expected to occur). Concentrations that exceed NOECs may not cause adverse effects, but may indicate that further evaluation is warranted. The basis for the screening criteria used in the decision criteria for the LTM Program are summarized in the following sections and described in detail in Appendix B.

Surface Water

Screening criteria for 'dissolved' or filter-passing THg (FTHg) is based on the current National Recommended Water Quality Criterion (NRWQC) and New Jersey Surface Water Quality Standard (NJSWQS) of 770 nanograms per liter (ng/L). For 'dissolved' or filter-passing MeHg (FMeHg) in surface water, a screening criterion of 4 ng/L was selected. This value represents the no-observable effect concentration (NOEC) derived from a lowest-observed effect concentration (LOEC) derived by the Canadian Council of Ministers for the Environment (CCME). A LOEC of 40 ng/L for daphnid reproduction was divided by a safety factor of 10 (CCME, 2003) to estimate the NOEC of 4 ng/L.

There are no screening criteria for the concentration of THg or MeHg on suspended sediment particles (THgP and MeHgP, respectively). These measurements are indicators of potential sediment resuspension and transport of mercury. Since mercury concentrations on particles may increase as the result of increased precipitation and run-off from the watershed into the lake and/or sediment resuspension, these data will be compared to comparable measurements from baseline and Reference Area datasets to evaluate changes over time in the context of regional conditions.

Young-of-Year and Adult Fish Tissue

Beckvar et al. (2005) recommended a whole body fish tissue threshold effect concentration of 210 nanograms THg/gram, wet weight (ng THg/g ww); this threshold effect concentration was considered protective of YOY and adult fish due to the representation of multiple life stages in the supporting studies. This benchmark is considered a conservative, low-end critical body residue no observable effect concentration (CBR_{NOEC}) as a screening criterion for YOY and adult tissue residues.

Sediment

Screening criteria were not developed for mercury due to the lack of reliable sediment quality benchmarks (SQBs) for THg and MeHg. Generic SQBs are typically derived from large co-occurrence databases of sediment chemistry and toxicity data from a wide range of freshwater environments. The resulting SQBs have limited relevance to site-specific exposures and may not reflect a reliable cause and effect relation between exposure to an individual constituent, particularly mercury, and an ecological effect observed in test organisms exposed to a mixture of chemical and non-chemical stressors that may be acting together in a sediment toxicity test. Because contaminant concentrations tend to co-vary in sediments (Long et al., 1998, Smith and Jones, 2006), concentrations of multiple constituents are likely to be correlated with observed toxicity, even when the concentration of the constituent in question is not sufficiently high enough to contribute significantly to toxicity (Fuchsman et al., 2006).

Pore Water

For THg in pore water 4,000 ng THg/L was selected as a NOEC to evaluate potential sublethal growth effects to benthic macroinvertebrates exposed to pore water and surface water at the sediment-surface water interface. Aqueous exposure of infaunal benthic invertebrates is primarily associated with exposure to pore water; epifaunal benthic invertebrates are exposed primarily to surface water at the sediment-surface water interface, but may also be exposed to pore water in shallow sediment. Aqueous toxicity studies were evaluated to identify potential effects associated with exposure to mercury in pore water and surface water. Studies presenting concentration response relationships for survival and growth endpoints based on benthic invertebrate test organisms were prioritized in the effects analysis (Chibunda, 2009; Azevedo-Pereira and Soares, 2010; Valenti et al., 2005). Studies using benthic invertebrate test organisms were also queried from the EPA ECOTOX (ECOTOXicology) database to provide additional aqueous endpoints for mercury. The results of this analysis are described in detail in Appendix B.

For FMeHg in pore water, the NOEC of 4 ng/L represents the CCME Water Quality Guideline for the Protection of Aquatic Life, derived based on a LOEC of 40 ng/L for daphnid reproduction divided by a safety factor of 10 (CCME, 2003).

Larval and Emergent Invertebrate Tissue

Benthic invertebrate CBRs were selected based on the review of available studies associating invertebrate tissue residues with potential effects on growth and reproduction. A conservative CBR_{NOEC} of 36.7 ng MeHg/g ww was selected as a screening criterion for MeHg based on the NOEC for hexagenid mayfly reported by Naimo et al. (2000); Naimo et al. (2000) did not observe diminished growth of hexagenid mayfly nymphs with

increasing MeHg concentrations in tissue concentrations up to 183.7 ng MeHg/g dw (36.7 ng MeHg/g ww) during a series of four 21-day bioaccumulation tests.

The bounded NOEC reproduction endpoint of 1,530 ng THg/g ww for daphnids reported by Biesinger et al., (1982) was selected as the CBR_{NOEC} screening criterion for THg. Biesinger et al. (1982) reported bounded NOEC and LOEC reproduction endpoints for daphnids of 1,530 ng THg/g ww and 2,330 ng/g ww, respectively.

Critical body residues were not identified for emergent adult invertebrates due to the lack of data available to evaluate adverse ecological effects based on tissue residue concentrations. However, it is assumed that mercury CBR screening criteria protective of aquatic stages (i.e., larvae or nymphs) are protective of metamorphosis into adult stages.

3.2.3 Reference Area

Any observed changes in mercury concentrations in abiotic or biotic media must be considered in the context of regional data for two primary reasons. First, mercury is a regional constituent of concern which may be transported to aquatic systems in the region via atmospheric deposition. As a result, many lakes in the region without any industrial sources of mercury can have mercury concentrations in fish that are similar to those observed in the PLSA (Friedmann, 2002). Second, the biogeochemical cycling of mercury in aquatic systems has a strong biological component (i.e., mercury methylation) that may change in response to changes in temperature and other geochemical conditions (Benoit et al., 2003). Therefore, for each decision criterion, a comparison to reference data will be made to evaluate whether or not any observed changes in mercury concentrations is consistent with regional conditions.

4.0 Long-Term Monitoring Data Quality Assurance

The following sections describe procedures that will be implemented to collect data of sufficient quality to achieve the objectives of the LTM Program. QA/QC and record keeping procedures are presented and data quality objectives for analytical matrices are evaluated.

4.1 Quality Assurance/Control Procedures

The following sections detail QA/QC procedures for sample handling and custody and field data record keeping.

4.1.1 Sample Handling and Custody

Analytical samples collected as part of the LTM Program will be handled and analyzed in accordance with specifications provided in USEPA- or ASTM-approved analytical methods. A summary of container types, sample volumes, preservation requirements for each specified analytical method and sampling matrix is presented in Table 5. Analytical hold time requirements for preservation or extraction and analysis are also provided in Table 5.

Samples collected during each monitoring event will be clearly labeled and handled according to standard chain-of-custody (COC) procedures. Each sample will be labeled using waterproof ink with the sample number, date and time of collection, initials of the sampler, requested analyses, and method of preservation. A COC form will be prepared to document the possession of the samples from collection through shipping, storage, and analysis to data reporting and disposal. The times of sample collections and relevant observations will be recorded in the field log, as described below.

4.1.2 Field Data Recordkeeping

Field data for each monitoring event will be recorded on field data sheets and daily activities will be documented in the field logbook. In all cases, the field logbook, calibration logs, and laboratory logbooks shall be maintained by the sampling contractor. At the end of the contract with a sampling contractor, data, checklists, photographs, etc., generated during the monitoring activities, shall be included as part of the project file and/or logbooks and submitted to Chemours. The front covers of the logbooks shall be labeled with the following information:

- Person or organization to whom the book is assigned
- Book number
- Project name and number
- Start date
- End date.

Data will be recorded in the field logbook in a legible manner. Logbook entries shall contain accurate and detailed documentation of daily project activities.

4.2 Analytical Data Quality

Analytical methods for the LTM Program will be performed by a certified laboratory following USEPA- or ASTM-approved methods (Table 5). MeHg will be analyzed in solids according to a modification of USEPA Method 1630 for the analysis of MeHg in solids. This method is based on cold-vapor atomic fluorescence spectrometry (CV-AFS) technology and is widely accepted and used for the analyses of MeHg in solid samples (e.g., Bloom, 1992). The following sections evaluate MDLs for the proposed methods in relation to decision criteria, QA/QC sampling, and laboratory data quality review and long-term storage of electronic data.

4.2.1 Analytical Data Quality Objectives

Analytical data for the long-term monitoring elements described in Section 2.0 will be used to make decisions regarding the progression of the LTM Program based on the framework presented in Section 3.0. Analytical results from the PLSA will be compared to 2013 baseline data, screening criteria, and Reference Area data to evaluate decision criteria for the LTM Program. Therefore, MDLs for the analytical methods must be adequately sensitive to enable comparisons to decision criteria.

Anticipated MDLs for the proposed methods based on minimum sample volumes were compared to screening criteria for each monitoring element. As shown in Table 5, MDLs for THg and MeHg analyses in each matrix are below screening criteria. This comparison indicates that identified methods are adequately sensitive to detect THg and MeHg concentrations below the screening criteria. MDLs for THg and MeHg are also below 2013 baseline concentrations that will be used for temporal comparisons with data collected during the LTM Program (Table 3).

4.2.2 Quality Assurance/Quality Control Samples

QA/QC procedures for the LTM Program will include the collection of QA/QC samples. A summary of QA/QC samples that will be collected as part of the LTM Program and the rates of QA/QC sample collection include:

- Duplicate samples: Duplicate samples will be obtained by simultaneously filling aliquots of homogenized sample media into two sets of bottle ware: 1) the investigative set and 2) the duplicate set. Duplicate samples will be collected at a rate of 5 percent of the total samples collected during a monitoring event for each matrix.
- Matrix spike/matrix spike duplicate (MS/MSD) samples: MS/MSD samples are prepared at the laboratory by dividing a control sample into two aliquots, then spiking each with identical concentrations of specific analytes. At sampling locations where MS/MSD samples are to be collected, a sufficient volume of sampling material, as required by the laboratory will be collected. MS/MSD samples will be collected at a rate of 5 percent of the total number of samples in each matrix.
- Field (rinsate) blank samples: A field blank sample will be collected by rinsing laboratory supplied organic-free deionized water over decontaminated sampling

apparatus into a laboratory-supplied sample bottle. Field blanks associated with a non-aqueous matrix will be collected at a rate of 5 percent of the non-aqueous samples collected throughout the sampling event, not to exceed a rate of one per day; field blanks associated with an aqueous matrix will be collected at a rate of one per day. A field blank does not need to be collected when dedicated or disposable sampling equipment is used.

- Temperature blank: A temperature blank will be included in each cooler shipped to the analytical laboratory.

For pore water and low sample mass biological tissue analyses (e.g., Larval and emergent invertebrate tissue), QA/QC analyses will be conducted as practicable by the laboratory based on available sample volume.

4.2.3 Laboratory Electronic Data Review and Storage

Electronic data deliverables (EDDs) and complete laboratory data packages for field and QA/QC samples will be generated and distributed by the certified analytical laboratory services contractor. Electronic data will be reviewed independently through the Project Data Review (PDR) process, an automated internal review process to assess data usability. EDDs will be loaded into the Locus EIM™ database maintained by Chemours and processed through a series of data quality checks, which are a combination of software (Locus EIM™ database Data Validation Module) and manual review evaluation. Analytical data will be evaluated using the following data usability checks:

- Field and laboratory blank contamination.
- Analytical method hold time criteria.
- Missing QA/QC samples.
- MS/MSD recoveries and the relative percent differences (RPDs) between these spikes.
- Laboratory control sample/control sample duplicate recoveries and the RPD between these spikes.
- RPD between field duplicate sample pairs.
- RPD between laboratory replicates for inorganic analyses.
- Difference/percent difference between total and dissolved sample pairs.

The PDR applies the following data evaluation qualifiers to analysis results, as warranted:

Qualifier	Definition
B	Not detected substantially above the level reported in the laboratory or field blanks.
R	Unusable result. Analyte may or may not be present in the sample.
J	Analyte present. Reported value may not be accurate or precise.
UJ	Not detected. Reporting limit may not be accurate or precise.

Analytical data collected as part of the LTM Program will be stored in the Locus EIM™ database maintained by Chemours.

5.0 Data Analysis and Reporting

Data analysis and reporting will be conducted on an annual basis to determine if changes to monitoring elements or the frequency of monitoring events is warranted. A comprehensive five-year monitoring report will analyze the complete five-year dataset. An overview of data analysis and reporting procedures for the LTM Program is presented in the following sections.

5.1 Annual Reporting

Annual reports will be submitted to USEPA that document the monitoring results for each year and provide recommendations for the following year of monitoring. The annual reports will present the evaluation of analytical data relative to the decision framework to determine if modifications to the LTM Program are warranted, as illustrated in Figure 2. Mercury concentrations for monitoring elements in the PLSA will be evaluated relative to the concentrations observed during the 2013 baseline, in the Reference Area during that year of monitoring, and/or relative to applicable screening criteria. As described in Section 3.0, the results of these comparisons will provide the basis for recommendations for the appropriate tier of monitoring for the following year of monitoring (Figure 2).

5.2 Comprehensive Five-Year Monitoring Report

Following the completion of the initial five-year monitoring period, a comprehensive data analysis report will be submitted to USEPA that presents the analysis of all data collected during the LTM Program. Following the five years of data collection, there will be a range of data available depending on the results of annual monitoring and the progression of the LTM Program (Figure 2). The tiered approach to monitoring will allow for a comprehensive evaluation of mercury movement through the abiotic and biotic components of the PLSA food web. The resulting data set will be comprehensive, with multiple matrices collected at various frequencies. Table 6 presents a summary of the minimum number of samples from the PLSA and Reference Area that will be available based only on Tier I monitoring frequency (Years 1-5) and an estimate of the maximum number of samples that will be available for the analysis based on Tier I (Year 1), Tier II (Years 2-3), and Tier III (Years 4-5) monitoring frequencies. Table 6 does not include the number of samples that will be included for potential Tier III monitoring elements because the number samples for these monitoring elements will be determined based on the results of preceding Tier I and Tier II monitoring events.

LTM data will be available from the PLSA and Reference Area, enabling the comparison of changes relative to 2013 baseline and regional reference conditions (Table 6). The multiple years and seasons sampled will allow an evaluation of potential post-remediation changes in mercury exposure conditions in the PLSA under conditions that account for seasonal and inter-annual variability. Table 6 identifies potential data analyses that may be conducted to evaluate the specific objectives identified for each monitoring element. Appropriate statistical tests will be selected to support these analyses depending on the composition of each dataset following five years of monitoring. Analyses of the entire datasets from the five-year monitoring period will increase the statistical power of the analyses relative to datasets analyzed in annual monitoring reports.

6.0 References

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Tables

Table 1
Proposed Tier I and II Elements for the Pompton Lake Long-Term Monitoring Program
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Monitoring Element	Specific Monitoring Objective	Study Design/Sampling Approach	Measurements	Monitoring Frequency - Years Following Restoration				
				Year 1	Year 2	Year 3	Year 4	Year 5
Surface water	1) Monitor temporal and spatial patterns in total mercury (THg) and methylmercury (MeHg) on suspended particles (pTHg and pMeHg) to evaluate the potential transport of mercury within the PLSA. 2) Evaluate potential changes in mercury concentrations in the Ramapo River from the inflow of Pompton Lake at the Lakeside Avenue Bridge to the outflow near the Pompton Lake Dam. 3) Monitor potential aqueous exposure to THg and methylmercury (MeHg) within the PLSA.	**Stations:** Based on existing surface water sampling network - PLSA: 8 stations - 4 low-frequency and 4 high-frequency stations during variable frequency sampling (Figure 3) - Reference Area: 4 stations - 2 low-frequency and 2 high-frequency stations during variable frequency sampling (Figure 3) - Transects at Pompton Lake inflow (SW-07) and outflow (SW-10) stations: Width- and depth-integrated composite samples collected along transects **Flow Conditions:** Baseflow sampling plus one low flow sampling event (<10th percentile discharge[1]) and one high flow (> 90th percentile discharge[1]) sampling event within the initial 5-year monitoring period, as occurs. **Depth interval:** Mid column, except for width- and depth-integrated samples at transects established at SW-07 and SW-10 **Collection method:** Closed system pump with field filtration (e.g., peristaltic pump w/ dedicated tubing) at discrete stations; EWI method for depth- and width-integrated transect samples; unfiltered and field-filtered (0.45-µm passing) samples	Unfiltered: - THg (USEPA 1631) - MeHg (USEPA 1630) - TSS (USEPA 160.2) Filtered (passing 0.45 µm): - THg (USEPA 1631) - MeHg (USEPA 1630) In situ parameters: temperature, pH, dissolved oxygen, specific conductivity	Tier I Variable[2,3]	Tier I Variable[2,3]	Tier I Quarterly	Tier I Quarterly	Tier I Quarterly
Young-of-Year (YOY) Fish Tissue	1) Monitor temporal and spatial patterns in mercury bioaccumulation by YOY fish, which are subject to short-term, localized mercury exposure. 2) If significant differences in YOY concentrations exist, evaluate potential adverse effects associated with mercury bioaccumulation into fish tissue.	**Locations:** Nearshore environments that provide habitat to support YOY fish - PLSA: Samples distributed between three sampling extents between Lakeside Avenue Bridge and Pompton Lake Dam (Figure 4) - Reference Area: Within single sampling extent between Lakeside Avenue Bridge and Potash Lake (Figure 4) **Target species:** - Bluegill (*Lepomis macrochirus*) - Yellow perch (*Perca flavescens*) - Largemouth bass (*Micropterus salmoides*) **Target sample sizes:** - PLSA: 12 composite samples of 3-5 fish - Reference Area: 5 composite samples of 3-5 fish	Samples: Whole body composite - THg (USEPA 1631) - Total solids	None	Tier II August - September	Tier I August - September	Tier II August - September	Tier I August - September

Table 1
Proposed Tier I and II Elements for the Pompton Lake Long-Term Monitoring Program
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Monitoring Element	Specific Monitoring Objective	Study Design/Sampling Approach	Measurements	Monitoring Frequency - Years Following Restoration				
				Year 1	Year 2	Year 3	Year 4	Year 5
Adult Fish Tissue	1) Monitor temporal and spatial patterns in mercury bioaccumulation into adult fish of a similar age class. 2) If significant differences in adult fish tissue concentrations exist, evaluate the potential for adverse effects associated with mercury bioaccumulation into fish tissue. 3) Monitor potential exposure to piscivorous wildlife receptors foraging on adult fish.	**Locations:** - PLSA: Samples distributed between three sampling extents between Lakeside Avenue Bridge and Pompton Lake Dam (Figure 4) - Reference Area: Within single sampling extent between Lakeside Avenue Bridge and Potash Lake (Figure 4) **Target species:** - Piscivorous species: Largemouth bass (*Micropterus salmoides*) - Demersal species: Yellow and/or Brown Bullhead (*Amerius spp.*) **Target age/size class:** Less than 3-year old fish[4] - Largemouth bass: 150 - 250 mm total length - Bullhead: 150 - 250 mm total length **Target sample sizes:** - Pompton Lake: 12 individual fish - Reference Area: 12 individual fish	Samples: Individual filet plus carcass - THg (USEPA 1631) - Total solids	None	None	None	Tier II[5] August	Tier I August
Sediment	1) Evaluate potential changes in overall sediment mercury concentrations relative to 2013 baseline data.	**Locations:** Incremental sampling methodology (ISM) to provide representative average mercury concentrations - PLSA: Three decision units (DUs) outside of remediated/restored areas within the PLSA base; on substrate type - Reference Area: One DU of similar substrate types to the PLSA **Sampling Approach:** ISM composite samples for each DU - Minimum of 30 discrete samples composited into a representative sample for each DU - Triplicate analyses of composite samples for each DU to evaluate variance on mean concentrations	Bulk sediment analysis: - THg (USEPA 1631) - TOC (USEPA 9060) - Grain size distribution (ASTM D422) - Total solids	None	None	None	None	Tier I August

Notes:

1, Based on historical (1922-2016) flow conditions at the United States Geological Survey (USGS) gaging station 01388000 (Ramapo River at Pompton Lakes, NJ).

