ONONDAGA LAKE TISSUE AND BIOLOGICAL MONITORING REPORT FOR 2013

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LIST OF ACRONYMS

CPUE catch (of fish) per unit of effort

DDT	dichloro diphenyl trichloroethane
DUSR	Data Usability and Summary Report
mg/kg	milligrams per kilogram (or parts per million in water)
mm	millimeters
NYSDEC	New York State Department of Environmental Conservation
PCBs	polychlorinated biphenyls
PIT	passive integrated transponder
PHM	Permanent Habitat Module
QA/QC	quality assurance / quality control
RI	remedial investigation
ROD	Record of Decision
SUNY-ESF	State University of New York College of Environmental Science and Forestry
UFI	Upstate Freshwater Institute
USEPA	United States Environmental Protection Agency

DEFINITIONS

Benthic	Bottom dwelling (*i.e.*, in sediment)
Littoral	Zone within a body of water adjacent to shore where waters do not thermally stratify. In Onondaga Lake, the outer extent of the littoral zone corresponds to a water depth of 30 ft. (9 meters).
ng/L	Nanogram per liter or part per trillion in water. 1 ng/L is the same as 0.000001 milligram per liter (mg/L) or part per million.
Profundal	Offshore zone within a water body where water depths are greater than the depth to which sunlight can penetrate to support aquatic plants, in contrast with the littoral zone closer to shore. In Onondaga Lake, the profundal zone stratifies each year from May to October based on water temperature. The profundal zone of Onondaga Lake occupies 64 percent of the lake surface area based on a minimum water depth of 30 ft. (9 meters).

EXECUTIVE SUMMARY

The objectives of tissue and biological monitoring conducted on behalf of Honeywell in 2013 were to document conditions in Onondaga Lake based on parameters established to evaluate the effectiveness of lake remediation. This report includes results from the 2013 Onondaga Lake tissue monitoring and fish community monitoring efforts consistent with a work plan approved in advance by the New York State Department of Environmental Conservation (NYSDEC).

Preliminary remediation goals as chemical concentrations were established for fish in the lake bottom Record of Decision (ROD) issued by the NYSDEC and the United States Environmental Protection Agency (USEPA) in 2005. Fish tissue monitoring that was completed in 2013 included collection and chemical analysis of 100 adult sport fish and 40 composited samples of prey fish. The adult sport fish submitted for chemical analysis were filleted in accordance with the NYSDEC protocol. Laboratory analyses were also conducted in 2013 of representative fish and zooplankton samples for stable carbon and nitrogen isotopes. Fish community monitoring was conducted in 2013 to maintain continuity with fish community data collected from 2008 through 2012 and to help characterize fish community dynamics in Onondaga Lake prior to habitat restoration. Zooplankton mercury concentrations were monitored in 2013 as a continuation of lake monitoring work conducted annually since 2008 to help assess mercury movement within the lake's food web.

Biota samples were collected in 2013 from May through November. Adult sport fish were collected for chemical analyses in May, June and July 2013. Prey fish were collected for chemical analyses in August 2013. Fish community and zooplankton monitoring were conducted in 2013 from May through October. Samples of seston *(i.e.*, phytoplankton and nonliving particles collected with phytoplankton) for stable isotope analyses were collected in September and November. Zooplankton were collected for chemical analyses in 2013 from May through November.

SECTION 1

INTRODUCTION

Tissue and biological monitoring in Onondaga Lake were conducted on behalf of Honeywell in 2013 to document lake conditions during the second year of remedial dredging and capping in the lake. Tissue monitoring forms a portion of the basis for evaluating the effectiveness of the lake bottom remedy identified in the ROD issued by the NYSDEC and the USEPA (NYSDEC and USEPA, 2005) and described in the *Remedial Design Work Plan for the Lake Bottom* (Parsons, 2009). Fish community monitoring provides data to help facilitate an understanding of fish community dynamics in Onondaga Lake.

The program objectives for fish tissue and fish community monitoring completed in 2013 were to provide additional data for future understanding of:

- Remedy effectiveness in achieving remediation goals for Onondaga Lake
- Fish community response to habitat restoration

As in previous years, the 2013 work scope for tissue monitoring efforts was submitted as a work plan addendum approved by NYSDEC (Parsons, Anchor QEA and Exponent, 2013). The 2013 work scope for fish community monitoring was the same as the fish community monitoring work scope presented in the 2012 work plan for habitat and biological monitoring also approved in advance by NYSDEC (Parsons and Anchor QEA, 2012). Tissue and fish community monitoring objectives, program elements, and data uses are presented in Table 1.

This report follows the format applied in the Baseline Monitoring Reports for Onondaga Lake for 2008 through 2011 (Parsons, Exponent, and Anchor QEA, 2011a, 2011b, 2011c, and 2012) and the Onondaga Lake Tissue and Biological Monitoring Report for 2012 (Parsons and Anchor QEA, 2013). Section 1 provides an introduction. Section 2 presents a summary of the sampling and analytical work. Section 3 provides a summary of data management and validation. Section 4 presents a brief assessment of the 2013 tissue data. Appendix A provides the 2013 Data Usability and Summary Reports (DUSR) for tissue monitoring and follows the format from prior monitoring years including laboratory data verification, data validation, and data usability.

SECTION 2

SAMPLING AND ANALYSIS SUMMARY FOR 2013

Sample collection, sample management, equipment decontamination, and other lake monitoring field procedures were conducted in accordance with work plans and addenda for tissue and biological monitoring approved in advance by NYSDEC (Parsons, Anchor QEA and Exponent, 2012b; Parsons and Anchor QEA, 2012; Parsons, Anchor QEA and Exponent, 2013). Field and analytical procedures used to conduct the work reported herein are documented in a quality assurance project plan (Parsons, Anchor QEA and Upstate Freshwater Institute (UFI), 2012). Surface water and sediment trap monitoring completed as part of the work scope for the 2013 portion of the nitrate addition test (Parsons, 2013) are summarized in the report for 2013 nitrate addition efforts (Parsons and UFI, 2014). Table 2 summarizes the media, sampling locations, and primary activities completed for the 2013 tissue monitoring efforts.

Each of the 2013 tissue monitoring efforts were completed using standard procedures described in a Quality Assurance Project Plan (Parsons, Anchor QEA and Upstate Freshwater Institute, 2012).

2.1 FISH SAMPLING

Fish tissue monitoring during 2013 included adult sport fish and prey fish sample collection throughout the lake (Figure 1). Fish sampling for tissue chemical analyses was conducted by Anchor QEA with assistance from the Onondaga County Department of Water Environment Protection and the State University of New York College of Environmental Science and Forestry (SUNY-ESF). Fish population and community assessments (including lake sturgeon) were conducted during 2013 throughout the lake (Figure 2) primarily by SUNY-ESF under the supervision of Dr. Neil Ringler with support and oversight by Anchor QEA.

Sampling locations for fish tissue chemical analyses were the same during 2013 as those occupied during 2008 through 2012, coinciding with historical locations sampled for fish tissue during the remedial investigation (RI) for Onondaga Lake (TAMS Consultants, 2002), as well as locations sampled as part of Onondaga County's Ambient Monitoring Program.

Adult sport fish and prey fish sampling for tissue chemical analyses was conducted from May through August, 2013. Fish samples for tissue analyses were collected and analyzed using the same methods as during 2008 through 2012, including electrofishing, gill netting, trap netting, and seining. Electrofishing was the preferred method for sampling Brown Bullhead *Ameiurus nebulosus* and Pumpkinseed *Lepomis gibbosus*, because these species tend to move towards shore at night. Trap nets near the shoreline were a secondary source for collection of Brown Bullhead and Pumpkinseed. Walleye *Sander vitreus* and Smallmouth Bass *Micropterus dolomieui* were primarily captured in gill nets set at 10- to 33-ft. (3- to 10-meter) water depth during night time hours when they are more active. Occasionally, walleye or smallmouth bass

were captured by electroshocking or seining. Prey fish were captured with seines and gill nets along the shoreline where they typically congregate during day time hours.

Samples from four adult sport fish species and two prey fish families were collected for tissue chemical analyses. For adult sport fish, 25 individuals from each of the four species (Smallmouth Bass, Walleye, Brown Bullhead, and Pumpkinseed), were collected from eight locations (based on a target of three to four individual fish from each species at each location) for a total of 100 adult sport fish tissue samples. Legal size fish were targeted, with a maximum size identified to restrict the year-to-year variability in mercury concentration as a function of size; 305 to 500 millimeter (mm) total length for Smallmouth Bass, 200 mm to 350 mm total length for Brown Bullhead, and 380 mm to 575 mm total length for Walleye. Three Walleye that were captured exceeded the targeted size range but were retained because they would not have survived capture. Two Smallmouth Bass were slightly below the targeted size range but were kept for analysis because they also would not have survived capture.

Consistent with the approved work plan addendum for this fish sampling, a pectoral spine from each adult Brown Bullhead, otoliths (small ear bones) from each Smallmouth Bass and Walleye, and scales from each adult Pumpkinseed were collected to estimate fish age. Total length (in mm) and mass (to nearest gram) of each adult fish sample for tissue chemical analyses were recorded as well.

Prey fish samples collected for tissue chemical analyses included fish from the topminnow and herring families (Fundulidae, Clupeidae). Species of prey fish were determined based on availability and included 16 alewife composites and 24 banded killifish composites. Prey fish composites were collected by seining or gillnetting at each of eight locations, for a total of 40 composite samples submitted for mercury analysis. Composite samples included 10 to 15 prey fish per sample, depending on weights of individual fish.

Fish community composition was assessed again in Onondaga Lake during 2013 using trap nets, gill nets, seines, and electroshocking. Distribution of adult sport fish was assessed monthly from May through October to determine overall community structure.

Trap nets were deployed at 11 sampling locations, and gill nets were set at 10 sampling locations (Figure 2). The trap net locations at the Parsons location were only sampled in June and July, and at the 690 Point location only in July, because access was limited due to construction during the following months. Locations near Harbor Brook and the Metro outfall were not sampled in 2013, because ongoing remediation activities limited access in that area of the lake. A trap net location was added at Hiawatha Pt, 690 Pt, and Ley Creek; while gill net locations were added to Ley Creek and Wastebeds 1-8 locations to allow for similar levels of sampling as in previous years.

Trap nets were set at each location once per month during the late afternoon/evening and checked the following morning. In addition to the smaller-mesh gill net used during community surveys, a larger-sized gill net was used to better understand Lake Sturgeon abundance and distribution. Gill nets were set for the capture of Lake Sturgeon once per month in May, June,

September, and October 2013. Due to high water temperatures in July and August, sampling was suspended to reduce the risk of mortality. Community sampling was conducted with 5.9-inch stretch mesh netting, and sturgeon gill netting was conducted with an eight-panel experimental gill net with two panels each of 6-, 8-, 10-, and 12-inch stretch mesh in sequence for two series. Captured Lake Surgeon were measured for total length in mm, weighed in grams, tagged with an individually marked Carline dangler tag and a passive integrated transponder (PIT) tag (if not already tagged), and the basal portion of the pelvic fin ray was removed for age estimation. Double tagging was conducted to minimize the loss of the information due to tag loss as recommended by the USGS.

Seining was conducted from August 19-21, 2013 at eight sample locations.

Sampling using electroshocking equipment on a boat was conducted from June 2 to July 2, 2013 to estimate population density of several species. Individual Largemouth Bass, Smallmouth Bass, Pumpkinseed, and Bluegill were measured for total length (mm) and examined for visible marks. Target fish that were captured received a fin clip specific to the location of capture and were then released back into the lake. Due to its larger size, Largemouth Bass also received a t-bar anchor tag as an additional indicator that the individual had been captured. As in 2012, sampling using electroshocking was condensed in 2013 to one event per week over a four-week period in an attempt to get a more rigorous population estimate for 2013. The Onondaga Lake littoral zone was divided into 21 transects for electrofishing; however, four transects (transects, 11, 12, 13, and 14) were inaccessible due to Honeywell's dredging and capping activities on the South end of the lake. Population estimates for Largemouth Bass, Pumpkinseed, and Bluegill (*Lepomis macrochirus)* were calculated using the modified Schnabel estimator (Ricker 1975), as described in the Book 2 Work Plan for 2008 (Parsons et al. 2008). Sample size was not sufficient to estimate the Smallmouth Bass population in 2013 likely due to many Smallmouth Bass residing in deeper lake waters where electrofishing capture effectiveness is reduced. The electrofishing effort in Onondaga Lake in 2013 was consistent with recent prior year efforts.

2.2 ZOOPLANKTON AND SESTON SAMPLING

Zooplankton samples were collected at South Deep at a frequency ranging from weekly to monthly by UFI from May 20 to November 20, 2013. UFI also attempted to collect samples of large *Daphnia spp.* zooplankton (at least 1 millimeter in length); however, similar to 2010 through 2012, quantities of *Daphnia spp.* large enough for chemical analysis were not found during any of the 2013 zooplankton sampling events.

Seston are phytoplankton and non-living particles collected incidentally with phytoplankton collected in September and November 2013 at the South Deep location for stable isotope analyses. Seston were collected from surface water filtered in the lab through pre-combusted glass fiber filters. After rinsing with one percent hydrochloric acid and deionized water to remove carbonate, the filters were dried at 60°C, enclosed in foil envelopes, frozen, and shipped to Cornell's stable isotope laboratory. These filters contained primarily phytoplankton but in all

likelihood the filters also contained zooplankton, inorganic particles, bacteria, protozoans, and other small forms of aquatic life.

2.3 ANALYTICAL WORK SCOPE

Fillet samples (NYSDEC standard fish fillet based on NYSDEC 2000; skin-on except for brown bullhead) were collected from each adult sport fish for mercury analysis at a commercial laboratory. In addition to being analyzed for mercury, each of the adult sport fish fillet samples (100 total) were analyzed for polychlorinated biphenyl (PCB) aroclors, dichlorodiphenyl trichloroethane (DDT) and metabolites, hexachlorobenzene, and lipids. One of the 25 Brown Bullhead fillets was not analyzed for mercury because of a sample handling inconsistency in the laboratory.

A subset of Smallmouth Bass (N=19) and Walleye (N=20), as well as zooplankton and seston samples collected in 2013 were analyzed for stable isotopic ratios of carbon (13C/12C) and nitrogen (15N/14N) for comparison with data from 2008 and 2009. Samples for stable isotope analyses were sent to the Cornell Isotope Laboratory, similar to samples analyzed in 2008 and 2009.

Prey fish samples consisted of 40 composite samples that were analyzed at a commercial laboratory for mercury, PCBs, DDT and metabolites, hexachlorobenzene, and lipids.

Zooplankton samples collected at South Deep were analyzed at a commercial laboratory for total mercury and methylmercury using low-level methods.

Filters containing primarily phytoplankton were analyzed at Cornell's stable isotope laboratory.

SECTION 3

DATA MANAGEMENT AND VALIDATION SUMMARY

3.1 DATABASE

Validated results from each of the 2013 tissue monitoring efforts have been stored and accounted for in Honeywell's Locus Focus data management system for Onondaga Lake.

3.2 QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

Sample identification, QA/QC procedures, sample collection, data entry, and data validation were conducted in accordance with the three agency-approved work plan addenda. Verification of sampling information and chemical data occurred at several levels during the field and laboratory work. Data verification included checking procedures for compliance with the project plan, correctness of protocols used in the field and at the laboratory, comparability of the data collection and analysis procedures, and completeness of the data set and supporting documentation.

TestAmerica Laboratories located in Pittsburgh, PA and North Canton, OH performed the 2013 tissue monitoring laboratory analyses on behalf of Honeywell. TestAmerica's laboratory in North Canton, Ohio conducted the analyses of zooplankton for low-level mercury and methylmercury. Other analyses of fish samples were performed by TestAmerica in their Pittsburgh, PA laboratory.

3.3 DATA VALIDATION

Chemical analytical data generated by TestAmerica were reviewed and validated by Parsons for usability in accordance with data validation procedures described in the Data Usability and Summary Report (DUSR) (Appendix A).

SECTION 4

DATA ASSESSMENT

4.1 LABORATORY RESULTS FOR 2013 FISH SAMPLES

4.1.1. Fish Tissue Chemical Results

Mercury concentrations in fish samples collected in 2013 ranged from 0.04 to 1.20 milligrams per kilogram (or parts per million in water) (mg/kg) in Brown Bullhead fillets; 0.29 to 1.90 mg/kg in Smallmouth Bass fillets; 0.46 to 2.30 mg/kg in Walleye fillets; 0.04 to 0.43 mg/kg in Pumpkinseed fillets;, and from 0.04 to 0.35 mg/kg in whole-body prey fish composite samples (Table 3). Mercury concentrations in adult sport fish were also evaluated by age. Mercury concentrations in 2013 tended to increase with age in Pumpkinseed, Smallmouth Bass, and Walleye, while there was no apparent trend in Brown Bullhead (Figure 3).

PCB Aroclor concentrations in fish samples collected in 2013 ranged from 0.005 to 0.17 mg/kg in Brown Bullhead fillets; 0.03 to 0.78 mg/kg in Smallmouth Bass fillets; 0.10 to 2.08 mg/kg in Walleye fillets; 0.007 to 0.08 mg/kg in Pumpkinseed fillets; and from 0.01 to 0.54 mg/kg in whole-body prey fish composites (Table 3).

Concentrations of DDT and metabolites in fish samples collected in 2013 ranged from 0.0004 to 0.02 mg/kg in Brown Bullhead fillets; 0.003 to 0.08 mg/kg in Smallmouth Bass fillets; 0.008 to 0.14 mg/kg in Walleye fillets; 0.0003 to 0.004 mg/kg in Pumpkinseed fillets; and from 0.002 to 0.07 mg/kg in whole-body prey fish composites (Table 3).

Hexachlorobenzene in fish samples collected in 2013 ranged from non-detect to 0.003 mg/kg in Brown Bullhead fillets; 0.0007 to 0.005 mg/kg in Smallmouth Bass fillets; 0.003 to 0.02 mg/kg in Walleye fillets; 0.0002 to 0.003 mg/kg in Pumpkinseed fillets; and from 0.0002 to 0.04 mg/kg in whole-body prey fish composites (Table 3).

Percent lipid in 2013 fish tissue samples ranged from 0.02 to 0.94 percent in Brown Bullhead fillets, 0.09 to 0.95 percent in Smallmouth Bass fillets, 0.46 to 4.10 percent in Walleye fillets, 0.03 to 0.49 percent in Pumpkinseed fillets; and from 0.32 to 11.0 percent in whole-body prey fish composites (Table 3).

