
ADDENDUM 3 (2011)
ONONDAGA LAKE BASELINE MONITORING
BOOK 2
FISH, INVERTEBRATE, AND LITTORAL WATER
MONITORING FOR 2008

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The logo for Anchor QEA features a stylized anchor on the left. To the right of the anchor, the word "ANCHOR" is written in a serif font, and "QEA" is written in a smaller, similar font below it. To the right of "QEA" are three wavy lines representing water.

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**APPENDIX A REVISED WORKSHEET 18 FOR THE QUALITY ASSURANCE
PROJECT PLAN (QAPP)**

LIST OF ACRONYMS

DDT	dichlorodiphenyl trichloroethane
DUSR	Data Usability and Summary Report
NYSDEC	New York State Department of Environmental Conservation
PCB	polychlorinated biphenyl
QAPP	Quality Assurance Project Plan
SOP	Standard Operating Procedure

EXECUTIVE SUMMARY

This third addendum to the 2008 Book 2 Work Plan for Onondaga Lake (Parsons, Exponent, and QEA, 2008) presents the scope for the 2011 biota monitoring in the context of the baseline monitoring program objectives, program elements, and data uses, as well as the sampling completed during the 2010 baseline monitoring work. The 2011 scope is the same as that for 2010 with the exception of including phytophilous invertebrate community survey work and not including monitoring for benthic macroinvertebrates and associated sediment based on the variable results from work completed during 2008 and 2010.

Key components of the 2011 Book 2 work scope are: 1) fish tissue chemical analyses, 2) food web structure and fish community assessment, 3) adult sport fish telemetry work, 4) fish community assessment work for lake sturgeon, and 5) phytophilous invertebrate community survey as was conducted during 2008. Laboratory analyses will include mercury in prey fish and four species of adult sport fish; polychlorinated biphenyls (PCBs), dichlorodiphenyl trichloroethane (DDT), hexachlorobenzene and lipids in a subset of prey fish and adult sport fish; and dioxins and furans in a subset of adult sport fish. The rationale for the 2011 scope and modifications to the 2010 scope are presented.

The work proposed in this addendum will use the 2008 Book 2 Standard Operating Procedures (SOP), the 2008 Book 2 Quality Assurance Project Plan (QAPP), and 2010 SOPs for fish telemetry and lake sturgeon community assessment work. A worksheet revised from the 2008 Book 2 QAPP is provided as Appendix A.

SECTION 1

INTRODUCTION

This third addendum to the 2008 Onondaga Lake Baseline Monitoring Book 2 Work Plan (Parsons, Exponent, and QEA, 2008) presents the scope for the 2011 Onondaga Lake biota monitoring being conducted on behalf of Honeywell. The work scope for 2011 is presented in the context of the baseline monitoring program objectives, program elements, and data uses. The rationale for key modifications to the 2010 Book 2 Work Plan is also presented. The Book 2 baseline monitoring data collected since 2008 were assessed in the context of the *Baseline Monitoring Scoping Document* (Parsons, Exponent, and QEA, 2010b) to determine an appropriate Book 2 baseline monitoring work scope for 2011.

The work proposed in this addendum will use the 2008 Book 2 Standard Operating Procedures (SOP) and Quality Assurance Project Plan (QAPP). A revised Worksheet 18 (Sampling Locations and Method/SOP Requirements Table) from the 2008 Book 2 QAPP is provided as Appendix A.

1.1 OBJECTIVES AND DATA USES

Program objectives, program elements, and data uses for Book 2 monitoring previously described in the draft *Baseline Monitoring Scoping Document* are presented in Table 1 along with a summary of how each was addressed since 2008 and is addressed by the work described in this addendum for 2011.

1.2 BOOK 2 WORK PLAN SCOPE FOR 2011

This 2011 addendum for Book 2 baseline monitoring includes the following elements:

- Fish tissue preparation

For 2011, chemical analyses of all four adult sport fish types will be conducted exclusively on fillet samples as was done for samples collected during 2010. Fewer samples will be collected during 2011 than during prior baseline monitoring years for reasons discussed in Section 2.

