ABSTRACT

Title of Thesis: BIOACCUMULATION OF POLYCHLORINATED BIPHENYLS IN THE DELAWARE RIVER ESTUARY

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Composite collections of channel catfish (*Ictalurus punctatus*), white perch (*Morone americana*), their prey items (forage fish and epibenthos), and surficial sediment were collected in the Delaware River estuary in Fall 2001 and Spring 2002 to quantify polychlorinated biphenyl (PCB) accumulation and to examine the mechanisms of bioaccumulation and trophic transfer. Samples were collected from four zones in a section of the Delaware River from Trenton, NJ to Liston Point, DE, and analyzed for lipid content and the hydrophobic organic contaminants PCBs. Our results indicate PCB levels and congener distributions in biota reflect spatial and temporal trends in ambient PCB concentrations. PCB congener patterns vary among sampling zones, with higher homologue groups enriched in lower zones. Demersal species have similar congener accumulation patterns. The presence of highly chlorinated congeners in lower zones does not reflect commercial Aroclor mixtures, indicating a possible point source of PCB contamination in the region downstream of Philadelphia, Pennsylvania. The relationships between total PCB levels in biota and those in water and sediment was constant over the

study area based on bioaccumulation parameters. Ambient water quality criteria calculated for the Delaware River with estuarine-specific values derived from this study indicates a major reduction in PCB point and non-point loadings is necessary to reduce PCB contamination in fish, thereby meeting acceptable risk levels for human consumption.

BIOACCUMULATION OF POLYCHLORINATED BIPHENYLS IN THE DELAWARE RIVER ESTUARY

by

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Thesis submitted to the Faculty of the Graduate School of the
University of Maryland, College Park in partial fulfillment
of the requirements for the degree of
Master of Science
2003

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DEDICATION

I dedicate this work to my parents Keith and Annette Toaspern for their unyielding support, guidance, and love. I owe all of my accomplishments to the two greatest people in my life and am extremely fortunate to have them both.

ACKNOWLEDGEMENTS

I would like to thank my advisor Joel E. Baker for his endless support and extreme patience throughout my graduate career. The opportunities made available to me through working with his lab made this endeavor a fulfilling and rewarding experience. Many thanks to my other committee members: Dr. David Secor and Dr. Chris Rowe for their insight and perspective towards this project.

Assistance from the Delaware River Basin Commission and the Delaware Department of Natural Resources and Environmental Control made this work possible. The teamwork and cooperation provided by all parties was such a positive experience for me. Specifically, I was overwhelmed with the support from Dr. Tom Fisklin and Rick Greene who were incredibly helpful in sharing information, insight, and their wonderful senses of humor. Their dedication to improving the environmental quality of the Delaware River is inspiring.

This work is a collaborative effort of so many talented and supportive people. The dedication and hard work of Dr. Jeff Ashley and Matt Wilhelm from the Academy of Natural Sciences made it possible not only to amass such a work, but also to provide feedback on a project where even the sampling design proves a perplexing puzzle. I greatly appreciate the help of Scott McGuire and David Secor not only in sample collection and analysis, but also in answering all of my fishy questions. Thank you also to Elgin Perry for his help with statistical applications.

To my friends and colleagues in the Baker Lab past and present: Jeff Ashley, Holly Bamford, Eileen Beard, Travis Burrell, Andrew Chang, Abby Cohen, Bernie Crimmins, Susan Klosterhaus, Fung Chi Ko, Dan Liebert, Amy Merten, and Heather

Stapleton, thank you for your support and friendship but mainly for helping me keep my sanity. Thanks to Dan Liebert, Scott McGuire, and Matt Wilhelm for their help with the "thunderbird"; now I am adept at filleting fish, although I will never again use a food processor. Profuse thanks to Susan Klosterhaus for her unending supply of insight and patience in dealing with me running to her desk every ten minutes with a new question. I could never have completed this work without my mentor, Heather Stapleton, who has been such an amazing symbol of integrity, intelligence, and compassion throughout our friendship.

Lastly, to all of my friends, colleagues, and family at the Chesapeake Biological Laboratory, thank you.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Chapter One

INTRODUCTION

Background

Polychlorinated biphenyls (PCBs) are a class of chemicals consisting of 209 possible congeners containing varying numbers of chlorine atoms substituted on one biphenyl molecule. Approximately 130 PCB congeners were found in commercial mixtures and released into the environment. First produced commercially in 1929, PCBs function in a variety of capacities due to their high thermal stability and insulating properties such as heat transfer fluid in electrical capacitors and transformers, fire retardants, plasticizers, hydraulic and lubricating fluids. Monsanto was principal US manufacturer until production ended in 1977 (Connell et al. 1997).

In the 1960's it was found that polychlorinated biphenyls pose a threat to human and ecosystem health (Shifrin and Toole 1998). Adverse biological effects attributed to PCB contamination have been reported at the biochemical and cellular level (van der Oost et al. 2003). PCBs are extremely hydrophobic, lipophilic compounds with a tendency to bioaccumulate in organisms among all trophic levels (Oliver and Niimi 1988; Harding et al. 1997; Kucklick and Baker 1998). Because of the persistence of these contaminants and the resulting harmful effects to organisms and human health, we must continue to monitor their presence in the environment.

The Delaware River estuary is an urbanized area receiving contaminant inputs from a variety of point and non-point sources. Due to these high levels of contamination the Delaware River is currently classified as "impaired" under the Clean Water Act section 303(d). PCB contaminant poses a threat to human and wildlife health, therefore long-standing advisories currently restrict consumption of fish from the river.

A consortium of state and federal agencies known as the Delaware River Basin Commission (DRBC) was created to manage the river system through planning, development, and regulation. Gathering knowledge of current PCB concentrations in the river will contribute to the Delaware River Basin Commission's effort to assess the sources and extent of PCB loadings. The DRBC is formulating a bioaccumulation model to help in the development of a PCB Total Maximum Daily Load (TMDL) as required by the Clean Water Act 303(d) for impaired bodies of water. Adequately characterizing loadings in the Delaware River estuary increases predictive capabilities and directs future regulatory efforts. By exploring trophic transfer of PCB congeners within an estuarine food web over a contaminant concentration gradient, we may also gain insight to PCB accumulation patterns and the relation between abiotic and biotic compartments.

In the fall of 2001, groups from the University of Maryland, Rutgers University, and the Academy of Natural Sciences undertook a project supported by the DRBC and the Delaware Department of Natural Resources and Environmental Control. The main objective was to produce a data set quantifying PCB concentrations in biota and sediments within the Delaware River estuary. To address food web dynamics in the Delaware River estuary, two representative predators, channel catfish (*Ictalurus punctatus*) and white perch (*Morone americana*), were chosen based on their abundance, and their commercial and recreational importance (Dove and Nyman 1995). Differences in life histories and feeding patterns have been shown to affect PCB accumulation (Madenjian et al. 1993; Ashley et al. 2000; Feldman and Titus 2001). These two demersal predators have different migration behaviors within the Delaware River estuary. White perch are a semi anadromous species, migrating within the Delaware River estuary while channel catfish have a small spatial range, and therefore are more closely coupled to local benthos (Dove and Nyman 1995). These two species allow us to compare and contrast the transfer of PCB contaminants based on life histories, and how feeding behavior influences bioaccumulation.

Objectives

Through quantifying PCB concentration in sediment and biota samples in the Delaware River estuary, we may:

(1) Examine the variation of PCB congener patterns spatially and among species of different trophic levels

(2) Observe the effect of life history and migratory patterns on PCB congener accumulation in fish

(3) Evaluate relationships among abiotic and biotic compartments used in modeling PCB accumulation

(4) Compare PCB contaminant levels in fish measured in the Delaware to those predicted by the EPA national guidelines.

Strategy

Sediments and prey items of channel catfish and white perch including epibenthic invertebrates, macrobenthic invertebrates, and small fish were analyzed to compare PCB congener pattern accumulation and transfer across the estuary. Collaborators from the University of Maryland, Academy of Natural Sciences, and Rutgers University collected samples in Fall 2001 and Spring 2002 in four zones of the Delaware River estuary

(Figure1.1). Samples were analyzed for 82 individual congeners, which were summed to determine total polychlorinated biphenyl content. Chapter 2 details the methods and materials associated with collection and analysis. Chapter 3 addresses the accumulation of PCBs in biota and sediment, with consideration of spatial variability. Also, PCB congener profiles in biota are considered for relationships among species. Chapter 4 applies PCB data to bioaccumulation parameters to study mechanisms of transfer and accumulation in the estuary. Specifically, bioconcentration factors, biota-sediment accumulation factors and trophic transfer ratios are determined. PCB concentrations in water used in calculating bioconcentration factors were obtained from the Delaware River Basin Commission from ambient water sampling conducted in September 2001 and March 2002 (DRBC 2003). Further application of this bioconcentration factor may be used to determine ambient water quality criteria as set forth by the US Environmental Protection Agency (2000b).

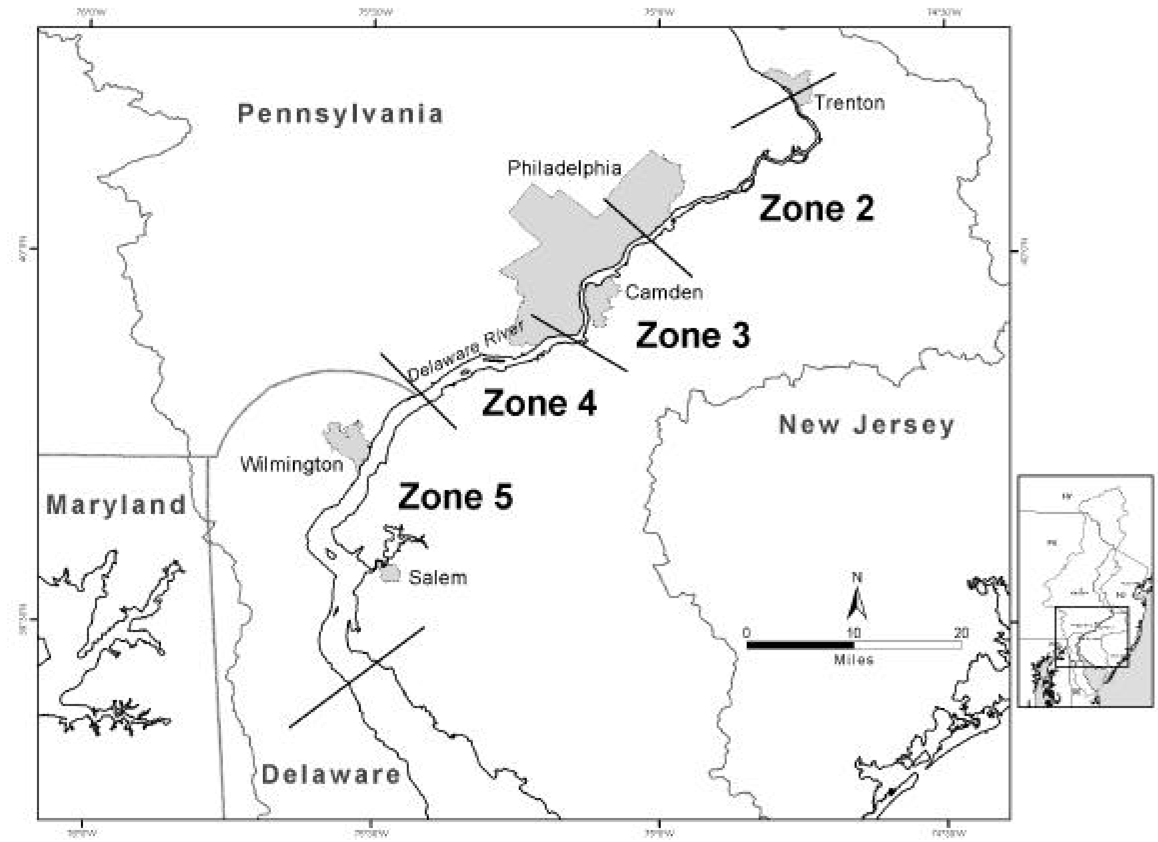


Figure 1.1. Map of Delaware River estuary displaying sampling zones.

Chapter Two

MATERIALS AND METHODS

Sample Collection

Collection Sites: This study was conducted in four zones along a 130-km stretch of the Delaware River from Trenton, New Jersey to Liston Point, Delaware (Figure 1.1). The latitude and longitude of each sampling location were recorded using a handheld Trimble Geoexplorer Global Positioning System (GPS) as well as the shipboard GPS. The location, date, time of collection, and descriptive sample identifications are listed for fall and spring collections. (Appendix A)

Spatial strata were sampled during the fall of 2001 and spring of 2002. While sampling was intended to encompass low and high flow conditions, drought conditions lowered the average flow rate by 60-70% relative to the long-term mean. The flow rate at the northernmost point of our study area in Trenton, New Jersey for November 2001 was 2,850 CFS (cubic feet per second) while the average for this month is 9,480 CFS. The flow rate for March 2002 sampling was 8,380 CFS as compared to the average 18,120 CFS (DRBC Monthly flow data from website http://www.state.nj.us/drbc/data_summaries).

To accomplish the objectives of the study, a "core study" and two "variability studies" were performed. The core study included composite collections of fish, prey items, and surficial sediment at 2-3 random sites selected within each of the 4 zones. A channel catfish variability study was conducted for both fall and spring sampling campaigns, focusing on three specific locations chosen to reflect suspected low (Bulkhead Shoals, Zone 5), moderate (Tinicum Shoals, Zone 4), and high (Dredge Harbor, Zone 2) PCB contamination. This variability study focused on contaminant transfer through the food web in localized areas to determine if contaminant transfer varied at different exposure levels of contaminants. Individual channel catfish, respective prey items, and surficial sediments were collected at the three sites, and individual channel catfish fillets were analyzed as well as a composite of the fillets to assess whether composites were representative of contaminant levels at a given site. Samples from the channel catfish variability study were labeled as CC by zone. The second "variability study" for white perch was conducted in Zone 5 during the fall campaign. This study focused on spatial variability within a zone and examined whether sites for the core study were representative of the entire zone. Three separate tows were conducted, with 5 fish sampled from each tow. Individual white perch fillets and the composite fillets from each tow were analyzed for PCB content. These samples are labeled as VAR for variability study. The Zone 5 white perch fillet CORE composite was taken from one of the variability tows, hence the CORE/VAR label in the sampling overview (Appendix A).

Sediment Collection: Ekman sediment grabs were collected aboard the University of Maryland's *R/V Aquarius* following published guidelines (U.S. EPA 2001). Three or more grabs were taken within a 5-10 m radius at each sediment site. The top 5 cm of sediment from each grab was collected using a pre-rinsed stainless steel spoon and transferred to a stainless steel bowl. The samples were homogenized and transferred to pre-cleaned glass jars. Samples were placed on ice whilst aboard the ship and transferred to -20º C freezers for storage prior to analysis.

All locations of sediment samples were determined using navigational maps, shore-based observations, handheld GPS (accurate to < 5 m), and shipboard GPS.

Samples were collected outside of the dredged channel, except for transects across the river that were sampled to quantify spatial variability. Criteria for acceptability of grab samples included intact samples with sufficient depth penetration (>10 cm) and a relatively undisturbed sediment surface.

Biota Collection: Adult white perch (*Morone americana*), adult channel catfish (*Ictalurus punctatus*), forage fish, and epibenthic invertebrates, were collected throughout each of the four zones by a 6 m head x 8 m bar balloon otter trawl. The otter trawl had a cod end lined with 1 cm square mesh to collect smaller forage fish and macrobethos. Trawls were conducted at depths ranging from 6-12 m for 3-5 minutes in duration. White perch greater than 120 mm and catfish greater than 300 mm in length were sub-sampled from trawls when available. The average age, length, weight, lipid content and total PCB content of channel catfish and white perch composites collected for the fall and spring campaigns appear in Table 2.1. A list of collected small prey items from the fall and spring campaigns and their associated sample IDs appear in Table 2.2. Small fish and invertebrates were identified to the lowest possible taxa. A complete list of samples appears in Appendix A.

White perch and channel catfish stomach content was analyzed using a gastric lavage technique with additional samples of white perch and channel catfish collected for gut analysis to identify prey items (Horwitz et al. 2002). All fish were anesthetized in Tricaine Methanesulfonate (MS-222), measured for total length, rinsed with DI water, and wrapped in foil. Small fish and macrobenthic invertebrates were separated by species and placed in pre-cleaned glass jars. Epibenthic organisms were collected from substrate caught in the otter trawls, using benthic traps and/or benthic mats deployed for numerous days or from sediment grabs. Invertebrates, mainly the amphipod *Gammarus duebeni*, were picked from substrate using pre-cleaned forceps and depurated for 6 hours or more. Organisms were identified at the lowest visually identifiable taxa level. Biota samples were placed on ice aboard the ship and transferred to -20º C freezers prior to analysis. Additional sampling was necessary for Zone 2 both in fall and spring sampling campaigns, as benthic trawls were unusable due to bottom topography. Further samples were collected by the Academy of Natural Sciences in Zone 2 using gill netting and/or electroshocking, and fish were processed in the manner described above (Horwitz et al. 2002).

Extraction and Analysis

Sample preparation: Channel catfish and white perch were prepared for extraction according to standard methods following Environmental Protection Agency protocols (EPA 2000). Fillets and remains were homogenized using an industrial strength food grinder. For the core study, equal measures were taken from each of the fish and thoroughly mixed to form composites of fillet and remains. For the variability studies, individual fillets were homogenized for analysis as well as a composite of the fillets. During processing, otoliths were removed for subsequent age determination. Small fish and macro invertebrates were sorted by species and size and homogenized whole using a pre-cleaned food processor. Most fish samples were filleted, homogenized and subsampled at the Chesapeake Biological Laboratory (CBL), samples were divided between CBL and the Academy of Natural Sciences (ANS) for analysis. Channel catfish, prey fish, and invertebrates were analyzed at CBL while white perch and sediments were measured at ANS. Both laboratories used identical preparatory and analytical methods as

Table 2.1. PCB concentrations observed channel catfish (*Ictalurus punctatus)* and white perch (*Morone americana*) collected from the Delaware River estuary in Fall 2001 and Spring 2002 (N=number of organisms in composite ±standard deviation (SD), NA= Not Available, *based on fillet/whole fish ratio).

Organism	Zone	Date	N	Average Length (cm) ± SD	Average Weight (g) ± SD	Average Age ± SD	%Lipid	Total PCBs (ng/g ww)
Ictalurus punctatus	2	11/8/2001	6	48 ± 7	1023 ± 585	12 ± 4	9.2	1040
	3	11/9/2001	6	42 ± 4	667 ± 223	9 ± 1	10.1	1990
	4	11/8/2001	6	37 ± 2	368 ± 90	6 ± 1	8.6	1220
	5	11/8/2001	5	41 ± 7	636 ± 449	7 ± 2	5.9	610
	2	4/2/2002	5	52 ± 2	1415 ± 270	10 ± 1	4.8	480
	3	3/20/2002	5	44 ± 5	833 ± 392	8 ± 1	7.4	1490
	4	3/20/2002	5	37 ± 29	433 ± 124	7 ± 1	9.0	1620
	5	3/20/2002	5	42 ± 4	654 ± 216	9 ± 1	10.1	1450
Morone americana	2	11/8/2001	6	20 ± 1	105 ± 39	6 ± 2	6.0	650
	3	11/9/2001	6	17 ± 1	68 ± 11	3 ± 1	7.7	1260
	4	11/8/2001	6	17 ± 11	70 ± 13	3 ± 1	7.3	1370*
	5	11/8/2001	5	20 ± 2	122 ± 27	6 ± 2	10.3	320
	2	6/21/2002	5	16 ± 2	64 ± 2	3 ± 1	6.0	620*
	3	3/20/2002	5	18 ± 1	85 ±15	4 ± 1	7.1	1020
	4	3/20/2002	5	18 ± 1	92 ±19	4 ± 0	7.1	1090
	5	3/20/2002	5	21 ± 1	171 ±38	7 ± 2	4.3	1060

Table 2.2. PCB concentrations observed within prey fish and invertebrates collected from the Delaware River estuary in Fall 2001 and Spring 2002 (N=number of organisms in composite, YOY=young of the year)

Organism		Zone	Date	N	%Lipid	Total PCBs (ng/g ww)
Ictalurus punctatus	YOY Channel Catfish	3	11/8/2001	4	4.5	780
Trinectes maculatus	Hogchoker	3	11/8/2001	1	0.9	90
Ictalurus punctatus	YOY Catfish	3	11/8/2001	1	2.5	540
Micropogonias undulatus	Croaker	4	11/8/2001	16	2.0	180
Micropogonias undulatus	Croaker	4	11/8/2001	15	1.1	100
Trinectes maculatus	Hogchoker	4	11/8/2001	5	3.2	550
Ictalurus punctatus	YOY Channel Catfish	4	11/8/2001	10	5.5	640
Notropis hudsonius	Spottailed Shiner	4	11/8/2001	1	5.7	950
Etheostoma olmstedi	Tesselated Darter	4	11/8/2001	1	0.3	310
Morone americana	Juvenile White Perch	4	11/8/2001	4	2.4	340
Anguilla rostrata	American Eel	5	11/8/2001	3	2.7	340
Trinectes maculatus	Hogchoker	5	11/8/2001	4	3.8	40
Notropis hudsonius	Spot-tailed Shiners	2	4/2/2002	11	3.2	100
Etheostoma olmstedi	Tessalated Darter	2	4/2/2002	8	2.7	90
Fundulus diaphanus	Banded Killifish	2	4/2/2002	7	2.2	150
Ictalurus punctatus	YOY Channel Catfish	3	3/20/2002	5	1.5	660
Morone americana	Juvenile White Perch	3	3/20/2002	6	2.5	500
Morone americana	Juvenile White Perch	4	3/20/2002	8	2.7	600
Ictalurus punctatus	YOY Channel Catfish	4	3/20/2002	7	1.8	580
Notropis hudsonius	Spottail shiner	4	3/20/2002	1	5.0	730
Morone americana	Juvenile White Perch	5	3/20/2002	2	2.4	140
Ictalurus punctatus	YOY Channel Catfish	5	3/20/2002	3	1.9	220
Gammarus spp.	Amphipods	2	11/8/2001		0.6	40
Gammarus spp.	Amphipods	3	11/8/2001		0.4	110
Gammarus spp.	Amphipods	4	11/8/2001		0.8	150
Gammarus spp.	Amphipods	5	11/8/2001		0.6	50
Palaemonetes spp.	Grass shrimp	5	11/8/2001		1.1	40
Gammarus spp.	Amphipods	2	4/3/2002		1.7	240
Gammarus spp.	Amphipods	3	3/20/2002		2.2	150
Gammarus spp.	Amphipods	3	3/20/2002		0.9	80
Gammarus spp.	Amphipods	3	3/20/2002		1.6	30
Decopoda	Crayfish	4	3/20/2002		1.8	50
Gammarus spp.	Amphipods	4	3/20/2002		1.3	30
Decopoda	Crayfish	4	3/20/2002		1.1	50
Gammarus spp.	Amphipods	5	3/20/2002		1.2	100

detailed below.

Laboratory methods: Whole individual forage fish, invertebrates, fish fillet and remains homogenates were ground with granular Na_2SO_4 using a pre-cleaned mortar and pestle to dry the sample. This mixture was placed in pre-baked and cleaned Soxhlet extractor with glass wool plugs, spiked with PCB surrogate standards 3,5-dichlorobiphenyl (congener 14) and 2,3,4,4',5,6-hexachlorobiphenyl (congener 166). In addition, ANS analyzed 2,3,5,6-tetrachlorobiphenyl (congener 65). Sediment analysis performed by the Academy of Natural Sciences is detailed in Ashley and Baker (1999). Briefly, sub-samples were taken to determine water content; sediment was then dried with sodium sulfate. Pre-cleaned activated elemental copper wool was added to round bottom flasks to remove elemental sulfur. Elemental sulfur has been shown to interfere with PCB congener detection when using an electron capture detector (Ashley and Baker 1999). All samples were extracted for at least 18 hours with dichloromethane. Samples were then concentrated and dichloromethane was exchanged with hexane by rotary evaporation.

Biota extracts were sub-sampled for lipid content with an aliquot of extract removed and placed in a pre-tared aluminum tray, dried overnight at 60° C and weighed the next day to determine gravimetric lipid content. Lipid in the remaining extract was removed by gel permeation chromatography (GPC) using a 250-mm x 22.5-mm inner diameter Phenomenex Phenogel column (10µm particles with a 100-Å pore size) and dichloromethane as the mobile phase at 5ml/min. Samples were then concentrated and dichloromethane was exchanged with hexane by rotary evaporation. Samples were further cleaned using Florisil and the PCB fraction was separated. Florisil was pre-cleaned with a hexane: acetone mixture (1:1 v/v) for 24 hours, activated at 550 ºC for 4 hours, and deactivated using 2% deionized water. The Florisil was placed in a glass column with a pre-cleaned glass wool plug and a 1g cap of Na_2SO_4 was added. Petroleum ether (35ml) was used to elute the first fraction (F1) of the sample containing PCBs. The second fraction (F2) was eluted using petroleum ether: dichloromethane (50ml, 1:1 v/v) to collect organochlorine pesticides. Both F1 and F2 fractions were concentrated and transferred to hexane using rotary evaporation. Samples were transferred to auto sampler vials with further concentration under a nitrogen stream. The F2 fraction was archived for future analysis. PCB internal standards 2,3,6-trichlorobiphenyl (congener 30) and 2,2',3,4,4',5,6,6'-octachlorobiphenyl (congener 204) were added to F1 samples and calibration standards for analysis on the GC-ECD.

PCB congeners were analyzed using a Hewlett Packard 5890 gas chromatograph equipped with a ^{63}Ni electron capture detector. A 60 meter 5% phenylmethyl silicon capillary column with a 0.25-mm internal diameter and 0.25-μm stationary phase film thickness was used (DB-5, J&W Scientific, Folsom, CA, USA). The carrier and make-up gases were nitrogen (CBL) or hydrogen and argon/methane (ANS) with a flow rate of 30 ml/min. The inlet pressure was 100 kPa. The temperature program began with 100 degrees C for 2 min, 100-170 degrees C at 4 degrees C/min, 170-280 degrees C at 3 degrees C/min, and 5 min at 280 degrees C. The injector and detector temperatures were 225 degrees C and 285 degrees C, respectively. 2-μl samples were injected with an auto sampler (HP 7673) in the splitless injection mode. Both an HP3393A integrator and Chemstation computer software were used to acquire data (Hewlett Packard, Palo Alto, CA, USA). PCB congeners were identified and quantified based on previously reported methods (Mullin et al. 1984). Congener identification was based on chromatographic retention times in relation to the internal standards added. The relationship between congeners and the corresponding calibration standard allowed for quantification of PCBs. If co eluting congeners were unable to be resolved, combined values were reported. Congener specific results were totaled to determine "total PCB". To report as PCB homologue groups, co eluting congeners were separated based on percent contribution to commercial Aroclor mixtures (Frame et al. 1996).

Determination of whole fish values: Whole fish total PCB concentrations were calculated using the weight of fillet/ weight of the whole fish ratio and the weight of remains/ weight of whole fish ratio to determine the percent contribution of each to a whole fish PCB value. Fillet vs. whole fish ng/g ww and lipid values are presented in Figure 2.2. The fillet vs. whole ratio for wet weight PCBs on average is 1:3. When values are lipid normalized, the fillet to whole fish ratio shows a consistent 1:1 ratio. In the event of a sample loss, the average ratio of PCBs in fillet/ PCBs in whole fish was calculated and applied to fillet values to determine whole fish. In the case of Spring Zone 5 channel catfish, surrogate recovery was low. For this sample, individual congeners were transformed based on the percent surrogate recovery to meet the average surrogate recovery of 90% from all samples.

Water samples: PCB data from water samples taken during fall and spring cruises was unavailable at the time of publication, therefore BCF values were calculated using dissolved PCB concentrations obtained from the Delaware River Basin Commission from ambient water sampling conducted in September 2001 and March 2002 (DRBC 2003). Only those congeners analyzed in both data sets were used for individual congener bioconcentration factors (Table 2.3).

Quality Assurance

Comparison of PBC Congener Analysis: Similar quantification methods were used by ANS and CBL as detailed previously, although reporting styles differed for a few congeners. ANS reported individual concentrations for the commonly co-eluting congeners of 47+48, 66+95 and 82+151 where CBL reported them as the sum of congeners. CBL reported individual concentrations for co-eluting congeners 172+197 whereas ANS reported the co-eluting pair. To merge the data sets, individual concentrations were added to produce one concentration in such cases. ANS does not report congeners 89 and 119 due to low levels in calibration standards. The same is true for congener 131 for CBL, therefore a data qualifier of "NA" (not analyzed) is listed for these congeners. A complete list of congeners analyzed by ANS and CBL is shown in Table 2.3. To measure analytical precision and accuracy quality assurance methods were employed using laboratory matrix blanks, surrogate materials, standard reference materials, and replicate analysis (Appendix D).

Detection limits: To address possible laboratory contamination and calculate detection limits for each congener, matrix blanks of ~30g of clean Na_2SO_4 spiked with PCB surrogates were analyzed following the procedure used for biota and sediment samples. The blank detection limit for each congener was estimated as three times the peak area of the signal produced in the matrix blank. CBL detection limits of t-PCB ranged from to 16 ng to 24 ng; ANS t-PCB detection limits ranged from to 12 ng to 34 ng. The method detection limit is defined as three times the blank signal concentration corrected for concentration (detection limit mass divided by the sample mass extracted).

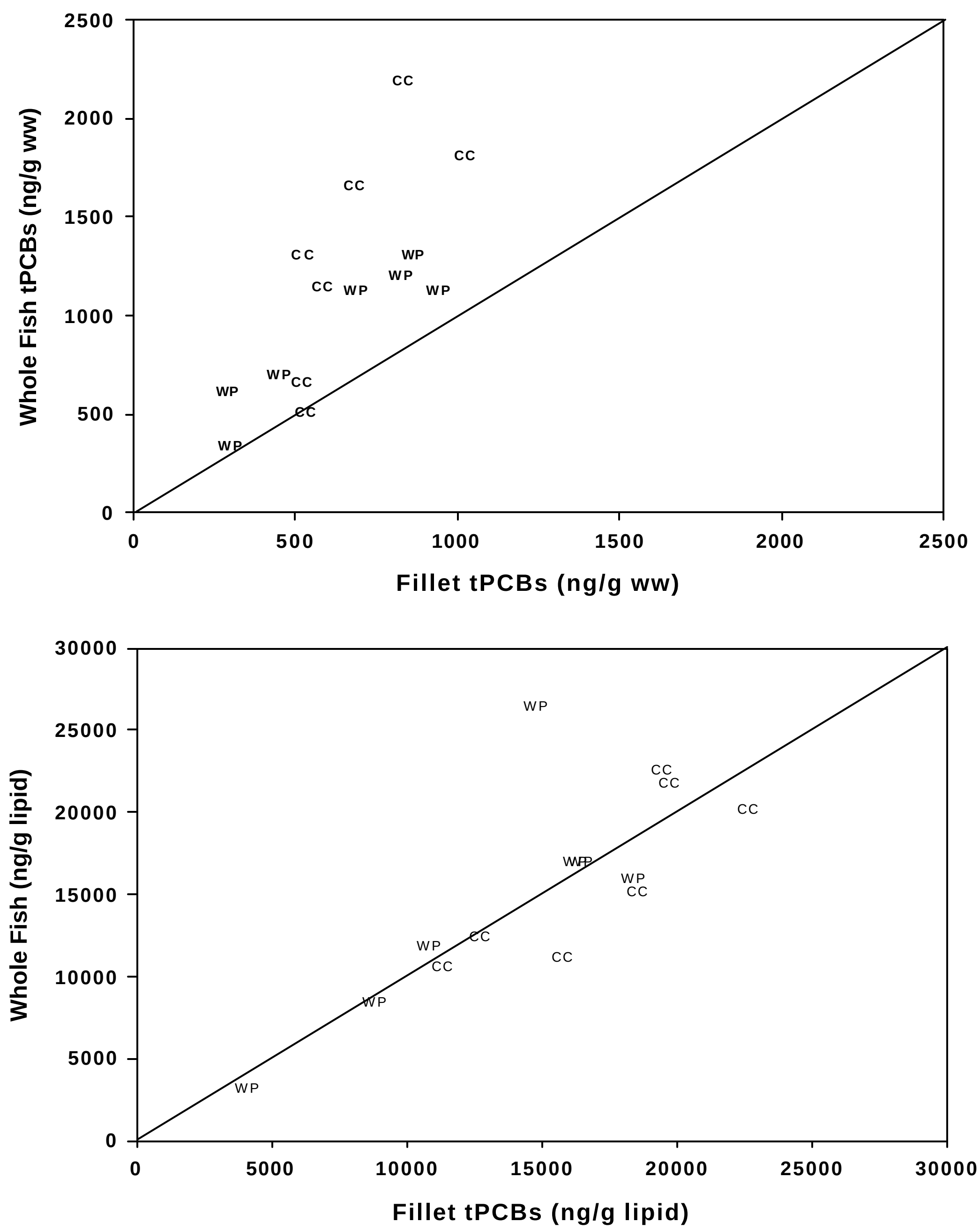


Figure 2.1. Total PCBs in fillet vs. whole fish in ng/g wet weight and ng/g lipid (CC=channel catfish, WP=white perch).

Congeners Detected by CBL and ANS	Congeners Detected by DRBC	Congeners Detected by CBL and ANS	Congeners Detected by DRBC
1*	1*	77,110	77,110
3*	3*	**82, 151**	**82**
4,10	4+10	**135,144**	**135**
7,9	**7**	107	107
6	6	**123,149**	**123**
8,5	8	118	118
19	19	134	134
12,13	**12**	146	146
18*	18*	132,153,105	132+153+105
17	17	141	141
24	24	137,130,176	137+130+176
16,32	16+32	158*	158*
26	26	129,178	129+178
25	25	**187,182**	**187**
31, 28	**31**	183	183
33,21,53	**21**	128	128
22	22	174	174
45	45	177	177
46	46	202,171,156	202+171+156
52	52	172,197	172+197
49*	49*	180	180
47,48*	**48**	191	191
44	44	170,190	170+190
37,42	**37**	198	198
41,64,71	**64**	201*	201*
40	40	203,196	203+196
63*	63*	189	189
74	74	208,195	208+195
66,95	**66**	207	207
56,60/92,84	56+60/92+84	194	194
89*	**NA***	205	205
83	83	206	206
85	85	209	209
136	136		

Table 2.3. Comparison of PCB Congeners Quantified by Chesapeake Biological Laboratory (CBL) and the Academy of Natural Sciences (ANS) with Delaware River Basin Commission (DRBC). Highlighted congeners indicate discrepancy in data sets. *Congeners eliminated from analysis based on suspected co-elution problems.

Concentrations falling below the method detection limit are denoted as "ND" (non-detect).

Surrogate recoveries: Due to matrix interferences, the recovery of congener 14 was problematical and was not used to assess analyte loss. Mean recoveries of PCB congeners for 65 and 166 for all samples extracted and analyzed by ANS were 86 ± 16% and 90 ± 18%, respectively. Mean recoveries of PCB congener 166 extracted and analyzed by CBL was 76 ± 18 %. Surrogate recoveries were relatively high with low standard deviations; therefore all reported values for PCBs were not corrected for analyte loss.

Congener selection: Certain congeners were eliminated from the data set based on suspected co-elution problems (1, 3, 18, 47+48, 49, 51, 63, 89, 119, 158, 199, 201). Most of these congeners contribute less than 1% to the total PCB concentration. The complete data set is presented in Appendices B and C, although analysis of the data set for this paper is based on the abbreviated congener list.

Standard Reference Materials: To evaluate extraction efficiency and analytical accuracy, standard reference materials from the National Institute for Standards and Technology (NIST) were used. Lake Superior Fish Tissue (1946) was analyzed by both CBL and ANS with measured values of 77 ± 34% and 87 ± 35% on average of their certified values. Four congeners were excluded from this average for CBL (18, 63, 195, 201) due to recoveries well over 100%, leaving a total of 37 congeners compared between data sets. In addition, CBL's measured values of Organics in Mussel Tissue (1974a) to compare recoveries in samples with low contaminant concentrations. The measured values were 52 ± 24% of the certified value. ANS analyzed Organics in Sediment (1944) measured values were 61 ± 32% of the certified value.

Replicates: To assess precision of analytical techniques, CBL and ANS both performed replicate analysis on randomly selected samples. Replicate sampling was attempted for biota and sediment for both seasons providing sufficient sample mass was available. Relative percent differences of replicates ranged between 1-31% of the total PCBs for CBL. ANS replicates ranged from 0-23%, with one sediment sample at 100% due to very low concentrations of total PCB of 4 ng/g dw and 13 ng/g dw for the replicate. This use of relative percent difference may be misleading. Heterogeneity exists among samples and those with very low concentrations of total PCB such as invertebrates had high relative percent differences.

Interlaboratory comparison: To assess comparability between CBL and ANS laboratories, six fish samples were exchanged between the two participating laboratories and analyzed. The relative percent differences (RPDs) of total PCBs were between 22-43% for interlab comparison.

Analytical Variability: Due to limited sampling capabilities, one composite sample per zone was analyzed for sediment and biota groups. Separate variability studies were undertaken to address variability within a zone, and determine if sampling adequately represented PCB concentrations. Lack of replicates did not allow conventional statistical analysis with such a data set.

The average recovery of surrogate 65 was 86 ± 16% while the average recovery of CBL and ANS for surrogate 166 was 81 ± 19%. We may calculate the method precision based on these recoveries using the relative standard deviation of the surrogate recoveries from the average surrogate recovery. This measure of analytical precision was calculated to be 21%. As stated previously, CBL's recovery of surrogate 14 was problematic due to matrix interferences and was therefore disregarded in analysis.

Variability Study: Individual white perch and channel catfish fillets were analyzed to investigate PCB variability among fish collected within a zone. Overall, the white perch and channel catfish showed considerable variation among fillet PCB content (Table 2.4). Lipid normalizing the wet weight values explains some, but not all of the variability among individual fish within a zone (Figures 2.3-2.11). This variation within fish collected from the same site leads to concerns with predictive capabilities, specifically if we may adequately address the range of PCB concentrations in fish samples through the sampling design. The limited sample size in this study limits statistical power to show differences or similarities. In considering the benefits of compositing samples against the cost of the ability to conduct rigorous inferential statistics, we find the mathematical average of individual fillet PCB values equals the PCB concentration in composited individual fillets. This demonstrates the efficiency and cost effectiveness of compositing tissue samples.

PCB variability among fish collected within a zone may be addressed through the white perch and channel catfish variability studies. For the white perch variability study, ANOVA ($P<0.05$) shows no significant differences among tows. Evidence exists for violation of normality assumption of ANOVA with residuals skewed to the high end, therefore white perch data may be log-normal in distribution. It is difficult to produce a standard error for the composite means, therefore we will continue under the assumption of normality. Levene's test shows no evidence for violation of homogeneous variance assumption of ANOVA. Based on these statistics we may assume variability is consistent across tows. The standard error of the mean for the white perch variability study (n=5) is 154 ng/g ww total PCBs.

Channel catfish collected at the suspected high contamination site Tinicum Shoals (Zone 4) had concentrations for fall and spring of 15,250 ng/g lipid and 33,460 ng/g lipid respectively; the catfish at the moderate contamination site Mud Island Shoals or Dredge Harbor (Zone 2) had fall and spring concentrations of 11,200 ng/g lipid and 25,450 ng/g lipid; channel catfish at Bulkhead Shoals (Zone 5), the least likely PCB contaminated site, had PCB values of 10,080 ng/g lipid and 7,320 ng/g lipid. ANOVA showed significant differences among zones (P=0.028), but no significant difference between seasons. There was no evidence for violation of normality assumption of ANOVA. Using Levene's test there was no evidence for violation of homogeneous variance assumption of ANOVA. The standard error of the mean for the channel catfish variability study (n=5) is 94 ng/g ww total PCBs.

Sample	Zone	Season	N	Total PCB (ng/g ww)	Standard Deviation	Coefficient of Variation
White Perch	5	Fall	5	361	225	0.62
	5	Fall	5	376	378	1.00
	5	Fall	5	606	437	0.72
Channel Catfish	2	Fall	5	513	203	0.40
	4	Fall	5	486	159	0.32
	5	Fall	5	375	298	0.80
	2	Spring	5	767	243	0.32
	4	Spring	5	574	137	0.24
	5	Spring	5	337	168	0.50

Table 2.4. Total PCB (ng/g ww) concentrations in white perch and channel catfish variability studies (N=number of organisms)

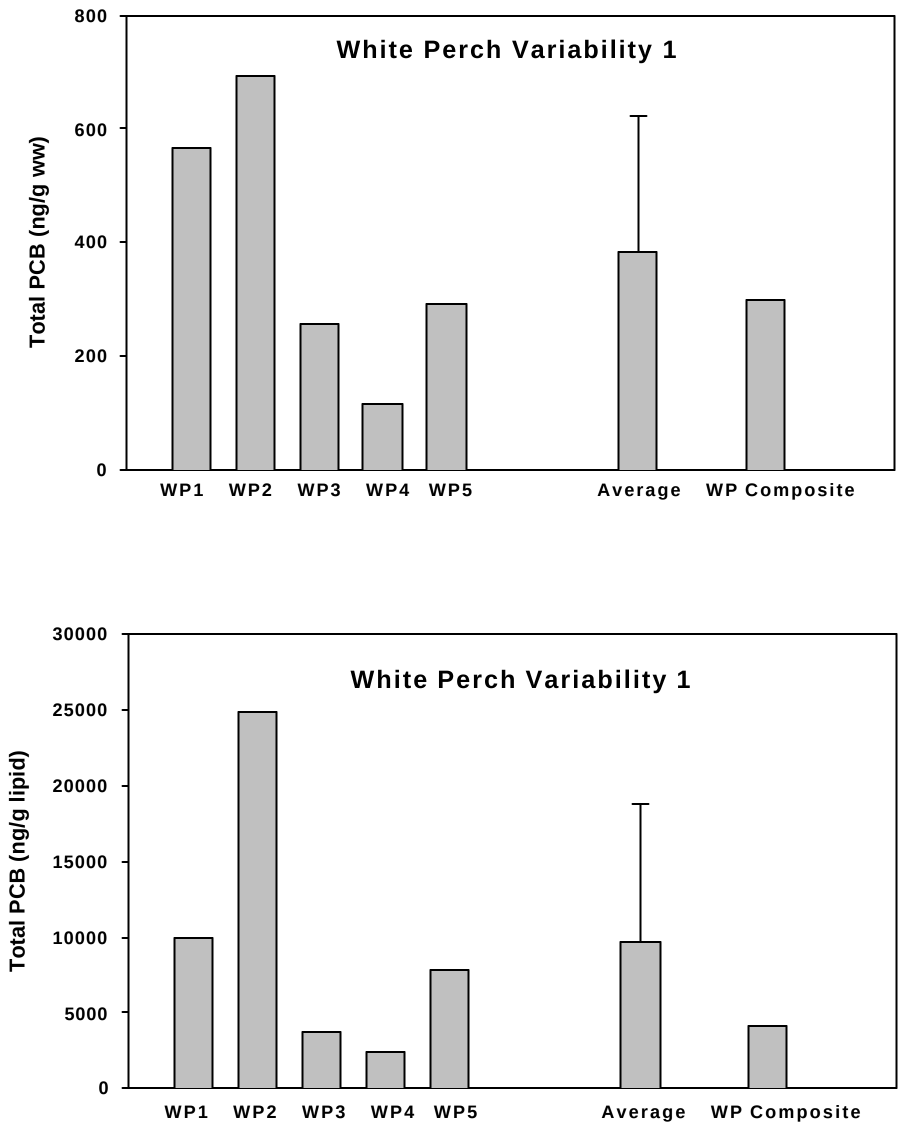
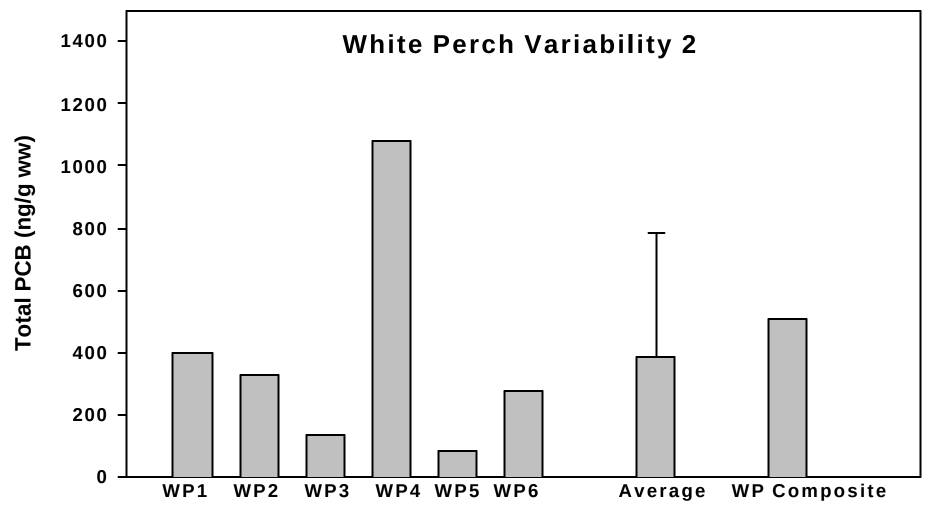


Figure 2.2. Total PCBs (ng/g ww) for individual white perch (WP1-WP5), the mathematical average and white perch composite for Fall 2001 variability study 1 in zone 5.