4.1.2. Stable Isotope Results

Results of stable isotope analyses can be used to evaluate position of the lake's organisms within the food web as well as diet and original carbon source, both of which help to better understand local bioaccumulation pathways. A value called "δ" is calculated using the equation:

$$\delta = [(R_{SAMPLE}/R_{STANDARD} - 1)]*1000$$

where R is the ratio of the heavy isotope to the light (and generally most abundant) isotope. δ is reported in parts per thousand (‰), where a value of 0 ‰ means that the sample is identical to

the standard. A negative δ value indicates that the sample is lighter and a positive value indicates that the sample is heavier than the standard. In general, an increase in δ for the nitrogen-15 isotope *(i.e.,* δ15N) represents an increase in trophic level. Differences in δ for the carbon-13 isotope (*i.e.,* δ13C) show differences in food sources. In 2013, stable isotope analysis was conducted on samples from lower trophic levels (seston and zooplankton) and on samples from higher trophic levels (smallmouth bass and walleye).

Patterns in δ15N values provide information on relative position in the food web. Seston results for samples collected in 2013 show a relatively low δ15N reflecting lower trophic level consumers (Figure 4). Differences between samples collected in September and November are apparent. Zooplankton show a relatively high δ15N, indicating a higher trophic level, similar to Smallmouth Bass and Walleye (Figure 4). Further evaluation of the zooplankton community (i.e., what species dominated the sample) sampled would be necessary to understand this higher than expected δ15N value. Smallmouth Bass and Walleye are shown separated by two sizes, in order to evaluate potential differences in feeding source and trophic level as the fish grow. Both Walleye and Smallmouth Bass of all size ranges sampled show a high δ15N, indicating upper trophic level predators (Figure 4).

Patterns in δ13C provide insight about diet reflecting either a benthic food source (higher δ13C) or a water column food source (lower δ13C). Seston samples from September and November 2013 show low and slightly different δ13C, indicating a water column carbon source used for photosynthesis. Zooplankton from 2013 also have relatively low δ13C, indicating a water column food source (i.e., phytoplankton). Both Walleye size ranges also have a lower δ13C, similar to zooplankton and seston, indicating a more water column based food source (Figure 4). For Smallmouth bass, δ13C varied based on the size of the fish, with smaller fish showing a higher δ13C than larger fish (Figure 4). One hypothesis is that smaller Smallmouth Bass would show a more sediment based feeding while larger Smallmouth Bass would show a water column based feeding, reflecting a potential shift as Smallmouth Bass grow and move offshore. While for both of the size ranges of Smallmouth bass the δ13C results for 2013 were higher than δ13C results for walleye and zooplankton, the distinct separation of the two size ranges may indicate that larger fish are feeding more heavily on water column based food sources (e.g., alewives), while the smaller fish may have focused on a more sediment-based food sources in the littoral zone (e.g., banded killifish and minnows).

4.2 FISH COMMUNITY MONITORING RESULTS FOR 2013

4.2.1 Fish Community Assessment

Thirty-eight fish species were captured or observed in Onondaga Lake during fish community sampling at eleven locations from May through October of 2013. Thirty-five fish species were captured with trap nets, 15 species with gill nets, and 15 species with seines (Table 4).

A total of 5,589 individuals representing 35 species were captured during 63 nights of trap netting during 2013 (Table 5). The 2013 fish community from trap net sampling was dominated

by Bluegill, making up 29 percent of the total observations across sites. Alewife was the second most abundant, making up 16.3 percent of the total catch. Additionally, *Lepomis sp*. made up 11.4 percent and White Perch made up 6.8 percent, while Pumpkinseed and Largemouth Bass each accounted for approximately 6 percent of the catch. All other species observed accounted for less than 5 percent of the catch. The number of species captured at each location in 2013 using trap nets varied from 15 at Maple Bay to 23 at Willow Bay (Table 5). The highest abundances were observed at Ninemile (788 individuals), while the lowest abundance was observed at Maple Bay (189 individuals).

Between May 29 and October 10, 2013 gill nets were set at ten different locations throughout Onondaga Lake for approximately two hours each, for a total of 58 gill net sets (Table 6). The highest abundance and species richness were observed at the Outlet, with 54 individuals and ten species observed (Table 7). The lowest abundance was seen at Hiawatha Point (13 individuals) and the lowest species richness was at Iron Bridge (5 species). A total of 326 fish of 15 different species were captured using gill nets during the 2013 sampling period (Table 7). The most abundant fish captured with gillnets was Walleye, making up 38 percent of the total catch. Common Carp, Channel Catfish, and Freshwater Drum were the next most abundant species, making up 15.6 percent, 15.3 percent, and 12.3 percent, respectively. All other species observed individually accounted for less than 10 percent of the total catch. In addition, eight Lake Sturgeon were captured during regular gill netting: two at Ninemile and the Outlet, one at Hiawatha Point, and three at the Permanent Habitat Module (PHM) location (Table 7). Catch-per-unit-effort (CPUE) (fish per hour) using gill nets averaged approximately 5.18 fish per hour during the 2013 sampling season.

Thirty-two Lake Sturgeon gill nets were set at ten locations between May 21st and October 10th 2013. They were fished for an average of four hours per net. Nineteen Lake Sturgeon were captured with a CPUE of approximately 0.1965 (excluding the eight sturgeon captured during community sampling; Table 8). Due to high water temperatures, sampling was suspended in the months of July and August. Lake Sturgeon length ranged from 1011 to 1778 mm, with an average length of 1279 mm. Not all Lake Sturgeon were weighed because some surpassed the maximum weight limit (20 kg) of the scale. Of those individuals that were captured and weighed, weights ranged from 13.2 kg to 20 kg (Table 8). Two of the 27 Lake Sturgeon were USGS recaptures, and two were recaptures previously recorded by SUNY-ESF. PIT detector malfunction in the latter part of the sampling period prevented the captured sturgeon from being scanned for PIT tags, as well as being tagged if they were new captures. Lake Sturgeon were captured at seven of the ten sampling locations, including six at Hiawatha Point, four at the Outlet, six at the PHM, six at Ninemile, one each at Parsons and the Marina, and three at the Wastebeds (Table 8).

A total of 2,670 individuals of 16 species were captured using seines. Catches using seines were dominated by Banded Killifish (61 percent) and Largemouth Bass (22 percent). Round Gobies accounted for 10 percent of the catch, while Bluegill, Brook Stickleback, Emerald Shiner, Rock Bass, and Tessellated Darters all made of 1 percent of the total catch. All other

species observed contributed less than 1 percent of the catch. The number of species captured at each location using seines ranged from 4 at Metro to 11 at PHM (Table 9).

4.2.2 Fish Population Assessment for Adult Pumpkinseed, Bluegill, Largemouth Bass, and Smallmouth Bass

A total of 2,573 Bluegill were captured and 20 were recaptured during the 2013 sampling period. The Schnabel method produced a population estimate of 117,106 Bluegill in Onondaga Lake with a 95 percent confidence interval of 82,620 to 201,005.

A total of 3,166 Pumpkinseed were captured and 42 were recaptured during the 2013 sampling period. The Schnabel method produced a population estimate of 86,188 of Pumpkinseed in Onondaga Lake with a 95 percent confidence interval of 66,534 to 122,323.

A total of 3,819 Largemouth Bass ≥300mm were captured and 32 were recaptured during the 2013 sampling period. The Schnabel method produced a population estimate of 3,819 Largemouth Bass in Onondaga Lake with a 95 percent confidence interval of 2,859 to 5,752.

A total of 67 Smallmouth Bass were captured and 3 were recaptured during the 2013 sampling period. However, the Schnabel method requires greater than three recaptures to calculate a population estimate.

Changes in net deployments at four locations due to ongoing dredging and capping efforts in the lake during 2013 likely did not affect estimates of fish population sizes based on a comparison of 2013 results with results from recent prior years.

4.3 ZOOPLANKTON MERCURY RESULTS FOR 2013

Table 10 and Figure 5A present total mercury and methylmercury concentrations measured in zooplankton collected at South Deep in 2013. Methylmercury as a percentage of total mercury in the 2013 zooplankton samples is presented in Figure 5B. Figure 5B does not include results for August 12, September 5, and September 9, 2013, because total mercury could not be measured due to limited zooplankton biomass that was able to be collected on those dates.

The highest total mercury concentration observed in 2013 in zooplankton was 0.14 mg/kg on a wet-weight basis observed on October 14 three weeks prior to fall turnover. The highest methylmercury concentrations observed in 2013 in zooplankton was 0.016 mg/kg also on October 14. The highest portion of methylmercury observed in 2013 as a percentage of total mercury was 87 percent on August 26 and, with the exception of results from August 26, percentages of methylmercury ranged from 6 on September 23 to 27 percent on July 1, 2013.

SECTION 5

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TABLES

TABLE 1

ONONDAGA LAKE FISH TISSUE, HABITAT AND BIOLOGICAL MONITORING OBJECTIVES, PROGRAM ELEMENTS, AND DATA USES FOR 2013

Element	Objective	Data Uses
Adult sport fish and prey fish tissue sampling and analysis	Establish chemical and physical conditions	Provide basis for comparing concentrations of mercury and organic parameters of interest to prior year results and in the long term to determine when fish tissue target concentrations for human health and wildlife protection are met.
Other biota sampling[a]	Provide additional data for future understanding of remedy effectiveness in achieving preliminary remediation goals	Assess zooplankton mercury and fish community - fish population that may contribute to variability in fish mercury concentrations. Fish community - fish population data also provide additional data prior to re-establishing habitat following dredging and capping.

Adapted from Table ES.1 in the draft Onondaga Lake Monitoring and Maintenance Scoping Document (Parsons, Anchor QEA and Exponent, 2012a)

[a] Other biota besides adult sport fish and prey fish (i.e zooplankton mercury and fish community - fish populations)

TABLE 2

SUMMARY OF TISSUE AND BIOLOGICAL MONITORING WORK COMPLETED DURING 2013

WORK PLAN AND MEDIA	LOCATIONS	PRIMARY ACTIVITY (May through October)
Zooplankton	South Deep	Monthly to weekly sampling and analyses for total mercury and methylmercury.
Adult Sport Fish	SMUs 2 through 7 (8 locations)	Collected and analyzed for chemical parameters of interest a total of 100 adult sport fish (25 smallmouth bass, 25 walleye, 25 pumpkinseed and 25 brown bullhead). Collected fish lakewide with trap nets, gill nets and seines to quantify fish community composition. Collected pumpkinseed, bluegill and largemouth bass lakewide to assess fish populations.
Prey (forage) Fish	SMUs 2 through 7 (same 8 locations as for adult sport fish)	Collected and analyzed composites of prey fish from each of eight locations for a total of 40 composites that included 16 composites of alewife and 24 composites of minnows.

Note: Fall turnover in Onondaga Lake during 2013 occurred on or about November 3.

TABLE 3
SUMMARY OF 2013 FISH TISSUE CHEMICAL CONCENTRATIONS MEASURED IN ONONDAGA LAKE
(wet weight basis)

Parameter	Prep	Species	Sample Size	Number of Detections	Arithmetic Mean[1]	Min[2]	Max	Standard Deviation[3]	Standard Error[4]
Mercury (mg/kg)[1]	whole body	Prey fish[5]	40	40	0.14	0.04	0.35	0.08	0.01
	fillet	Brown bullhead	24	24	0.34	0.04	1.20	0.31	0.06
	fillet	Smallmouth bass	25	25	0.78	0.29	1.90	0.36	0.07
	fillet	Walleye	25	25	1.39	0.46	2.30	0.51	0.10
	fillet	Pumpkinseed	25	25	0.20	0.04	0.43	0.11	0.02
Total PCBs (mg/kg)[1]	whole body	Prey fish	40	40	0.21	0.01	0.54	0.19	0.03
	fillet	Brown bullhead[2]	25	20	0.03	0.005	0.17	0.04	0.01
	fillet	Smallmouth bass	25	25	0.16	0.03	0.78	0.15	0.03
	fillet	Walleye	25	25	0.58	0.10	2.08	0.41	0.08
	fillet	Pumpkinseed[2]	25	18	0.02	0.007	0.08	0.02	0.004
Sum of DDT and metabolites (mg/kg)[1]	whole body	Prey fish	40	40	0.02	0.002	0.07	0.02	0.003
	fillet	Brown bullhead	25	25	0.002	0.0004	0.02	0.003	0.001
	fillet	Smallmouth bass	25	25	0.02	0.003	0.08	0.02	0.003
	fillet	Walleye	25	25	0.05	0.008	0.14	0.03	0.01
	fillet	Pumpkinseed[2]	25	22	0.002	0.0003	0.004	0.0009	0.0002
Hexachlorobenzene (mg/kg)[1]	whole body	Prey fish[2]	40	28	0.01	0.0002	0.04	0.01	0.002
	fillet	Brown bullhead	25	18	0.0009	0.00019U[6]	0.003	0.0008	0.0002
	fillet	Smallmouth bass[2]	25	24	0.002	0.0007	0.005	0.001	0.0002
	fillet	Walleye	25	25	0.008	0.003	0.02	0.004	0.0008
	fillet	Pumpkinseed[2]	25	7	0.0008	0.0002	0.003	0.0006	0.0001
Percent Lipid (% by weight)[1]	whole body	Prey fish	40	40	3.18	0.32	11.00	3.40	0.54
	fillet	Brown bullhead	25	25	0.16	0.02	0.94	0.22	0.04
	fillet	Smallmouth bass	25	25	0.40	0.09	0.95	0.24	0.05
	fillet	Walleye	25	25	1.67	0.46	4.10	0.84	0.17
	fillet	Pumpkinseed	25	25	0.13	0.03	0.49	0.11	0.02

1. For individual non-detects, 1/2 the reporting limit was used in calculations.
2. Some detected concentrations were found to be lower than the reporting limit of some non-detect results.
3. Standard deviation is an estimate of the variability of the data points used to calculate the mean.
4. Standard error is an estimate of how close the calculated mean is likely to be to the true population mean.
5. The average, minimum, and maximum mercury concentrations for alewife (a prey fish subset) were 0.10, 0.042, and 0.13 mg/kg respectively. Alewife made up 16 of the 40 prey fish composite samples collected and analyzed.
6. U means not detected at the reporting limit specified.

TABLE 4

SUMMARY OF SPECIES COLLECTED BY GEAR TYPE FOR
ONONDAGA LAKE FISH COMMUNITY ASSESSMENT: MAY-OCTOBER 2013

Common Name	Scientific Name	Trap Net	Gill Net	Electroshocker	Seining
Alewife	*Alosa pseudoharengus*	x			
Banded Killifish	*Fundulus diaphanus*	x			x
Black Bullhead	*Ameiurus melas*	x			
Black Crappie	*Pomoxis nigromaculatus*	x			
Bluegill Sunfish	*Lepomis macrochirus*	x		x	x
Bluntnose Minnow	*Pimephales notatus*	x			x
Bowfin	*Amia calva*	x			
Brook Stickleback	*Culaea inconstans*	x			x
Brown Bullhead	*Ameiurus nebulosus*	x	x		x
Brown Trout	*Salmo trutta*		x		
Channel Catfish	*Ictalurus punctatus*	x	x		
Common Carp	*Cyprinus carpio*	x	x		x
Emerald Shiner	*Notropis atherinoides*	x			x
Fathead Minnow	*Pimephales promelas*	x			
Freshwater Drum	*Aplodinotus grunniens*	x	x		
Gizzard Shad	*Dorosoma cepedianum*	x	x		
Golden Shiner	*Notemigonus crysoleucas*	x			
Goldfish	*Carassius auratus auratus*	x			
Green Sunfish	*Lepomis cyanellus*	x			
Lake Sturgeon	*Acipenser fulvescens*		x		
Largemouth Bass	*Micropterus salmoides*	x		x	x
Longnose Gar	*Lepisosteus osseus*	x			
Northern Pike	*Esox lucius*	x	x		
Pumpkinseed	*Lepomis gibbosus*	x		x	x
Quillback	*Carpiodes cyprinus*		x		
Rock Bass	*Ambloplites rupestris*	x			x
Round Goby	*Neogobius melanostomus*	x			x
Common Rudd	*Scardinius erythrophthalmus*	x			
Shorthead Redhorse	*Moxostoma macrolepidotum*	x	x		
Silver Redhorse	*Moxostoma anisurum*	x			
Smallmouth Bass	*Micropterus dolomieu*	x	x	x	x
Spottail Shiner	*Notropis hudsonius*	x			
Tadpole Madtom	*Noturus gyrinus*				x
Tesselated Darter	*Etheostoma olmstedi*	x			x
Tiger Muskellunge	*Esox masquinongy*	x	x		
Walleye	*Sander vitreus*		x		
White Perch	*Morone americana*	x	x		
White Sucker	*Catostomus commersonii*	x	x		
Yellow Bullhead	*Ameiurus natalis*	x			
Yellow Perch	*Perca flavescens*	x			x
	Totals	**35**	**15**	**4**	**15**