2, Monthly sampling at upstream, downstream and select mid-lake locations, quarterly at other locations depending on safe working conditions (e.g., safe work environment).

3, Forgoing monthly sampling during winter months (e.g., December, January, February) is not anticipated to adversely effect monitoring of MeHg in surface water due to relatively low MeHg production in colder months.

4, Consistent with NJDEP Routine Monitoring Program for Toxics in Fish, which standardizes mercury concentrations to 3-year old largemouth bass for inter-lake comparisons.

5, Adult fish tissue sampling is not proposed earlier than Year 4, if warranted based on Tier I monitoring, due to the targeting of fish < 3-years old for analysis; fish > 3-years old sampled prior to Year 4 would be potentially exposed during remediation/restoration activities and, therefore, would not provide representative data for post-restoration conditions.

EWI, Equal-width-increment.

ISM, Incremental sampling method.

MeHg, Methylmercury.

THg, Total mercury.

TOC, Total organic carbon.

TSS, Total suspended solids.

Table 2
Potential Tier III Elements for the Pompton Lake Long-Term Monitoring Program Dependent on the Outcome of Tier I and II Monitoring
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Monitoring Element	Specific Monitoring Objective	Study Design/Sampling Approach	Measurements	Monitoring Frequency - Years Following Restoration				
				Year 1	Year 2	Year 3	Year 4	Year 5
Larval Invertebrate Tissue	1) Monitor temporal and spatial patterns in mercury bioaccumulation from sediments by larval invertebrates.	**Locations:** Specific number of locations dependent on Tier I/II monitoring results; stations co-located with emergent invertebrate traps except in restored areas[1]. **Collection method:** Sieved from bulk sediment collected by standard Ponar or equivalent grab sampler **Target taxon:** Chironomidae (Diptera)	Samples: Whole body composite samples depurated for a minimum of 6 hours - THg (USEPA 1631) - MeHg (Modified USEPA 1630) - Total solids	None	None	None	Tier III August - September	Tier III August - September
Emergent Invertebrate Tissue	1) Monitor temporal and spatial patterns in mercury export from sediments via emerging invertebrates. 2) Monitor potential exposure to terrestrial receptors foraging on emerging invertebrates (e.g., aerial insectivorous birds/mammals, spiders)	**Locations:** Specific number of locations dependent on Tier I/II monitoring results; stations co-located with larval invertebrate sampling stations distributed within Pompton Lake and Reference Area; **Collection method:** Emergent traps up to 20 days to obtain sufficient sample mass for analysis **Target taxon:** Chironomidae (Diptera)	Samples: Whole body composite samples: - THg (USEPA 1631) - MeHg (Modified USEPA 1630) - Total solids	None	None	None	Tier III August - September	Tier III August - September
Sediment/Pore Water	1) Evaluate mercury bioavailability from sediments into sediment-dwelling biota.	**Locations:** Specific number of locations dependent on Tier I/II monitoring results; stations co-located with emergent and larval invertebrate tissue sampling locations. **Collection method:** - Sediment: Surface grab with standard Ponar or equivalent grab sampler - Pore water: Centrifugation from bulk sediment sample per protocol established in *2013 Ecological Investigation* (URS, 2014)	Sediment: - THg (USEPA 1631) - MeHg (Modified USEPA 1630) - Total solids Pore Water (passing 0.45 µm filter): - THg (USEPA 1631) - MeHg (USEPA 1630)	None	None	None	Tier III August - September	Tier III August - September

Notes:
Tier III monitoring elements will implemented pending the outcome of Tier I/II monitoring; the specific number and locations of Tier III samples will be contingent upon data generated during Tier I/II monitoring events.
1, The collection of larval insect tissue samples is not proposed in restored areas because the number of sediment grab samples that would be necessary to obtain adequate sample mass would be destructive to the ecological-layer that is placed during restoration activities.
MeHg, Methylmercury.
THg, Total mercury.

Table 3
Summary of 2013 Baseline Mercury Concentrations
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Monitoring Element	Analyte	Summary of 2013 Baseline Concentrations				Units	UCL_{mean} Method[1]
		Sample Size (N)	Minimum	Maximum	UCL_{mean}		
Surface Water							
Suspended Particles	pTHg	14	0.112	3.131	1.82	mg/kg dw	95% Adjusted Gamma UCL
	pMeHg	14	0.0	0.0119	0.0077	mg/kg dw	95% Chebyshev (Mean, Sd) UCL
Young-of-Year Fish Tissue							
Bluegill (YOY)	THg	5	28	46	44	ng/g ww	95% Student's-t UCL
Largemouth Bass (YOY)	THg	5	59	82	79	ng/g ww	95% Student's-t UCL
Yellow Perch (YOY)	THg	4	36	62	64	ng/g ww	95% Student's-t UCL
Adult Fish Tissue							
Brown/Yellow Bullhead (Adult)	THg	18	43	497	215	ng/g ww	95% H-UCL
Largemouth Bass (Adult)	THg	20	70	364	232	ng/g ww	95% Chebyshev (Mean, Sd) UCL
Larval and Emergent Insect Tissue							
Chironomid (Larval)	MeHg	18	1.8	11	5.2	ng/g ww	95% Student's-t UCL
	THg	18	3.3	300	119	ng/g ww	95% Chebyshev (Mean, Sd) UCL
Chironomid (Emergent)	MeHg	20	5.3	30	15.9	ng/g ww	95% Student's-t UCL
	THg	20	7.7	53	28.8	ng/g ww	95% Student's-t UCL
Sediment							
Surficial Sediment (0-0.5-ft)[2]	THg	107	0.0124	28.9	5.67	mg/kg dw	95% KM (Chebyshev) UCL

Notes:

1, Method recommended by USEPA ProUCL Version 5.0 (USEPA, 2013).

2, UCL estimated based on surficial sediment data (0-0.5-ft) collected in August 2013 characterize total mercury concentrations in sediment outside of the remedial action defined in the 2011 CMI WP (ARCADIS et al., 2014).

dw, dry weight.

MeHg, Methylmercury.

THg, Total mercury.

pMeHg, Methylmercury on suspended particles.

pTHg, Total mercury on suspended particles.

$UCL_{mean,}$ Upper confidence limit of the mean.

ww, wet weight.

Table 4
Decision Points and Decision Criteria to Adapt the Long-Term Monitoring Program
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Decision Point	Monitoring Element	Decision Criteria	Screening Criteria
1	Surface Water (SW)	1) Mean SW $[pTHg]_{PLSA}$ **OR** mean SW $[pMeHg]_{PLSA}$ exceeds: -Respective baseline UCL_{mean} PLSA mercury concentration; **AND** -Respective UCL_{mean} reference area mercury concentration; **OR** 2) Mean SW $[FTHg]_{PLSA}$ **OR** mean SW $[FMeHg]_{PLSA}$ exceeds: -Relevant screening criteria; **AND** -Respective UCL_{mean} reference area mercury concentration	FTHg: 770 ng/L FMeHg: 4 ng/L
2	SW	1) Mean SW $[pTHg]_{PLSA}$ **OR** mean SW $[pMeHg]_{PLSA}$ exceeds: -Respective baseline UCL_{mean} PLSA mercury concentration; **AND** -Respective UCL_{mean} reference area mercury concentration; **OR** 2) Mean SW $[FTHg]_{PLSA}$ **OR** mean SW $[FMeHg]_{PLSA}$ exceeds: -Relevant screening criteria; **AND** -Respective UCL_{mean} reference area mercury concentration	FTHg: 770 ng/L FMeHg: 4 ng/L
	Young-of-Year (YOY) Fish ($Fish_{YOY}$)	1) Mean $Fish_{YOY}$ $[THg]_{PLSA}$ exceeds: -Baseline UCL_{mean} $Fish_{YOY}$ [THg]; **AND** -UCL_{mean} reference area $Fish_{YOY}$ [THg]; **OR** 2) Mean FishYOY [THg]PLSA exceeds: -Relevant screening criterion, **AND** -UCL_{mean} reference area $Fish_{YOY}$ [THg]	CBR_{NOEC}: 210 ng THg/g ww
3	SW	1) Mean SW $[pTHg]_{PLSA}$ **OR** mean SW $[pMeHg]_{PLSA}$ exceeds: -Respective baseline UCL_{mean} PLSA mercury concentration; **AND** -Respective UCL_{mean} reference area mercury concentration; **OR** 2) Mean SW $[FTHg]_{PLSA}$ **OR** mean SW $[FMeHg]_{PLSA}$ exceeds: -Relevant screening criteria; **AND** -Respective UCL_{mean} reference area mercury concentration	FTHg: 770 ng/L FMeHg: 4 ng/L
	Pore water (PW)	1) Mean PW $[FTHg]_{PLSA}$ **OR** mean PW $[FMeHg]_{PLSA}$ exceeds: -Respective baseline UCL_{mean} PLSA mercury concentration; **AND** -Respective UCL_{mean} reference area mercury concentration; **OR** 2) Mean PW $[FTHg]_{PLSA}$ **OR** mean PW $[FMeHg]_{PLSA}$ exceeds: -Relevant screening criteria; **AND** -Respective UCL_{mean} reference area mercury concentration	FTHg: 4000 ng/L FMeHg: 4 ng/L
	Sediment	1) Mean Sediment $[THg]_{PLSA}$ exceeds: -Baseline UCL_{mean} Sediment $[THg]_{PLSA}$; **AND** -UCL_{mean} reference area Sediment $[THg]_{PLSA}$	Not applicable
	$Fish_{YOY}$	1) Mean $Fish_{YOY}$ $[THg]_{PLSA}$ exceeds: -Baseline UCL_{mean} $Fish_{YOY}$ [THg]; **AND** -UCL_{mean} reference area $Fish_{YOY}$ [THg]; **OR** 2) Mean FishYOY [THg]PLSA exceeds: -Relevant screening criterion, **AND** -UCL_{mean} reference area $Fish_{YOY}$ [THg]	CBR_{NOEC}: 210 ng THg/g ww
	Adult Fish	1) Mean $Fish_{Adult}$ $[THg]_{PLSA}$ exceeds: -Baseline UCL_{mean} $Fish_{Adult}$ [THg]; **AND** -UCL_{mean} reference area $Fish_{Adult}$ [THg]; **OR** 2) Mean FishAdult [THg]PLSA exceeds: -Relevant screening criterion, **AND** -UCL_{mean} reference area $Fish_{Adult}$ [THg]	CBR_{NOEC}: 210 ng THg/g ww
	Larval Invertebrate Tissue	1) Mean $Invert_{Larval}$ $[THg]_{PLSA}$ **OR** $Invert_{Larval}$ $[MeHg]_{PLSA}$ exceeds: -Baseline UCL_{mean} $Invert_{Larval}$ [THg]; **AND** -UCL_{mean} reference area $Invert_{Larval}$ [THg]; **OR** 2) Mean $Invert_{Larval}$ $[THg]_{PLSA}$ OR $Invert_{Larval}$ $[MeHg]_{PLSA}$ exceeds: -Relevant screening criteria, **AND** -UCL_{mean} reference area mercury concentration	CBR_{NOEC}: 1,530 ng THg/g ww CBR_{NOEC}: 36.7 ng MeHg/g ww
	Emergent Invertebrate Tissue	1) Mean $Invert_{Emergent}$ $[THg]_{PLSA}$ **OR** $Invert_{Emergent}$ $[MeHg]_{PLSA}$ exceeds: -Baseline UCL_{mean} $Invert_{Emergent}$ [THg]; **AND** -Respective UCL_{mean} reference area $Invert_{Emergent}$ [THg]; **OR** 2) Mean $Invert_{Emergent}$ [THg]PLSA OR $Invert_{Emergent}$ [MeHg]PLSA exceeds: -Relevant screening criteria, **AND** -Respective UCL_{mean} reference area mercury concentration	CBR_{NOEC}: 1,530 ng THg/g ww CBR_{NOEC}: 36.7 ng MeHg/g ww

Table 4
Decision Points and Decision Criteria to Adapt the Long-Term Monitoring Program
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Notes:

Refer to Table 3 for UCL_{mean} baseline mercury concentrations.
CBR, Critical body residue.
FMeHg, 0.45 μm-filtered methylmercury.
FTHg, 0.45 μm-filtered total mercury.
MeHg, methylmercury.
$MeHg_{P,}$ Particulate methylmercury.
NOEC, No effect concentration.
PLSA, Pompton Lakes Study Area.
THg, total mercury.
$THg_{P,}$ Total particulate mercury.
ww, wet weight.

Table 5
Summary of Analytical Methods and Sample Handling Requirements
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Analysis	Method Reference	Units	Method Detection Limit (MDL)	Screening Criteria	Minimum Sample Volume Requirement	Hold Time	Sample Container	Preservation
Surface Water					**(mL)**			
Total Mercury (THg)	USEPA 1631	ng/L	0.1	770 (filtered)	25	90 days	125 mL FLPE	Wet ice
Methylmercury (MeHg)	USEPA 1630	ng/L	0.02	4 (filtered)	50	180 days	250 mL FLPE	Wet ice
Pore Water					**(mL)**			
Total Mercury (THg)	USEPA 1631	ng/L	0.1	4000 (filtered)	25	90 days	125 mL FLPE	Wet ice
Methylmercury (MeHg)	USEPA 1630	ng/L	0.02	4 (filtered)	50	180 days	250 mL FLPE	Wet ice
Bulk Sediment					**(grams)**			
Total Mercury (THg)	USEPA 1631	ng/g dw	0.15	NA	1	365 days	50 mL plastic	Wet ice
Methylmercury (MeHg)	Modified USEPA 1630[a]	ng/g dw	0.012	NA	2.5	365 days	50 mL plastic	Dry ice
Grain size distribution	ASTM D422	% Passing	0.5	NA	70[b]	NA	500 mL glass	Wet ice
Total organic carbon (TOC)	USEPA 9060	mg/kg	100	NA	1	28 days	250 mL glass	Wet ice
Fish Tissue					**(grams)**			
Total Mercury (THg)	USEPA 1631	ng/g ww	0.16	210	1	365 days	50 mL plastic	Frozen; dry ice
Methylmercury (MeHg)	Modified USEPA 1630[a]	ng/g ww	1	NA	0.1	365 days	50 mL plastic	Frozen; dry ice
Larval and Emergent Invertebrate Tissue					**(grams)**			
Total Mercury (THg)	USEPA 1631	ng/g ww	1.6	1,530	0.1	365 days	50 mL plastic	Frozen; dry ice
			0.16	1,530	1	365 days	50 mL plastic	Frozen; dry ice
Methylmercury (MeHg)	Modified USEPA 1630[a]	ng/g ww	1	36.7	0.1	365 days	50 mL plastic	Frozen; dry ice

Notes:
a, Modified from USEPA 1630 based on cold vapor atomic fluorescence spectrometry technology (CV-AFS) following Bloom (1992).
b, Sample mass required for analysis after drying and sieving.
NA, Not applicable.
ww, wet weight.
dw, dry weight.