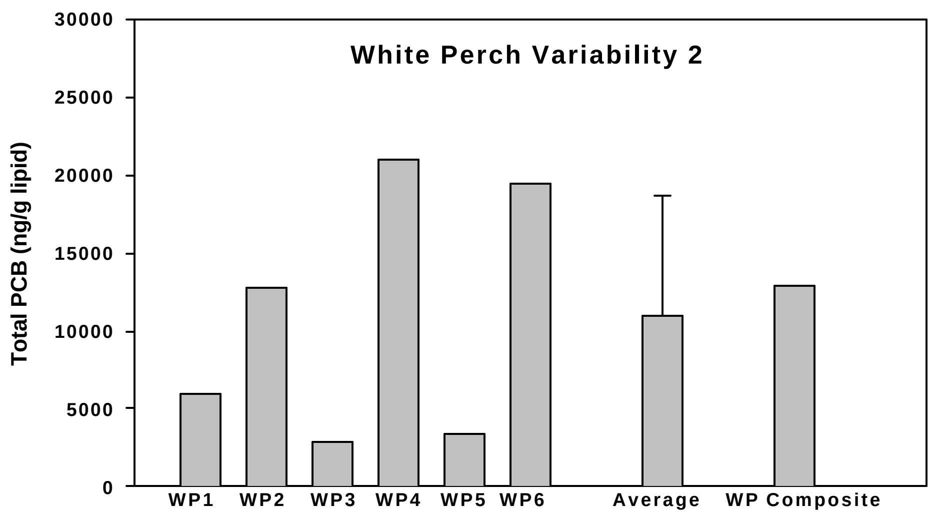
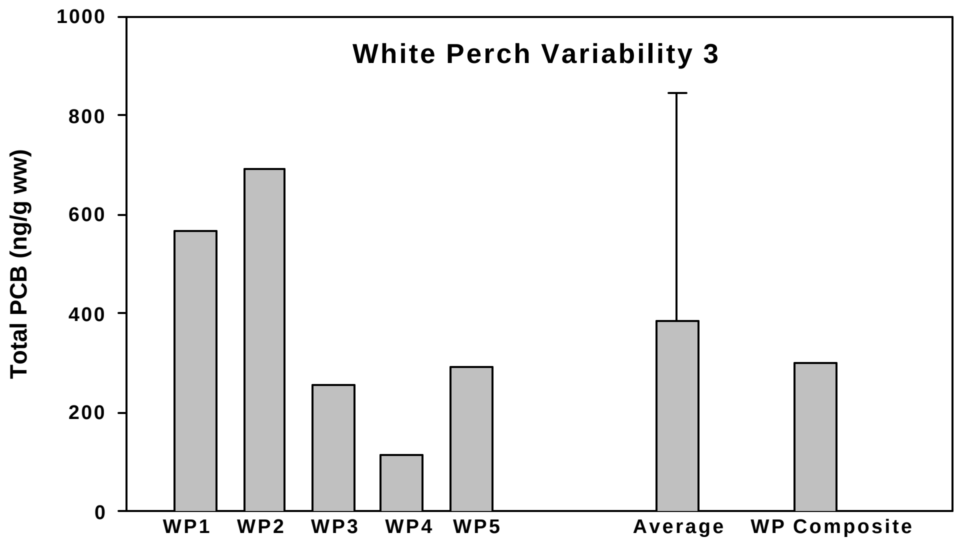


Figure 2.3. Total PCBs (ng/g ww) for individual white perch (WP1-WP6), the mathematical average and white perch composite for Fall 2001 variability study 2 in zone 5.



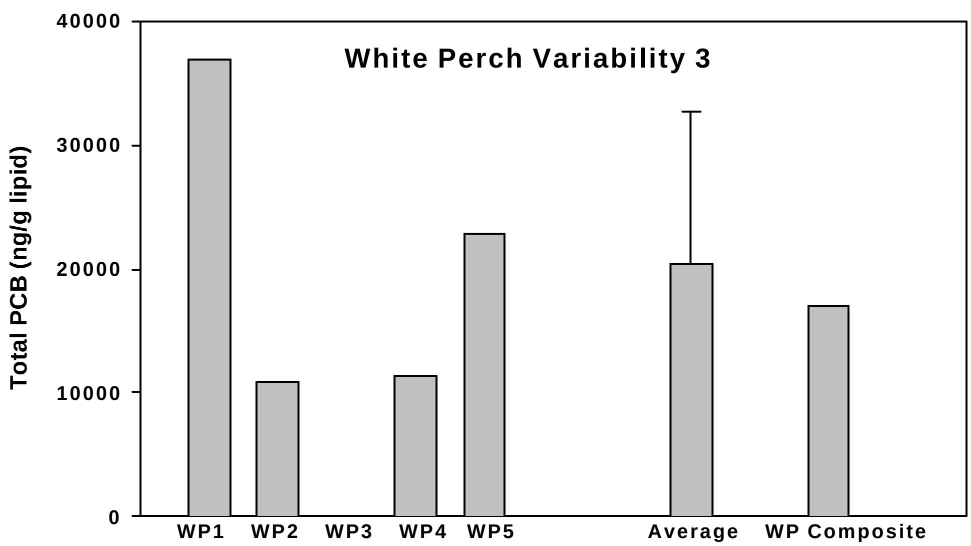
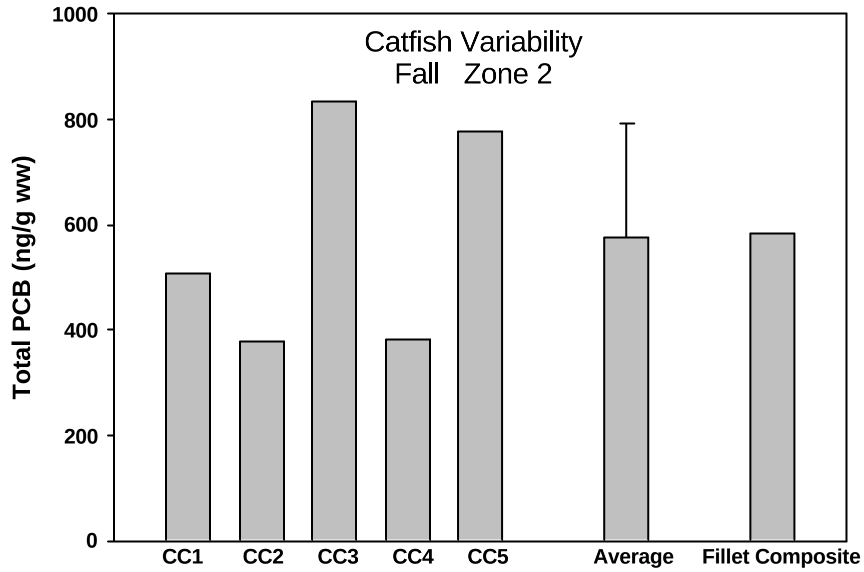


Figure 2.4. Total PCBs (ng/g ww) for individual white perch (WP1-WP5), the mathematical average and white perch composite for Fall 2001 variability study 3 in zone 5 (WP 3 lipid value not available).



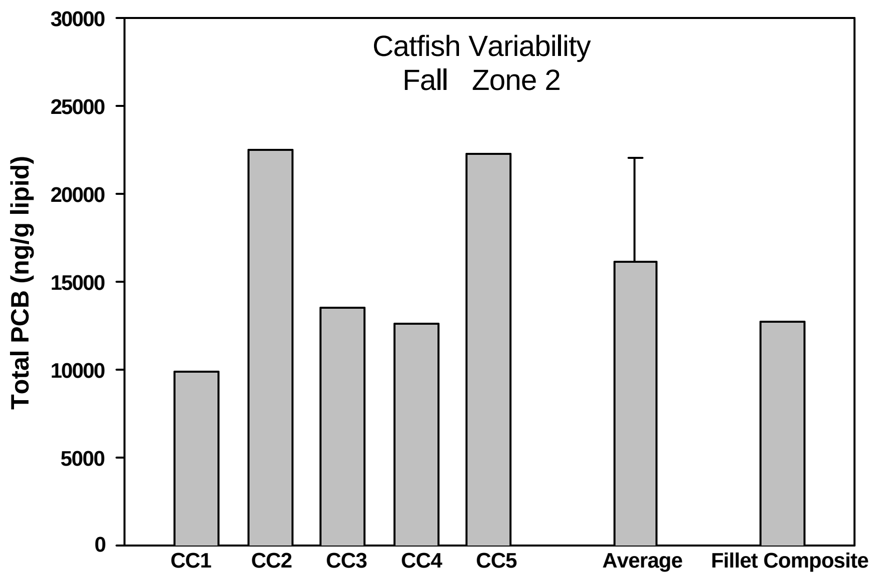
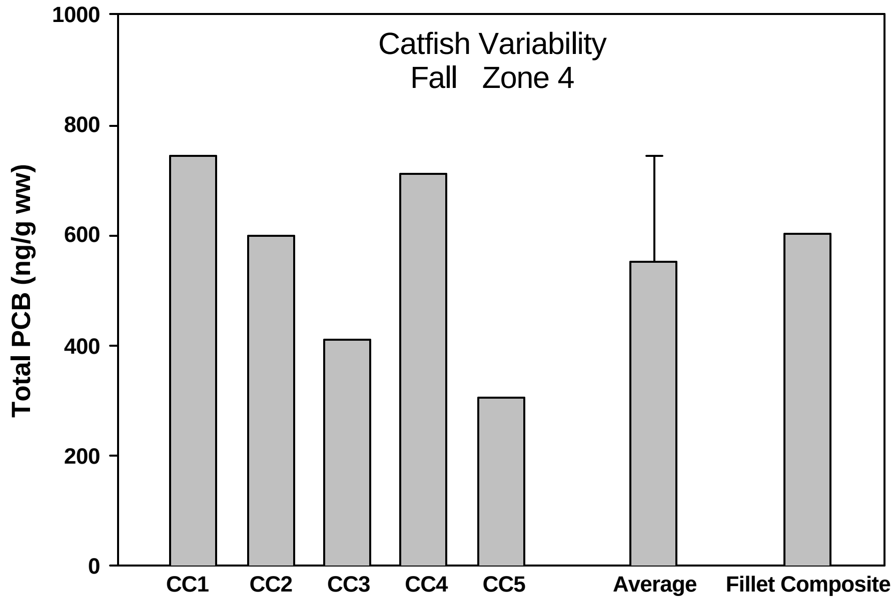


Figure 2.5. Total PCBs (ng/g ww) for individual channel catfish (CC1-CC5), the mathematical average and channel catfish composite for Fall 2001 variability study in zone 2.



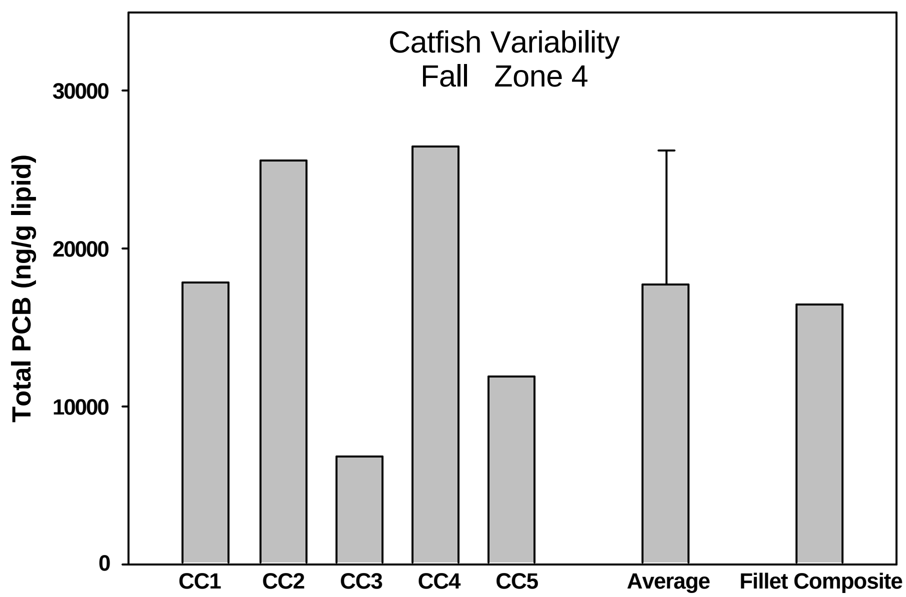


Figure 2.6. Total PCBs (ng/g ww) for individual channel catfish (CC1-CC5), the mathematical average and channel catfish composite for Fall 2001 variability study in zone 4.

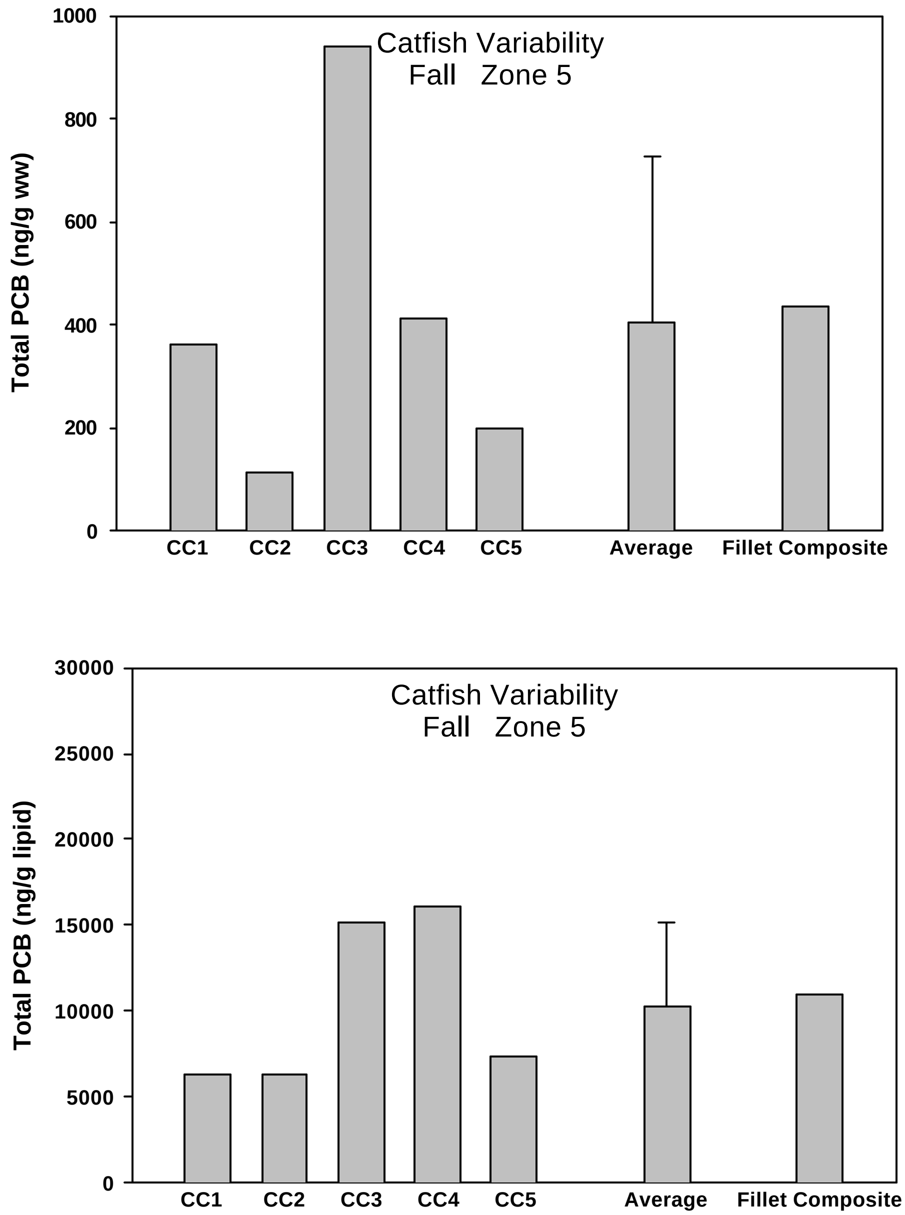
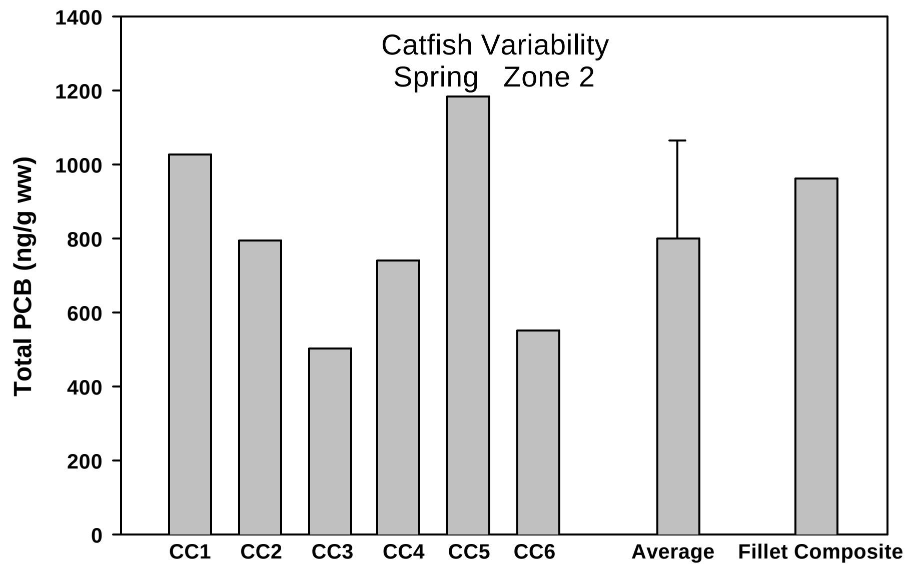


Figure 2.7. Total PCBs (ng/g ww) for individual channel catfish (CC1-CC5), the mathematical average and channel catfish composite for Fall 2001 variability study in zone 5.



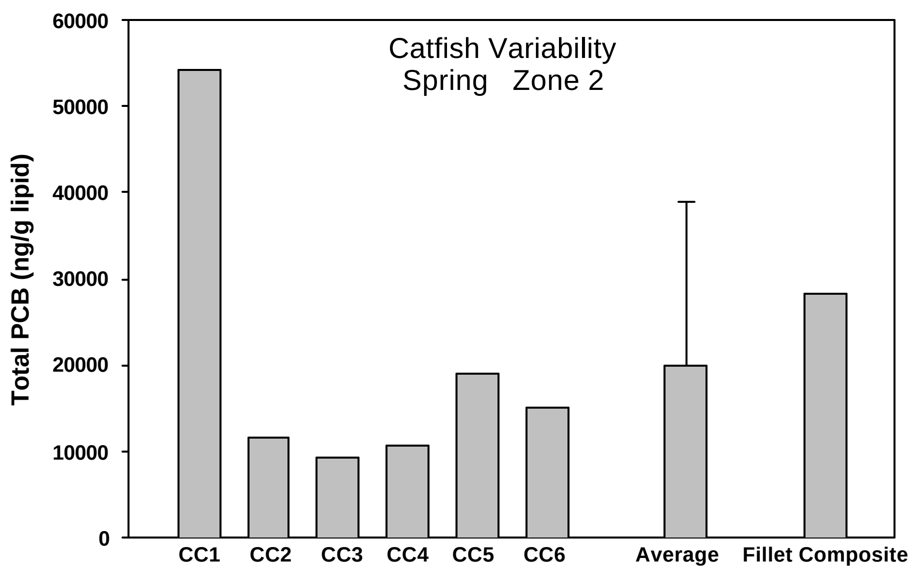
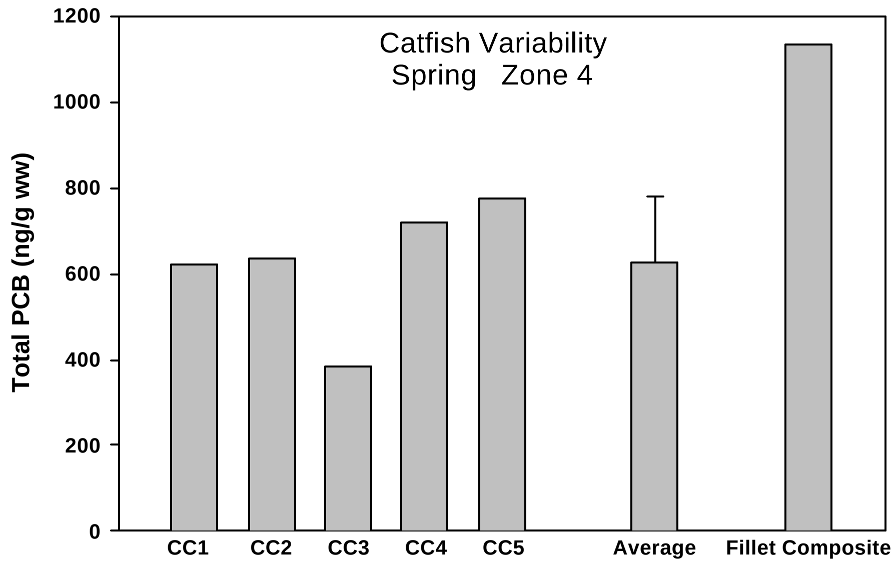


Figure 2.8. Total PCBs (ng/g ww) for individual channel catfish (CC1-CC6), the mathematical average and channel catfish composite for Spring 2002 variability study in zone 2.



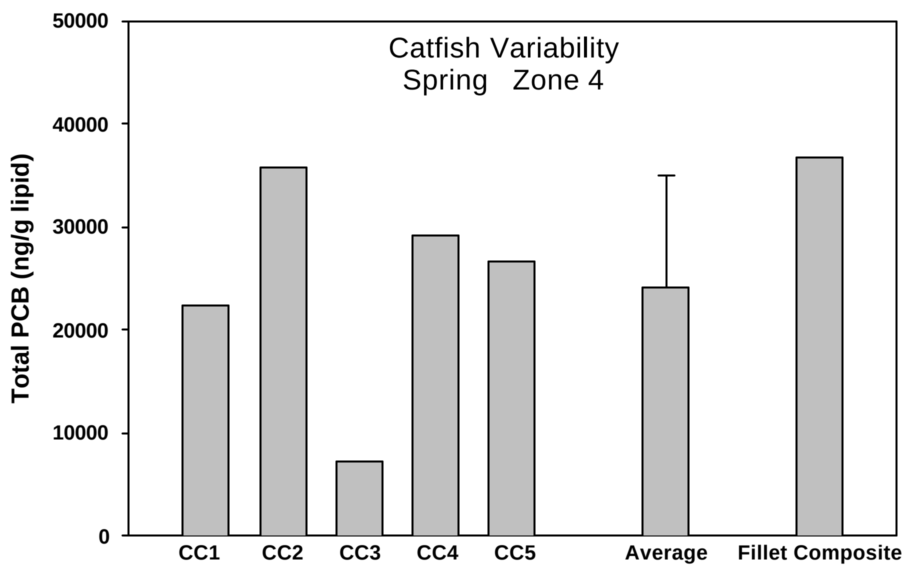
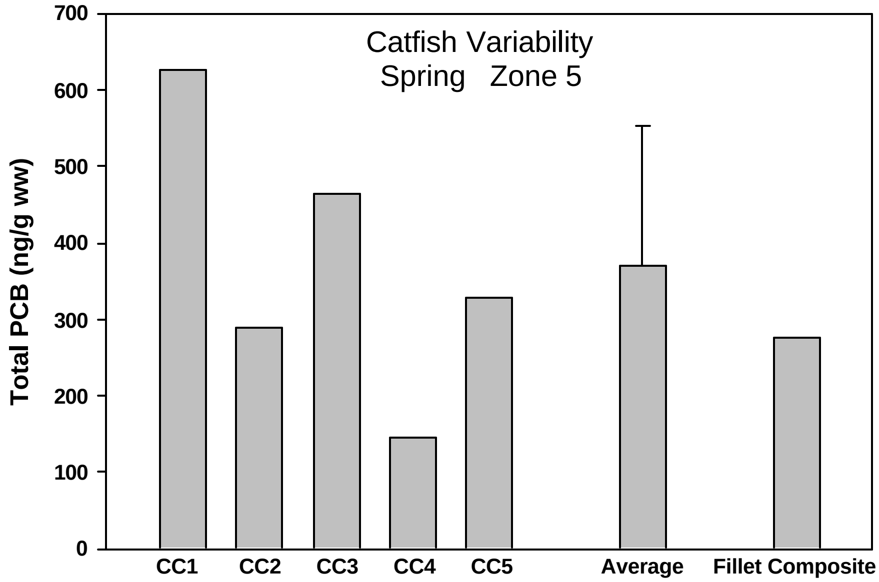


Figure 2.9. Total PCBs (ng/g ww) for individual channel catfish (CC1-CC5), the mathematical average and channel catfish composite for Spring 2002 variability study in zone 4.



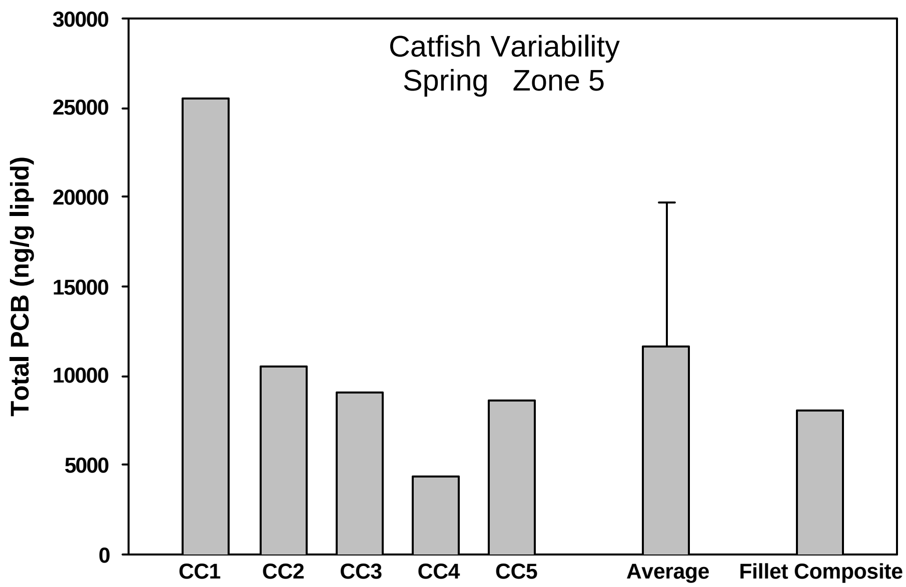


Figure 2.10. Total PCBs (ng/g ww) for individual channel catfish (CC1-CC5), the mathematical average and channel catfish composite for Spring 2002 variability study in zone 5.

Chapter Three

ACCUMULATION OF POLYCHLORINATED BIPHENYLS IN SEDIMENT AND BIOTA

Introduction

Estuaries are dynamic systems with great spatial, temporal, and chemical variability. Point and non-point sources of hydrophobic organic contaminants such as polychlorinated biphenyls (PCBs) are often located along or adjacent to estuaries, resulting in contaminant concentration gradients within urban waters. Residence times of these hydrophobic organic contaminants in sediments can be long enough that exposure can lead to significant bioaccumulation in resident organisms (Mackay and Fraser 2000; van der Oost et al. 2003). The partitioning of PCBs between sediment and biota depends on chemical properties such as the octanol/water partition coefficient, K_{ow} (Shaw and Connell 1984; Mackay and Fraser 2000). Accumulation within biota is affected by many processes including uptake, egestion, metabolism, growth and reproduction (Mackay and Fraser 2000).

The Delaware River is characterized by significant spatial gradients in PCB levels due to elevated urban loadings (DRBC 1998). We may hypothesize that ambient PCB levels in the river may correspond to areas of high urbanization. The relationship between ambient PCB levels and levels of PCB accumulation in biota may be examined over the spatial gradient. Modeling PCB transfer throughout an estuarine food web requires extensive data that describe physical and biological variability. Analysis of contaminant concentrations in top predators and their respective prey items gives an overall view of food web dynamics and the transport and accumulation of PCBs (Thomann et al. 1992; DiPinto and Coull 1997; Harding et al. 1997). Extensive data on predator/prey dynamics and bioenergetics information is required to accurately represent contaminant transfer in a system.

The objectives of this study are to determine the PCB levels in the Delaware River estuary with emphasis on spatial/temporal variability and accumulation in the food web to address the following points:

(1) Examine the variation of PCB congener patterns spatially and among species of different trophic levels
(2) Observe the effect of life history and migratory patterns on PCB congener accumulation in fish

Results and Discussion

PCB Spatial Patterns:

The values presented in Figure 3.1 are average concentrations of PCB levels in the sediment within zones. PCB concentrations in individual sediment samples prior to compositing range from 0-400 ng/g dw over an evident spatial gradient of PCB distribution with low concentrations in zone 2 (70 and 20 ng/g dw for fall and spring zonal averages) and the highest concentrations in Zone 3 (180-220 ng/g dw for fall and spring zonal averages) with levels decreasing downstream (Figure 3.1). The sampling design was not sufficient to estimate zonal variation, as 1-3 samples were collected in each zone. ANOVA ($P<0.05$) showed no significant difference between fall and spring samples, the relative rank of PCB concentrations in sediments did not change seasonally.

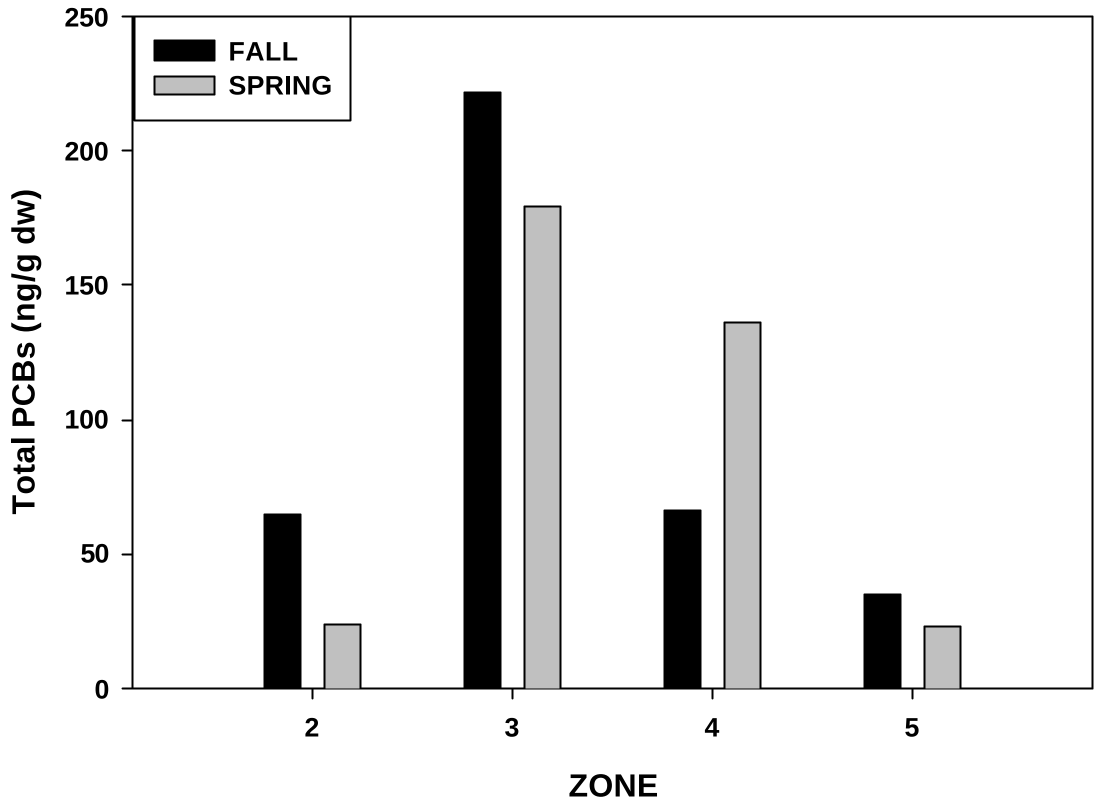


Figure 3.1 Total PCB concentration in surficial sediments by zone in the Delaware River estuary during Fall 2001 and Spring 2002.

Zone 3 and 4 are industrialized segments of the river receiving direct input from Philadelphia, Pennsylvania and Camden, New Jersey run-off and discharge from public works and industrial facilities. Consequently these areas are expected to be higher in contaminants. This PCB concentration pattern has been seen in previous sediment samples from the Delaware River with 128 and 180 ng/g dw for Zones 3 and 4 respectively. Zone 5 had a lower mean concentration of 89 ng/g dw (DRBC 1998). A second study listed variable sediment PCB from 1-295 ng/g dw within the river but high values reported in Zones 3 and 4 (Hartwell et al. 2001).

To compare, total PCB concentrations in the Chesapeake Bay range from 10-2,150 ng/g dw (Ashley and Baker 1999), while levels in the lower Hudson River range from 50-1,130 ng/g dw ((Steinbacher 2001). PCB levels in the San Francisco Bay Estuary range from below detection limits to 80,000 ng/g dw (SFEI 1999).

PCB concentrations in channel catfish and white perch range from 480-1990 ng/g wet weight and 320-1370 ng/g wet weight, respectively (Table 2.1). Previous studies of PCB contamination in channel catfish in the Delaware River showed similar levels of 465-2210 ng/g wet weight. White perch PCB concentrations range from 170-3060 ng/g wet weight, which are lower than levels in 1970 which were reported up to 9350 ng/g wet weight (Greene 2002).

In comparison, levels of total PCBs in the upper Chesapeake Bay range from 300-900 ng/g wet weight in channel catfish and 150-500 ng/g wet weight in white perch (Liebert et al. 2000). White catfish, *Ictalurus catus*, in the Sacramento-San Joaquin Delta range from 10-100 ng/g wet weight (Davis et al. 2000), while further downstream in the San Francisco estuary, shiner perch, *Cymatogaster aggregata*, range from 45-490 ng/g wet weight (Greenfield et al. 2003).

Prey fish total PCB concentrations range from 40-950 ng/g wet weight and invertebrates range from 30-240 ng/g wet weight (Table 2.2). PCB levels in biota from fall collections reflect spatial and temporal trends in sediment PCB concentrations. ANOVA ($P<0.05$) showed no seasonal differences for channel catfish, white perch, and invertebrates while a significant difference was seen in prey fish. Once again, the limited sample size (N=4 for channel catfish, white perch and invertebrates, N=3 for prey fish) gives limited power for predicting similarities or differences among samples. Elevated concentrations are seen for channel catfish, white perch, prey fish and invertebrates in zone 3 and 4 with lower concentrations in zone 2 and 5 (Figure 3.2). Spring PCB levels in channel catfish and prey fish follow similar spatial trends reflective of sediment concentrations, while white perch and invertebrates vary considerably.

Channel catfish and white perch show variable lipid content throughout the river (Figure 3.3), likely due to spawning dynamics and feeding behaviors. As lipid content affects contaminant levels, normalizing for lipid content (Figure 3.4) should reduce variability in organism chemical concentration (Thomann 1989). Comparing lipid normalized total PCB values of trophic levels indicates PCB concentrations do not increase with trophic position as discussed further in Chapter 4.

White perch PCB levels are consistent with the sediment spatial PCB gradient in the fall, while PCB concentrations in white perch are similar throughout the estuary in spring. White perch have limited movement downstream to deeper waters in the fall, and extensive movement within the estuary during the spring spawn (Mansueti 1961). This

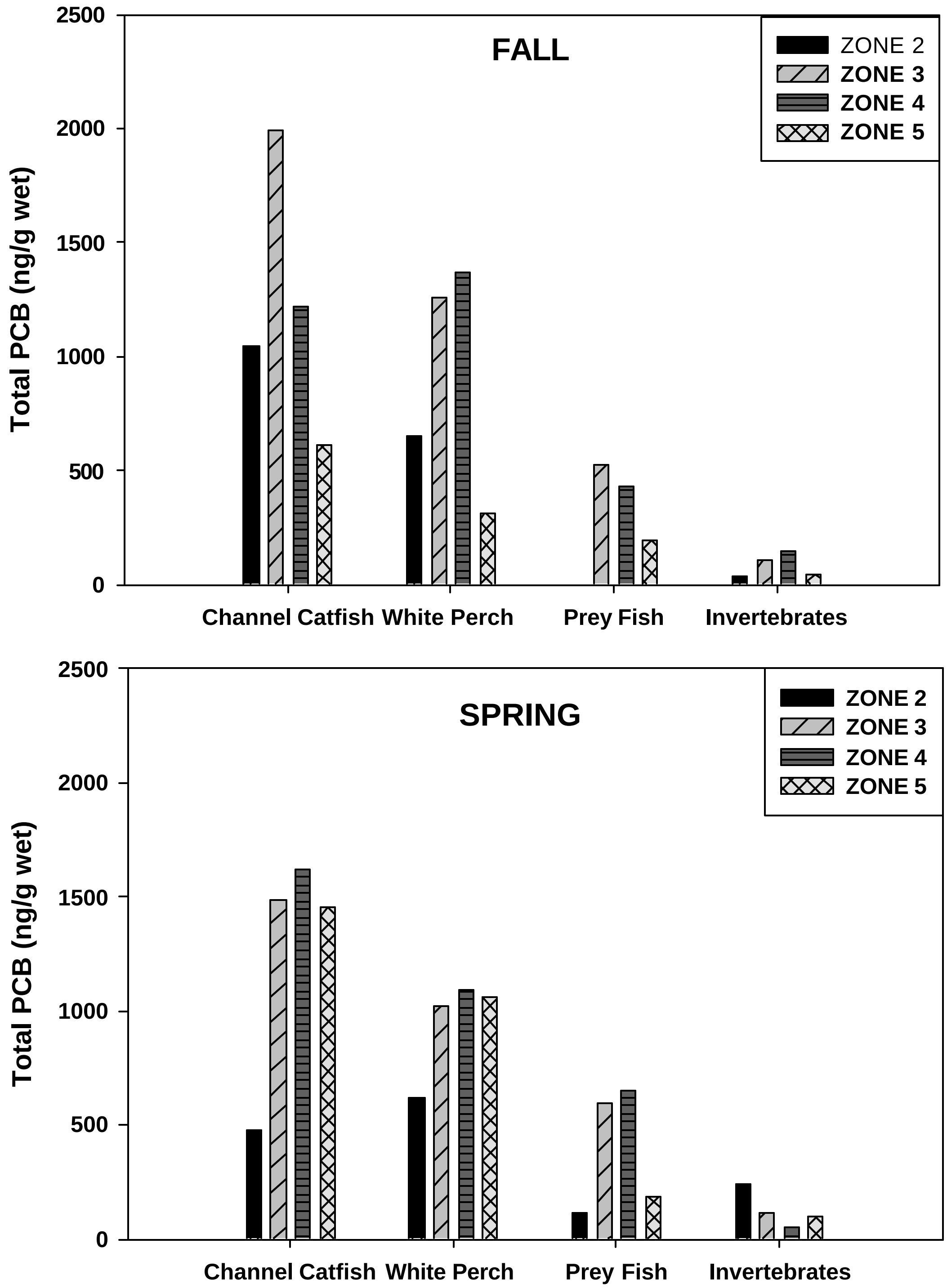


Figure 3.2. Total PCB concentrations (ng/g wet weight) in biota collected from the Delaware River estuary in Fall 2001 and Spring 2002.