TABLE 5

SUMMARY OF NUMBER OF INDIVIDUALS PER SPECIES CAPTURED IN TRAP NETS MAY-OCTOBER 2013

		Station Description (Station Identifier OL-STA)														
Common Name	**Scientific Name**	**Rte 690 (20158)**	**South Parsons (20158)**	**North Parsons (20158)**	**Parsons (20158)**	**Wastebeds 1-8 (30093)**	**Ninemile (40212)**	**Permanent Habitat Module (50057)**	**Maple Bay (50057)**	**Willow Bay (50057)**	**Marina (50058)**	**Hiawatha Pt. (50058)**	**Iron Bridge (50059)**	**North Ley Creek (60225)**	**Total Fish Captured**	**Percentage of Community**
Alewife	*Alosa pseudoharengus*	203	1	49	50	133	31	64	16	18	18	147	129	103	**912**	**16.3**
Banded Killifish	*Fundulus diaphanus*	4		3	3	41	5	11	1	5	16		4		**90**	**1.6**
Black Bullhead	*Ameiurus melas*										1				**1**	**0.0**
Black Crappie	*Pomoxis nigromaculatus*						1			1		1			**3**	**0.1**
Bluegill Sunfish	*Lepomis macrochirus*	6	10	2	12	164	515	107	84	243	118	105	88	178	**1620**	**29.0**
Bluntnose Minnow	*Pimephales notatus*							1		2	4				**7**	**0.1**
Bowfin	*Amia calva*	2	3	3	6	17	7	5	5	10	5	4	2	6	**69**	**1.2**
Brook Stickleback	*Culaea inconstans*					2	2	4			1	2			**11**	**0.2**
Brown Bullhead	*Ameiurus nebulosus*	5	3	12	15	20	3	45		47	27	7	12	28	**209**	**3.7**
Channel Catfish	*Ictalurus punctatus*	2							1					1	**4**	**0.1**
Common Carp	*Cyprinus carpio*	7				13	5	3	4	9	15	24	10	13	**103**	**1.8**
Emerald Shiner	*Notropis atherinoides*	16				8	11	14		4			5	2	**60**	**1.1**
Fathead Minnow	*Pimephales promelas*									1					**1**	**0.0**
Freshwater Drum	*Aplodinotus grunniens*	9		2	2						1		3		**15**	**0.3**
Gizzard Shad	*Dorosoma cepedianum*	20	3		3	11	6	8	14	4	1	9	2	12	**90**	**1.6**
Golden Shiner	*Notemigonus crysoleucas*	14	2	14	16	20	4	2	1	41	15	3	27	6	**149**	**2.7**
Goldfish	*Carassius auratus auratus*	4		3	3	4						1	6	1	**19**	**0.3**
Green Sunfish	*Lepomis cyanellus*						1			2	1				**4**	**0.1**
Largemouth Bass	*Micropterus salmoides*	15	8		8	42	70	16	23	63	30	14	24	12	**317**	**5.7**
Longnose Gar	*Lepisosteus osseus*	1	4		4		1							5	**11**	**0.2**
Northern Pike	*Esox lucius*									2					**2**	**0.0**
Pumpkinseed	*Lepomis gibbosus*	4	7	2	9	14	70	10	14	75	30	37	25	29	**317**	**5.7**
Rock Bass	*Ambloplites rupestris*		3	2	5	9	2	3	4	4	10	2	5	6	**50**	**0.9**
Round Goby	*Neogobius melanostomus*		1		1	2	2	1			1	1	1	1	**10**	**0.2**
Rudd	*Scardinius erythrophthalmus*	1				17			1			8	11	157	**195**	**3.5**
Shorthead Redhorse	*Moxostoma macrolepidotum*	1										1			**2**	**0.0**
Silver Redhorse	*Moxostoma anisurum*											1			**1**	**0.0**
Smallmouth Bass	*Micropterus dolomieu*									1					**1**	**0.0**
Spottail Shiner	*Notropis hudsonius*										1				**1**	**0.0**
Sunfish (YOY)	*Lepomis spp.*	278				65	8	2		3	65	3	191	22	**637**	**11.4**
Tesselated Darter	*Etheostoma olmstedi*								1						**1**	**0.0**
Tiger Muskellenge	*Esox masquinongy*	1													**1**	**0.0**
White Perch	*Morone americana*	27	1	218	219	6	7	1	2	3	2	7	27	81	**382**	**6.8**
White Sucker	*Catostomus commersonii*	2		19	19	1	2			5			3		**32**	**0.6**
Yellow Bullhead	*Ameiurus natalis*									1			2	1	**4**	**0.1**
Yellow Perch	*Perca flavescens*	1	12	6	18	15	35	5	18	23	13	34	44	52	**258**	**4.6**
	Total Count	**623**	**58**	**260**	**393**	**604**	**788**	**302**	**189**	**567**	**375**	**411**	**621**	**716**	**5589**	
	Number of Species	**22**	**13**	**13**	**17**	**20**	**21**	**18**	**15**	**23**	**21**	**20**	**21**	**20**	**35**	

TABLE 6

2013 GILL NET SAMPLING LOCATIONS IN ONONDAGA LAKE

Location Name	Sampling Date	Set Time	End Time	Water Depth (m)		Number Times Sampled
				Shallow	Deep	
Route 690 Point (OL-STA-20158)	7/16/2013	7:58 PM	9:01 PM	3.9	7.9	4
	8/6/2013	8:25 PM	9:26 PM	3.4	8.6	
	9/10/2013	8:54 PM	9:52 PM	3.0	7.8	
	10/10/2013	6:43 PM	8:09 PM	3.3	6.9	
Parsons (OL-STA-20158)	5/31/2013	7:57 PM	9:00 PM	NA	NA	6
	6/20/2013	9:05 PM	10:05 PM	NA	NA	
	7/15/2013	10:38 PM	11:44 PM	4.0	7.4	
	8/6/2013	9:17 PM	10:19 PM	4.2	7.0	
	9/10/2013	9:46 PM	10:46 PM	3.6	7.0	
	10/9/2013	8:57 PM	9:56 PM	4.2	6.2	
Wastebeds 1-8 (OL-STA-30093)	5/29/2013	7:57 PM	8:50 PM	3.5	8.6	6
	6/20/2013	8:20 PM	9:23 PM	NA	NA	
	7/16/2013	8:31 PM	10:23 PM	3.9	7.8	
	8/6/2013	7:50 PM	8:50 PM	3.4	7.6	
	9/9/2013	9:30 PM	10:31 PM	2.9	6.0	
	10/9/2013	6:57 PM	9:00 PM	2.4	8.0	
Ninemile (OL-STA-40212)	5/29/2013	8:10 PM	9:28 PM	4.2	6.0	6
	6/19/2013	8:47 PM	9:48 PM	NA	NA	
	7/16/2013	10:10 PM	11:10 PM	3.8	5.9	
	8/5/2013	9:12 PM	10:12 PM	3.8	5.5	
	9/9/2013	9:54 PM	10:54 PM	4.0	6.9	
	10/10/2013	7:11 PM	8:45 PM	5.5	6.2	
Outlet (OL-STA-50057)	5/31/2013	10:18 PM	11:18 PM	NA	NA	6
	6/19/2013	10:08 PM	11:08 PM	NA	NA	
	7/17/2013	8:41 PM	9:50 PM	3.3	6.3	
	8/5/2013	7:34 PM	8:38 PM	3.4	6.8	
	9/10/2013	7:30 PM	8:31 PM	3.7	7.3	
	10/8/2013	6:54 PM	8:18 PM	2.9	6.2	
Permanent Habitat Module (OL-STA-50057)	5/31/2013	11:00 PM	NA	NA	NA	6
	6/19/2013	9:30 PM	10:34 PM	NA	NA	
	7/17/2013	7:53 PM	8:53 PM	3.6	8.7	
	8/5/2013	7:54 PM	9:19 PM	4.6	8.4	
	9/10/2013	8:17 PM	9:18 PM	3.1	8.7	
	10/10/2013	8:36 PM	9:40 PM	3.1	7.5	
Hiawatha Pt. (OL-STA-50057)	5/31/2013	11:36 PM	12:36 PM	NA	NA	6
	6/19/2013	10:58 PM	11:59 PM	NA	NA	
	7/15/2013	8:39 PM	9:40 PM	3.8	10.0	
	8/5/2013	9:35 PM	10:59 PM	3.8	8.5	
	9/10/2013	7:00 PM	8:07 PM	3.8	7.2	
	10/8/2013	8:12 PM	9:10 PM	3.6	9.6	
Marina (OL-STA-50058)	5/19/2013	10:14 PM	11:03 PM	4.3	10.1	6
	6/19/2013	11:48 PM	12:53 PM	NA	NA	
	7/15/2013	9:47 PM	10:47 PM	4.1	9.2	
	8/5/2013	10:55 PM	12:00 PM	2.9	9.4	
	9/9/2013	7:14 PM	8:14 PM	3.1	7.8	
	10/8/2013	6:36 PM	7:50 PM	3.4	6.2	
Iron Bridge (OL-STA-50059)	5/29/2013	9:55 PM	10:46 PM	4.1	9.5	6
	6/20/2013	10:40 PM	11:42 PM	NA	NA	
	7/15/2013	9:17 PM	10:18 PM	4.1	9.2	
	8/6/2013	10:31 PM	11:31 PM	3.3	9.1	
	9/9/2013	8:58 PM	9:35 PM	3.0	9.6	
	10/9/2013	5:45 PM	6:45 PM	2.9	9.9	
Ley Creek (OL-STA-60225)	5/31/2013	8:22 PM	9:39 PM	NA	NA	6
	6/20/2013	9:40 PM	10:45 PM	NA	NA	
	7/15/2013	8:00 PM	9:02 PM	3.9	8.8	
	8/6/2013	9:58 PM	10:59 PM	3.5	8.3	
	9/9/2013	7:46 PM	9:04 PM	3.0	6.7	
	10/9/2013	6:37 PM	8:32 PM	3.2	6.7	
Total Number of Gill Net Sets						58

TABLE 7

SUMMARY OF NUMBER OF INDIVIDUALS PER SPECIES CAPTURED IN GILL NETS: MAY-OCTOBER 2013

		Station Description (Station Identifier: OL-STA)											
Common Name	**Scientific Name**	**Rte 690 (20158)**	**Parsons (20158)**	**Wastebeds 1-8 (30093)**	**Ninemile (40212)**	**Permanent Habitat Module (50057)**	**Marina (50058)**	**Hiawatha Pt. (50058)**	**Iron Bridge (50059)**	**North Ley Creek (60225)**	**Outlet (50057)**	**Total Fish Captured**	**Percentage of Community**
Brown Bullhead	*Ameiurus nebulosus*			1			1		1			**3**	**0.9**
Brown Trout	*Salmo trutta*				1	1						**2**	**0.6**
Common Carp	*Cyprinus carpio*	4	3	2	6	2	8	2	5	9	10	**51**	**15.6**
Channel Catfish	*Ictalurus punctatus*	11	2	4	10	1	9	4		7	2	**50**	**15.3**
Freshwater Drum	*Aplodinotus grunniens*	10	5	3	4	1	11	1	1	1	3	**40**	**12.3**
Gizzard Shad	*Dorosoma cepedianum*	4		3	1		3	1	2		1	**15**	**4.6**
Lake Sturgeon	*Acipenser fulvescens*				2	3		1			2	**8**	**2.5**
Northern Pike	*Esox lucius*										2	**2**	**0.6**
Quillback	*Carpoides cyprinus*					1						**1**	**0.3**
Shorthead Redhorse	*Moxostoma macrolepidotum*						1			1	1	**3**	**0.9**
Smallmouth Bass	*Micropterus dolomieu*	3	1	1	3		1			3	10	**22**	**6.8**
Tiger Muskellunge	*Noturus gyrinus*						1					**1**	**0.3**
Walleye	*Sander vitreus*	10	30	15	10	5	16	4	5	7	22	**124**	**38.0**
White Perch	*Morone americana*											**0**	**0.0**
White Sucker	*Catostomus commersoni*		1	1		1					1	**4**	**1.2**
	Total Count	**42**	**42**	**30**	**37**	**15**	**51**	**13**	**14**	**28**	**54**	**326**	
	Number of Species	**6**	**6**	**8**	**8**	**8**	**9**	**6**	**5**	**6**	**10**	**15**	

TABLE 8

LAKE STURGEON CATCH AND TAG INFORMATION - 2013

Location	Sampling Date	Coordinates	Total Length (mm)	Weight (kg)	Carlin Tag	Pit Tag	Notes	Recapture?
Hiawatha Pt.	5/21/2013	430310 N 4761259 W	1467		99	2050891		No
Hiawatha Pt.	5/21/2013	430310 N 4761259 W	1025		98		PIT detected, but no number	NA
Hiawatha Pt.	5/21/2013	430310 N 4761259 W	1011			20477625		No
Hiawatha Pt.	5/21/2013	430310 N 4761259 W	1020		97	20437564		No
Hiawatha Pt.	5/21/2013	430310 N 4761259 W	1030		96	20429311		No
Outlet	5/21/2013	430651 N 4761425 W	1018		95	#00095605		No
Outlet	5/21/2013	430651 N 4761425 W	1025				Listed as USGS 1146	No
PHM	5/22/2013	398818 N 4773657 W	1014		49	#00095626		No
PHM	5/22/2013	398818 N 4773657 W	1350		48	#00095615		No
PHM	5/22/2013	398818 N 4773657 W	1397		50	#00095548	Cartilage of nose exposed	No
Parsons	6/17/2013	430451 N 4761234 W	1778		94	#00095630		No
Marina	10/9/2013	430515 N 4761232 W	1346	19.8	53		PIT detector malfunction	No
Ninemile	10/10/2013	430530 N 4761349 W	1295	13.8	55		PIT detector malfunction	No
Ninemile	10/10/2013	430530 N 4761349 W	1498	15.2	56		PIT detector malfunction	No
Ninemile	10/10/2013	430530 N 4761349 W	1270	19.8	57		PIT detector malfunction	No
Ninemile	10/10/2013	430530 N 4761349 W	1346	19.3	58		PIT detector malfunction	No
Wastebeds	10/10/2013	430521 N 4761320 W	1270	16.8	97		PIT detector malfunction	No
Wastebeds	10/10/2013	430521 N 4761320 W	1320	17.1	54		PIT detector malfunction	No
Wastebeds	10/10/2013	430521 N 4761320 W	1473	18.2	93		PIT detector malfunction	No
Regular Gill Net Catches (These fish were measured and released)								
Ninemile	5/29/2013	430530 N 4761349 W	1190		18			Yes
Ninemile	5/29/2013	430530 N 4761349 W	1441					
PHM	6/19/2013	398818 N 4773657 W	1295		51	#00095610		No
PHM	9/10/2013	398818 N 4773657 W	1397		50	#00095548	Cartilage of nose exposed	Yes
Outlet	10/8/2013	430651 N 4761425 W	1143	13.2	18	20477894		Yes
Outlet	10/8/2013	430651 N 4761425 W	1346	20		16642114	Listed as USGS 850	No
Hiawatha Pt.	10/8/2013	430310 N 4761259 W	1346	17.8	52			No
PHM	10/10/2013	398818 N 4773657 W	1442	20	92		PIT detector malfunction	No

TABLE 9

SUMMARY OF NUMBER OF INDIVIDUALS PER SPECIES CAPTURES BY SEINING - 2013

		Station Description (Station Identifier: OL-STA)									
Common Name	**Scientific Name**	**Wastebeds 1-8 (30093)**	**Ninemile (40212)**	**Permanent Habitat Module (50057)**	**Maple Bay (50057)**	**Willow Bay (50057)**	**Marina (50058)**	**Iron Bridge (50059)**	**Metro (70124)**	**Total Fish Captured**	**Percentage of Community**
Banded Killifish	*Fundulus diaphanus*	582	37	249	142	105	218	216	83	**1632**	**61.1**
Bluegill Sunfish	*Lepomis macrochirus*			5	3	4		19		**31**	**1.2**
Bluntnose Minnow	*Pimephales notatus*				1		3	4		**8**	**0.3**
Brook Stickleback	*Culaea inconstans*	1	3				36			**40**	**1.5**
Brown Bullhead	*Ameiurus nebulosus*			8			5			**13**	**0.5**
Common Carp	*Cyprinus carpio*	2		1			1		2	**6**	**0.2**
Emerald Shiner	*Notropis atherinoides*				9		15			**24**	**0.9**
Sunfish YOY	*Lepomis sp.*			1	18	2	6			**27**	**1.0**
Largemouth Bass	*Micropterus salmoides*	28	66	179	53	82	70	90	7	**575**	**21.5**
Pumpkinseed	*Lepomis gibbosus*			4		4				**8**	**0.3**
Rock Bass	*Ambloplites rupestris*	6	4	1	1		1	1		**14**	**0.5**
Round Goby	*Neogobius melanostomus*	17	7	12	105	110		3	3	**257**	**9.6**
Smallmouth Bass	*Micropterus dolomieu*							2		**2**	**0.1**
Tesselated Darter	*Etheostoma olmstedi*	4		6	3		5			**18**	**0.7**
Tadpole Madtom	*Noturus gyrinus*			7		1				**8**	**0.3**
Yellow Perch	*Perca flavescens*		1		2	2		2		**7**	**0.3**
	Total Count	**640**	**118**	**473**	**337**	**310**	**360**	**337**	**95**	**2670**	
	Number of Species	**7**	**6**	**11**	**10**	**8**	**10**	**8**	**4**	**16**	

TABLE 10

MERCURY CONCENTRATIONS IN ZOOPLANKTON SAMPLES COLLECTED AT SOUTH DEEP IN 2013

Field Sample ID	Date	Total mercury (mg/kg wet weight)	Methylmercury (mg/kg wet weight)	Methylmercury (Percent of Total Mercury)
OL-1904-01	5/20/13	0.028	0.0028	10
OL-1911-01	6/17/13	0.073J	0.0072	10
OL-1919-01	7/1/13	0.041	0.011	27
OL-1926-01	7/15/13	0.12	0.011	9
OL-1933-01	7/29/13	0.056	0.011	20
OL-1940-01	8/12/13	NM	0.011	No value
OL-1949-01	8/26/13	0.0083	0.0072	87
OL-1953-01	9/5/13	NM	0.0073	No value
OL-1957-01	9/9/13	NM	0.0084	No value
OL-1964-01	9/16/13	0.088	0.0058	7
OL-1969-01	9/23/13	0.074	0.0046	6
OL-1974-01	9/30/13	0.1	0.0097	10
OL-1979-01	10/8/13	0.071	0.0071	10
OL-1783-01	10/14/13	0.14	0.016	11
OL-1988-01	10/21/13	0.042	0.0081	19
OL-1994-01	10/28/13	0.065	0.011	17
OL-2025-01	11/4/13	0.068	0.011	16
OL-2029-01	11/20/13	0.059	0.015	25

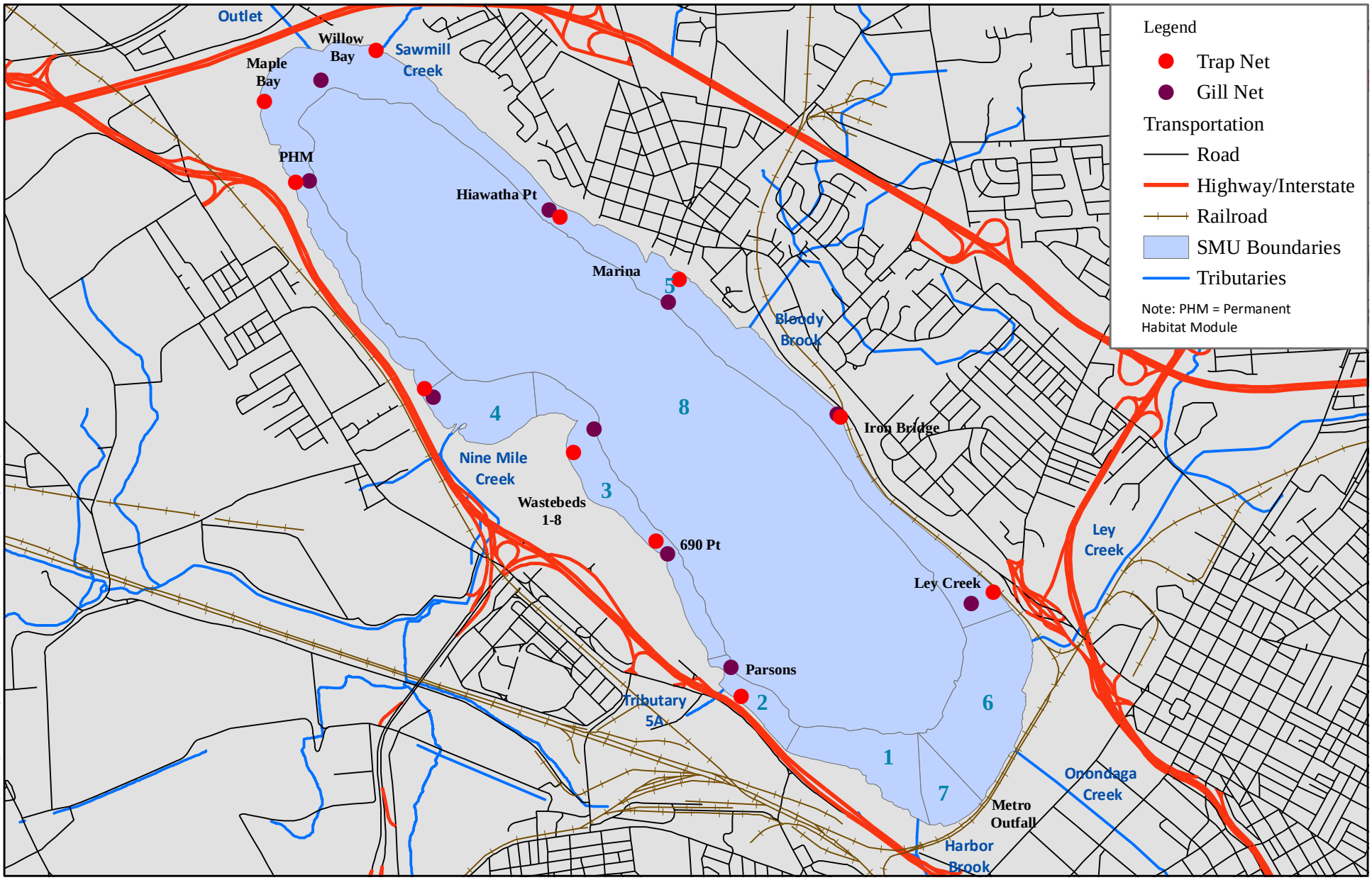
J - estimated value

NM – not measured due to insufficient quantity of zooplankton biomass to analyze for both total mercury and methylmercury despite extra field team effort completing an additional tow with the zooplankton net to provide additional biomass.