Table 6
Summary of Anticipated Available LTM Data and Potential Data Analyses for the Comprehensive Five-Year Monitoring Report
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

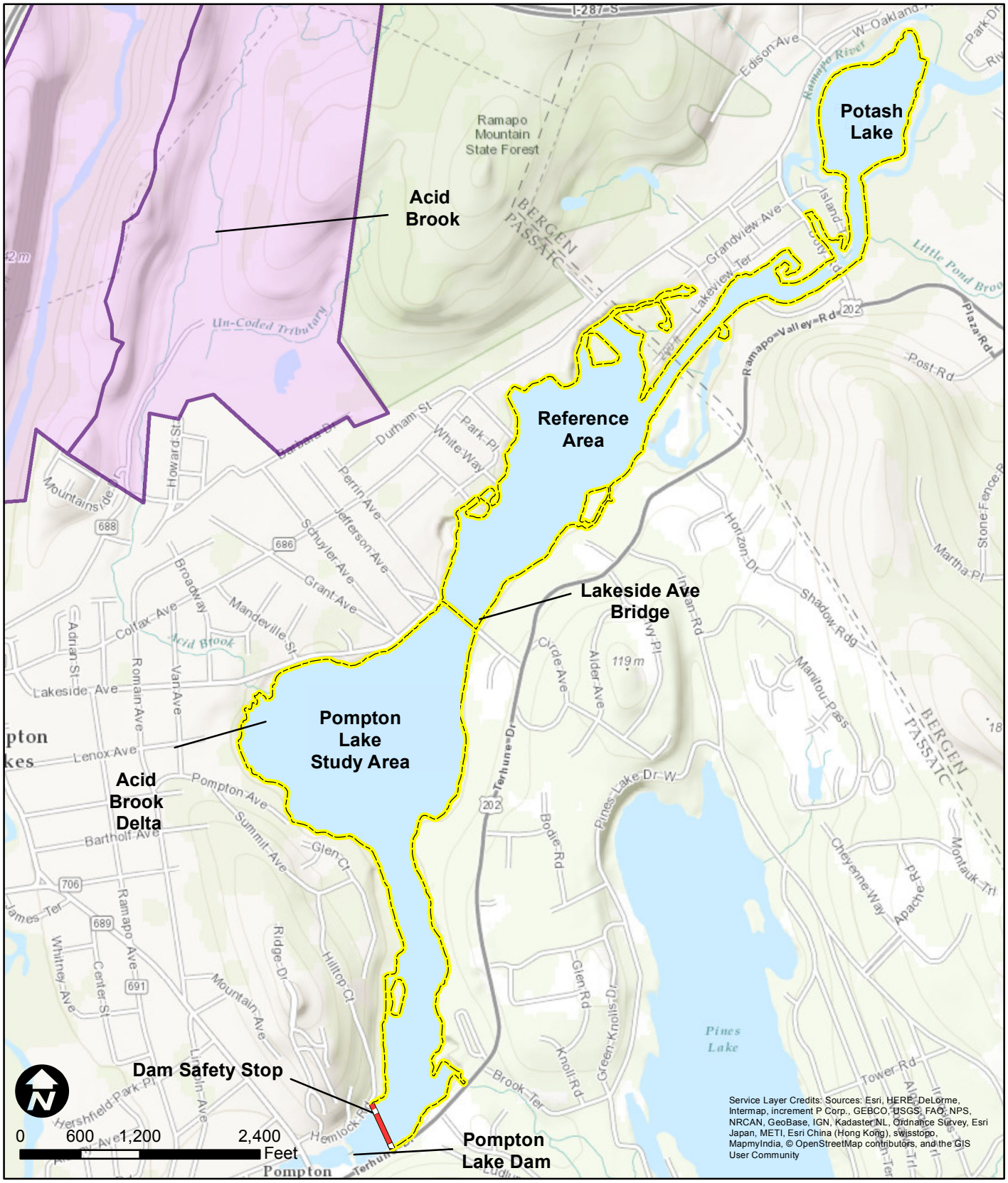
Monitoring Element	Specific Monitoring Objective	Potential Data Usability/Analyses	Anticipated Range of Sample Sizes After Initial 5-Year Monitoring Period			
			Minimum Tier I (Years 1-5)		Maximum Tier II (Years 2-3) and Tier III (Years 4-5)	
			PLSA	Reference Area	PLSA	Reference Area
Tier I and II Monitoring						
Surface water	1) Monitor temporal and spatial patterns in THg on suspended particles (pTHg) to evaluate the potential transport of mercury within the PLSA.	Spatial and temporal trend analyses controlling for potential effects of seasonality	240	120	304	152
	2) Evaluate potential changes in mercury concentrations in the Ramapo River from the inflow of Pompton Lake at the Lakeside Avenue Bridge to the outflow near the Pompton Lake Dam.	Comparison of means testing of THg and MeHg concentrations in the inflow and outflow of Pompton Lake based on width- and depth-integrated samples at inflow and outflow sampling transects.	38	38	54	54
	3) Monitor potential aqueous exposure to THg and MeHg within the PLSA.	Comparison of UCL_{mean} concentrations to screening criteria protective of aquatic life	240	120	304	152
Young-of-Year (YOY) Fish Tissue	1) Monitor temporal and spatial patterns in mercury bioaccumulation by YOY fish, which are subject to short-term, localized mercury exposure.	Comparisons of means testing of concentrations between PLSA and Reference Area and between sampling events	Composite samples[1]: 24 - Largemouth bass 24 - Yellow perch 24 - Bluegill	Composite samples[1]: 10 - Largemouth bass 10 - Yellow perch 10 - Bluegill	Composite samples[1]: 48 - Largemouth bass 48 - Yellow perch 48 - Bluegill	Composite samples[1]: 20 - Largemouth bass 20 - Yellow perch 20 - Bluegill
	2) If significant differences in YOY concentrations exist, evaluate potential adverse effects associated with mercury bioaccumulation into fish tissue.	Comparison of UCL_{mean} concentration to CBR_{NOEC} protective of juvenile fish				
Adult Fish Tissue	1) Monitor temporal and spatial patterns in mercury bioaccumulation into adult fish of a similar age class.	Comparisons of means testing of concentrations between PLSA and Reference Area and between sampling events	Individual samples[2]: 12 - Largemouth bass 12 - Bullhead	Individual samples[2]: 12 - Largemouth bass 12 - Bullhead	Individual samples[2]: 24 - Largemouth bass 24 - Bullhead	Individual samples[2]: 24 - Largemouth bass 24 - Bullhead
	2) If significant differences in adult fish tissue concentrations exist, evaluate the potential for adverse effects associated with mercury bioaccumulation into fish tissue.	Comparison of UCL_{mean} concentration to CBR_{NOEC} protective of juvenile fish				
	3) Monitor potential exposure to piscivorous wildlife receptors foraging on adult fish.	Comparison of UCL_{mean} concentrations to dietary concentrations that would result in a lowest observable adverse effect level (LOAEL) for piscivorous birds/mammals				
Sediment	1) Evaluate potential changes in overall sediment mercury concentrations relative to 2013 baseline data.	Comparisons of mean THg concentrations: - Between PLSA and Reference Area - Between PLSA and 2013 baseline.	9 - Triplicate Analyses of ISM Composites from 3 Decision Units	3 - Triplicate Analyses of ISM Composites from 1 Decision Unit	To Be Determined	To Be Determined

Table 6
Summary of Anticipated Available LTM Data and Potential Data Analyses for the Comprehensive Five-Year Monitoring Report
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Monitoring Element	Specific Monitoring Objective	Potential Data Usability/Analyses	Anticipated Range of Sample Sizes After Initial 5-Year Monitoring Period			
			Minimum Tier I (Years 1-5)		Maximum Tier II (Years 2-3) and Tier III (Years 4-5)	
			PLSA	Reference Area	PLSA	Reference Area
Potential Tier III Monitoring						
Larval Invertebrate Tissue	1) Monitor temporal and spatial patterns in mercury bioaccumulation from sediments by larval invertebrates.	Comparisons of means testing of concentrations: - Between PLSA and Reference Area - Between PLSA and 2013 baseline.	To Be Determined	To Be Determined	To Be Determined	To Be Determined
Emergent Invertebrate Tissue	1) Monitor temporal and spatial patterns in mercury export from sediments via emerging invertebrates.	Comparisons of means testing of concentrations: - Between PLSA and Reference Area - Between PLSA and 2013 baseline.	To Be Determined	To Be Determined	To Be Determined	To Be Determined
	2) Monitor potential exposure to terrestrial receptors foraging on emerging invertebrates (e.g., aerial insectivorous birds/mammals, spiders)	Comparison of UCL_{mean} concentrations to dietary concentrations that would result in a lowest observable adverse effect level (LOAEL) for aerial insectivorous birds/mammals				
Sediment/Pore Water	1) Evaluate mercury bioavailability from sediments into sediment-dwelling biota.	Comparisons of THg and MeHg measured in sediment/pore water to concentrations measured in benthic invertebrate tissues	To Be Determined	To Be Determined	To Be Determined	To Be Determined

Notes:
1, Composite samples of 3-5 similarly-sized individual fish.
2, Individual fish samples consist of filet plus carcass analysis.
To be determined, Tier III monitoring elements will implemented pending the outcome of Tier I/II monitoring; the specific number and locations of Tier III samples will be contingent upon data generated during Tier I/II monitoring events.
CBR_{NOEC}, Critical body residue associated with no observed effects concentrations.
LOAEL, Lowest observed adverse effect level.
MeHg, Methylmercury.
PLSA, Pompton Lake Study Area
pTHg, Total mercury on suspended particles.
THg, Total mercury.
UCL_{mean}, Upper confidence limit of the mean concentration.
YOY, Young-of-year.

Figures



Legend

- Dam Safety Stop
- Study Areas
- Pompton Lakes Works

DRAFT

Notes:
1. Figure modified from URS (2014)

EHS Support consider it done	POMPTON LAKE LONG-TERM MONITORING (LTM) PROGRAM	Pompton Lake Location Map	FIGURE 1

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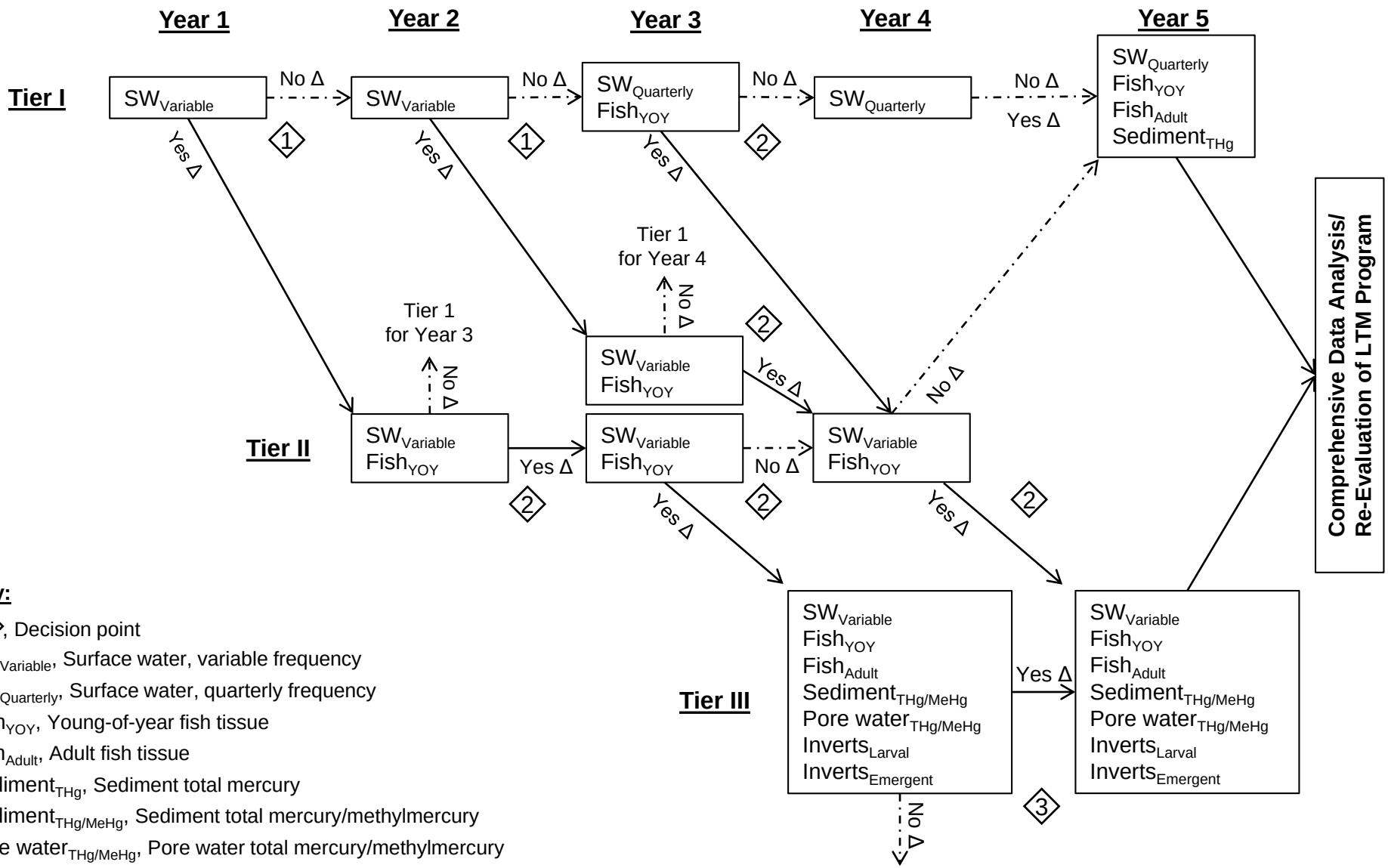
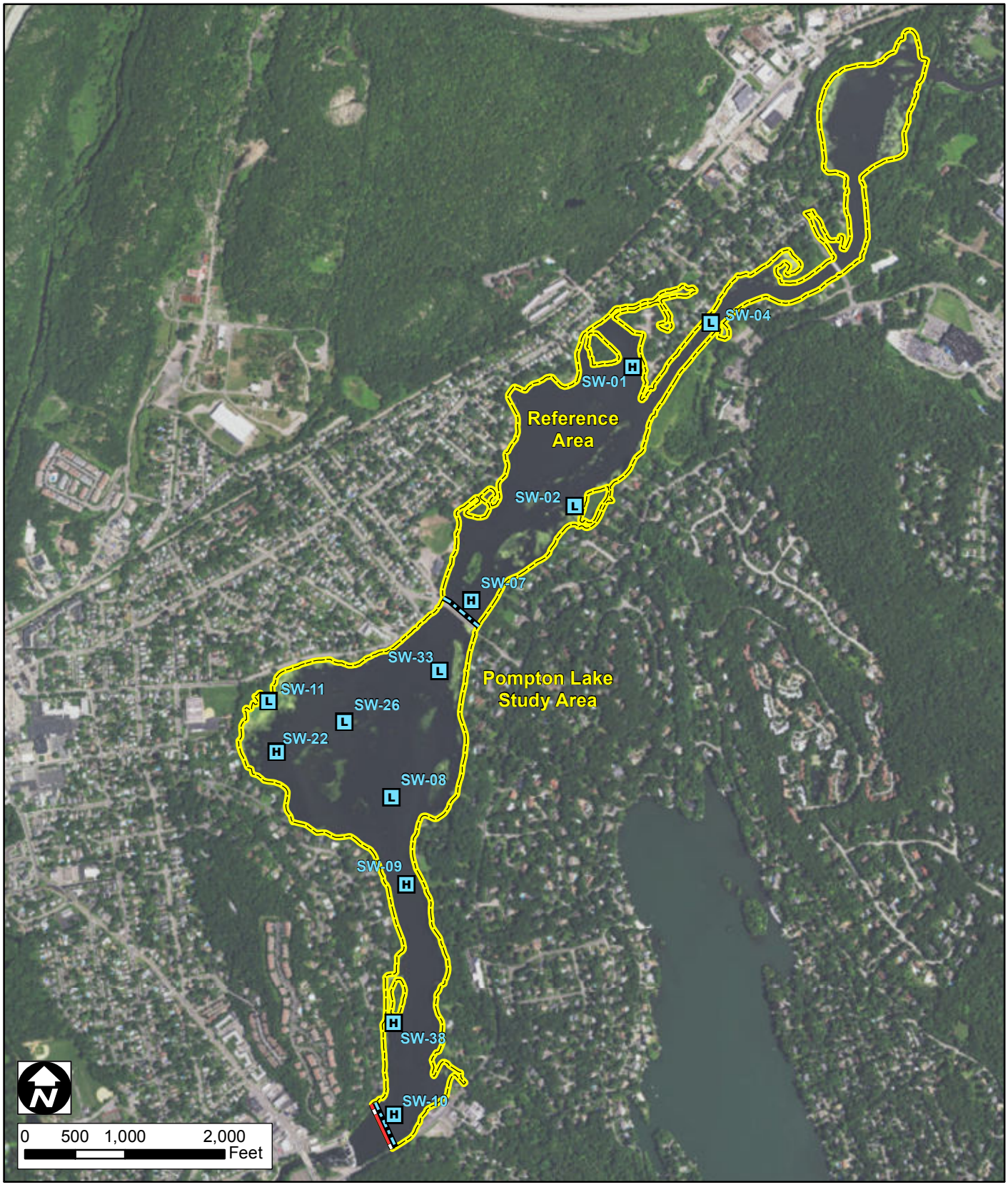


EHS Support consider it done	POMPTON LAKE LONG-TERM MONITORING (LTM) PROGRAM	**Conceptual Approach for Long-Term Monitoring of the Pompton Lake Study Area**	**FIGURE 2**



Legend

- Study Areas
- Dam Safety Stop
- Depth-Integrated Transect

Sampling Frequency

- H High-Frequency
- L Low-Frequency

DRAFT

Notes:
1. Reference Area includes upstream Ramapo River and Potash Lake
2. Figure modified from URS (2014)
3. Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

EHS Support consider it done

POMPTON LAKE LONG-TERM MONITORING (LTM) PROGRAM

Proposed Surface Water Monitoring Stations

FIGURE 3

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Legend

- Fish Sampling Extents
- Dam Safety Stop

DRAFT

Notes:

1. Ref.= Upstream Ramapo River and Potash Lake, URC = Upper Ramapo Channel, and LRC = Lower Ramapo Channel.
2. Figure modified from URS (2014).
3. Imagery Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

EHS Support consider it done	POMPTON LAKE LONG-TERM MONITORING (LTM) PROGRAM	Proposed Fish Tissue Monitoring Extents	FIGURE 4

D:\EHSS_GIS\C00000_PomptonLakes\01_ANALYSIS\20160516_LTM_Figures\Revised - 20160518\Figure 4 Proposed Fish Tissue Monitoring Extents.mxd

