
**ADDENDUM 2 (2014) TO ONONDAGA LAKE
TISSUE MONITORING
WORK PLAN FOR 2012**

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LIST OF ACRONYMS

DDT	Dichloro, diphenyl trichloroethane
NYSDEC	New York State Department of Environmental Conservation
OLMMS	Onondaga Lake Maintenance and Monitoring Scoping Document
PCBs	Polychlorinated biphenyls
UFI	Upstate Freshwater Institute
USEPA	United States Environmental Protection Agency

WORK PLAN ADDENDUM 2 - ONONDAGA LAKE TISSUE MONITORING FOR 2014

This is a work plan addendum for monitoring Onondaga Lake fish and zooplankton tissue in 2014 on behalf of Honeywell International that employs the same types of work efforts completed in Onondaga Lake in 2012 and 2013. This work plan addendum for 2014 includes sampling and chemical analysis of adult sport fish, prey fish and zooplankton as well as monitoring of fish populations and fish communities. Biota tissue concentrations and fish communities in Onondaga Lake have been monitored annually on behalf of Honeywell since 2008. Dredging and capping began in Onondaga Lake in July 2012.

As described in the draft Onondaga Lake Monitoring and Maintenance Scoping Document (OLMMS) (Parsons, Anchor QEA and Exponent, 2012a), the primary objective for monitoring biota tissue is to provide basis for determining achievement of fish tissue performance criteria. Zooplankton tissue will continue to be monitored for mercury to help better understand bioaccumulation pathways.

The primary purpose of fish community monitoring is to provide data during and after habitat reestablishment to assist in determining overall effectiveness and biological response that is guided by the success criteria and decision making framework discussed in the draft OLMMS. Biological monitoring work in 2014 will again focus on fish community and fish population assessments at the same level of effort completed in 2012 and 2013 (Parsons and Anchor QEA, 2012). Habitat reestablishment will begin in the summer of 2014. Monitoring of habitat will begin after 2015 which is the first full growing season after initial reestablishment of habitat.

Based on lake monitoring results from recent years, the objectives, equipment, and procedures for tissue and biological monitoring efforts will be the same in 2014 as they were in 2012 and 2013 (Parsons, Anchor QEA and Exponent, 2012b). The lake tissue and biological monitoring effort for 2014 will include the following:

- Collect a total of 25 adult pumpkinseed, 25 adult common carp, 25 adult brown bullhead, 25 adult smallmouth bass, and 25 adult walleye evenly distributed from eight locations around the lake (as practical) for tissue chemical analyses consistent with sampling completed in 2013. The target length range for adult common carp is 14 to 28 inches (350 to 700 millimeters).
- Collect 24 composites of abundant small prey fish and 24 individual large prey fish (suckers or similar). 2014 is the first year that large prey fish will be collected for fish tissue chemical analysis. Collect the small (less than 180 mm total length) and large prey (180 to 600 mm total length) fish from the same eight portions of the lake where adult sport fish will be collected (three small prey fish composites and three large prey fish from each location to the extent practical). From 2008 through 2013, prey fish collections consisted of 40 composites of small prey fish. Collecting large prey fish is new to the fish tissue monitoring for 2014. Large prey fish in Onondaga Lake are part of the diet of ecological receptors.

- Document on site the total lengths and weights of all 125 adult sport fish and 24 large prey fish as well as the weights of the 24 prey fish composites.
- Document estimated ages of all 125 adult sport fish based on scales (pumpkinseed), spines (brown bullhead), and otoliths (common carp, smallmouth bass and walleye).
- In the laboratory conducting chemical analyses, prepare fillets of adult sport fish in accordance with NYSDEC's protocol, whole body composites of small prey fish, and individual whole bodies of large prey fish.
- Analyze the 125 adult sport fish fillets, 24 composites of whole body small prey fish, and 24 individual whole body large prey fish for total mercury, PCB aroclors, hexachlorobenzene, and lipid content. In addition, analyze the composites of whole body small prey fish and the 24 individual whole body large prey fish for DDT and its metabolites based on risk drivers presented on Table 7 in the Record of Decision (NYSDEC and USEPA Region 2, 2005).
- Analyze 12 of the 25 adult pumpkinseed, smallmouth bass and walleye fillets and 6 of the 25 adult brown bullhead and common carp fillets for dioxins-furans. .
- Analyze a subset of whole-body large prey fish for carbon-13 (delC) and nitrogen-15 (delN) stable isotopes. The purpose of this additional stable isotope work is to provide information about the position of large prey fish within the lake's food web and to help better understand local bioaccumulation pathways. Up to 10 samples of large white suckers processed for mercury analysis will also be analyzed for carbon-13 and nitrogen-15 stable isotopes. Up to 10 samples each of zooplankton and phytoplankton also will be analyzed for carbon-13 and nitrogen-15 stable isotopes.
- Collect one composite zooplankton sample at the South Deep location on 18 dates from mid-May to late November. Analyze each zooplankton sample for total mercury and methylmercury using low-level (USEPA 1630 series) methods.