No value – unable to quantify a percentage of methylmercury because total mercury was not mearured for the reason explained above.

FIGURES

Figure 1
Fish Sampling Locations for 2013
Tissue Chemical Analyses



\\Helios\d_drive\Projects\Honeywell\Onondaga_Lake_Remediation(090139-01)\Baseline_Monitoring\GIS\Maps\ESF_Fish_Comm_20140113.mxd MCS 1/13/2014

ANCHOR QEA

Honeywell PARSONS

Figure 2
Sampling Locations for 2013
Fish Community Assessment

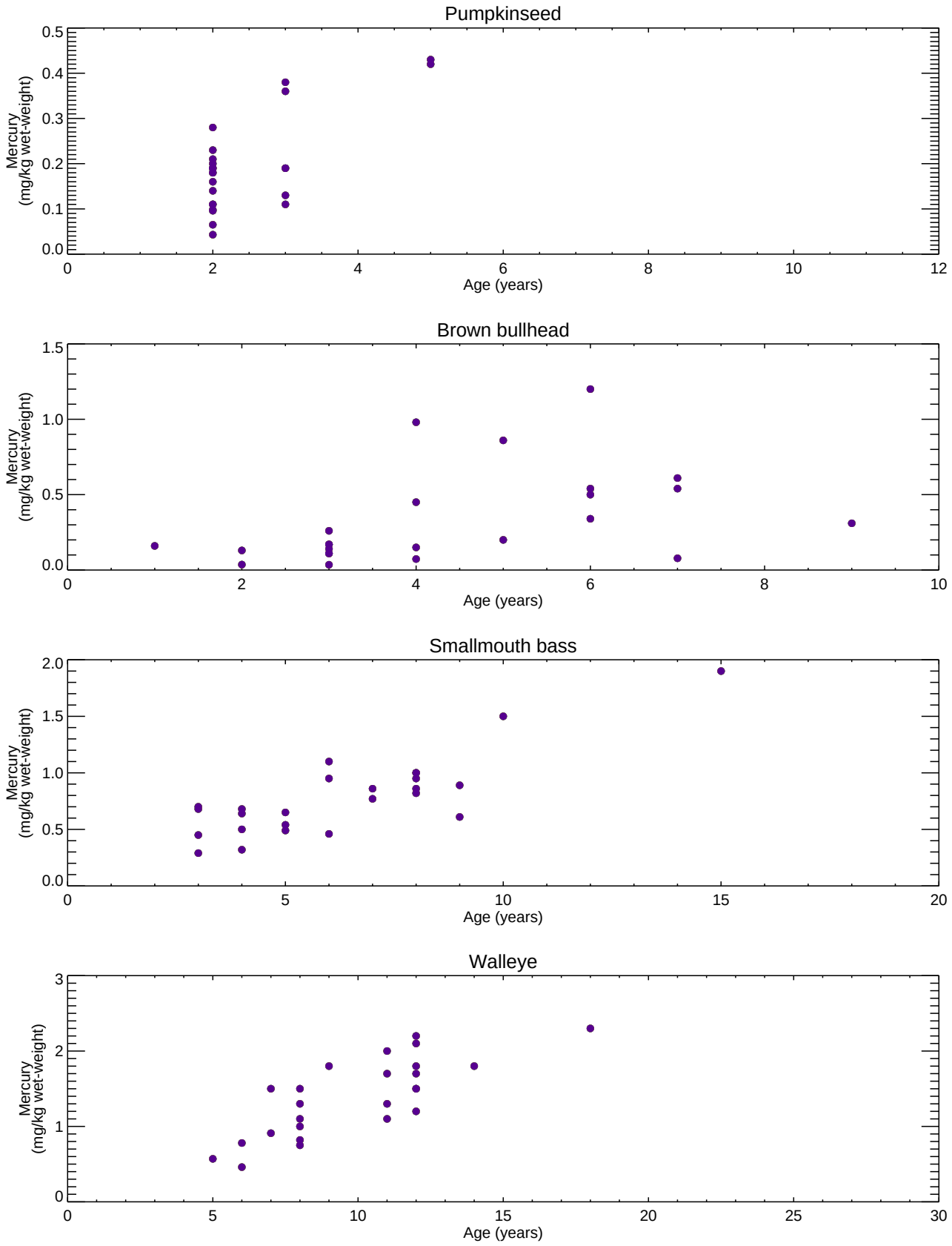


Figure 3. Mercury vs. Age in Onondaga Lake Fish Sampled in 2013 Only.

Data source: 2012-2013 Operations Maintenance and Monitoring (OMM)

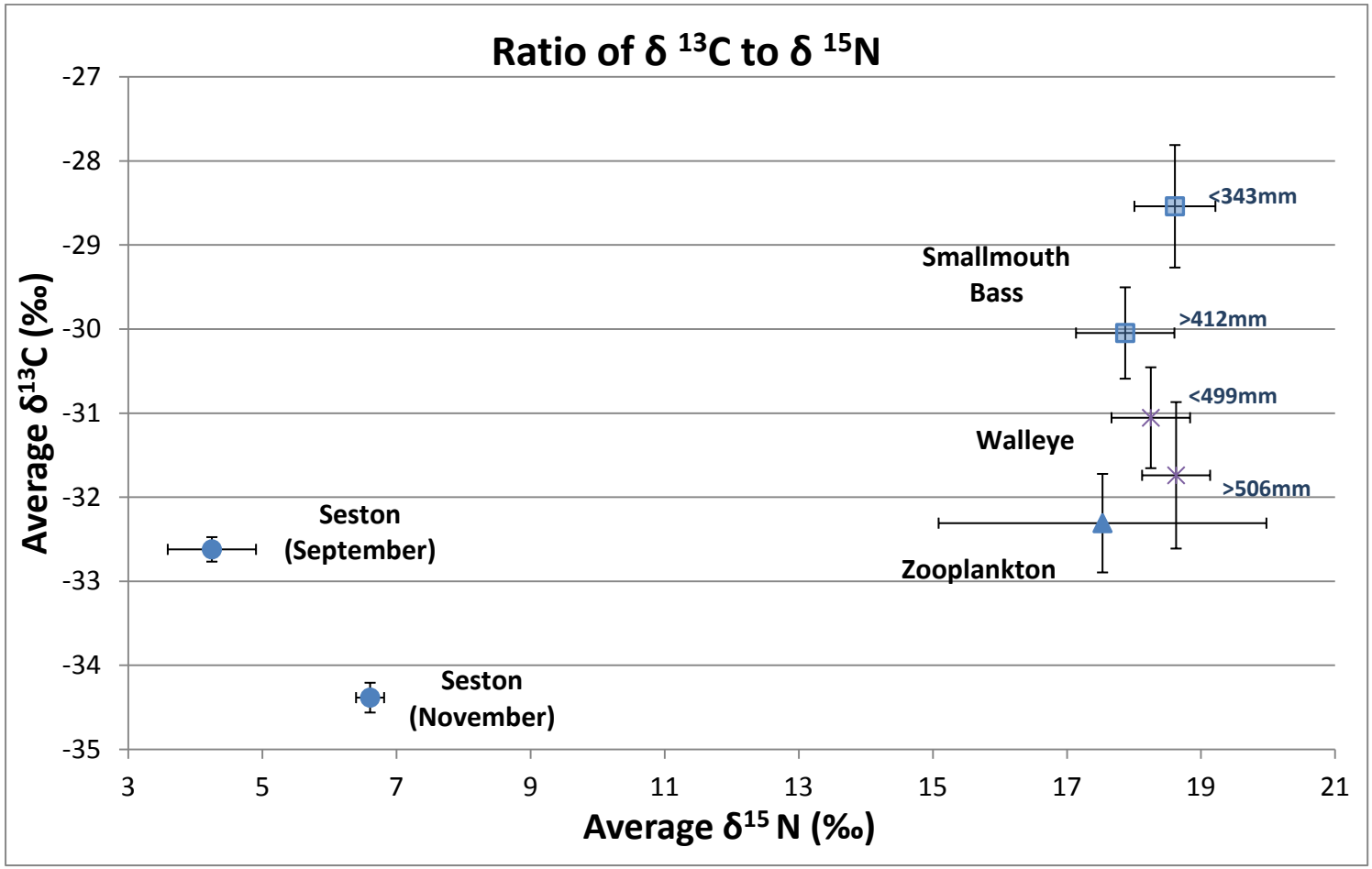


Figure 4 Ratio of $\delta^{13}C$ to $\delta^{15}N$ for Samples Collected in 2013

Note: Smallmouth bass and walleye ratios were averaged by length categories and labeled in blue font.
Values are mean with 1 standard deviation error bars.

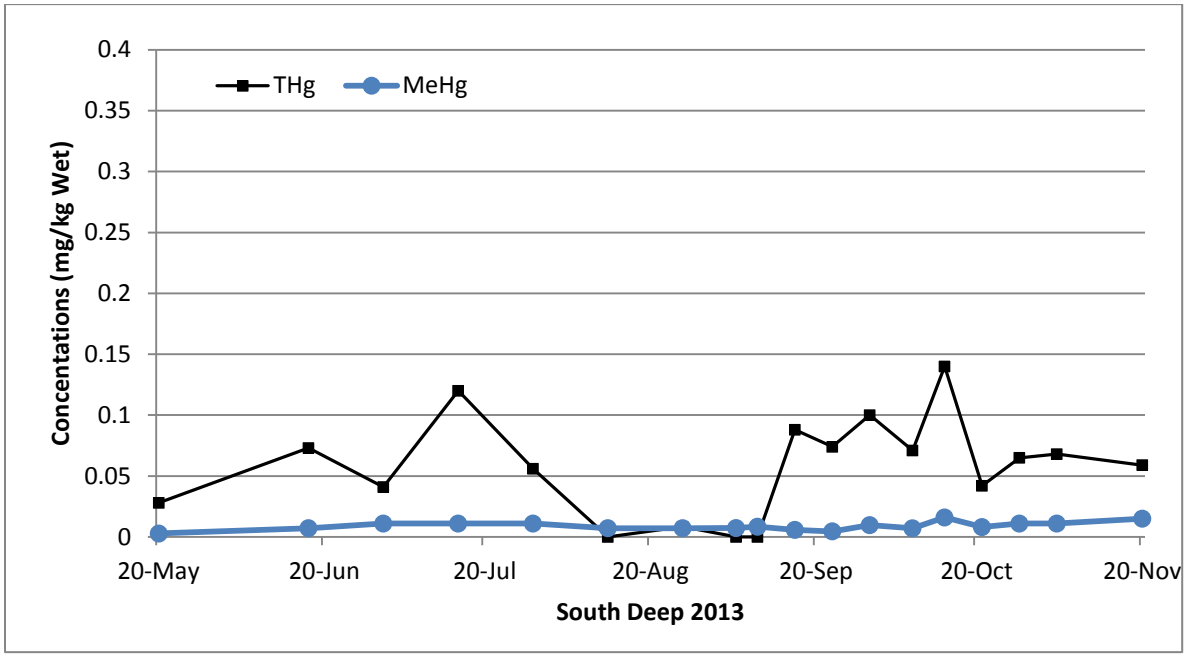


Figure 5A Total Mercury (Hg) and Methylmercury (MeHg) Concentrations in Zooplankton at South Deep in 2013

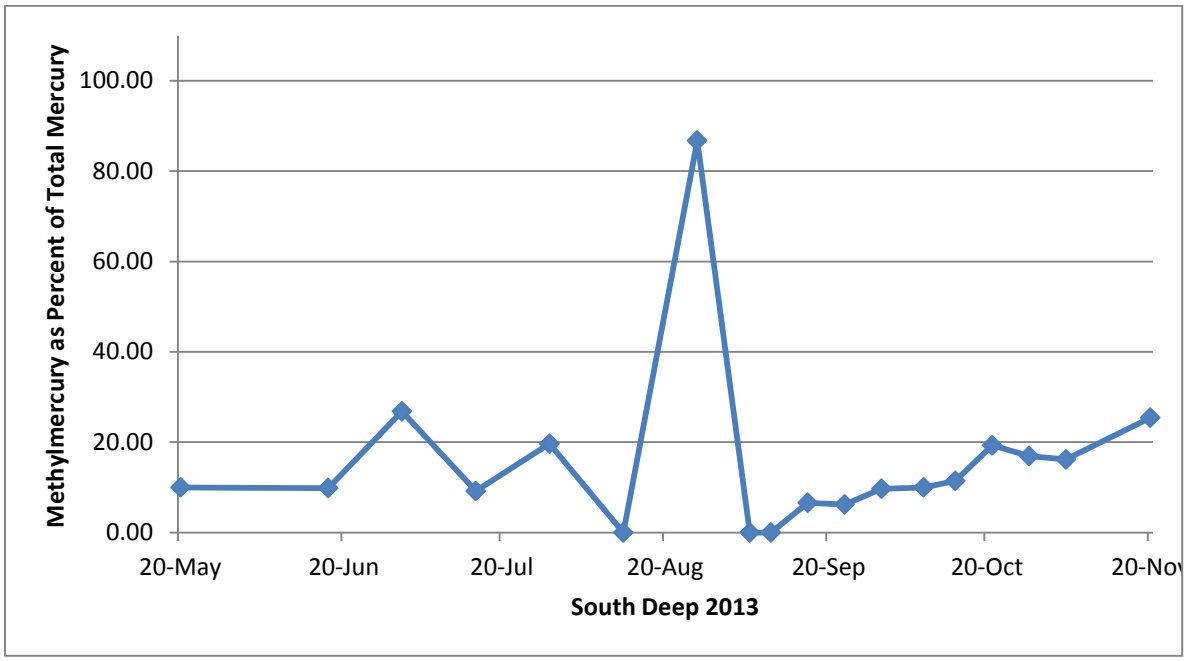


Figure 5B Percent Contribution of Methylmercury (MeHg) to total Mercury (THg) in Zooplankton at South Deep in 2013

APPENDIX A

DATA USABILITY AND SUMMARY REPORT: ONONDAGA LAKE 2012 TISSUE MONITORING: FISH AND ZOOPLANKTON

APPENDIX A:

DATA USABILITY SUMMARY REPORT
ONONDAGA LAKE TISSUE MONITORING FOR 2013

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FEBRUARY 2014

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ATTACHMENT A-2 VALIDATED LABORATORY DATA FOR ZOOPLANKTON SAMPLES

SECTION A1

DATA USABILITY SUMMARY

Fish and zooplankton samples were collected as part of the 2013 remedial goal monitoring efforts for Onondaga Lake from May 20, 2013 through November 20, 2013. Analytical results from these samples were validated and reviewed by Parsons for usability with respect to the following requirements:

- Onondaga Lake Remedial Goal Monitoring Work Plan
- Onondaga Lake Pilot Test to Add Nitrate to the Hypolimnion Work Plan
- Onondaga Lake Remedial Goal and Construction Water Quality Monitoring QAPP
- Onondaga Lake Baseline Monitoring Book 1 QAPP
- USEPA Region II Standard Operating Procedures (SOPs) for organic and inorganic data review

The fish samples were collected by Anchor QEA with some assistance from Parsons for sample processing. The zooplankton samples were collected by Upstate Freshwater Institute (UFI).

The analytical laboratory for this project was Test America Laboratories (TAL). This laboratory is certified by the State of New York to conduct laboratory analyses for this project through the National Environmental Laboratory Accreditation Conference (NELAC) and New York Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP).

A1.1 LABORATORY DATA PACKAGES

The laboratory data package turnaround time, defined as the time from sample receipt by the laboratory to receipt of the analytical data packages by Parsons, was 6 to 92 days for the samples.

The data packages received from the laboratories were paginated, complete, and overall were of good quality. Comments on specific quality control (QC) and other requirements are discussed in detail in the attached data validation report which is summarized in Section A2.

A1.2 SAMPLING AND CHAIN-OF-CUSTODY

The samples were collected, shipped under a COC record, and received at the laboratory within one day of sampling. All samples were received intact and in good condition at TAL.

A1.3 LABORATORY ANALYTICAL METHODS

The fish samples were collected from the site and analyzed for hexachlorobenzene, 4,4'-DDT and metabolites, polychlorinated biphenyls (PCBs), mercury, and/or percent lipids. The zooplankton samples were collected from the site and analyzed for low level mercury and methyl mercury. Summaries of deviations from the Work Plan, QAPP, or USEPA Region II SOPs concerning these laboratory analyses are presented in Subsections A1.3.1 through A1.3.4. The data qualifications resulting from the data validation review and statements on the laboratory analytical precision, accuracy, representativeness, completeness, and comparability (PARCC) are discussed for each analytical method by matrix in Section A2. The laboratory data were reviewed and may be qualified with the following validation flags:

"U" - not detected at the value given

"UJ" - estimated and not detected at the value given

"J" - estimated at the value given

"N" - presumptive evidence at the value given

"R" - unusable value

The validated laboratory data were tabulated and are presented in Attachment A.

A1.3.1 Mercury, Low Level Mercury, and Methyl Mercury Analysis

Fish samples collected from the site were analyzed by TAL for mercury using the USEPA SW846 7471A analytical method. Zooplankton samples collected from the site were analyzed by TAL for low level mercury using the USEPA 1631E analytical method; and methyl mercury using the USEPA 1630 analytical method. Certain reported results for the mercury and low level mercury samples were considered estimated based upon matrix spike/matrix spike duplicate (MS/MSD) recoveries and sample receipt temperature. The reported mercury, low level mercury, and methyl mercury analytical results were considered 100% complete (i.e., usable) for the data presented by TAL. PARCC requirements were met.

