ONONDAGA LAKE PRE-DESIGN INVESTIGATION: PHASE V WORK PLAN ADDENDUM 1: HABITAT

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LIST OF ACRONYMS

DGPS	differential global positioning system
FS	feasibility study
GPS	global positioning system
JSA	Job Safety Analysis
NYSDEC	New York State Department of Environmental Conservation
PDI	Pre-Design Investigation
PVC	polyvinyl chloride
RI	remedial investigation
ROD	Record of Decision
SSP	Subcontractor Safety Plan
SUNY-ESF	State University of New York College of Environmental Science and Forestry
TOC	total organic carbon
TWG	Technical Work Group
USEPA	Untied States Environmental Protection Agency
WP	work plan

PHASE V PRE-DESIGN INVESTIGATION WORK PLAN – ADDENDUM 1: HABITAT

1.0 INTRODUCTION

Onondaga Lake is a 4.6-mi^2 (2900-acre) lake located northwest of the City of Syracuse in central New York State (Figure 1). The lake, its tributaries, and the upland hazardous waste sites related to the lake have been identified as a federal Superfund site on the United States Environmental Protection Agency's (USEPA's) National Priorities List (CERCLIS NYD986913580). The remedial investigation (RI) for the Onondaga Lake bottom subsite was completed in December 2002, the Feasibility Study (FS) was completed in November 2004, the Phase I Pre-Design Investigation (PDI) was completed in 2005, the Phase II PDI was completed in 2006, and the Phase III PDI was completed in 2007. Additional information on the site can be found in the FS (Parsons, 2004) and the Record of Decision (ROD) issued by the New York State Department of Environmental Conservation (NYSDEC) and the USEPA on July 1, 2005 (NYSDEC and USEPA, 2005).

The Phase V PDI has been structured in a similar fashion as the Phase IV effort to collect additional information for the Onondaga Lake design and to fill additional data gaps identified during the design development. Unless otherwise noted, the field activities identified in this addendum will be conducted in accordance with the procedures outlined in the Phase I - V PDI Work Plans and associated appendices (Parsons, 2005, 2006, 2007, 2008, and 2009). This addendum describes the sample collection activities required to fill several key data needs identified by the Habitat Technical Work Group (TWG). Additional data needs may be identified based on continuing discussion with the Habitat TWG. If additional data collection is required, those activities will be covered in another addendum. The details regarding the program objectives, sample collection and analysis, implementation of field activities, data management, and reporting are described in the sections below.

2.0 PROJECT OBJECTIVES

Before any of the remedial actions are implemented, additional information is required to complete the remedial design. Since many of the details around the design have not been finalized, this work plan is intended to address several remaining gaps within the existing data set. Any additional data collection required in 2009 beyond the scope of this work plan will be submitted to NYSDEC as future addenda to the Phase V PDI Work Plan.

The tasks discussed in this addendum focus on collecting habitat data to fill data gaps identified by the Habitat TWG. The specific objectives for the habitat PDI are as follows:

- characterize aquatic macrophytes; and
- evaluate habitat structure in SMU 5 and reference lakes.

The first objective which is to characterize aquatic macrophytes, will fill the data gap related to macrophyte presence and the relationship with physical factors (e.g., substrate characteristics, energy regimes, and water depth) and is a continuation of the data collection initiated in 2008. In addition, analysis of seasonal changes will be completed to document habitat conditions during the various fish life cycles (reproductive cover, juvenile cover, adult cover) and potential limitations in habitat during any of these stages. These data are necessary during design to identify suitable or unsuitable macrophyte recolonization areas and facilitate the creation of diverse habitats following remediation.

The second objective is to evaluate structure in SMU 5 and reference lakes and will provide data to assess the need for the addition of structure in remediation areas and the type of structure to be incorporated during design. Structure can be an important component in fish community dynamics including predator-prey relationships related to feeding efficiency and growth (Crowder and Cooper 1982). Understanding the current status of structure in areas not being remediated and in local lakes will provide information on suitable density and distribution of structure in remediation areas.

The Phase V habitat data will be combined with the existing information for the lake for use during remedial design. An assessment of remaining data gaps for intermediate and/or final design will be conducted based on a review of data collected through the Phase V PDI.