Consistent with the 2008 work plan, each of the individual adult sport fish and composite prey fish samples will be analyzed for total mercury. In addition, data from 2010 analyses of organics in adult sport fish tissue are not comparable to prior year results because the 2010 adult sport fish were not filleted in accordance with the NYSDEC filleting protocol; therefore, a subset of 2011 adult sport fish fillet samples (12 per species for a total of 48 samples) will be analyzed for PCBs, DDT and its metabolites, hexachlorobenzene, and lipids. Dioxins/furans will be analyzed in five of

the 2011 samples from each of the four adult sport fish species for a total of 20 samples. Samples selected for analysis of organics and lipids will be representative of the various lake sampling locations to the extent practical.

- Otolith analysis to estimate ages in adult smallmouth bass and walleye

In 2009 and 2010, both scales and otoliths (small ear bones) were obtained from adult smallmouth bass and adult walleye collected for chemical analyses. More accurate estimates of adult smallmouth bass and walleye ages are obtainable from fish otoliths than from fish scales. Therefore, otoliths will be collected from smallmouth bass and walleye and analyzed in 2011 to provide a more accurate estimation of the age of these fish in the lake to help understand mercury dynamics within the lake food web. Spines are typically adequate to estimate ages of brown bullhead, and scales are typically adequate to estimate ages of pumpkinseed.

- Telemetry for adult smallmouth bass and adult walleye

Tracking of fish movements was added as part of Honeywell's 2010 baseline monitoring program for Onondaga Lake. Continuing to track movements of adult smallmouth bass and adult walleye during 2011 will provide additional information to better understand how adult smallmouth bass and walleye are using the lake and thereby help assess mercury bioaccumulation by assessing fish exposure and fish movement. The focus for fish tracking work in 2011 will continue to be on smallmouth bass and walleye, because these two sport fish have been monitored since 2008 and represent top predators in the lake food web. A total of 17 adult walleye and 2 adult smallmouth bass were tagged during 2010. The goal for 2011 is to tag an additional 20 adult smallmouth bass and 13 walleye. Passive receivers, 8-hour surveys, and 24-hour surveys will be implemented again during 2011 consistent with their use during 2010.

- Lake sturgeon community assessment

Fish community assessment procedures enhanced in 2010 to more fully assess the presence of lake sturgeon in Onondaga Lake will be continued during 2011.

- Phytophilous invertebrate community survey

The phytophilous community was not highly abundant in 2008. As indicated in the Book 2 Work Plan Addendum for 2010 (Parsons, Exponent, and Anchor QEA, 2010a), phytophilous invertebrate communities will be surveyed during 2011 consistent with the procedures and locations in the lake specified in the 2008 Book 2 Work Plan.

SECTION 2

2011 BOOK 2 BIOTA MONITORING

The 2011 biota monitoring consists of three components: fish tissue analysis, food web structure and fish community assessment, and phytophilous invertebrate community survey work. These three components are briefly described below and summarized in Table 2.

2.1 FISH TISSUE ANALYSIS

Prey fish and adult sport fish will be collected from eight locations in the lake, consistent with Honeywell's 2008 baseline fish sampling and analysis work (Parsons, Exponent, and QEA, 2008) and the 2009 Book 2 Addendum 1 work (Parsons, Exponent, and QEA, 2009).

A total of 25 samples of each of the four adult sport fish species (i.e., pumpkinseed, brown bullhead, smallmouth bass, and walleye) will be targeted with approximately even distribution among the eight sampling locations. For 2011, 25 adult sport fish samples will be targeted instead of 50 samples to reduce mortality based on concerns for the potential to be impacting the population sizes of the fish species being sampled, particularly the population size for smallmouth bass which has not been able to be quantified due to low numbers of captures in recent years.

To assess the representativeness of a sample size of 25, mercury concentrations from 50 individuals of each species sampled within a year were sub-sampled to obtain a random sample of 25 individuals of each species. This sub-sampling was repeated ten times for each year with available records, and the mean and standard error of each random sample was calculated. For each of these subsamples, the standard error was less than 20 percent of the overall mean from the 50 samples. Twenty percent is often cited as a general estimate of the limit of precision that can be achieved in field studies. For example, Suter et al. (2000) stated that differences in natural populations on the order of 20 percent are generally not observable. With the number of adult sport fish to be collected per species and sacrificed for chemical analysis being reduced, fish sample collection will focus on legal size fish for human consumption.

