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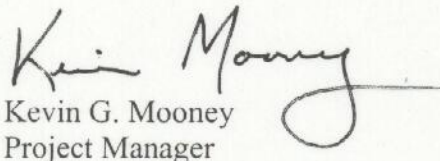
**Re: Housatonic River – Connecticut  
Proposed Biological Monitoring for 2008**

Dear Ms. Peterson:

The General Electric Company (GE) proposes to continue the biennial monitoring program for fish and benthic insects in the Connecticut portion of the Housatonic River, using the same study design used in prior years. Accordingly, I am enclosing a document titled *Proposed 2008 Biological Monitoring Studies on the Connecticut Portion of the Housatonic River*, which was prepared on GE's behalf by the Academy of Natural Sciences of Philadelphia. This document sets forth GE's proposal for continuing the biennial fish and benthic insect monitoring program in 2008.

Please let me know if you have any questions about this proposal or would like to discuss it further.

Very truly yours,

  
Kevin G. Mooney  
Project Manager

Enclosure

cc: Dean Tagliaferro, EPA  
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Public Information Repositories

**Proposed 2008 Biological Monitoring Studies  
on the Connecticut Portion of the  
Housatonic River**

Submitted to the

Connecticut Department of Environmental Protection

and

U.S. Environmental Protection Agency

by the

Patrick Center for Environmental Research  
Academy of Natural Sciences of Philadelphia  
1900 Benjamin Franklin Parkway  
Philadelphia, Pennsylvania 19103

on behalf of the

General Electric Company

Proposal No. 2008-24

14 May 2008



## Introduction

The Academy of Natural Sciences' Patrick Center for Environmental Research (Patrick Center) has conducted biennial biological monitoring studies in the Connecticut portion of the Housatonic River since 1984. All of these studies have included analysis of PCB concentrations in fish. Monitoring of PCB concentrations in benthic insects was conducted by the Connecticut Department of Environmental Protection (CTDEP) during 1978–1981 and 1984–1990 but has been conducted by the Patrick Center since 1992.

Results of the Patrick Center's 1994 study indicated a substantial reduction in PCB concentrations in brown trout, smallmouth bass, and benthic insects compared to 1992. Concentrations observed in the 1996–2004 studies were roughly similar to those in 1994. The 2006 study found that concentrations were broadly similar to those in the 1994–2004 studies, and lower than levels observed in 1992 and most prior years.

The 1994 biological monitoring study was the last of the biennial studies required by the 1990 Housatonic River Cooperative Agreement between CTDEP and the General Electric Company (GE). The 1996 and 1998 studies were conducted in order to determine whether the marked reduction in PCB concentrations observed in 1994 had persisted, and the results indicated that it largely had. A new Housatonic River Follow-up Cooperative Agreement was executed by GE and CTDEP in October 1999, requiring continuation of these biennial studies in 2000, 2002, and 2004. No cooperative agreement has been in effect since completion of the 2004 study, but the biennial biological monitoring program was nevertheless continued in 2006. Here we propose to continue it in 2008 by conducting a biological monitoring study with the same design as in previous years.

## Study Objectives

The main objectives of the proposed 2008 biological monitoring study are the following:

- ❑ *Measure PCB concentrations in selected Housatonic River fish.* As in prior monitoring studies, the species to be sampled and analyzed for total PCBs will be brown trout at West Cornwall and smallmouth bass at West Cornwall, Bulls Bridge, Lake Lillinonah, and Lake Zoar.
- ❑ *Measure PCB concentrations in selected benthic insects at West Cornwall.* The insect taxa to be sampled and analyzed for total PCBs will be a filter-feeding caddisfly, a predatory stonefly, and a predatory dobsonfly.
- ❑ *Compare PCB concentrations measured in each fish species (a) among stations in 2008 and (b) with concentrations measured in previous years.* All comparisons will be based on appropriate and rigorous statistical methods.
- ❑ *Compare measured PCB concentrations for each benthic insect group with those measured in previous years.* Comparisons among years will be based on visual inspection of the data, due to the lack of replicate samples in most study years. A statistical analysis will be conducted to determine if there is an overall trend of decreasing PCB concentrations in the historical data series for benthic insects.