3.0 MOBILIZATION AND LOGISTICS

3.1 Health and Safety

The Subcontractor Safety Plans (SSP) dated June 10, 2009 will be used for this investigation and will be strictly followed by all field personnel. Any task outside of the previous field efforts will have a new Job Safety Analysis (JSA) completed before the task begins. Copies of the SSPs will be maintained at the support zone and on each vessel.

3.2 Site Facilities, Decontamination, and Waste Handling

The support zone and facilities established during the Phase IV PDI will be used for the Phase V investigation. All decontamination and waste management activities will be conducted in accordance with the Phase I PDI Work Plan (Parsons, 2005).

4.0 SAMPLE COLLECTION AND ANALYSIS

Additional data collection is needed to understand habitat conditions in the lake. To address existing data gaps and further the design process, additional habitat related information will be collected from the lake in 2009.

4.1 Aquatic Macrophyte Survey

Aquatic macrophytes within the littoral zone of Onondaga Lake will be characterized to understand the relationship between physical factors (e.g., substrate, energy, water depth) and the

presence of aquatic macrophytes, including the two threatened and endangered species currently known to exist in the lake. In addition, analysis of seasonal changes will be completed to document habitat conditions during the various fish life cycles (reproductive cover, juvenile cover, adult cover) and potential limitations in habitat during any of these stages. The survey methods are the same as conducted in 2008 and are summarized below; detailed methodology is provided in the Phase IV PDI, Addendum 1, Work Plan (Parsons, 2008).

Aquatic macrophyte species composition and distribution will be characterized monthly from May to October along the same points sampled in 2008 that are distributed approximately every 2 acres (total of 397 points) in 0 to 7 m water depths to allow for evaluation of changes in the size and shape of the macrophyte bed and species composition over the growing season (Figure 2). Points will be identified based on global positioning system (GPS) coordinates and will be sampled each month. Sampling will be conducted at each point according to Madsen (1999). Species composition will be evaluated using a rake toss method. In addition, water depth will be recorded at each point along the transect.

During each sampling event, biomass samples will be collected at 120 set points: 60 points within the dredge and cap areas, 20 points in the cap only areas, and 40 points in the unremediated areas (Figure 2). This is a slight deviation from 2008 sampling due to limitations of the sampling device to 9 ft or less. The cap areas do not cover a large enough area to include 40 biomass locations; therefore, 20 locations were added to the cap and dredge areas to maintain the same original balance between unremediated (40 locations) and remediated areas (80 locations). The same areas sampled in 2008 will be used, with the addition of the 20 locations noted above. A 6-inch inside diameter core sampler constructed of polyvinyl chloride (PVC) will be used to collect the plants to determine above ground biomass. The sampler will be pushed approximately 20 cm into the sediments and a rubber cap placed on the open end of the handle to create a vacuum. The sampler is then removed from the sediment, brought above the water, and placed in a 5-gallon bucket with a mesh bottom. The cap is removed and the entire sample released into the bucket. The bucket can then be dipped in the water several times to remove excess sediment. Plant samples will be sorted by species in the field and placed into resealable plastic bags labeled with a unique sample number, date, station, species, and sampler initials, placed in a cooler on wet ice, and transported to the laboratory. In the laboratory, plant samples will be separated into above ground (shoots) and below ground (roots and rhizomes) fractions. Wet weight will be determined for the below ground and above ground biomass samples by species and recorded on the field log. Dry weights will be obtained by drying samples at 70^{o}C for at least 24 hours until constant mass is obtained. Dry weight will be recorded for each species and sample type. Samples will be archived and stored for one year.

During one of the monthly surveys, a substrate evaluation will be conducted along transects at each of the biomass locations. Sediment will be collected with a petite ponar and placed into a labeled container for grain size analysis by ASTM Method D422 in the laboratory and total organic carbon (TOC) analysis.