A1.3.2 PCB Analysis

Fish samples collected from the site were analyzed by TAL for PCBs using the USEPA SW846 8082 analytical method. Certain reported results for the PCB samples were considered estimated based upon surrogate recoveries and sample receipt temperature. The reported PCB analytical results were considered 100% complete with all data considered usable and valid as reported by TAL. PARCC requirements were met.

A1.3.3 Hexachlorobenzene, 4,4'-DDT, and Metabolites Analysis

Fish samples collected from the site were analyzed by TAL for hexachlorobenzene, 4,4'-DDT, and metabolites using the USEPA SW846 8081A analytical method. Certain reported

results for these samples were qualified as estimated based upon sample surrogate recoveries, MS/MSD recoveries, sample result identifications, and sample receipt temperature. The reported analytical results for these samples were considered 100% complete with all data considered usable and valid as reported by TAL. PARCC requirements were met.

A1.3.4 Percent Lipids

Fish samples collected from the site were analyzed by TAL for percent lipids using the TAL SOP analytical method. Certain reported results for these samples were qualified as estimated based upon laboratory duplicate precision and sample receipt temperature. The reported analytical results for these samples were considered 100% complete with all data considered usable and valid as reported by TAL. PARCC requirements were met.

SECTION A2

DATA VALIDATION REPORT

A2.1 FISH

Data review has been completed for data packages generated by TAL containing fish samples collected from the site. The specific samples contained in these data packages, the analyses performed, and validated laboratory data are tabulated and presented in Attachment A-1. All of these samples were shipped under a COC record and received intact by the analytical laboratory.

Data validation was performed for all samples in accordance with the project work plan and QAPP as well as the USEPA Region II SOPs HW-44, Revision 1 "Data Validation SOP of Organochlorine Pesticides by Gas Chromatography SW-846 Method 8081B"; HW-45, Revision 1 "Data Validation SOP of Organic Analysis of PCBs by Gas Chromatography SW-846 Method 8082A; HW-2, Revision 13 "Evaluation of Metals Data for the CLP Program"; and HW-19, Revision 1 "USEPA Region II Data Validation SOP for SW-846 Method 8290 Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) By High-Resolution Gas Chromatography/High-Resolution Mass Spectrometry (HRGC/HRMS)". This data validation and usability report is presented by analysis type.

A2.1.1 Mercury

The following items were reviewed for compliancy in the mercury analysis:

- Custody documentation
- Holding times
- Initial and continuing calibration verifications
- Initial and continuing calibration, and laboratory preparation blank contamination
- Matrix spike/matrix spike duplicate (MS/MSD) recoveries
- Laboratory duplicate precision
- Laboratory control sample (LCS) recoveries
- Interference check sample recoveries
- Sample result verification and identification
- Quantitation limits

- Data completeness

These items were considered compliant and acceptable in accordance with the validation protocols with the exception of MS/MSD recoveries as discussed below.

MS/MSD Recoveries

All MS/MSD recoveries were considered acceptable and within the 75-125%R QC limit for designated spiked project samples with the exception of the low MS/MSD mercury recoveries (70%R, 54%R) associated with fish samples collected on 7/24/13; the low MS/MSD mercury recoveries (70%R, 65%R) associated with fish samples collected on 8/7/13; and the low MS/MSD mercury recoveries (67%R, 72%R) associated with fish samples collected on 8/16/13. Therefore, mercury results for these samples were considered estimated, possibly biased low, with positive results qualified "J" and nondetected results qualified "UJ" for the affected samples.

Usability

All mercury sample results for the fish samples were considered usable following data validation.

Summary

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, and comparability. The mercury data presented by TAL were 100% complete (i.e., usable). The validated mercury laboratory data are tabulated and presented in Attachment A-1.

It was noted that the laboratory received fish samples at temperatures of 12.2-18.8ºC for fish collected on 6/21/13 and 8/7/13. Therefore, all results for these fish samples were considered estimated with positive results qualified "J" and nondetected results qualified "UJ".

A2.1.2 PCBs

The following items were reviewed for compliancy in the PCB analysis:

- Custody documentation
- Holding times
- Surrogate recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) precision and accuracy

- Laboratory control sample (LCS) recoveries
- Laboratory method blank contamination
- Initial calibrations
- Verification calibrations
- Chromatogram quality
- Sample result verification and identification
- Quantitation limits
- Data completeness

These items were considered compliant and acceptable in accordance with the validation protocols with the exception of surrogate recoveries as discussed below.

Surrogate Recoveries

All sample surrogate recoveries were considered acceptable and within the 35-140%R QC limit with the exception of the high tetrachloro-m-xylene and decachlorobiphenyl surrogate recoveries in sample OL-2011-08F (156%R and 160%R, respectively), OL-2012-10F (183%R and 206%R, respectively), OL-2012-14F (159%R and 162%R, respectively), and OL-2012-15F (163%R and 203%R, respectively). Therefore, positive PCB results in these samples were considered estimated, possibly biased high, and qualified "J" for the affected samples.

Usability

All PCB sample results for the fish samples were considered usable following data validation.

Summary

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, and comparability. The PCB data presented by TAL were 100% complete with all data considered usable and valid. The validated data are tabulated and presented in Attachment A-1.

It was noted that the laboratory received fish samples at temperatures of 12.2-18.8ºC for fish collected on 6/21/13 and 8/7/13. Therefore, all results for these fish samples were considered estimated with positive results qualified "J" and nondetected results qualified "UJ".

A2.1.3 Hexachlorobenzene, 4,4'-DDT, and Metabolites

The following items were reviewed for compliancy in the hexachlorobenzene, 4,4'-DDT, and metabolites analysis:

- Custody documentation
- Holding times
- Surrogate recoveries
- Matrix spike/matrix spike duplicate (MS/MSD) precision and accuracy
- Laboratory control sample (LCS) recoveries
- Laboratory method blank contamination
- Initial calibrations
- Verification calibrations
- 4,4'-DDT breakdown
- Chromatogram quality
- Sample result verification and identification
- Quantitation limits
- Data completeness

These items were considered compliant and acceptable in accordance with the validation protocols with the exceptions of surrogate recoveries, MS/MSD precision and accuracy, blank contamination, and sample result identifications as discussed below.

Surrogate Recoveries

All sample surrogate recoveries were considered acceptable and within the 45-130%R QC limit with the exception of the high tetrachloro-m-xylene and decachlorobiphenyl recoveries on both the primary quantitation column and secondary confirmation column in samples OL-2011-08F (145%R, 142%R and 151%R, 139%R, respectively), OL-2012-10F (159%R, 159%R and 155%R, 154%R, respectively), OL-2012-14F (157%R, 154%R and 150%R, 155%R, respectively), and OL-2012-15F (152%R, 152%R and 157%R, 161%R, respectively). The positive results for these samples were considered estimated, possibly biased high, and qualified "J".

MS/MSD Precision and Accuracy

All MS/MSD precision and accuracy measurements for spiked compounds were considered acceptable and within QC limits for designated spiked project samples with the exception of the low MS accuracy results for 4,4'-DDE and 4,4'-DDD during the spiked analyses of samples OL-2004-01F and OL-2008-14F; the low MS/MSD accuracy results for 4,4'-DDD and 4,4'-DDT during the spiked analyses of samples OL-2010-01F and OL-2011-01F; the low MS accuracy result and the high precision result for 4,4'-DDE during the spiked analyses of sample OL-2011-01F; the low MSD accuracy result for 4,4'-DDD during the spiked analyses of sample OL-2012-01F; the low MS accuracy result for 4,4'-DDD during the spiked analyses of samples OL-2013-01F and OL-2021-01; the low MS accuracy results for 4,4'-DDT, 4,4'-DDE, and 4,4'-DDD during the spiked analyses of sample OL-2015-01; the low MS accuracy result for 4,4'-DDE during the spiked analyses of sample OL-2014-02F; the low MSD accuracy result for 4,4'-DDE during the spiked analyses of sample OL-2017-01F; and the low MS/MSD accuracy results for 4,4'-DDD during the spiked analyses of sample OL-2019-09. Validation qualification of the parent samples where only one MS or MSD accuracy result fell below the QC limit was not required. However, results for those compounds where both MS/MSD accuracy results fell below QC limits were considered estimated, possibly biased low, with positive results qualified "J" and nondetected results qualified "UJ" for the parent sample.

Blank Contamination

The laboratory method blank associated with samples OL-2009-03F, -04F, -05F, and -09F contained hexachlorobenzene at a concentration of 0.254 µg/kg; the laboratory method blank associated with samples collected on 7/12/13 contained hexachlorobenzene at a concentration of 0.849 µg/kg; and the laboratory method blank associated with samples collected on 8/15/13 and 8/16/13 contained hexachlorobenzene at a concentration of 0.356 µg/kg. Therefore, the associated hexachlorobenzene results less than validation action concentrations were considered not detected and qualified "U" for the affected samples.

Sample Result Identifications

Positive sample results were verified and confirmed present using dual column confirmation. There were many precision (%RPD) outliers between the results on the dual columns that exceeded 40% for many of the project samples. Therefore, these results were considered estimated and qualified "J" for the affected samples. However, for those compounds where the %RPD was greater than 90%, the results were considered estimated, tentatively identified, and qualified "JN" for the affected samples.

Usability

All hexachlorobenzene, 4,4'-DDT, and metabolite sample results for the fish samples were considered usable following data validation.

Summary

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, and comparability. The hexachlorobenzene, 4,4'-DDT, and metabolite data presented by TAL were 100% complete with all data considered usable and valid. The validated data are tabulated and presented in Attachment A-1.

It was noted that the laboratory received fish samples at temperatures of 12.2-18.8ºC for fish collected on 6/21/13 and 8/7/13. Therefore, all results for these fish samples were considered estimated with positive results qualified "J" and nondetected results qualified "UJ".

A2.1.4 Percent Lipids

The following items were reviewed for compliancy in the percent lipids analysis:

- Custody documentation
- Holding times
- Laboratory blank contamination
- Laboratory duplicate precision
- Sample result verification and identification
- Quantitation limits
- Data completeness

These items were considered compliant and acceptable in accordance with the validation protocols with the exception of laboratory duplicate precision as discussed below.

Laboratory Duplicate Precision

All laboratory duplicate precision results were considered acceptable and less than 25%RPD with the exception of the laboratory duplicate precision %lipids results (160%RPD and 77%RPD) associated with fish samples collected on 7/24/13 and 7/25/13, respectively. Therefore, the %lipids results for these samples were considered estimated and qualified "J".

Usability

All percent lipids sample results for the fish samples were considered usable following data validation.

Summary

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, and comparability. The percent lipids data presented by TAL were 100% complete (i.e., usable). The validated laboratory data are tabulated and presented in Attachment A-1.

It was noted that the laboratory received fish samples at temperatures of 12.2-18.8ºC for fish collected on 6/21/13 and 8/7/13. Therefore, all %lipids results for these fish samples were considered estimated with positive results qualified "J".

It is noted that the laboratory has an established reporting limit (RL) and method detection limit (MDL) for the analysis of percent lipids and reports percent lipids results that are between the RL and MDL as estimated "J". Percent lipids results that are less than the MDL are reported by the laboratory as nondetect "U" at the RL. Based upon discussion with the NYSDEC, it is unacceptable to report nondetected percent lipids results. Therefore, fish samples with nondetected percent lipids results were reanalyzed yielding similar results. As a result from data validation, the original nondetected percent lipids results were recalculated with the "U" removed from the validated laboratory data presented in Attachment A-1. In addition, the "J" qualifiers for the percent lipids results reported by the laboratory (i.e., percent lipid results between the RL and MDL) were also removed from the validated laboratory data presented in Attachment A-1.

A2.2 ZOOPLANKTON SAMPLES

Data review has been completed for data packages generated by TAL containing zooplankton samples collected from the site. The specific samples contained in these data packages, the analyses performed, and the validated laboratory data were tabulated and are presented in Attachment A-2. All of these samples were shipped under a COC record and received intact by the analytical laboratory.

Data validation was performed for all samples in accordance with the project work plan and QAPP as well as the USEPA Region II SOP HW-2, Revision 13 "Evaluation of Metals Data for the CLP Program". This data validation and usability report is presented by analysis type.

A2.2.1 Low Level Mercury

The following items were reviewed for compliancy in the low level mercury analysis:

- Custody documentation
- Holding times
- Initial and continuing calibration verifications
- Initial and continuing calibration, and laboratory preparation blank contamination
- Matrix spike / matrix spike duplicate (MS/MSD) recoveries
- Laboratory duplicate precision
- Laboratory control sample (LCS) recoveries
- Sample result verification and identification
- Quantitation limits
- Data completeness

These items were considered compliant and acceptable in accordance with the validation protocols with the exception of blank contamination and MS/MSD recoveries as discussed below.

Blank Contamination

Laboratory preparation blanks contained low level mercury below the reporting limit associated with project samples at a concentration range of 0.0727 – 0.227 µg/kg. Validation qualification of the project samples was not required since the samples were not affected by the contamination detected in these blanks.

MS/MSD Recoveries

All MS/MSD recoveries were considered acceptable and within the 70-130%R QC limit for low level mercury with the exception of the extremely low MS/MSD recoveries (14%R, -0.2%R) associated with sample OL-1911-01. Therefore, the positive low level mercury result for this sample was considered estimated, possibly biased low, and qualified "J".

Usability

All low level mercury sample results for the zooplankton samples were considered usable following data validation.

Summary

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, and comparability. The low level mercury data presented by TAL were 100% complete (i.e., usable). The validated low level mercury laboratory data are tabulated and presented in Attachment A-2.

It was noted that samples OL-1940-01, OL-1953-01, and OL-1957-01 experienced limited sample volume. Therefore, low level mercury for these samples was not analyzed.

A2.2.2 Methyl Mercury

The following items were reviewed for compliancy in the methyl mercury analysis:

- Custody documentation
- Holding times
- Surrogate recoveries
- Initial and continuing calibration verifications
- Initial and continuing calibration, and laboratory preparation blank contamination
- Matrix spike / matrix spike duplicate (MS/MSD) recoveries
- Laboratory duplicate precision
- Laboratory control sample (LCS) recoveries
- Sample result verification and identification
- Quantitation limits
- Data completeness

These items were considered compliant and acceptable in accordance with the validation protocols with the exception of blank contamination as discussed below.

Blank Contamination

Initial and continuing calibration blanks contained methyl mercury below the reporting limit associated with project samples at a concentration range of 0.0139 – 0.0289 ng/L. The methyl mercury sample results did not require qualification since sample concentrations were not affected by the contamination in these blanks.

Usability

All methyl mercury sample results for the zooplankton samples were considered usable following data validation.

Summary

The quality assurance objectives for measurement data included considerations for precision, accuracy, representativeness, completeness, and comparability. The methyl mercury data presented by TAL were 100% complete (i.e., usable). The validated methyl mercury laboratory data are tabulated and presented in Attachment A-2.

ATTACHMENT A

VALIDATED LABORATORY DATA

ATTACHMENT A-1

VALIDATED LABORATORY DATA FOR FISH SAMPLES

		Location	OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-30093		OL-STA-30093		OL-STA-30093	
		Field Sample ID	OL-2019-07		OL-2019-08		OL-2019-09		OL-2021-01		OL-2021-02		OL-2019-04		OL-2019-05		OL-2019-06	
		Sample Date	8/7/2013		8/7/2013		8/7/2013		8/15/2013		8/15/2013		8/7/2013		8/7/2013		8/7/2013	
		SDG	180-23954-1		180-23954-1		180-23954-1		180-24220-1		180-24220-1		180-23954-1		180-23954-1		180-23954-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	MIN		MIN		MIN		ALE		ALE		MIN		MIN		MIN	
		Specimen Sex																
		Specimen Length	91.4 mm		83 mm		75.8 mm		138.6 mm		117.2 mm		71.1 mm		48.95 mm		89.6 mm	
		Specimen Weight	7.5 g		5.8 g		4.36 g		23.4 g		15.6 g		3.59 g		1.15 g		7.22 g	
		Specimen Age																
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	0.46	J	0.47	J	1	J	8.5		7.5		1.3	J	0.82	J	0.47	J
SW7471	MERCURY	mg/kg	0.25	J	0.15	J	0.29	J	0.091		0.093		0.27	J	0.055	J	0.29	J
SW8081	4,4'-DDD	ug/kg	0.21	JN	1.8	UJ	0.21	JN	6.8	JN	4.7	JN	0.3	JN	0.38	JN	0.16	JN
SW8081	4,4'-DDE	ug/kg	2.1	J	2.5	J	4.3	J	29		13	J	2	J	1.3	J	0.57	J
SW8081	4,4'-DDT	ug/kg	5	J	4.8	J	9.2	J	32		1.3	U	4.2	J	3.8	J	1.3	J
SW8081	HEXACHLOROBENZENE	ug/kg	1.3	UJ	1.8	UJ	0.33	J	24		44		0.39	J	0.52	J	1.3	UJ
SW8082	AROCLOR-1016	ug/kg	13	UJ	17	UJ	13	UJ	13	U	12	U	13	UJ	19	UJ	13	UJ
SW8082	AROCLOR-1221	ug/kg	13	UJ	17	UJ	13	UJ	13	U	12	U	13	UJ	19	UJ	13	UJ
SW8082	AROCLOR-1232	ug/kg	13	UJ	17	UJ	13	UJ	13	U	12	U	13	UJ	19	UJ	13	UJ
SW8082	AROCLOR-1242	ug/kg	13	UJ	17	UJ	13	UJ	13	U	12	U	13	UJ	19	UJ	13	UJ
SW8082	AROCLOR-1248	ug/kg	27	J	36	J	47	J	270		410		51	J	67	J	28	J
SW8082	AROCLOR-1254	ug/kg	13	UJ	17	UJ	13	UJ	13	U	12	U	13	UJ	19	UJ	13	UJ
SW8082	AROCLOR-1260	ug/kg	36	J	43	J	60	J	110		130		19	J	26	J	7.4	J
SW8082	AROCLOR-1262	ug/kg	13	UJ	17	UJ	13	UJ	13	U	12	U	13	UJ	19	UJ	13	UJ
SW8082	AROCLOR-1268	ug/kg	13	UJ	17	UJ	13	UJ	13	U	12	U	13	UJ	19	UJ	13	UJ
SW8082	PCBS, N.O.S.	ug/kg	63	J	79	J	110	J	380		540		70	J	93	J	35	J