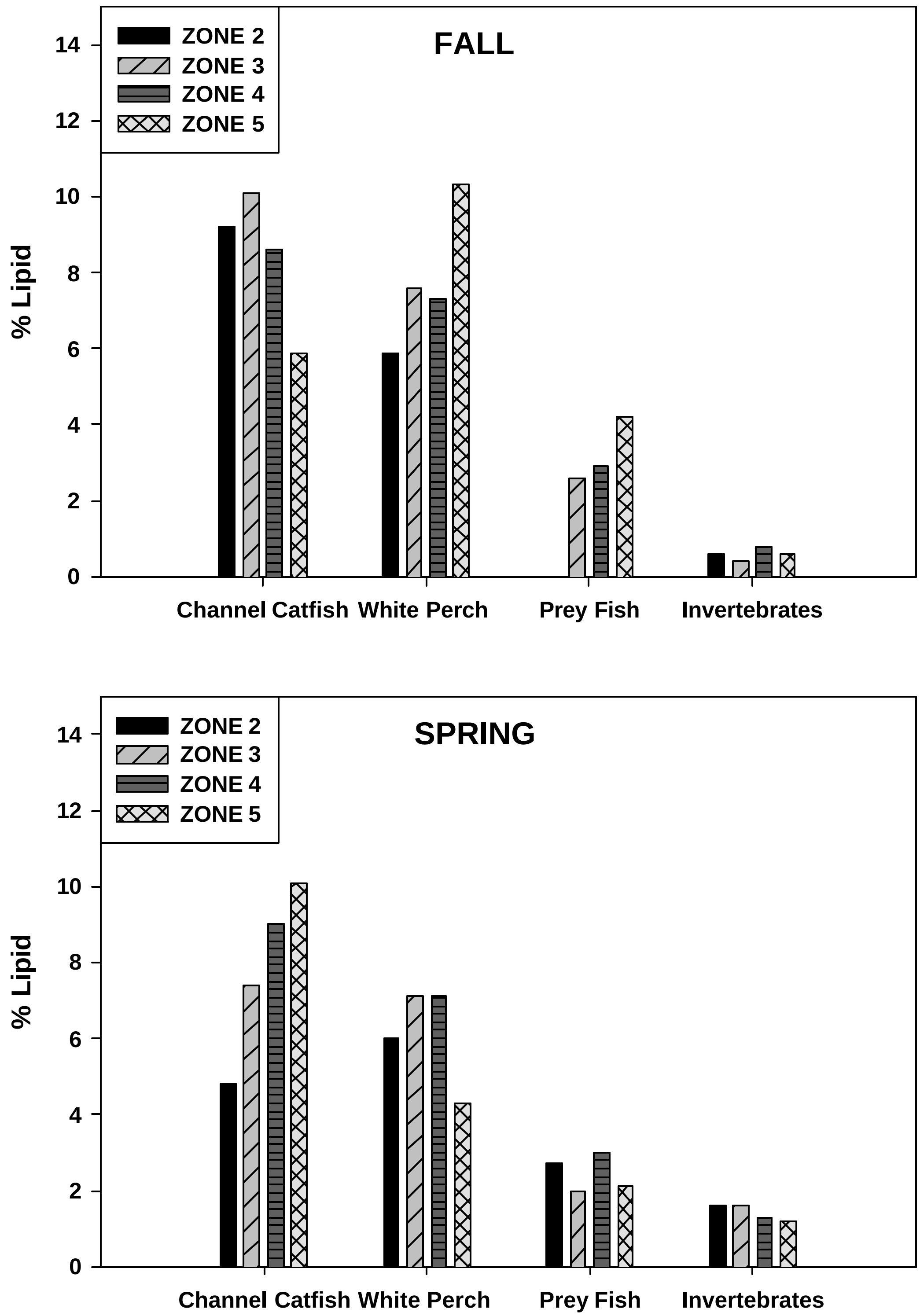
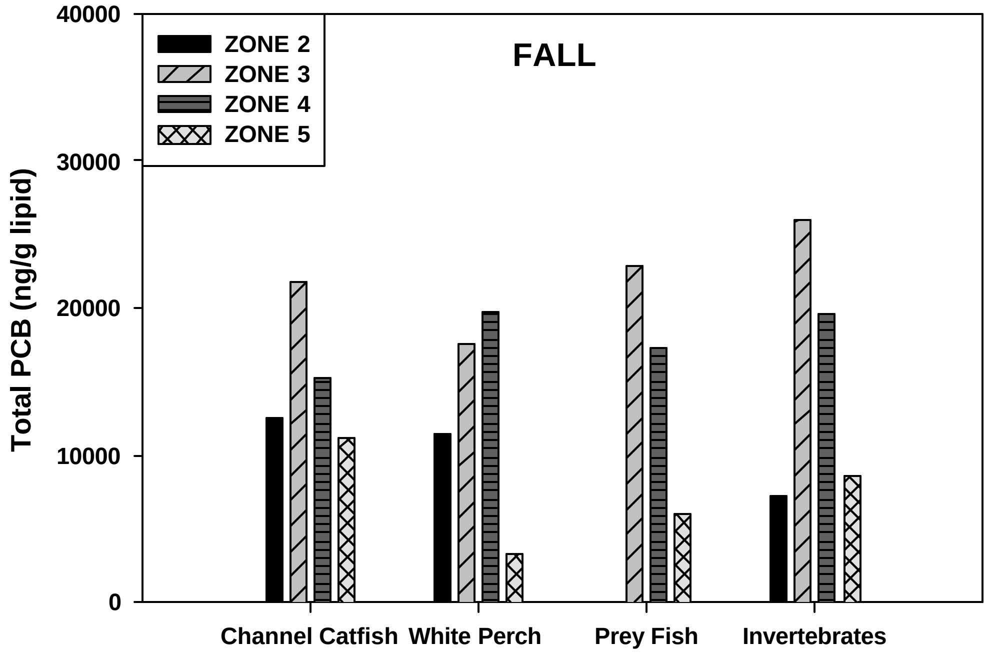


Figure 3.3. Percent lipid in biota collected from the Delaware River estuary in Fall 2001 and Spring 2002.



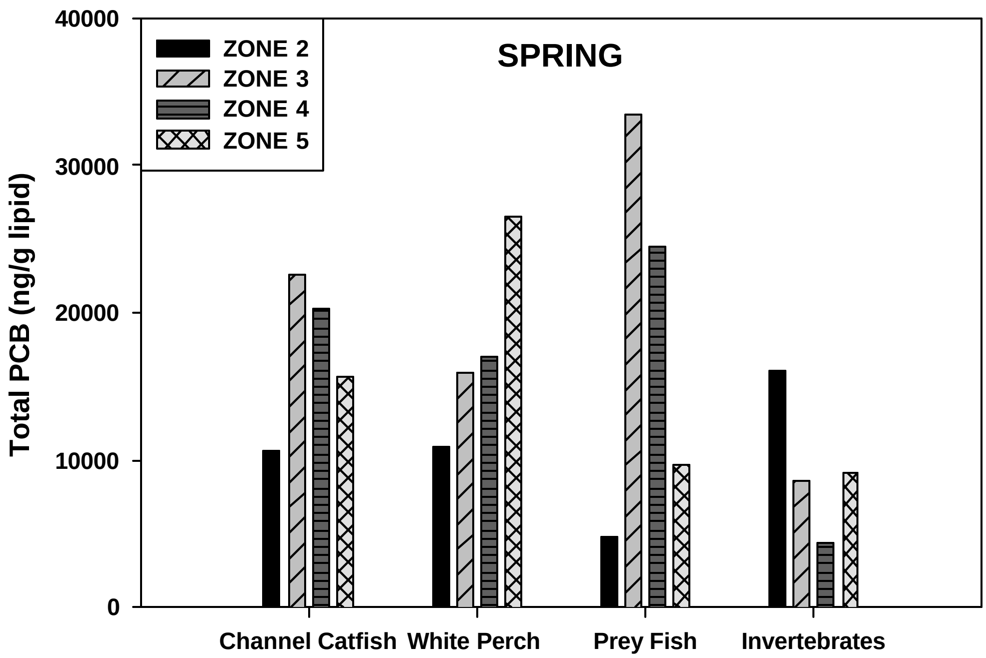


Figure 3.4. Total PCB concentrations (ng/g lipid) in biota collected from the Delaware River estuary in Fall 2001 and Spring 2002.

seasonal habitat change alters exposure to contaminants. Peak spawning occurs in late March to April (Jackson and Sullivan 1995), during the time of our spring sampling events. Changes in whole body lipid content from 10% in the fall to 4% in the spring influence the lipid normalized total PCB content (Table 2.1). Previous studies have shown a loss of contaminants resulting from spawning and coincident lowered lipid content (Larsson et al. 1993).

Although lipid content in amphipods is similar among zones for each season (Figure 3.3), amphipods undergo seasonal lipid fluctuation with an increase in average lipid content among zones from 0.6% in fall to 1.5% in the spring. *Gammarus* sp were the dominant epi-benthic invertebrates collected during this study. *Gammarus* sp. are epi-faunal organisms defined as deposit or scavenger feeders with reproduction occurring from spring to fall (DeWitt et al. 1992). The reproductive life cycle of *Gammarus lacustris* greatly affects lipid dynamics in females with a 10% drop in lipid levels with release of young (Wilhelm 2002).

PCB Congener Patterns:

PCB congener composition varies spatially in both sediment and biota with the more heavily chlorinated homologue fraction increasing downriver. Enrichment of octa-, nona-, and deca-chlorinated biphenyl groups is seen throughout all sediment and biota samples in zones 4 and 5 (Figures 3.5-3.9). The presence of heavier chlorinated congeners was observed for both seasons, indicating little temporal variability in congener distribution. A high concentration of the nona-chlorinated biphenyl group may be seen in fall sediment sample collected from zone 5, as well as a high concentration of the octa-chlorinated biphenyl group in the spring sediment sample from zone 4

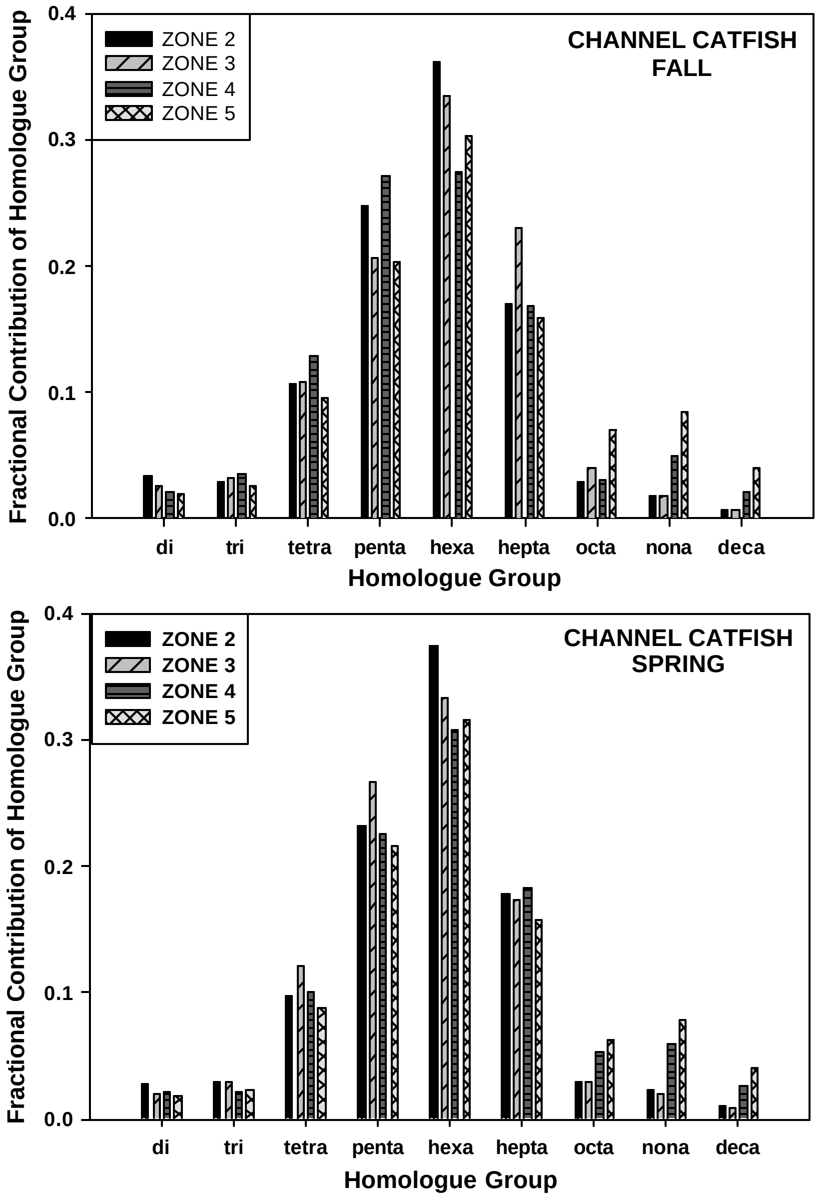


Figure 3.5. Fractional contribution of PCB homologue groups in channel catfish collected from the Delaware River estuary in Fall 2001 and Spring 2002.

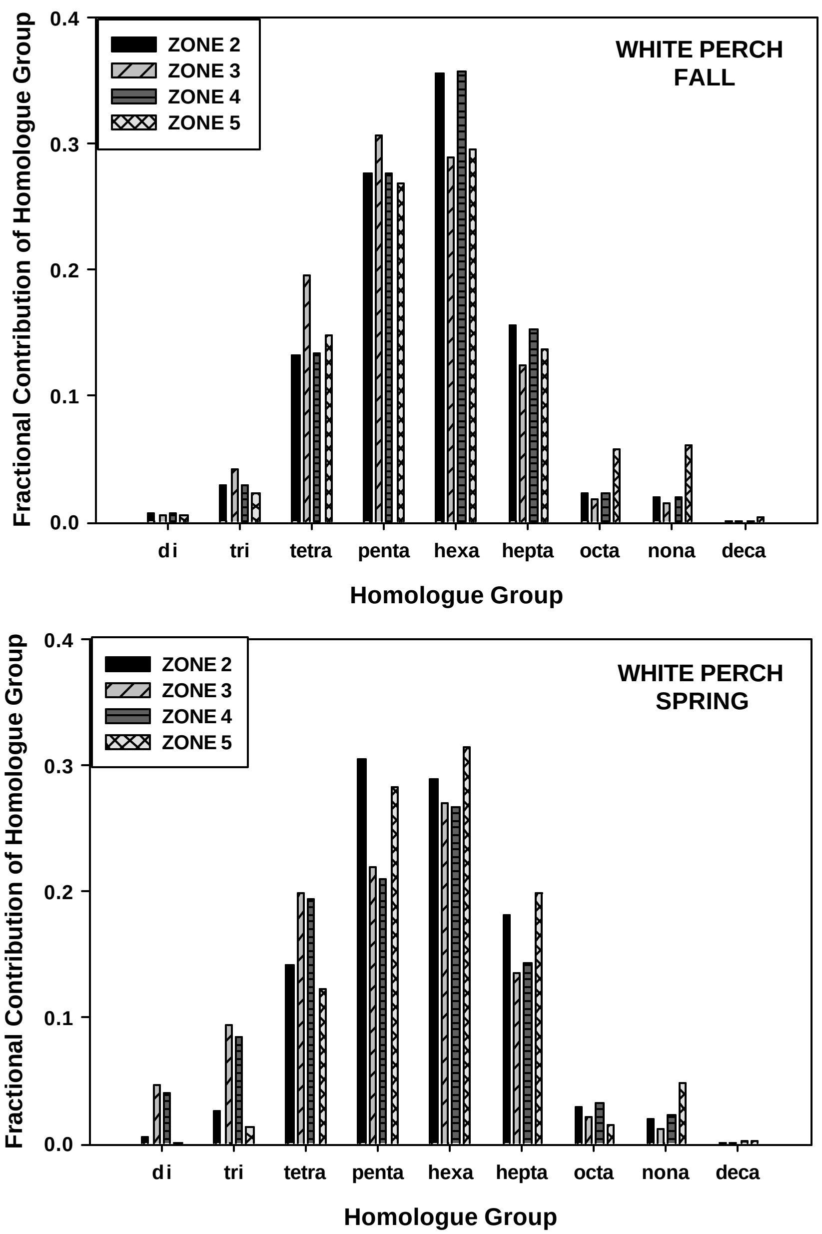


Figure 3.6. Fractional contribution of PCB homologue groups in white perch collected from the Delaware River estuary in Fall 2001 and Spring 2002.

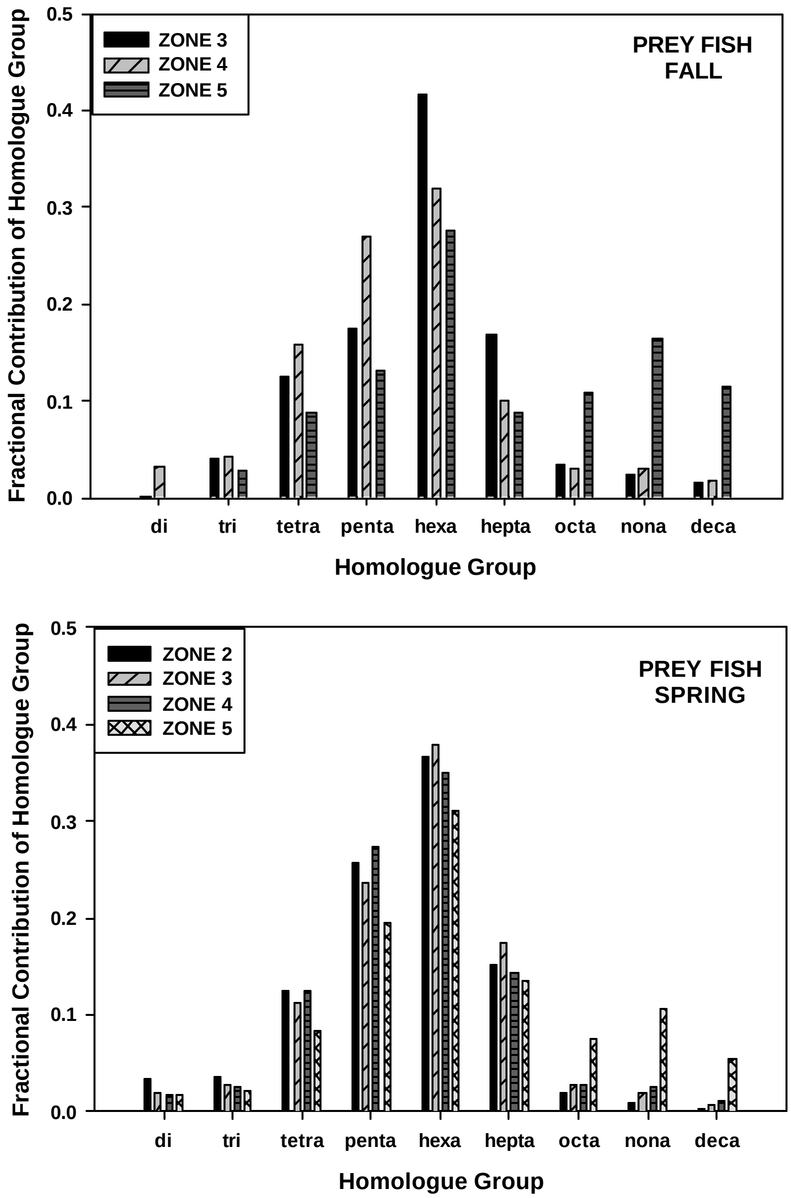


Figure 3.7. Fractional contribution of PCB homologue groups in prey fish collected from the Delaware River estuary in Fall 2001 and Spring 2002. (No sample available for Fall Zone 2)

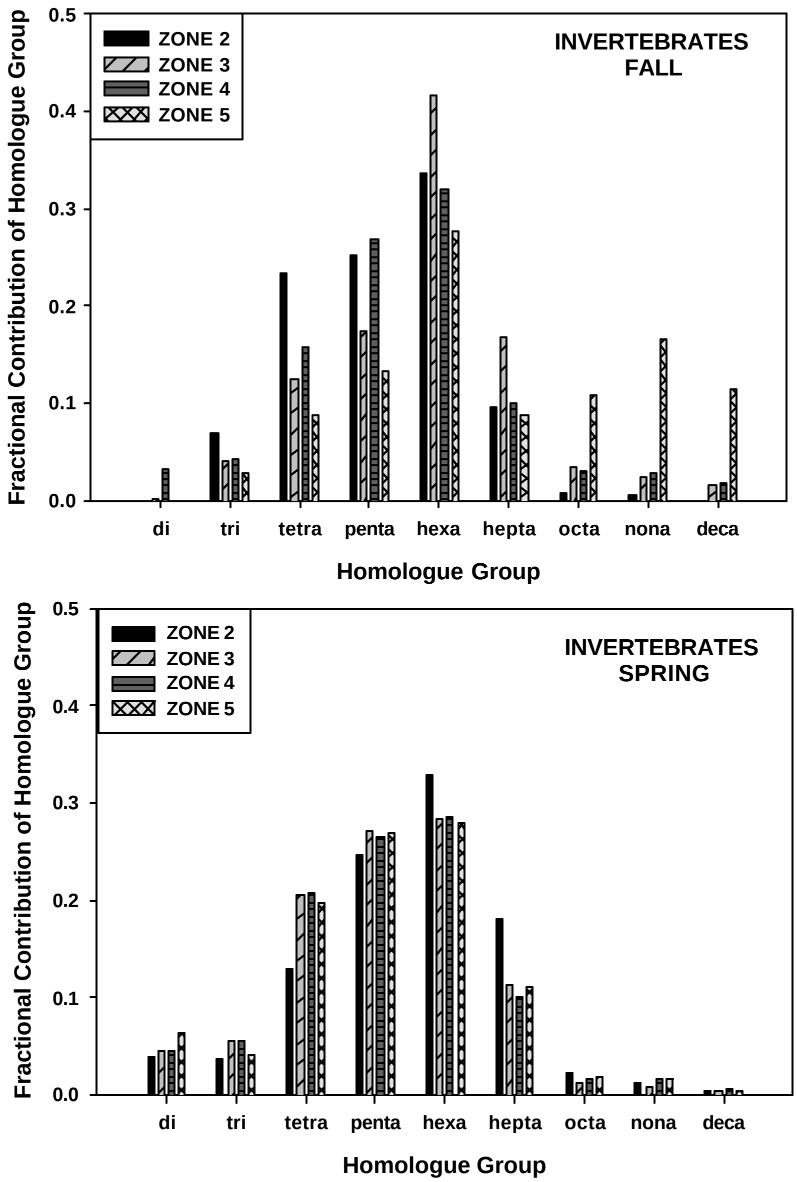


Figure 3.8. Fractional contribution of PCB homologue groups in invertebrates collected from the Delaware River estuary in Fall 2001 and Spring 2002.

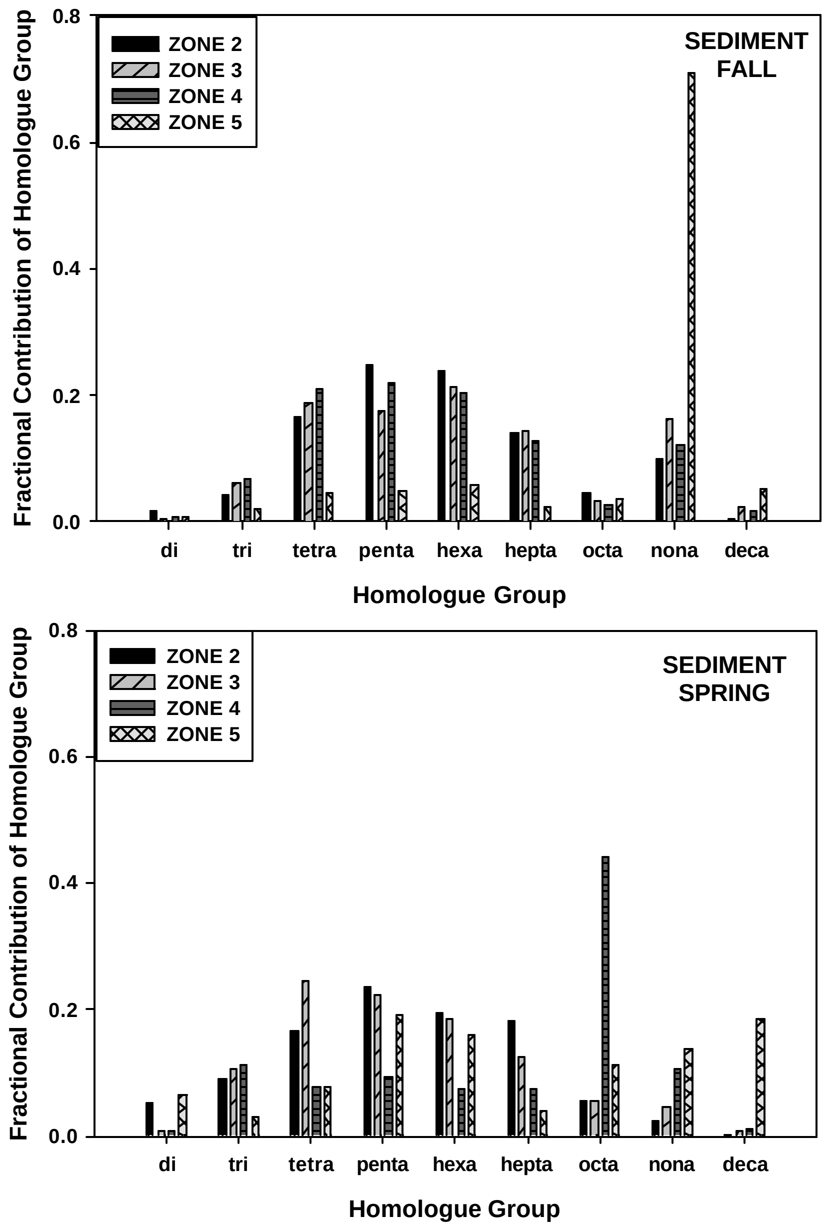


Figure 3.9. Fractional contribution of PCB homologue groups in sediment collected from the Delaware River estuary in Fall 2001 and Spring 2002.

(Figure 3.9). This increase in specific PCB congeners may be a factor of spatial heterogeneity of PCB contaminants in the river, influenced by a point source of contamination in the river.

Original commercial Aroclor mixtures, produced by the Monsanto Corporation, St. Louis, MO, have an extremely small contributions of nona and deca-chlorobiphenyl congeners (Anderson 1991; Frame et al. 1996). This pattern is not consistent with profiles in the Delaware River. In systems dominated by Aroclor 1268 contamination, the congener composition is predominately octa-chlorobiphenyls followed by hexa-, hepta-, and nona-chlorinated biphenyl groups. (Kannan et al. 1997; Maruya and Lee 1998). The high concentration of deca-chlorobiphenyl in the lower Delaware River estuary indicates a potential source of highly chlorinated biphenyls.

PCA Analysis: To explore PCB congener patterns among biota, principal component analysis (PCA) was performed. PCA effectively separates white perch from channel catfish, prey fish, and invertebrates (Figure 3.10). Congeners 66+95, 110+77, 193, and 163+138 drive PC 1 that accounts for 37% of variability. PC 2 accounts for 15% of variability and is driven by 82+151 and 56,60/92,84. White perch clearly separate out from channel catfish and respective prey items. Using eigenvalues from PC 2 for ANOVA ($P<0.05$) to look at species comparisons based on PCB congener pattern, all species patterns differ significantly except for those of white perch and invertebrates. This may be attributed to the fact the white perch's diet is mainly comprised of invertebrates. PC 1 shows a significant zone effect, with zone 5 differing significantly from all other zones. To further investigate zonal differences, a of white perch samples, a separation by zone is more easily discernable. PC 1 is separate principal component

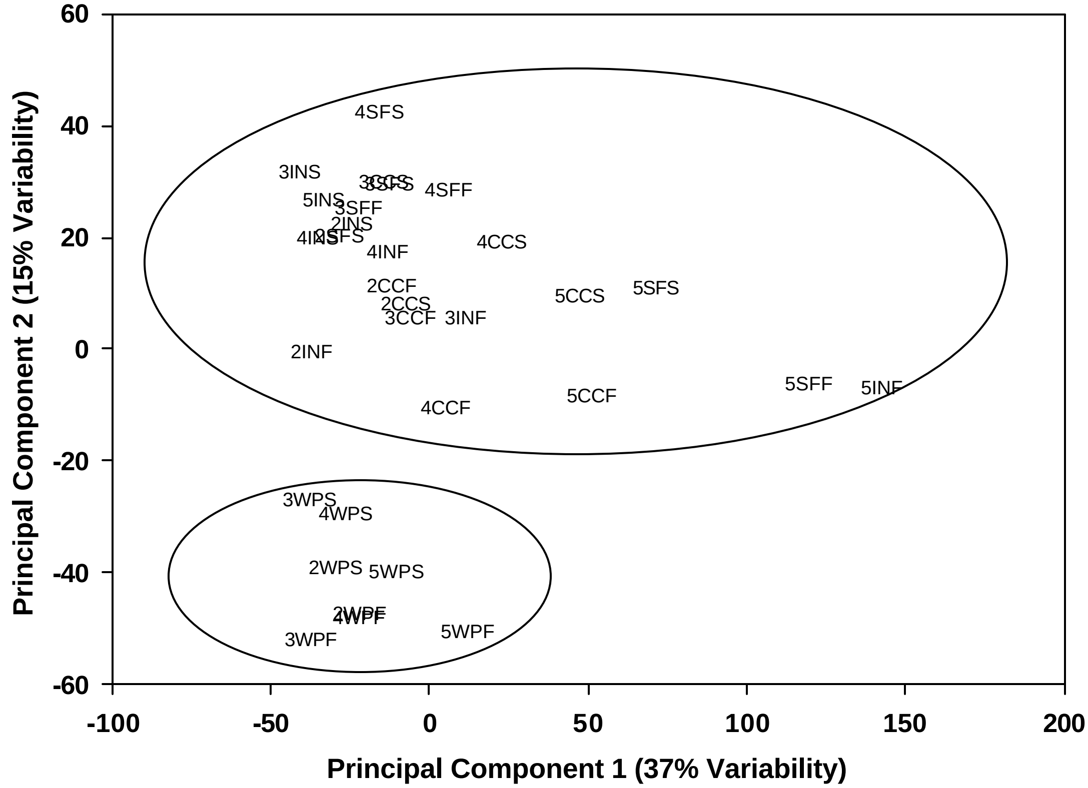


Figure 3.10. Principal Component Analysis results from biota collected from the Delaware River estuary, [Number indicates Zone, CC=channel catfish (*Ictalurus punctatus*);WP=white perch (*Morone americana*); PF=prey fish; IN=invertebrates; F indicates fall collection; S indicates spring collection].

analysis was performed excluding white perch congener profiles (Figure 3.11). With the removal the driving factor accounting for 47% of variability with 66+95, 89, 193, and 110+77 as dominant congeners. This indicates congener patterns vary spatially rather than by species. With the removal of white perch, the remaining groups are in close proximity to a common benthic environment for extended periods of time and these localized PCB concentrations affect contaminant burdens and congener patterns.

Congener tracers: Elevated levels of deca-chlorinated biphenyl congeners are observed in all biota samples (Figure 3.12), but the magnitude of accumulation varies among species. For that reason, congener 209 may act as a unique indicator of transfer and accumulation in the lower Delaware River estuary. Habitat exposure and ingestion of contaminated prey may affect a predator's contaminant congener pattern (Lake et al. 1995). Channel catfish and white perch are demersal predators with differing feeding and migration patterns. As benthic omnivores, channel catfish have closer contact with localized contaminated sediments whereas white perch migrate throughout the estuary (Dove and Nyman 1995). DiPinto and Coull (1997) found that bottom feeding fish, which were closely coupled with sediment, displayed increased accumulation of PCBs. The bioturbation and ingestion of sediment by the channel catfish could lead to a higher proportion of hydrophobic PCBs. Figure 3.13 shows the percent contribution of PCB 209, which increases downstream for channel catfish while it remains relatively consistent throughout the zones for white perch. The high octanol/water partition coefficient [log K_{ow}] >8.18-9.60 for congener 209 (Woodburn et al. 1984; Hawker and Connell 1988) indicates close association with sediments as highly chlorinated biphenyls are extremely hydrophobic and have greater adsorption to particles. Previous studies

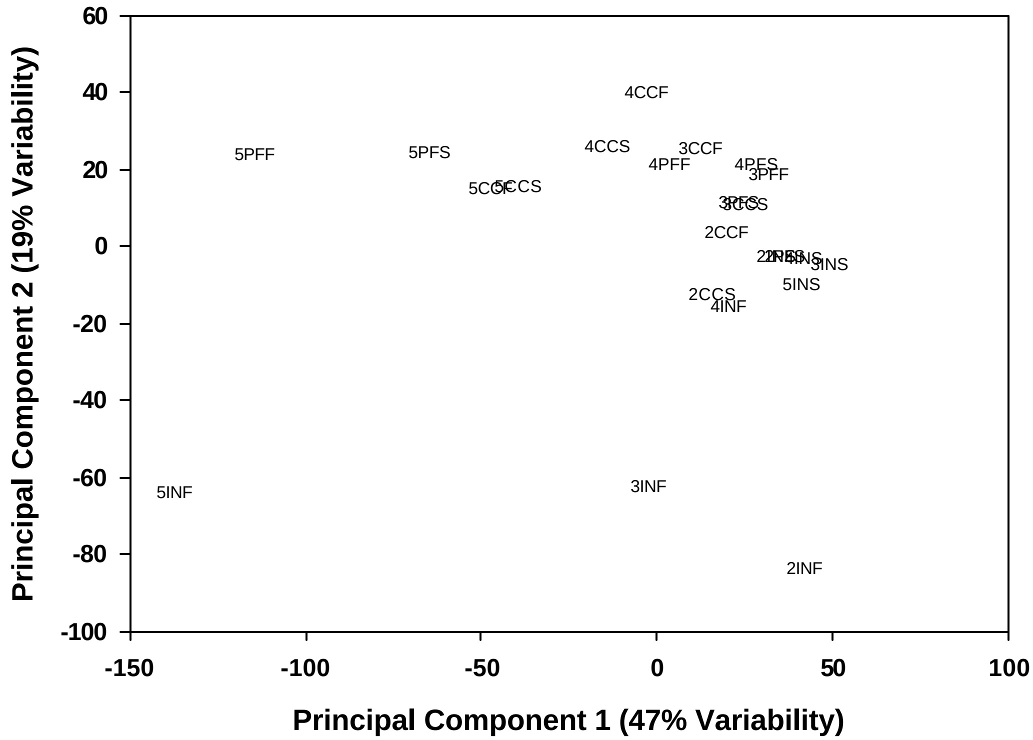


Figure 3.11. Principal Component Analysis results from biota collected from the Delaware River estuary excluding white perch. [Number indicates Zone, CC=channel catfish (*Ictalurus punctatus*); PF=prey fish; IN=invertebrates; F indicates fall collection; S indicates spring collection].

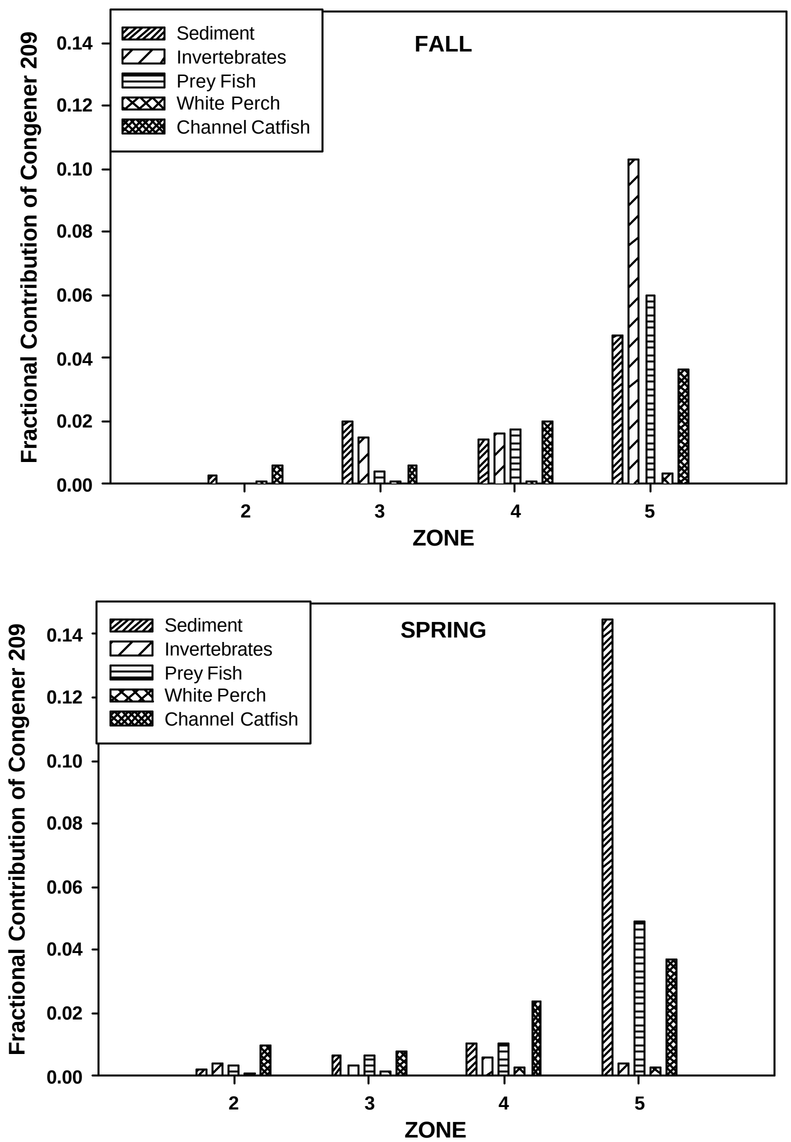


Figure 3.12. Comparison of fractional contribution of congener 209 in biota collected from the Delaware River estuary in Fall 2001 and Spring 2002.

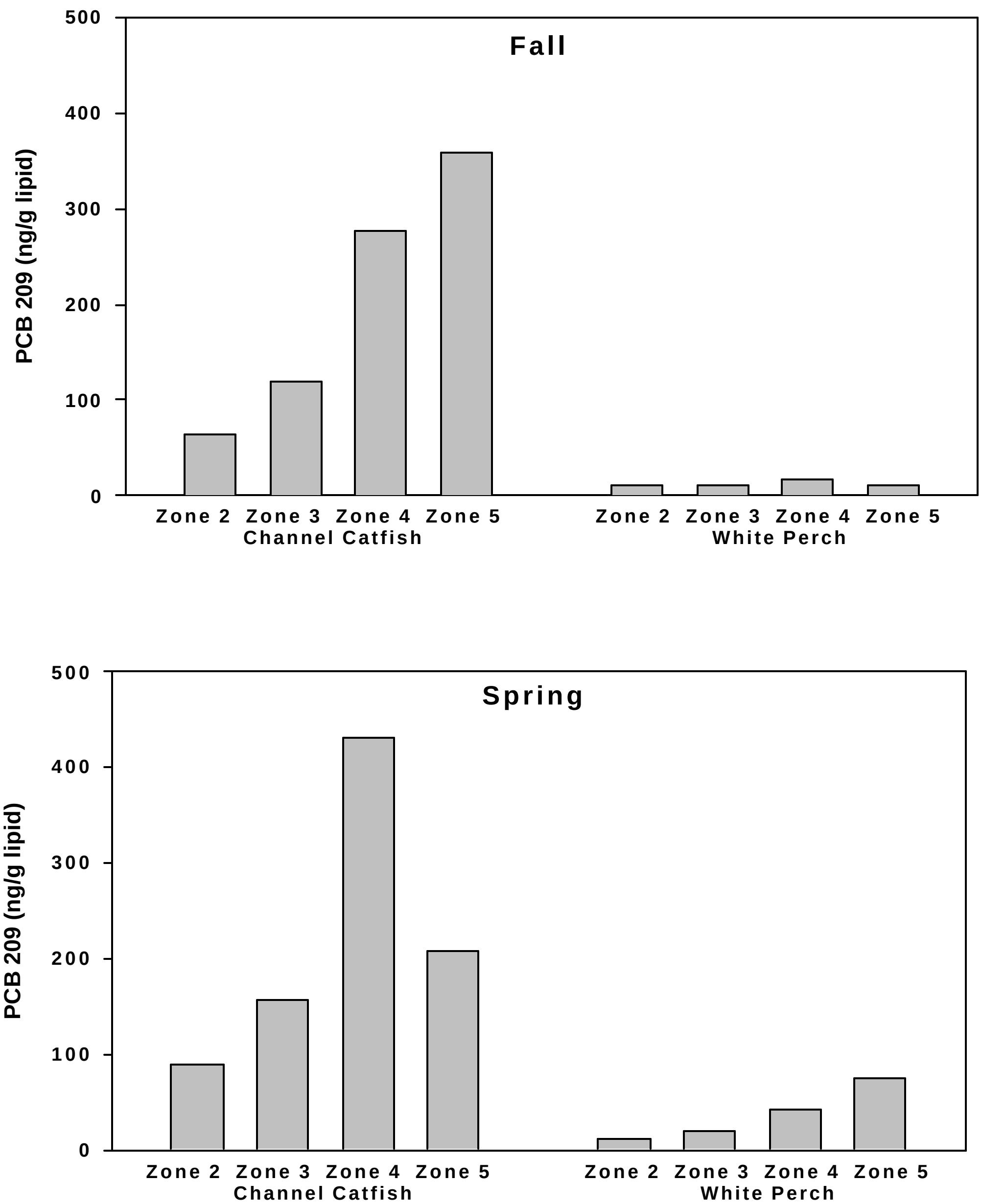


Figure 3.13. Comparison of congener 209 in channel catfish (*Ictalurus punctatus*) and white perch (*Morone americana*) collected from the Delaware River estuary in Fall 2001 and Spring 2002.

have shown lower assimilation efficiency of highly chlorinated, hydrophobic PCBs through the food web (Gobas et al. 1988; Fisk et al. 1998). Maruya and Lee (1998) reported a negative linear relationship between biota sediment accumulation factor (BSAF) and log K_{ow} for extremely hydrophobic PCBs.

Life histories and feeding patterns for channel catfish and white perch dictate magnitude of accumulation as well as congener pattern of PCB contaminants. The congener profiles of sediment and biota point to increased exposure of highly chlorinated biphenyls due to enrichment of octa-, nona-, and deca-chlorinated biphenyl groups in the lower Delaware River.

Conclusions

PCB concentrations vary spatially in the Delaware River estuary, with increased contaminant levels downstream of Philadelphia, PA and Camden, NJ. This industrialized portion of the estuary has had continued high contaminant loadings as previously detailed by the Delaware River Basin Commission (1998). One report on PCB loadings from tributaries and point sources discharge cited wastewater treatment plants and combined sewer overflows as significant sources. The Commission recommended conducting monitoring at municipal and industrial point sources at both dry and wet weather periods (1998). PCBs pose a current threat to the ecosystem from improperly disposed electrical equipment, as well as discharge from public works and industrial facilities. Current efforts to model PCB fate and transport within the estuary focus on processes of external loading, internal transport and transfer within food webs.

In addition to the spatial variability of PCB concentration, congener patterns showed increased presence of highly chlorinated congeners, specifically nona- and deca-polychlorinated biphenyls in Zone 4 and 5 for all sediment and biota samples. This trend indicates the presence of a non-Aroclor source of PCB contamination to the Delaware River.

While elevated levels of extremely hydrophobic biphenyls are seen throughout the food web, contrasting life history and migratory patterns result in varying accumulation of PCB congeners. Organisms closely associated with contaminated sediment have greater accumulation of hydrophobic PCB congeners than do migratory species such as white perch. These distinctions should be addressed when modeling the transfer of contaminants in an estuarine system such as the Delaware River.

Chapter Four

MECHANISMS OF BIOACCUMULATION AND TROPHIC TRANSFER OF POLYCHLORINATED BIPHENYL CONGENERS

Introduction

Although banned in the 1970's, polychlorinated biphenyls (PCBs) persist in aquatic ecosystems, causing concern for human and environmental health. The Environmental Protection Agency (EPA) has placed various advisories on the consumption of fish based on their accumulation of these hydrophobic organic contaminants (HOCs). To address ecological and human health risks, PCB concentrations must be accurately described and models developed to quantify PCB transfer from abiotic to biotic components.