4.22 Evaluation of Structure in SMU 5

This task is designed to evaluate structure in the shallow water areas of SMU 5 (approximately 7 ft water depth or less). Based on existing fisheries data from Onondaga County and State University of New York College of Environmental Science and Forestry (SUNY-ESF), SMU 5 represents the most productive portion of Onondaga Lake and serves as a reference condition for other portions of the lake where remediation will occur. Structure evaluations will be conducted when water clarity is sufficient to see at least through 2 m of water and conditions are calm. Sampling will be started prior to the majority of macrophyte establishment so that visibility is not reduced but will likely continue into August. Surveys will be conducted by surveying the area by boat and visually identifying underwater structures. The boat will start a survey line in approximately 5 ft offshore at the end of SMU 5 near the mouth of Ninemile Creek, and move parallel to the shore to the Seneca River outlet. Additional survey lines will be completed, offset from the initial survey line, based on visibility such that all areas of SMU 5 to a depth of 7 ft deep are surveyed. Once this area has been surveyed, the survey will be repeated from east of the Seneca River outlet to the marina, and from the marina to the SMU 5 boundary near Ley Creek.

Structure can be comprised of either natural (e.g., logs, boulders) or manmade (e.g., tires) material. Objects larger than approximately 5 inches will be recorded; anything smaller than this is likely of insufficient size to provide structure benefits. Secchi disk measurements will be taken each day surveys are conducted to record water clarity. Each underwater structure will be identified and the coordinates recorded using a differential global positioning system (DGPS; allows sub-meter accuracy) for later plotting on maps. A description of the structure (log, tire, etc.), the water depth, and the dimensions of the structure will be measured and recorded in the field. Additional observations, including fish presence or spawning activity around a structure, will be recorded, as feasible, during the structure survey. Observations of surrounding vegetation will be made and recorded during surveys. In addition, since macrophyte surveys are occurring monthly, distribution of macrophytes can be compared with the structure survey. The location and size of any areas where the bottom is not visible due to macrophyte growth will be noted for follow-up surveys after macrophyte die-off or by use of an underwater camera.

Structure surveys also will be conducted in selected areas of two reference lakes (Otisco Lake and Oneida Lake) during 2009. These qualitative surveys will provide information on the type and amount of structure that could be incorporated into remedial design. Methods are described in the proposed approach outlined in Appendix A - Qualitative Survey of Structure: Oneida and Otisco Lakes.

5.0 DATA MANAGEMENT AND REPORTING

5.1 Field Database

Field and laboratory data generated during the habitat PDI will be maintained in an Access database developed for the habitat PDI. Unique sample identifiers will be generated for each sample to maintain quality control and will consist of site location, sample type, and sampling event.

5.2 Sample Holding, Collection, and Recordkeeping

Samples will be collected and handled according to the procedures outlined in the Phase I PDI Work Plan (WP) and associated appendices. Samples will be managed by the field database as described above. Macrophyte samples will be archived as noted above and stored for up to one year.

5.3 Reporting

Upon completion of the Phase V PDI field activities and associated analyses, Parsons will submit applicable data to NYSDEC in accordance with the Consent Decree for the lake. Once the Phase V investigation and evaluation has been completed, a Data Summary Report will be prepared and submitted to NYSDEC.

6.0 REFERENCES

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Parsons. 2009. Draft Onondaga Lake Pre-Design Investigation: Phase V Work Plan. Prepared for Honeywell, Morristown, New Jersey. Syracuse, New York.