The 2014 sampling scope and schedule are summarized in Tables 1 and 2 attached. To be consistent with prior year sample collection times, our plan is to collect zooplankton beginning in mid-May, sport fish in July, and prey fish in August. Fish population and fish community assessment work began in mid- May.

Quality assurance and quality control procedures and standard operating procedures are presented separately (Parsons, Anchor QEA and UFI, 2012). Data will be organized into a compilation of laboratory and field generated data in electronic file format. Electronic data files will be generated by the analytical laboratory, while pertinent field data will be entered into electronic format during collection. Analytical data will be reviewed and validated as described in the QAPP associated with this work plan. Use of standard reference material for fish tissue chemical analyses conducted in 2014 will include analysis of a standard reference tissue sample to be identified and reviewed with NYSDEC prior to use.

A Tissue and Biological Monitoring Report for 2014 will be prepared and submitted to NYSDEC by the spring of 2015 that will include a summary of results and a Data Usability and Summary Report. Complete laboratory data packages will be available upon request.

References

- NYSDEC and USEPA Region 2, 2005. Record of Decision. *Onondaga Lake Bottom Subsite of the Onondaga Lake Superfund Site*. July 2005.
- Parsons, Anchor QEA and Exponent. 2012a. Onondaga Lake Monitoring and Maintenance Scoping Document. April 2012. Draft
- Parsons and Anchor QEA, 2012. Onondaga Lake Habitat and Biological Monitoring Work Plan for 2012. Prepared for Honeywell. June 2012.
- Parsons, Anchor QEA and Exponent. 2012b. Onondaga Lake Tissue Monitoring Work Plan for 2012. Prepared for Honeywell. June 2012.
- Parsons, Anchor QEA, and UFI 2012. Quality Assurance Project Plan for Onondaga Lake Construction and Post-Construction Media Monitoring (surface water, biota and sediment). Prepared for Honeywell. December 2012. Draft.
- TAMS Consultants, Inc. 2002. *Baseline Ecological Risk Assessment*. Prepared with YEC, Inc. for NYSDEC, Division of Environmental Remediation, Albany, New York. December 2002.

TABLE 1

SUMMARY OF BIOTA SAMPLING LOCATIONS, NUMBER OF SAMPLES, SAMPLE PREPARATION, AND DURATION OF SAMPLING FOR 2014

Activity	Number of Locations	Number of field matrix samples per location	Number of species	Sample Preparation	Duration
Adult Sport Fish Tissue Sampling ¹	8	3-4	5	Fillets	Approximately 10 days in July
Prey Fish Tissue Sampling ²	8	6	Variable	Whole body	Approximately five days in August
Zooplankton	1	18 (Once in May and every 2 weeks from late June to late November except weekly during September and October prior to lake turnover)	Variable	Entire sample	May-November

- Notes:
1. Target for collecting individual adult sport fish is 25 common carp, 25 brown bullhead, 25 pumpkinseed, 25 smallmouth bass and 25 walleye evenly distributed among each of the sampling locations. However, if species are sparse at one location, additional individual will be collected from one of the other locations to achieve target sample numbers.
 2. Target for collecting prey fish is 24 composites of small prey fish and 24 individual large prey fish.
 3. Analytical work scope summary for fish tissue: 125 adult fillets, 24 composites of small prey fish and 24 individual large prey fish to be analyzed for mercury, PCB aroclors, hexachlorobenzene, and lipid content, plus 24 composites of small prey fish and 24 individual large prey fish to be analyzed for DDT and its metabolites. In addition, 12 of the 25 fillets of adult pumpkinseed, smallmouth bass and walleye and 6 of the 25 fillets of common carp and brown bullhead collected in total from all eight locations will be analyzed for dioxins-furans.

TABLE 2

**SAMPLING SCHEDULE FOR ONONDAGA LAKE FISH AND
ZOOPLANKTON TISSUE FOR 2014**

Activity	Month							
	April	May	June	July	Aug	Sept	Oct	Nov
Adult sport fish tissue				**				
Prey fish tissue ^{1,2}					**			
Zooplankton ³		*	* *	* *	* *	*****	*****	* *

Notes: 1. Each asterisk (*) represents one week.

2. Zooplankton will be collected at a frequency consistent with recent prior baseline years of sampling (see Table 1).