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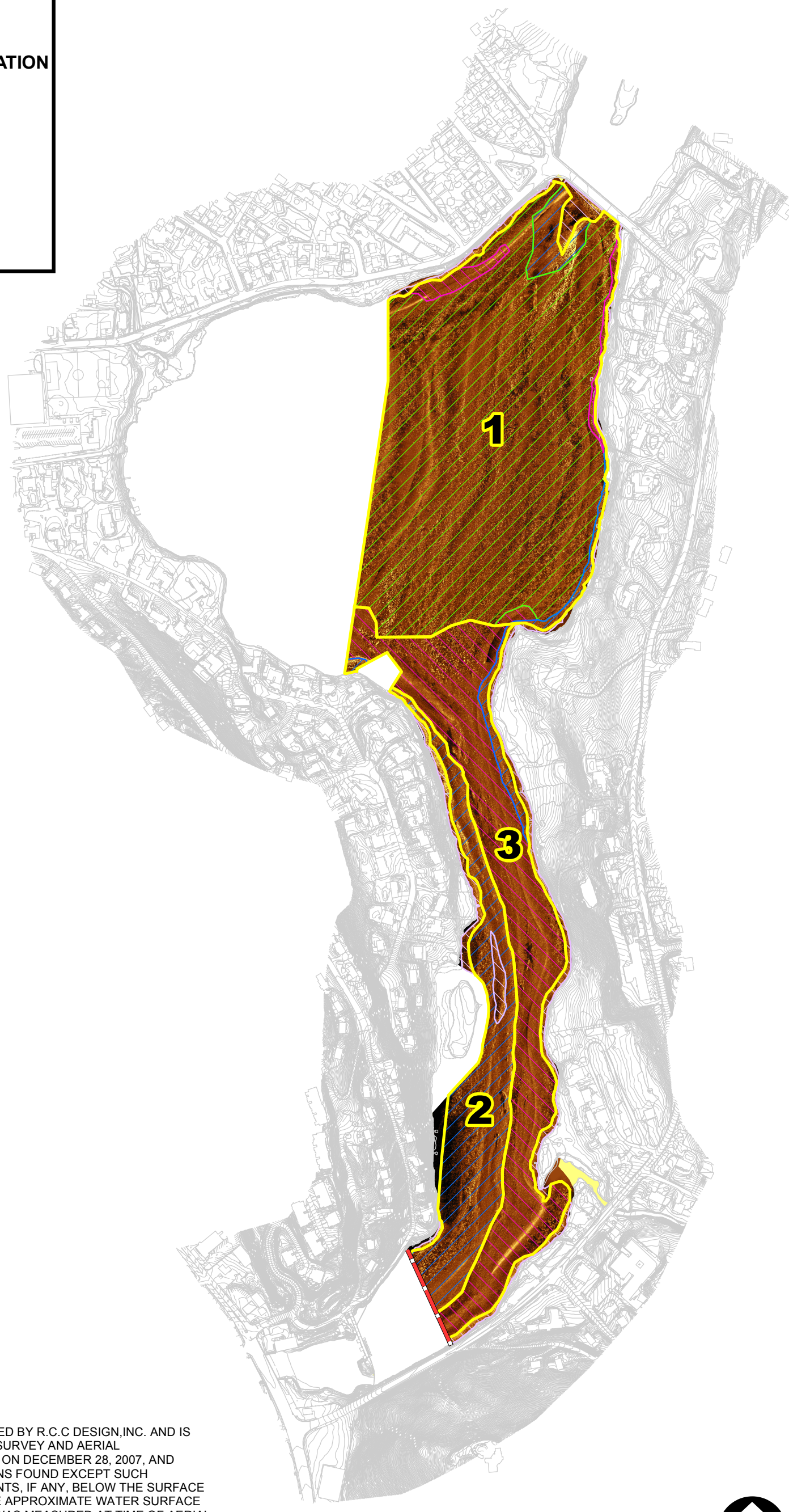
LEGEND

- Dam Safety Stop
- Decision Units

SEDIMENT CLASSIFICATION

- Gravel/Sand
- Sand
- Silt
- Vegetation
- Contours



1. THE BASE MAP WAS PREPARED BY R.C.C DESIGN,INC. AND IS BASED UPON ACTUAL FIELD SURVEY AND AERIAL PHOTOGRAPHY PERFORMED ON DECEMBER 28, 2007, AND REPRESENTS THE CONDITIONS FOUND EXCEPT SUCH EASEMENTS OF IMPROVEMENTS, IF ANY, BELOW THE SURFACE LANDS AND NOT VISIBLE. THE APPROXIMATE WATER SURFACE ELEVATION SHOWN HEREIN WAS MEASURED AT TIME OF AERIAL SURVEY, AND MAY VARY BASED ON CURRENT SITE CONDITIONS. HORIZONTAL AND VERTICAL DATUMS ARE BASED ON NAD 83 AND NAVD 88, RESPECTIVELY.

2. THE SIDE SCAN SONAR SURVEY EVENT, INCLUDING COLLECTION OF GRAB SAMPLES, WAS PERFORMED BY AQUA SURVEY, INC. ON MAY 14-15, 2013.

N

0 250 500 1,000 Feet

EHS Support consider it done

DUPONT POMPTON LAKES WORKS
POMPTON LAKES, NEW JERSEY

Decision Units for Sediment Sampling

FIGURE 5

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Appendices

Appendix A
2013 Pompton Lake Ecological Investigation Summary of Analytical Data

Table A-1
Summary of 2013 Baseline Data - Surface Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	Field Sample ID Location Sample Date Matrix Sample Purpose Sample Type Filtered	EI13-ABD-SW11S-SW SW11 09/04/2013 Liquid Regular Sample Surface Water			EI13-ABD-SW11S-SW-Z SW11 09/04/2013 Liquid Regular Sample Surface Water			EI13-ABD-SW13S-SW SW13 09/04/2013 Liquid Regular Sample Surface Water			EI13-ABD-SW13S-SW-Z SW13 09/04/2013 Liquid Regular Sample Surface Water			EI13-ABD-SW15S-SW SW15 09/04/2013 Liquid Regular Sample Surface Water			EI13-ABD-SW15S-SW-Z SW15 9/4/2013 Liquid Regular Sample Surface Water			EI13-ABD-SW22S-SW SW22 09/04/2013 Liquid Regular Sample Surface Water		
				Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
TOTAL SUSPENDED SOLIDS	MG/L	160.2	N	13.6		J				8.2		J				13.4		J				10.6		J
METHYL MERCURY	NG/L	1630	N	1.8						0.237						0.463		J				0.143		J
METHYL MERCURY	NG/L	1630	Y				0.559						0.065						0.078		J			
MERCURY, LOW LEVEL	NG/L	1631	N	244						224						156						31.5		
MERCURY, LOW LEVEL	NG/L	1631	Y				3.75						6.22						2.48					

Notes:
MDL - Method Detection Limit.
B - Not detected substantially above the level reported in the laboratory or field blanks.
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.
UJ - Not detected. Reporting limit may not be accurate or precise.

Table A-1
Summary of 2013 Baseline Data - Surface Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	Field Sample ID Location Sample Date Matrix Sample Purpose Sample Type Filtered	EI13-ABD-SW22S-SW-Z SW22 09/04/2013 Liquid Regular Sample Surface Water			EI13-ABD-SW31S-SW SW31 09/04/2013 Liquid Regular Sample Surface Water			EI13-ABD-SW31S-SW-Z SW31 09/04/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW08D-SW SW8 09/03/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW08D-SW-Z SW8 09/03/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW08S-SW SW8 09/03/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW08S-SW-Z SW8 09/03/2013 Liquid Regular Sample Surface Water		
				Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
TOTAL SUSPENDED SOLIDS	MG/L	160.2	N				16.5		J				6.5		B				17.7		J			
METHYL MERCURY	NG/L	1630	N				0.135						0.05		J				0.04		J			
METHYL MERCURY	NG/L	1630	Y	0.056		J				0.263						0.071		J					0.02	UJ
MERCURY, LOW LEVEL	NG/L	1631	N				1140						3.95						4.99					
MERCURY, LOW LEVEL	NG/L	1631	Y	6.7						2.63						0.97						1.46		

Notes:
MDL - Method Detection Limit.
B - Not detected substantially above the level reported in the laboratory or field blanks.
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.
UJ - Not detected. Reporting limit may not be accurate or precise.

Table A-1
Summary of 2013 Baseline Data - Surface Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	Field Sample ID Location Sample Date Matrix Sample Purpose Sample Type Filtered	EI13-PLSA-SW09D-SW SW9 09/03/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW09D-SW-Z SW9 09/03/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW09S-SW SW9 09/03/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW09S-SW-Z SW9 09/03/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW10D-SW SW10 09/03/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW10D-SW-Z SW10 09/03/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW10S-SW SW10 09/03/2013 Liquid Regular Sample Surface Water		
				Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
TOTAL SUSPENDED SOLIDS	MG/L	160.2	N	3.8		B				6.2		B				5.4		B				6.8		B
METHYL MERCURY	NG/L	1630	N	0.041		J				0.04		J					0.02	UJ				0.03		J
METHYL MERCURY	NG/L	1630	Y					0.02	UJ				0.028		J					0.02	UJ			
MERCURY, LOW LEVEL	NG/L	1631	N	3.44						6.02						1.72						1.44		
MERCURY, LOW LEVEL	NG/L	1631	Y				0.59						1.46						0.59					

Notes:
MDL - Method Detection Limit.
B - Not detected substantially above the level reported in the laboratory or field blanks.
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.
UJ - Not detected. Reporting limit may not be accurate or precise.

Table A-1
Summary of 2013 Baseline Data - Surface Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	Field Sample ID Location Sample Date Matrix Sample Purpose Sample Type Filtered	EI13-PLSA-SW10S-SW-Z SW10 09/03/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW26S-SW SW26 09/04/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW26S-SW-Z SW26 09/04/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW33S-SW SW33 9/4/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW33S-SW-Z SW33 9/4/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW33D-SW-Z SW33 9/4/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW33D-SW-Z SW33 9/4/2013 Liquid Regular Sample Surface Water		
				Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
TOTAL SUSPENDED SOLIDS	MG/L	160.2	N				6.1		J				2.1		B				2.2		J			
METHYL MERCURY	NG/L	1630	N				0.096		J				0.052		J				0.028					
METHYL MERCURY	NG/L	1630	Y		0.02	UJ				0.026		J				0.027		J				0.027		J
MERCURY, LOW LEVEL	NG/L	1631	N				21.6						6.26		B				2.99					
MERCURY, LOW LEVEL	NG/L	1631	Y	0.68						2.5						0.45						0.4		J

Notes:
MDL - Method Detection Limit.
B - Not detected substantially above the level reported in the laboratory or field blanks.
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.
UJ - Not detected. Reporting limit may not be accurate or precise.

Table A-1
Summary of 2013 Baseline Data - Surface Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	Field Sample ID Location Sample Date Matrix Sample Purpose Sample Type Filtered	EI13-PLSA-SW34S-SW SW34 9/4/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW34S-SW-Z SW34 9/4/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW35S-SW SW35 9/4/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW35S-SW-Z SW36 9/4/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW37S-SW SW37 9/3/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW37S-SW-Z SW37 9/3/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW38S-SW SW38 9/3/2013 Liquid Regular Sample Surface Water		
				Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
TOTAL SUSPENDED SOLIDS	MG/L	160.2	N	2.4						4.8						7						6.6		
METHYL MERCURY	NG/L	1630	N		0.02	U				0.056						0.044		J				0.048		J
METHYL MERCURY	NG/L	1630	Y					0.02	U				0.054						0.021		J			
MERCURY, LOW LEVEL	NG/L	1631	N	2.23						13						4.23						2.44		
MERCURY, LOW LEVEL	NG/L	1631	Y				0.49						0.49						0.76					

Notes:
MDL - Method Detection Limit.
B - Not detected substantially above the level reported in the laboratory or field blanks.
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.
UJ - Not detected. Reporting limit may not be accurate or precise.

Table A-1
Summary of 2013 Baseline Data - Surface Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	Field Sample ID Location Sample Date Matrix Sample Purpose Sample Type Filtered	EI13-PLSA-SW38S-SW-Z SW38 9/3/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW39S-SW SW39 9/3/2013 Liquid Regular Sample Surface Water			EI13-PLSA-SW39S-SW-Z SW39 9/3/2013 Liquid Regular Sample Surface Water			EI13-REF-SW01D-SW SW1 09/05/2013 Liquid Regular Sample Surface Water			EI13-REF-SW01D-SW-Z SW1 09/05/2013 Liquid Regular Sample Surface Water			EI13-REF-SW01S-SW SW1 09/05/2013 Liquid Regular Sample Surface Water			EI13-REF-SW01S-SW-Z SW1 09/05/2013 Liquid Regular Sample Surface Water		
				Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
TOTAL SUSPENDED SOLIDS	MG/L	160.2	N				4.9						2.4		J				2.5		J			
METHYL MERCURY	NG/L	1630	N				0.022		J				0.028		J				0.032		J			
METHYL MERCURY	NG/L	1630	Y		0.02	U					0.02	U					0.02	U				0.026		J
MERCURY, LOW LEVEL	NG/L	1631	N				1.32						1.33		B				2.53		B			
MERCURY, LOW LEVEL	NG/L	1631	Y	0.84						0.62						0.48		B				0.67		B

Notes:
MDL - Method Detection Limit.
B - Not detected substantially above the level reported in the laboratory or field blanks.
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.
UJ - Not detected. Reporting limit may not be accurate or precise.

Table A-1
Summary of 2013 Baseline Data - Surface Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	Field Sample ID Location Sample Date Matrix Sample Purpose Sample Type Filtered	EI13-REF-SW02S-SW SW2 09/05/2013 Liquid Regular Sample Surface Water			EI13-REF-SW02S-SW-Z SW2 09/05/2013 Liquid Regular Sample Surface Water			EI13-REF-SW04S-SW SW4 09/05/2013 Liquid Regular Sample Surface Water			EI13-REF-SW04S-SW-Z SW4 09/05/2013 Liquid Regular Sample Surface Water			EI13-REF-SW07S-SW SW7 09/05/2013 Liquid Regular Sample Surface Water			EI13-REF-SW07S-SW-Z SW7 09/05/2013 Liquid Regular Sample Surface Water			EI13-REF-SW32S-SW SW32 09/05/2013 Liquid Regular Sample Surface Water			EI13-REF-SW32S-SW-Z SW32 09/05/2013 Liquid Regular Sample Surface Water		
				Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
TOTAL SUSPENDED SOLIDS	MG/L	160.2	N	5.1		J				2.7		J				3.2		J				2.6					
METHYL MERCURY	NG/L	1630	N	0.034		J				0.038		J					0.02	U				0.03		J			
METHYL MERCURY	NG/L	1630	Y				0.03		J					0.02	U					0.02	U				0.021		J
MERCURY, LOW LEVEL	NG/L	1631	N	2.4		B				1.88		B				3.23		B				2.46					
MERCURY, LOW LEVEL	NG/L	1631	Y				0.53		B				0.68		B				0.55		B				0.57		

Notes:
MDL - Method Detection Limit.
B - Not detected substantially above the level reported in the laboratory or field blanks.
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.
UJ - Not detected. Reporting limit may not be accurate or precise.

Table A-2
Summary of 2013 Baseline Data - Sediment Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-C1-01-SD-091013 PLSA-C1-01 09/10/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-04-SD-091013 PLSA-C1-04 09/10/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-10-SD-091113 PLSA-C1-10 09/11/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-10-SD-091113-D PLSA-C1-10 09/11/2013 Solid Field Duplicate Sediment			EI13-PLSA-C1-11-SD-091113 PLSA-C1-11 09/11/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-12-SD-091213 PLSA-C1-12 09/12/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-14-SD-090413 PLSA-C1-14 09/04/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-16-SD-091313 PLSA-C1-16 09/13/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-19-SD-090413 PLSA-C1-19 09/04/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-20-SD-090613 PLSA-C1-20 09/06/2013 Solid Regular Sample Sediment		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
MERCURY																															
MERCURY, LOW LEVEL	UG/KG	1631	2770			631			2120						1870			5730			5270			1230			6140			635		
METHYL MERCURY	UG/KG	1630	0.706			0.996			4.7		J				0.344		J	2.9			1.13		J	0.38			0.982		J	0.337		J
OTHER SEDIMENT PARAMETERS																															
TOTAL ORGANIC CARBON	MG/KG	9060A MOD.	35000			58600			105000			98900			19500			47800			28500			21500			28600			6320		
PERCENT MOISTURE	%	2540 G-1997	71.8			83.6			86			90.1			68.5			73.9		J	74.1			68.1			69.9			71.1		J
TOTAL SOLIDS	%	2540 G-1997	33.12			23.66			15.81						39.98			27.35			28.39			37.82			28.03			32.9		
GRAIN SIZE DISTRIBUTION																															
0.001 MM	% PASSING	D422	3				0.5	U	8.5			8				0.5	U		0.5	U		0.5	U		0.5	U		0.5	U		0.5	U
0.002 MM	% PASSING	D422	11			2			11			11			5			4			3			4.5			1.5				0.5	U
0.005 MM	% PASSING	D422	23			7			16.5			16			14			10			10			12.5			6.5			4		
0.02 MM	% PASSING	D422	55			37			42			43			39			32			34			42			38			22		
0.05 MM	% PASSING	D422	76			70			69			70			56			47			68.5			68.5			57			68		
0.064 MM	% PASSING	D422	83			79			78			76			64			53			78.5			77.5			61.5			77		
0.075 MM	% PASSING	D422	84.9			84.2			81.1			78.4			67.1			54.7			83.3			81.8			65.1			83.1		
0.15 MM	% PASSING	D422	90.7			94.3			88.6			84.9			77.6			57.1			95.2			93.7			85.5			94.2		
0.3 MM	% PASSING	D422	98			96.8			93.6			89.9			97.4			59.5			96.9			98.2			97.2			97.2		
0.6 MM	% PASSING	D422	98.9			97.5			95.6			94.7			99.1			64.3			97.4			98.8			98.3			98.6		
1.18 MM	% PASSING	D422	99.2			98.1			98.9			96.9			99.3			69.4			97.5			99.4			98.5			99.1		
19 MM	% PASSING	D422	100			100			100			100			100			100			100			100			100			100		
2.36 MM	% PASSING	D422	99.7			98.6			100			98			99.8			73.8			98.6			99.9			99.6			99.7		
3.35 MM	% PASSING	D422	99.8			99.5			100			98.7			99.9			79.5			99.2			100			99.8			99.9		
37.5 MM	% PASSING	D422	100			100			100			100			100			100			100			100			100			100		
4.75 MM	% PASSING	D422	99.9			100			100			99.7			100			85.8			99.8			100			100			100		
75 MM	% PASSING	D422	100			100			100			100			100			100			100			100			100			100		

Notes:
MDL - Method Detection Limit
B - Not detected substantially above the level reported in the laboratory or field blanks.
J - Analyte present. Reported value may not be accurate or precise.
R - Unusable result. Analyte may or may not be present in the sample.
U - Not detected.
UJ - Not detected. Reporting limit may not be accurate or precise.