A maximum of 40 composite samples of prey fish (minnow species) will be collected in total from the eight locations (five composites per location) as was also conducted during 2008, 2009, and 2010. Reasonable attempts will be made to include at least two alewife or gizzard shad (less than 7 in. or 180 millimeters [mm] - total length) composites from each location. The alewife and gizzard shad sampling will be targeted in May when these fish are easier to capture. Gill net sets will be used during night time hours in approximately 13 to 20 ft. (4 to 6 meters) of water depth to capture alewife and gizzard shad.

Sport fish samples will be collected starting in May when smallmouth bass may be more easily captured as they move in shallow waters while preparing for spawning. Sampling in late

August 2008 yielded few smallmouth bass, so sampling was moved to mid-June 2009 and 2010 in an attempt to obtain more smallmouth bass just after nesting. Sampling still proved to be difficult; therefore, sampling will be moved to May for 2011 prior to nesting activities and focusing on legal size fish. Composite prey fish samples will be collected in both May (alewife and gizzard shad) and August (all others). Most of the prey fish for chemical analyses will be collected during August, consistent with the 2008-2010 prey fish sampling efforts. Figure 1 shows the 2011 fish sampling locations. Every reasonable effort will be made to collect fish during 2011 from the locations where fish were collected during 2008, 2009, and 2010.

Age will be estimated for each individual adult sport fish collected for tissue chemical analysis using one of three different fish aging techniques: scales, spines, and otoliths. Scales will be used to estimate fish age for pumpkinseed. Pectoral spines will be used to estimate fish age for bullhead. Otoliths will be used to estimate fish age for smallmouth bass and walleye. For older fish, otoliths can quantify fish age more distinctively than scales. Otoliths from smallmouth bass and walleye will be removed prior to submittal to the analytical laboratory.

Mercury will be analyzed for each of the adult sport fish and for the prey fish composite samples collected for chemical analyses. In addition to mercury, PCBs, DDT and metabolites, hexachlorobenzene, and lipids will be analyzed in 12 samples from each of the four adult sport fish species. Fillet samples will be prepared for analyses of all four adult sport fish types to be collected using the standard New York State Department of Environmental Conservation (NYSDEC) fillet preparation procedure (i.e., a skin on fillet that includes the ribs and belly flap). Every reasonable effort will be made to collect and analyze fish for PCB, DDT, hexachlorobenzene, and lipid analysis during 2011 from the locations where fish were collected during 2008 and analyzed for the same organic compounds. In addition, samples of alewife and gizzard shad will be sent to Cornell University's stable isotope laboratory for analysis of ¹⁵N and ¹³C isotopes, consistent with stable isotope work completed by Cornell for Honeywell during 2009 and 2010.

2.2 FOOD WEB STRUCTURE, FISH COMMUNITY ASSESSMENT, AND FISH MIGRATION WORK

The 2011 biota monitoring will continue the 2008 Book 2 work on food web structure and fish community assessment. The three sampling activities are 1) assessment of fish population, 2) assessment of fish community composition, and 3) sampling and analysis of fish gut contents.

Fish population will be evaluated in 2011 with the same mark-recapture techniques used on behalf of Honeywell since 2008. The Onondaga Lake fish community will be assessed in 2011 at a minimum of eight of the locations sampled during 2008, 2009, and 2010. Sampling at all locations will include seining, gill netting, trap netting, and electrofishing as was done during 2008, 2009, and 2010. Pop netting will not be used in 2011 due to the relative inefficiency of fish capture in the lake using this technique in prior years. Vegetated littoral zone habitats will be sampled using a combination of trap netting, seining, and electrofishing. Fish community

assessments will be conducted several times from June through October to account for species shifts due to changes in water temperature and dissolved oxygen concentrations, as well as fish immigration and emigration. These data also will be used to assess the reproductive success of sport fish species.

Sampling and visual analysis of fish gut contents will be conducted from adult sport fish samples collected for tissue chemical analyses. As has been conducted since 2008, stomachs will be pumped by gastric lavage and preserved in buffered formalin prior to processing. Prey fish submitted for tissue analysis will not be sampled for stomach contents. Fish gut content analysis will provide an estimate of the trophic structure within the lake and facilitate understanding of the lake's food web. Sport fish collected as part of the fish community assessment will be sampled for stomach contents as time permits.