Locations of the sampling stations are shown in Figure 1. For maximal comparability with previous results, fish and benthic insects will be collected from the same locations and during the same seasonal time periods as in prior studies. The fish species and benthic insect taxa sampled will be the same as in the 1996–2006 studies (excluding supplemental species sampled in 2000, 2004, and 2006), and the size distribution of fish collected will be consistent with previous studies.

## **Study Design and Rationale**

The sampling design for the three components of the monitoring study (brown trout, smallmouth bass, and benthic insects) is summarized in Table 1. The timing of major project elements is summarized in Table 2. The rationale for each component is as follows.

### **Brown trout**

Brown trout from West Cornwall have been one of the two main study groups throughout the biennial fish-sampling program. Specimens have included both newly stocked trout and holdover trout stocked in prior years. We propose to analyze brown trout collected during August and October 2008. The number of specimens will be the same as in the main 2004 and 2006 studies, with different sizes represented in approximately the same proportions, depending on availability. Pre-stocking PCB concentrations will be determined in 2 brown trout from the hatchery, bringing the total number of specimens to 32.

### **Smallmouth bass**

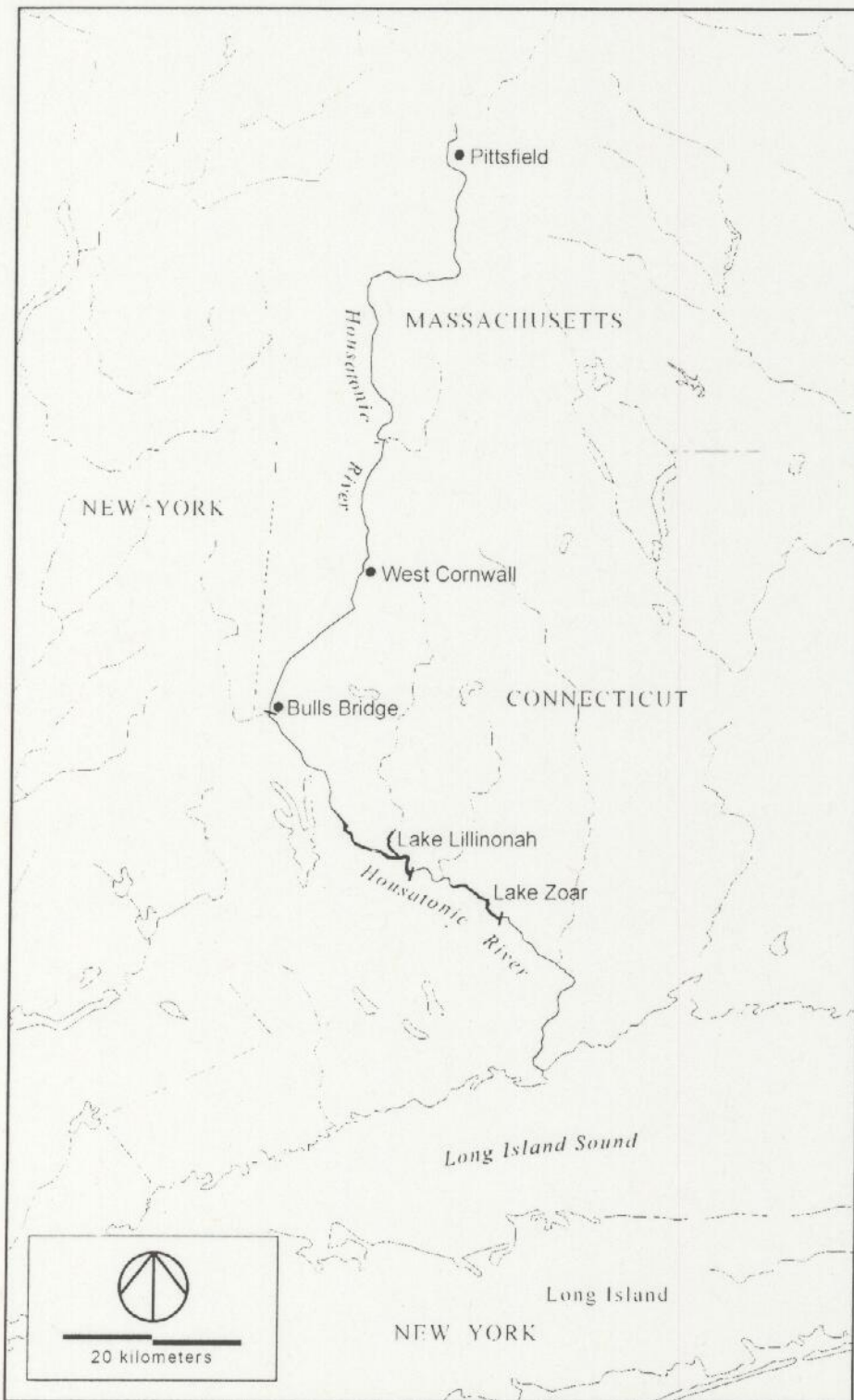
Smallmouth bass is one of the few sport species found in both riverine and impounded sections of the Housatonic River. It is also the only species collected at all four Housatonic sampling zones in each survey. It has therefore been the most useful species for examining longitudinal (upstream-downstream) patterns in PCB concentrations. We propose to continue monitoring smallmouth bass in each of the sampling zones. The number of specimens collected in each zone (10) will be the same as in the 2004 and 2006 studies, yielding a total of 40 specimens. Sampling will be conducted in August and October 2008.