		Location	OL-STA-30093		OL-STA-30093		OL-STA-40212		OL-STA-40212		OL-STA-40212		OL-STA-40212		OL-STA-40212		OL-STA-50057	
		Field Sample ID	OL-2020-01		OL-2020-02		OL-2019-01		OL-2019-02		OL-2019-03		OL-2020-07		OL-2022-03		OL-2018-04	
		Sample Date	8/14/2013		8/14/2013		8/7/2013		8/7/2013		8/7/2013		8/14/2013		8/16/2013		8/5/2013	
		SDG	180-24217-1		180-24217-1		180-23954-1		180-23954-1		180-23954-1		180-24217-1		180-24275-1		180-23883-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	ALE		ALE		MIN		MIN		MIN		ALE		ALE		MIN	
		Specimen Sex																
		Specimen Length	130.6 mm		122.6 mm		89.2 mm		82.2 mm		81.6 mm		135.8 mm		125.2 mm		78.8 mm	
		Specimen Weight	18.6 g		16 g		7.34 g		5.32 g		5.3 g		19.4 g		17.4 g		4.5 g	
		Specimen Age																
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	3.7		5.3		0.48	J	0.75	J	0.75	J	4.4		10		1.2	
SW7471	MERCURY	mg/kg	0.087		0.095		0.33	J	0.22	J	0.35	J	0.13		0.088	J	0.09	
SW8081	4,4'-DDD	ug/kg	3.4	JN	9.8	J	0.18	JN	0.3	JN	0.44	JN	2.3	JN	6	JN	0.35	JN
SW8081	4,4'-DDE	ug/kg	18		19		0.63	J	1.3	J	2.1	J	13		24		1.6	
SW8081	4,4'-DDT	ug/kg	29		27		0.76	J	1.6	J	3.3	J	24		1.3	U	2.9	
SW8081	HEXACHLOROBENZENE	ug/kg	20		28		0.21	J	0.81	J	0.64	J	13		41		0.54	J
SW8082	AROCLOR-1016	ug/kg	13	U	12	U	13	UJ	17	UJ	19	UJ	13	U	13	U	12	U
SW8082	AROCLOR-1221	ug/kg	13	U	12	U	13	UJ	17	UJ	19	UJ	13	U	13	U	12	U
SW8082	AROCLOR-1232	ug/kg	13	U	12	U	13	UJ	17	UJ	19	UJ	13	U	13	U	12	U
SW8082	AROCLOR-1242	ug/kg	13	U	12	U	13	UJ	17	UJ	19	UJ	13	U	13	U	12	U
SW8082	AROCLOR-1248	ug/kg	270		290		26	J	37	J	40	J	200		360		12	U
SW8082	AROCLOR-1254	ug/kg	13	U	12	U	13	UJ	17	UJ	19	UJ	13	U	13	U	12	U
SW8082	AROCLOR-1260	ug/kg	120		110		7.6	J	18	J	24	J	100		110		13	
SW8082	AROCLOR-1262	ug/kg	13	U	12	U	13	UJ	17	UJ	19	UJ	13	U	13	U	12	U
SW8082	AROCLOR-1268	ug/kg	13	U	12	U	13	UJ	17	UJ	19	UJ	13	U	13	U	12	U
SW8082	PCBS, N.O.S.	ug/kg	390		400		34	J	55	J	64	J	300		470		13	

		Location	OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50058		OL-STA-50058		OL-STA-50058		OL-STA-50058	
		Field Sample ID	OL-2018-05		OL-2018-06		OL-2020-03		OL-2020-04		OL-2018-01		OL-2018-02		OL-2018-03		OL-2020-05	
		Sample Date	8/5/2013		8/5/2013		8/14/2013		8/14/2013		8/5/2013		8/5/2013		8/5/2013		8/14/2013	
		SDG	180-23883-1		180-23883-1		180-24217-1		180-24217-1		180-23883-1		180-23883-1		180-23883-1		180-24217-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	MIN		MIN		ALE		ALE		MIN		MIN		MIN		ALE	
		Specimen Sex																
		Specimen Length	46.4 mm		87.4 mm		127.4 mm		117.6 mm		82.2 mm		44.52 mm		65.6 mm		125.4 mm	
		Specimen Weight	1.03 g		6.78 g		16.2 g		14.2 g		7 g		0.88 g		3.03 g		16.8 g	
		Specimen Age																
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	0.86		0.42		8.5		8		0.32		1		0.91		6.4	
SW7471	MERCURY	mg/kg	0.047		0.11		0.1		0.085		0.15		0.061		0.081		0.13	
SW8081	4,4'-DDD	ug/kg	0.49	JN	0.27	JN	3.9	JN	4.1	JN	0.23	JN	0.37	JN	0.31	JN	3.1	JN
SW8081	4,4'-DDE	ug/kg	2.4		1.2	J	11	J	11	J	0.87	J	1.5		1.3	J	12	J
SW8081	4,4'-DDT	ug/kg	3.8		2.1		29		28		2.3		2.9		3.2		36	
SW8081	HEXACHLOROBENZENE	ug/kg	1.2	J	0.28	J	33		37		1.6	U	1.3	U	1.7	U	22	
SW8082	AROCLOR-1016	ug/kg	14	U	13	U	13	U	12	U	16	U	12	U	16	U	13	U
SW8082	AROCLOR-1221	ug/kg	14	U	13	U	13	U	12	U	16	U	12	U	16	U	13	U
SW8082	AROCLOR-1232	ug/kg	14	U	13	U	13	U	12	U	16	U	12	U	16	U	13	U
SW8082	AROCLOR-1242	ug/kg	14	U	13	U	13	U	12	U	16	U	12	U	16	U	13	U
SW8082	AROCLOR-1248	ug/kg	54		13	U	390		420		14	J	12	U	16	U	390	
SW8082	AROCLOR-1254	ug/kg	14	U	13	U	13	U	12	U	16	U	12	U	16	U	13	U
SW8082	AROCLOR-1260	ug/kg	18		9.9	J	130		120		12	J	22		16		150	
SW8082	AROCLOR-1262	ug/kg	14	U	13	U	13	U	12	U	16	U	12	U	16	U	13	U
SW8082	AROCLOR-1268	ug/kg	14	U	13	U	13	U	12	U	16	U	12	U	16	U	13	U
SW8082	PCBS, N.O.S.	ug/kg	72		9.9	J	520		540		26		22		16		540	

		Location	OL-STA-50058		OL-STA-50059		OL-STA-50059		OL-STA-50059		OL-STA-50059		OL-STA-50059		OL-STA-60225		OL-STA-60225	
		Field Sample ID	OL-2020-06		OL-2018-07		OL-2018-08		OL-2018-09		OL-2021-04		OL-2022-01		OL-2019-13		OL-2019-14	
		Sample Date	8/14/2013		8/5/2013		8/5/2013		8/5/2013		8/15/2013		8/16/2013		8/7/2013		8/7/2013	
		SDG	180-24217-1		180-23883-1		180-23883-1		180-23883-1		180-24220-1		180-24275-1		180-23954-1		180-23954-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	ALE		MIN		MIN		MIN		ALE		ALE		MIN		MIN	
		Specimen Sex																
		Specimen Length	118.2 mm		92.2 mm		83.2 mm		76.2 mm		134.6 mm		125.4 mm		86.2 mm		75.4 mm	
		Specimen Weight	13.8 g		7.96 g		6.24 g		4.44 g		20.8 g		16.8 g		6.64 g		4.22 g	
		Specimen Age																
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	9.2		0.34		0.73		0.5		4.3		8.1		0.82	J	0.78	J
SW7471	MERCURY	mg/kg	0.089		0.14		0.12		0.089		0.13		0.11	J	0.077	J	0.075	J
SW8081	4,4'-DDD	ug/kg	4.4	JN	0.16	JN	0.31	JN	1.3	U	2.2	JN	3.7	JN	0.6	JN	0.71	JN
SW8081	4,4'-DDE	ug/kg	11	J	0.47	J	1.2	J	1	J	9.7	J	19		2	J	2.1	J
SW8081	4,4'-DDT	ug/kg	28		1.6		3.5		3.4		1.3	U	1.3	U	10	J	14	J
SW8081	HEXACHLOROBENZENE	ug/kg	31		1.3	U	1.7	U	1.3	U	14		28		1.5	UJ	2.1	UJ
SW8082	AROCLOR-1016	ug/kg	13	U	13	U	17	U	13	U	13	U	13	U	15	UJ	20	UJ
SW8082	AROCLOR-1221	ug/kg	13	U	13	U	17	U	13	U	13	U	13	U	15	UJ	20	UJ
SW8082	AROCLOR-1232	ug/kg	13	U	13	U	17	U	13	U	13	U	13	U	15	UJ	20	UJ
SW8082	AROCLOR-1242	ug/kg	13	U	13	U	17	U	13	U	13	U	13	U	15	UJ	20	UJ
SW8082	AROCLOR-1248	ug/kg	390		7.8	J	17	U	15		190		270		200	J	410	J
SW8082	AROCLOR-1254	ug/kg	13	U	13	U	17	U	13	U	13	U	13	U	15	UJ	20	UJ
SW8082	AROCLOR-1260	ug/kg	120		8.4	J	19		21		94		98		50	J	89	J
SW8082	AROCLOR-1262	ug/kg	13	U	13	U	17	U	13	U	13	U	13	U	15	UJ	20	UJ
SW8082	AROCLOR-1268	ug/kg	13	U	13	U	17	U	13	U	13	U	13	U	15	UJ	20	UJ
SW8082	PCBS, N.O.S.	ug/kg	510		16		19		36		280		370		250	J	500	J

		Location	OL-STA-60225		OL-STA-60225		OL-STA-60225		OL-STA-70124		OL-STA-70124		OL-STA-70124		OL-STA-70124		OL-STA-70124	
		Field Sample ID	OL-2019-15		OL-2021-03		OL-2022-02		OL-2019-10		OL-2019-11		OL-2019-12		OL-2021-05		OL-2022-04	
		Sample Date	8/7/2013		8/15/2013		8/16/2013		8/7/2013		8/7/2013		8/7/2013		8/15/2013		8/16/2013	
		SDG	180-23954-1		180-24220-1		180-24275-1		180-23954-1		180-23954-1		180-23954-1		180-24220-1		180-24275-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	MIN		ALE		ALE		MIN		MIN		MIN		ALE		ALE	
		Specimen Sex																
		Specimen Length	88.4 mm		130.8 mm		129.4 mm		85.8 mm		85.6 mm		84 mm		78.2 mm		115.4 mm	
		Specimen Weight	7.26 g		18.8 g		17.2 g		6.88 g		6.82 g		6.2 g		5 g		14.2 g	
		Specimen Age																
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	0.61	J	6.3		3.5		0.5	J	0.66	J	0.6	J	5.8		11	
SW7471	MERCURY	mg/kg	0.1	J	0.12		0.12	J	0.2	J	0.2	J	0.24	J	0.042		0.087	J
SW8081	4,4'-DDD	ug/kg	0.26	JN	2.3	JN	3.4	JN	0.64	JN	0.77	JN	0.61	JN	2.1	JN	4.4	JN
SW8081	4,4'-DDE	ug/kg	0.84	J	9.4	J	17		1.7	J	2.2	J	1.2	J	8.8		19	
SW8081	4,4'-DDT	ug/kg	4.5	J	1.3	U	1.3	U	5.1	J	6.4	J	5.5	J	1.2	U	1.3	U
SW8081	HEXACHLOROBENZENE	ug/kg	1.3	UJ	19		19		0.74	J	0.8	J	0.88	J	13		30	
SW8082	AROCLOR-1016	ug/kg	12	UJ	12	U	13	U	13	UJ	13	UJ	13	UJ	12	U	13	U
SW8082	AROCLOR-1221	ug/kg	12	UJ	12	U	13	U	13	UJ	13	UJ	13	UJ	12	U	13	U
SW8082	AROCLOR-1232	ug/kg	12	UJ	12	U	13	U	13	UJ	13	UJ	13	UJ	12	U	13	U
SW8082	AROCLOR-1242	ug/kg	12	UJ	12	U	13	U	13	UJ	13	UJ	13	UJ	12	U	13	U
SW8082	AROCLOR-1248	ug/kg	140	J	240		260		17	J	27	J	24	J	140		350	
SW8082	AROCLOR-1254	ug/kg	12	UJ	12	U	13	U	13	UJ	13	UJ	13	UJ	12	U	13	U
SW8082	AROCLOR-1260	ug/kg	33	J	110		100		38	J	45	J	35	J	32		110	
SW8082	AROCLOR-1262	ug/kg	12	UJ	12	U	13	U	13	UJ	13	UJ	13	UJ	12	U	13	U
SW8082	AROCLOR-1268	ug/kg	12	UJ	12	U	13	U	13	UJ	13	UJ	13	UJ	12	U	13	U
SW8082	PCBS, N.O.S.	ug/kg	170	J	350		360		55	J	72	J	59	J	170		460	

		Location	OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-20158	
		Field Sample ID	OL-2005-01F		OL-2005-02F		OL-2007-01F		OL-2009-06F		OL-2009-07F		OL-2009-08F		OL-2009-09F		OL-2011-02F	
		Sample Date	6/19/2013		6/19/2013		6/25/2013		7/9/2013		7/9/2013		7/9/2013		7/9/2013		7/11/2013	
		SDG	180-22363-1		180-22363-1		180-22559-1		-22931-1|180-26783-1		-22931-1|180-26783-1		180-22931-1		-22931-1|180-26783-1		180-23031-1	-230
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	SMB		SMB		SMB		BB		BB		BB		PKSD		WALL	
		Specimen Sex							U		U		U		U		U	
		Specimen Length	378 mm		310 mm		310 mm		339 mm		336 mm		350 mm		154 mm		531 mm	
		Specimen Weight	811 g		462 g		540 g		402 g		569 g		492 g		71 g		2261 g	
		Specimen Age	5 yrs		8+ yrs		3+ yrs		8+ yrs		6+ yrs		9+ yrs		5+ yrs		12+ yrs	
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	0.48		0.13		0.48		0.1		0.025		0.019		0.0625		4.1	
SW7471	MERCURY	mg/kg	0.65		0.68		0.7		NA		0.34		0.31		0.42		1.2	
SW8081	4,4'-DDD	ug/kg	0.55	JN	0.75	JN	0.91	JN	0.22	J	0.25	JN	0.25	J	1.3	U	6.7	JN
SW8081	4,4'-DDE	ug/kg	2.2	J	4.6		3.9	J	0.26	J	1.2	J	1.3	U	1.3	U	50	
SW8081	4,4'-DDT	ug/kg	4.8		5.8		8.4		0.45	J	1.7		0.44	J	1	J	52	
SW8081	HEXACHLOROBENZENE	ug/kg	1	J	1.9		3.2		1.3	U	0.55	J	1.3	U	1.3	U	13	
SW8082	AROCLOR-1016	ug/kg	12	U	13	U	13	U	12	U	12	U	13	U	13	U	13	U
SW8082	AROCLOR-1221	ug/kg	12	U	13	U	13	U	12	U	12	U	13	U	13	U	13	U
SW8082	AROCLOR-1232	ug/kg	12	U	13	U	13	U	12	U	12	U	13	U	13	U	13	U
SW8082	AROCLOR-1242	ug/kg	12	U	13	U	13	U	12	U	12	U	13	U	13	U	13	U
SW8082	AROCLOR-1248	ug/kg	43		49		68		12	U	14		13	U	3.4	J	510	
SW8082	AROCLOR-1254	ug/kg	12	U	13	U	13	U	12	U	12	U	13	U	13	U	13	U
SW8082	AROCLOR-1260	ug/kg	34		44		63		12	U	21		7.4	J	8	J	300	
SW8082	AROCLOR-1262	ug/kg	12	U	13	U	13	U	12	U	12	U	13	U	13	U	13	U
SW8082	AROCLOR-1268	ug/kg	12	U	13	U	13	U	12	U	12	U	13	U	13	U	13	U
SW8082	PCBS, N.O.S.	ug/kg	77		93		130		12	U	35		7.4	J	11	J	810	
	NA - not analyzed																	

		Location	OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-20158	
		Field Sample ID	OL-2011-06F		OL-2011-07F		OL-2011-08F		OL-2012-01F		OL-2012-02F		OL-2012-03F		OL-2012-14F		OL-2012-15F	
		Sample Date	7/11/2013		7/11/2013		7/11/2013		7/12/2013		7/12/2013		7/12/2013		7/12/2013		7/12/2013	
		SDG	31-1|180-26783-1		-23031-1|180-26783-1		-23031-1|180-26783-1		180-23067-1		180-23067-1		180-23067-1		180-23067-1		-23067-1|180-26783-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	PKSD		PKSD		PKSD		WALL		WALL		WALL		PKSD		PKSD	
		Specimen Sex	U		U		U		U		U		U		U		U	
		Specimen Length	165 mm		131 mm		130 mm		574 mm		535 mm		526 mm		135 mm		130 mm	
		Specimen Weight	106 g		52 g		51 g		2336 g		2242 g		2175 g		52 g		45 g	
		Specimen Age	3+ yrs		2+ yrs		2+ yrs		8+ yrs		12+ yrs		8+ yrs		2+ yrs		2+ yrs	
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	0.0941		0.025		0.0435		1.2		1.1		2.6		0.49		0.0824	
SW7471	MERCURY	mg/kg	0.36		0.18		0.098		0.75		1.5		1		0.21		0.23	
SW8081	4,4'-DDD	ug/kg	2	U	2	U	2.5	U	2.3	JN	6.4	JN	5.4	JN	1.2	U	1.8	U
SW8081	4,4'-DDE	ug/kg	2	U	2	U	2.5	U	12		37		29		0.41	J	0.33	J
SW8081	4,4'-DDT	ug/kg	2	U	0.39	J	2.5	U	12		40		32		1.1	J	1.1	J
SW8081	HEXACHLOROBENZENE	ug/kg	2	U	2	U	2.5	U	5.9		11		11		1.2	U	1.8	U
SW8082	AROCLOR-1016	ug/kg	20	U	20	U	25	U	12	U	12	U	13	U	12	U	18	U
SW8082	AROCLOR-1221	ug/kg	20	U	20	U	25	U	12	U	12	U	13	U	12	U	18	U
SW8082	AROCLOR-1232	ug/kg	20	U	20	U	25	U	12	U	12	U	13	U	12	U	18	U
SW8082	AROCLOR-1242	ug/kg	20	U	20	U	25	U	12	U	12	U	13	U	12	U	18	U
SW8082	AROCLOR-1248	ug/kg	20	U	20	U	25	U	130		520		390		12	J	11	J
SW8082	AROCLOR-1254	ug/kg	20	U	20	U	25	U	12	U	12	U	13	U	12	U	18	U
SW8082	AROCLOR-1260	ug/kg	20	U	20	U	25	U	110		330		280		12	U	18	U
SW8082	AROCLOR-1262	ug/kg	20	U	20	U	25	U	12	U	12	U	13	U	12	U	18	U
SW8082	AROCLOR-1268	ug/kg	20	U	20	U	25	U	12	U	12	U	13	U	12	U	18	U
SW8082	PCBS, N.O.S.	ug/kg	20	U	20	U	25	U	240		850		670		12	J	11	J
	NA - not analyzed																	