Modeling the movement of hydrophobic organic contaminants such as PCBs through an estuary requires extensive information on the physical, chemical and biological parameters of the estuary. Bioconcentration factors (BCFs), biota-sediment accumulation factors (BSAFs), and trophic transfer factors (TTFs) are often used to quantify bioaccumulation to set criteria for health advisories (Thomann 1989; Maruya and Lee 1998; Mackay and Fraser 2000). Chemical exchange across abiotic-biotic interfaces is governed by several parameters, such as the octanol-water partition coefficient (K_{ow}), chemical bioavailability, and toxicokinetics. (Hawker and Connell 1988; Thomann 1989; Thomann et al. 1992; Mackay and Fraser 2000; van der Oost et al. 2003). Intra and inter-biotic contaminant transfers involving efficiency of uptake, elimination, and metabolism also vary as a function of physiochemical properties (Gobas et al. 1988; Sijm et al. 1992). Parameters such as K_{ow} are used to determine the movement of PCBs in food webs. In the Delaware River estuary, modeling PCB dynamics using a simplified food web should utilize top predators such as white perch (*Morone americana*) and channel catfish (*Ictalurus punctatus*), their respective prey items of fish and invertebrates, as well as sediment and water. By modeling contaminants, we may accurately represent PCB concentrations in the estuary, which enhances predictive capabilities and further supports regulatory efforts.

Currently three states bordering the Delaware River estuary have issued fish consumption advisories due to elevated PCB levels. Regulating contaminants in higher trophic levels to protect human and wildlife health by setting criteria based on water and sediment contamination levels requires that the relationships between PCB levels in the abiotic and biotic compartments be known. As part of the Clean Water Act, Section 303(d), the Environmental Protection Agency (EPA) requires states to establish Total Maximum Daily Loads (TMDLs), which provide the basis for states to set water quality-based controls in order to meet acceptable water quality standards. Lacking site-specific data, water quality criteria are set using national averages of water and biota information. To improve this assessment and focus in on the area of concern, site-specific values for the Delaware River estuary may be applied to water and sediment quality criteria. In doing so, we may explore the feasibility of applying water and sediment quality criteria values to an estuarine system with great temporal, spatial, and chemical variability.

An urbanized waterway with varying contaminant concentrations, the Delaware River estuary serves as a model to explore partitioning of PCBs from abiotic to biotic compartments. Using PCB values in water, sediment and biota, we investigated the transfer of contaminants over spatial and chemical concentration gradients. In doing so, we may:

(1) Evaluate relationships among abiotic and biotic compartments used in modeling PCB accumulation

(2) Compare PCB contaminant levels in fish measured in the Delaware to those predicted by the EPA national guidelines.

Results and Discussion

BCFs

Individual congener BCFs (bioconcentration factors) were calculated using the ratio of PCB content in tissue normalized to lipid, C_B, to the dissolved PCB concentration in the water, C_{WT}. The units for biota samples of mg/kg lipid divided by mg/L in water samples gives the BCF units of L/kg (Mackay and Fraser 2000).

$$BCF = C_B/C_{WD} \qquad (1)$$

The BCF for total PCBs is calculated using the congeners common to the fish tissue and water analysis.

$$\text{Total BCF} = \sum (\text{congener specific } C_B) / \sum (\text{congener specific } C_{WD}) \qquad (2)$$

Bioconcentration factors increased with K_{ow} for all biota samples (Figures 4.1-4.4). The average log BCF for total PCBs was similar throughout the estuary for all biota groups (Table 4.1).

Using filtrate PCB concentrations presents a source of bias as actual dissolved concentrations may be overestimated due to the contribution of non-filterable colloids in total dissolved PCB values, thereby underestimating the bioconcentration factor (Baker and Eisenreich 1990). The contribution of the colloidal fraction to total dissolved PCBs was calculated using:

$C_d/C_t = 1/1+((K_{ow} *DOC)/10^6)$ (3)

where DOC is the dissolved organic carbon concentration (kg carbon/ L water) in the Delaware River. The truly dissolved phase is on average ~18% of the filtrate concentration, resulting in a BCF underestimation. Most BCF calculations in the literature do not correct for the colloid fraction contribution, and for that reason BCF values presented in this paper are based on filtrate PCB concentrations.

With increasing hydrophobicity contaminants may adsorb more strongly to particulate matter. Therefore chemicals with large octanol-water partitioning coefficients will not be as readily bioavailable (Mackay and Fraser 2000). Regression analysis showed a positive relationship between bioconcentration and K_{ow} for all biota groups (Figures 4.1-4.4), for channel catfish, white perch, prey fish, and invertebrates ($P>0.001$).

Although bioconcentration factors vary based on K_{ow}, the average log BCF value for biota throughout the study area remains relatively constant, indicating it is possible to apply a universal log BCF value of 7 to the Delaware system.

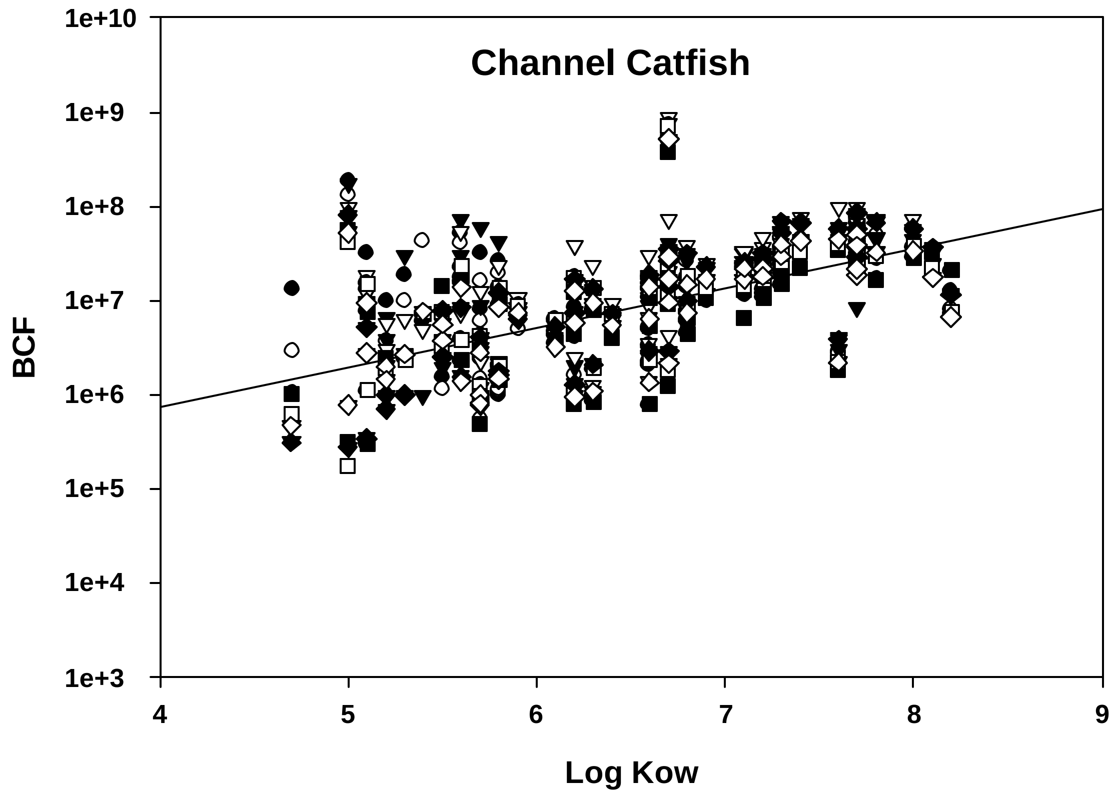


Figure 4.1. Bioconcentration factors (BCF) vs. log K_{ow} for individual PCB congeners in channel catfish collected from the Delaware River estuary, USA in Fall 2001 and Spring 2002. Regression analysis of BCF values vs. log K_{ow} values gave a linear regression of log BCF = 0.34*log K_{ow} + 4.81 (R = 0.49, P<0.0001). ●=Zone 2, ○=Zone 3, ▼=Zone 4, ▽=Zone 5.

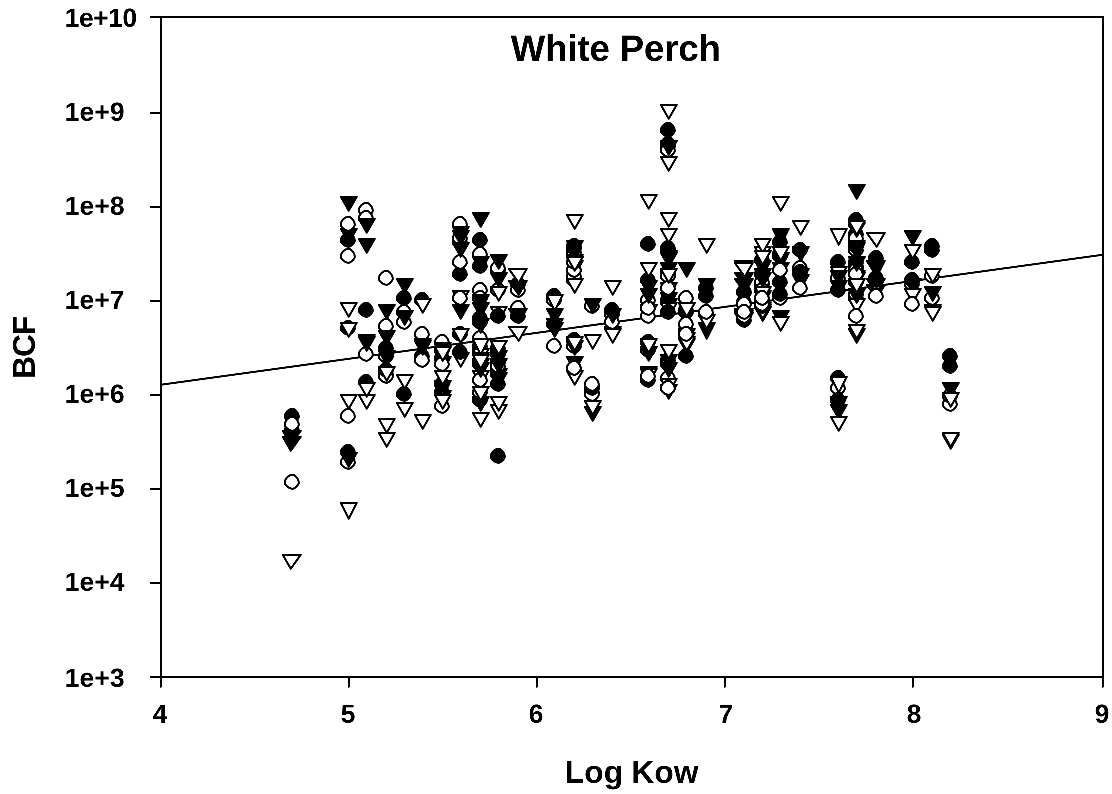


Figure 4.2. Bioconcentration factors (BCF) vs. log K_{ow} for individual PCB congeners in white perch collected from the Delaware River estuary, USA in Fall 2001 and Spring 2002. Regression analysis of BCF values vs. log K_{ow} values gave a linear regression of log BCF = 0.25*log K_{ow} + 5.24 (R = 0.35, P<0.0001). ●=Zone 2, ○=Zone 3, ▼=Zone 4, ▽=Zone 5.

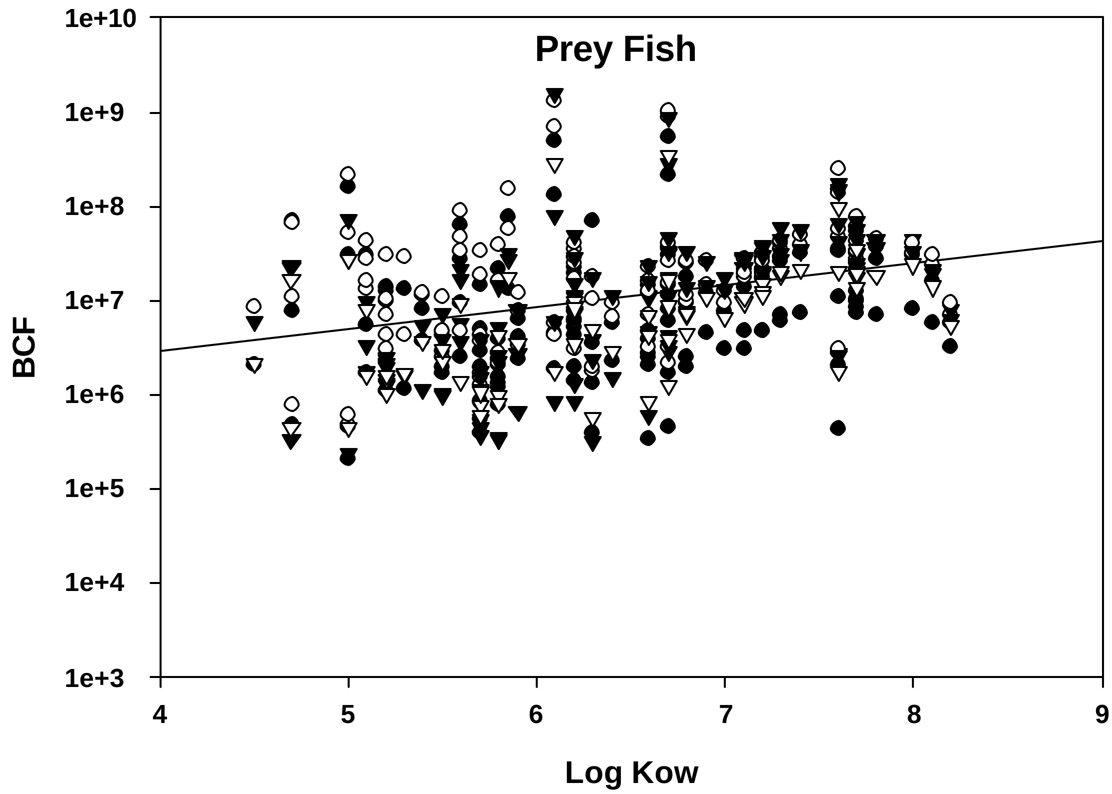


Figure 4.3. Bioconcentration factors (BCF) vs. log K_{ow} for individual PCB congeners in prey fish collected from the Delaware River estuary, USA in Fall 2001 and Spring 2002. Regression analysis of BCF values vs. log K_{ow} values gave a PCB linear regression of log BCF = 0.31*log K_{ow} + 4.88 (R = 0.44, P<0.0001). ●=Zone 2, ○=Zone 3, ▼=Zone 4, ▽=Zone 5.

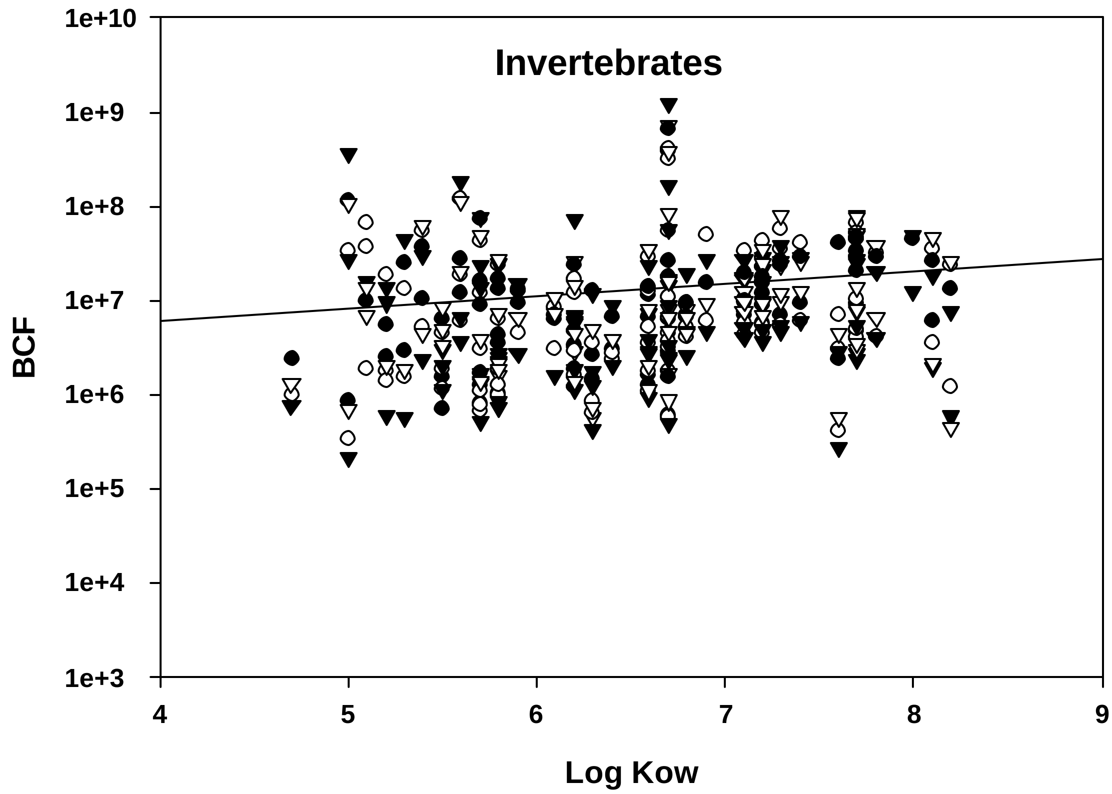


Figure 4.4. Bioconcentration factors (BCF) vs. log K_{ow} for individual PCB congeners in invertebrates collected from the Delaware River estuary, USA in Fall 2001 and Spring 2002. Regression analysis of BCF values vs. log K_{ow} values a PCB linear regression of log BCF = 0.14*log K_{ow} + 5.92 (R = 0.20, P=0.0001). ●=Zone 2, ○=Zone 3, ▼=Zone 4, ▽=Zone 5.

Organism		Total BCF	Total Log BCF	Average Log BCF±SD	Total BSAF	Average BSAF±SD
Channel Catfish						
Fall	Zone 2	10,700,000	7.0	7.0 ± 0.1	6.5	6.3 ± 3.1
	Zone 3	9,900,000	7.0		5.6	
	Zone 4	12,000,000	7.1		9.2	
	Zone 5	17,000,000	7.2		2.1	
Spring	Zone 2	8,500,000	6.9		10.0	
	Zone 3	10,900,000	7.0		5.2	
	Zone 4	11,900,000	7.1		2.2	
	Zone 5	9,800,000	7.0		9.4	
White Perch						
Fall	Zone 2	10,300,000	6.9	7.0 ± 0.2	6.2	6.1 ± 5.0
	Zone 3	8,200,000	6.8		4.6	
	Zone 4	6,700,000	6.7		5.2	
	Zone 5	5,000,000	6.9		0.6	
Spring	Zone 2	8,700,000	6.9		10.4	
	Zone 3	7,700,000	7.0		3.7	
	Zone 4	10,200,000	7.2		1.9	
	Zone 5	17,000,000	7.2		16.2	
Prey Fish						
Fall	Zone 2	NS		7.0 ± 0.2	NS	5.3 ± 3.0
	Zone 3	10,200,000	7.0		5.8	
	Zone 4	12,700,000	7.1		9.8	
	Zone 5	7,500,000	6.9		0.9	
Spring	Zone 2	3,700,000	6.6		4.4	
	Zone 3	16,000,000	7.2		7.6	
	Zone 4	14,200,000	7.2		2.7	
	Zone 5	6,000,000	6.8		5.7	
Invertebrates						
Fall	Zone 2	6,200,000	6.8	6.9 ± 0.3	3.7	5.8 ± 5.1
	Zone 3	12,200,000	7.1		6.9	
	Zone 4	15,200,000	7.2		11.7	
	Zone 5	13,000,000	7.1		1.6	
Spring	Zone 2	12,700,000	7.1		14.8	
	Zone 3	4,100,000	6.6		2.0	
	Zone 4	2,500,000	6.4		0.5	
	Zone 5	5,700,000	6.8		5.4	
NS = Not Sampled						

Table 4.1. Bioconcentration (BCF) factors and biota-sediment accumulation (BSAF) factors for total PCB concentrations in biota collected in the Delaware River estuary in Fall 2001 and Spring 2002. Average log BCFs and BSAFs are reported with standard deviations, SD.

BSAFs

Individual congener BSAFs (biota sediment accumulation factors) were calculated using the ratio of PCB content in tissue normalized to lipid, C_B, to the PCB concentration in sediment normalized to carbon, C_S, for biota samples.

$$BSAF= C_B/C_S \qquad (4)$$

BSAF values were calculated for zones and using biota samples compared with their respective sediment sites for both seasons. In order to evaluate the influence of hydrophobicity on bioaccumulation, BSAF values were plotted against log K_{ow} and both linear and quadratic regression analyses were performed for each group of biota, with all zones and seasons included (Figures 4.5-4.8). The parabolic function ($P<0.0001$ for channel catfish and white perch) better explained the relationship than the linear function, indicating that the bioavailability of chlorinated biphenyls to organisms initially increased and then decreased with increasing hydrophobicity. To address variation among trophic level, BSAF values based on total PCBs for all species are close to the mean of species-specific median BSAF values of 5.1 as shown in a box and whisker plot (Figure 4.9), exhibiting similarity in BSAFs between species with comparable habitats. Previous studies have shown that similarity in chemical exposure for benthic species may allow for the application of sediment quality criteria for habitat groups (Tracey and Hansen 1996).

The observed trends in biota BSAF factors are similar to previously reported declines in bioavailability with increasing K_{ow} (Shaw and Connell 1984; Tracey and Hansen 1996; Maruya and Lee 1998). PCBs with K_{ow}s >7 have been shown to have reduced bioavailability, possibly due to problems with membrane permeability or

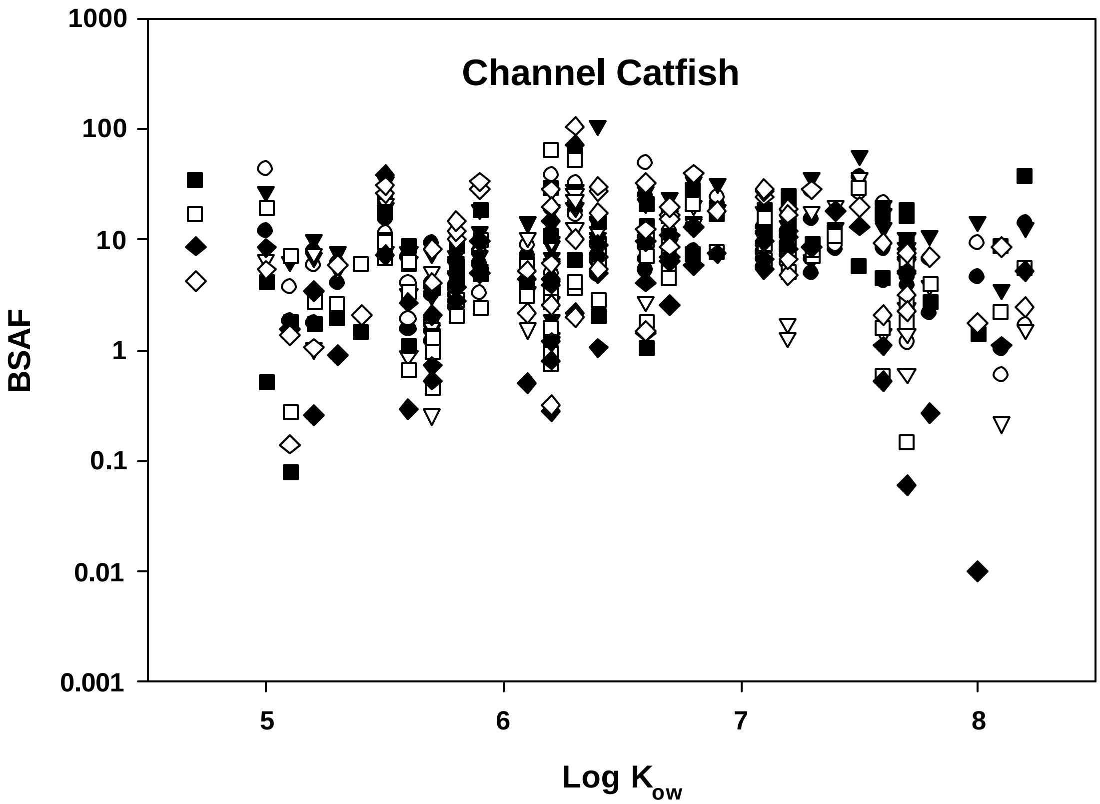


Figure 4.5. Biota-sediment accumulation factors (BSAFs) vs. log K_{ow} for individual PCB congeners in channel catfish collected from the Delaware River estuary, USA in Fall 2001 and Spring 2002. PCB linear regression: BSAF = 1.06*log K_{ow} + 3.23 (R = 0.08, P=0.08); PCB quadratic regression: BSAF = -2.83*log K_{ow}^2 + 37.98*log K_{ow} –115.22 (R = 0.20, P<0.0001). ●=Fall Zone 2, ○= Fall Zone 3, ▼= Fall Zone 4,▽= Fall Zone 5, ■=Spring Zone 2, □=Spring Zone 3,◆=Spring Zone 4, ◇=Spring Zone 5.

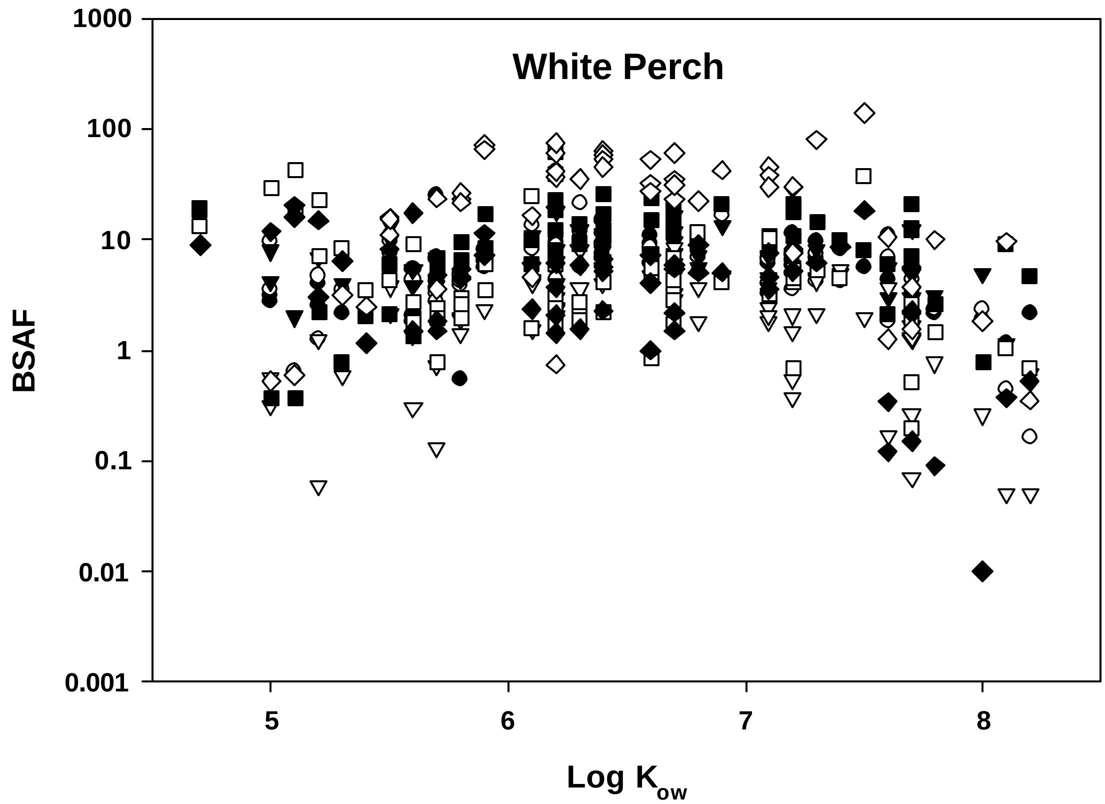


Figure 4.6. Biota-sediment accumulation factors (BSAFs) vs. log K_{ow} for individual PCB congeners in white perch collected from the Delaware River estuary, USA in Fall 2001 and Spring 2002. PCB linear regression: BSAF = -0.33*log K_{ow} + 10.75 (R = 0.02, P=0.62); PCB quadratic regression: BSAF = -3.35*log K_{ow}^2 + 43.37*log K_{ow} –-129.43 (R = 0.20, P<0.0001). ●=Fall Zone 2, ○= Fall Zone 3, ▼= Fall Zone 4, ▽= Fall Zone 5, ■=Spring Zone 2, □=Spring Zone 3, ◆=Spring Zone 4, ◇=Spring Zone 5.

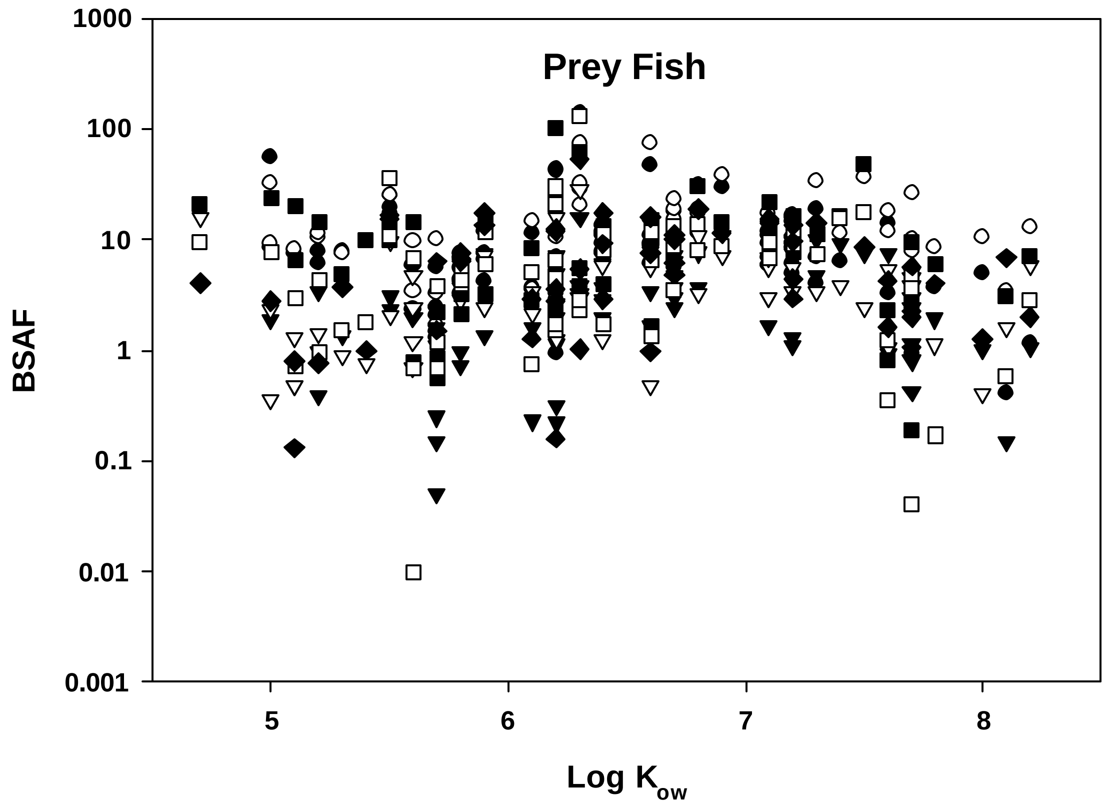


Figure 4.7. Biota-sediment accumulation factors (BSAFs) vs. log K_{ow} for individual PCB congeners in prey fish collected from the Delaware River estuary, USA in Fall 2001 and Spring 2002. PCB linear regression: BSAF = -0.17*log K_{ow} + 10.2 (R = 0.01, P=0.83); PCB quadratic regression: BSAF = -2.94*log K_{ow}^2 + 38.20*log K_{ow} –112.82 (R = 0.16, P=0.0021).●=Fall Zone 2, ○= Fall Zone 3, ▼= Fall Zone 4,▽= Fall Zone 5, ■=Spring Zone 2, □=Spring Zone 3,◆=Spring Zone 4, ◇=Spring Zone 5.

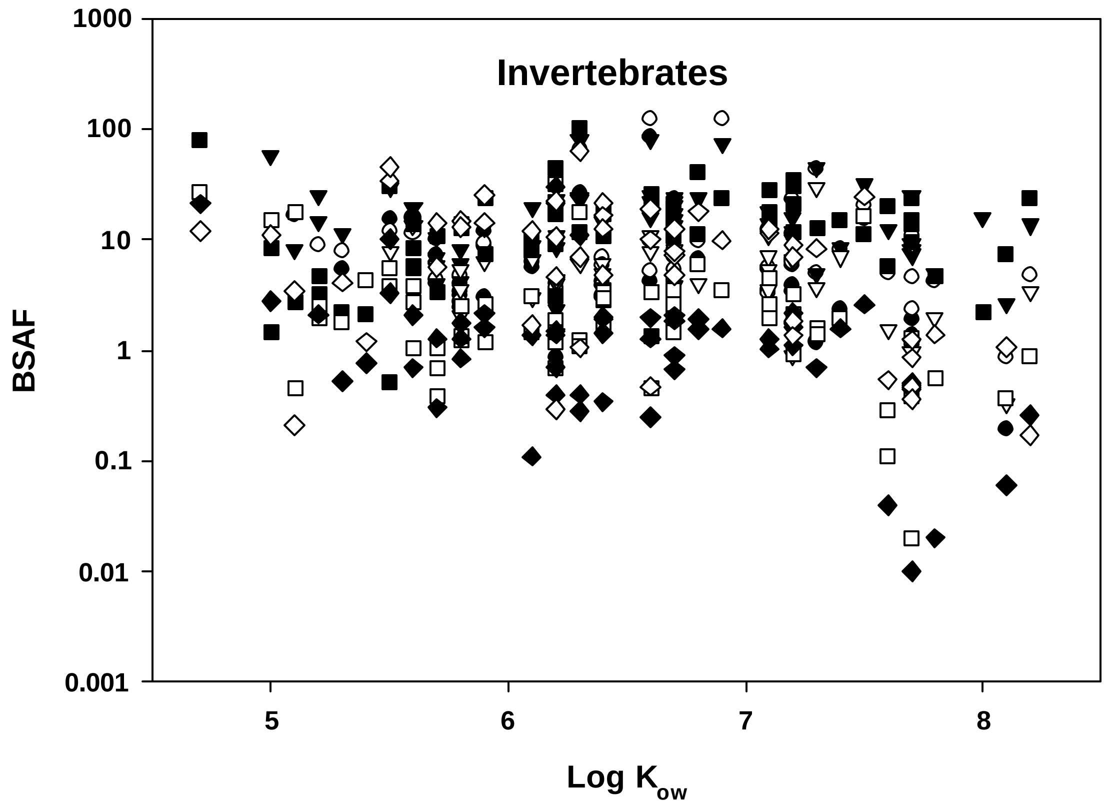


Figure 4.8. Biota-sediment accumulation factors (BSAFs) vs. log K_{ow} for individual PCB congeners in invertebrates collected from the Delaware River estuary, USA in Fall 2001 and Spring 2002. PCB linear regression: log BSAF = -0.51*log K_{ow} + 12.01 (R = 0.03, P=0.49); PCB quadratic regression: log BSAF = -2.36*log K_{ow}^2 + 30.32*log K_{ow} –86.94 (R = 0.13, P=0.013). ●=Fall Zone 2, ○= Fall Zone 3, ▼= Fall Zone 4,▽= Fall Zone 5, ■=Spring Zone 2, □=Spring Zone 3,◆=Spring Zone 4, ◇=Spring Zone 5.

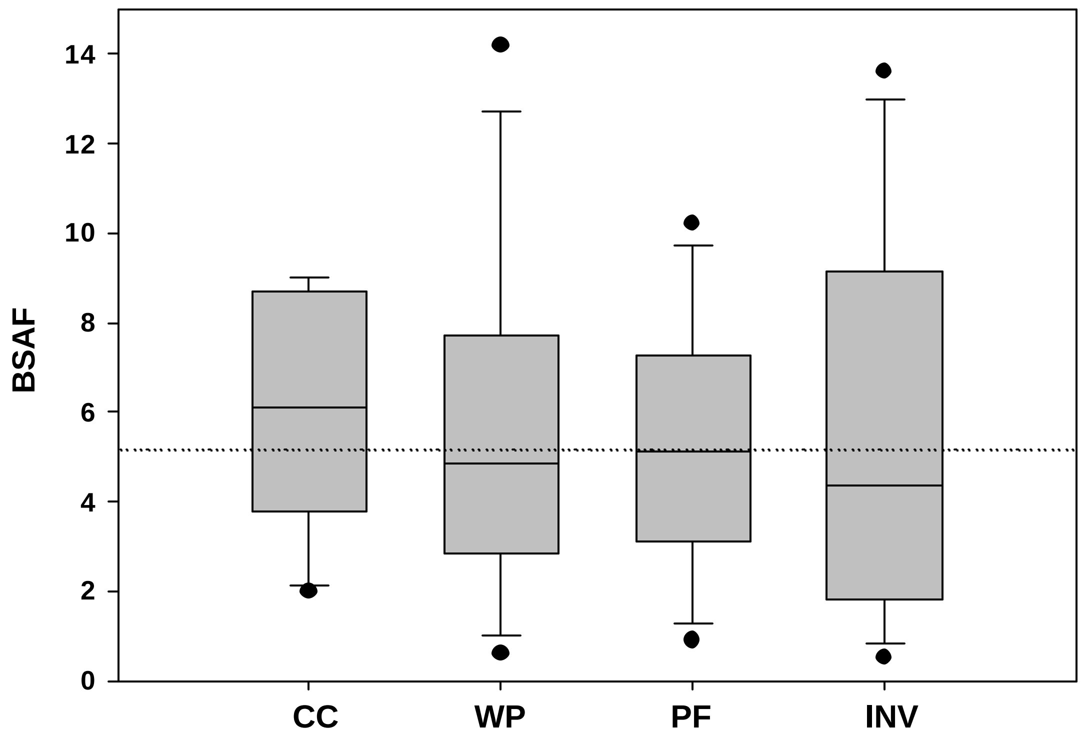


Figure 4.9. Total biota-sediment accumulation factors (BSAF) for channel catfish (CC), white perch (WP), prey fish (PF) and invertebrates (INV) collected from the Delaware River estuary in Fall 2001 and Spring 2002. The dotted line indicates the mean of species-specific median BSAF values.

assimilation efficiency (Gobas et al. 1988; Tracey and Hansen 1996; Kannan et al. 1997; Fisk et al. 1998).

Life history of an organism should be considered when grouping of species with similar habitats. Although both species are demersal predators, channel catfish and white perch exhibit a variation in accumulation of extremely hydrophobic PCB congeners present in the lower zones as seen in Chapter 3. This may be due to migratory patterns as white perch migrate throughout the estuary while channel catfish remain in a small home range and have increased contact with the hydrophobic congeners. This is an important consideration in systems with point sources and sharp pollutant chemical gradients. However, we found that these variations in congener patterns do not affect the BSAF values based on total PCBs of these benthic species.

Biota samples from urbanized estuaries have elevated concentrations of PCBs corresponding to the highly urbanized zone 3 as shown in chapter 3. BSAFs do not vary with PCB concentration levels (Table 4.1). Although BSAFs vary within the river, the average BSAF is similar for all species. The spatial heterogeneity of PCB levels in sediment from the river leads to concerns whether natural variability would adequately be addressed using these BSAF values.

Tracey and Hansen (1996) calculated BSAF values among habitat groups from field data with median BSAFs of 2.2 and 1.4 for the benthically-coupled species of channel catfish and white perch respectively, which are lower than the BSAF of 5.1 found in this study. BSAF values express exposure levels from sediment. The higher BSAF values obtained in this study, suggest that the organisms are more efficient at bioaccumulation of PCBs, exposure is originating from some other source than sediment, or that the sediment samples are not representative of the study area. The sediment sites were randomly selected throughout each of the four zones, with little sampling occurring in the flanks of the river, and may not adequately represent the spatial heterogeneity in the river. Organisms may not be feeding in the channels, but possibly closer to shorelines or in hot spots of contamination the river. Prey items such as small fish and macro invertebrates may be accumulating high levels of contaminants from tributaries, marsh areas, or flanks of the river then dispersing throughout the main steam of the river where they may be preyed upon. It is also possible that organisms are not accumulating a large proportion of contaminants from sediment, but from dissolved or particulate PCBs in the water column or ingestion of contaminated prey items as previously mentioned.

Predator/Prey Ratios

Also known as trophic transfer factors, predator/prey ratios (PPR) are the ratio of lipid normalized PCB content in the predator to lipid normalized PCB content in the prey and may be used to address magnification.

$$PPR= [PCB]_{predator}/[PCB]_{prey} \qquad (5)$$

Food web dynamics involve multiple dietary pathways with varying contributions, while simple predator/prey ratios address single species. Predator/prey ratios were calculated based on available prey items and knowledge of channel catfish and white perch diets. All organisms in this food web are benthic species; therefore they may not be directly comparable to previous work on the kinetics of PCB transport throughout food webs containing many trophic levels. As omnivorous feeders, the trophic position of channel catfish is difficult to characterize (VanderZanden and

Rasmussen 1996), as demonstrated by gut content analysis which included a variety of items such as algae and insects. White perch stomach contents were mainly comprised of the invertebrate *Gammarus duebeni* (Horwitz et al. 2002). The simple predator/prey ratio allows us to determine contaminant transfer on a congener level. The resulting ratios (Figures 4.10-4.12) show no distinct variation with K_{ow}. In addition, no consistent pattern by season or zone was observed on a congener specific level.

The predator/prey ratio of total PCB concentrations were 1-2 for both fall and spring channel catfish vs. prey fish and fall white perch vs. invertebrates (Table 4.2). The predator/prey ratios for spring channel catfish and white perch vs. invertebrates were higher due to low lipid content in spring invertebrates. Invertebrate spawning dynamics influence lipid content, thereby altering trophic transfer ratios (Wilhelm 2002).

Our results do not support the theory of increased biomagnification with higher trophic levels in the Delaware River estuary (Oliver and Niimi 1988; VanderZanden and Rasmussen 1996). Little magnification occurs between trophic levels as seen with predator/prey ratios of around 1 for both channel catfish and white perch over the range of PCB congeners. Previous work suggested that trophic transfer ratios decrease with increasing K_{ow} due to reduced uptake and assimilation efficiencies of highly chlorinated congeners (Thomann 1989; Kannan et al. 1997; Maruya and Lee 1998).