Table A-2
Summary of 2013 Baseline Data - Sediment Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-C1-22-SD-090513 PLSA-C1-22 09/05/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-24-SD-090913 PLSA-C1-24 09/09/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-25-SD-090513 PLSA-C1-25 09/05/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-28-SD-091713 PLSA-C1-28 09/17/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-30-SD-091713 PLSA-C1-30 09/17/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-33-SD-091613 PLSA-C1-33 09/16/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-39-SD-092413 PLSA-C1-39 09/24/2013 Solid Regular Sample Sediment			EI13-PLSA-C1-40-SD-092513 PLSA-C1-40 09/25/2013 Solid Regular Sample Sediment			EI13-PLSA-C2-03-SD-092313 PLSA-C2-03 09/23/2013 Solid Regular Sample Sediment			EI13-PLSA-C2-06-SD-092413 PLSA-C2-06 09/24/2013 Solid Regular Sample Sediment		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
MERCURY																															
MERCURY, LOW LEVEL	UG/KG	1631	12400			3370			2970			40.1			1100			1070			2640			23500			2550			19.1		
METHYL MERCURY	UG/KG	1630	1.11		J	0.849		J	0.458		J	0.053		J	1.43		J	0.867			0.845		J	1.43		J	0.485		J	0.082		J
OTHER SEDIMENT PARAMETERS																															
TOTAL ORGANIC CARBON	MG/KG	9060A MOD.	34300			9490			33300			3100			95700			56400			44700			35700			26200			7600		
PERCENT MOISTURE	%	2540 G-1997	75			69		J	70			32.1			84.9			80.8			68			78.6			76.5			28.1		
TOTAL SOLIDS	%	2540 G-1997	25.78			30.28			31.37			72.32			17.67			21.23			32.46		J	25.42		J	28.55			73		J
GRAIN SIZE DISTRIBUTION																															
0.001 MM	% PASSING	D422	1			1			1				0.5	U	1.5				0.5	U	7			2.5			6			2.5		
0.002 MM	% PASSING	D422	3			3.5			3				0.5	U	2			4.5			13			11			18			2.5		
0.005 MM	% PASSING	D422	9			8.5			8				0.5	U	7			16			25			22			35			3		
0.02 MM	% PASSING	D422	40			29			28.5			1			29.5			43			70.5			55			72.5			10		
0.05 MM	% PASSING	D422	78			69			34			2.5			58.5			68			87.5			82			85.5			16		
0.064 MM	% PASSING	D422	88			81			21			7			79			80			87.5			86			91.5			22		
0.075 MM	% PASSING	D422	92.6			87.1			15.8			8.5			86.7			84.6			88.2			88.7			93.6			25.4		
0.15 MM	% PASSING	D422	96.9			94.8			17.4			24.7			91.9			90.9			94			91.3			96.3			36.4		
0.3 MM	% PASSING	D422	97.7			97.3			21.3			94			94.1			94.3			96.6			98.3			97.7			54.5		
0.6 MM	% PASSING	D422	98.3			98.1			28.8			99.4			95.2			95.9			98.2			98.7			97.9			67.8		
1.18 MM	% PASSING	D422	98.4			98.4			45.6			99.6			97			97.2			99.2			98.9			98.3			77		
19 MM	% PASSING	D422	100			100			100			100			100			100			100			100			100			100		
2.36 MM	% PASSING	D422	99			99.2			99.4			99.7			98.4			98.6			99.6			99.4			98.6			84.7		
3.35 MM	% PASSING	D422	99.7			99.7			99.7			99.8			99.3			99.5			99.9			99.7			99.5			87.7		
37.5 MM	% PASSING	D422	100			100			100			100			100			100			100			100			100			100		
4.75 MM	% PASSING	D422	100			99.9			100			99.8			100			100			100			99.9			100			90.3		
75 MM	% PASSING	D422	100			100			100			100			100			100			100			100			100			100		

Notes:
MDL - Method Detection Limit
B - Not detected substantially above the level reported in the laboratory or field blanks.
J - Analyte present. Reported value may not be accurate or precise.
R - Unusable result. Analyte may or may not be present in the sample.
U - Not detected.
UJ - Not detected. Reporting limit may not be accurate or precise.

Table A-2
Summary of 2013 Baseline Data - Sediment Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-C2-09-SD-092413 PLSA-C2-09 09/24/2013 Solid Regular Sample Sediment			EI13-PLSA-C2-32-SD-092513 PLSA-C2-32 09/25/2013 Solid Regular Sample Sediment			EI13-PLSA-C2-35-SD-091713 PLSA-C2-35 09/17/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-02-SD-092313 PLSA-C3-02 09/23/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-05-SD-092313 PLSA-C3-05 09/23/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-07-SD-091013 PLSA-C3-07 09/10/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-08-SD-091113 PLSA-C3-08 09/11/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-13-SD-091213 PLSA-C3-13 09/12/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-15-SD-092313 PLSA-C3-15 09/23/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-17-SD-092313 PLSA-C3-17 09/23/2013 Solid Regular Sample Sediment		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
MERCURY																																	
MERCURY, LOW LEVEL	UG/KG	1631	2570			25.9			621			4290			13100			2750			4610			276			2570			1220		
METHYL MERCURY	UG/KG	1630	2.02		J	0.148		J	0.458		J	1.08		J	2.7		J	1.86			1.46		J	0.242			0.519		J	0.653		J
OTHER SEDIMENT PARAMETERS																																	
TOTAL ORGANIC CARBON	MG/KG	9060A MOD.	16500			2390			41900			30300			22800			54500			41700			17200			33000			89300		
PERCENT MOISTURE	%	2540 G-1997	47.3			32.7			80.4			65.4			72.8			87.8			76.6			54		J	75.3			85		
TOTAL SOLIDS	%	2540 G-1997	35.97		J	62.36		J	29.57			37.23			37.42			18.04			26.08			57.92			29.73			16.37		
GRAIN SIZE DISTRIBUTION																																	
0.001 MM	% PASSING	D422	1.5				0.5	U				4			6.5			5			1				0.5	U	4			4		
0.002 MM	% PASSING	D422	6.5			0.5						13			14			10			6.5				0.5	U	9.5			12.5		
0.005 MM	% PASSING	D422	11			1.5						23			26			23			16.5				0.5	U	20.5			24		
0.02 MM	% PASSING	D422	24			2.5						36			54			57			48			2			57.5			63		
0.05 MM	% PASSING	D422	49			4						49			71.5			76			68.5			7			68.5			81		
0.064 MM	% PASSING	D422	64			5.5						58			78.5			84			77.5			13			69.5			77		
0.075 MM	% PASSING	D422	71.1			7.9						61			82			87.6			80.9			16.1			70.6			76.7		
0.15 MM	% PASSING	D422	77.3			23.8						75.5			93.5			93.7			92.3			31.5			78.9			82.1		
0.3 MM	% PASSING	D422	77.9			82.3						89.8			97.2			97			98.7			82.6			90.5			88.7		
0.6 MM	% PASSING	D422	78			89.7						96.1			98.2			98			99.4			96.4			95.2			94.8		
1.18 MM	% PASSING	D422	78.1			90.4						97			98.2			98.8			99.7			98.7			98.1			98.4		
19 MM	% PASSING	D422	90.7			98.1						100			100			100			100			100			100			100		
2.36 MM	% PASSING	D422	78.2			90.7						97.3			98.6			99.1			99.8			99.7			98.3			99.8		
3.35 MM	% PASSING	D422	83.1			92.1						98.6			99.3			100			100			99.9			99.5			99.9		
37.5 MM	% PASSING	D422	100			100						100			100			100			100			100			100			100		
4.75 MM	% PASSING	D422	86.5			94.1						99.1			99.8			100			100			100			99.9			100		
75 MM	% PASSING	D422	100			100						100			100			100			100			100			100			100		

Notes:
MDL - Method Detection Limit
B - Not detected substantially above the level reported in the laboratory or field blanks.
J - Analyte present. Reported value may not be accurate or precise.
R - Unusable result. Analyte may or may not be present in the sample.
U - Not detected.
UJ - Not detected. Reporting limit may not be accurate or precise.

Table A-2
Summary of 2013 Baseline Data - Sediment Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-C3-18-SD-092413 PLSA-C3-18 09/24/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-21-SD-092513 PLSA-C3-21 09/25/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-23-SD-092413 PLSA-C3-23 09/24/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-26-SD-091313 PLSA-C3-26 09/13/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-27-SD-091313 PLSA-C3-27 09/13/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-29-SD-091613 PLSA-C3-29 09/16/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-31-SD-092013 PLSA-C3-31 09/20/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-34-SD-092013 PLSA-C3-34 09/20/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-36-SD-092313 PLSA-C3-36 09/23/2013 Solid Regular Sample Sediment			EI13-PLSA-C3-37-SD-092013 PLSA-C3-37 09/20/2013 Solid Regular Sample Sediment		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
MERCURY																																	
MERCURY, LOW LEVEL	UG/KG	1631	4770			3690			1410			4390			1320			39.1			921			1080			3300			60.9		
METHYL MERCURY	UG/KG	1630	0.753		J	0.454		J	0.497		J	0.806			0.432			0.129			0.389		J	0.475		J	0.246		J	0.311		J
OTHER SEDIMENT PARAMETERS																																	
TOTAL ORGANIC CARBON	MG/KG	9060A MOD.	34200			42300			35500			59000			32600			7220			53400			148000			31900			6450		
PERCENT MOISTURE	%	2540 G-1997	75			76.2			74			75.1			75.6			33.3			84.3			81.1			71.5			41.4		
TOTAL SOLIDS	%	2540 G-1997	29.8		J	23.55		J	35.32		J	29.95			25.55			72.57			21.06			26.04			32.64			57.6		
GRAIN SIZE DISTRIBUTION																																	
0.001 MM	% PASSING	D422	3			1			3			1			1				0.5	U	7.5			7			6.5				0.5	U
0.002 MM	% PASSING	D422	7.5			6			8			3			3				0.5	U	15.5			15			14				0.5	U
0.005 MM	% PASSING	D422	15			12			14			9			8.5				0.5	U	24			26.5			30			1.5		
0.02 MM	% PASSING	D422	47			32			50			28.5			33				0.5	U	47			61			57			3		
0.05 MM	% PASSING	D422	74			62.5			80			62			66.5			1			70			75			79			11		
0.064 MM	% PASSING	D422	83			80			86			74			80			3			77			81			87			19		
0.075 MM	% PASSING	D422	87.2			88.3			88.6			78.3			87.3			4.8			79.4			83.2			90.9			24.8		
0.15 MM	% PASSING	D422	95			94.5			95.2			91.7			95.5			31.4			88			91.3			96.8			70.2		
0.3 MM	% PASSING	D422	96.8			97.4			96.7			96.6			97.6			94.2			92.8			94.8			98.5			98.8		
0.6 MM	% PASSING	D422	97.4			97.8			97.2			98.2			98.3			99.2			95.7			96.2			99			99.6		
1.18 MM	% PASSING	D422	97.8			98.5			97.7			98.9			98.7			100			97.3			96.9			99.1			99.6		
19 MM	% PASSING	D422	100			100			100			100			100			100			100			100			100			100		
2.36 MM	% PASSING	D422	98.6			98.9			98.3			99.5			99.4			100			98.5			97.5			99.2			99.8		
3.35 MM	% PASSING	D422	99.7			99.6			99.4			99.8			99.8			100			99.2			99.2			99.8			99.9		
37.5 MM	% PASSING	D422	100			100			100			100			100			100			100			100			100			100		
4.75 MM	% PASSING	D422	100			99.9			99.9			100			100			100			99.7			100			100			100		
75 MM	% PASSING	D422	100			100			100			100			100			100			100			100			100			100		

Notes:
MDL - Method Detection Limit
B - Not detected substantially above the level reported in the laboratory or field blanks.
J - Analyte present. Reported value may not be accurate or precise.
R - Unusable result. Analyte may or may not be present in the sample.
U - Not detected.
UJ - Not detected. Reporting limit may not be accurate or precise.

Table A-2
Summary of 2013 Baseline Data - Sediment Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-C3-38-SD-092413 PLSA-C3-38 09/24/2013 Solid Regular Sample Sediment			EI13-REF-C1-01-SD-092013 REF-C1-01 09/20/2013 Solid Regular Sample Sediment			EI13-REF-C1-02-SD-091913 REF-C1-02 09/19/2013 Solid Regular Sample Sediment			EI13-REF-C1-02-SD-091913-D REF-C1-02 09/19/2013 Solid Field Duplicate Sediment			EI13-REF-C1-03-SD-091813 REF-C1-03 09/18/2013 Solid Regular Sample Sediment			EI13-REF-C1-04-SD-091813 REF-C1-04 09/18/2013 Solid Regular Sample Sediment			EI13-REF-C1-05-SD-091913 REF-C1-05 09/19/2013 Solid Regular Sample Sediment			EI13-REF-C3-06-SD-091813 REF-C3-06 09/18/2013 Solid Regular Sample Sediment			EI13-REF-C3-07-SD-091913 REF-C3-07 09/19/2013 Solid Regular Sample Sediment			EI13-REF-C3-08-SD-091913 REF-C3-08 09/19/2013 Solid Regular Sample Sediment		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
MERCURY																																				
MERCURY, LOW LEVEL	UG/KG	1631	9470			138			18.8						29.5			194			250			115			19			165		
METHYL MERCURY	UG/KG	1630	0.987		J	0.631			0.146		J				0.21		J	0.602		J	0.353		J	0.352		J	0.124		J	1.17		J
OTHER SEDIMENT PARAMETERS																																				
TOTAL ORGANIC CARBON	MG/KG	9060A MOD.				16800			10600		J	20900		J	3950			19700			53200		J	18200			5090		J	44400		J
PERCENT MOISTURE	%	2540 G-1997	57.9			57.9			45.7			54.2			30.6			67.5			74.5			63.2			37.3			70.3		
TOTAL SOLIDS	%	2540 G-1997	40.13		J	35.42			68.3						64.43			34.49			25.66			39.44			67.49			31.22		
GRAIN SIZE DISTRIBUTION																																				
0.001 MM	% PASSING	D422	2				0.5	U	2		J		0.5	U		0.5	U		0.5	U	6.5				0.5	U	0.5				0.5	U
0.002 MM	% PASSING	D422	8			1.5			2			1				0.5	U	2.5			21			1			0.5			4		
0.005 MM	% PASSING	D422	16			5			2			3				0.5	U	8			39			2.5			0.5			10		
0.02 MM	% PASSING	D422	28			12			7.5			9			1			18			76.5			11			3			16.5		
0.05 MM	% PASSING	D422	42			27			12			14			2			46			91			28			7			45		
0.064 MM	% PASSING	D422	51.5			41.5			15			18			4			60			94			40			10			53		
0.075 MM	% PASSING	D422	56.2			49.6			17			20			5.4			65.4			95			48.1			11.4			58		
0.15 MM	% PASSING	D422	74.5			76.6			31.5			36.6			6.9			72.2			97.5			74.9			21.2			81.5		
0.3 MM	% PASSING	D422	92.2			98			88.1			90.3			24.4			77.6			98.2			83.8			55.5			97.5		
0.6 MM	% PASSING	D422	97.9			99.2			99.2			98.8			85.2			80.5			98.4			85.8			85.6			98.9		
1.18 MM	% PASSING	D422	99			99.6			99.6			99.4			97.4			83			98.5			87.1			87.9			99.5		
19 MM	% PASSING	D422	100			100			100			100			100			100			100			89.4			100			100		
2.36 MM	% PASSING	D422	99.4			100			99.8			99.7			98.5			86			98.8			88.6			89			99.9		
3.35 MM	% PASSING	D422	99.7			100			99.9			99.9			98.8			90.7			99.4			89			90.7			100		
37.5 MM	% PASSING	D422	100			100			100			100			100			100			100			100			100			100		
4.75 MM	% PASSING	D422	99.9			100			100			100			99.3			94.3			99.8			89.4			93.1			100		
75 MM	% PASSING	D422	100			100			100			100			100			100			100			100			100			100		

Notes:
MDL - Method Detection Limit
B - Not detected substantially above the level reported in the laboratory or field blanks.
J - Analyte present. Reported value may not be accurate or precise.
R - Unusable result. Analyte may or may not be present in the sample.
U - Not detected.
UJ - Not detected. Reporting limit may not be accurate or precise.

Table A-3
Summary of 2013 Baseline Data - Field Pore Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-C1-01-PW-091013 PLSA-C1-01 09/10/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-04-PW-091013 PLSA-C1-04 09/10/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-10-PW-091113 PLSA-C1-10 09/11/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-11-PW-091113 PLSA-C1-11 09/11/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-12-PW-091213 PLSA-C1-12 09/12/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-14-PW-090413 PLSA-C1-14 09/04/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-16-PW-091313 PLSA-C1-16 09/13/2013 Liquid Regular Sample Pore Water		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/L	1630	0.063			0.083			0.229			0.057			0.2			0.113			0.023		J
MERCURY, LOW LEVEL	NG/L	1631	0.41		J	0.42			1.45			0.94			3.68			0.45			0.86		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.

Table A-3
Summary of 2013 Baseline Data - Field Pore Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-C1-19-PW-090413 PLSA-C1-19 09/04/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-20-PW-090613 PLSA-C1-20 09/06/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-22-PW-090513 PLSA-C1-22 09/05/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-24-PW-090913 PLSA-C1-24 09/09/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-25-PW-090513 PLSA-C1-25 09/05/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-28-PW-091713 PLSA-C1-28 09/17/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-30-PW-091713 PLSA-C1-30 09/17/2013 Liquid Regular Sample Pore Water		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/L	1630	0.133			0.091			0.085			0.054			0.049		J	0.064		J	0.115		
MERCURY, LOW LEVEL	NG/L	1631	0.64			0.7			1.9			0.53			0.53			0.6			0.48		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.

Table A-3
Summary of 2013 Baseline Data - Field Pore Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-C1-33-PW-091613 PLSA-C1-33 09/16/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-39-PW-092413 PLSA-C1-39 09/24/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C1-40-PW-092513 PLSA-C1-40 09/25/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C2-03-PW-092313 PLSA-C2-03 09/23/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C2-06-PW-092413 PLSA-C2-06 09/24/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C2-09-PW-092413 PLSA-C2-09 09/24/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C2-32-PW-092513 PLSA-C2-32 09/25/2013 Liquid Regular Sample Pore Water		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/L	1630	0.035		J	0.213			0.075			0.04		J	0.427			1.31			0.058		
MERCURY, LOW LEVEL	NG/L	1631	0.42		J	8.26			1.76			6.89			2.16			10.1				0.16	U

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.