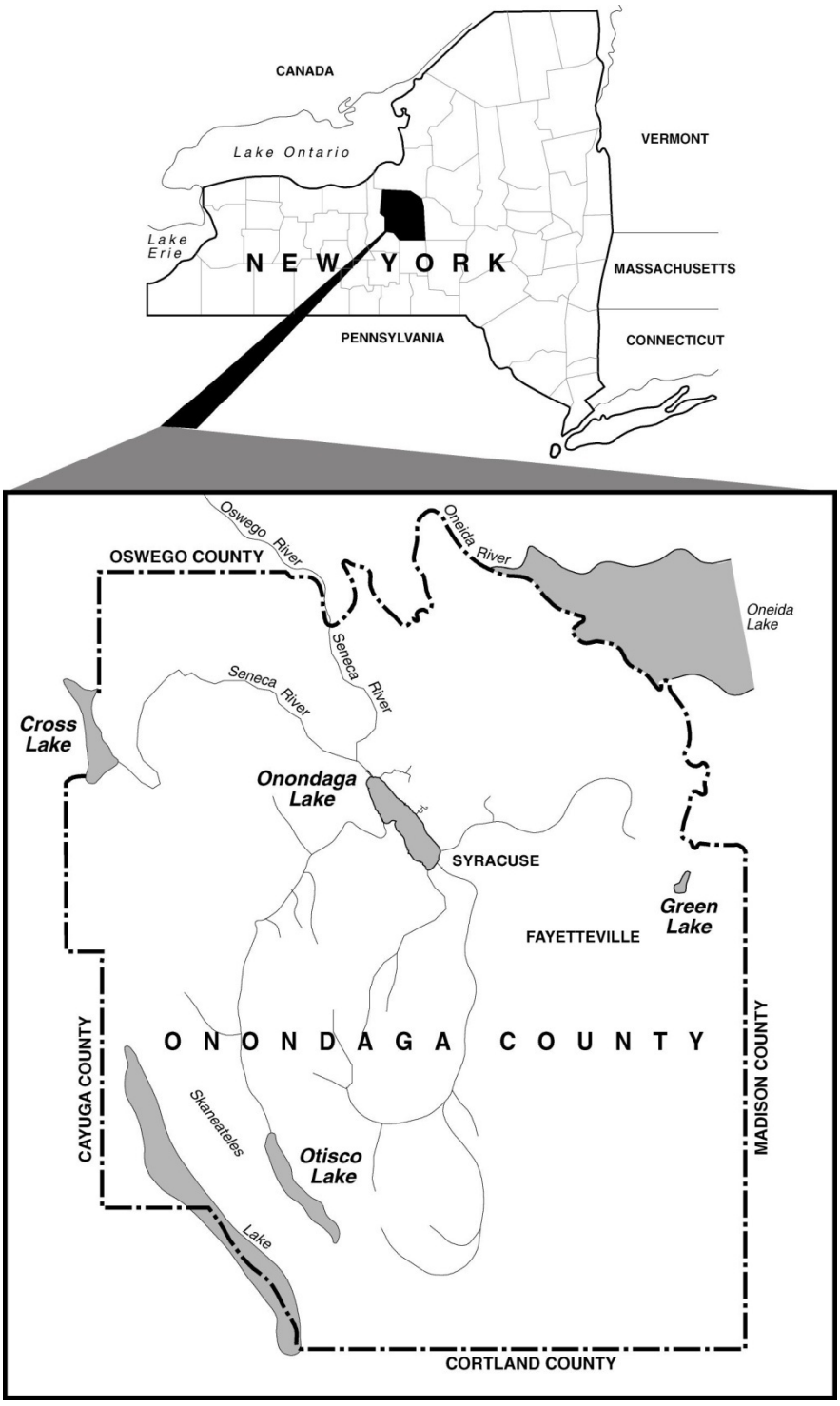
TABLES

TABLE 1

SUMMARY OF PROPOSED SAMPLING LOCATIONS, FREQUENCY OF COLLECTION, NUMBER OF SAMPLES, SAMPLE TIMING, AND DURATION OF SAMPLING

Activity	Number of Locations	Frequency of Collection	Number of Samples/Surveys	Sampling Timing	Duration of Each Sampling Event
Macrophyte Survey	397	Monthly	6 surveys	May - Oct	1 week
Macrophyte Biomass Assessment	120	Monthly	60 points in cap and dredge, 20 in cap only, and 40 points in non-remediated locations each month	May - Oct	1 week
Structure Assessment	SMU 5	Once	One survey of entire area less than 7 ft deep	June –-– July	Approximately two months
	Reference Lakes	Once	One survey in selected areas of each of two reference lakes (Otisco Lake and Oneida Lake)	September	One day each

FIGURES



Source: Modified from TAMS 2002c.