To more fully assess the Onondaga Lake fish community, a larger sized gill net (8 ft. deep by 200 ft. long with 6- to 12-inch stretch mesh openings) that was used during adult sport fish sample collections during 2010 will be used again during 2011 for fish community survey work to better understand lake sturgeon abundance and distribution. Sampling will be similar to that conducted in Oneida Lake to more fully assess the size range of sturgeon potentially residing in Onondaga Lake. The SOP for this work is presented as Appendix C of the 2010 Work Plan Addendum (Parsons, Exponent and Anchor QEA, 2010a).

Fish migration (telemetry) work in Onondaga Lake initiated during 2010 will be continued again during 2011 using the procedures specified in the 2010 Book 2 Work Plan Addendum. The focus for fish tracking work will continue to be on smallmouth bass and walleye, because these two sport fish have been monitored since 2008 and represent top predators in the lake food web. The goal for 2011 is to tag an additional 20 adult smallmouth bass and 13 walleye based on the original targets of 30 small mouth bass and 30 walleye. Attempts will be made to tag fish early in the season during May and June to allow more time for fish tracking. Passive receivers located near the Onondaga Creek outlet, Ninemile Creek outlet, and the lake outlet; 8-hour surveys; and 24-hour surveys will be implemented again during 2011 consistent with their use as specified in the Book 2 Work Plan Addendum for 2010 (Parsons, Exponent and Anchor QEA, 2010a).

2.3 PHYTOPHILOUS INVERTEBRATE COMMUNITY SURVEY

A phytophilous invertebrate community analysis will be conducted during 2011 following the same protocols in the Book 2 Work Plan for 2008. Nine locations will be sampled for phytophilous invertebrates during 2011 at vegetated areas in the vicinity of the nine locations sampled during 2010 for benthic macroinvertebrates, and three samples will be collected at each location. If sufficient biomass is collected, up to nine phytophilous invertebrate samples (one from each location) will be analyzed for total mercury and methylmercury.

Samples for phytophilous invertebrate community composition and abundance will be sorted and identified in a laboratory following procedures used during 2008 and described in the approved Book 2 (2008) Work Plan. Prior to sorting, samples will be rinsed through a sieve with

water and returned to the original container with 75 percent ethanol and rose bengal stain to assist with sorting. Invertebrates will be sub-sampled and then identified to the lowest taxonomic level reasonably achievable.

2.4 HEALTH AND SAFETY

The safety of field team members and the general public is Honeywell's highest priority. The Parsons Project Safety Plan and the Anchor QEA Project Safety Plan prepared for prior Onondaga Lake field activities will be reviewed, modified as warranted, and strictly followed by all personnel. Any task outside of the 2011 work scope defined in the relevant safety plans will have new job safety analyses completed as warranted before the task begins. Copies of these safety plans will be maintained at the support zone along the lakeshore and on the sampling boat.

2.5 DATA MANAGEMENT AND REPORTING

Analytical data will be submitted to the NYSDEC consistent in content and timing with submissions being provided for other pre-design investigation and baseline monitoring efforts for Onondaga Lake. Analytical data generated during this investigation will be reviewed and validated as described in detail in the QAPP associated with the 2008 Book 2 Work Plan. All analytes will be subject to Level III validation as described in the QAPP for the Phase I Pre-Design Investigation (Parsons, 2005). In addition, 10 percent of the total mercury, methylmercury, and PCB results will be validated based on Level IV protocols. The validated results will be incorporated into the Locus Focus database by Parsons following validation.

Once the data validation has been completed, one or more electronic data deliverables and a Data Usability and Summary Report (DUSR) will be prepared and submitted to NYSDEC. The DUSR will present the results of data validation and data usability assessment. A data export will be provided in the DUSR. Data interpretation and trend analysis will be discussed with the agencies and summarized separately.