Table A-3
Summary of 2013 Baseline Data - Field Pore Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-C2-35-PW-091713 PLSA-C2-35 09/17/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-02-PW-092313 PLSA-C3-02 09/23/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-05-PW-092313 PLSA-C3-05 09/23/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-07-PW-091013 PLSA-C3-07 09/10/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-08-PW-091113 PLSA-C3-08 09/11/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-13-PW-091213 PLSA-C3-13 09/12/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-15-PW-092313 PLSA-C3-15 09/23/2013 Liquid Regular Sample Pore Water		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/L	1630	0.056			0.042		J	0.234			0.091			0.037		J	0.074			0.052		
MERCURY, LOW LEVEL	NG/L	1631	0.28		J	4.38			4.11			0.67			0.44			0.75			0.54		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.

Table A-3
Summary of 2013 Baseline Data - Field Pore Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-C3-17-PW-092313 PLSA-C3-17 09/23/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-18-PW-092413 PLSA-C3-18 09/24/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-21-PW-092513 PLSA-C3-21 09/25/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-23-PW-092413 PLSA-C3-23 09/24/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-26-PW-091313 PLSA-C3-26 09/13/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-27-PW-091313 PLSA-C3-27 09/13/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-29-PW-091613 PLSA-C3-29 09/16/2013 Liquid Regular Sample Pore Water		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/L	1630		0.02	U	0.278			0.082			0.367			0.075			0.077			0.133		
MERCURY, LOW LEVEL	NG/L	1631	0.28		J	10.4			2.46			12.2			0.52			2.02			0.56		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.

Table A-3
Summary of 2013 Baseline Data - Field Pore Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-C3-31-PW-092013 PLSA-C3-31 09/20/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-34-PW-092013 PLSA-C3-34 09/20/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-36-PW-092313 PLSA-C3-36 09/23/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-37-PW-092013 PLSA-C3-37 09/20/2013 Liquid Regular Sample Pore Water			EI13-PLSA-C3-38-PW-092413 PLSA-C3-38 09/24/2013 Liquid Regular Sample Pore Water			EI13-REF-C1-01-PW-092013 REF-C1-01 09/20/2013 Liquid Regular Sample Pore Water			EI13-REF-C1-02-PW-091913 REF-C1-02 09/19/2013 Liquid Regular Sample Pore Water		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/L	1630	0.062			0.053			0.023		J	0.099			0.094			0.078			0.083		
MERCURY, LOW LEVEL	NG/L	1631		0.16	U	0.2		J	12.7			0.52			6.95			0.2		J	0.53		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.

Table A-3
Summary of 2013 Baseline Data - Field Pore Water Samples
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-REF-C1-03-PW-091813 REF-C1-03 09/18/2013 Liquid Regular Sample Pore Water			EI13-REF-C1-04-PW-091813 REF-C1-04 09/18/2013 Liquid Regular Sample Pore Water			EI13-REF-C1-05-PW-091913 REF-C1-05 09/19/2013 Liquid Regular Sample Pore Water			EI13-REF-C3-06-PW-091813 REF-C3-06 09/18/2013 Liquid Regular Sample Pore Water			EI13-REF-C3-07-PW-091913 REF-C3-07 09/19/2013 Liquid Regular Sample Pore Water			EI13-REF-C3-08-PW-091913 REF-C3-08 09/19/2013 Liquid Regular Sample Pore Water		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/L	1630	0.164			0.034		J	0.029		J	0.126			0.142			0.048		J
MERCURY, LOW LEVEL	NG/L	1631	0.36		J	0.27		J	0.34		J	0.4		J	0.61			0.38		J

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.

Table A-4
Summary of 2013 Baseline Data - Whole Body Larval Chironomid Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-L-CHI-C1-01-091013 PLSA-L-CHI-C1-01 09/10/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C1-04-091013 PLSA-L-CHI-C1-04 09/10/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C1-11-091113 PLSA-L-CHI-C1-11 09/11/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C1-12-091213 PLSA-L-CHI-C1-12 09/12/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C1-14-090413 PLSA-L-CHI-C1-14 09/04/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C1-16-091313 PLSA-L-CHI-C1-16 09/13/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	4.75				3.17	U	3.23		J	6.12		J	5.76			1.84		J
MERCURY, LOW LEVEL	NG/G	1631	32.5		J	3.27			28		J	300		J	41.6		J	20.7		J

Notes:
MDL is Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.

Table A-4
Summary of 2013 Baseline Data - Whole Body Larval Chironomid Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-L-CHI-C1-19-090413 PLSA-L-CHI-C1-19 09/04/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C1-20-090613 PLSA-L-CHI-C1-20 09/06/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C1-22-090513 PLSA-L-CHI-C1-22 09/05/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C1-24-090913 PLSA-L-CHI-C1-24 09/09/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C1-30-091713 PLSA-L-CHI-C1-30 09/17/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C1-33-091613 PLSA-L-CHI-C1-33 09/16/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	5.32		J		1.96	U	5.29		J	2.57		J		3.89	U		2.34	U
MERCURY, LOW LEVEL	NG/G	1631	27.8		J	15.6			29.9		J	38.9		J	5.11			11.4		

Notes:
MDL is Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.

Table A-4
Summary of 2013 Baseline Data - Whole Body Larval Chironomid Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-L-CHI-C1-39-092413 PLSA-L-CHI-C1-39 09/24/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C1-40-092513 PLSA-L-CHI-C1-40 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C2-03-092313 PLSA-L-CHI-C2-03 09/23/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C2-06-092413 PLSA-L-CHI-C2-06 09/24/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C2-09-092413 PLSA-L-CHI-C2-09 09/24/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-L-CHI-C2-32-092513 PLSA-L-CHI-C2-32 09/25/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	3.5		J	11.3			3.55		J	4.61			5.49		J	3.72		
MERCURY, LOW LEVEL	NG/G	1631	82.3		J	104		J	40.8		J	23.8		J	48.4		J	35.1		J

Notes:
MDL is Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.

Table A-4
Summary of 2013 Baseline Data - Whole Body Larval Chironomid Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-REF-L-CHI-C1-01-092013 REF-L-CHI-C1-01 09/20/2013 Biota Regular Sample Animal Tissue			EI13-REF-L-CHI-C1-02-091913 REF-L-CHI-C1-02 09/19/2013 Biota Regular Sample Animal Tissue			EI13-REF-L-CHI-C1-03-091813 REF-L-CHI-C1-03 09/18/2013 Biota Regular Sample Animal Tissue			EI13-REF-L-CHI-C1-05-091913 REF-L-CHI-C1-05 09/19/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630		1.69	U	4.5		J	2.18		J		5.49	U
MERCURY, LOW LEVEL	NG/G	1631	1.43			5.53			3.37			32.6		

Notes:
MDL is Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
U - Not detected.

Table A-5
Summary of 2013 Baseline Data - Whole Body Adult Chironomid Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-A-CHI-TS[1] A-CHI-TS 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C1-01-092513 PLSA-A-CHI-C1-01 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C1-04-092513 PLSA-A-CHI-C1-04 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C1-10-092513 PLSA-A-CHI-C1-10 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C1-11-092513 PLSA-A-CHI-C1-11 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C1-12-092513 PLSA-A-CHI-C1-12 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C1-14-092513 PLSA-A-CHI-C1-14 09/25/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	-			13.3			12.7			16.8			8.7			16.9			25.7		
MERCURY, LOW LEVEL	NG/G	1631	-			22.6		J	17.7		J	40		J	21.8		J	52.6		J	37.5		J
TOTAL SOLIDS	%	2540 G-1997	33.97			-			-			-			-			-			-		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
TS - Total Solids
- - not analyzed
[1]TS sample was analyzed from a composite sample of individuals collected from sampling locations in the study area

Table A-5
Summary of 2013 Baseline Data - Whole Body Adult Chironomid Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-A-CHI-C1-16-092513 PLSA-A-CHI-C1-16 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C1-19-092513 PLSA-A-CHI-C1-19 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C1-20-092513 PLSA-A-CHI-C1-20 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C1-22-092513 PLSA-A-CHI-C1-22 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C1-24-092513 PLSA-A-CHI-C1-24 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C1-25-092513 PLSA-A-CHI-C1-25 09/25/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	5.56			12.3			11.4			29.7			14.2			13.8		
MERCURY, LOW LEVEL	NG/G	1631	7.7		J	22.9		J	17.7		J	50.2		J	18.1		J	20.6		J
TOTAL SOLIDS	%	2540 G-1997	-			-			-			-			-			-		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
TS - Total Solids
- - not analyzed
[1]TS sample was analyzed from a composite sample of individuals collected from sampling locations in the study area

Table A-5
Summary of 2013 Baseline Data - Whole Body Adult Chironomid Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-A-CHI-C1-28-092513 PLSA-A-CHI-C1-28 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C1-30-092513 PLSA-A-CHI-C1-30 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C1-33-092513 PLSA-A-CHI-C1-33 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C2-03-092513 PLSA-A-CHI-C2-03 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C2-06-092513 PLSA-A-CHI-C2-06 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C2-09-092513 PLSA-A-CHI-C2-09 09/25/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	17.9			5.61			8.2			15.2			15.5			12.5		
MERCURY, LOW LEVEL	NG/G	1631	26.2		J	11.3		J	16.6		J	25		J	28		J	22.9		J
TOTAL SOLIDS	%	2540 G-1997	-			-			-			-			-			-		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
TS - Total Solids
- - not analyzed
[1]TS sample was analyzed from a composite sample of individuals collected from sampling locations in the study area

Table A-5
Summary of 2013 Baseline Data - Whole Body Adult Chironomid Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-A-CHI-C2-32-092513 PLSA-A-CHI-C2-32 09/25/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-A-CHI-C2-35-092513 PLSA-A-CHI-C2-35 09/25/2013 Biota Regular Sample Animal Tissue			EI13-REF-A-CHI-C1-01-092513 REF-A-CHI-C1-01 09/25/2013 Biota Regular Sample Animal Tissue			EI13-REF-A-CHI-C1-02-092513 REF-A-CHI-C1-02 09/25/2013 Biota Regular Sample Animal Tissue			EI13-REF-A-CHI-C1-03-092513 REF-A-CHI-C1-03 09/25/2013 Biota Regular Sample Animal Tissue			EI13-REF-A-CHI-C1-04-092513 REF-A-CHI-C1-04 09/25/2013 Biota Regular Sample Animal Tissue			EI13-REF-A-CHI-C1-05-092513 REF-A-CHI-C1-05 09/25/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	7.81			5.26			6.17			6.11			10.2			11			12.3		J
MERCURY, LOW LEVEL	NG/G	1631	12.3		J	8.47		J	11.4		J	10.1		J	14.2		J	17.8		J	19.9		J
TOTAL SOLIDS	%	2540 G-1997	-			-			-			-			-			-			-		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
TS - Total Solids
- - not analyzed
[1]TS sample was analyzed from a composite sample of individuals collected from sampling locations in the study area

Table A-6
Summary of 2013 Baseline Data - Whole Body Young-of-Year (YOY) Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-ABD-Y-LEMAC-01-082013 ABD-Y-LEMAC-01 08/20/2013 Biota Regular Sample Animal Tissue			EI13-ABD-Y-LEMAC-02-082013 ABD-Y-LEMAC-02 08/20/2013 Biota Regular Sample Animal Tissue			EI13-ABD-Y-LEMAC-03-082013 ABD-Y-LEMAC-03 08/20/2013 Biota Regular Sample Animal Tissue			EI13-ABD-Y-LEMAC-04-082013 ABD-Y-LEMAC-04 08/20/2013 Biota Regular Sample Animal Tissue			EI13-ABD-Y-LEMAC-05-082013 ABD-Y-LEMAC-05 08/20/2013 Biota Regular Sample Animal Tissue			EI13-ABD-Y-MISAL-01-082313 ABD-Y-MISAL-01 08/23/2013 Biota Regular Sample Animal Tissue			EI13-ABD-Y-MISAL-02-082913 ABD-Y-MISAL-02 08/29/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	78.9			70.8			95.4			81.8			102			142			154		
MERCURY, LOW LEVEL	NG/G	1631	132			167			157			117			222			169			173		
TOTAL SOLIDS	%	2540 G-1997	23.92			20.05			22.65			22.07			25.42			21.11			21.73		

Notes:
MDL - Method Detection Limit
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
PEFLA - Yellow Perch

Table A-6
Summary of 2013 Baseline Data - Whole Body Young-of-Year (YOY) Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-ABD-Y-MISAL-03-082313 ABD-Y-MISAL-03 08/23/2013 Biota Regular Sample Animal Tissue			EI13-ABD-Y-MISAL-04-082913 ABD-Y-MISAL-04 08/29/2013 Biota Regular Sample Animal Tissue			EI13-ABD-Y-MISAL-05-082713 ABD-Y-MISAL-05 08/27/2013 Biota Regular Sample Animal Tissue			EI13-ABD-Y-PEFLA-01-082313 ABD-Y-PEFLA-01 41509 Biota Regular Sample Animal Tissue			EI13-ABD-Y-PEFLA-02-082313 ABD-Y-PEFLA-02 41509 Biota Regular Sample Animal Tissue			EI13-PLSA-Y-LEMAC-01-081913 PLSA-Y-LEMAC-01 08/19/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-Y-LEMAC-02-081913 PLSA-Y-LEMAC-02 08/19/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	98.2			108			120			81			39.3			30.6			25.3		
MERCURY, LOW LEVEL	NG/G	1631	121			120			116			120			51.9			44.8			29.2		
TOTAL SOLIDS	%	2540 G-1997	21.28			20.86			21.48			24.13			23.14			21.48			21.58		

Notes:
MDL - Method Detection Limit
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
PEFLA - Yellow Perch

Table A-6
Summary of 2013 Baseline Data - Whole Body Young-of-Year (YOY) Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-Y-LEMAC-03-082213 PLSA-Y-LEMAC-03 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-Y-LEMAC-04-082113 PLSA-Y-LEMAC-04 08/21/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-Y-LEMAC-05-082213 PLSA-Y-LEMAC-05 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-Y-MISAL-01-082913 PLSA-Y-MISAL-01 08/29/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-Y-MISAL-02-082613 PLSA-Y-MISAL-02 08/26/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-Y-MISAL-03-082713 PLSA-Y-MISAL-03 08/27/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-Y-MISAL-04-082713 PLSA-Y-MISAL-04 08/27/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	30.7			41.8			28.7			86.1			59.2			59.6			67.7		
MERCURY, LOW LEVEL	NG/G	1631	33.2			45.8			28.2			81.8			68.3			76.7			66.8		
TOTAL SOLIDS	%	2540 G-1997	16.57			22.97			19.37			21.74			22.32			21.88			20.73		

Notes:
MDL - Method Detection Limit
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
PEFLA - Yellow Perch

Table A-6
Summary of 2013 Baseline Data - Whole Body Young-of-Year (YOY) Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-Y-MISAL-05-082913 PLSA-Y-MISAL-05 08/29/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-Y-PEFLA-01-082113 PLSA-Y-PEFLA-01 41507 Biota Regular Sample Animal Tissue			EI13-PLSA-Y-PEFLA-02-082113 PLSA-Y-PEFLA-02 41507 Biota Regular Sample Animal Tissue			EI13-PLSA-Y-PEFLA-03-100213 PLSA-Y-PEFLA-03 41549 Biota Regular Sample Animal Tissue			EI13-PLSA-Y-PEFLA-04-100213 PLSA-Y-PEFLA-04 41549 Biota Regular Sample Animal Tissue			EI13-REF-Y-LEMAC-01-082113 REF-Y-LEMAC-01 08/21/2013 Biota Regular Sample Animal Tissue			EI13-REF-Y-LEMAC-02-082313 REF-Y-LEMAC-02 08/23/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	67.9			50.9			55.9			37.8			29.3			31.9			40		
MERCURY, LOW LEVEL	NG/G	1631	58.9			62.3			56.7			42.7			35.8			32.7			35.9		
TOTAL SOLIDS	%	2540 G-1997	20.29			23.1			22.35			24.67			24.31			21.69			22.2		

Notes:
MDL - Method Detection Limit
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
PEFLA - Yellow Perch

Table A-6
Summary of 2013 Baseline Data - Whole Body Young-of-Year (YOY) Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-REF-Y-LEMAC-03-082313 REF-Y-LEMAC-03 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-Y-LEMAC-04-082313 REF-Y-LEMAC-04 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-Y-LEMAC-05-082313 REF-Y-LEMAC-05 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-Y-MISAL-01-082313 REF-Y-MISAL-01 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-Y-MISAL-02-082313 REF-Y-MISAL-02 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-Y-MISAL-03-082313 REF-Y-MISAL-03 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-Y-MISAL-04-082713 REF-Y-MISAL-04 08/27/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	29.6			39.1			30.9			52.1			54.1			46.5			49.6		
MERCURY, LOW LEVEL	NG/G	1631	36			43.3			34.2			56.6			63.6			56.6			55.2		
TOTAL SOLIDS	%	2540 G-1997	20.71			24.02			21.86			21.18			22.62			21.87			20.88		

Notes:
MDL - Method Detection Limit
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
PEFLA - Yellow Perch

Table A-6
Summary of 2013 Baseline Data - Whole Body Young-of-Year (YOY) Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-REF-Y-MISAL-05-082713 REF-Y-MISAL-05 08/27/2013 Biota Regular Sample Animal Tissue			EI13-REF-Y-PEFLA-01-082313 REF-Y-PEFLA-01 41509 Biota Regular Sample Animal Tissue			EI13-REF-Y-PEFLA-02-082713 REF-Y-PEFLA-02 41513 Biota Regular Sample Animal Tissue			EI13-REF-Y-PEFLA-03-082713 REF-Y-PEFLA-03 41513 Biota Regular Sample Animal Tissue			EI13-REF-Y-PEFLA-04-082713 REF-Y-PEFLA-04 41513 Biota Regular Sample Animal Tissue			EI13-REF-Y-PEFLA-05-082713 REF-Y-PEFLA-05 41513 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	33.1			29.5			31.3			23.5			34.8			28.4		
MERCURY, LOW LEVEL	NG/G	1631	40.4			36.1			39			27.1			38.6			33.3		
TOTAL SOLIDS	%	2540 G-1997	20.86			22.54			23.55			22.2			23.59			22.69		