### **Benthic insects**

The main benthic insect taxa collected will be net-spinning caddisflies, dobsonflies, and perlid stoneflies. Caddisfly larvae are filter feeders that consume fine suspended particles, while dobsonfly larvae and stonefly nymphs are predators. The sampling design will be the same as in the 2004<sup>1</sup> and 2006 studies, with sampling in May or June 2008 (river conditions permitting). Because of substantial variability among composites documented in previous Patrick Center studies, an attempt will be made to collect enough material for 2 composites of each taxon, yielding a total of 6 samples.

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<sup>1</sup> Due to continually elevated river flow during the 2004 field season, collection of benthic insect samples for the 2004 study was postponed to 2005.



**Figure 1.** Map of the Housatonic River, showing approximate locations of the Connecticut sampling stations (West Cornwall, Bulls Bridge, Lake Lillinonah, and Lake Zoar) for the 2008 biological monitoring study.



**Table 1.** Proposed sampling design for fish species and insects, broken down by sampling location. The table lists numbers of individuals for fish (each fish yields one sample) and numbers of composite samples for insects. QA samples are listed separately.

Species and Sampling Period	Station					Total
	W. Cornwall	Bulls Bridge	Lillinonah	Zoar	Hatchery	
<i>Brown trout</i> Aug & Oct 2008	30	—	—	—	2	32
<i>Smallmouth bass</i> Aug & Oct 2008	10	10	10	10	—	40
<i>Benthic insects</i> May/June 2008	6	—	—	—	—	6
					Subtotal	78
QA samples						20
					<b>Total</b>	<b>98</b>

Each of four types of QA sample (blanks, sample duplicates, matrix spikes, and standard reference materials) will be analyzed at a frequency of approximately 5%

**Table 2.** Project schedule for the 2008 Housatonic Biological Monitoring Study.

Task	2008								2009						
	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Begin project	◆														
Benthic insect sampling and analysis	▬														
Fish															
First sampling trip				▬											
Second sampling trip						▬									
Fish PCB analysis															
Sample preparation					▬										
Extraction and analysis						▬									
Data workup							▬								
Statistical analyses of fish data										▬					
Report															
Report preparation										▬					
QA review													▬		
Submit draft final report															◆
Comments and revisions														▬	
Submit final report															◆
Project completion															◆

## Sampling Techniques

As in past surveys, we expect that the CTDEP Fisheries Division will collect fish from the West Cornwall reach in August (or possibly September) 2008, with the assistance of Patrick Center staff. Brown trout and smallmouth bass will be collected during this period.