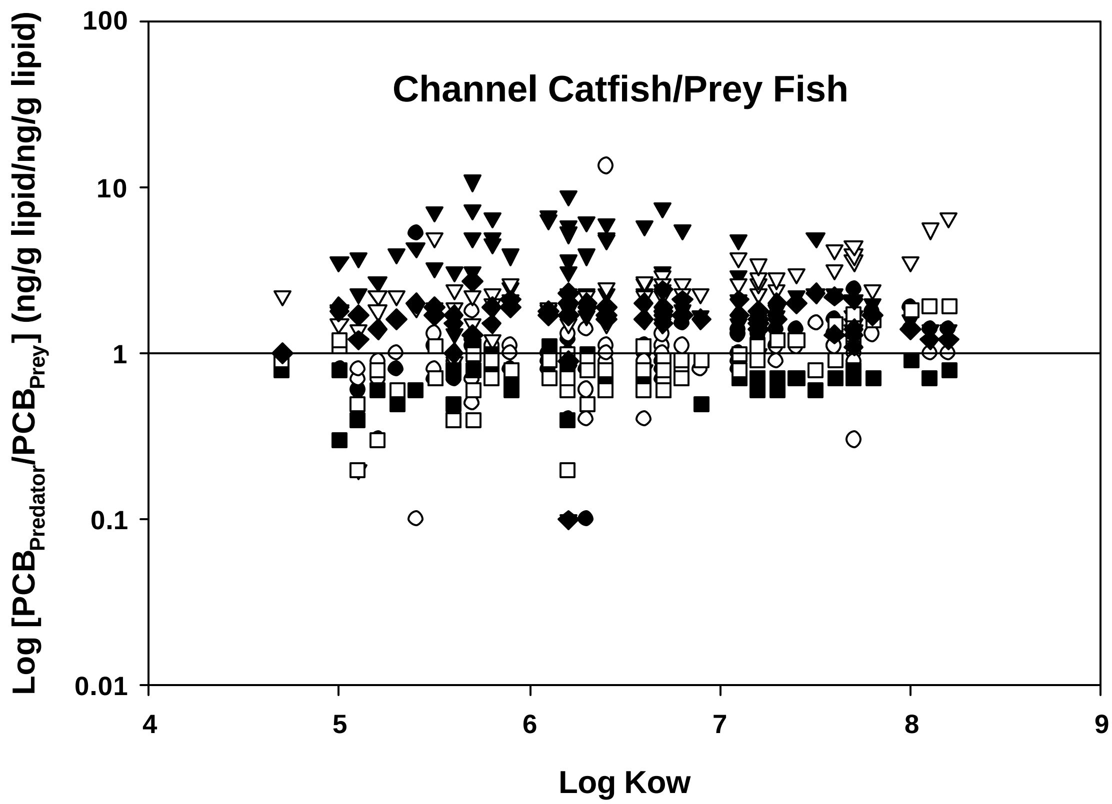


Figure 4.10. Lipid normalized predator/prey ratios vs. log K_{ow} for individual PCB congeners for channel catfish/prey fish collected from the Delaware River estuary, USA in Fall 2001 and Spring 2002. The line represents a 1:1 ratio, indicating no bioaccumulation of PCBs from prey to predator. ●=Fall Zone 3, ○= Fall Zone 4, ▼= Fall Zone 5,▽= Spring Zone 2, ■=Spring Zone 3, □=Spring Zone 4,◆=Spring Zone 5.

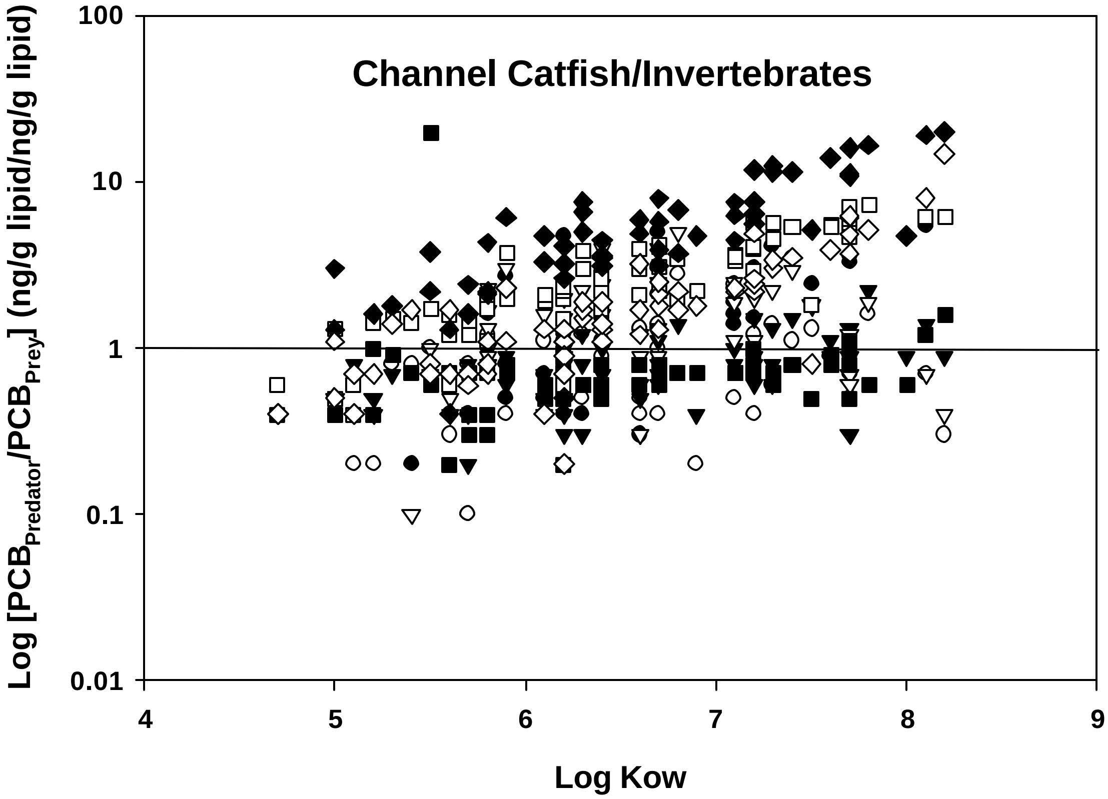


Figure 4.11. Lipid normalized predator/prey ratios vs. log K_{ow} for individual PCB congeners for channel catfish/invertebrates collected from the Delaware River estuary, USA in Fall 2001 and Spring 2002. The line represents a 1:1 ratio, indicating no bioaccumulation of PCBs from prey to predator. ●=Fall Zone 2, ○= Fall Zone 3, ▼= Fall Zone 4,▽= Fall Zone 5, ■=Spring Zone 2, □=Spring Zone 3,◆=Spring Zone 4, ◇=Spring Zone 5.

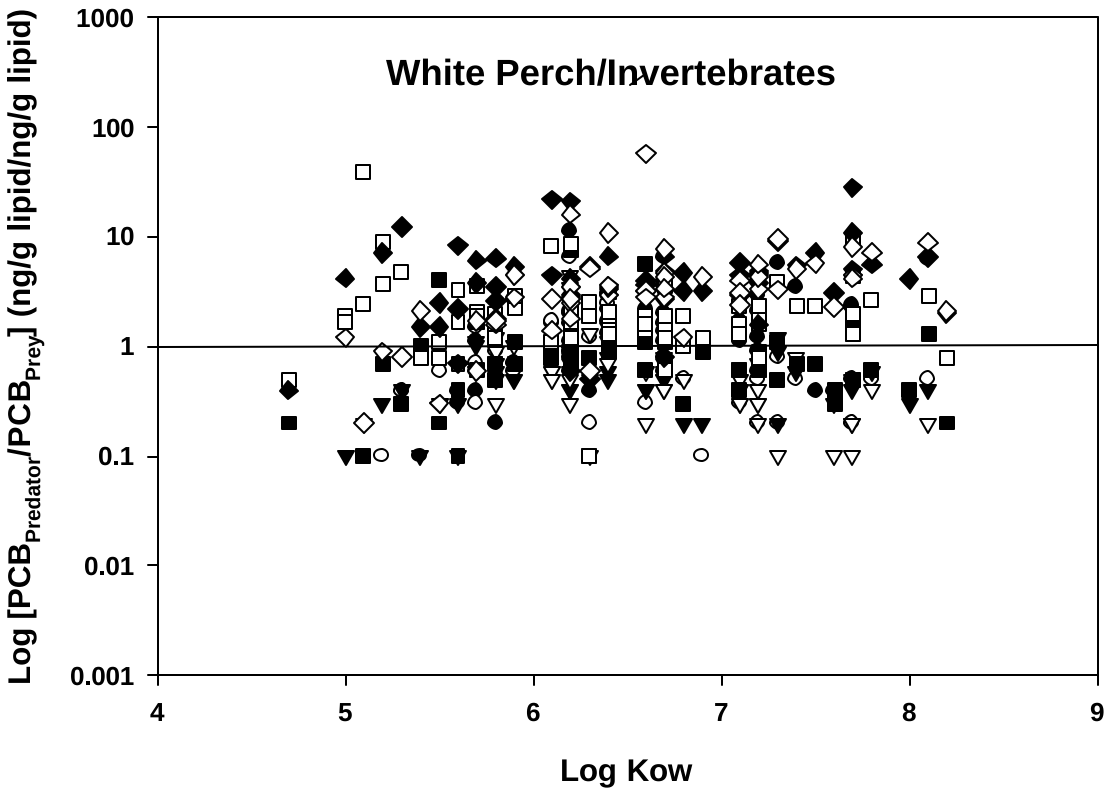


Figure 4.12. Lipid normalized predator/prey ratios vs. log K_{ow} for individual PCB congeners for white perch/invertebrates collected from the Delaware River estuary, USA in Fall 2001 and Spring 2002. The line represents a 1:1 ratio, indicating no bioaccumulation of PCBs from prey to predator. ●=Fall Zone 2, ○= Fall Zone 3, ▼= Fall Zone 4,▽= Fall Zone 5, ■=Spring Zone 2, □=Spring Zone 3,◆=Spring Zone 4, ◇=Spring Zone 5.

$[PCB]_{predator}/[PCB]_{prey}$	**Fall**	**Spring**
Channel Catfish / Prey Fish	1.9	1.3
Channel Catfish / Invertebrates	1.4	2.8
White Perch / Invertebrates	1.0	3.1

Table 4.2. Predator/Prey Ratios of lipid normalized total PCBs from biota collected in the Delaware River estuary in Fall 2001 and Spring 2002.

Ambient Water Quality Criteria

Limits on PCB contamination levels for a system are established in hopes of protecting water quality for human use, and reducing overall PCB body burdens in the food web. The following calculations are based on methodology the EPA has set forth to derive ambient water quality criteria as required under the Clean Water Act (EPA 2000).

The first step in creating water quality criteria is determining the amount of PCBs you may ingest daily for a given risk level. The risk specific dose is determined using default values provided by the EPA adopting a conservative estimate of cancer risk of 10^{-6}, meaning one additional case in a population of one million, divided by the cancer potency factor for PCBs of 2 mg/kg-day. Using an average body weight of 70 kg for adults, we may estimate that humans ingesting a total of 35 ng of PCBs daily will have an additional one in one million chance of getting cancer. The calculation of water quality criteria relies on the assumption that PCB exposure comes exclusively from dietary intake of drinking water and consumed fish fillets. The current level of total PCB in dissolved water is around 2000 picograms/liter, which would require consuming more than 17.5 liters of water daily to excede the maximum ingestion of 35 ng of PCBs. Using the EPA default value of 2 liters/day of water one would consume 4 ng of PCB daily, leaving 31 ng allowable for consumption from fish. We can disregard the percentage of total exposure accounted for by drinking water for now, and focus on PCB contamination from ingested fish. A study of fish consumption patterns of Delaware recreational fisherman and their households (DNREC 1994) determined fish intake to be 17.5 grams/day, consisting of equal portions of channel catfish (trophic level 4) and white perch (trophic level 3). Consuming 17.5 g of fish a day with a maximum ingestion of 35 ng of PCBs would mean PCB levels in the fish should be 2 ng/g wet weight. This contaminant level is well below the current PCB concentration in fish from the Delaware River ranging from 320-1990 ng/g wet weight (Table 2.1), which is why regulators hope to limit PCB loadings in the river to help reduce PCB body burdens in organisms.

In developing water quality criteria, we need to examine the relationship of PCB concentration in fish and water. Although there is a difference in terminology BAFs or bioaccumulation factors are determined using the same formula as bioconcentration factors (BCFs), using the lipid normalized PCB concentrations in fish tissue divided by the dissolved PCB concentration in water. The calculations are similar for this exercise, therefore we will continue with the term BCF, whereas EPA water quality criteria uses BAF.

Individual BCFs are calculated for each species based on trophic level. Channel catfish are trophic level four and white perch are trophic level three. We may apply our individual BCFs for both species using an average of the four zones to create a Delaware specific BCF, which may also be thought of as a trophic level BCF. Applying our Delaware Specific BCFs to determine Ambient Water Quality Criterion or AWQC measured in mg/L:

$$AWQC = RSD\,[BW / DI + \sum (FI_i * BCF_i)] \qquad (6)$$

RSD	= Risk Specific Dose in mg/kg-day ($10^{-6}/2$)
BW	= Body Weight (default = 70 kg)
DI	= Drinking water intake per day (default = 2 liters)
FI_i	= Fish intake at trophic level i (channel catfish i = 4, white perch i = 3)
BCF_i	= Bioconcentration factor at trophic level i

There are now two Delaware specific BCFs, one for channel catfish and one for white perch, based on total PCBs in the consumed fillet. Based on field data collected in this study, the average BCFs for zones and seasons for channel catfish and white perch are 127,000 and 169,000 respectively. As stated previously, the fish intake is 8.75 g/day for both channel catfish and white perch. Using default values provided by the EPA for factors such as risk specific dose, body weight, and drinking water intake, and Delaware specific fish intake and bioconcentration factors for the AWQC calculation shown above, we find the freshwater criteria for total PCBs to be 13.5 picograms/liter. As mentioned previously, the average total PCB concentration in the dissolved fraction of the water is around 2000 picograms/liter for our study area.

Ambient Water Quality Criteria proposed by the EPA has evolved significantly since the 1980 methodology with increased information on chemical contaminants as well as cancer and exposure assessments. Using estuarine-specific values of bioconcentration factors, percent lipid in fish consumed fish, and accurate consumption rates relevant for the estuary, we may determine water quality criteria for the Delaware River (Table 4.3).

Conclusions

Modeling contaminant transfer in estuarine systems requires attention to multiple parameters. Simplistic models based on factors such as BCFs and BSAFs may apply blanket values to estuarine systems (Thomann 1989; Thomann et al. 1992; Morrison et al. 1996; Morrison et al. 2002). However, additional inputs of species-specific lipid content, growth, reproduction, uptake and elimination kinetics are required with increasingly elaborate models (Barber et al. 1991; Sijm et al. 1992). Factors such as consumption and such as PCBs readily partition into organisms lipid compartments, consequently

Parameter	Cancer Potency Factor	BCF/BAF	% Lipid of Consumed Fish	Consumption Rate (grams/day)	Basis for Rate of Consumption	Freshwater Criteria (picograms/liter)
Total PCBs	7.70e+00	31200	3.0	6.5	Old default value	44.4
Total PCBs	2.00e+00	169,000[b] 127,000[c]	3.8[b] 4.0[c]	17.5 (50% for level 3 & 4)	Estuary-Specific Data	13.5

Table 4.3. Ambient Water Quality Criteria for the Delaware River Estuary for Total PCBs a-BCF from 1980 Ambient Water Quality Criteria document, b-BAF for trophic level 4 c- BAF for trophic level 3.

changes in lipid content affect contaminant levels (Thomann 1989). Considerations of seasonal variations are applicable to lower trophic species such as invertebrates that follow boom and bust dynamics and varying lipid contents have great impact on lipid normalized contaminant concentrations (Gardner et al. 1985). Higher trophic levels do not follow such extreme fluctuation in lipid content although seasonal spawning does affect lipid reserves (Larsson et al. 1993).

The approach taken in this study predicts median behavior for contaminants in a system with broad temporal and spatial variability. These values provide a general look at PCB contamination in the estuary and do not address the individual variability associated with sediment and biota samples collected from the river. Removing the variability associated with an organism's seasonal and lipid fluctuation does not fully address variation in PCB contamination within a species. PCB contaminant values determined from this study may be used to establish water and sediment quality criteria, setting a goal for acceptable contaminant levels. By reducing loadings in the river, PCB body burdens in recreational and commercial fisheries should decrease thereby protecting human and wildlife endpoints from adverse chemical effects. Using median values allows for a wider range surrounding the acceptable contaminant levels.

Using a universal BCF or BSAF value to calculate allowable PCB concentrations in water and sediment gives flexibility in an estuarine system and allows for general applications. Trends in the river may be dampened, possibly leading to a large margin of error. Underestimating bioconcentration factors results in a higher concentration threshold for water quality criteria. Subsequently, this would allow for higher PCB concentrations in biotic compartments. The bioconcentration factors and biota-sediment accumulation factors determined for the Delaware River estuary are higher than reported in other systems.

The level of complexity for modeling PCB contamination depends on the application of such models and the accuracy desired. With a contamination gradient, the efficiency of transport remains consistent throughout the estuary. The observed bioaccumulation does not vary considerably. Using generalized sediment and water PCB concentrations from a site in the river, we may broadly predict contaminant burdens in localized fish populations.

APPENDIX A: SAMPLE COLLECTION

A-1. Location of Biota and Sediment Collections for Fall 2001

Sample Site ID	STUDY	START Latitude	START Longitude	Date	Time
Sediment Collection					
Zone 2					
02 SED1	CORE	40.10387	74.83698	11/7/2001	1:53:00
Zone 3					
03 SED1	CORE	39.96467	75.09897	11/7/2001	7:55:00
Zone 4					
04 SED1	CORE	39.84375	75.28223	11/6/2001	2:17:00
04 SED2	CORE	39.86788	75.20395	11/6/2001	3:00:00
04 CC	CC Var	39.85238	75.31213	11/6/2001	12:48:09
Zone 5					
05 SED1	CORE	39.58208	75.54306	11/6/2001	10:00:00
05 SED2	CORE	39.68438	75.52755	11/6/2001	11:24:31
05 SED3	CORE	39.75000	75.48330	11/8/2001	~1:30:00
05 Var1	Variability	39.77995	75.46597	11/9/2001	9:51:00
05 Var2	Variability	39.77687	75.46367	11/9/2001	10:06:00
05 Var3	Variability	39.77574	75.46095	11/9/2001	10:16:00
05 Var4	Variability	39.77487	75.45829	11/9/2001	10:23:00
Biota Collection					
Zone 2					
02 CC2	CORE	40.0388	74.9881	11/8/2001	7:30:00
02 CC2	CORE/CC	40.0399	74.9880	11/8/2001	7:54:00
Zone 3					
03 SED1	CORE	39.5799	75.0697	11/9/2001	6:06:00
03 SED2	CORE	40.0005	75.0556	11/9/2001	6:47:00
Zone 4					
04 SED1	CORE	39.8511	75.3016	11/8/2001	3:24:00
04 SED2	CORE	39.8514	75.3018	11/8/2001	3:36:00
04 CC	CC Var	39.8509	75.3005	11/8/2001	3:40:00
Zone 5					
05 CC	CORE/WP Var1	39.6054	75.5773	11/8/2001	12:03:00
05 SED2	CC Var	39.6700	75.5334	11/8/2001	12:42:00
05 SED3	WP Var2	39.7516	75.4778	11/8/2001	1:36:00
05 SED4	WP Var3	39.7854	75.4538	11/8/2001	2:17:18

A-2. Location of Biota and Sediment Collections for Spring 2002

Sample Site ID	STUDY	START Latitude	START Longitude	Date	Time
Sediment Collection					
Zone 2					
02 CC	CC	40.04087	74.97816	3/19/2002	14:05
02 Sed 1	Core	40.10405	74.83773	3/19/2002	15:02
02 Sed3	Core/Var	40.15044	74.72394	3/19/2002	16:01
02 Var2	Var	40.08987	74.43357	3/19/2002	
02 Var3	Var	40.14875	74.72126	3/19/2002	
02 Var4	Var	40.14738	74.72089	3/19/2002	
Zone 3					
03 Sed1	Core	39.96407	75.09901	3/19/2002	10:30
03 Sed2	Core	39.99409	75.05546	3/19/2002	11:27
Zone 4					
04 Sed1	Core	39.84375	75.28223	3/18/2002	15:36
04 Sed2	Core	39.86788	75.20395	3/18/2002	16:05
04 CC	CC	39.85238	75.31213	3/18/2002	
Zone 5					
05 Sed1	CC	39.5440	75.54165	3/18/2002	11:52
05 Sed2	Core	39.6700	75.5334	3/18/2002	13:08
05 Sed2 amphipod	Core	39.6888	75.52169	3/18/2002	13:20
05 Sed3	Core	39.7537	75.4673	3/18/2002	14:11
Biota Collection					
Zone 3					
03 SED1	CORE	39.9649	75.1164	3/20/2002	7:03
03 SED2	CORE	40.0000	75.0576	3/20/2002	8:06
Zone 4					
04 SED1	CORE	39.8499	75.2748	3/20/2002	11:11
04 SED2	CORE	39.8662	75.2118	3/20/2002	10:30
04 CC	CC	39.8555	75.3087	3/20/2002	12:19/18:28
Zone 5					
05 SED1	CC	39.5839	75.5532	3/20/2002	14:43/15:23
05 SED2	CORE	39.6824	75.5259	3/20/2002	16:50
05 SED3	CORE	39.7472	75.4780	3/20/2002	17:16
Additional Sampling Trips					
Zone 2					
2CC	CC	40.04	74.97	4/3/2002	
2Sed1	Core	40.1	74.84	4/2/2002	
2Sed3	Core	40.1	74.84	4/2/2002	
2Sed4	Core	40.15	74.72	4/2/2002	
2Sed1	Core	40.15	74.16	5/21/2002	

A-3. Summary of Channel Catfish Samples from Fall 2001 Collections/Analyses

Sample ID	Sex	Age	Length (cm)	Weight (g)	Fillet Whole (g)	Fillet (g)	Whole Remains (g)
Zone 2							
110801 02 CC2 CC1	F	9	44.2	761	92.2	69.44	668.8
110801 02 CC2 CC2	F gravid	19	44.8	799.2	109.24	80.23	689.96
***02 CC2 CC3**	M	9	40.3	524.2	75.7	25.01	448.5
***02 CC2 CC4**	M	11	49.2	1020.4	124.71	25.01	895.69
***02 CC2 CC5**	F	13	47.4	863.4	122.53	24.99	740.87
***02 CC2 CC6**	F	10	60.2	2170.2	314.71	24.99	1855.49
***Second sampling trip**	Average	12		1023.07	139.85		883.22
Zone 3							
110901 03 Sed1 CC1	M	9	38.2	475.05	58.84	55.65	416.21
110901 03 Sed1 CC2	M	9	38	448.75	55.98	57.68	392.26
110901 03 Sed1 CC3	M	10	46.2	907.9	100.99	57.67	807.3
110901 03 Sed2 CC1	M	8	47.1	892.42	124.52	57.38	767.9
110901 03 Sed2 CC2	M	8	44.5	801.26	127.26	57.75	674
110901 03 Sed2 CC3	M	9	38.4	476.42	58.04	57.72	418.38
110901 03 Core CCF	Average	9		666.97	87.61		579.34
110901 03 Core CCR							
Zone 4							
110801 04 Sed 1 CC1	F	8	37.5	406.54	52.24	34.99	200.02
110801 04 Sed 2 CC1	M	5	35.7	292.81	36.9	35.02	199.55
110801 04 Sed2 CC2	Discarded						
110801 04 Sed2 CC3	F	5	34.3	282.14	36.53	35.01	199.23
110801 04 Sed2 CC4	F	5	35.8	358.39	45.72	35.03	199.8
110801 04 Sed2 CC5	M	7	40.6	500.24	63.75	34.99	201.23
110801 04 Core CCF	Average	6		368.02	47.03		199.97
110801 04 Core CCR							
Variability							
110801 04 CC CC1	M	8	33.7	601.9		15	
110801 04 CC CC2	M	7	38.8	597.7		14.99	
110801 04 CC CC3	M	7	35.3	484.7		15	
110801 04 CC CC4	F	5	36	427.5		15.01	
110801 04 CC CC5	M	3	26.7	359.7		15.01	
110801 04 CC CC1-5F	Average	6				71.36	
Zone 5							
110801 05 CC5 CC1	F	4	33.8	291.07	37.41	35.03	235.98
110801 05 CC5 CC2	F	8	41.7	579.23	79.27	34.97	479.89
110801 05 CC5 CC3	M	9	52	1410.17	146.44	35.02	1151.09
110801 05 CC5 CC4	M	5	40.8	535.62	67.37	35.03	453.48
110801 05 CC5 CC5	F	7	36.6	366.06	40.05	35.03	327.94
110801 05 Core CCF	Average	7		636.43	74.11		529.68
110801 05 Core CCR							
Variability							
110801 05 Sed2 CC1	F	6	40.5	500.76	63.97	19.96	
110801 05 Sed2 CC2	M	5	41.9	569.79	68.98	19.97	
110801 05 Sed2 CC3	M	8	47.7	963.1	130.16	19.91	
110801 05 Sed2 CC4	F	7	39.7	537.63	66.28	19.91	
110801 05 Sed2 CC5	F	5	29.5	184.82	45.85	19.98	
110801 05 Sed2 CC1-5F	Average	6				66.45	

A-4. Summary of Channel Catfish Samples from Spring 2002 Collections/Analyses

Sample ID	Sex	Age	Length (cm)	Weight (g)	Fillet Whole (g)	Fillet (g)	Whole Remains (g)
Zone 2							
040202 02 CC1	M?	9	48.9	995.4	138.97	~120	856.43
040202 02 CC2	M	12	51.9	1535.5	188.8	~120	1346.7
040402 02 CC3	M	10	53.5	1375.9	151.28	~120	1224.62
040402 02 CC4	M	10	52.5	1439.6	182.94	~120	1256.66
040402 02 CC5	F gravid	11	55.2	1728	230.53	~120	1497.47
040402 02 Core CCF	Average	10.4		1414.88	178.50		1236.38
040402 02 Core CCR							
Catfish Variability							
040302 02 CC1	F gravid	10	47	1132.5	112.13	29.98	
040302 02 CC2	M	9	47.4	977.2	116.52	30.02	
040302 02 CC3	M	9	48	952	137.98	30.07	
040302 02 CC4	F	9	45.8	902.9	137.16	29.99	
040302 02 CC5	M	14	51.4	1190.3	117.85	30.05	
040302 02 CC6	M	7	41.9	621.7	149.27*	29.99	
040302 CC1-6F					* 2 fillets		
Zone 3							
032002 03 CC1	M	8	40.5	590.85	78.99	40.02	511.86
032002 03 CC2	M	9	52.1	1505.50	222.87	40.00	1282.63
032002 03 CC3	F	10	43.7	738.80	57.65	40.05	681.15
032002 03 CC4	M	8	44.9	801.10	46.10	40.03	755.00
032002 03 CC5	M	7	40.2	526.85	73.26	40.01	453.59
032002 03 Core CCF	Average	8		832.62	95.77		736.85
032002 03 Core CCR							
Zone 4							
032002 04 CC1	F gravid	8	409	642.70	57.70	30.02	585.00
032002 04 CC2	F	6	384	441.56	47.91	30.04	393.65
032002 04 CC6	F gravid	6	353	392.53	42.32	30.03	350.21
032002 04 CC7	M	8	350	361.68	42.06	29.98	319.62
032002 04 CC8	M	8	340	328.30	33.15	30.02	295.15
032002 04 Core CCF	Average	7		433.35	44.63		388.73
032002 04 Core CCR							
Catfish Variability							
032002 04 CC1	M	7	385	419.80	40.88	10.03	
032002 04 CC2	M	8	375	400.86	42.18	10.04	
032002 04 CC3	M	11	338	336.99	35.55	9.99	
032002 04 CC4	F	10	362	393.81	35.18	10.03	
032002 04 CC5	F	9	365	376.27	31.73	10.00	
032002 04 CC1-5F						46.90	
Zone 5							
032002 05 CC1	F	11	41.5	624.7	58.97	38.78	565.73
032002 05 CC2	F	8	40.5	528.27	50.88	38.47	477.39
032002 05 CC3	F	9	48	1021.6	92.54	38.54	929.06
032002 05 CC4	F	8	41.5	627.1	46.77	38.04	580.33
032002 05 CC5	F	7	38.5	470.46	38.89	38.89	431.57
032002 05 Core CCF	Average	9		654.43	57.61		596.82
032002 05 Core CCR							
Catfish Variability							
032002 05 CC1	F	6	385	472.09	56.26	10.03	
032002 05 CC2	M	6	360	357.38	49.68	10.02	
032002 05 CC3	F	7	387	589.47	54.30	9.99	
032002 05 CC4	M	4	275	174.76	20.52	9.98	
032002 05 CC5	M	8	390	513.33	56.72	9.98	
032002 05 CC1-5F						50.00	

A-5. Summary of White Perch Samples from Fall 2001 Collections/Analyses

Sample ID	Sex	Age	Length (cm)	Weight (g)	Fillet Whole (g)	Fillet (g)	Whole Remains (g)
Zone 2							
110801 02 CC2 WP1	F gravid	6	21.9	171.3	32.39	15.01	138.91
110801 02 CC2 WP2	F gravid	5	19.9	102.7	20.01	14.98	82.69
110801 02 CC2 WP3	Discarded			51.86			51.86
110801 02 CC2 WP4	M ripe	5	18.1	93.26	18.96	15.02	74.3
110801 02 CC2 WP5	M ripe	9	21.2	137.66	27.78	15.01	109.88
110801 02 CC2 WP6	M ripe	5	17.4	79.9	15.61	15.03	64.29
110801 02 CC2 WP7	Discarded						
110801 02 CC2 WP8	M ripe	5	18.7	96.23	19.95	14.97	76.28
110801 02 Core WPF	Average	6		104.70	22.45		85.46
110801 02 Core WPR							
Zone 3							
110801 03 Sed1 WP1	M	2	16.5	66.66	12.93	10.82	51.57
110801 03 Sed1 WP3	F	3	16.9	65.51	13.84	10.34	50.89
110801 03 Sed1 WP4	M	3	16.6	69.92	13.97	10.68	53.93
110801 03 Sed1 WP5	M	5	18	84.64	18.07	10.78	63.55
110801 03 Sed1 WP6	M	3	16	53.53	10.6	10.6	40.18
110801 03 Sed1 WP2*	F	6	23.4	203.62	38.86	37.78	158.57
110801 03 Core WPF	Average	3		68.05	13.88		52.02
110801 03 Core WPR							
Zone 4							
110801 04 Sed 1 WP1	F (gravid)	3	18.4	88.75	17.13	10.99	71.62
110801 04 Sed 1 WP2	F	4	17.3	65.74	14.24	10.99	51.5
110801 04 Sed 1 WP3	F	4	17.6	76.98	17.05	10.97	59.93
110801 04 Sed 1 WP4	F	3	15.9	51.66	11.45	11.01	40.21
110801 04 Sed 2 WP1	F (gravid)	3	18	75.13	15.52	10.97	59.61
110801 04 Sed 2 WP2	F	3	16.5	59.74	12.59	11.03	47.15
110801 04 Core WPF	Average	3		69.67	14.66		55.00
110801 04 Core WPR							
Zone 5							
110801 05 CC5 WP1	M ripe	6	22.3	161.38	33.61	15	90.41
110801 05 CC5 WP2	M ripe	3	18.6	92.93	18.9	15.01	52.26
110801 05 CC5 WP3	F gravid	7	20.2	129.27	26.22	15.02	71.96
110801 05 CC5 WP4	M ripe	6	19.9	125.26	25.72	15.02	68.3
110801 05 CC5 WP5	M ripe	6	19	100.89	19.72	14.99	55.78
110801 05 Core/Var WPF	Average	6		121.95	24.83		67.74
110801 05 Core WPR							
Variability Study							
110801 05 CC5 WP1	M ripe	6	22.3	161.38	31.11	29	
110801 05 CC5 WP2	M ripe	3	18.6	92.93	19.82	17.62	
110801 05 CC5 WP3	F gravid	7	20.2	129.27	24.55	21.55	
110801 05 CC5 WP4	M ripe	6	19.9	125.26	24.45	21.27	
110801 05 CC5 WP5	M ripe	6	19	100.89	20.61	17.97	
110801 05 Var2 WP1	M	4	18.5	84.27	34.55	5.03	
110801 05 Var2 WP2	F	3	17.9	75.03	32.22	5.01	
110801 05 Var2 WP3	F	2	16.2	55.79	25.97	5.01	
110801 05 Var2 WP4	M	5	17.5	66.25	28.83	4.99	
110801 05 Var2 WP5	M	3	15.3	44.88	19.76	5.02	
110801 05 Var2 WP6	F	2	13.5	27.39	12.3	5.01	
110801 05 Var2 WPF						28.32	
110801 05 Var3 WP1	M	5	18.6	91.98	36.62	9	
110801 05 Var3 WP2	M	3	17.3	68.24	29.61	9.01	
110801 05 Var3 WP3	F	2	16.2	52.24	22.01	9.02	
110801 05 Var3 WP4	F	2	15.4	48.56	18.43	8.99	
110801 05 Var3 WP5	M	3	15.8	51.11	21.82	9	
110801 05 Var3 WP6	F gravid	4	16.3	53.32	21.54	8.97	
110801 05 Var3 WPF						41.92	

*Individual

A-6. Summary of White Perch Samples from Spring 2002 Collections/Analyses

Sample ID	Sex	Age	Length (cm)	Weight (g)	Fillet Whole (g)	Fillet (g)	Whole Remains (g)
Zone 2							
062102 02 WP1*	M	3	15.5	63.23	18.57	10.01	37.76
062102 02 WP2*	F	3	15.2	60.96	14.92	10.03	37.4
062102 02 WP3*	M	NA	15.4	64.25	19.26	9.99	37.67
062102 02 WP4*	M	2	16.3	65.02	18.4	10.03	43.41
062102 02 WP5*	F (gravid)	3	16	66.27	19.9	10.01	42.53
062102 02 CORE WPF	Average	3		63.95	18.21		39.75
062102 02 CORE WPR							
***Caught by rod & reel by ANS (near Bordentown, NJ)**							
NA=Not available							
Zone 3							
032002 03 WP1	F	4	18.3	94.66	21.22	9.98	69.48
032002 03 WP2	F	4	17.2	87.13	18.87	10.02	65.29
032002 03 WP3	M	5	16.7	62.12	22.18	9.97	73.98
032002 03 WP4	M	3	19	99.02	13.95	9.98	45.89
032002 03 WP5	F	3	17.7	79.8	15.02	10.01	58.59
032002 03 Core WPF	Average	4		84.55	18.25		62.65
032002 03 Core WPR							
Zone 4							
032002 04 WP1	F	4	184	90.79	19.34	10.01	71.45
032002 04 WP2	M	4	196	119.81	19.31	10.00	100.50
032002 04 WP3	M	4	183	89.10	15.91	10.03	73.19
032002 04 WP4	M	5	179	90.82	16.76	9.99	74.06
032002 04 WP5	M	4	165	67.34	12.98	10.00	54.36
032002 04 Core WPF	Average	4		91.57	16.86		74.71
032002 04 Core WPR							
Zone 5							
032002 05 WP1	F	9	23.8	220	38.33	25	195
032002 05 WP2	F	9	20.8	183	34.93	24.99	158.01
032002 05 WP4	F	6	20.9	177	33.38	24.98	152.02
032002 05 WP6	M	6	20.8	162	29.68	24.98	137.02
032002 05 WP8	M	5	19.1	115	42.09	24.99	90.01
032002 05 Core WPF	Average	7		171.4	35.68		146.41
032002 05 Core WPR							

A-7. Summary of Prey Fish from Fall 2001 Collections/Analyses

Sample ID	Species	
Zone 3		
110801 03 SED1 SFA	4 YOY Channel Catfish	*Ictalurus punctatus*
110801 03 SED1 SFB	1 Hogchoker	*Trinectes maculatus*
110801 03 SED2 SFA	YOY Catfish	*Ictalurus punctatus*
110801 03 SED2 SFB	YOY Catfish	*Ictalurus punctatus*
110801 03 SED2 SFC	YOY Catfish	*Ictalurus punctatus*
Zone 4		
110801 04 CC SFA	4 YOY Channel Catfish	*Ictalurus punctatus*
110801 04 SED1 SFA	16 Croaker	*Micropogonias undulatus*
110801 04 SED1 SFB	15 Croaker	*Micropogonias undulatus*
110801 04 SED1 SFC	5 Hogchoker	*Trinectes maculatus*
110801 04 SD1 SFD	10 YOY Channel Catfish	*Ictalurus punctatus*
110801 04 SD1 SFE	1 Spottailed Shiner	*Notropis hudsonius*
110801 04 SED1 SFF	Tesselated Darter	*Etheostoma olmstedi*
110801 04 SED1 SFG	4 White perch	*Morone americana*
Zone 5		
110801 05 SED2 SFA	1 YOY Channel Catfish	*Ictalurus punctatus*
110801 05 SED2 SFB	Croaker	*Micropogonias undulatus*
110801 05 SED2 SFC	Croaker	*Micropogonias undulatus*
110801 05 CC SFA	3 American Eels	*Anguilla rostrata*
110801 05 CC SFB	4 Hogchoker	*Trinectes maculatus*

*Individual species analyzed and composited by zone

**No Zone 2 SF

***YOY= Young of the Year

A-8. Summary of Prey Fish from Spring 2002 Collections/Analyses

Small Fish	Species	
Zone 2		
040202 2CC SFA	Gizzard shad	*Dorosoma cepedianum*
040302 02CORE SFA	Spot-tailed Shiners	*Notropis hudsonius*
040302 02CORE SFB	Tessalated Darter	*Etheostoma olmstedi*
040302 02CORE SFC	Banded Killifish	*Fundulus diaphanus*
Zone 3		
032002 03 CORE SFA	YOY Channel Catfish	*Ictalurus punctatus*
032002 03 CORE SFB	Juvenile White Perch	*Morone americana*
Zone 4		
032002 04 SED2 SFA1	Juvenile White Perch	*Morone americana*
032002 04 SED2 SFA2	Juvenile White Perch	*Morone americana*
032002 04 SED2 SFA3	Juvenile White Perch	*Morone americana*
032002 04 SED2 SFB	YOY Channel Catfish	*Ictalurus punctatus*
032002 04 SED2 SFC	Spottail shiner	*Notropis hudsonius*
Zone 5		
032002 05 SED1 SFA	Juvenile White Perch	*Morone americana*
032002 05 SED1 SFB	Hogchoker	*Trinectes maculatus*
032002 05 SED1 SFC	YOY Channel Catfish	*Ictalurus punctatus*
032002 05SED3 SFA	Juvenile White Perch	*Morone americana*
032002 05SED3 SFB	YOY Channel Catfish	*Ictalurus punctatus*

*Individual species analyzed and composited by zone

**YOY= Young of the Year

A-9. Summary of Invertebrate Samples from Fall 2001 Collections/Analyses

Sample ID	Species	
Zone 2		
110801 02 CC INVA	Amphipods	*Gammarus* spp.
110801 02 CC INVB	Blue crab	*Callinectes sapidus*
110801 02 SED1 INV	Amphipods	*Gammarus* spp.
Zone 3		
110801 03 SED1 INV	Amphipods	*Gammarus* spp.
Zone 4		
110801 04 CC INV	Amphipods	*Gammarus* spp.
110801 04 SED1 INV	Amphipods	*Gammarus* spp.
Zone 5		
110801 05 CC INVA	Amphipods	*Gammarus* spp.
110801 05 CC INVB	Grass shrimp	*Palaemonetes* spp.
110801 05 SED2 INV	Grass Shrimp	*Palaemonetes* spp.