FIGURE 1

Honeywell

ONONDAGA LAKE
SYRACUSE, NEW YORK

LOCATION OF ONONDAGA LAKE

PARSONS

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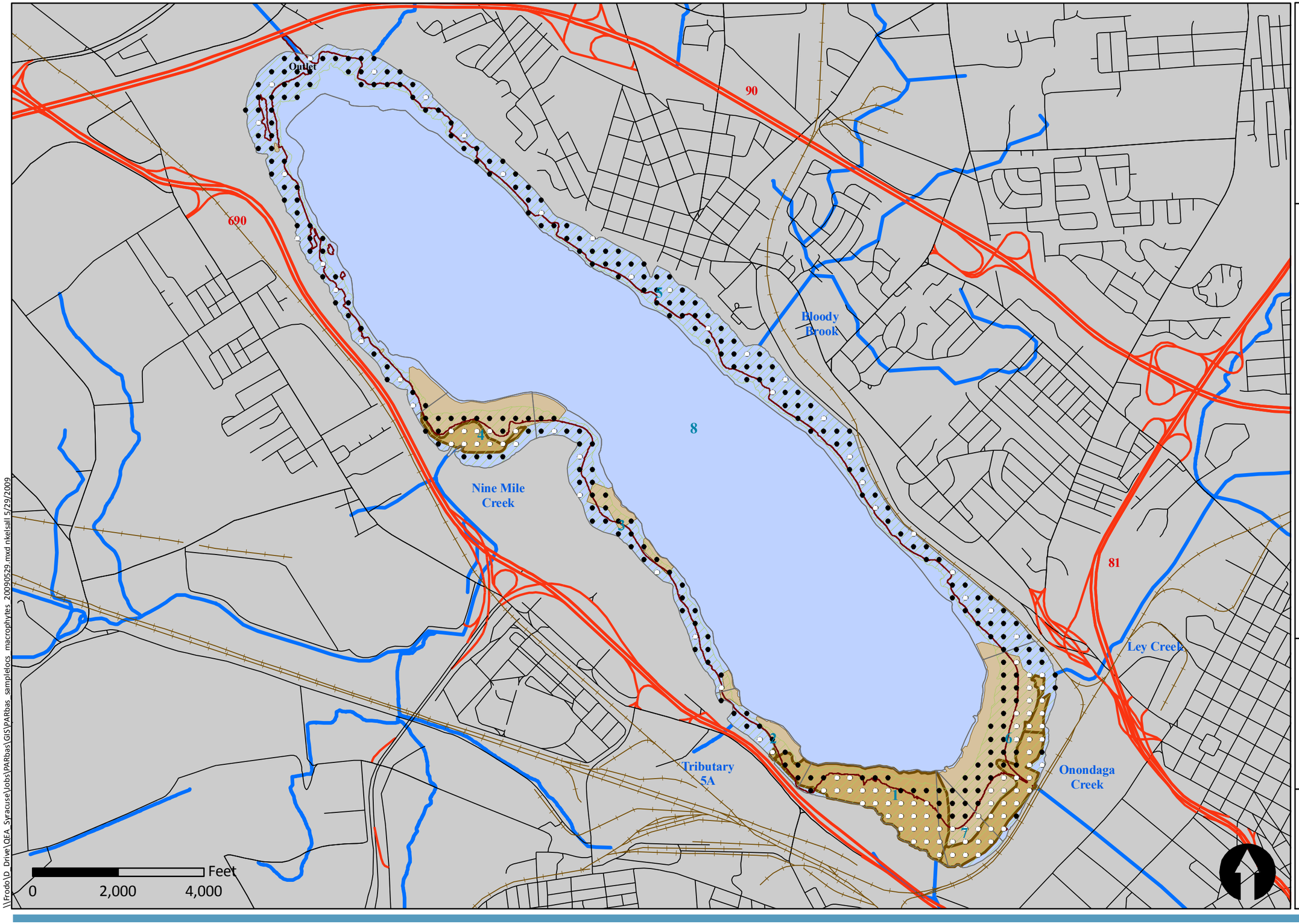

LOCATOR

LEGEND

Locations

- Community Samples
- Community and Biomass Samples*
- Railroad

Roads

- Road
- Highway/Interstate
- 3-m Depth Contour
- Shore to 7m bathymetry
- Drege and Cap Areas
- Cap Only
- SMU Boundaries
- Tributaries

Notes:
** Indicated as white dots on the map.*
Biomass samples were limited to areas shallower than 3 meters.