Notes:
MDL - Method Detection Limit
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
PEFLA - Yellow Perch

Table A-7
Summary of 2013 Baseline Data - Whole Body Adult Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-AMNAT-01-082613 PLSA-AMNAT-01 08/26/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNAT-06-082113 PLSA-AMNAT-06 08/21/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNAT-07-082113 PLSA-AMNAT-07 08/21/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNAT-08-082213 PLSA-AMNAT-08 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNAT-09-082213 PLSA-AMNAT-09 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNAT-10-082213 PLSA-AMNAT-10 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNAT-11-082613 PLSA-AMNAT-11 08/26/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	66.5			472			177			326			354			146			109		
MERCURY, LOW LEVEL	NG/G	1631	58.6			497			199			375			333			166			123		
TOTAL SOLIDS	%	2540 G-1997	21.4			23.48			20.24			20.97			18.53			19.93			25.2		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
AMNAT - Yellow Bullhead Catfish
AMNEB - Brown Bullhead Catfish
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
NOCRY - Bolden Shiner
PEFLA - Yellow Perch

Table A-7
Summary of 2013 Baseline Data - Whole Body Adult Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-AMNAT-12-082613 PLSA-AMNAT-12 08/26/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNAT-13-082713 PLSA-AMNAT-13 08/27/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNEB-02-082613 PLSA-AMNEB-02 08/26/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNEB-03-082613 PLSA-AMNEB-03 08/26/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNEB-04-082613 PLSA-AMNEB-04 08/26/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNEB-05-082913 PLSA-AMNEB-05 08/29/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNEB-14-082913 PLSA-AMNEB-14 08/29/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	86.5			159			59.8			60.2			41.9			51.6			102		
MERCURY, LOW LEVEL	NG/G	1631	80.5			171			99.5			68.6			42.9			65.4			89.7		
TOTAL SOLIDS	%	2540 G-1997	21.28			22.83			24.04			24.41			23.31			22.41			26.49		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
AMNAT - Yellow Bullhead Catfish
AMNEB - Brown Bullhead Catfish
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
NOCRY - Bolden Shiner
PEFLA - Yellow Perch

Table A-7
Summary of 2013 Baseline Data - Whole Body Adult Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-AMNEB-15-082913 PLSA-AMNEB-15 08/29/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNEB-16-082913 PLSA-AMNEB-16 08/29/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNEB-17-082913 PLSA-AMNEB-17 08/29/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-AMNEB-18-082913 PLSA-AMNEB-18 08/29/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-01-082213 PLSA-MISAL-01 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-02-082213 PLSA-MISAL-02 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-03-082213 PLSA-MISAL-03 08/22/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	106			39.2			71.2			138		J	89			81.1			71.6					
MERCURY, LOW LEVEL	NG/G	1631	104			60.2			82.2			63.8		J	92.9			73.1			80.6					
TOTAL SOLIDS	%	2540 G-1997	24.9			23.63			33.7			35.85			22.33			22.96			21.62					

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
AMNAT - Yellow Bullhead Catfish
AMNEB - Brown Bullhead Catfish
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
NOCRY - Bolden Shiner
PEFLA - Yellow Perch

Table A-7
Summary of 2013 Baseline Data - Whole Body Adult Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-MISAL-04-082213 PLSA-MISAL-04 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-05-082613 PLSA-MISAL-05 08/26/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-06-081913 PLSA-MISAL-06 8/19/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-07-081913 PLSA-MISAL-07 8/19/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-08-082213 PLSA-MISAL-08 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-09-082213 PLSA-MISAL-09 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-10-082213 PLSA-MISAL-10 08/22/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	82.9			70.7			88.5			100			321			213			350		
MERCURY, LOW LEVEL	NG/G	1631	96.3			77.6			123			153			348			222			364		
TOTAL SOLIDS	%	2540 G-1997	22			24.17			26.92			25.76			24.35			22.37			23.29		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
AMNAT - Yellow Bullhead Catfish
AMNEB - Brown Bullhead Catfish
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
NOCRY - Bolden Shiner
PEFLA - Yellow Perch

Table A-7
Summary of 2013 Baseline Data - Whole Body Adult Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-MISAL-11-082213 PLSA-MISAL-11 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-12-082213 PLSA-MISAL-12 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-13-082213 PLSA-MISAL-13 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-14-082213 PLSA-MISAL-14 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-15-082613 PLSA-MISAL-15 08/26/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-16-082613 PLSA-MISAL-16 08/26/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-17-082613 PLSA-MISAL-17 08/26/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	198			188			158			122			60.6			61.8			118		
MERCURY, LOW LEVEL	NG/G	1631	243			189			174			148			70.8			75.5			126		
TOTAL SOLIDS	%	2540 G-1997	22.15			23.59			23.1			22.07			22.2			23.72			22.25		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
AMNAT - Yellow Bullhead Catfish
AMNEB - Brown Bullhead Catfish
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
NOCRY - Bolden Shiner
PEFLA - Yellow Perch

Table A-7
Summary of 2013 Baseline Data - Whole Body Adult Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-MISAL-18-082613 PLSA-MISAL-18 08/26/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-19-082713 PLSA-MISAL-19 08/27/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-MISAL-20-082713 PLSA-MISAL-20 08/27/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-NOCRY-01-082713 PLSA-NOCRY-01 08/27/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-NOCRY-02-082113 PLSA-NOCRY-02 08/21/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-NOCRY-03-082113 PLSA-NOCRY-03 08/21/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-NOCRY-04-082713 PLSA-NOCRY-04 08/27/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	70.1			90.7			58.4			42.1			116			93.1			98.4		
MERCURY, LOW LEVEL	NG/G	1631	69.8			86.6			72.4			35.7			131			98.8			95.6		
TOTAL SOLIDS	%	2540 G-1997	22.74			23.61			22.15			23.11			28.93			26.4			27.74		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
AMNAT - Yellow Bullhead Catfish
AMNEB - Brown Bullhead Catfish
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
NOCRY - Bolden Shiner
PEFLA - Yellow Perch

Table A-7
Summary of 2013 Baseline Data - Whole Body Adult Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-NOCRY-05-082213 PLSA-NOCRY-05 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-NOCRY-06-082213 PLSA-NOCRY-06 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-NOCRY-07-082113 PLSA-NOCRY-07 8/21/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-PEFLA-06-082313 PLSA-PEFLA-06 08/23/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-PEFLA-07-082213 PLSA-PEFLA-07 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-PEFLA-08-082213 PLSA-PEFLA-08 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-PEFLA-09-082213 PLSA-PEFLA-09 08/22/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	112			24.8			84.5			142			420			154			94		
MERCURY, LOW LEVEL	NG/G	1631	105			28			94.5			188			463			142			101		
TOTAL SOLIDS	%	2540 G-1997	28.49			23.49			26.73			28.75			25.53			26.59			27.28		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
AMNAT - Yellow Bullhead Catfish
AMNEB - Brown Bullhead Catfish
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
NOCRY - Bolden Shiner
PEFLA - Yellow Perch

Table A-7
Summary of 2013 Baseline Data - Whole Body Adult Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-PLSA-PEFLA-10-082213 PLSA-PEFLA-10 08/22/2013 Biota Regular Sample Animal Tissue			EI13-PLSA-PEFLA-11-082613 PLSA-PEFLA-11 08/26/2013 Biota Regular Sample Animal Tissue			EI13-REF-AMNAT-02-082713 REF-AMNAT-02 08/27/2013 Biota Regular Sample Animal Tissue			EI13-REF-AMNAT-03-082913 REF-AMNAT-03 08/29/2013 Biota Regular Sample Animal Tissue			EI13-REF-AMNAT-04-082913 REF-AMNAT-04 08/29/2013 Biota Regular Sample Animal Tissue			EI13-REF-AMNAT-05-082913 REF-AMNAT-05 08/29/2013 Biota Regular Sample Animal Tissue			EI13-REF-AMNAT-06-082113 REF-AMNAT-06 08/21/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	138			232			46.6			44.5			37.7			62.1			70.1		
MERCURY, LOW LEVEL	NG/G	1631	151			269			47.6			42.1			34.7			77.7			66		
TOTAL SOLIDS	%	2540 G-1997	27.84			28.09			20.14			22.26			24.69			21.95			25.27		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
AMNAT - Yellow Bullhead Catfish
AMNEB - Brown Bullhead Catfish
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
NOCRY - Bolden Shiner
PEFLA - Yellow Perch

Table A-7
Summary of 2013 Baseline Data - Whole Body Adult Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-REF-AMNEB-01-082913 REF-AMNEB-01 08/29/2013 Biota Regular Sample Animal Tissue			EI13-REF-AMNEB-07-082113 REF-AMNEB-07 08/21/2013 Biota Regular Sample Animal Tissue			EI13-REF-AMNEB-08-082313 REF-AMNEB-08 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-AMNEB-09-082313 REF-AMNEB-09 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-01-082313 REF-MISAL-01 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-02-082313 REF-MISAL-02 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-03-082313 REF-MISAL-03 08/23/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	26.8			47.5			17.7			38.3			58.7			54.5			68.9		
MERCURY, LOW LEVEL	NG/G	1631	26.5			41.8			20			37.5			67			59.7			82.1		
TOTAL SOLIDS	%	2540 G-1997	26.38			20.15			23.47			24.79			20.9			21.11			23.48		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
AMNAT - Yellow Bullhead Catfish
AMNEB - Brown Bullhead Catfish
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
NOCRY - Bolden Shiner
PEFLA - Yellow Perch

Table A-7
Summary of 2013 Baseline Data - Whole Body Adult Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-REF-MISAL-04-082313 REF-MISAL-04 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-05-082313 REF-MISAL-05 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-06-082113 REF-MISAL-06 08/21/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-07-082113 REF-MISAL-07 08/21/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-08-082113 REF-MISAL-08 08/21/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-09-082113 REF-MISAL-09 08/21/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-10-082113 REF-MISAL-10 08/21/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	31.6			64.7			119			233			140			137			63.4		
MERCURY, LOW LEVEL	NG/G	1631	54.8			78			135			245			143			150			74.4		
TOTAL SOLIDS	%	2540 G-1997	22.99			23.54			26.3			25.4			24.85			24.74			22.21		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
AMNAT - Yellow Bullhead Catfish
AMNEB - Brown Bullhead Catfish
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
NOCRY - Bolden Shiner
PEFLA - Yellow Perch

Table A-7
Summary of 2013 Baseline Data - Whole Body Adult Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-REF-MISAL-11-082313 REF-MISAL-11 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-12-082313 REF-MISAL-12 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-13-082313 REF-MISAL-13 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-14-082313 REF-MISAL-14 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-15-082313 REF-MISAL-15 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-16-082713 REF-MISAL-16 08/27/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-17-082713 REF-MISAL-17 08/27/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	93.9			57.7			97.4			77.8			115			74.8			101		
MERCURY, LOW LEVEL	NG/G	1631	112			77.2			109			90.4			138			74.2			120		
TOTAL SOLIDS	%	2540 G-1997	22.32			22.82			24.04			24.65			23.66			22.73			23.11		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
AMNAT - Yellow Bullhead Catfish
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LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
NOCRY - Bolden Shiner
PEFLA - Yellow Perch

Table A-7
Summary of 2013 Baseline Data - Whole Body Adult Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-REF-MISAL-18-082713 REF-MISAL-18 08/27/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-19-082713 REF-MISAL-19 08/27/2013 Biota Regular Sample Animal Tissue			EI13-REF-MISAL-20-082813 REF-MISAL-20 08/28/2013 Biota Regular Sample Animal Tissue			EI13-REF-NOCRY-01-082313 REF-NOCRY-01 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-NOCRY-02-082313 REF-NOCRY-02 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-NOCRY-03-082313 REF-NOCRY-03 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-NOCRY-04-082313 REF-NOCRY-04 08/23/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	75.8			63.6			56.7			44.9			50.1			90.8			86.1		
MERCURY, LOW LEVEL	NG/G	1631	85.9			72			79.6			48.5			59.8			87.3			78.1		
TOTAL SOLIDS	%	2540 G-1997	23.5			21.86			22.22			25.19			26.47			28.21			25.65		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
AMNAT - Yellow Bullhead Catfish
AMNEB - Brown Bullhead Catfish
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
NOCRY - Bolden Shiner
PEFLA - Yellow Perch

Table A-7
Summary of 2013 Baseline Data - Whole Body Adult Fish Tissue
Pompton Lake Long-Term Monitoring Program
Pompton Lakes, New Jersey

Parameter Name	Units	Analytical Method	EI13-REF-NOCRY-05-082313 REF-NOCRY-05 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-PEFLA-06-082113 REF-PEFLA-06 08/21/2013 Biota Regular Sample Animal Tissue			EI13-REF-PEFLA-07-082113 REF-PEFLA-07 08/21/2013 Biota Regular Sample Animal Tissue			EI13-REF-PEFLA-08-082113 REF-PEFLA-08 08/21/2013 Biota Regular Sample Animal Tissue			EI13-REF-PEFLA-09-082313 REF-PEFLA-09 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-PEFLA-10-082313 REF-PEFLA-10 08/23/2013 Biota Regular Sample Animal Tissue			EI13-REF-PEFLA-11-082813 REF-PEFLA-11 08/28/2013 Biota Regular Sample Animal Tissue		
			Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier	Result	MDL	Qualifier
METHYL MERCURY	NG/G	1630	117			162			74.9			84.6			73.3			135			145		
MERCURY, LOW LEVEL	NG/G	1631	107			178			81.1			93.5			81.5			127			140		
TOTAL SOLIDS	%	2540 G-1997	27.39			26.72			29.18			29.21			30.41			27.97			29.5		

Notes:
MDL - Method Detection Limit
J - Analyte present. Reported value may not be accurate or precise.
AMNAT - Yellow Bullhead Catfish
AMNEB - Brown Bullhead Catfish
LEMAC - Bluegill Sunfish
MISAL - Largemouth Bass
NOCRY - Bolden Shiner
PEFLA - Yellow Perch

Appendix B
Technical Basis for Screening Criteria

Appendix B
Technical Basis for Screening Criteria
Long-Term Monitoring Plan
Pompton Lake Study Area
Pompton Lakes, New Jersey

1.0 Introduction

Screening criteria were identified as decision criteria for some monitoring elements to support decision-making regarding the progression of the Long-Term Monitoring (LTM) Program (See Section 3.0 and Figure 2 of the LTM Plan). Screening criteria may be standards promulgated by the United States Environmental Protection Agency (USEPA) and/or New Jersey Department of Environmental Protection (NJDEP), or developed based on a review of the toxicology literature. Screening criteria were selected that correspond to no-observed effect concentrations (NOECs) where possible, as these levels are associated with concentrations below which no effect is expected to occur. However, concentrations that exceed these levels may not cause effects, but may indicate that further evaluation is warranted. The basis for the screening criteria identified to support the decision framework for the LTM Program are described in detail in the following sections.

1.1 Surface Water

Current USEPA National Recommended Water Quality Criteria (NRWQC) and NJDEP Surface Water Quality Standard (SWQS) for the protection of aquatic life for total mercury (THg) are based on water quality criteria derived in USEPA (1996). Acute Criteria Maximum Concentration (CMC) and Chronic Criteria Continuous Concentration (CCC) protective of general aquatic life are 1,400 and 770 nanograms total mercury per liter (ng THg/L), respectively, based on the filtered (dissolved) water fraction.

USEPA nor NJDEP currently provide an NRWQC or SWQS, respectively, for methylmercury (MeHg) for the protection of aquatic life; however, other surface water quality screening benchmarks have been derived for MeHg for the general protection of aquatic life:

Methylmercury Water Quality Screening Benchmark	NOEC (ng/L)	LOEC (ng/L)	Source
Canadian Water Quality Guideline (WQG)	4	40	CCME (2003)
Effect Concentration (EC20) Daphnids	--	870	Suter (1996)
EPA Tier II Secondary Chronic Value (SCV)	2.8	--	Suter and Tsao (1996)

The bounded NOEC and LOEC values presented in the Canadian Water Quality Guidelines (WQGs) were selected as screening criteria to evaluate MeHg concentrations in surface water in the LTM Program. The Canadian WQG NOEC of 4 ng MeHg/L was derived from a lowest-observable effect concentration (LOEC) of 40 ng MeHg/L for daphnid reproduction by dividing the LOEC by a safety factor of 10 (CCME, 2003).

Based on a review of the available literature for aqueous toxicity of mercury to aquatic life the following surface water screening criteria were selected to evaluate exposure in the PLSA:

- THg: 770 ng THg/L (dissolved) for THg based on the current NRWQC (USEPA, 2014) /NJSWQS.
- MeHg: 4 ng MeHg/L (dissolved) for MeHg based on the Canadian WQG derived based on a LOEC of 40 ng MeHg/L for daphnid reproduction divided by a safety factor of 10 (CCME, 2003).

1.2 Fish Tissue

Several studies have attempted to establish mercury critical body residues (CBRs) for the protection of fish (Niimi and Kissoon, 1994; Wiener and Spry, 1996; Beckvar et al., 2005; and Dillon et al., 2010). Based on available literature at the time, Niimi and Kissoon (1994) concluded that lethal body burdens of mercury ranged from 10,000 to 20,000 ng THg/gram (g) wet weight (ww) (whole body) and speculated that sublethal impacts would be observed in the 1,000 to 5,000 ng THg/g ww (whole body) concentration range. Wiener and Spry (1996) conducted an exhaustive review of mercury residue-effects literature and identified a whole body CBR of 5,000 ng/g ww as the probable toxic effects level and 3,000 ng THg/g ww (whole body) as the no-observed-effects-level for freshwater fish.

Beckvar et al. (2005) summarized no effect residue (NER) and low effect residue (LER) body burden (whole body) thresholds for mercury. Based on the geometric mean of paired NER and LER values for all species and life stages evaluated, Beckvar et al. (2005) recommended a whole body threshold effect concentration of 210 ng THg/g ww; this threshold effect concentration was considered protective of juvenile and adult fish due to the representation of multiple life stages in the supporting studies. This benchmark is considered a conservative, low end CBR_{NOEC} for evaluating YOY and adult tissue residues in the PLSA.