A-10. Summary of Invertebrate Samples from Spring 2002 Collections/Analyses

Site	Species	
Zone 2		
040302 02 CC INV	Amphipods	*Gammarus* spp.
040302 02 CORE INV	Amphipods	*Gammarus* spp.
Zone 3		
032002 03 CORE INV	Amphipods	*Gammarus* spp.
032002 03 CORE MACRO INV	Crayfish	Decopoda
Zone 4		
032002 04 CORE INV	Amphipods	*Gammarus* spp.
032002 04 CORE MACRO	Crayfish	Decopoda
Zone 5		
032002 05 CORE INV	Amphipods	*Gammarus* spp.
032002 05 SED1 INV	Amphipods	*Gammarus* spp.
032002 05 SED1 MACRO INV	White fingered mud crab	*Rhithropanopeus harrisii*

A-11. Summary of Sediment Samples from Fall 2001 Collections/Analyses

Sample ID
Zone 2
02 Sed1
Zone 3
03 Sed1
Zone 4
04 Sed1
04 Sed2
04 CC
Zone 5
05 Sed1
05 Sed2
05 Sed3
Variability
05 Sed Var1
05 Sed Var2
05 Sed Var3
05 Sed Var4

A-12. Summary of Sediment Samples from Spring 2002 Collections/Analyses

Sample ID
Zone 2
02 CC
02 Sed1
02 Sed3
02 Var2
02 Var3
02 Var4
Zone 3
03 Sed1
03 Sed2
Zone 4
04 Sed1
04 Sed2
04 CC
Zone 5
05 Sed1
05 Sed2
05 Sed2 amphipod
05 Sed3

APPENDIX B: PCB CONCENTRATIONS IN BIOTA

B-1. PCB concentrations in Channel Catfish (ng/g) from Fall 2001 Core Study

Field ID	2 CORE CCF	2 CORE CCR	2 CORE Whole Fish	3 CORE CCFA	3 CORE CCFB	3 CORE CCFC	3 CORE CCR
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	2	2	2	3	3	3	3
Description	Fillet Composite	Remains Composite	Whole Fish	Fillet Composite	Fillet Composite	Fillet Composite	Remains Composite
Replicate analysis?				rep A	rep B	rep C	
Analyzed by	CBL	CBL	CBL	CBL	CBL	CBL	CBL
Lipid Content (%)	4.6%	9.9%	9.2%	4.2%	4.1%	4.3%	11.0%
1	6.49	3.27	3.69	ND	ND	ND	ND
3	14.71	9.00	9.75	8.14	0.70	3.75	15.91
4,10	3.63	6.86	6.43	2.41	2.42	ND	6.36
7,9	0.24	0.39	0.37	0.35	0.33	0.33	0.65
6	0.26	0.36	0.34	0.31	0.29	0.26	0.64
8,5	12.64	25.53	23.83	13.21	12.93	14.17	41.36
19	ND	ND	ND	ND	ND	ND	ND
12,13	0.22	0.48	0.45	0.41	0.29	0.24	0.40
18	4.13	8.94	8.30	6.28	5.77	5.37	11.85
17	2.04	4.22	3.93	3.87	3.58	3.52	7.94
24	0.24	0.30	0.29	0.25	0.23	0.19	4.21
16,32	2.77	5.74	5.35	5.37	5.03	4.66	11.54
29	ND	ND	ND	ND	ND	ND	ND
26	0.32	0.53	0.50	0.46	0.31	0.40	1.44
25	0.23	0.30	0.29	0.27	0.26	0.23	0.60
31, 28	3.72	8.20	7.61	6.83	6.31	5.91	16.66
33,21,53	4.09	8.45	7.87	6.84	6.56	5.80	15.13
51	0.72	1.47	1.37	2.06	1.95	1.78	4.98
22	0.62	0.93	0.89	1.09	1.26	1.17	3.36
45	3.05	6.22	5.80	3.89	3.89	3.84	10.34
46	2.55	6.06	5.60	3.52	3.20	3.14	9.97
52	4.07	8.34	7.77	8.50	7.94	7.26	20.10
49	7.18	9.09	8.83	7.67	7.26	7.02	16.14
47,48	9.03	14.95	14.17	9.92	9.72	9.52	40.70
44	4.55	9.09	8.49	7.97	7.72	6.85	19.67
37,42	4.42	9.58	8.89	5.03	4.99	4.65	16.43
41,64,71	7.31	15.54	14.45	12.79	12.26	11.66	29.94
40	1.01	2.16	2.00	1.61	1.57	1.59	4.68
100	1.90	4.05	3.77	2.62	2.48	2.85	8.45
63	0.99	2.19	2.03	1.27	1.17	1.15	3.68
74	5.49	12.09	11.22	7.00	6.64	6.82	21.08
70,76	2.26	4.77	4.44	3.70	3.55	3.22	9.42
66,95	20.80	41.01	38.34	33.79	31.98	30.12	84.43
91	2.41	5.36	4.97	3.75	3.49	3.23	9.70
56,60/92,84	11.85	25.65	23.83	12.41	11.84	13.39	49.93
89	15.69	36.89	34.09	7.68	24.70	7.92	78.71
101	10.35	21.38	19.92	17.20	16.21	16.11	42.19
99	8.33	17.98	16.70	10.74	9.91	10.19	26.92
119	1.73	4.40	4.04	1.77	1.59	1.60	5.27
83	1.77	3.82	3.55	1.83	1.73	2.13	8.25
97	17.34	27.81	26.43	19.79	19.19	17.31	48.36
81,87	5.74	20.75	18.76	1.59	1.55	1.39	4.08
85	19.23	10.86	11.97	5.74	5.36	5.92	16.08
136	0.49	11.86	10.36	1.29	1.25	1.14	3.07
77,110	19.09	41.36	38.41	26.98	26.41	23.77	72.41
82, 151	1.40	3.13	2.90	3.28	3.08	3.18	7.00
135,144	3.55	7.83	7.27	6.40	6.35	6.48	17.60
107	1.70	3.87	3.58	2.28	2.14	2.22	6.34
123,149	16.74	34.70	32.33	28.46	27.15	25.99	69.77
118	19.30	45.09	41.68	22.71	20.65	21.83	62.65
134	0.72	1.24	1.17	0.99	0.96	1.17	3.97
146	6.64	14.40	13.37	9.18	8.64	9.00	22.93
132,105,153	66.97	148.74	137.93	93.85	89.22	91.10	233.55
141	6.27	14.36	13.29	21.23	20.08	22.10	58.19
137,130,176	2.15	4.84	4.49	3.23	3.16	2.91	8.13
163,138	46.88	105.41	97.67	72.38	69.31	72.72	186.97
158	1.44	3.05	2.83	2.11	2.19	2.25	5.71
129,178	4.55	10.33	9.56	7.28	7.16	7.47	19.76
187,182	18.42	40.31	37.41	27.83	26.10	28.00	71.46
183	10.66	24.29	22.49	19.02	17.87	19.72	51.28
128	3.76	9.11	8.40	5.23	5.15	4.88	15.36
185	1.87	4.37	4.04	3.61	3.42	3.64	10.47
174	6.12	13.92	12.89	17.59	16.80	16.91	46.27
177	7.38	16.39	15.20	10.40	10.35	8.96	25.96
202,171,156	7.90	18.91	17.45	13.04	12.42	13.35	37.48
157,200	2.81	6.97	6.42	4.25	3.99	4.10	11.88
172,197	2.77	6.53	6.03	7.17	6.75	7.58	20.63
180	31.15	73.60	67.99	70.23	66.42	73.73	196.09
193	9.11	26.05	23.81	11.81	11.37	12.32	43.08
191	0.94	2.38	2.19	2.00	1.89	2.11	5.71
199	ND	ND	ND	ND	ND	ND	ND
170,190	12.72	32.66	30.02	27.68	33.80	28.98	106.08
198	0.75	1.79	1.65	1.30	1.21	1.32	3.53
201	6.66	15.90	14.68	14.10	13.22	14.53	39.04
203,196	16.07	39.64	36.52	28.95	27.17	27.76	83.62
189	0.38	0.87	0.81	0.95	0.87	1.02	2.83
208,195	5.83	14.32	13.20	6.47	6.25	7.05	32.10
207	0.99	2.25	2.08	1.34	1.50	1.47	4.01
194	3.60	9.20	8.46	11.03	10.39	12.06	34.46
205	0.60	1.10	1.03	1.13	0.68	0.97	2.44
206	6.11	15.43	14.20	10.51	9.91	10.51	32.28
209	2.56	6.45	5.94	4.75	4.24	4.52	13.15
Total PCBs	583	1238	1151	852	828	825	2396
Recovery							
14	221%	377%	356%	259%	260%	219%	553%
65	NM	NM	NM	NM	NM	NM	NM
166	93%	102%	101%	104%	102%	86%	137%

B-1. PCB concentrations in Channel Catfish (ng/g) from Fall 2001 Core Study

Field ID	3 CORE Whole Fish	4 CORE CCF	4 CORE CCR	4 CORE Whole Fish	5 CORE CCF	5 CORE CCR	5 CORE Whole Fish
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	3	4	4	4	5	5	5
Description	Whole Fish	Fillet Composite	Remains Composite	Whole Fish	Fillet Composite	Remains Composite	Whole Fish
Replicate analysis?							
Analyzed by	CBL	CBL	CBL	CBL	CBL	CBL	CBL
Lipid Content (%)	10.1%	2.8%	9.5%	8.6%	3.3%	7.9%	5.9%
1	ND	ND	ND	ND	ND	ND	ND
3	14.38	0.72	1.43	1.34	1.75	9.49	6.84
4,10	5.85	ND	1.56	ND	ND	ND	ND
7,9	0.61	0.27	0.45	0.42	0.19	0.27	0.21
6	0.59	0.29	0.46	0.44	0.23	0.45	0.34
8,5	37.69	7.13	23.32	21.25	7.09	12.63	9.65
19	ND	ND	ND	ND	ND	ND	ND
12,13	0.39	0.27	0.45	0.43	0.21	0.32	0.25
18	11.06	4.92	9.51	8.93	3.52	5.05	3.94
17	7.38	2.68	5.46	5.11	1.97	2.85	2.22
24	3.68	0.21	0.01	0.04	0.13	0.17	0.13
16,32	10.68	3.76	7.43	6.96	2.49	3.64	2.83
29	ND	ND	ND	ND	ND	ND	ND
26	1.30	0.24	0.65	0.60	0.13	0.63	0.46
25	0.55	0.20	0.43	0.40	0.14	0.21	0.16
31, 28	15.31	4.87	13.80	12.66	2.68	4.17	3.23
33,21,53	13.98	5.23	11.04	10.30	3.93	5.46	4.27
51	4.58	1.31	3.18	2.94	0.58	0.95	0.73
22	3.07	0.81	2.27	2.08	0.45	0.62	0.49
45	9.49	3.22	7.20	6.69	2.15	3.38	2.61
46	9.10	1.87	5.50	5.03	1.43	2.70	2.05
52	18.50	7.46	18.08	16.72	4.38	7.15	5.50
49	14.98	5.89	12.19	11.39	6.42	7.26	5.82
47,48	36.63	7.48	13.12	12.40	9.93	8.38	7.01
44	18.07	6.35	16.50	15.20	3.79	6.21	4.78
37,42	14.91	4.53	12.00	11.05	3.38	4.87	3.80
41,64,71	27.61	9.74	23.50	21.74	7.08	10.80	8.37
40	4.27	1.49	3.89	3.58	1.15	1.80	1.39
100	7.69	1.88	4.90	4.51	1.59	2.65	2.04
63	3.35	0.93	2.88	2.64	1.04	1.99	1.51
74	19.21	4.87	14.00	12.84	4.40	6.21	4.85
70,76	8.64	2.16	7.08	6.45	1.52	2.47	1.90
66,95	77.54	25.95	68.06	62.68	18.17	29.53	22.75
91	8.88	3.02	7.84	7.22	2.35	4.05	3.10
56,60/92,84	45.02	7.82	24.43	22.31	6.69	12.49	9.51
89	70.14	5.38	19.20	17.44	12.14	8.86	7.60
101	38.82	12.20	31.35	28.91	9.73	15.63	12.05
99	24.74	8.67	21.88	20.20	8.22	14.04	10.77
119	4.79	1.16	4.05	3.68	1.07	2.11	1.60
83	7.42	1.47	4.70	4.29	1.13	2.12	1.61
97	44.48	8.77	21.65	20.00	8.57	13.44	10.39
81,87	3.75	1.20	46.98	41.13	0.82	1.38	1.06
85	14.71	4.54	13.97	12.76	4.08	6.40	4.94
136	4.16	0.92	2.25	2.77	0.66	0.98	1.12
77,110	66.28	21.69	58.84	54.09	16.48	27.72	21.28
82, 151	6.50	1.83	3.91	3.65	1.40	2.39	1.83
135,144	16.13	3.97	10.72	9.86	3.10	5.25	4.03
107	5.80	1.71	5.08	4.65	1.62	2.89	2.21
123,149	64.18	17.92	44.89	41.44	13.63	21.43	16.56
118	57.28	16.58	50.12	45.83	13.51	24.61	18.77
134	3.58	0.58	1.05	0.99	0.74	1.00	0.79
146	21.09	6.05	15.10	13.94	7.13	11.78	9.06
132,105,153	214.88	55.73	93.95	89.06	51.86	84.02	64.74
141	53.33	8.81	24.77	22.73	7.66	13.27	10.16
137,130,176	7.47	2.22	5.96	5.48	2.02	3.28	2.53
163,138	171.80	39.86	104.39	96.14	35.39	59.21	45.49
158	5.25	1.32	3.09	2.87	1.31	1.86	1.45
129,178	18.12	4.34	11.11	10.25	4.79	7.18	5.58
187,182	65.66	15.06	38.10	35.16	17.88	29.11	22.42
183	47.02	8.43	23.02	21.16	8.78	14.85	11.40
128	14.01	3.35	9.99	9.15	3.13	5.26	4.04
185	9.56	1.78	5.22	4.78	1.52	2.61	2.00
174	42.44	8.46	21.53	19.86	7.78	12.63	9.73
177	23.85	6.38	17.48	16.06	5.27	8.89	6.83
202,171,156	34.25	6.80	19.96	18.28	7.66	7.49	6.13
157,200	10.86	3.14	8.98	8.24	4.28	7.42	5.68
172,197	18.86	3.44	10.12	9.26	3.99	7.20	5.49
180	179.54	31.31	89.61	82.16	29.82	53.45	40.82
193	38.98	6.11	25.62	23.12	4.77	10.12	7.62
191	5.22	0.69	2.07	1.89	0.62	1.19	0.91
199	ND	ND	ND	ND	ND	ND	ND
170,190	96.10	10.68	34.33	31.31	12.57	17.56	13.74
198	3.23	0.94	3.01	2.75	1.23	2.37	1.80
201	35.74	9.70	28.32	25.94	13.33	23.93	18.27
203,196	76.31	15.95	48.84	44.64	20.25	37.16	28.32
189	2.58	0.42	1.35	1.23	0.39	0.73	0.56
208,195	28.75	3.59	10.64	9.74	17.74	33.02	25.14
207	3.67	2.23	5.98	5.50	4.21	7.55	5.77
194	31.40	5.26	18.48	16.79	5.19	10.36	7.84
205	2.24	0.38	1.31	1.19	0.33	0.64	0.48
206	29.39	16.52	53.89	49.11	27.13	52.40	39.77
209	12.01	8.54	26.06	23.82	14.84	27.96	21.26
Total PCBs	**2191**	**524**	**1442**	**1310**	**521**	**871**	**664**
Recovery							
14	513%	218%	485%	451%	145%	183%	144%
65	NM	NM	NM	NM	NM	NM	NM
166	132%	82%	92%	91%	86%	75%	63%

B-2. PCB concentrations in Channel Catfish (ng/g) from Fall 2001 Variability Study

Field ID	2CC CC1F	2CC CC2F	2CC CC3F	2CC CC4F	2CC CC5F	2CC CC1-5F	4CC CC1F	4CC CC2F
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	2	2	2	2	2	2	4	4
Description	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Composite fillet	Individual Fillet	Individual Fillet
Replicate analysis?								
Analyzed by	CBL	CBL	CBL	CBL	CBL	CBL	CBL	CBL
Fish Mass (g)	761	799.2	524.2	1020.4	863.4		240.31	467.75
Fish Length (mm)	442	448	403	492	474		337	388
Fish Sex	F	F	M	M	F		M	M
Fish Age (yrs)	9	19	9	11	13		8	7
Lipid Content (%)	5.1%	1.7%	6.2%	3.0%	3.5%	4.6%	4.2%	2.3%
1	6.49	ND	ND	ND	ND	6.49	ND	ND
3	54.23	2.93	6.67	4.30	5.41	14.71	2.84	0.70
4,10	2.36	ND	5.97	2.85	3.34	3.63	ND	ND
7,9	0.35	0.09	0.28	0.18	0.29	0.24	0.24	0.41
6	0.53	0.05	0.28	0.16	0.26	0.26	0.26	0.26
8,5	11.20	7.54	21.12	9.34	13.99	12.64	9.99	8.98
19	ND	ND	ND	ND	ND	ND	ND	ND
12,13	0.15	0.14	0.30	0.19	0.31	0.22	0.24	0.22
18	2.56	2.75	6.27	3.60	5.49	4.13	5.25	6.14
17	1.04	0.95	3.68	1.79	2.76	2.04	2.99	2.78
24	0.66	0.07	0.21	0.12	0.17	0.24	0.24	0.23
16,32	1.82	1.21	4.93	2.24	3.67	2.77	4.61	4.48
29	ND	ND	ND	ND	ND	ND	ND	ND
26	0.26	ND	0.59	0.22	0.20	0.32	0.30	0.64
25	0.49	0.08	0.24	0.14	0.22	0.23	0.22	0.46
31, 28	2.55	1.51	6.17	3.38	4.97	3.72	5.46	4.41
33,21,53	2.95	2.39	6.21	3.32	5.57	4.09	6.21	4.71
51	0.61	0.30	1.40	0.53	0.76	0.72	1.73	1.68
22	0.73	ND	0.68	0.47	0.61	0.62	0.81	0.79
45	2.51	2.02	5.11	2.11	3.51	3.05	3.87	2.76
46	1.74	1.90	4.23	1.72	3.16	2.55	2.88	1.02
52	3.24	1.58	7.40	3.48	4.63	4.07	8.70	8.23
49	5.56	3.09	10.63	10.22	6.41	7.18	6.95	15.46
47,48	6.34	5.96	9.13	9.30	14.40	9.03	8.21	13.57
44	3.26	1.88	9.68	2.83	5.10	4.55	9.09	6.83
37,42	2.87	1.96	8.53	3.24	5.52	4.42	5.95	5.53
41,64,71	5.12	4.05	11.75	5.41	10.24	7.31	13.01	7.53
40	1.34	0.56	1.39	0.57	1.20	1.01	2.27	1.40
100	1.65	1.26	2.73	1.36	2.50	1.90	2.28	2.13
63	1.08	0.61	1.28	0.60	1.40	0.99	1.35	1.15
74	3.63	3.21	8.30	4.23	8.06	5.49	5.93	4.67
70,76	2.17	1.33	3.21	1.92	2.66	2.26	3.48	1.40
66,95	14.66	9.93	34.99	13.70	30.71	20.80	34.85	23.13
91	1.52	1.39	4.12	1.73	3.30	2.41	3.96	3.30
56,60/92,84	7.78	6.22	23.01	7.84	14.40	11.85	10.95	6.41
89	11.79	8.37	32.34	7.75	18.21	15.69	39.44	16.61
101	7.22	5.84	16.88	7.92	13.89	10.35	16.18	13.84
99	4.84	6.31	11.63	5.99	12.87	8.33	10.42	8.37
119	0.87	1.58	2.57	1.32	2.31	1.73	1.63	1.15
83	1.45	1.03	3.17	1.17	2.01	1.77	2.29	1.36
97	12.51	7.17	33.38	14.66	18.95	17.34	20.87	21.70
81,87	0.62	0.67	1.66	0.63	25.14	5.74	1.65	6.86
85	71.57	4.53	8.23	3.87	7.96	19.23	5.66	3.80
136	0.32	0.23	0.99	0.34	0.50	0.49	1.52	0.52
77,110	11.67	12.10	31.96	12.19	27.51	19.09	31.57	20.28
82, 151	1.19	0.92	2.18	1.07	1.66	1.40	2.57	1.72
135,144	2.46	2.55	5.80	2.64	4.32	3.55	5.43	3.73
107	1.05	1.27	2.45	1.16	2.57	1.70	2.39	1.33
123,149	12.40	11.27	27.44	10.72	21.87	16.74	23.82	20.25
118	10.05	15.02	29.25	13.31	28.89	19.30	21.59	12.21
134	0.98	0.24	1.29	0.40	0.68	0.72	0.64	0.50
146	4.36	5.02	8.73	4.83	10.28	6.64	8.02	8.20
132,105,153	32.37	54.24	101.53	48.44	98.27	66.97	72.98	58.49
141	5.62	4.74	7.84	4.04	9.09	6.27	11.55	11.24
137,130,176	1.47	1.59	3.41	1.27	3.04	2.15	3.27	2.34
163,138	28.81	37.67	65.13	33.73	69.08	46.88	52.13	45.15
158	0.96	1.21	1.90	1.15	1.97	1.44	1.52	1.31
129,178	3.22	3.35	6.23	3.27	6.70	4.55	5.66	5.26
187,182	12.71	14.91	24.93	13.31	26.27	18.42	19.33	21.25
183	7.12	8.96	14.23	7.49	15.49	10.66	11.00	11.10
128	2.68	2.83	5.43	2.50	5.36	3.76	4.72	3.55
185	1.41	1.58	2.76	1.23	2.35	1.87	2.39	2.08
174	5.71	4.87	8.35	3.74	7.92	6.12	11.09	9.75
177	5.41	6.57	11.95	2.53	10.44	7.38	9.88	7.73
202,171,156	5.13	6.35	10.87	5.51	11.63	7.90	9.02	6.90
157,200	1.95	2.21	3.93	1.76	4.19	2.81	4.09	3.14
172,197	2.52	2.10	3.58	1.78	3.87	2.77	4.85	4.16
180	24.03	25.50	43.49	20.08	42.65	31.15	44.82	38.00
193	4.35	6.13	15.94	6.04	13.07	9.11	9.44	4.40
191	0.71	0.80	1.47	0.65	1.10	0.94	0.91	0.76
199	ND	ND	ND	ND	ND	ND	ND	ND
170,190	10.18	10.02	17.30	7.88	18.22	12.72	16.92	13.96
198	0.61	0.55	1.03	0.46	1.08	0.75	1.31	1.17
201	6.26	4.80	8.43	3.96	9.86	6.66	13.53	10.95
203,196	12.06	13.25	22.06	9.86	23.14	16.07	21.59	15.49
189	0.47	0.25	0.44	0.21	0.51	0.38	0.60	0.56
208,195	6.13	4.28	7.10	3.27	8.37	5.83	3.65	10.07
207	1.38	0.65	1.04	0.48	1.41	0.99	2.46	1.91
194	4.03	2.44	4.54	1.92	5.07	3.60	8.20	4.86
205	1.34	0.35	0.56	0.23	0.52	0.60	0.63	0.55
206	8.19	3.76	6.91	2.79	8.89	6.11	23.67	12.27
209	3.61	1.63	2.81	1.25	3.51	2.56	11.29	6.62
Total PCBs	**509**	**379**	**836**	**384**	**778**	**583**	**743**	**599**
Recovery								
14	231%	137%	334%	204%	200%	221%	216%	283%
65	NM	NM	NM	NM	NM	NM	NM	NM
166	81%	89%	97%	98%	100%	93%	69%	78%

B-2. PCB concentrations in Channel Catfish (ng/g) from Fall 2001 Variability Study

Field ID	4CC CC3F	4CC CC4F	4CC CC5F	4CC CC1-5F	5SED2 CC1F	5SED2 CC2F	5SED2 CC3F	5SED2 CC4F
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	4	4	4	4	5	5	5	5
Description	Individual Fillet	Individual Fillet	Individual Fillet	Composite fillet	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet
Replicate analysis?								
Analyzed by	CBL	CBL	CBL	CBL	CBL	CBL	CBL	CBL
Fish Mass (g)	376.91	352.38	129.28		500.76	569.79	963.1	537.63
Fish Length (mm)	353	360	267		405	419	477	397
Fish Sex	M	F	M		F	M	M	F
Fish Age (yrs)	7	5	3		6	5	8	7
Lipid Content (%)	6.0%	2.7%	2.6%	3.6%	5.8%	1.8%	6.2%	2.6%
1	ND	9.94	ND	ND	ND	ND	ND	ND
3	1.90	39.28	1.65	0.99	3.11	1.27	5.84	1.18
4,10	ND	ND	ND	ND	ND	ND	ND	ND
7,9	0.17	0.52	0.14	0.26	0.16	0.07	0.39	0.10
6	0.15	0.45	0.27	0.28	0.22	0.05	0.50	0.11
8,5	13.55	16.95	4.42	13.19	8.15	1.84	16.88	4.99
19	ND	ND	ND	ND	0.46	ND	0.83	ND
12,13	0.17	0.38	0.13	0.31	0.20	0.08	0.40	0.09
18	3.51	4.78	1.97	4.76	3.09	0.87	7.48	1.49
17	2.23	2.62	1.31	2.78	1.91	0.47	4.57	1.10
24	0.16	0.24	0.07	0.24	0.16	0.05	0.35	0.03
16,32	3.55	4.47	1.53	4.27	2.57	0.68	6.45	0.86
29	ND	ND	ND	ND	ND	ND	ND	ND
26	0.23	0.56	0.33	0.44	0.19	0.02	0.32	0.16
25	0.11	0.20	0.16	0.17	0.16	0.03	0.34	0.16
31, 28	4.20	4.42	1.38	4.75	3.12	0.52	8.26	2.22
33,21,53	3.64	6.38	2.38	5.11	3.36	0.96	8.41	1.56
51	1.53	1.23	0.24	1.50	0.74	0.12	2.14	0.21
22	1.00	1.16	0.43	0.97	0.55	ND	1.69	ND
45	3.20	3.66	0.98	3.40	1.81	0.58	5.21	1.32
46	2.67	1.75	0.66	2.17	1.29	0.31	3.55	1.27
52	6.25	7.50	2.30	7.46	5.34	1.01	11.54	2.71
49	3.80	10.08	9.55	7.35	4.56	2.74	10.27	4.80
47,48	4.30	11.93	7.57	7.57	4.89	1.80	11.90	2.65
44	6.39	7.49	1.40	7.40	3.61	0.97	12.41	0.96
37,42	3.83	5.68	1.47	4.86	2.69	0.70	7.92	1.66
41,64,71	8.57	11.27	4.02	10.84	5.33	1.75	17.99	2.79
40	1.55	1.92	0.57	1.81	0.98	0.33	2.90	0.70
100	1.53	1.92	0.95	1.85	1.38	0.36	3.62	1.35
63	0.89	0.87	0.72	1.02	0.97	0.22	2.22	1.31
74	4.25	5.77	2.33	5.15	3.19	0.84	8.66	3.19
70,76	1.46	2.42	0.77	2.50	1.59	0.36	4.73	1.06
66,95	20.12	28.64	7.93	26.98	15.68	4.08	45.85	11.57
91	2.37	3.38	1.23	3.20	2.13	0.59	5.52	1.83
56,60/92,84	9.86	8.36	3.29	9.56	5.89	1.57	18.65	4.95
89	9.07	24.17	1.52	6.28	3.74	1.10	10.58	2.16
101	9.05	13.39	5.74	12.75	8.26	2.29	21.74	8.43
99	5.57	9.12	5.87	8.37	6.11	1.92	15.77	7.71
119	1.71	1.78	0.66	1.46	0.96	0.27	2.57	1.14
83	1.31	1.68	0.55	1.81	1.07	0.28	2.92	0.65
97	11.07	27.48	6.23	17.19	5.91	1.98	12.64	4.66
81,87	0.98	1.62	ND	1.36	0.72	ND	2.08	ND
85	3.01	5.03	2.63	4.54	2.59	0.76	7.56	3.39
136	0.68	1.18	0.21	1.05	0.47	0.17	1.64	0.42
77,110	17.73	28.05	7.14	24.77	14.63	3.87	43.24	1.65
82, 151	0.92	1.92	0.76	1.94	1.14	0.31	2.40	1.13
135,144	2.62	4.32	1.65	4.07	2.59	0.67	6.75	2.92
107	1.15	1.70	1.10	1.75	1.38	0.41	3.24	1.13
123,149	12.53	19.32	5.64	18.36	10.52	3.45	31.53	10.33
118	11.26	17.87	9.87	16.50	9.98	2.54	30.91	12.34
134	0.44	0.82	0.51	0.70	0.49	0.24	0.89	0.47
146	3.88	6.49	4.62	6.48	4.83	1.87	10.91	6.23
132,105,153	35.43	40.09	31.33	58.90	32.39	12.27	100.36	40.26
141	6.12	10.85	5.07	10.15	5.48	1.54	13.38	7.13
137,130,176	1.55	2.94	0.96	2.64	1.47	0.55	4.12	0.92
163,138	25.95	45.60	23.99	42.59	24.58	7.99	70.15	26.54
158	0.90	1.64	ND	1.39	0.82	ND	2.05	ND
129,178	2.76	5.63	2.72	4.93	3.02	1.06	6.87	3.46
187,182	10.03	15.77	10.19	15.92	11.85	4.52	25.25	15.49
183	5.31	8.46	4.75	9.07	5.56	1.68	14.98	7.52
128	2.11	5.09	2.20	3.73	2.33	0.49	6.03	2.78
185	1.20	2.05	0.87	2.04	1.00	0.33	2.78	1.52
174	5.77	10.59	4.40	9.81	5.02	1.83	13.08	7.44
177	4.55	8.03	1.02	7.77	2.77	1.35	11.34	1.67
202,171,156	4.46	8.06	3.28	7.59	3.49	1.36	9.35	4.74
157,200	2.09	4.31	2.45	3.72	2.67	0.97	6.03	3.52
172,197	2.41	4.29	2.29	4.28	2.52	0.91	5.66	3.64
180	21.16	35.44	17.10	37.51	18.88	5.81	49.57	28.58
193	8.44	5.08	2.24	6.95	3.72	0.96	12.47	4.69
191	0.44	0.63	0.35	0.78	0.42	0.10	1.27	0.52
199	ND	ND	ND	ND	ND	ND	ND	ND
170,190	7.78	16.26	6.04	14.10	6.33	1.93	17.77	9.59
198	0.72	1.27	0.75	1.14	0.80	0.33	1.77	1.29
201	7.54	13.48	8.22	12.41	8.39	3.29	17.38	13.79
203,196	11.27	19.64	11.20	19.69	12.25	4.51	30.08	19.63
189	0.31	0.46	0.21	0.52	0.26	0.08	0.72	0.37
208,195	1.77	17.36	10.74	3.21	10.77	0.34	3.78	20.48
207	1.67	3.42	2.75	2.88	2.43	1.21	5.10	4.13
194	3.96	7.40	3.11	7.11	3.19	1.11	7.92	5.53
205	0.26	0.63	0.21	0.52	0.18	0.07	0.60	0.35
206	15.54	28.96	17.33	24.50	16.06	7.02	36.64	34.80
209	8.21	14.70	11.82	12.65	8.94	4.63	19.84	20.13
Total PCBs	**410**	**710**	**304**	**601**	**362**	**116**	**942**	**414**
Recovery								
14	655%	228%	136%	305%	204%	81%	324%	176%
65	NM	NM	NM	NM	NM	NM	NM	NM
166	83%	93%	83%	87%	71%	64%	95%	91%

B-2. PCB concentrations in Channel Catfish (ng/g) from Fall 2001 Variability Study

Field ID	5SED2 CC5F	5SED2 CC1-5F
Collected	Fall 2001	Fall 2001
Zone	5	5
Description	Individual Fillet	Composite fillet
Replicate analysis?		
Analyzed by	CBL	CBL
Fish Mass (g)	184.1	
Fish Length (mm)	295	
Fish Sex	F	
Fish Age (yrs)	5	
Lipid Content (%)	2.7%	4.0%
1	ND	ND
3	1.77	3.14
4,10	ND	ND
7,9	0.06	0.21
6	0.06	0.19
8,5	3.33	7.73
19	ND	ND
12,13	0.08	0.24
18	1.28	3.60
17	0.84	2.16
24	0.07	0.16
16,32	1.23	2.88
29	ND	ND
26	0.11	0.20
25	0.06	0.18
31, 28	1.41	3.29
33,21,53	1.29	4.09
51	0.46	0.79
22	0.34	0.75
45	1.00	2.16
46	0.57	1.38
52	2.91	5.10
49	3.10	5.48
47,48	1.66	6.25
44	2.38	4.10
37,42	1.55	3.16
41,64,71	3.24	6.96
40	0.58	1.10
100	0.67	1.50
63	0.48	1.01
74	1.43	3.71
70,76	0.70	1.70
66,95	8.71	17.99
91	1.07	2.38
56,60/92,84	2.49	6.35
89	2.23	3.54
101	4.18	9.39
99	2.87	7.44
119	0.43	1.11
83	0.54	0.98
97	2.44	7.72
81,87	0.37	0.76
85	1.46	3.40
136	0.34	0.62
77,110	7.58	14.80
82, 151	0.54	1.30
135,144	1.26	2.90
107	0.52	1.45
123,149	5.91	12.44
118	4.32	12.58
134	0.25	0.60
146	2.04	5.99
132,105,153	18.88	44.71
141	2.70	6.68
137,130,176	0.80	1.75
163,138	12.13	31.54
158	ND	1.23
129,178	1.59	3.52
187,182	4.77	14.33
183	2.76	7.19
128	1.06	2.77
185	0.62	1.37
174	3.21	6.78
177	2.07	3.96
202,171,156	1.82	6.48
157,200	1.39	3.40
172,197	1.42	3.15
180	11.78	24.43
193	1.65	4.77
191	0.22	0.52
199	ND	ND
170,190	3.72	7.76
198	0.50	1.04
201	5.29	10.74
203,196	9.06	16.14
189	0.18	0.32
208,195	1.01	2.70
207	1.99	3.35
194	2.62	4.37
205	0.20	0.31
206	16.01	22.95
209	9.39	13.09
Total PCBs	201	438
Recovery		
14	115%	187%
65	NM	NM
166	59%	85%

B-3. PCB concentrations in Channel Catfish (ng/g) from Spring 2002 Core Study

Field ID	2 CORE CCF	2 CORE CCR	2 CORE WHOLE FISH	3 CORE CCF	3 CORE CCR	3 CORE WHOLE FISH	4 CORE CCF
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Zone	2	2	2	3	3	3	4
Description	Fillet Composite	Remains Composite	Whole Fish	Fillet Composite	Remains Composite	Whole Fish	Fillet Composite
Replicate analysis?							
Analyzed by	CBL	CBL	CBL	CBL	CBL	CBL	CBL
Lipid Content (%)	4.7%	4.9%	4.8%	3.5%	7.8%	7.4%	4.5%
1	0.27	0.51	0.44	0.33	0.11	0.13	2.69
3	2.75	2.89	2.62	3.85	6.63	6.31	8.41
4,10	3.88	0.43	3.33	1.08	2.66	2.48	0.92
7,9	0.17	0.22	0.16	0.14	0.30	0.28	0.15
6	0.03	0.09	0.01	0.05	0.05	0.05	0.04
8,5	7.80	10.26	8.02	9.75	26.17	24.28	17.55
19	0.25	0.40	0.25	0.27	0.38	0.37	0.31
12,13	0.20	0.28	0.19	ND	0.39	ND	0.12
18	4.08	6.35	4.46	4.04	9.02	8.45	2.72
17	1.73	2.30	1.84	1.99	4.79	4.47	1.78
24	0.13	0.20	0.15	0.19	0.48	0.44	0.19
16,32	2.22	2.98	2.39	3.07	7.20	6.72	2.84
29	0.21	0.30	0.20	0.22	0.45	0.43	0.12
26	0.32	0.33	0.32	0.50	1.23	1.14	0.43
25	ND	ND	ND	ND	ND	ND	ND
31, 28	3.24	3.31	2.99	4.27	13.03	12.02	7.62
33,21,53	3.71	4.63	3.80	3.70	10.64	9.85	3.26
51	0.56	0.57	0.59	1.54	4.61	4.26	1.77
22	0.55	0.50	0.53	0.57	1.88	1.73	0.36
45	2.46	2.88	2.63	3.81	10.69	9.90	4.61
46	2.99	2.73	2.46	1.96	5.03	4.68	3.31
52	3.34	3.59	3.48	7.49	18.97	17.65	11.81
49	ND	ND	ND	ND	ND	ND	ND
47,48	6.09	11.66	6.54	12.53	31.33	29.16	16.51
44	3.64	4.09	3.66	6.81	18.05	16.75	8.14
37,42	3.18	4.01	3.47	5.37	14.28	13.25	6.96
41,64,71	6.39	8.03	6.65	9.35	24.40	22.67	11.59
40	0.49	0.60	0.51	1.34	3.83	3.54	1.97
100	1.44	1.69	1.47	2.16	5.92	5.49	3.11
63	0.77	0.79	0.73	1.04	2.72	2.53	1.86
74	4.91	5.72	4.79	6.32	16.79	15.59	8.09
70,76	1.80	2.08	1.83	2.98	8.59	7.95	3.05
66,95	15.41	17.57	15.55	28.01	68.62	63.95	34.11
91	2.11	2.39	2.16	3.37	8.89	8.25	5.08
56,60/92,84	9.60	11.37	9.51	15.28	44.93	41.52	18.71
89	6.92	5.56	5.11	31.43	98.08	90.42	41.00
101	8.57	9.45	8.84	14.83	37.42	34.82	22.44
99	5.39	8.85	7.80	9.70	24.27	22.59	16.13
119	3.19	3.39	2.79	2.60	7.11	6.59	3.91
83	1.29	1.53	1.40	3.03	8.91	8.23	4.94
97	19.11	24.33	19.68	25.36	65.38	60.78	27.93
81,87	0.95	1.11	0.92	1.53	3.85	3.58	1.84
85	4.25	4.96	3.96	4.66	15.75	14.47	7.76
136	0.42	0.52	1.01	0.94	2.76	1.86	1.10
77,110	16.07	17.49	15.73	27.19	71.68	66.57	36.45
82, 151	1.48	1.22	1.43	2.13	5.76	5.34	2.93
135,144	2.99	3.40	3.03	5.00	13.26	12.31	7.09
107	1.53	1.68	1.46	1.88	5.10	4.73	3.04
123,149	13.82	15.02	14.47	23.02	57.96	53.94	27.14
118	19.39	20.33	17.55	20.83	54.57	50.69	29.48
134	1.35	2.05	1.55	2.22	7.92	7.26	2.23
146	7.90	8.78	7.53	8.27	20.43	19.03	14.59
132,105,153	71.99	78.02	70.09	77.21	191.53	178.38	101.91
141	6.73	7.73	6.39	11.84	31.15	28.92	18.29
137,130,176	2.53	2.86	2.36	3.02	8.07	7.49	3.83
163,138	49.08	53.72	46.07	53.02	131.91	122.84	77.02
158	1.88	2.14	1.77	1.80	4.62	4.29	2.12
129,178	4.68	5.53	4.47	5.49	14.34	13.33	8.62
187,182	19.13	21.26	18.19	19.81	49.52	46.11	30.82
183	10.81	12.30	10.04	12.38	31.93	29.68	15.87
128	4.46	4.68	3.94	4.72	12.43	11.54	7.78
185	1.81	2.08	1.67	2.26	6.19	5.74	3.25
174	6.31	7.41	6.06	10.81	27.87	25.90	15.24
177	6.91	7.80	6.51	9.13	23.79	22.10	8.27
202,171,156	8.49	9.74	7.71	8.97	23.74	22.04	13.47
157,200	3.14	3.68	2.93	3.24	8.74	8.11	5.72
172,197	3.05	3.35	2.83	4.14	10.73	9.97	7.62
180	31.01	35.42	28.45	40.14	103.76	96.44	66.06
193	26.16	30.81	20.23	10.80	32.11	29.66	16.79
191	0.96	0.96	0.90	1.07	2.68	2.49	1.23
199	ND	ND	ND	ND	5.80	ND	2.98
170,190	12.91	15.07	11.35	17.52	48.71	45.12	28.40
198	0.77	0.93	0.70	0.81	2.21	2.05	1.82
201	7.59	9.04	6.86	8.88	23.40	21.73	20.95
203,196	17.10	20.34	14.96	16.79	46.11	42.74	30.77
189	0.39	0.47	0.34	0.44	1.31	1.21	0.79
208,195	6.76	8.44	6.29	7.96	20.53	19.08	21.83
207	1.31	1.66	1.29	1.29	3.20	2.98	3.55
194	3.88	4.75	3.44	5.19	15.02	13.89	11.16
205	0.45	0.52	0.40	0.43	1.32	1.21	0.80
206	8.68	11.52	8.26	10.02	25.48	23.70	37.98
209	4.30	5.74	4.35	5.05	12.34	11.51	19.19
Total PCBs	**535**	**613**	**511**	**682**	**1794**	**1660**	**1024**
Recovery							
14	196%	211%	193%	188%	376%	354%	260%
65	NM	NM	NM	NM	NM	NM	NM
166	82%	79%	78%	75%	91%	89%	91%

B-3. PCB concentrations in Channel Catfish (ng/g) from Spring 2002 Core Study

Field ID	4 CORE CCR	4 CORE WHOLE FISH	5 CORE CCF	5 CORE CCR	5 CORE WHOLE FISH	5 CORE WHOLE FISH*
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Zone	4	4	5	5	5	5
Description	Remains Composite	Whole Fish	Fillet Composite	Remains Composite	Whole Fish	Whole Fish
Replicate analysis?						
Analyzed by	CBL	CBL	CBL	CBL	CBL	CBL
Lipid Content (%)	9.5%	9.0%	3.0%	10.8%	10.1%	10.1%
1	5.06	4.82	ND	0.22		
3	10.39	10.18	0.76	1.84	1.75	4.45
4,10	1.58	1.52	0.21	0.72	0.67	1.70
7,9	0.14	0.14	0.03	0.15	0.14	0.36
6	0.03	0.03	0.02	0.13	0.12	0.30
8,5	31.55	30.11	2.35	8.80	8.23	20.80
19	0.64	0.61	0.10	0.41	0.38	0.96
12,13	0.15	0.15	0.03	0.21	0.19	0.48
18	3.95	3.83	0.74	3.86	3.58	9.03
17	2.77	2.67	0.47	2.08	1.94	4.89
24	ND	ND	0.03	0.20	0.18	0.46
16,32	4.94	4.73	0.45	2.04	1.90	4.80
29	0.15	0.15	0.04	0.18	0.17	0.42
26	0.97	0.91	0.15	0.36	0.34	0.88
25	ND	ND	ND	ND	ND	ND
31, 28	14.28	13.59	0.90	3.35	3.14	7.93
33,21,53	5.16	4.97	0.70	3.31	3.08	7.77
51	3.22	3.07	0.19	0.74	0.69	1.75
22	1.22	1.13	0.16	0.46	0.44	1.11
45	7.78	7.45	0.79	2.91	2.73	6.90
46	6.75	6.40	0.43	1.28	1.21	3.06
52	20.75	19.83	1.53	5.53	5.18	13.09
49	25.60	ND	ND	ND	ND	ND
47,48	28.48	27.25	2.86	6.41	6.09	15.51
44	15.00	14.29	1.31	4.68	4.39	11.09
37,42	12.71	12.11	1.07	3.95	3.70	9.35
41,64,71	20.35	19.45	1.94	7.69	7.18	18.14
40	3.70	3.52	0.30	1.18	1.10	2.77
100	5.54	5.29	0.49	1.75	1.64	4.15
63	3.59	3.41	0.34	1.20	1.13	2.85
74	15.66	14.88	1.32	4.90	4.59	11.60
70,76	5.24	5.02	0.40	1.57	1.47	3.71
66,95	62.25	59.35	5.32	19.39	18.15	45.90
91	8.64	8.27	0.89	3.18	2.98	7.54
56,60/92,84	37.20	35.29	2.91	9.67	9.07	22.96
89	93.19	87.81	4.64	16.11	15.10	38.19
101	37.57	36.01	3.29	12.00	11.23	28.40
99	26.26	25.22	2.82	10.07	9.43	23.85
119	8.24	7.79	0.65	2.21	2.08	5.25
83	9.99	9.47	0.72	2.21	2.08	5.27
97	46.88	44.93	5.63	23.50	21.93	55.37
81,87	3.30	3.15	0.29	1.01	0.94	2.39
85	13.89	13.26	1.13	3.94	3.69	9.34
136	2.07	1.94	0.17	0.67	1.05	2.59
77,110	64.85	61.92	6.29	21.50	20.16	51.01
82, 151	5.48	5.21	0.45	1.65	1.55	3.92
135,144	12.41	11.86	1.09	3.86	3.62	9.15
107	5.54	5.28	0.55	1.99	1.87	4.72
123,149	45.95	44.02	5.06	17.68	16.57	41.92
118	52.87	50.46	4.14	15.21	14.23	35.98
134	6.67	6.21	0.60	1.86	1.75	4.43
146	24.81	23.76	2.89	10.30	9.65	24.40
132,105,153	174.21	166.76	14.37	67.53	62.85	158.52
141	33.57	32.00	2.75	9.70	9.09	22.98
137,130,176	7.21	6.86	0.82	2.92	2.73	6.91
163,138	132.42	126.72	12.89	46.45	43.50	109.99
158	3.85	3.67	0.45	1.50	1.41	3.57
129,178	15.35	14.66	1.72	6.45	6.04	15.25
187,182	53.53	51.19	6.26	22.36	20.94	52.96
183	29.06	27.70	3.02	10.92	10.22	25.85
128	13.61	13.01	1.09	4.06	3.80	9.60
185	6.33	6.01	0.56	1.91	1.79	4.53
174	27.27	26.03	2.73	9.87	9.24	23.38
177	16.08	15.28	2.21	7.99	7.48	18.92
202,171,156	25.77	24.51	2.60	9.72	9.09	22.99
157,200	11.00	10.46	1.36	6.00	5.60	14.12
172,197	14.84	14.10	1.39	5.06	4.73	11.97
180	122.00	116.24	10.45	38.25	35.80	90.52
193	40.96	38.47	2.29	8.73	8.17	20.64
191	2.31	2.20	0.20	0.74	0.69	1.75
199	5.00	ND	1.94	4.31	ND	ND
170,190	56.48	53.59	4.13	15.49	14.49	36.63
198	3.85	3.64	0.41	1.53	1.43	3.62
201	41.38	39.27	4.50	16.87	15.79	39.90
203,196	63.36	60.01	6.31	24.33	22.74	57.46
189	1.70	1.61	0.14	0.53	0.49	1.25
208,195	46.47	43.93	5.88	22.77	21.29	53.79
207	7.43	7.03	1.27	5.07	4.74	11.96
194	24.80	23.40	1.69	6.57	6.14	15.53
205	1.82	1.71	0.12	0.45	0.42	1.06
206	83.71	79.00	9.76	38.24	35.73	90.27
209	40.84	38.61	5.99	22.37	20.93	52.91
Total PCBs	**1932**	**1810**	**179**	**669**	**622**	**1572**
Recovery						
14	420%	404%	85%	184%	176%	447%
65	NM	NM	NM	NM	NM	NM
166	97%	96%	43%	49%	49%	126%