Figure 2.

Macrophyte Sampling Locations.
Honeywell/PARhwg
May 2009

Honeywell
PARSONS
ANCHOR QEA

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APPENDIX A

QUALITATIVE SURVEY OF STRUCTURE: ONEIDA AND OTISCO LAKES

QUALITATIVE SURVEY OF STRUCTURE
Oneida and Otisco Lakes

Introduction

As described in the Habitat Plan, the Habitat Technical Work Group (TWG) developed a method to combine the representative species and their habitat requirements into habitat areas, or "modules," which could be readily integrated with the proposed remedial activities for Onondaga Lake. One of the objectives identified in the Habitat Plan is to include the use of structure to improve the habitat value for the modules. The type and amount of structure needed to improve the habitat value of a module depends on the module type and the species under consideration.

For the modules in deeper water, structure would primarily be used to improve the habitat suitability for fish. In shallow water, structure is used by a broader assortment of animals including fish, reptiles, amphibians and mammals. The habitat suitability index (HSI) models provide general information on the structure requirements for several representative species. In order to supplement this general information the Habitat TWG has agreed to conduct qualitative structure surveys to provide information on the type and amount of structure that could be incorporated into the remedial designs. These surveys will be conducted in two reference lakes, Oneida Lake and Otisco Lake, which are considered to provide suitable habitat for numerous species, including several of the representative species.

Methods

The presence of structure will be evaluated in the shallow water areas of the reference lakes (approximately 7 ft water depth or less) by visual observation from a boat. The evaluation will be conducted when water clarity is sufficient to see at least through 6-7 ft of water and wind conditions are calm. The trip will be scheduled after the majority of macrophytes have started to senesce (currently scheduled September 29th and 30th) so that visibility is not obscured. Surveys will be conducted by visually identifying underwater structures from the boat. The boat will start a survey line in approximately 3-5 ft of water at one end of survey area and move parallel the shore. Additional survey lines may be completed, offset from the initial survey line, to survey areas at a depth of 7 ft deep if time and water clarify permit.

For Oneida Lake, the survey area will include shallow water locations from near Lakeshore Country Club paralleling the shore of Sandy Bay to Long Point (Figure 1). After completing the survey in this area, a survey line will be completed across the mouth of Scriba Creek (Figure 1) if time and weather conditions permit. These locations were selected due to the proximity of forested areas adjacent to the shoreline which may be a source of structure (Sandy Bay) and because the area is an important fishery (Scriba Creek). For Otisco Lake, the survey area will

extend from Otisco Lake Park to approximately half the shoreline distance to Otisco Lake Marina (Figure 2). This area was selected because, with the exception of the two shallow embayments at either end of the lake, this is the portion of the lake with the widest littoral bench. The survey area may extend farther towards Otisco Lake Park if time and weather conditions permit.

For the purposes of this survey, structure is defined as any natural (e.g., logs, boulders) feature that provides 3-dimensional relief. Objects with any dimension larger than approximately 6 inches will be recorded. Secchi disk measurements will be taken each day surveys are conducted to record water clarity. A description of the structure, water depth, and the dimensions of the structure will be recorded in the field. These data will be used in combination with HSI models for the representative species to develop the designs for incorporating structure in the habitat modules.

Schedule

The survey is anticipated to take approximately two days to complete on September 29th and 30th as outlined below. Directions to Oneida Bay Marina (adjacent to Lakeshore Country Club), Borio's Restaurant, and Otisco Lake Park are provided on the following pages.

Day 1: Tuesday, September 29th (Oneida Lake)

12:30 pm	Meet at Oneida Bay Marina
1:00 pm-5:00 pm	Structure survey in Sandy Bay and Scriba Creek
5:30 pm	Debriefing at Borio's Restaurant

Day 2: Wednesday, September 30th (Otisco Lake)

8:30 am	Meet at Otisco Lake Marina launch site
9:00 am-1:00 pm	Structure survey from Otisco Lake Marina towards Otisco Lake Park
1:30 pm	Debriefing at launch site

APPENDIX A FIGURES

Figure 1. Oneida Lake. Group will embark/disembark at Oneida Bay Marina. Boxed areas indicate survey locations. Scriba Creek area will be surveyed based on time constraints and weather conditions.