The endpoints summarized in Beckvar et al. (2005), were further evaluated to develop a more site-specific and relevant benchmark for fish tissue data collected as part of the 2013 Pompton Lake Ecological Investigation (URS, 2014). Species not applicable to or appropriate for Pompton Lake, including brackish (e.g., striped mullet, mummichog) and arctic species (grayling) were not considered in development of a site-specific CBR. In addition, comparisons of concentrations in early life stages (ELS), including eggs and larvae, were not appropriate for comparisons to YOY and adult tissue residues measured in Pompton Lake. Based on applicable and appropriate species and life stages, the geometric mean of NER and LER endpoints was calculated as 436 ng THg/g ww. This benchmark is consistent with overall LER effects benchmarks for adult/juvenile and ELS endpoints; the geometric mean of LER concentrations for all life stages for species appropriate to Pompton Lake is 406 ng THg/g ww (URS, 2014).

The CBR_{LOEC} of 436 ng THg/g ww is supported as a low effects benchmark by the evaluation of mercury fish tissue residues conducted by Dillon et al. (2010). Mercury dose-response relationships (D-Rs) were developed for ELS and juvenile or adult fish based on published tissue residue-toxicity data. The D-Rs relied primarily on lethality-

equivalent test endpoints (i.e., endpoints that can be directly related to mortality, such as survival, reproductive success, and developmental abnormalities). The D-Rs for the juvenile and adult fish predicted 2.8 to 77.8 percent effects over a tissue residue range of 100 to 10,000 ng THg/g ww; for the same range of tissue residues, the D-R for ELS fish predicted 19.8 to 96.1percent effects. Consistent with the CBR_{LOEC}, Dillon et al. (2010) found an 11 percent probability of effects at ~400 ng THg/g ww.

Regional data indicate that mercury concentrations in largemouth bass exceeding the whole body CBR_{LOEC} of 436 ng THg/g ww may not cause adverse effects. Friedmann (2002) indicated no substantial decrease in general and reproductive health for adult largemouth bass in three New Jersey lakes (field study assessing body weight, length, condition factor, gonadosomatic index) with average whole body mercury concentrations ranging from 210 to 3,800 ng THg/g, ww[1]. The findings of this study indicate that the identified CBR_{NOEC} and CBR_{LOEC} for fish tissue are adequately protective of adult largemouth bass in the PLSA.

In summary, more recent literature-based whole body CBRs indicate a conservative (i.e., no effect) screening benchmark of 210 ng THg/g ww for juvenile and adult fish. Multiple sources support the derivation of a low-effect level of 436 ng THg/g ww for juvenile and adult fish exposure in the PLSA (Beckvar et al., 2005; Dillon et al., 2010). As a result, CBR_{NOEC} of 210 ng THg/g is considered a conservative screening criterion to evaluate the potential effects associated with mercury concentrations measured in juvenile and adult fish tissue sampled in the PLSA.

1.3 Benthic Invertebrate Critical Body Residues

Nine studies were evaluated that reported mercury concentrations in tissue residues associated with survival, growth, or reproductive success endpoints for aquatic invertebrates. While most studies evaluated survival endpoints, growth and reproduction endpoints were the most sensitive endpoints.

Potential effects of mercury exposure on benthic invertebrate growth were not identified in the literature review. Naimo et al. (2000) did not observe diminished growth of hexagenid mayfly nymphs with increasing concentrations of mercury in tissue concentrations up to 183.7 ng MeHg/g dw (36.7 ng MeHg/g ww[2]) or 10, 819 ng THg/g dw (2,164 ng THg/g ww) during a series of four 21-day bioaccumulation tests (Naimo et al., 2000[3]). Growth was also not influenced in a 9-day experiment with hexagenid mayfly nymphs that accumulated up to 7,493 ng MeHg/g ww and 3,765 ng THg/g ww (Souter et al., 1993).

Studies that associated adverse effects on invertebrates with mercury concentrations in tissue residues were limited. Biesinger et al. (1982) reported bounded NOEC and LOEC reproduction endpoints for daphnids of 1,530 ng THg/g ww and 2,330 ng/g ww, respectively. Niimi and Cho (1983) identified a reproductive THg LOEC for the water

[1]Whole body concentration estimated from fillet data assuming a whole body:fillet ratio of 0.7.
[2] Conversions of dry weight values reported in literature studies assume a moisture content of 80 percent.
[3] Note: Concentrations reported in literature studies reviewed for invertebrate critical body residues have been expressed as ng/g ww for consistency with the presentation of invertebrate tissue concentrations in this report.

flea (*Daphnia magna*) of 4,660 ng THg/g ww. Other LOECs identified for survival ranged from 9,730 to 18,400 ng THg/g ww (URS, 2014).

Benthic invertebrate CBRs were selected as screening criteria for the LTM Program based on the review of available studies associating invertebrate tissue residues with potential effects on growth and reproduction. A conservative CBR_{NOEC} of 36.7 ng MeHg/g ww was selected for MeHg based on the NOEC for hexagenid mayfly reported by Naimo et al. (2000). The bounded NOEC reproduction endpoint for daphnids reported by Biesinger et al., (1982) of 1,530 ng THg/g ww was selected as the CBR_{NOEC} screening criterion for THg.

The selected CBRs are comparable to (THg) or more conservative than (MeHg) the results of a field study of population-level benthic invertebrate impacts and measured invertebrate tissue residues. In a long-term study conducted near a mine site at Clear Lake, California, Suchanek et al. (2008) reported THg body burdens of 288 ng THg/g dw (1,440 ng THg/g ww) and MeHg body burden of 67 ng/g dw (335 ng MeHg/g ww) in larval chironomids. A 50-year monitoring effort showed that chironomids did not experience any significant population-level effects and that the littoral invertebrate community did not exhibit any significant response to the mercury exposures from surface water and sediment. The findings of Suchanek et al. (2008) indicate that the selected CBRs are adequately conservative as screening criteria to evaluate potential benthic invertebrate impacts within the PLSA in the LTM Program.

Critical body residues were not identified for emergent adult invertebrates due to the lack of data available to evaluate adverse ecological effects based on tissue residue concentrations. However, it is assumed that mercury CBRs protective of aquatic stages (i.e., larvae or nymphs) are protective of metamorphosis into adult stages.

1.4 Pore Water

The primary exposure pathway for infaunal benthic invertebrates in the PLSA is the aqueous exposure to sediment pore water. Epifaunal benthic invertebrates are exposed primarily to surface water at the sediment-surface water interface, but may also be exposed to pore water in shallow sediment.

There are no promulgated USEPA or NJDEP numeric criteria for mercury in pore water. Aqueous toxicity studies were evaluated to identify potential effects associated with exposure to mercury in pore water and surface water. Studies presenting concentration-response relationships for survival and growth endpoints based on benthic invertebrate test organisms were prioritized in the effects analysis (Chibunda, 2009; Azevedo-Pereira and Soares, 2010; Valenti et al., 2005). Studies using benthic invertebrate test organisms were also queried from the EPA ECOTOX (ECOTOXicology) database to provide additional aqueous endpoints for mercury. Selected studies focused on exposure to freshwater benthic invertebrate test organisms to provide a toxicity dataset relevant to conditions in the PLSA; test organisms from marine or estuarine environments were excluded.

An evaluation of aqueous toxicity endpoints for THg indicates that sublethal responses are generally more sensitive than lethal responses. In studies establishing concentration-response relationships for relevant benthic test organisms exposed to aqueous mercury,

statistically significant reductions in growth were observed at lower aqueous mercury concentrations than reductions in survival (Chibunda, 2009; Azevedo-Pereira and Soares, 2010; Valenti et al., 2005). Chibunda (2009) reported no significant reduction in 14-day survival of *Chironomus riparius* exposed to THg concentrations in filtered pore water up to 85,000 ng THg/L; Valenti et. al. (2005) reported no significant reduction in the survival of juvenile rainbow mussel (*Villosa iris*) exposed to a solution of $HgCl_2$ containing 114,000 ng THg/L over a 21-day exposure. Figure B-1 presents a cumulative frequency distribution plot of average median lethal concentrations (LC_{50}) for benthic test organisms exposed to THg in filtered and unfiltered aqueous toxicity tests over various durations. The plot indicates that the vast majority of lethal responses to THg in are associated with aqueous exposure media concentrations of THg exceeding 10,000 ng THg/L (see Figure B-1).

Potential sublethal effects associated with benthic invertebrate exposure to THg in aqueous media were evaluated using studies reporting concentration-response relationships for growth endpoints (Azevedo-Pereira and Soares, 2010; Chibunda, 2009; Valenti et al., 2005). Growth endpoints from these studies were expressed on a relative basis given the varied, but biologically sensitive metrics used to measure growth in each study (e.g., total body length, dry weight). Relative growth was calculated as the ratio of the growth endpoint in the study treatment to the growth endpoint in the study control. Figure B-2 presents the relative growth of *C. riparius* (8-day and 14-day exposures) and juvenile rainbow mussel *V. iris* (21-day exposure) over a range of THg concentrations in aqueous exposure media; open symbols in Figure B-2 indicate growth endpoints that were statistically different than control treatments ($p < 0.05$), as reported in each respective study.

As illustrated in Figure B-2, the relative growth of benthic invertebrate test organisms decreased with exposure to increasing concentrations of THg in aqueous media. The minimum bounded NOEC of 4,000 ng THg/L was identified for the 21-day exposure of juvenile *V. iris* (Valenti et al., 2005); the LOEC of 8,000 ng THg/L was identified as the lowest concentration at which a statistically significant reduction in growth was reported. An ECOTOX query of growth endpoints for freshwater benthic invertebrate test organisms did not indicate a more sensitive growth endpoint for inorganic forms of mercury, indicating that these NOEC and LOEC values are adequately sensitive to evaluate adverse growth effects in the PLSA. Based on this analysis, 4,000 ng THg/L was selected as a NOEC screening criterion for the LTM Program to evaluate potential sublethal growth effects to benthic macroinvertebrates exposed to pore water and surface water at the sediment-surface water interface.

Toxicological data on the effects of aqueous exposures of MeHg on benthic invertebrate test organisms are limited. However, water quality screening benchmarks have been derived for MeHg for the general protection of aquatic life.

Consistent with the MeHg screening criterion selected for surface water, the bounded NOEC value of 4 ng MeHg/L presented in the Canadian WQGs was selected to evaluate potential benthic invertebrate exposure to MeHg in filtered pore water. The Canadian WQG was derived based on a LOEC of 40 ng MeHg/L for daphnid reproduction divided by a safety factor of 10 (CCME, 2003). This value represents a conservative screening criterion derived for the broader protection of aquatic life. As such, this benchmark

concentration is not necessarily indicative of adverse effects to benthic invertebrate organisms, which may be less sensitive to MeHg exposure than the aquatic test organisms (e.g., daphnids) used to derive the benchmarks.

2.0 References

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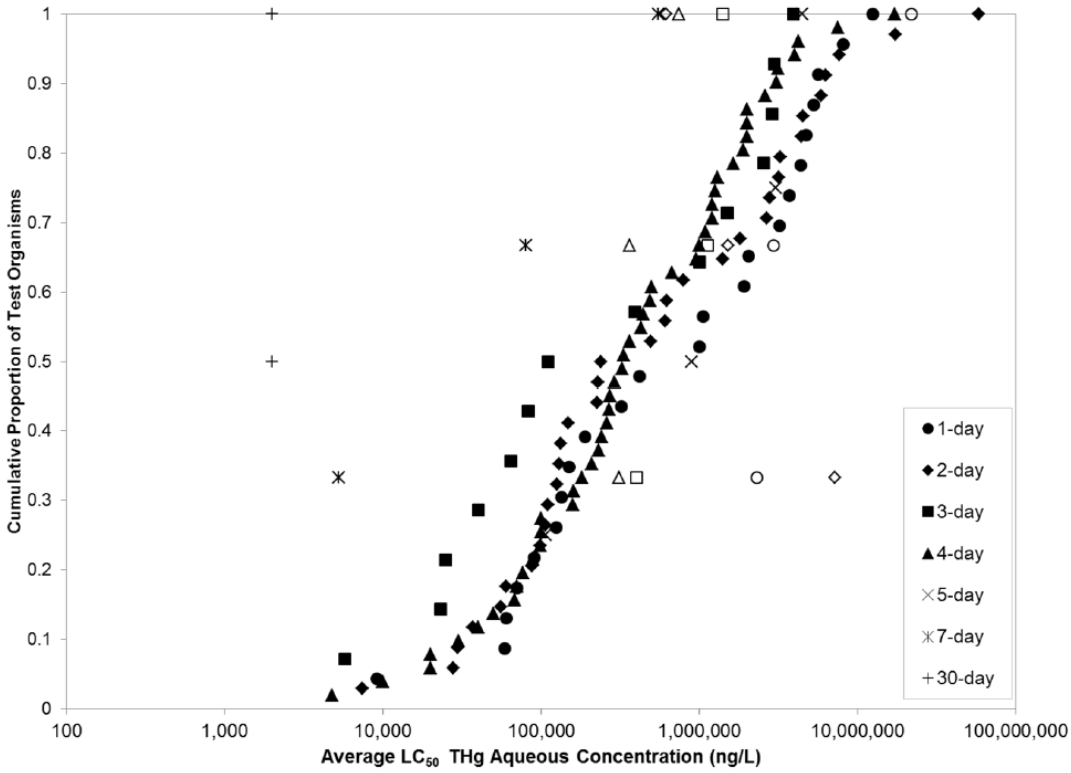
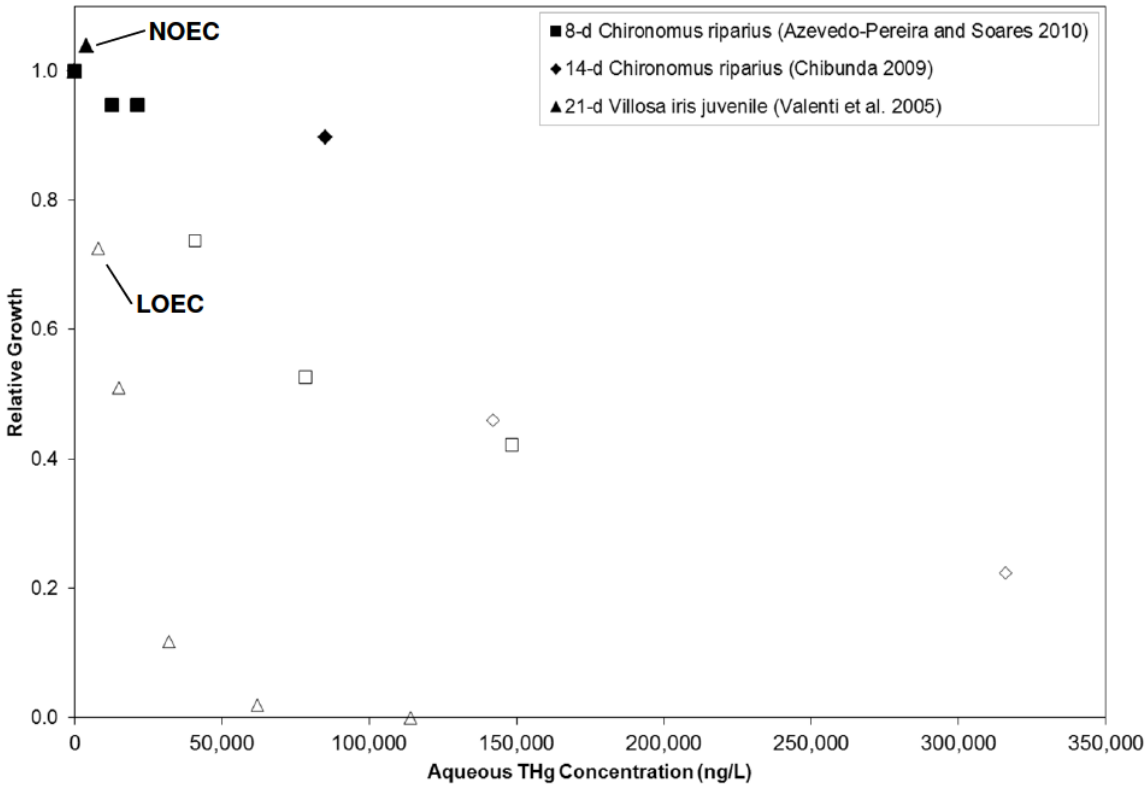
Figure B-1
Cumulative Frequency Distribution of Median Lethal Concentrations (LC_{50}) for Aqueous THg
Averaged by Benthic Macroinvertebrate Test Species
Pompton Lake Study Area
Pompton Lakes, New Jersey



Notes: Data shown are the cumulative frequencies of median lethal concentrations (LC50) averaged by test species for various durations of exposure (in days) to aqueous concentrations of total mercury (THg). Open symbols indicate aqueous concentration was based on filtered results and closed symbols indicate aqueous concentration was based on unfiltered results; concentrations representing exposures of 5 days or more were based on unfiltered sample results. Data were obtained from the EPA ECOTOX (ECOTOXicology) database. Test organisms associated with benthic environments were preferentially selected for inclusion in the cumulative frequency distribution plot.

Figure B-2
Relative Growth of Benthic Test Organisms Exposed to Total Mercury in Aqueous Media
Pompton Lake Study Area
Pompton Lakes, New Jersey



Notes: Data shown are the relative growth of benthic macroinvertebrate test organisms exposed to aqueous total mercury concentrations (THg). Relative growth was calculated as the ratio of the growth endpoint in the study treatment (e.g., total body length, dry weight) to the growth endpoint in the study control. Open symbols represent growth endpoints that were statistically different than control treatments ($p < 0.05$), as reported in each respective study. The minimum bounded no observed effect concentration (NOEC) was identified as 4,000 ng/L from the 21-day exposure of juvenile *Villosa iris* (Valenti et al., 2005); the lowest observed effect concentration (LOEC) of 8,000 ng THg/L was identified as the lowest concentration in Valenti et al. (2005) at which a statistically significant reduction in growth was reported. Relative growth calculations for endpoints reported by Azevedo-Pereira and Soares (2010) were estimated from Figure 2 presented in the study.