***Transformed value to meet average recovery**

B-4. PCB concentrations in Channel Catfish (ng/g) from Spring 2002 Variability Study

Field ID	2CC CC1F	2CC CC2F	2CC CC3F	2CC CC4F	2CC CC5F	2CC CC6F	2CC CC1-6F
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Zone	2	2	2	2	2	2	2
Description	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Composite fillet
Replicate analysis?							
Analyzed by	CBL	CBL	CBL	CBL	CBL	CBL	CBL
Fish Mass (g)	1133	977	952	903	1190	622	
Fish Length (mm)	470	474	480	458	514	419	
Fish Sex	F	M	M	F	M	M	
Average Fish Age (yrs)	10	9	9	9	14	7	
Lipid Content (%)	6.2%	6.8%	5.4%	6.9%	1.9%	3.7%	3.4%
1	6.01	1.68	0.23	0.15	0.82	0.42	0.20
3	5.88	9.42	5.34	4.28	3.56	1.33	3.03
4,10	1.95	2.89	1.73	3.06	1.10	1.52	2.35
7,9	0.42	0.52	0.19	0.18	0.31	0.20	0.28
6	0.25	0.36	0.15	0.10	0.21	0.12	0.18
8,5	21.25	22.44	14.03	15.74	11.65	9.10	15.97
19	0.47	0.74	0.34	0.36	0.27	0.38	0.39
12,13	0.65	0.47	0.19	0.26	0.30	0.20	0.35
18	12.47	12.72	6.21	5.91	6.05	4.99	7.03
17	4.64	5.02	2.47	2.74	2.57	2.37	3.53
24	0.16	0.50	0.19	0.24	0.13	0.20	0.21
16,32	3.75	7.38	2.61	3.72	2.57	3.21	4.16
29	0.62	0.44	0.22	0.22	0.32	0.20	0.29
26	0.55	0.39	0.26	0.45	0.36	0.23	0.55
25	ND	1.06	ND	ND	0.58	ND	ND
31, 28	7.54	8.66	3.77	5.55	4.27	4.01	7.80
33,21,53	8.68	8.70	4.34	5.57	4.51	3.98	6.30
51	1.18	1.94	1.05	1.86	0.75	1.23	1.65
22	0.78	2.40	0.65	0.94	0.60	0.56	1.30
45	7.24	6.94	4.04	5.68	3.69	3.77	5.32
46	2.56	2.27	1.77	3.41	4.56	1.71	3.57
52	8.18	9.30	5.53	8.03	6.36	4.62	8.37
49	ND	ND	ND	ND	ND	ND	ND
47,48	27.87	19.77	7.20	7.03	20.97	11.43	19.64
44	3.14	10.90	4.10	9.41	3.46	6.18	7.82
37,42	5.47	8.56	5.16	8.06	4.81	5.32	7.72
41,64,71	10.78	15.93	8.21	11.40	12.64	8.32	13.01
40	1.94	1.98	0.94	1.66	1.42	1.03	1.71
100	4.30	3.32	1.98	2.46	3.32	1.93	3.21
63	1.65	1.36	0.69	1.15	1.90	0.84	1.65
74	11.53	9.50	5.30	7.06	9.03	5.28	9.06
70,76	3.41	3.23	1.95	3.17	2.08	2.03	3.23
66,95	31.81	32.33	18.73	31.47	23.87	19.81	35.19
91	4.88	4.04	2.92	4.17	3.59	2.76	4.66
56,60/92,84	19.17	23.05	15.42	21.49	18.15	14.05	23.81
89	33.86	38.05	16.73	49.79	4.18	31.50	41.03
101	21.77	16.14	12.24	16.36	17.61	11.03	19.12
99	18.23	9.83	7.97	10.32	17.48	7.15	14.30
119	4.49	4.12	2.86	4.81	4.28	2.74	5.44
83	3.62	3.14	2.45	3.53	3.18	2.19	3.75
97	51.55	34.79	21.25	29.19	35.14	22.77	22.39
81,87	0.87	1.74	1.07	1.63	1.61	1.06	1.63
85	8.47	4.77	4.39	5.25	10.77	4.14	7.88
136	1.06	0.85	0.47	1.36	0.22	0.68	0.97
77,110	8.28	27.29	17.54	29.43	21.13	19.70	27.01
82, 151	2.79	2.20	1.71	2.58	3.03	1.76	2.92
135,144	7.38	4.54	3.99	5.75	6.00	3.76	6.39
107	2.36	1.88	1.53	2.09	3.56	1.44	2.72
123,149	25.61	24.20	16.36	26.08	16.14	17.85	24.84
118	30.86	18.43	15.34	21.91	34.32	15.38	29.51
134	4.56	3.35	2.51	3.26	3.82	2.13	4.40
146	18.44	9.22	7.16	9.30	17.13	6.70	13.41
132,105,153	131.31	89.16	60.89	87.88	117.68	67.45	107.35
141	24.59	9.12	5.03	6.59	29.79	6.68	16.43
137,130,176	2.64	3.26	2.07	3.72	2.58	2.56	3.41
163,138	87.12	55.72	43.71	56.17	98.06	41.91	76.23
158	4.00	2.14	1.62	1.91	3.81	1.50	2.88
129,178	11.51	6.11	4.49	5.62	9.96	4.45	8.50
187,182	40.76	23.17	17.30	21.83	36.83	16.83	30.74
183	26.00	12.52	9.80	12.56	25.60	9.61	19.21
128	9.42	4.54	3.78	4.98	12.47	3.36	7.75
185	4.42	2.36	1.69	2.25	3.86	1.92	3.34
174	20.77	8.63	4.95	7.19	17.36	6.72	12.91
177	4.13	8.93	3.41	9.94	2.03	7.58	7.57
202,171,156	18.94	8.79	6.93	9.25	18.50	6.88	14.06
157,200	8.53	3.68	2.51	3.36	5.78	2.65	5.01
172,197	9.10	3.39	2.05	2.79	9.68	2.71	6.22
180	85.90	35.26	22.20	30.39	85.48	29.81	60.03
193	18.73	13.95	11.83	19.58	31.00	14.12	26.13
191	2.16	1.09	0.80	1.03	2.35	0.82	1.71
199	5.87	ND	ND	ND	2.89	ND	3.11
170,190	37.27	13.57	8.96	12.20	39.84	11.47	26.36
198	2.15	0.78	0.52	0.74	1.93	0.63	1.42
201	23.22	7.46	4.20	5.97	18.93	5.97	13.74
203,196	40.79	15.91	10.81	15.33	35.63	13.28	27.79
189	1.06	0.37	0.44	0.32	1.05	0.32	0.67
208,195	25.34	6.32	3.91	5.52	14.34	5.07	12.31
207	5.39	1.18	0.61	0.94	2.55	0.83	2.24
194	12.48	3.73	1.98	2.90	12.29	3.54	8.12
205	0.97	0.43	0.32	0.46	0.86	0.40	0.80
206	37.00	6.80	3.28	5.34	18.60	6.40	16.65
209	19.29	3.19	1.51	2.62	7.91	3.33	8.25
Total PCBs	**1186**	**796**	**505**	**739**	**1030**	**554**	**962**
Recovery							
14	295%	238%	158%	224%	138%	143%	243%
65	NM	NM	NM	NM	NM	NM	NM
166	84%	68%	57%	75%	94%	65%	97%

B-4. PCB concentrations in Channel Catfish (ng/g) from Spring 2002 Variability Study

Field ID	4CC CC1F	4CC CC2F	4CC CC3F	4CC CC4F	4CC CC5F	4CC CC1-5F	5SED CC1F
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Zone	4	4	4	4	4	4	5
Description	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Composite fillet	Individual Fillet
Replicate analysis?							
Analyzed by	CBL	CBL	CBL	CBL	CBL	CBL	CBL
Fish Mass (g)	420	401	337	394	376		472
Fish Length (mm)	385	375	338	326	365		385
Fish Sex	M	M	M	F	F		F
Average Fish Age (yrs)	7	8	11	10	9		6
Lipid Content (%)	2.8%	1.8%	5.4%	2.5%	2.9%	3.1%	2.5%
1	0.66	0.46	0.10	0.50	0.20	0.19	0.74
3	0.50	1.89	1.70	3.08	2.64	5.19	2.31
4,10	0.85	0.29	0.39	0.59	0.49	0.76	0.94
7,9	0.21	0.11	0.16	0.09	0.08	0.16	0.16
6	0.14	0.06	0.15	0.01	ND	0.08	0.08
8,5	9.12	7.69	13.04	7.94	10.07	14.04	8.01
19	0.37	0.21	0.44	0.17	0.19	0.30	0.24
12,13	0.25	0.06	0.17	0.17	0.14	0.22	0.17
18	4.74	3.02	3.31	2.57	2.23	4.42	4.42
17	2.48	1.10	2.24	1.21	1.30	2.40	2.05
24	0.23	0.99	0.19	0.09	0.16	0.20	0.18
16,32	3.51	2.90	3.70	1.27	1.97	2.92	2.33
29	0.19	0.08	0.12	0.16	0.12	0.24	0.19
26	0.28	0.13	0.22	ND	0.27	0.37	0.11
25	ND	ND	ND	0.56	ND	ND	ND
31, 28	3.82	7.20	3.96	2.81	3.74	4.44	3.04
33,21,53	4.73	2.38	3.72	2.31	2.45	4.51	3.30
51	1.41	1.98	1.72	0.45	1.12	1.56	1.14
22	0.73	0.52	1.00	0.35	0.52	0.70	0.49
45	3.46	3.08	3.40	2.43	3.42	4.57	3.08
46	1.52	3.88	2.87	1.84	2.23	3.36	1.38
52	8.01	8.01	5.83	3.81	5.76	9.25	6.29
49	ND	ND	ND	ND	ND	ND	ND
47,48	11.91	0.99	4.62	11.34	12.04	17.32	6.78
44	6.95	8.14	5.93	1.87	6.23	7.61	4.92
37,42	5.89	6.55	3.60	2.54	5.72	5.95	4.40
41,64,71	10.22	10.29	8.64	6.62	8.70	12.24	8.86
40	1.27	1.53	1.49	0.86	1.14	1.66	0.95
100	1.74	2.88	1.42	2.10	2.10	3.16	1.73
63	0.82	1.87	0.77	1.18	1.21	1.70	0.86
74	5.14	8.16	3.91	4.98	5.84	8.15	5.04
70,76	1.70	1.13	1.28	1.00	1.56	1.95	1.08
66,95	24.65	26.64	17.42	13.18	23.77	31.36	19.52
91	3.31	4.08	2.33	2.40	3.63	4.83	3.19
56,60/92,84	10.23	14.35	8.90	9.22	12.23	16.50	10.08
89	26.51	9.79	9.06	5.86	33.05	31.77	18.21
101	14.17	12.60	8.93	12.20	13.65	20.60	12.74
99	8.72	13.33	5.22	11.53	12.39	16.48	9.27
119	2.41	4.53	2.45	2.15	2.94	3.87	2.07
83	2.45	2.40	1.21	2.04	3.34	4.06	2.24
97	25.94	19.40	11.37	18.56	22.80	35.26	26.07
81,87	1.27	1.62	0.89	0.79	1.38	1.86	1.16
85	4.09	6.33	2.79	4.99	5.85	7.59	4.11
136	0.83	0.49	0.71	0.19	0.62	0.91	0.47
77,110	24.28	30.32	15.87	15.10	29.98	36.54	22.60
82, 151	1.70	2.28	0.86	1.71	1.98	2.97	1.77
135,144	4.09	4.82	2.50	3.89	4.98	6.99	3.84
107	1.65	2.67	1.00	2.09	2.26	3.19	1.84
123,149	18.78	21.42	11.83	12.44	21.14	29.19	19.39
118	16.00	24.40	9.49	19.54	22.95	29.70	14.61
134	1.45	0.98	0.65	1.54	1.81	2.67	1.94
146	7.72	8.98	4.37	12.36	11.25	16.63	9.50
132,105,153	61.64	61.89	34.51	78.45	62.61	118.75	67.21
141	8.71	11.46	5.96	16.02	12.23	22.25	9.96
137,130,176	2.76	2.41	1.60	1.95	3.48	4.64	2.76
163,138	42.73	45.74	24.16	61.30	60.22	88.43	45.31
158	1.48	1.43	1.07	1.92	1.76	2.67	1.61
129,178	5.14	4.79	2.75	7.77	6.65	10.73	5.91
187,182	16.47	19.56	9.86	28.56	23.90	37.21	21.62
183	8.92	10.24	5.14	15.23	13.01	20.69	9.80
128	4.04	4.38	2.21	5.79	5.41	8.03	3.72
185	1.95	1.80	1.15	2.71	2.46	4.09	1.86
174	8.63	8.95	5.46	12.14	11.85	19.09	9.63
177	7.53	7.10	4.11	2.27	10.04	12.14	7.66
202,171,156	7.27	8.07	4.22	11.58	10.88	16.22	8.11
157,200	3.54	2.98	2.04	5.81	5.09	7.48	4.57
172,197	3.77	4.62	2.26	6.82	5.76	9.38	4.30
180	32.77	38.12	18.40	59.51	48.39	80.70	35.99
193	9.98	12.43	8.18	11.20	11.97	18.11	9.22
191	0.65	0.93	0.40	1.15	0.99	1.60	0.69
199	2.84	ND	2.17	3.25	3.25	4.61	3.49
170,190	14.47	16.72	6.42	23.50	19.92	34.73	13.88
198	1.03	1.00	0.63	1.73	1.69	2.29	1.20
201	10.87	11.54	6.54	19.80	18.26	25.90	13.41
203,196	16.49	17.82	9.57	29.86	26.82	39.59	18.69
189	0.39	0.44	0.25	0.70	0.66	1.00	0.48
208,195	13.03	10.55	1.47	21.85	21.43	28.16	15.63
207	2.40	1.66	1.48	4.23	4.00	4.80	3.16
194	5.80	5.43	3.12	10.17	8.22	13.69	5.69
205	0.49	0.37	0.23	0.68	0.61	0.96	0.41
206	22.09	16.97	12.23	37.88	37.22	47.28	25.94
209	11.79	7.77	6.68	20.43	20.71	24.05	13.75
Total PCBs	**623**	**636**	**382**	**721**	**775**	**1132**	**626**
Recovery							
14	145%	130%	629%	109%	154%	180%	137%
65	NM	NM	NM	NM	NM	NM	NM
166	67%	92%	71%	66%	79%	94%	73%

B-4. PCB concentrations in Channel Catfish (ng/g) from Spring 2002 Variability Study

Field ID	5SED CC2F	5SED CC3F	5SED CC4F	5SED CC5F	5SED CC1-5F
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Zone	5	5	5	5	5
Description	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Composite fillet
Replicate analysis?					
Analyzed by	CBL	CBL	CBL	CBL	CBL
Fish Mass (g)	357	589	174	513	
Fish Length (mm)	360	387	275	390	
Fish Sex	M	F	M	M	
Average Fish Age (yrs)	6	7	4	8	
Lipid Content (%)	2.8%	5.1%	3.3%	3.8%	3.5%
1	0.14	0.12	0.77	0.16	0.19
3	0.93	1.32	5.68	0.66	0.44
4,10	0.35	0.53	0.40	0.59	0.27
7,9	0.05	0.05	0.02	0.10	0.05
6	0.01	0.01	0.06	0.09	0.02
8,5	3.50	5.29	2.37	4.06	3.38
19	0.13	0.18	0.10	0.23	0.11
12,13	0.06	0.06	0.06	0.10	0.04
18	1.48	1.53	0.45	1.97	1.18
17	0.76	0.96	0.34	1.05	0.65
24	0.06	0.06	0.03	0.09	0.05
16,32	0.73	0.91	0.22	1.06	0.58
29	0.07	0.07	0.05	0.09	0.05
26	ND	0.21	0.11	0.09	0.09
25	ND	ND	ND	ND	ND
31, 28	1.11	1.82	0.69	1.29	1.29
33,21,53	1.21	1.50	0.41	1.84	0.97
51	0.30	0.50	0.07	0.35	0.30
22	0.19	ND	0.47	0.26	ND
45	1.27	1.84	0.75	1.48	1.18
46	0.67	0.91	0.44	0.74	0.58
52	2.64	3.81	0.84	3.20	2.54
49	ND	ND	ND	ND	ND
47,48	2.76	6.73	0.95	5.28	4.25
44	1.87	3.27	0.37	2.39	1.83
37,42	1.61	2.72	0.33	1.90	1.61
41,64,71	3.28	4.84	0.88	3.99	2.94
40	0.40	0.77	0.24	0.64	0.47
100	0.80	1.17	0.42	0.95	0.70
63	0.38	0.84	0.26	0.68	0.44
74	1.98	3.10	0.77	2.58	1.91
70,76	0.29	1.01	0.24	0.98	0.55
66,95	7.75	12.53	2.80	10.53	8.20
91	1.06	2.30	0.53	1.67	1.36
56,60/92,84	4.15	6.92	1.87	5.50	3.94
89	5.71	13.28	2.98	8.08	6.88
101	5.87	8.75	2.40	6.78	5.59
99	4.85	6.77	1.98	5.24	4.30
119	1.01	1.63	0.54	1.24	0.90
83	0.97	1.79	0.38	1.26	0.91
97	9.35	14.07	2.98	11.34	8.88
81,87	0.53	0.73	0.11	0.49	0.41
85	1.80	2.70	0.71	2.01	1.86
136	0.26	0.37	0.13	0.47	0.26
77,110	9.71	16.19	1.34	10.84	8.85
82, 151	0.75	1.16	0.34	0.89	0.73
135,144	1.69	2.69	0.94	2.06	1.67
107	0.91	1.44	0.26	1.00	0.79
123,149	8.93	13.32	3.58	9.85	8.38
118	6.69	9.45	2.58	7.40	6.07
134	0.92	1.45	0.35	1.22	0.75
146	5.11	7.27	2.04	5.36	4.51
132,105,153	33.54	44.75	13.34	35.17	29.75
141	4.19	6.74	1.85	4.77	4.06
137,130,176	1.38	2.09	0.54	1.42	1.21
163,138	22.73	32.21	8.13	22.84	19.79
158	0.78	1.01	0.38	0.98	0.69
129,178	2.78	4.33	1.21	2.92	2.55
187,182	11.43	16.61	5.07	11.89	10.35
183	5.23	7.02	2.24	5.60	4.60
128	2.01	2.87	0.82	1.93	1.64
185	0.78	1.34	0.45	0.91	0.80
174	4.32	6.81	2.33	4.78	4.15
177	3.48	6.11	0.75	3.69	3.10
202,171,156	4.17	6.65	2.18	4.77	3.85
157,200	2.32	3.65	1.17	2.29	1.99
172,197	2.28	3.77	1.11	2.54	2.05
180	16.99	26.80	7.80	18.43	15.80
193	3.70	5.43	1.43	4.86	3.49
191	0.33	0.46	0.14	0.41	0.29
199	2.32	3.47	2.47	ND	2.10
170,190	6.72	11.17	3.22	7.26	6.28
198	0.60	1.14	0.40	0.66	0.60
201	7.16	12.42	4.29	7.70	6.88
203,196	10.09	16.98	6.09	11.36	9.62
189	0.23	0.35	0.15	0.22	0.18
208,195	8.34	16.27	6.95	9.41	8.87
207	1.94	3.49	1.62	2.14	1.95
194	2.68	5.44	1.38	2.97	2.63
205	0.19	0.38	0.24	0.21	0.19
206	13.08	27.22	11.90	15.29	14.99
209	7.29	15.18	7.94	8.60	8.91
Total PCBs	**290**	**463**	**145**	**328**	**277**
Recovery					
14	98%	150%	123%	120%	101%
65	NM	NM	NM	NM	NM
166	50%	78%	48%	68%	51%

B-5. PCB concentrations in White Perch (ng/g) from Fall 2001 Core Study

Field ID	2 CORE WPF	2 CORE WPF	2 CORE WPR	2 CORE Whole Fish	3 CORE WPF	3 CORE WPR	3 Core Whole Fish	4 CORE WPF
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	2	2	2	2	3	3	3	4
Description	Fillet Composite	Fillet Composite	Remains Composite	Whole Fish	Fillet Composite	Remains Composite	Whole Fish	Fillet Composite
Replicate analysis?	rep A	rep B						
Analyzed by	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS
Lipid Content (%)	4.6%	3.7%	6.4%	5.9%	5.3%	8.3%	7.6%	3.3%
1	ND	ND	ND	ND	ND	ND	ND	ND
3	0.99	0.92	0.60	0.68	1.57	2.35	2.19	0.91
4,10	0.12	0.10	0.13	0.13	0.15	0.19	0.18	0.10
7,9	0.05	0.04	0.06	0.06	0.10	0.12	0.11	0.06
6	ND	ND	ND	0.00	0.06	0.08	0.08	0.06
8,5	2.42	1.89	3.95	3.57	4.33	6.88	6.34	2.45
19	0.25	0.18	0.40	0.36	0.42	0.70	0.64	0.21
12,13	0.07	0.04	0.10	0.09	0.18	0.21	0.20	ND
18	1.17	0.82	1.45	1.36	2.55	3.93	3.64	1.33
17	1.15	0.80	1.48	1.37	2.20	3.46	3.19	1.06
24	0.06	0.05	0.08	0.07	0.10	0.16	0.14	0.05
16,32	1.84	1.52	2.52	2.34	4.19	6.95	6.37	1.88
29	ND	ND	ND	ND	ND	ND	ND	ND
26	0.77	0.54	0.94	0.88	1.32	2.20	2.01	0.69
25	0.42	0.31	0.53	0.50	0.77	1.24	1.14	0.44
31, 28	5.14	3.76	7.17	6.60	13.17	23.87	21.61	6.32
33,21,53	3.03	2.23	4.32	3.97	7.43	12.82	11.68	2.73
51	1.05	0.76	1.48	1.36	3.24	5.33	4.89	0.98
22	0.53	0.40	0.73	0.67	1.60	2.85	2.59	0.98
45	1.88	1.36	2.80	2.55	3.28	5.14	4.75	1.35
46	1.19	0.89	1.79	1.63	2.04	3.30	3.04	0.79
52	6.29	4.57	ND	1.13	14.36	23.53	21.60	5.15
49	6.26	4.49	8.36	7.74	13.92	22.85	20.97	4.83
47,48	9.15	6.66	8.64	8.49	21.36	36.15	33.03	6.64
44	5.15	3.72	6.97	6.44	12.31	21.12	19.26	4.37
37,42	3.41	2.07	5.00	4.53	6.67	13.78	12.28	2.95
41,64,71	7.05	6.98	13.65	12.27	22.62	38.70	35.31	7.59
40	1.77	1.27	2.29	2.13	3.77	6.52	5.94	1.29
100	1.97	1.40	3.37	3.02	4.13	6.96	6.36	1.73
63	0.56	0.41	0.79	0.73	1.06	1.88	1.71	0.70
74	4.56	3.21	6.12	5.66	9.78	17.44	15.83	3.73
70,76	9.73	6.83	13.05	12.06	23.71	41.22	37.53	8.13
66,95	19.68	18.88	26.88	25.30	41.97	72.96	66.42	16.71
91	3.48	2.43	5.00	4.57	6.64	11.09	10.15	2.17
56,60/92,84	27.82	19.36	37.36	34.49	51.78	86.60	79.25	11.39
89	NA	NA	NA	NA	NA	NA	NA	NA
101	16.03	11.05	21.30	19.69	28.82	47.20	43.33	9.27
99	10.95	7.63	15.04	13.85	19.31	33.27	30.32	6.37
119	NA	NA	NA	NA	NA	NA	NA	NA
83	1.79	1.22	2.61	2.38	3.25	6.26	5.63	1.08
97	4.10	2.81	5.68	5.22	8.01	13.53	12.37	2.51
81,87	1.25	1.00	2.04	1.85	2.99	5.26	4.78	0.85
85	3.55	ND	ND	0.74	ND	ND	ND	ND
136	2.28	1.56	3.20	2.93	4.04	6.61	6.07	1.27
77,110	28.27	19.22	38.93	35.77	54.39	92.05	84.10	15.87
82, 151	13.37	8.98	18.92	17.31	21.69	36.39	33.29	6.17
135,144	6.32	4.22	9.08	8.29	10.33	17.39	15.90	2.79
107	2.34	1.57	3.60	3.26	4.29	7.55	6.86	1.34
123,149	19.39	13.45	27.61	25.28	28.69	46.33	42.61	9.53
118	15.21	10.22	22.27	20.29	23.23	48.65	43.29	8.21
134				0.00			0.00	
146	5.64	3.64	8.28	7.53	7.41	12.43	11.37	2.34
132,105,153	62.14	41.80	87.75	80.30	77.86	127.31	116.87	26.47
141	3.15	2.20	4.86	4.41	4.76	7.91	7.25	1.51
137,130,176	2.22	1.57	3.37	3.06	3.30	5.65	5.15	1.08
163,138	50.01	32.95	70.54	64.49	71.06	119.98	109.66	22.61
158	0.88	0.58	1.29	1.17	1.31	2.32	2.11	0.36
129,178	5.27	3.53	7.91	7.18	7.40	12.75	11.63	2.35
187,182	14.04	9.41	20.79	18.90	17.11	28.64	26.21	5.88
183	10.42	6.71	15.49	14.05	12.31	21.19	19.31	3.72
128	5.41	2.64	7.88	7.08	8.52	15.36	13.92	2.47
185	1.72	1.18	2.64	2.39	2.36	4.06	3.70	0.76
174	6.42	4.39	9.75	8.84	10.38	17.75	16.20	3.25
177	4.17	2.94	6.41	5.82	6.48	11.24	10.23	2.17
202,171,156	7.26	4.72	10.57	9.61	9.56	16.87	15.33	3.07
157,200	2.97	1.98	3.56	3.34	4.20	7.25	6.61	0.92
172,197	1.90	1.24	2.76	2.52	2.48	4.28	3.90	0.84
180	32.78	21.70	47.90	43.60	41.71	72.17	65.75	12.67
193	4.75	ND	1.78	2.39	2.32	ND	ND	ND
191	0.58	0.44	0.83	0.77	0.79	1.38	1.25	0.21
199	0.18	0.13	0.29	0.26	0.31	0.53	0.49	0.13
170,190	21.05	13.00	29.31	26.76	28.14	50.53	45.80	8.44
198	0.41	0.28	0.61	0.55	0.63	1.15	1.04	0.26
201	8.77	5.86	13.13	11.92	12.11	21.20	19.28	4.54
203,196	12.60	8.12	18.70	16.96	15.49	27.59	25.04	5.18
189	1.01	0.64	1.35	1.24	1.14	1.96	1.79	0.39
208,195	4.32	2.42	5.89	5.37	4.67	8.52	7.71	5.54
207	0.61	0.42	0.89	0.81	0.79	1.31	1.20	0.41
194	4.12	2.63	5.87	5.35	5.32	9.22	8.40	1.92
205	0.27	0.16	0.30	0.29	0.28	0.48	0.44	0.16
206	8.02	5.57	11.38	10.43	11.19	18.73	17.14	6.32
209	0.48	0.34	0.63	0.58	0.60	0.93	0.86	0.45
Total PCBs	**537**	**365**	**741**	**702**	**864**	**1474**	**1303**	**291**
Recovery								
14	126%	113%	107%	113%	97%	NM	97%	119%
65	83%	73%	NM	78%	74%	88%	81%	68%
166	83%	72%	92%	85%	80%	102%	91%	68%

B-5. PCB concentrations in White Perch (ng/g) from Fall 2001 Core Study

Field ID	4 CORE WPR	4 CORE Whole Fish*	5 CORE WPF	5 CORE WPR	5 CORE Whole Fish
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	4	4	5	5	5
Description	Remains Composite	Whole Fish	Fillet Composite	Remains Composite	Whole Fish
Replicate analysis?					
Analyzed by	ANS	ANS	ANS	ANS	ANS
Lipid Content (%)	8.0%	7.3%	7.2%	11.4%	10.3%
1	Sample Lost	ND	ND	ND	ND
3		1.94	0.55	0.89	0.80
4,10		0.21	0.04	0.03	0.03
7,9		0.13	0.02	0.02	0.02
6		0.12	ND	ND	ND
8,5		5.20	1.44	1.48	1.47
19		0.44	0.07	0.09	0.09
12,13		ND	0.03	0.03	0.03
18		2.82	0.46	0.48	0.48
17		2.25	0.42	0.44	0.43
24		0.11	0.02	0.03	0.02
16,32		4.00	0.73	0.84	0.81
29		ND	ND	ND	ND
26		1.48	0.31	0.32	0.32
25		0.92	0.13	0.14	0.14
31, 28		13.42	2.28	2.67	2.56
33,21,53		5.80	1.54	1.64	1.61
51		2.08	0.60	0.67	0.65
22		2.08	0.28	0.29	0.29
45		2.88	1.37	1.22	1.26
46		1.69	0.62	0.63	0.63
52		10.94	3.65	3.96	3.88
49		10.26	3.55	3.91	3.81
47,48		14.11	5.09	5.79	5.60
44		9.29	3.00	3.39	3.29
37,42		6.28	2.16	2.07	2.09
41,64,71		16.11	5.60	6.55	6.29
40		2.74	1.06	1.24	1.20
100		3.68	1.26	1.44	1.39
63		1.49	0.27	0.33	0.31
74		7.92	2.31	2.75	2.63
70,76		17.26	4.90	5.87	5.61
66,95		35.50	11.88	16.99	15.62
91		4.61	1.97	2.21	2.14
56,60/92,84		24.19	14.73	17.12	16.48
89		NA	NA	NA	NA
101		19.70	8.29	9.12	8.90
99		13.53	6.54	7.54	7.27
119		NA	NA	NA	NA
83		2.29	1.60	1.79	1.74
97		5.33	2.22	2.55	2.46
81,87		1.81	0.72	0.87	0.83
85		ND	ND	ND	ND
136		2.69	1.11	1.26	1.22
77,110		33.71	16.19	18.26	17.70
82, 151		13.10	6.38	7.42	7.14
135,144		5.93	3.04	3.58	3.44
107		2.84	1.32	1.66	1.57
123,149		20.24	9.04	10.03	9.76
118		17.44	7.46	8.88	8.50
134					
146		4.97	3.43	4.22	4.01
132,105,153		56.23	28.46	31.80	30.90
141		3.21	1.42	1.67	1.61
137,130,176		2.30	1.03	1.25	1.19
163,138		48.03	23.34	26.97	25.99
158		0.76	ND	ND	ND
129,178		5.00	2.61	3.11	2.98
187,182		12.48	7.31	8.24	7.99
183		7.91	4.69	5.62	5.37
128		5.24	2.62	3.31	3.12
185		1.61	0.92	1.09	1.05
174		6.91	3.16	3.78	3.61
177		4.61	2.03	2.42	2.31
202,171,156		6.52	3.85	4.63	4.42
157,200		1.95	1.92	2.21	2.13
172,197		1.78	0.99	1.19	1.14
180		26.92	15.93	19.29	18.39
193		ND	0.92	0.63	0.71
191		0.44	0.28	0.36	0.34
199		0.28	0.16	0.15	0.16
170,190		17.93	10.49	13.19	12.46
198		0.54	0.34	0.40	0.39
201		9.64	7.17	8.37	8.04
203,196		11.01	8.05	9.77	9.31
189		0.83	0.44	0.56	0.52
208,195		11.77	11.05	12.49	12.10
207		0.86	1.01	1.10	1.07
194		4.08	2.36	2.94	2.78
205		0.35	0.13	0.14	0.14
206		13.43	15.25	17.13	16.62
209		0.95	1.11	1.17	1.15
Total PCBs		**619**	**299**	**348**	**335**
Recovery					
14		119%	NM	NM	NM
65		68%	NM	NM	NM
166		68%	NM	NM	NM

*Based on Fillet/Whole Fish Ratio

B-6. PCB concentrations in White Perch (ng/g) from Fall 2001 Variability Study 1

Field ID	5 VAR1 WP1	5 VAR1 WP2	5 VAR1 WP3	5 VAR1 WP4	5 VAR1 WP5	5 VAR1 WP1-5F
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	5	5	5	5	5	5
Description	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Fillet Composite
Replicate analysis?						
Analyzed by	ANS	ANS	ANS	ANS	ANS	ANS
Fish Mass (g)	161.38	92.93	129.27	125.3	100.9	
Fish Length (mm)	223	186	203	199	190	
Fish Sex	M	M	F	M	M	
Average Fish Age (yrs)	6	3	7	6	6	
Lipid Content (%)	5.7%	2.8%	6.9%	4.9%	3.7%	7.2%
1	ND	ND	ND	ND	ND	ND
3	1.21	1.25	0.58	0.57	0.47	0.55
4,10	0.06	0.06	0.05	ND	0.03	0.04
7,9	0.03	0.04	0.03	0.01	0.02	0.02
6	ND	ND	ND	ND	ND	ND
8,5	2.16	ND	1.71	0.68	1.25	1.44
19	0.11	0.18	0.10	0.05	0.06	0.07
12,13	0.06	0.06	0.03	0.20	0.02	0.03
18	0.68	1.19	0.54	0.15	0.52	0.46
17	0.58	0.91	0.60	0.14	0.45	0.42
24	0.04	0.06	0.03	ND	0.02	0.02
16,32	0.80	1.96	0.96	0.25	0.81	0.73
29	ND	ND	ND	ND	ND	ND
26	0.45	0.64	0.33	0.20	0.34	0.31
25	0.16	0.33	0.16	0.06	0.16	0.13
31, 28	1.55	5.45	3.19	0.56	2.78	2.28
33,21,53	2.13	4.24	1.49	0.48	1.69	1.54
51	0.71	1.67	0.59	0.14	0.70	0.60
22	0.28	0.61	0.32	ND	0.32	0.28
45	1.78	2.66	1.27	0.56	1.27	1.37
46	1.03	1.35	0.61	0.15	0.55	0.62
52	5.76	9.25	3.43	1.18	3.77	3.65
49	5.72	8.83	3.51	1.08	3.63	3.55
47,48	7.81	13.53	4.85	1.34	5.66	5.09
44	4.29	7.67	2.97	0.88	3.19	3.00
37,42	3.29	5.34	2.04	0.64	2.25	2.16
41,64,71	7.95	15.16	5.49	1.45	5.95	5.60
40	1.65	2.77	0.91	0.35	1.10	1.06
100	1.86	3.07	1.17	0.29	1.24	1.26
63	0.44	0.69	0.27	0.11	0.26	0.27
74	2.97	5.76	2.47	0.63	2.47	2.31
70,76	6.07	13.44	5.32	1.25	5.12	4.90
66,95	17.92	44.85	14.08	4.34	14.24	11.88
91	3.65	4.96	1.73	0.71	1.81	1.97
56,60/92,84	23.61	40.35	13.43	4.57	14.48	14.73
89	NA	NA	NA	NA	NA	NA
101	15.20	22.22	7.06	2.71	8.14	8.29
99	11.37	15.01	5.71	2.27	6.16	6.54
119	NA	NA	NA	NA	NA	NA
83	1.62	2.73	1.50	0.70	1.49	1.60
97	3.86	6.17	1.88	0.63	2.20	2.22
81,87	1.08	2.23	0.66	0.16	0.72	0.72
85	ND	ND	ND	ND	ND	ND
136	2.08	3.06	0.99	0.33	1.04	1.11
77,110	26.76	41.57	14.23	5.14	15.21	16.19
82, 151	11.76	16.83	5.39	1.86	6.29	6.38
135,144	5.57	8.38	2.63	0.89	2.85	3.04
107	2.51	3.38	1.08	0.45	1.16	1.32
123,149	17.88	23.06	8.46	3.30	8.69	9.04
118	11.88	20.79	7.18	2.14	7.19	7.46
134	ND	ND	ND	ND	ND	ND
146	6.48	6.85	2.89	1.70	3.19	3.43
132,105,153	57.81	65.87	25.05	11.38	27.84	28.46
141	2.87	3.65	1.37	0.50	1.32	1.42
137,130,176	1.95	2.64	1.02	0.37	0.89	1.03
163,138	43.24	58.21	20.21	8.07	23.05	23.34
158	0.65	1.05	0.34	0.11	0.36	ND
129,178	5.39	5.96	2.20	1.02	2.52	2.61
187,182	16.05	14.16	5.61	3.29	7.31	7.31
183	9.35	10.93	3.94	1.68	4.62	4.69
128	4.57	7.13	2.00	0.84	2.60	2.62
185	1.48	1.85	0.89	0.36	0.85	0.92
174	6.06	7.90	2.93	1.05	2.92	3.16
177	3.89	4.80	2.06	0.73	1.64	2.03
202,171,156	8.02	8.01	3.04	1.58	3.64	3.85
157,200	4.62	3.46	1.36	0.93	1.68	1.92
172,197	2.02	2.06	0.74	0.38	0.99	0.99
180	30.99	36.04	12.57	5.49	16.42	15.93
193	ND	4.99	0.53	0.39	1.28	0.92
191	0.43	0.67	0.21	0.08	0.30	0.28
199	0.48	0.26	0.10	0.09	0.13	0.16
170,190	19.73	24.02	7.92	3.53	10.72	10.49
198	0.86	0.51	0.22	0.19	0.28	0.34
201	17.61	10.74	4.65	3.85	6.43	7.17
203,196	17.83	13.44	5.71	3.70	7.51	8.05
189	0.89	0.85	0.33	0.22	0.43	0.44
208,195	31.68	12.64	6.07	7.07	8.57	11.05
207	2.97	1.02	0.48	0.73	0.79	1.01
194	4.96	4.19	1.65	0.98	2.26	2.36
205	0.30	0.21	0.08	0.08	0.13	0.13
206	42.91	14.39	6.94	9.79	11.79	15.25
209	3.28	0.91	0.48	0.79	0.78	1.11
Total PCBs	**568**	**693**	**255**	**115**	**291**	**299**
Recovery						
14	116%	127%	NM	NM	NM	NM
65	71%	79%	NM	NM	NM	NM
166	73%	81%	NM	NM	NM	NM

B-7. PCB concentrations in White Perch (ng/g) from Fall 2001 Variability Study 2

Field ID	5 VAR2 WP1	5 VAR2 WP2	5 VAR2 WP3	5 VAR2 WP4	5 VAR2 WP5	5 VAR2 WP6	5 VAR2 WP1-6F
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	5	5	5	5	5	5	5
Description	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Fillet Composite
Replicate analysis?							
Analyzed by	ANS	ANS	ANS	ANS	ANS	ANS	ANS
Fish Mass (g)	84.27	75.03	55.79	66.25	44.88	27.39	
Fish Length (mm)	185	230	162	175	153	135	
Fish Sex	M	F	F	M	M	F	
Average Fish Age (yrs)	4	3	2	5	3	2	
Lipid Content (%)	6.8%	2.6%	4.7%	5.1%	2.5%	1.4%	3.9%
1	ND	9.10	ND	ND	ND	ND	0.41
3	0.85	3.91	1.68	2.03	0.22	0.80	0.64
4,10	0.05	0.62	0.04	0.07	0.03	0.05	0.06
7,9	0.03	0.47	0.02	0.03	0.02	0.03	0.04
6	0.07	0.78	ND	ND	0.04	ND	0.06
8,5	2.10	13.43	2.50	5.83	ND	ND	ND
19	0.14	ND	0.08	0.28	0.04	0.11	0.18
12,13	0.03	0.28	0.05	0.07	0.01	0.03	0.03
18	0.80	3.08	0.61	1.42	0.38	0.54	0.98
17	1.05	2.31	0.46	1.24	0.41	0.54	1.05
24	0.06	0.22	0.02	0.08	ND	0.03	ND
16,32	1.47	3.32	0.91	2.84	0.56	0.94	1.64
29	ND	0.09	ND	ND	ND	0.01	ND
26	0.76	ND	0.39	1.00	0.33	0.34	0.94
25	0.38	ND	0.18	0.46	0.17	0.18	0.52
31, 28	4.20	8.74	3.57	10.06	2.07	2.77	7.51
33,21,53	2.51	3.68	1.38	5.09	0.88	1.84	3.11
51	0.82	1.02	0.40	2.32	0.17	0.66	1.14
22	0.44	1.34	0.63	0.81	0.27	0.31	0.76
45	1.86	1.14	0.91	3.77	0.48	1.17	1.21
46	0.75	0.48	0.33	1.98	0.15	0.67	0.81
52	5.76	6.28	2.69	12.10	1.98	3.85	7.21
49	5.94	6.01	2.30	12.15	1.83	3.77	7.40
47,48	8.24	6.97	0.81	17.42	2.52	6.33	10.90
44	4.81	4.61	2.40	17.90	1.85	3.28	5.74
37,42	3.80	2.99	1.72	ND	1.25	2.33	4.14
41,64,71	9.42	6.78	3.71	21.59	2.88	6.22	10.61
40	1.70	1.64	0.74	4.27	0.50	1.15	1.78
100	1.52	1.42	ND	4.70	0.25	1.23	1.97
63	0.60	0.45	0.20	1.05	0.16	0.40	0.72
74	3.92	3.30	2.05	9.10	1.40	2.77	5.66
70,76	7.41	7.02	3.76	20.09	3.04	6.08	12.82
66,95	18.09	17.02	8.41	45.95	13.21	34.42	59.73
91	2.69	5.73	0.93	6.01	0.56	1.90	3.10
56,60/92,84	20.63	6.12	ND	50.21	ND	ND	25.93
89	NA	NA	NA	NA	NA	NA	NA
101	10.15	7.86	3.95	24.95	2.26	8.34	14.28
99	8.65	5.62	2.49	21.70	1.84	6.45	10.26
119	NA	NA	NA	NA	NA	NA	NA
83	2.61	1.31	ND	7.11	0.38	1.23	1.68
97	2.90	1.25	1.05	7.18	0.67	2.35	3.79
81,87	0.97	1.36	0.36	2.61	0.18	0.84	1.35
85	ND	2.31	0.78	ND	0.48	1.30	3.07
136	1.31	ND	0.42	3.49	0.20	1.08	1.65
77,110	20.85	14.25	7.65	51.40	4.02	16.09	22.92
82, 151	7.15	5.22	2.15	19.14	1.15	6.21	7.97
135,144	3.53	2.47	0.95	9.44	0.51	2.93	4.12
107	1.74	1.27	0.48	4.38	0.26	1.32	2.15
123,149	9.89	10.48	3.22	31.74	1.68	8.54	11.94
118	9.54	4.97	3.68	29.91	2.16	8.48	14.98
134	13.08	3.01	5.96	28.82	2.39	6.05	7.70
146	3.75	4.09	1.04	12.38	0.52	2.54	4.59
132,105,153	32.03	31.99	11.56	90.12	5.48	26.41	44.05
141	1.66	2.77	0.39	5.68	0.24	1.39	1.89
137,130,176	1.37	0.56	0.44	4.65	0.18	1.06	1.70
163,138	26.79	21.22	10.52	84.55	4.21	22.71	34.53
158	ND	2.75	ND	ND	ND	ND	ND
129,178	3.04	2.26	0.97	9.85	0.44	2.29	3.15
187,182	7.16	7.27	2.23	21.11	0.94	5.49	7.53
183	4.84	4.34	1.39	15.11	0.62	4.00	5.84
128	3.42	2.19	1.23	11.28	0.48	2.71	3.55
185	1.14	0.70	0.23	4.35	0.12	0.72	1.06
174	3.70	3.14	0.99	14.02	0.53	2.84	4.30
177	2.55	2.13	1.10	9.68	0.37	2.12	2.97
202,171,156	4.33	3.23	1.23	12.97	0.62	3.02	2.78
157,200	2.34	0.65	0.53	6.45	0.27	1.26	2.34
172,197	1.14	ND	0.37	3.93	0.16	0.75	1.51
180	17.54	10.86	5.40	61.80	2.08	12.83	25.27
193	0.65	11.44	0.16	1.61	0.12	0.44	0.49
191	0.29	0.27	0.10	0.96	0.04	0.22	0.32
199	0.25	ND	0.05	0.65	0.04	0.09	0.21
170,190	11.86	7.11	3.89	44.60	1.39	8.37	15.36
198	0.49	0.15	0.11	1.28	0.07	0.18	0.42
201	9.31	3.32	2.18	25.17	1.30	3.86	7.85
203,196	9.59	4.31	2.15	27.53	1.19	4.85	9.68
189	0.52	0.37	0.16	1.71	0.07	0.36	0.68
208,195	15.56	3.32	3.16	36.86	2.27	4.13	11.67
207	1.38	0.23	0.21	2.47	0.19	0.29	1.06
194	2.94	1.18	0.84	11.18	0.34	1.61	4.05
205	0.16	ND	0.06	0.75	0.02	0.10	0.26
206	23.84	3.04	3.64	48.87	2.98	4.04	19.10
209	1.67	0.30	0.27	3.16	0.21	0.26	1.14
Total PCBs	**401**	**327**	**134**	**1079**	**83**	**277**	**506**
Recovery							
14	NM	121%	NM	NM	NM	113%	94%
65	NM	79%	NM	NM	NM	89%	49%
166	NM	90%	NM	NM	NM	89%	68%