The Patrick Center will collect brown trout again in October 2008, primarily by electroshocking. Fish may also be collected by angling, either by Patrick Center staff or by local volunteer fishermen under special permit from the CTDEP Fisheries Division.

Smallmouth bass from Bulls Bridge, Lake Lillinonah, and Lake Zoar will be collected principally by boat electroshocking. Other gear will be used if needed (e.g., gill nets, trotlines). These fish will be collected during the August trip and, if necessary, a second trip in October.

Benthic insects will be collected from the West Cornwall reach. Collecting techniques and species sampled will be consistent with the Patrick Center's 2004 and 2006 studies. The collecting techniques will include one or more of the following, as needed: kick-net samples, kick-screen samples, and direct sampling of individual stones from the river bottom.

## Laboratory Preparation

Fish will be handled as in previous surveys, using the methods detailed in ANSP (2007), which is also described in Attachment H-2 to Appendix H to GE's *Field Sampling Plan/Quality Assurance Project Plan* (FSP/QAPP) (Blasland, Bouck & Lee 2004). This involves field preservation on ice, followed by labeling with clean aluminum tags, wrapping in clean aluminum foil, and transferring to dry ice within 24 hours of collection. Fish will be maintained on dry ice until brought into the laboratory, where they will be maintained in freezers. Specimens will be thawed for sample preparation, and fillet samples (one or more, as needed to provide a minimum of 20 g wet mass) will be taken and refrozen. Fillet samples later will be ground with a Tissuemizer, desiccated, and extracted, using methods detailed in ANSP (2007).

Following standard practice based on typical human food-preparation customs, skin and scales will be left on brown trout. For smallmouth bass, skin will be left on the fillets but scales will be removed. Ages of most trout will be obtained from fin or jaw clips. Ages of bass, unclipped trout, and trout with ambiguous marks will be estimated from otolith sections, as in previous surveys.

Insect samples will be handled as in the 2004 and 2006 studies, using methods detailed in ANSP (2007). Specimens will be placed in labeled I-Chem Superfund Analyzed glass jars. Jars will be sealed in the field, placed on ice, and then frozen after completion of sampling. They will remain frozen until ready for grinding, desiccation, and extraction.



## PCB Analysis

PCB and lipid analysis will be based on methods detailed in ANSP (2007), which are also presented in Attachment H-2 to Appendix H to GE's FSP/QAPP. Data from this analytical scheme will enable us to calculate Aroclors 1254 and 1260 for comparison with data from previous years, but also will enable us to quantify congeners not in these Aroclors.

## Quality Assurance Procedures

The Patrick Center will follow the general provisions established by the Patrick Center's Quality Assurance Implementation Plan (Revision 1; June 1998). A QA/QC Officer will be assigned to this project to ensure that it complies with the Plan, as well as applicable QA/QC requirements established by the Patrick Center, as set forth in Attachment H-2 to Appendix H to GE's FSP/QAPP.

QA/QC elements established for the proposed study include a study audit, data review, and final report review. The anticipated audit will include review of field data forms, field logbooks, Chain-of-Custody forms, and so forth to ensure that the documentation is adequately completed, the protocol and Standard Operating Procedures (SOPs) were followed, and all samples were shipped under Chain of Custody. The study audit also will include a laboratory review to ensure that laboratory and personnel records are complete and adequately maintained, the study protocol and laboratory SOPs were followed, and performance records are complete and adequate. A percentage of the data generated during the project will be reviewed for QA to ensure against errors in data recording, data entry, and computing. The final report will be reviewed for QA as a final check to ensure adherence to SOPs and study protocol, and to ensure that all required QA elements of the project have been addressed. All QA elements will be completed prior to submitting the draft final report.

## Literature Cited

- Academy of Natural Sciences of Philadelphia (ANSP). 2007. *PCB Concentrations in Fishes from the Housatonic River, Connecticut, 1984–2006, and in Benthic Insects, 1978–2006*. Rept. No. 07-08F. Academy of Natural Sciences of Philadelphia.
- Blasiand, Bouck & Lee. 2004. *Field Sampling Plan / Quality Assurance Project Plan*. Blasland, Bouck & Lee, Syracuse, New York.