		Location	OL-STA-20158		OL-STA-20158		OL-STA-20158		OL-STA-30093		OL-STA-30093		OL-STA-30093		OL-STA-30093		OL-STA-30093	
		Field Sample ID	OL-2013-02F		OL-2014-01F		OL-2014-02F		OL-2004-01F		OL-2007-02F		OL-2008-07F		OL-2008-08F		OL-2008-15F	
		Sample Date	7/16/2013		7/17/2013		7/17/2013		6/18/2013		6/25/2013		7/9/2013		7/9/2013		7/9/2013	
		SDG	180-23205-1		180-23228-1		180-23228-1		180-22307-1		180-22559-1		180-22925-1		180-22925-1		180-22925-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	SMB		WALL		SMB		SMB		SMB		BB		BB		WALL	
		Specimen Sex	U		U		U		U				U		U		U	
		Specimen Length	460 mm		457 mm		450 mm		492 mm		412 mm		254 mm		340 mm		531 mm	
		Specimen Weight	1294 g		1421 g		1347 g		1457 g		1125 g		225 g		554 g		1630 g	
		Specimen Age	8+ yrs		8+ yrs		8+ yrs		15 yrs				4+ yrs		6 yrs		5+ yrs	
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	0.38		1.7		0.36		0.19		0.21		0.11		0.11		0.46	
SW7471	MERCURY	mg/kg	0.95		0.82		0.82		1.9		0.86		0.073		0.54		0.57	
SW8081	4,4'-DDD	ug/kg	2.2	JN	2.9	JN	1.5	JN	0.82	JN	1	JN	0.16	U	0.2	JN	0.62	JN
SW8081	4,4'-DDE	ug/kg	14		21		9.4		5.3		5.6		0.4	J	0.38	J	2.7	J
SW8081	4,4'-DDT	ug/kg	18		22		12		7.1		7.4		0.65	J	1.1	J	4.9	
SW8081	HEXACHLOROBENZENE	ug/kg	2.8		7.5		2.6		0.74	J	1	J	0.49	J	0.48	J	3.4	
SW8082	AROCLOR-1016	ug/kg	13	U	12	U	13	U	12	U	13	U	12	U	12	U	13	U
SW8082	AROCLOR-1221	ug/kg	13	U	12	U	13	U	12	U	13	U	12	U	12	U	13	U
SW8082	AROCLOR-1232	ug/kg	13	U	12	U	13	U	12	U	13	U	12	U	12	U	13	U
SW8082	AROCLOR-1242	ug/kg	13	U	12	U	13	U	12	U	13	U	12	U	12	U	13	U
SW8082	AROCLOR-1248	ug/kg	170		370		80		44		55		12	U	12	U	64	
SW8082	AROCLOR-1254	ug/kg	13	U	12	U	13	U	12	U	13	U	12	U	12	U	13	U
SW8082	AROCLOR-1260	ug/kg	110		220		120		68		55		6.6	J	11	J	37	
SW8082	AROCLOR-1262	ug/kg	13	U	12	U	13	U	12	U	13	U	12	U	12	U	13	U
SW8082	AROCLOR-1268	ug/kg	13	U	12	U	13	U	12	U	13	U	12	U	12	U	13	U
SW8082	PCBS, N.O.S.	ug/kg	280		590		200		110		110		6.6	J	11	J	100	
	NA - not analyzed																	

		Location	OL-STA-30093		OL-STA-30093		OL-STA-30093		OL-STA-30093		OL-STA-30093		OL-STA-30093		OL-STA-30093		OL-STA-40212	
		Field Sample ID	OL-2008-16F		OL-2008-17F		OL-2009-01F		OL-2009-02F		OL-2009-03F		OL-2009-04F		OL-2009-05F		OL-2008-09F	
		Sample Date	7/9/2013		7/9/2013		7/9/2013		7/9/2013		7/9/2013		7/9/2013		7/9/2013		7/9/2013	
		SDG	180-22925-1		180-22925-1		180-22931-1		180-22931-1		180-22931-1	-22931-1|180-26783-1		-22931-1|180-26783-1			180-22925-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	WALL		WALL		BB		BB		PKSD		PKSD		PKSD		WALL	
		Specimen Sex	U		U		U		U		U		U		U		U	
		Specimen Length	543 mm		543 mm		284 mm		340 mm		132 mm		126 mm		133 mm		596 mm	
		Specimen Weight	2793 g		2275 g		283 g		538 g		46 g		43 g		49 g		2638 g	
		Specimen Age	12+ yrs		11+ yrs		4+ yrs		7+ yrs		3+ yrs		2+ yrs		2+ yrs		14+ yrs	
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	2.4		1.3		0.055		0.033		0.32		0.0875		0.147		1.1	
SW7471	MERCURY	mg/kg	2.2		1.1		0.15		0.078		0.11		0.19		0.28		1.8	
SW8081	4,4'-DDD	ug/kg	3.8	JN	1.4	JN	0.22	J	0.18	J	0.32	JN	0.17	JN	1.2	U	2.1	JN
SW8081	4,4'-DDE	ug/kg	24	J	14		1.3	U	0.33	J	0.91	J	0.74	J	0.53	J	19	
SW8081	4,4'-DDT	ug/kg	42		13		0.22	J	0.62	J	1.2	J	1.1	J	0.79	J	23	
SW8081	HEXACHLOROBENZENE	ug/kg	9.6		4.6		1.3	U	1.3	U	1.3	U	1.3	U	1.2	U	6.1	
SW8082	AROCLOR-1016	ug/kg	13	U	13	U	12	U	13	U	13	U	13	U	12	U	13	U
SW8082	AROCLOR-1221	ug/kg	13	U	13	U	12	U	13	U	13	U	13	U	12	U	13	U
SW8082	AROCLOR-1232	ug/kg	13	U	13	U	12	U	13	U	13	U	13	U	12	U	13	U
SW8082	AROCLOR-1242	ug/kg	13	U	13	U	12	U	13	U	13	U	13	U	12	U	13	U
SW8082	AROCLOR-1248	ug/kg	580		140		12	U	13	U	13		9.2	J	7.3	J	260	
SW8082	AROCLOR-1254	ug/kg	13	U	13	U	12	U	13	U	13	U	13	U	12	U	13	U
SW8082	AROCLOR-1260	ug/kg	290		97		12	U	13	U	10	J	8.4	J	7.3	J	180	
SW8082	AROCLOR-1262	ug/kg	13	U	13	U	12	U	13	U	13	U	13	U	12	U	13	U
SW8082	AROCLOR-1268	ug/kg	13	U	13	U	12	U	13	U	13	U	13	U	12	U	13	U
SW8082	PCBS, N.O.S.	ug/kg	870		240		12	U	13	U	23		18		15		440	
	NA - not analyzed																	

		Location	OL-STA-40212		OL-STA-40212		OL-STA-40212		OL-STA-40212		OL-STA-40212		OL-STA-40212		OL-STA-40212		OL-STA-40212	
		Field Sample ID	OL-2008-10F		OL-2008-11F		OL-2010-05F		OL-2010-08F		OL-2010-09F		OL-2010-10F		OL-2010-11F		OL-2010-12F	
		Sample Date	7/9/2013		7/9/2013		7/10/2013		7/10/2013		7/10/2013		7/10/2013		7/10/2013		7/10/2013	
		SDG	180-22925-1		180-22925-1		180-23007-1		180-23007-1		180-23007-1	-23007-1|180-26783-1		-23007-1|180-26783-1		-23007-1|180-26783-1		-230
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	WALL		WALL		WALL		BB		BB		PKSD		PKSD		PKSD	
		Specimen Sex	U		U		U		U		U		U		U		U	
		Specimen Length	537 mm		525 mm		544 mm		324 mm		324 mm		147 mm		162 mm		165 mm	
		Specimen Weight	2194 g		2051 g		2084 g		456 g		415 g		74 g		93 g		98 g	
		Specimen Age	12+ yrs		8+ yrs		12+ yrs		7+ yrs		5 yrs		3+ yrs		3+ yrs		3+ yrs	
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	2.5		0.87		1.3		0.061		0.033		0.0333		0.0778		0.0412	
SW7471	MERCURY	mg/kg	1.5		1.5		1.7		0.54		0.2		0.13		0.38		0.19	
SW8081	4,4'-DDD	ug/kg	2.3	JN	2.1	JN	4.3	JN	1.2	U	1.3	U	1.3	U	1.5	U	2	U
SW8081	4,4'-DDE	ug/kg	13	J	12	J	25		0.22	J	0.37	J	0.6	J	1.5	U	2	U
SW8081	4,4'-DDT	ug/kg	23		19		29		0.34	J	0.77	J	0.59	J	0.28	J	0.8	J
SW8081	HEXACHLOROBENZENE	ug/kg	7.1		6.6		8.1		0.25	J	0.67	J	0.45	J	0.31	J	2	U
SW8082	AROCLOR-1016	ug/kg	13	U	13	U	13	U	12	U	13	U	13	U	15	U	19	U
SW8082	AROCLOR-1221	ug/kg	13	U	13	U	13	U	12	U	13	U	13	U	15	U	19	U
SW8082	AROCLOR-1232	ug/kg	13	U	13	U	13	U	12	U	13	U	13	U	15	U	19	U
SW8082	AROCLOR-1242	ug/kg	13	U	13	U	13	U	12	U	13	U	13	U	15	U	19	U
SW8082	AROCLOR-1248	ug/kg	320		230		420		12	U	6	J	7.4	J	15	U	19	U
SW8082	AROCLOR-1254	ug/kg	13	U	13	U	13	U	12	U	13	U	13	U	15	U	19	U
SW8082	AROCLOR-1260	ug/kg	160		120		330		12	U	7.6	J	7.4	J	15	U	19	U
SW8082	AROCLOR-1262	ug/kg	13	U	13	U	13	U	12	U	13	U	13	U	15	U	19	U
SW8082	AROCLOR-1268	ug/kg	13	U	13	U	13	U	12	U	13	U	13	U	15	U	19	U
SW8082	PCBS, N.O.S.	ug/kg	480		350		750		12	U	14		15		15	U	19	U
	NA - not analyzed																	

		Location	OL-STA-40212		OL-STA-40212		OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50057	
		Field Sample ID	OL-2010-13F		OL-2016-02F		OL-2000-01F		OL-2000-02F		OL-2002-01F		OL-2002-02F		OL-2002-03F		OL-2003-01F	
		Sample Date	7/10/2013		7/24/2013		5/21/2013		5/21/2013		6/3/2013		6/3/2013		6/3/2013		6/13/2013	
		SDG	07-1|180-26783-1		180-23465-1		180-21459-1		180-21459-1		180-21801-1		180-21801-1		180-21801-1		180-22210-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	PKSD		BB		SMB		SMB		SMB		SMB		SMB		SMB	
		Specimen Sex	U		U		U								U		U	
		Specimen Length	124 mm		295 mm		402 mm		434 mm		343 mm		305 mm		292 mm		292 mm	
		Specimen Weight	39 g		370 g		1036 g		1234 g		529 g		415 g		354 g		409 g	
		Specimen Age	2+ yrs		3+ yrs		6 yrs		9 yrs		4 yrs		3 yrs		3 yrs		4 yrs	
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	0.08		0.14	J	0.093		0.23		0.37		0.46		0.31		0.72	
SW7471	MERCURY	mg/kg	0.19		0.17	J	1.1		0.89		0.5		0.29		0.45		0.32	
SW8081	4,4'-DDD	ug/kg	0.29	J	1.3	U	0.69	JN	0.97	JN	0.52	JN	0.66	JN	0.24	JN	0.82	JN
SW8081	4,4'-DDE	ug/kg	0.43	J	1.3	U	4.5		5.6		2.8		3.1		0.93	J	3.8	
SW8081	4,4'-DDT	ug/kg	0.62	J	0.69	J	6.3		7		3.5		2.2		2		4.3	
SW8081	HEXACHLOROBENZENE	ug/kg	2.1	U	0.43	J	0.93	J	1.1	J	0.98	J	1.1	J	0.74	J	1.5	
SW8082	AROCLOR-1016	ug/kg	20	U	13	U	13	U	12	U	13	U	13	U	12	U	12	U
SW8082	AROCLOR-1221	ug/kg	20	U	13	U	13	U	12	U	13	U	13	U	12	U	12	U
SW8082	AROCLOR-1232	ug/kg	20	U	13	U	13	U	12	U	13	U	13	U	12	U	12	U
SW8082	AROCLOR-1242	ug/kg	20	U	13	U	13	U	12	U	13	U	13	U	12	U	12	U
SW8082	AROCLOR-1248	ug/kg	20	U	5.8	J	45		54		34		23		17		44	
SW8082	AROCLOR-1254	ug/kg	20	U	13	U	13	U	12	U	13	U	13	U	12	U	12	U
SW8082	AROCLOR-1260	ug/kg	7.7	J	6.4	J	51		49		25		17		15		30	
SW8082	AROCLOR-1262	ug/kg	20	U	13	U	13	U	12	U	13	U	13	U	12	U	12	U
SW8082	AROCLOR-1268	ug/kg	20	U	13	U	13	U	12	U	13	U	13	U	12	U	12	U
SW8082	PCBS, N.O.S.	ug/kg	7.7	J	12	J	96		100		59		40		32		74	
	NA - not analyzed																	

		Location	OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50057	
		Field Sample ID	OL-2008-01F		OL-2008-02F		OL-2008-03F		OL-2008-04F		OL-2008-05F		OL-2008-06F		OL-2008-12F		OL-2008-13F	
		Sample Date	7/9/2013		7/9/2013		7/9/2013		7/9/2013		7/9/2013		7/9/2013		7/9/2013		7/9/2013	
		SDG	180-22925-1		180-22925-1		180-22925-1		180-22925-1		180-22925-1		180-22925-1		180-22925-1		180-22925-1	-229
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	WALL		WALL		WALL		SMB		WALL		WALL		WALL		BB	
		Specimen Sex	U		U		U		U		U		U		U		U	
		Specimen Length	629 mm		517 mm		540 mm		439 mm		558 mm		519 mm		521 mm		276 mm	
		Specimen Weight	3340 g		2282 g		1808 g		1443 g		2392 g		1557 g		2063 g		435 g	
		Specimen Age	9+ yrs		11+ yrs		7+ yrs		8+ yrs		8+ yrs		11+ yrs		18+ yrs		4 yrs	
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	2.5		1.8		1.5		0.95		1.3		1.5		2.4		0.041	
SW7471	MERCURY	mg/kg	1.8		2		0.91		1		1.3		1.7		2.3		0.98	
SW8081	4,4'-DDD	ug/kg	3.8	JN	4.9	JN	1.6	JN	1.7	JN	2.1	JN	4.6	JN	5.6	JN	0.16	U
SW8081	4,4'-DDE	ug/kg	23		23	J	9.5		12		13		41		31	J	0.5	J
SW8081	4,4'-DDT	ug/kg	26		41		9.8		14		13		43		49		0.61	J
SW8081	HEXACHLOROBENZENE	ug/kg	9.9		11		5		1.9		4		10		10		0.19	U
SW8082	AROCLOR-1016	ug/kg	13	U	12	U	13	U	13	U	12	U	13	U	12	U	13	U
SW8082	AROCLOR-1221	ug/kg	13	U	12	U	13	U	13	U	12	U	13	U	12	U	13	U
SW8082	AROCLOR-1232	ug/kg	13	U	12	U	13	U	13	U	12	U	13	U	12	U	13	U
SW8082	AROCLOR-1242	ug/kg	13	U	12	U	13	U	13	U	12	U	13	U	12	U	13	U
SW8082	AROCLOR-1248	ug/kg	330		550		130		130		170		460		690		13	U
SW8082	AROCLOR-1254	ug/kg	13	U	12	U	13	U	13	U	12	U	13	U	12	U	13	U
SW8082	AROCLOR-1260	ug/kg	200		270		76		100		92		290		340		5.2	J
SW8082	AROCLOR-1262	ug/kg	13	U	12	U	13	U	13	U	12	U	13	U	12	U	13	U
SW8082	AROCLOR-1268	ug/kg	13	U	12	U	13	U	13	U	12	U	13	U	12	U	13	U
SW8082	PCBS, N.O.S.	ug/kg	530		820		210		230		260		750		1000		5.2	J
	NA - not analyzed																	

		Location	OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50057		OL-STA-50058		OL-STA-50058	
		Field Sample ID	OL-2008-14F		OL-2010-06F		OL-2010-07F		OL-2015-01F		OL-2015-02F		OL-2015-03F		OL-2001-02F		OL-2010-01F	
		Sample Date	7/9/2013		7/10/2013		7/10/2013		7/18/2013		7/18/2013		7/18/2013		5/31/2013		7/10/2013	
		SDG	25-1|180-26783-1		-23007-1|180-26783-1		180-23007-1		180-23320-1		180-23320-1		180-23320-1		180-21761-1		180-23007-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	BB		PKSD		BB		SMB		SMB		SMB		SMB		WALL	
		Specimen Sex	U		U		U		U		U		U		U		U	
		Specimen Length	328 mm		187 mm		333 mm		447 mm		416 mm		447 mm		324 mm		560 mm	
		Specimen Weight	780 g		132 g		412 g		1334 g		1129 g		1488 g		577 g		2507 g	
		Specimen Age	6+ yrs		5+ yrs		7 yrs		8+ yrs		6+ yrs		9+ yrs		5 yrs		7+ yrs	
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	0.035		0.06		0.12		0.84		0.86		0.68		0.18		1.5	
SW7471	MERCURY	mg/kg	1.2		0.43		0.61		1		0.46		0.61		0.49		1.5	
SW8081	4,4'-DDD	ug/kg	0.23	JN	1.7	U	0.27	JN	5.6	JN	1.8	JN	2.5	JN	0.61	JN	5	JN
SW8081	4,4'-DDE	ug/kg	0.77	J	1.7	U	1	J	33		11		12		3.4		28	
SW8081	4,4'-DDT	ug/kg	1.1	J	1.7	U	1.3		39		7.9		11		4.6		33	
SW8081	HEXACHLOROBENZENE	ug/kg	0.23	J	0.41	J	2.1		5.3		2.6		2.4		1.1	J	13	
SW8082	AROCLOR-1016	ug/kg	12	U	17	U	12	U	12	U	13	U	13	U	13	U	12	U
SW8082	AROCLOR-1221	ug/kg	12	U	17	U	12	U	12	U	13	U	13	U	13	U	12	U
SW8082	AROCLOR-1232	ug/kg	12	U	17	U	12	U	12	U	13	U	13	U	13	U	12	U
SW8082	AROCLOR-1242	ug/kg	12	U	17	U	12	U	12	U	13	U	13	U	13	U	12	U
SW8082	AROCLOR-1248	ug/kg	12	U	17	U	12		440		79		160		36		450	
SW8082	AROCLOR-1254	ug/kg	12	U	17	U	12	U	12	U	13	U	13	U	13	U	12	U
SW8082	AROCLOR-1260	ug/kg	7.5	J	17	U	11	J	340		76		99		32		320	
SW8082	AROCLOR-1262	ug/kg	12	U	17	U	12	U	12	U	13	U	13	U	13	U	12	U
SW8082	AROCLOR-1268	ug/kg	12	U	17	U	12	U	12	U	13	U	13	U	13	U	12	U
SW8082	PCBS, N.O.S.	ug/kg	7.5	J	17	U	23		780		160		260		68		770	
	NA - not analyzed																	