SECTION 3

REFERENCES

- Parsons. 2005. *Onondaga Lake Pre-Design Investigation: Phase I Work Plan*. Prepared for Honeywell. September 2005.
- Appendix A *Phase I Sampling And Analysis Plan*
 - Appendix B *Quality Assurance Project Plan*
 - Appendix C *Project Safety Plan* Updated March 2007
- Parsons, Exponent, and Quantitative Environmental Analysis (QEA). 2008. *Onondaga Lake Baseline Monitoring Book 2 Fish, Invertebrate, and Littoral Water Monitoring Work Plan for 2008*. Prepared for Honeywell. September 2008.
- Parsons, Exponent, and QEA. 2009. *Addendum 1 (2009) to Onondaga Lake Baseline Monitoring Book 2 Fish, Invertebrate, and Littoral Water Monitoring Work Plan for 2008*. Prepared for Honeywell. September 2009.
- Parsons, Exponent, and Anchor QEA. 2010a. *Addendum 2 (2010) to Onondaga Lake Baseline Monitoring Book 2 Fish, Invertebrate, and Littoral Water Monitoring Work Plan for 2008*. Prepared for Honeywell. July 2010.
- Parsons, Exponent, and Anchor QEA. 2010b. *Baseline Monitoring Scoping Document for the Onondaga Lake Bottom Subsite*. Prepared for Honeywell. July 2010.
- Suter, G.W., Efroymsen, R.A., Sample, B.E. and Jones, D.S., 2000. *Ecological Risk Assessment for Contaminated Sites*. CRC Press.

TABLES

**TABLE 1
 ONONDAGA LAKE BASELINE MONITORING BOOK 2 SAMPLING FOR ADDENDUM 3 (2011)**

Objective/Data Use	Program Element	2008 Monitoring	2009 Monitoring	2010 Monitoring	2011 Monitoring
Establish baseline chemical and physical conditions to provide basis to measure achievement of target fish tissue concentrations	Sport and prey fish sampling	Included analysis of total mercury in four sport fish species and composite prey fish. A subset of sport fish and composite prey fish samples was analyzed for hexachlorobenzene, PCBs, DDT, and dioxins/furans (sport fish only). Fish age was determined using scales.	Same as 2008 except no HCB or DDT analysis; PCB analysis in smallmouth bass (SMB) and walleye (W) only. SMB and W were aged using otoliths and scales, brown bullhead (BB) using spines, and pumpkinseed (PKSD) using scales. Prey fish included 16 alewife composites to better assess pelagic bioaccumulation.	Same fish sampling and adult fish aging as 2009 except a smaller size range of bass (200 to 300 mm) will be targeted for a subset of the samples primarily to aid in understanding bioaccumulation patterns and no alewife sampling from pelagic zone. For littoral prey fish, include alewife if collected. Analyze fillets (no plugs). Same analytical scope as 2008.	Same as 2010 except the number of adult sport fish per species for chemical analysis will be reduced from 50 to 25 and focus on legal size fish. In addition, fish sample collection for chemical analysis will begin earlier (May) to try to capture more smallmouth bass and alewife and gizzard shad.
Provide basis to measure achievement of surface water quality standards and basis to establish water quality goals during remedy implementation	Lakewide water quality sampling	SMU 1 associated with sediment sampling for treatability testing.	None	Monitoring associated with construction was initiated during October 2010 as a separate effort on behalf of Honeywell.	Monitoring associated with construction that was initiated during 2010 will be continued during 2011.

**TABLE 1 (CONT.)
 ONONDAGA LAKE BASELINE MONITORING BOOK 2 SAMPLING FOR ADDENDUM 3 (2011)**

Objective/Data Use	Program Element	2008 Monitoring	2009 Monitoring	2010 Monitoring	2011 Monitoring
Provide additional data for future understanding of remedy effectiveness in achieving PRGs to assess biological factors that may contribute to variability in fish mercury concentrations	Other biota, co-located sediment, and littoral water sampling	Benthic macroinvertebrate community survey and chemical analysis of tissue, co-located sediment, and littoral water sampling three times at six locations (total mercury and methylmercury).	None	Same macroinvertebrate and co-located sediment sampling as August 2008 except samples were collected at nine locations and crayfish were collected and analyzed where present (three samples in total from two locations).	None
		Fish community assessment, phytoplankton macroinvertebrate community, sport fish population estimate, and fish diet assessment included.	Fish community assessment, fish diet assessment, and sport fish population estimate consistent with 2008 baseline monitoring efforts.	Fish community assessment, fish diet assessment, and sport fish population estimate consistent with 2008 and 2009 baseline monitoring efforts with a lake sturgeon community assessment added for 2010. Assess movements of adult smallmouth bass and walleye (to improve bioaccumulation understanding).	Same as during 2010 plus a phytoplankton invertebrate community survey.
		Littoral water sampling once during August and twice one to three weeks following lake turnover to assess whether methylmercury from SMU 8 hypolimnion can affect littoral zone.	No littoral water sampling was conducted for this purpose.	Same littoral zone water sampling and purpose as during 2008.	Littoral zone water sampling that was conducted separately during 2010 will be conducted again during 2011 as part of water quality monitoring for construction.