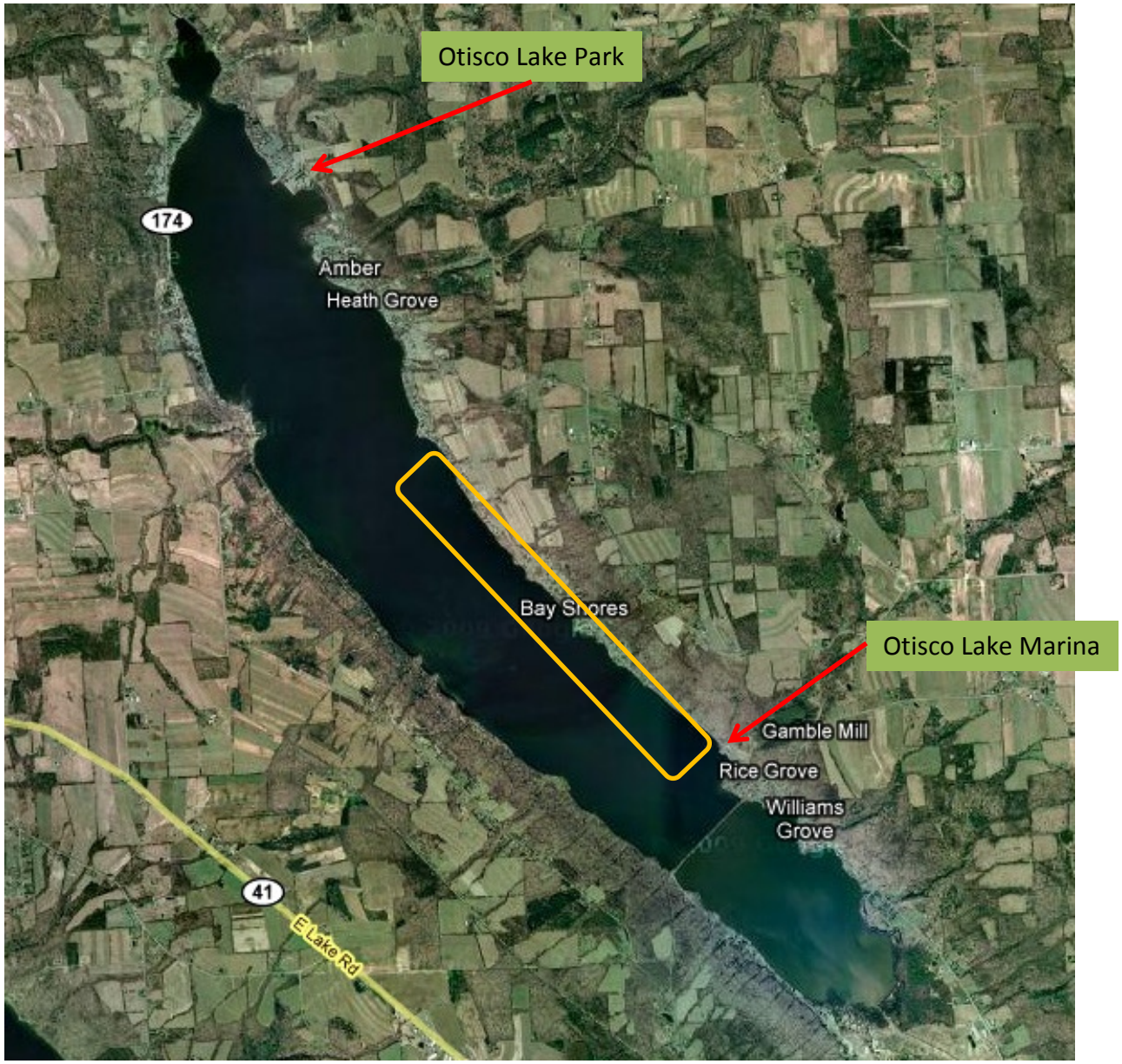

Figure 2. Otisco Lake. Meet and board at Otisco Lake Marina. Boxed area indicates survey location.