		Location	OL-STA-50058		OL-STA-50058		OL-STA-50058		OL-STA-50058		OL-STA-50058		OL-STA-50058		OL-STA-50058		OL-STA-50058	
		Field Sample ID	OL-2010-02F		OL-2010-03F		OL-2010-04F		OL-2012-09F		OL-2012-10F		OL-2012-11F		OL-2012-12F		OL-2012-13F	
		Sample Date	7/10/2013		7/10/2013		7/10/2013		7/12/2013		7/12/2013		7/12/2013		7/12/2013		7/12/2013	
		SDG	180-23007-1		180-23007-1		180-23007-1	-23067-1|180-26783-1		-23067-1|180-26783-1			180-23067-1		180-23067-1		180-23067-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	WALL		WALL		WALL		PKSD		PKSD		PKSD		PKSD		BB	
		Specimen Sex	U		U		U		U		U		U		U		U	
		Specimen Length	506 mm		519 mm		499 mm		139 mm		128 mm		139 mm		129 mm		274 mm	
		Specimen Weight	1799 g		1931 g		1632 g		57 g		44 g		65 g		54 g		336 g	
		Specimen Age	12+ yrs		12+ yrs		6+ yrs		2+ yrs		2+ yrs		2+ yrs		2+ yrs		5+ yrs	
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	1.8		1.1		0.53		0.0654		0.0938		0.086		0.3		0.035	
SW7471	MERCURY	mg/kg	1.8		2.1		0.78		0.18		0.19		0.16		0.14		0.86	
SW8081	4,4'-DDD	ug/kg	9.1	JN	2.3	JN	1.7	JN	0.2	JN	0.26	JN	0.27	JN	0.22	JN	1.3	U
SW8081	4,4'-DDE	ug/kg	47	J	12		9.5		0.72	J	0.64	J	0.86	J	0.85	J	0.59	J
SW8081	4,4'-DDT	ug/kg	86		13		10		1.4	J	1.2	J	1.4		1.4		0.99	J
SW8081	HEXACHLOROBENZENE	ug/kg	21		5.2		4.4		1.5	U	1.6	U	1.3	U	1.2	U	1.3	U
SW8082	AROCLOR-1016	ug/kg	12	U	13	U	13	U	15	U	15	U	13	U	12	U	13	U
SW8082	AROCLOR-1221	ug/kg	12	U	13	U	13	U	15	U	15	U	13	U	12	U	13	U
SW8082	AROCLOR-1232	ug/kg	12	U	13	U	13	U	15	U	15	U	13	U	12	U	13	U
SW8082	AROCLOR-1242	ug/kg	12	U	13	U	13	U	15	U	15	U	13	U	12	U	13	U
SW8082	AROCLOR-1248	ug/kg	1300		210		160		15		10	J	17		13		7.8	J
SW8082	AROCLOR-1254	ug/kg	12	U	13	U	13	U	15	U	15	U	13	U	12	U	13	U
SW8082	AROCLOR-1260	ug/kg	780		130		100		15	U	15	U	13	U	12	U	13	U
SW8082	AROCLOR-1262	ug/kg	12	U	13	U	13	U	15	U	15	U	13	U	12	U	13	U
SW8082	AROCLOR-1268	ug/kg	12	U	13	U	13	U	15	U	15	U	13	U	12	U	13	U
SW8082	PCBS, N.O.S.	ug/kg	2100		340		260		15		10	J	17		13		7.8	J
	NA - not analyzed																	

		Location	OL-STA-50058		OL-STA-50058		OL-STA-50058		OL-STA-50059		OL-STA-50059		OL-STA-50059		OL-STA-50059		OL-STA-50059	
		Field Sample ID	OL-2017-01F		OL-2017-02F		OL-2017-03F		OL-2000-03F		OL-2000-04F		OL-2001-01F		OL-2011-01F		OL-2011-03F	
		Sample Date	7/25/2013		7/25/2013		7/25/2013		5/21/2013		5/21/2013		5/31/2013		7/11/2013		7/11/2013	
		SDG	180-23552-1		180-23552-1		180-23552-1		180-21459-1		180-21459-1		180-21761-1		180-23031-1		180-23031-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	BB		BB		BB		SMB		SMB		SMB		WALL		WALL	
		Specimen Sex	U		U		U		U		F		F		U		U	
		Specimen Length	293 mm		261 mm		274 mm		357 mm		365 mm		335 mm		550 mm		577 mm	
		Specimen Weight	390 g		246 g		335 g		810 g		804 g		550 g		2167 g		2126 g	
		Specimen Age	3+ yrs		3+ yrs		3+ yrs		4 yrs		4 yrs		5 yrs		11+ yrs		6+ yrs	
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	0.94	J	0.044	J	0.32	J	0.32		0.2		0.33		3		1.3	
SW7471	MERCURY	mg/kg	0.26		0.17		0.035		0.68		0.64		0.54		1.3		0.46	
SW8081	4,4'-DDD	ug/kg	0.83	JN	0.16	JN	0.16	U	0.94	JN	0.5	JN	0.5	JN	6.3	JN	0.75	JN
SW8081	4,4'-DDE	ug/kg	4.6		0.49	J	0.19	U	5.2		1.9	J	1.8	J	39		7.8	J
SW8081	4,4'-DDT	ug/kg	12		1.9		0.82	J	6.9		4.4		5.1		44	J	13	
SW8081	HEXACHLOROBENZENE	ug/kg	2.3		0.82	J	0.26	J	2.1		1	J	1.2	J	11		5	
SW8082	AROCLOR-1016	ug/kg	13	U	13	U	13	U	12	U	13	U	12	U	12	U	12	U
SW8082	AROCLOR-1221	ug/kg	13	U	13	U	13	U	12	U	13	U	12	U	12	U	12	U
SW8082	AROCLOR-1232	ug/kg	13	U	13	U	13	U	12	U	13	U	12	U	12	U	12	U
SW8082	AROCLOR-1242	ug/kg	13	U	13	U	13	U	12	U	13	U	12	U	12	U	12	U
SW8082	AROCLOR-1248	ug/kg	83		23		33		65		39		33		460		120	
SW8082	AROCLOR-1254	ug/kg	13	U	13	U	13	U	12	U	13	U	12	U	12	U	12	U
SW8082	AROCLOR-1260	ug/kg	78		18		8.6	J	48		43		44		260		87	
SW8082	AROCLOR-1262	ug/kg	13	U	13	U	13	U	12	U	13	U	12	U	12	U	12	U
SW8082	AROCLOR-1268	ug/kg	13	U	13	U	13	U	12	U	13	U	12	U	12	U	12	U
SW8082	PCBS, N.O.S.	ug/kg	160		41		42		110		82		77		720		210	
	NA - not analyzed																	

		Location	OL-STA-50059		OL-STA-50059		OL-STA-50059		OL-STA-50059		OL-STA-50059		OL-STA-50059		OL-STA-50059		OL-STA-50059	
		Field Sample ID	OL-2011-04F		OL-2011-05F		OL-2012-04F		OL-2012-05F		OL-2012-06F		OL-2012-07F		OL-2012-08F		OL-2013-01F	
		Sample Date	7/11/2013		7/11/2013		7/12/2013		7/12/2013		7/12/2013		7/12/2013		7/12/2013		7/16/2013	
		SDG	180-23031-1		180-23031-1		180-23067-1		180-23067-1		180-23067-1		180-23067-1		180-23067-1		180-23205-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	SMB		WALL		SMB		BB		PKSD		PKSD		PKSD		SMB	
		Specimen Sex	U		U		U		U		U		U		U		U	
		Specimen Length	470 mm		554 mm		425 mm		324 mm		138 mm		135 mm		130 mm		440 mm	
		Specimen Weight	1411 g		2153 g		1199 g		387 g		60 g		58 g		55 g		1157 g	
		Specimen Age	10+ yrs		8+ yrs		6+ yrs		6+ yrs		2+ yrs		2+ yrs		2+ yrs		7+ yrs	
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	0.22		0.84		0.36		0.029		0.13		0.15		0.18		0.49	
SW7471	MERCURY	mg/kg	1.5		1.1		0.95		0.5		0.2		0.096		0.043		0.77	
SW8081	4,4'-DDD	ug/kg	1.3	JN	1.1	JN	2.1	JN	1.3	U	1.6	U	2	U	0.33	JN	1.8	JN
SW8081	4,4'-DDE	ug/kg	7	J	5.5	J	12		1.3	U	0.41	J	0.57	J	0.82	J	12	
SW8081	4,4'-DDT	ug/kg	14		10		16		0.49	J	0.82	J	2.1		2.8		16	
SW8081	HEXACHLOROBENZENE	ug/kg	0.97	J	3.3		2.3	U	1.3	U	1.6	U	2	U	1.9	U	2.5	
SW8082	AROCLOR-1016	ug/kg	13	U	12	U	12	U	13	U	16	U	19	U	18	U	13	U
SW8082	AROCLOR-1221	ug/kg	13	U	12	U	12	U	13	U	16	U	19	U	18	U	13	U
SW8082	AROCLOR-1232	ug/kg	13	U	12	U	12	U	13	U	16	U	19	U	18	U	13	U
SW8082	AROCLOR-1242	ug/kg	13	U	12	U	12	U	13	U	16	U	19	U	18	U	13	U
SW8082	AROCLOR-1248	ug/kg	100		93		150		13	U	16	U	43		62		160	
SW8082	AROCLOR-1254	ug/kg	13	U	12	U	12	U	13	U	16	U	19	U	18	U	13	U
SW8082	AROCLOR-1260	ug/kg	91		68		120		13	U	16	U	20		22		130	
SW8082	AROCLOR-1262	ug/kg	13	U	12	U	12	U	13	U	16	U	19	U	18	U	13	U
SW8082	AROCLOR-1268	ug/kg	13	U	12	U	12	U	13	U	16	U	19	U	18	U	13	U
SW8082	PCBS, N.O.S.	ug/kg	190		160		270		13	U	16	U	63		84		290	
	NA - not analyzed																	

		Location	OL-STA-50059		OL-STA-50059		OL-STA-60225		OL-STA-60225		OL-STA-60225		OL-STA-60225		OL-STA-60225		OL-STA-70124	
		Field Sample ID	OL-2016-11F		OL-2016-12F		OL-2006-01F		OL-2016-01F		OL-2016-03F		OL-2016-04F		OL-2016-05F		OL-2016-06F	
		Sample Date	7/24/2013		7/24/2013		6/21/2013		7/24/2013		7/24/2013		7/24/2013		7/24/2013		7/24/2013	
		SDG	180-23465-1		180-23465-1		180-22474-1		180-23465-1		180-23465-1		180-23465-1		180-23465-1		180-23465-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	BB		BB		SMB		BB		BB		PKSD		PKSD		PKSD	
		Specimen Sex	U		U				U		U		U		U		U	
		Specimen Length	253 mm		266 mm		391 mm		247 mm		211 mm		126 mm		137 mm		164 mm	
		Specimen Weight	247 g		290 g		1007 g		173 g		121 g		52 g		67 g		105 g	
		Specimen Age	3+ yrs		2+ yrs		7 yrs		1+ yrs		2+ yrs		2+ yrs		2+ yrs		3+ yrs	
Method	Parameter Name	Units																
Percent Lipids	%LIPIDS DETERMINATION	%	0.15	J	0.13	J	0.13	J	0.48	J	0.54	J	0.19	J	0.17	J	0.069	J
SW7471	MERCURY	mg/kg	0.14	J	0.13	J	0.86	J	0.16	J	0.036	J	0.11	J	0.11	J	0.19	J
SW8081	4,4'-DDD	ug/kg	0.37	JN	1.3	U	0.81	JN	0.27	JN	0.51	JN	0.2	JN	0.41	JN	0.27	JN
SW8081	4,4'-DDE	ug/kg	0.99	J	0.43	J	5.5	J	0.53	J	1.1	J	0.3	J	0.74	J	0.65	J
SW8081	4,4'-DDT	ug/kg	3.7		1.6		7.6	J	2		3.9		1.7		1.5	J	1.4	J
SW8081	HEXACHLOROBENZENE	ug/kg	3.1		0.47	J	0.97	J	0.74	J	0.83	J	0.23	J	0.44	J	3.2	
SW8082	AROCLOR-1016	ug/kg	13	U	13	U	12	UJ	13	U	14	U	13	U	22	U	17	U
SW8082	AROCLOR-1221	ug/kg	13	U	13	U	12	UJ	13	U	14	U	13	U	22	U	17	U
SW8082	AROCLOR-1232	ug/kg	13	U	13	U	12	UJ	13	U	14	U	13	U	22	U	17	U
SW8082	AROCLOR-1242	ug/kg	13	U	13	U	12	UJ	13	U	14	U	13	U	22	U	17	U
SW8082	AROCLOR-1248	ug/kg	33		25		60	J	23		140		42		36		19	
SW8082	AROCLOR-1254	ug/kg	13	U	13	U	12	UJ	13	U	14	U	13	U	22	U	17	U
SW8082	AROCLOR-1260	ug/kg	29		12	J	49	J	16		32		11	J	14	J	9.2	J
SW8082	AROCLOR-1262	ug/kg	13	U	13	U	12	UJ	13	U	14	U	13	U	22	U	17	U
SW8082	AROCLOR-1268	ug/kg	13	U	13	U	12	UJ	13	U	14	U	13	U	22	U	17	U
SW8082	PCBS, N.O.S.	ug/kg	62		37		110	J	39		170		53		50		28	
	NA - not analyzed																	

		Location	OL-STA-70124		OL-STA-70124		OL-STA-70124		OL-STA-70124	
		Field Sample ID	OL-2016-07F		OL-2016-08F		OL-2016-09F		OL-2016-10F	
		Sample Date	7/24/2013		7/24/2013		7/24/2013		7/24/2013	
		SDG	180-23465-1		180-23465-1		-23465-1|180-26783-1		180-23465-1	
		Matrix	TISSUE		TISSUE		TISSUE		TISSUE	
		Sample Purpose	Regular sample		Regular sample		Regular sample		Regular sample	
		Sample Type	Tissue - fish		Tissue - fish		Tissue - fish		Tissue - fish	
		Taxon	PKSD		BB		BB		BB	
		Specimen Sex	U				U		U	
		Specimen Length	131 mm		261 mm		313 mm		242 mm	
		Specimen Weight	52 g		255 g		334 g		244 g	
		Specimen Age	2+ yrs		3+ yrs		4+ yrs		3+ yrs	
Method	Parameter Name	Units								
Percent Lipids	%LIPIDS DETERMINATION	%	0.0957	J	0.35	J	0.0224	J	0.1	J
SW7471	MERCURY	mg/kg	0.065	J	0.11	J	0.45	J	0.11	J
SW8081	4,4'-DDD	ug/kg	2	U	0.35	JN	1.3	U	1.3	U
SW8081	4,4'-DDE	ug/kg	0.92	J	0.97	J	1.3	U	0.19	J
SW8081	4,4'-DDT	ug/kg	2.1		2.1		0.55	J	0.74	J
SW8081	HEXACHLOROBENZENE	ug/kg	0.61	J	2.7		0.2	J	0.73	J
SW8082	AROCLOR-1016	ug/kg	20	U	13	U	13	U	13	U
SW8082	AROCLOR-1221	ug/kg	20	U	13	U	13	U	13	U
SW8082	AROCLOR-1232	ug/kg	20	U	13	U	13	U	13	U
SW8082	AROCLOR-1242	ug/kg	20	U	13	U	13	U	13	U
SW8082	AROCLOR-1248	ug/kg	22		21		2.1	J	4.5	J
SW8082	AROCLOR-1254	ug/kg	20	U	13	U	13	U	13	U
SW8082	AROCLOR-1260	ug/kg	12	J	16		4.7	J	5	J
SW8082	AROCLOR-1262	ug/kg	20	U	13	U	13	U	13	U
SW8082	AROCLOR-1268	ug/kg	20	U	13	U	13	U	13	U
SW8082	PCBS, N.O.S.	ug/kg	34		37		6.8	J	9.5	J
	NA - not analyzed									

ATTACHMENT A-2

VALIDATED LABORATORY DATA FOR ZOOPLANKTON SAMPLES

								Parameter	MERCURY		METHYL MERCURY	
								Units	mg/kg		ng/g	
Field Sample ID	Location ID	Sample Date	Sample Delivery Group	Sample Depth	Matrix	Purpose	Samp Type	Filtered				
OL-1904-01	W1	5/20/2013	240-24672-1	NA	TISSUE	REG	T-ZP	N	0.028		2.8	
OL-1911-01	W1	6/17/2013	240-25813-1	NA	Tissue	REG	T-ZP	N	0.073	J	7.2	
OL-1919-01	W1	7/1/2013	240-26385-1	NA	Tissue	REG	T-ZP	N	0.041		11	
OL-1926-01	W1	7/15/2013	240-26896-1	NA	Tissue	REG	T-ZP	N	0.12		11	
OL-1933-01	W1	7/29/2013	240-27351-1	NA	Tissue	REG	T-ZP	N	0.056		11	
OL-1940-01	W1	8/12/2013	240-27874-1	NA	Tissue	REG	T-ZP	N			11	
OL-1949-01	W1	8/26/2013	240-28383-1	NA	TISSUE	REG	T-ZP	N	0.0083		7.2	
OL-1953-01	W1	9/5/2013	240-28749-1	NA	TISSUE	REG	T-ZP	N			7.3	
OL-1957-01	W1	9/9/2013	240-28819-1	NA	Tissue	REG	T-ZP	N			8.4	
OL-1964-01	W1	9/16/2013	240-29085-1	NA	Tissue	REG	T-ZP	N	0.088		5.8	
OL-1969-01	W1	9/23/2013	240-29360-1	NA	Tissue	REG	T-ZP	N	0.074		4.6	
OL-1974-01	W1	9/30/2013	240-29657-1	NA	Tissue	REG	T-ZP	N	0.1		9.7	
OL-1979-01	W1	10/8/2013	240-29993-1	NA	Tissue	REG	T-ZP	N	0.071		7.1	
OL-1983-01	W1	10/14/2013	240-30229-1	NA	Tissue	REG	T-ZP	N	0.14		16	
OL-1988-01	W1	10/21/2013	240-30470-1	NA	Tissue	REG	T-ZP	N	0.042		8.1	
OL-1994-01	W1	10/28/2013	240-30758-1	NA	Tissue	REG	T-ZP	N	0.065		11	
OL-2025-01	W1	11/4/2013	240-31023-1	NA	Tissue	REG	T-ZP	N	0.068		11	
OL-2029-01	W1	11/20/2013	240-31717-1	NA	Tissue	REG	T-ZP	N	0.059		15	