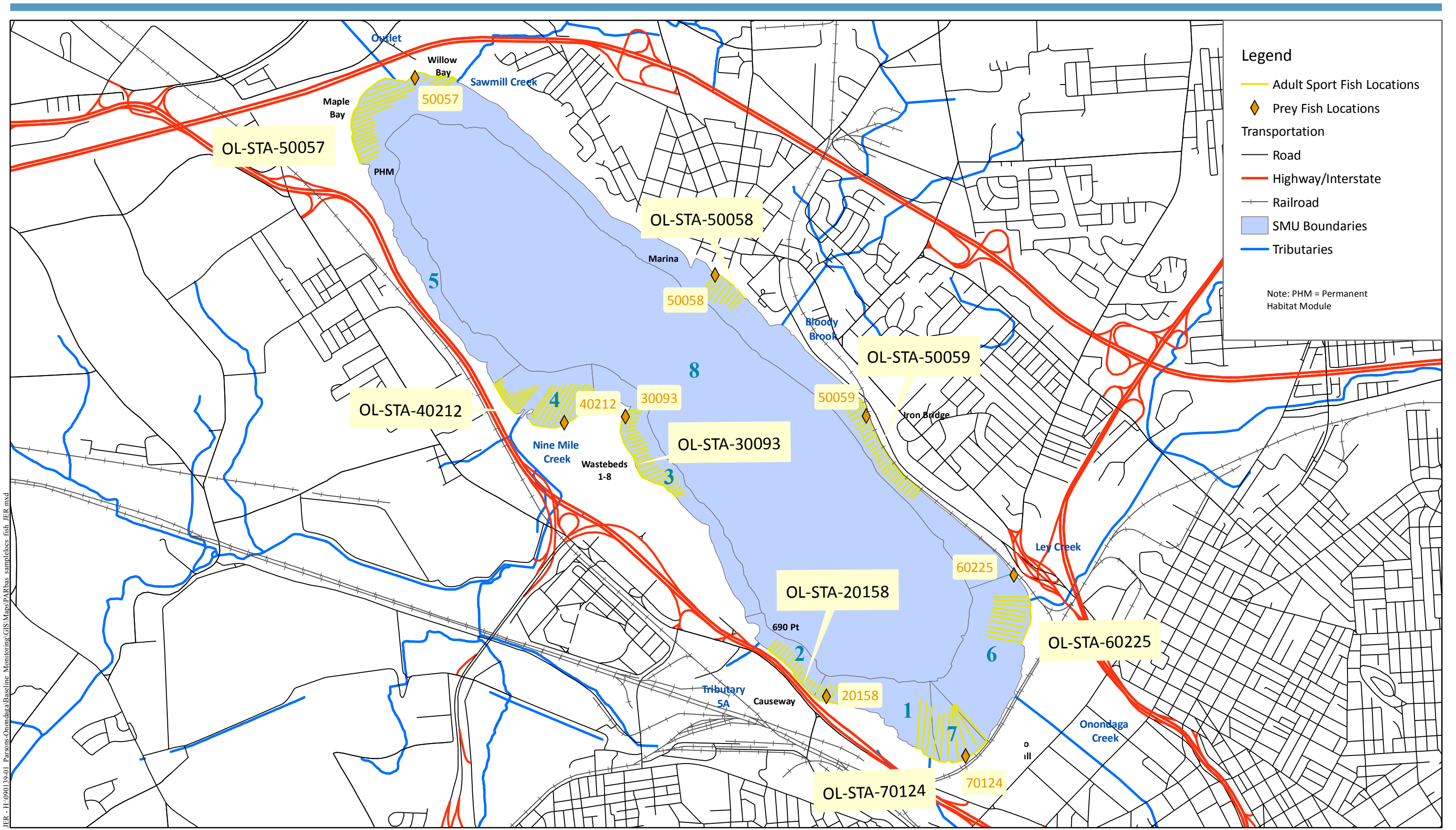
**TABLE 2
 SUMMARY OF PROPOSED BOOK 2 MONITORING ACTIVITIES FOR ADDENDUM 3 (2011)**

Activity	Number of Locations	Number of Samples per Location	Number of Species	Sample Preparation	Sampling Duration / Timeframe	Chemical Analytes
Adult Sport Fish Tissue Sampling ¹	8	3-4	4	Fillets for SMB, W, PKSD, and BB	May to June	Total mercury for all samples and organics for a sample subset
Prey Fish Tissue Sampling (minnow species, alewife and gizzard shad, if available)	8	5	Variable (composites of a prey species)	Whole body composites	Approximately five days in August except May for alewife and gizzard shad sampling	Total mercury for all samples and organics for a sample subset
Sport Fish Population Estimate	Lakewide	NA	4	NA	June to September	NA
Fish Community Assessment	8	NA	NA	NA	June to October	NA
Fish Diet Assessment	Lakewide	25 per species	4		June to September	NA
Fish Migration Assessment (telemetry)	Lakewide and Seneca River	Maximum of 20 individuals per species	2 (SMB and W)	NA	May to November	NA
Phytophilous Macroinvertebrate Community Assessment	9	3	NA	NA	Approximately 10 days during August	NA

NA – not applicable SMB – smallmouth bass W – walleye PKSD – pumpkinseed (sunfish) BB – brown bullhead

¹ Target for adult sport fish sampling is 25 per species. The goal is to evenly distribute these numbers of individuals from each location. However, if species are sparse at one location, additional individuals will be collected from one of the other locations to achieve the target numbers

FIGURES



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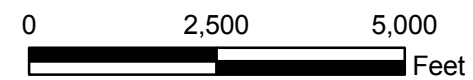


Figure 1
Baseline monitoring fish sampling locations for 2011.

APPENDIX A

**REVISED WORKSHEET 18 FOR THE QUALITY ASSURANCE PROJECT PLAN
(QAPP)**

<p><i>QAPP Worksheet #18</i> <i>Sampling Locations and Method/SOP Requirements</i> <i>Table</i></p>	<p>Title: Book 2 Addendum – Fish and Invertebrate Sampling for 2011 Revision Number: 0 Revision Date: May 5, 2011</p>
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See Figure 1 in this Book 2 Work Plan addendum for fish sampling locations. See Worksheet #18 in the 2008 Book 2 Work Plan for matrices, analytical groups, concentration levels, and number of samples. The number of locations, samples per location, and sampling duration are presented in this worksheet.

Activity	Number of Locations ¹	Number of samples per location	Number of species	Sample Preparation	Duration
Adult sport fish tissue	8	3	4	Fillets	Approximately 15 days in May-June
Prey fish tissue	8	5	Variable (samples are composites of a prey species)	Whole body composite	Approximately 5 days in August with the exception of also attempting to collect alewife and gizzard shad during May-June
Phytophilous Invertebrates Community Analysis	9	3 (one for mercury analysis)	Variable	Composites	Approximately 10 days in August

¹ Adult samples will be targeted from eight locations around the lake.

<i>QAPP Worksheet #18</i> <i>Sampling Locations and Method/SOP Requirements</i> <i>Table</i>	Title: Book 2 Addendum – Fish and Invertebrate Sampling for 2011 Revision Number: 0 Revision Date: May 5, 2011
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Sampling Location/ID Number	Matrix	Depth (units)	Analytical Group	Concentration Level	Number of Samples (field duplicates) ¹	Sampling SOP Reference ²	Rationale for Sampling Location
Lakewide	Adult sport fish (4 species)	Littoral zone	Total mercury	Low	100	SB-1	See Worksheet #17
			PCBs	Low	48		
			DDT and metabolites	Low	48		
			Hexachlorobenzene	Low	48		
			PCDDs/PCDFs for 10 adult sport fish samples		20		
			Percent Lipids		48		
Lakewide	Prey fish (composite samples)	Littoral zone	Total mercury	Low	40	SB-1	
			PCBs	Low	10		
			DDT and metabolites	Low	10		
			Hexachlorobenzene	Low	10		
			Percent Lipids		10		
Lakewide	Phytophilous Invertebrates	Littoral zone	Total mercury	Low	9	SB-8	Same areas as 2010 benthic macro-invertebrate sample collection
			Methylmercury	Low	9		

¹ Field duplicates not collected for tissue.

² See Worksheet #21.