B-8. PCB concentrations in White Perch (ng/g) from Fall 2001 Variability Study 3

Field ID	5 VAR3 WP1	5 VAR3 WP2	5 VAR3 WP3	5 VAR3 WP5	5 VAR3 WP6	5 VAR3 WP1-6F
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	5	5	5	5	5	5
Description	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Individual Fillet	Fillet Composite
Replicate analysis?						
Analyzed by	ANS	ANS	ANS	ANS	ANS	ANS
Fish Mass (g)	91.98	68.24	52.24	51.11	53.32	
Fish Length (mm)	186	173	162	158	163	
Fish Sex	M	M	F	M	F	
Average Fish Age (yrs)	5	3	2	3	4	
Lipid Content (%)	3.1%	2.5%	NA	3.0%	5.1%	2.9%
1	0.78	7.17	0.41	ND	ND	0.30
3	1.90	ND	1.01	1.36	2.12	1.03
4,10	0.10	0.97	0.04	0.07	0.09	0.06
7,9	0.05	0.32	0.02	0.03	0.05	0.04
6	0.08	0.50	ND	0.03	0.20	0.04
8,5	5.00	10.70	ND	ND	7.28	3.19
19	0.32	ND	ND	0.59	0.36	0.18
12,13	0.07	0.26	0.02	0.04	0.09	0.05
18	1.86	3.78	0.65	0.97	2.11	0.95
17	1.71	2.42	0.53	1.02	1.75	0.83
24	ND	0.13	ND	ND	0.12	0.06
16,32	3.44	3.99	1.15	1.83	3.97	1.68
29	ND	0.08	ND	ND	ND	0.01
26	1.33	ND	0.36	0.54	1.34	0.58
25	0.61	ND	0.17	0.31	0.63	0.28
31, 28	10.94	5.33	2.63	5.07	12.60	4.74
33,21,53	6.67	5.15	2.54	2.94	6.78	3.01
51	2.38	0.63	0.85	1.11	2.80	1.14
22	1.14	1.42	0.32	0.58	1.17	0.57
45	3.87	1.51	1.65	1.92	4.66	2.15
46	2.28	0.60	0.69	1.16	2.54	1.09
52	14.69	4.19	5.02	4.84	15.75	6.72
49	14.68	4.83	4.46	4.84	15.31	6.48
47,48	21.40	6.10	6.52	7.91	21.34	9.53
44	21.13	3.36	4.20	4.31	14.38	5.86
37,42	ND	2.47	2.75	3.20	10.73	4.12
41,64,71	26.54	6.00	7.67	7.71	27.83	11.04
40	4.89	1.18	1.46	1.49	5.18	2.07
100	4.67	1.28	1.37	1.64	4.92	2.08
63	1.35	0.43	0.32	0.46	1.29	0.55
74	10.66	2.20	2.48	3.75	10.89	4.32
70,76	21.73	4.25	5.56	8.32	23.72	9.36
66,95	146.22	15.66	41.87	35.28	81.74	35.06
91	7.92	8.12	2.28	2.28	7.68	3.35
56,60/92,84	62.53	8.40	16.67	9.71	62.48	22.19
89	NA	NA	NA	NA	NA	NA
101	31.63	5.39	9.64	10.25	32.34	14.09
99	25.72	3.67	7.24	8.02	27.66	11.36
119	NA	NA	NA	NA	NA	NA
83	6.35	1.46	ND	2.06	8.41	3.19
97	9.02	0.36	2.64	2.84	9.19	3.95
81,87	3.33	0.62	0.90	1.05	3.34	1.40
85	ND	1.52	ND	ND	ND	ND
136	4.44	ND	1.24	1.33	4.41	1.90
77,110	66.16	11.31	19.73	19.99	66.39	28.90
82, 151	25.12	4.48	6.66	7.86	24.30	10.62
135,144	12.29	1.98	3.21	3.45	11.96	5.14
107	5.70	0.88	1.28	1.42	5.35	2.25
123,149	29.01	7.36	9.64	10.88	30.92	14.38
118	27.78	1.33	7.92	11.05	29.40	13.17
134	27.40	0.69	9.06	10.34	30.50	13.09
146	9.75	3.06	3.03	2.83	10.08	4.48
132,105,153	84.27	25.61	25.62	31.55	89.75	42.00
141	4.77	3.09	1.78	1.42	5.26	2.32
137,130,176	3.98	0.92	1.12	1.18	4.29	1.81
163,138	76.09	15.87	22.54	28.01	80.91	36.75
158	ND	ND	ND	ND	ND	ND
129,178	8.27	ND	2.23	2.52	8.87	3.82
187,182	19.13	7.07	5.48	6.79	20.44	9.68
183	14.23	3.56	3.89	4.48	14.59	6.59
128	10.40	1.91	2.64	3.12	9.98	4.40
185	3.01	0.57	0.75	0.86	3.06	1.15
174	11.08	2.45	3.13	3.63	12.48	5.16
177	7.24	1.74	2.14	2.47	8.41	3.50
202,171,156	11.76	2.74	3.07	3.58	12.33	5.29
157,200	5.46	0.22	1.42	ND	6.03	2.50
172,197	3.01	ND	0.69	0.85	3.34	1.32
180	48.15	8.97	12.23	14.63	55.52	22.53
193	1.95	8.44	0.64	ND	1.92	0.83
191	0.99	0.10	0.21	0.25	0.92	0.38
199	0.43	ND	0.12	0.11	0.60	0.21
170,190	34.03	6.01	8.07	9.83	38.10	14.97
198	0.90	0.13	0.40	0.16	1.11	0.41
201	17.41	3.80	4.37	3.98	22.01	8.46
203,196	21.24	4.42	5.05	5.31	25.23	9.75
189	1.42	0.33	0.30	0.45	1.55	0.60
208,195	21.90	5.30	5.61	1.87	30.99	11.15
207	1.79	0.46	0.45	0.22	2.24	0.92
194	6.61	1.09	1.31	1.95	8.71	3.02
205	0.35	0.09	0.09	0.12	0.59	0.18
206	27.60	5.37	6.04	3.26	40.33	13.61
209	1.62	0.97	0.38	0.20	2.55	0.88
Total PCBs	**1136**	**269**	**320**	**341**	**1160**	**487**
Recovery						
14	107%	74%	92%	105%	122%	107%
65	108%	60%	69%	87%	105%	87%
166	112%	61%	64%	80%	109%	84%

B-9. PCB concentrations in White Perch (ng/g) from Spring 2002 Core Study

Field ID	2 CORE WPF	2 CORE WPR	2 CORE Whole Fish*	3 CORE WPF	3 CORE WPR	3 CORE Whole Fish	4 CORE WPF	4 CORE WPR
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Zone	2	2	2	3	3	3	4	4
Description	Fillet Composite	Remains Composite	Whole Fish	Fillet Composite	Remains Composite	Whole Fish	Fillet Composite	Remains Composite
Replicate analysis?								
Analyzed by	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS
Lipid Content (%)	3.7%	7.1%	6.0%	5.1%	7.9%	7.1%	5.1%	7.2%
1	ND	sample lost	ND	16.86	20.64	19.46	10.98	13.47
3	ND		ND	10.00	12.10	11.44	8.21	8.69
4,10	1.41		2.30	1.78	1.90	1.86	1.27	1.16
7,9	ND		ND	1.36	1.73	1.62	1.03	1.52
6	0.04		0.07	2.62	3.37	3.14	1.93	3.18
8,5	0.54		0.88	30.37	37.36	35.18	23.92	33.63
19	ND		ND	1.10	1.18	1.16	ND	ND
12,13	ND		ND	1.21	1.80	1.62	0.88	1.37
18	0.68		1.10	13.74	17.64	16.42	12.64	17.72
17	0.56		0.91	11.39	14.61	13.61	9.24	15.45
24	0.16		0.26	0.24	0.25	0.25	0.20	0.21
16,32	1.32		2.14	14.81	18.34	17.24	12.37	16.29
29	ND		ND	0.16	0.18	0.18	0.12	0.13
26	0.57		0.92	1.60	2.08	1.93	1.38	2.10
25	0.32		0.51	ND	1.50	ND	ND	1.29
31, 28	4.42		7.19	24.67	31.05	29.06	17.72	28.48
33,21,53	0.44		0.71	21.84	27.70	25.87	18.26	25.53
51	0.91		1.48	2.75	3.13	3.01	2.39	2.99
22	0.75		1.22	3.57	4.91	4.49	4.00	4.42
45	0.69		1.12	5.30	6.48	6.11	5.11	6.66
46	0.40		0.65	1.77	2.23	2.09	1.73	2.01
52	5.72		9.30	14.68	18.70	17.45	13.67	19.33
49	5.29		8.60	15.08	18.95	17.74	13.90	21.07
47,48	7.85		12.77	23.46	29.71	27.76	20.36	28.29
44	4.63		7.54	13.25	16.66	15.60	12.18	18.46
37,42	1.93		3.14	9.77	12.70	11.79	9.48	14.61
41,64,71	8.56		13.92	25.76	33.87	31.34	23.44	36.03
40	1.66		2.71	4.27	5.50	5.12	4.30	6.71
100	1.47		2.39	4.38	5.29	5.01	3.90	5.61
63	0.44		0.72	1.21	1.54	1.44	1.01	1.55
74	4.17		6.79	9.51	15.13	13.37	6.78	10.10
70,76	7.62		12.39	21.28	29.42	26.87	14.48	20.56
66,95	20.30		33.02	58.75	76.71	71.11	52.64	76.69
91	2.72		4.42	25.58	37.60	33.84	18.35	32.02
56,60/92,84	10.92		17.76	25.78	18.46	20.77	12.33	42.61
89	NA		NA	NA	NA	NA	NA	NA
101	12.38		20.14	18.68	24.66	22.79	16.88	23.54
99	11.00		17.90	12.35	17.01	15.55	10.81	15.23
119	NA		NA	NA	NA	NA	NA	NA
83	1.49		2.42	4.04	5.65	5.15	ND	5.68
97	3.33		5.41	1.79	2.31	2.15	1.70	3.03
81,87	3.68		5.99	2.22	2.96	2.73	14.53	2.56
85	ND		ND	6.95	10.01	9.06	5.28	7.65
136	1.81		2.94	2.87	3.59	3.37	2.81	4.06
77,110	23.08		37.53	39.33	55.84	50.68	35.27	51.16
82, 151	9.00		14.63	15.96	21.22	19.58	15.12	21.69
135,144	4.17		6.79	6.65	8.68	8.05	6.67	9.51
107	2.09		3.39	2.60	3.54	3.25	2.59	3.60
123,149	12.84		20.88	23.29	29.51	27.57	22.40	30.50
118	10.77		17.51	5.83	8.84	7.89	4.12	5.63
134	8.44		13.72	2.47	3.82	3.40	2.14	3.47
146	7.22		11.74	8.50	10.45	9.85	8.81	13.06
132,105,153	40.02		65.10	79.07	98.29	92.31	72.12	100.59
141	1.88		3.05	13.03	16.90	15.69	11.61	18.26
137,130,176	ND		ND	3.13	4.18	3.86	2.99	4.91
163,138	32.36		52.63	58.52	77.35	71.48	51.15	75.08
158	2.02		3.29	ND	ND	ND	ND	ND
129,178	3.20		5.20	6.48	8.69	8.00	6.04	9.96
187,182	10.90		17.74	21.05	25.84	24.35	18.95	28.19
183	6.36		10.34	11.53	15.31	14.13	10.61	16.55
128	3.90		6.34	6.77	10.38	9.25	5.95	8.91
185	1.02		1.65	2.32	4.17	3.59	2.33	3.88
174	4.30		6.99	9.63	13.19	12.07	8.84	14.95
177	2.89		4.70	5.96	8.32	7.58	5.10	8.11
202,171,156	ND		ND	9.27	13.47	12.15	8.16	12.59
157,200	2.07		3.36	0.70	1.22	1.06	0.64	1.18
172,197	1.67		2.72	ND	ND	ND	ND	ND
180	18.46		30.03	32.16	42.21	39.08	29.34	45.87
193	21.98		35.76	30.59	38.78	36.23	26.77	43.90
191	0.25		0.40	0.72	ND	ND	0.34	0.57
199	ND		ND	ND	ND	ND	ND	2.10
170,190	13.33		21.68	23.51	31.01	28.67	20.60	31.81
198	0.25		0.41	0.38	ND	ND	0.39	0.67
201	6.11		9.94	10.68	14.05	13.00	10.32	17.44
203,196	7.63		12.41	13.59	17.33	16.16	12.73	22.48
189	0.86		1.40	1.32	1.78	1.63	1.38	3.61
208,195	6.34		10.32	11.83	14.24	13.49	12.99	25.40
207	0.42		0.68	0.82	0.82	0.82	1.02	2.53
194	2.58		4.20	4.12	5.20	4.87	3.56	6.57
205	0.17		0.28	0.29	0.27	0.28	0.31	1.34
206	6.55		10.66	9.80	11.28	10.82	12.87	22.34
209	0.41		0.67	1.30	1.43	1.39	1.75	3.23
Total PCBs	**406**		**660**	**942**	**1214**	**1128**	**828**	**1253**
Recovery								
14	138%		138%	89%	81%	NM	171%	418%
65	94%		94%	68%	59%	NM	55%	63%
166	89%		89%	66%	56%	NM	55%	63%

*Based on Fillet/Whole Fish Ratio

B-9. PCB concentrations in White Perch (ng/g) from Spring 2002 Core Study

Field ID	4 CORE Whole Fish	5 CORE WPF	5 CORE WPR	5 CORE Whole Fish
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Zone	4	5	5	5
Description	Whole Fish	Fillet Composite	Remains Composite	Whole Fish
Replicate analysis?				
Analyzed by	ANS	ANS	ANS	ANS
Lipid Content (%)	7.1%	4.6%	4.2%	4.3%
1	13.47	ND	ND	ND
3	8.94	ND	ND	ND
4,10	1.24	ND	ND	ND
7,9	1.47	0.02	ND	ND
6	3.03	0.02	0.06	0.05
8,5	32.83	0.59	0.93	0.86
19	ND	0.37	0.48	0.46
12,13	1.32	ND	ND	ND
18	17.31	0.78	1.16	1.08
17	14.69	0.75	1.19	1.10
24	0.21	0.15	0.25	0.23
16,32	16.09	1.68	2.62	2.44
29	0.13	ND	ND	ND
26	2.02	0.68	1.09	1.01
25	ND	0.49	0.70	0.66
31, 28	27.24	1.72	3.21	2.92
33,21,53	24.95	ND	ND	ND
51	2.98	1.78	2.79	2.60
22	4.51	0.97	1.68	1.54
45	6.59	0.83	1.36	1.25
46	2.03	0.45	0.69	0.64
52	18.86	8.43	13.46	12.48
49	20.33	8.54	14.22	13.12
47,48	27.67	12.92	21.12	19.53
44	17.81	6.40	11.29	10.34
37,42	14.06	3.21	6.42	5.79
41,64,71	34.69	11.02	21.53	19.48
40	6.44	2.08	3.67	3.36
100	5.45	2.48	4.39	4.02
63	1.49	0.58	1.07	0.97
74	9.77	6.08	11.46	10.41
70,76	20.04	13.94	24.50	22.45
66,95	74.45	22.81	44.04	39.91
91	30.26	4.08	7.34	6.70
56,60/92,84	37.55	17.91	33.14	30.17
89	NA	NA	NA	NA
101	23.01	18.07	29.64	27.39
99	14.86	15.79	19.81	19.04
119	NA	NA	NA	NA
83	ND	4.14	8.70	7.81
97	2.85	4.82	8.51	7.79
81,87	5.37	5.69	10.72	9.74
85	7.43	ND	ND	ND
136	3.95	2.58	4.64	4.24
77,110	49.70	33.98	61.58	56.21
82, 151	21.11	12.17	22.55	20.53
135,144	9.27	5.84	10.99	9.99
107	3.52	2.61	5.87	5.24
123,149	29.94	24.43	39.33	36.43
118	5.52	20.31	33.63	31.04
134	3.32	16.64	38.14	33.95
146	12.64	11.76	26.88	23.93
132,105,153	98.35	72.58	117.55	108.81
141	17.52	3.22	6.03	5.48
137,130,176	4.68	ND	ND	ND
163,138	72.80	59.57	98.05	90.57
158	ND	4.88	10.22	9.18
129,178	9.49	5.06	9.99	9.03
187,182	27.28	20.70	37.38	34.13
183	15.89	11.01	21.69	19.61
128	8.61	6.58	13.93	12.50
185	3.69	1.40	4.00	3.49
174	14.19	7.99	14.98	13.62
177	7.77	4.73	9.14	8.28
202,171,156	12.11	8.89	18.09	16.29
157,200	1.11	3.27	7.62	6.77
172,197	ND	2.63	6.21	5.51
180	44.04	31.26	62.44	56.37
193	41.86	39.89	66.80	61.57
191	0.54	0.56	0.91	0.84
199	ND	ND	0.46	ND
170,190	30.60	23.94	48.44	43.67
198	0.64	0.45	1.04	0.93
201	16.56	12.21	26.10	23.39
203,196	21.21	14.15	31.87	28.41
189	3.26	0.69	0.92	0.88
208,195	23.66	3.38	ND	ND
207	2.30	1.40	3.96	3.46
194	6.17	8.39	9.61	9.38
205	1.16	0.71	0.40	0.46
206	21.13	22.78	47.31	42.53
209	3.03	1.75	3.51	3.16
Total PCBs	1202	685	1235	1127
Recovery				
14	NM	130%	121%	NM
65	NM	73%	98%	NM
166	NM	83%	117%	NM

*Based on Fillet/Whole Fish Ratio

B-10. PCB concentrations in Prey FIsh (ng/g) from Fall 2001 Core Study

Field ID	3SD1SFA	3SD1SFB	3SED2SFA	3SED2SFB	3SED2SFC	3 CORE SF	4SD1SFA	4SD1SFB	4SD1SFC
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	3	3	3	3	3	3	4	4	4
Description	4 YOY Catfish	1 Hogchoker	YOY Catfish	YOY Catfish	YOY Catfish	Prey Fish	16 Croaker	15 Croaker	5 Hogchoker
Replicate analysis?			Rep A	Rep B	Rep C				
Analyzed by	CBL	CBL	CBL	CBL	CBL	CBL	CBL	CBL	CBL
Lipid Content (%)	4.5%	8.6%	2.5%	2.4%	2.6%	2.6%	2.0%	1.1%	3.2%
1	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	10.33	1.98	0.93	2.87	4.40	4.10	0.98	0.60	6.71
4,10	ND	ND	ND	ND	ND	ND	ND	ND	ND
7,9	0.42	0.10	0.25	0.29	0.23	0.26	0.10	0.06	0.28
6	0.57	0.08	0.27	0.37	0.24	0.31	0.14	0.06	0.30
8,5	18.28	2.10	13.59	12.95	13.68	12.12	3.28	1.83	9.49
19	0.50	ND	ND	ND	ND	0.50	ND	ND	ND
12,13	0.61	0.06	0.30	0.46	0.27	0.34	0.10	0.06	0.30
18	7.03	1.35	5.86	5.80	5.62	5.13	1.97	1.12	4.88
17	3.69	0.58	2.73	2.67	2.59	2.45	0.90	0.51	2.23
24	0.25	0.05	0.21	0.20	0.19	0.18	0.08	0.05	0.15
16,32	5.54	0.85	4.13	3.78	3.82	3.62	1.46	0.83	3.44
29	ND	ND	ND	ND	ND	ND	ND	ND	ND
26	0.55	0.07	0.21	0.27	0.25	0.27	0.17	0.09	0.49
25	0.29	0.06	0.79	0.18	0.14	0.29	0.08	0.04	0.24
31, 28	5.69	1.06	3.68	3.64	3.69	3.55	0.85	0.45	3.26
33,21,53	8.18	1.04	6.11	5.68	5.75	5.35	2.25	1.30	4.84
51	2.42	0.20	1.62	1.53	1.62	1.48	0.39	0.22	1.01
22	1.44	ND	0.85	0.76	0.89	0.98	0.33	0.16	0.60
45	5.32	0.90	4.05	4.01	4.23	3.70	1.21	0.65	4.14
46	3.31	0.42	2.25	1.95	2.29	2.04	0.55	0.28	1.66
52	10.39	1.49	7.35	7.13	7.25	6.72	3.01	1.62	9.00
49	8.68	4.26	7.16	5.69	6.12	6.38	2.34	1.32	5.55
47,48	10.01	2.97	12.92	12.27	12.29	10.09	4.13	2.28	10.41
44	8.35	1.00	6.08	6.01	5.89	5.46	1.92	1.09	4.51
37,42	5.86	0.68	5.11	4.96	4.91	4.31	1.45	0.82	3.92
41,64,71	15.49	1.81	9.04	10.46	8.74	9.11	2.70	1.53	8.46
40	2.61	0.32	1.86	1.68	1.77	1.65	0.64	0.36	1.72
100	3.49	0.45	2.21	2.34	2.34	2.16	0.76	0.39	2.09
63	1.62	0.26	1.18	1.31	1.21	1.12	0.16	0.09	0.72
74	8.10	0.94	5.09	5.27	5.86	5.05	1.45	0.79	4.69
70,76	3.53	1.35	3.00	2.90	3.01	2.76	1.56	0.94	7.81
66,95	38.16	4.77	26.23	25.82	25.84	24.16	10.69	6.05	26.67
91	4.73	0.46	3.24	3.23	3.25	2.98	1.15	0.68	2.73
56,60/92,84	18.35	2.09	12.87	12.96	13.92	12.04	2.68	1.48	8.83
89	9.51	1.44	34.73	33.33	36.18	23.04	3.71	2.95	42.94
101	18.98	2.38	13.11	12.74	12.93	12.03	5.24	2.90	13.90
99	13.51	1.53	8.65	8.22	8.47	8.08	3.01	1.64	7.90
119	1.92	0.31	1.44	1.42	1.45	1.31	0.39	0.21	1.11
83	4.16	0.30	2.57	2.77	2.89	2.54	0.67	0.37	2.95
97	16.00	4.56	25.81	23.89	25.12	19.08	8.57	4.81	26.67
81,87	1.71	ND	1.36	1.29	1.40	1.44	0.45	0.21	1.20
85	8.53	0.83	4.84	4.85	141.50	32.11	1.38	0.76	2.98
136	1.51	0.25	0.92	0.89	0.93	0.90	0.85	0.47	1.72
77,110	38.12	2.43	25.59	24.76	25.63	23.31	8.33	4.96	19.18
82, 151	3.09	0.40	2.09	2.03	1.59	1.84	0.73	0.41	1.52
135,144	6.25	0.70	4.10	3.95	4.09	3.82	1.44	0.81	4.77
107	3.58	0.39	2.21	2.17	2.20	2.11	0.63	0.36	1.85
123,149	27.26	2.95	19.69	18.76	19.40	17.61	8.08	4.50	19.29
118	31.93	2.67	18.12	17.49	18.11	17.67	4.69	2.66	13.83
134	1.25	0.13	0.91	0.98	1.11	0.88	0.35	0.19	1.12
146	10.13	1.52	7.29	7.08	7.35	6.67	2.79	1.59	6.64
132,105,153	92.50	11.39	64.49	62.91	65.78	59.42	20.60	11.41	52.01
141	15.65	1.49	10.01	9.64	10.38	9.44	2.71	1.38	9.10
137,130,176	3.81	ND	2.64	2.54	2.70	2.92	0.89	0.50	2.90
163,138	67.94	8.02	48.46	46.82	49.20	44.09	14.49	7.85	40.24
158	2.20	ND	1.63	1.54	1.65	1.76	0.68	ND	1.28
129,178	6.17	0.95	4.90	4.55	5.47	4.41	1.57	0.76	5.46
187,182	23.88	3.58	19.31	18.52	19.61	16.98	6.50	3.53	16.67
183	14.98	1.79	10.10	10.06	10.29	9.44	3.51	1.82	8.16
128	6.02	0.62	4.03	4.02	5.18	3.97	1.14	0.61	4.33
185	2.74	0.38	1.90	1.75	1.96	1.74	0.61	0.32	2.15
174	12.82	1.09	8.96	8.49	9.16	8.11	2.56	1.35	9.37
177	11.66	1.42	8.09	7.82	8.28	7.45	1.72	0.96	8.53
202,171,156	11.72	1.26	7.55	7.27	7.76	7.11	2.87	1.54	7.40
157,200	3.96	0.36	2.46	2.53	2.53	2.37	1.31	0.64	3.50
172,197	5.63	0.67	3.53	3.46	3.54	3.36	1.00	0.49	4.15
180	53.90	4.91	35.20	34.15	36.18	32.87	9.29	4.33	34.16
193	10.19	1.27	7.06	6.47	7.30	6.46	2.06	1.10	6.38
191	1.41	0.14	0.91	0.94	0.91	0.86	0.20	0.10	0.51
199	ND	ND	ND	ND	ND	ND	ND	ND	ND
170,190	24.79	2.18	15.92	15.26	16.49	14.93	3.79	1.79	15.65
198	0.97	0.13	0.69	0.66	0.74	0.64	0.25	0.14	1.33
201	12.06	1.30	7.69	7.21	7.98	7.25	3.29	1.68	13.05
203,196	22.81	2.23	14.70	13.93	15.48	13.83	6.26	3.00	18.84
189	0.70	0.06	0.40	0.44	0.44	0.41	0.10	0.05	0.50
208,195	4.26	0.94	2.89	4.61	2.92	3.12	4.11	2.15	16.01
207	1.30	0.14	0.80	0.74	0.82	0.76	0.99	0.50	3.09
194	7.96	0.68	4.67	4.41	4.94	4.53	1.36	0.59	7.07
205	0.54	0.05	0.32	0.35	0.28	0.31	0.06	0.05	0.45
206	9.97	0.98	5.04	4.81	5.34	5.23	6.26	3.00	24.95
209	4.03	0.47	2.04	1.96	2.22	2.14	3.30	1.64	13.17
Total PCBs	**848**	**105**	**621**	**604**	**768**	**591**	**204**	**111**	**641**
Recovery									
14	256%	70%	158%	151%	171%	161%	125%	78%	233%
65	NM	NM	NM	NM	NM	NM	NM	NM	NM
166	116%	55%	97%	95%	102%	93%	94%	60%	94%

B-10. PCB concentrations in Prey FIsh (ng/g) from Fall 2001 Core Study

Field ID	4SD1SFD	4SD1SFE	4SD1SFF	4SD1SFG	4 CORE SF	5CCSFA	5CCSFB	5 CORE SF
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	4	4	4	4	4	5	5	5
Description	10 YOY Catfish	1 Spotted Shiner	Tesselated Darter	4 White perch	Prey Fish	3 American Eels	4 Hogchoaker	Prey Fish
Replicate analysis?								
Analyzed by	CBL	CBL	CBL	CBL	CBL	CBL	CBL	CBL
Lipid Content (%)	5.5%	5.7%	3.2%	2.4%	2.9%	2.7%	3.8%	4.2%
1	ND	ND	ND	ND	ND	ND	ND	ND
3	5.82	9.94	0.84	4.21	4.16	1.89	0.41	1.15
4,10	ND	ND	ND	ND	ND	ND	ND	ND
7,9	0.23	0.37	0.13	0.18	0.19	0.11	0.02	0.07
6	0.23	0.21	0.16	0.25	0.19	0.11	0.02	0.07
8,5	13.16	21.66	3.05	7.14	8.52	3.46	0.52	1.99
19	0.44	ND	ND	0.33	0.39	ND	ND	ND
12,13	0.15	0.58	0.13	0.22	0.22	0.12	0.02	0.07
18	4.35	8.17	2.08	3.55	3.73	1.16	0.28	0.72
17	2.38	3.66	0.85	1.57	1.73	0.65	0.15	0.40
24	0.18	0.32	0.10	0.16	0.15	0.03	0.01	0.02
16,32	3.55	5.19	1.70	2.72	2.70	1.52	0.27	0.90
29	ND	ND	ND	ND	ND	ND	ND	ND
26	0.35	1.42	0.07	0.40	0.43	0.08	0.01	0.04
25	0.17	0.54	0.05	0.15	0.18	0.03	0.01	0.02
31, 28	2.80	7.28	0.47	1.57	2.38	0.21	0.22	0.21
33,21,53	5.35	8.67	2.51	4.59	4.22	1.62	0.32	0.97
51	1.25	1.08	0.31	0.97	0.75	0.14	0.04	0.09
22	0.43	2.56	ND	0.42	0.75	0.26	ND	0.26
45	3.77	6.94	1.22	2.51	2.92	0.90	0.22	0.56
46	1.76	2.55	0.92	1.29	1.29	0.34	0.08	0.21
52	8.55	17.85	1.15	5.79	6.71	1.11	0.48	0.79
49	5.45	9.45	ND	3.40	4.59	ND	0.63	0.63
47,48	11.51	17.32	5.37	7.10	8.30	4.14	0.69	2.41
44	6.07	13.63	0.92	4.24	4.63	0.81	0.23	0.52
37,42	4.29	9.63	1.20	3.14	3.49	0.97	0.21	0.59
41,64,71	10.37	16.01	4.00	5.34	6.92	2.57	0.46	1.51
40	1.87	4.52	0.71	1.61	1.63	0.52	0.11	0.32
100	2.27	2.53	0.82	1.55	1.49	0.41	0.08	0.25
63	0.95	0.80	0.17	0.48	0.48	0.34	0.05	0.20
74	5.24	7.04	1.49	3.04	3.39	1.66	0.25	0.95
70,76	1.88	15.09	1.45	5.00	4.82	0.21	0.30	0.25
66,95	27.35	55.64	6.78	22.77	22.28	4.70	1.41	3.06
91	3.36	5.73	1.17	2.49	2.47	0.49	0.20	0.34
56,60/92,84	11.38	22.66	2.61	6.32	8.00	1.56	0.46	1.01
89	31.31	73.62	4.87	19.97	25.63	1.96	1.38	1.67
101	14.82	23.65	6.95	10.14	11.09	2.71	0.73	1.72
99	9.90	12.21	3.99	5.68	6.33	2.69	0.51	1.60
119	1.30	1.74	0.45	0.81	0.86	0.39	0.07	0.23
83	3.87	6.45	0.67	1.96	2.42	0.52	0.07	0.29
97	26.02	41.76	8.05	17.56	19.06	8.04	0.87	4.45
81,87	1.20	2.23	ND	0.93	1.04	0.33	ND	0.33
85	4.86	6.66	1.94	2.89	3.07	0.99	0.17	0.58
136	1.14	3.32	0.96	1.60	1.44	0.40	0.12	0.26
77,110	26.84	44.31	10.58	19.29	19.07	4.15	0.91	2.53
82, 151	2.05	2.25	1.01	1.53	1.36	0.21	0.08	0.15
135,144	4.71	7.61	2.13	3.74	3.60	0.76	0.23	0.49
107	2.19	2.70	1.08	1.36	1.45	1.23	0.10	0.67
123,149	19.96	32.04	14.12	14.71	16.10	6.39	1.12	3.75
118	18.97	22.69	7.13	10.22	11.46	3.09	0.45	1.77
134	1.38	2.05	0.67	0.57	0.90	1.22	0.15	0.68
146	7.91	9.89	5.78	4.64	5.61	7.06	0.52	3.79
132,105,153	62.30	87.57	42.99	35.44	44.62	31.91	3.06	17.48
141	10.01	14.58	6.71	5.63	7.16	2.30	0.33	1.31
137,130,176	2.83	4.74	2.10	1.44	2.20	1.76	0.24	1.00
163,138	46.71	64.09	29.64	25.71	32.68	23.79	1.84	12.81
158	1.44	2.18	ND	0.89	1.29	1.11	ND	1.11
129,178	5.15	7.37	3.82	2.96	3.87	4.92	0.44	2.68
187,182	18.11	21.85	14.26	10.07	13.00	31.96	1.24	16.60
183	9.55	14.39	7.94	6.09	7.35	6.64	0.51	3.57
128	4.21	5.89	2.44	2.47	3.01	2.02	0.15	1.09
185	2.26	3.04	1.49	1.05	1.56	0.48	0.12	0.30
174	9.81	15.26	7.62	4.27	7.18	4.08	0.75	2.42
177	7.14	11.73	5.25	2.60	5.42	5.87	0.48	3.18
202,171,156	8.52	11.46	5.75	4.81	6.05	7.98	0.77	4.37
157,200	4.36	5.32	2.21	1.82	2.74	4.52	0.68	2.60
172,197	4.42	6.08	2.65	1.84	2.95	3.94	0.39	2.16
180	38.16	48.80	24.80	15.77	25.04	24.30	1.56	12.93
193	5.79	12.45	3.22	4.65	5.09	2.03	0.18	1.11
191	0.77	1.38	0.53	0.42	0.56	0.54	0.02	0.28
199	4.59	ND	ND	ND	4.59	ND	ND	ND
170,190	17.91	22.78	10.04	6.89	11.26	10.80	0.72	5.76
198	1.41	1.71	0.65	0.36	0.84	1.51	0.18	0.84
201	14.45	16.78	7.18	4.53	8.71	16.88	1.68	9.28
203,196	22.88	29.92	11.90	8.77	14.51	20.91	2.18	11.55
189	0.49	0.73	0.27	0.18	0.33	0.34	0.04	0.19
208,195	18.69	19.53	6.31	4.20	10.14	22.99	3.42	13.21
207	3.65	4.48	1.11	1.07	2.13	4.76	0.89	2.83
194	7.45	9.77	3.27	1.81	4.48	5.23	0.47	2.85
205	0.51	0.73	0.17	0.09	0.29	0.37	0.07	0.22
206	31.40	30.40	8.20	6.50	15.82	33.66	5.59	19.63
209	15.33	16.02	3.60	2.93	8.00	17.60	3.44	10.52
Total PCBs	**706**	**1065**	**329**	**387**	**497**	**369**	**47**	**209**
Recovery								
14	256%	343%	82%	94%	173%	131%	54%	92%
65	NM	NM	NM	NM	NM	NM	NM	NM
166	102%	98%	69%	56%	82%	102%	28%	65%

B-11. PCB concentrations in Prey FIsh (ng/g) from Fall 2001 Variability Study

Field ID	4CCSFA	5 SD2 SFA	5 SD2 SFB	5 SD2 SFC	5 SD2 SF
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	4	5	5	5	5
Description	Prey Fish	1 YOY Catfish	Croaker	Croaker	Prey Fish
Replicate analysis?					
Analyzed by	CBL	CBL	CBL	CBL	CBL
Lipid Content (%)	4.1%	1.3%	1.5%	0.1%	1.0%
1	ND	ND	ND	ND	ND
3	4.04	0.77	ND	1.51	1.14
4,10	ND	ND	ND	ND	ND
7,9	0.17	0.07	0.06	ND	0.07
6	0.25	0.14	0.12	0.03	0.10
8,5	10.88	1.96	1.79	ND	1.88
19	0.31	ND	ND	ND	ND
12,13	0.23	0.08	0.06	ND	0.07
18	3.72	1.03	1.13	0.41	0.85
17	1.96	0.63	0.60	0.30	0.51
24	0.15	0.05	0.06	0.06	0.06
16,32	3.05	1.01	0.80	ND	0.91
29	ND	ND	ND	ND	ND
26	0.31	0.02	0.08	ND	0.05
25	0.10	0.04	0.03	0.16	0.08
31, 28	2.39	0.44	0.55	0.46	0.48
33,21,53	4.11	1.16	1.25	0.71	1.04
51	1.04	0.14	0.18	0.07	0.13
22	0.50	0.16	0.28	ND	0.22
45	2.96	0.63	0.66	0.24	0.51
46	1.32	0.32	0.34	ND	0.33
52	6.50	0.89	1.67	0.59	1.05
49	4.09	1.52	1.99	ND	1.76
47,48	5.16	2.83	2.76	1.46	2.35
44	4.86	0.94	0.94	0.53	0.80
37,42	3.34	0.98	0.81	0.49	0.76
41,64,71	8.20	2.24	1.84	1.49	1.86
40	1.51	0.29	0.38	0.18	0.28
100	1.58	0.33	0.43	0.20	0.32
63	0.81	0.40	0.13	0.11	0.21
74	3.51	1.14	0.90	0.50	0.84
70,76	1.46	0.31	0.79	0.43	0.51
66,95	19.53	4.14	6.27	2.66	4.36
91	2.53	0.71	0.79	0.34	0.61
56,60/92,84	7.12	1.88	1.42	2.28	1.86
89	4.31	2.78	2.49	1.21	2.16
101	10.69	2.54	3.16	1.61	2.43
99	7.07	2.42	2.07	1.03	1.84
119	0.98	0.25	0.24	ND	0.25
83	3.07	0.32	0.34	0.11	0.26
97	7.29	3.63	5.58	ND	4.60
81,87	1.01	0.26	ND	ND	0.26
85	4.08	1.04	0.79	0.33	0.72
136	0.80	0.18	0.52	0.15	0.29
77,110	19.91	5.24	4.76	2.10	4.03
82, 151	1.43	0.40	0.42	0.16	0.33
135,144	3.39	0.84	0.88	0.36	0.70
107	1.65	0.53	0.45	0.26	0.41
123,149	14.18	4.33	5.01	2.43	3.92
118	12.98	3.29	2.75	1.01	2.35
134	1.09	0.42	0.27	0.15	0.28
146	6.02	2.44	2.04	1.65	2.04
132,105,153	32.53	16.07	13.47	7.97	12.50
141	7.53	2.41	1.64	0.65	1.57
137,130,176	2.33	0.81	0.62	ND	0.71
163,138	35.84	11.54	8.77	3.99	8.10
158	1.09	0.63	ND	ND	0.63
129,178	3.19	1.63	0.91	0.33	0.96
187,182	13.97	7.36	4.57	2.35	4.76
183	7.70	2.81	2.19	1.05	2.01
128	3.46	0.99	0.60	0.25	0.62
185	1.75	0.60	0.38	0.13	0.37
174	8.05	3.23	1.79	0.68	1.90
177	5.85	1.98	1.20	0.41	1.20
202,171,156	4.40	2.69	2.09	0.89	1.89
157,200	4.22	1.89	1.06	0.34	1.10
172,197	3.93	1.42	0.77	0.39	0.86
180	31.36	9.62	5.46	2.30	5.79
193	4.58	1.06	1.14	0.49	0.90
191	0.57	0.19	0.12	ND	0.15
199	4.66	ND	ND	ND	ND
170,190	11.68	4.18	2.14	0.91	2.41
198	1.49	0.64	0.22	0.07	0.31
201	13.90	6.16	2.74	1.16	3.36
203,196	21.13	8.77	4.39	1.91	5.02
189	0.47	0.13	0.07	ND	0.10
208,195	20.32	9.36	3.97	0.05	4.46
207	4.14	2.17	0.98	0.43	1.19
194	7.23	1.89	0.86	0.31	1.02
205	0.54	0.14	0.04	ND	0.09
206	35.04	14.86	5.80	2.33	7.66
209	17.76	7.76	3.58	1.39	4.25
Total PCBs	**518**	**181**	**132**	**59**	**129**
Recovery					
14	178%	70%	133%	67%	90%
65	NM	NM	NM	NM	NM
166	80%	49%	98%	57%	68%

B-12. PCB concentrations in Prey FIsh (ng/g) from Spring 2002 Core Study

Field ID	2 CORE SFA	2 CORE SFB	2 CORE SFC	2 CORE SF	3 CORE SFA	3 CORE SFB	3 CORE SF	4 SED2 SFA1
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Zone	2	2	2	2	3	3	3	4
Description	Spot-tailed Shiners	Tessalated Darter	Banded Killifish	Prey Fish	YOY Channel Catfish	Juvenile White Perch	Prey Fish	Juvenile White Perch
Replicate analysis?								Rep A
Analyzed by	CBL	CBL	CBL	CBL	CBL	CBL	CBL	CBL
Lipid Content (%)	3.2%	2.7%	2.2%	2.7%	1.5%	2.5%	2.0%	2.6%
1	ND	0.03	0.16	0.10	1.86	ND	1.86	ND
3	ND	0.13	1.10	0.61	0.96	2.73	1.85	2.26
4,10	1.02	0.85	0.68	0.85	1.04	0.62	0.83	0.38
7,9	ND	0.05	0.08	0.07	0.24	0.19	0.22	0.09
6	0.05	0.03	0.04	0.04	0.20	0.47	0.34	0.04
8,5	2.17	1.54	3.90	2.54	7.88	8.53	8.21	8.61
19	0.10	0.06	0.14	0.10	0.40	0.31	0.35	0.22
12,13	0.07	0.04	0.07	0.06	0.35	0.21	0.28	0.17
18	0.82	0.90	1.96	1.23	8.62	3.62	6.12	2.62
17	0.28	0.40	0.72	0.47	2.70	1.75	2.22	1.41
24	0.03	0.04	0.07	0.04	0.28	0.12	0.20	0.11
16,32	0.33	0.64	0.87	0.61	3.48	2.30	2.89	2.15
29	0.04	0.04	0.07	0.05	0.40	0.13	0.26	0.10
26	0.06	0.11	0.07	0.08	0.19	0.57	0.38	0.69
25	ND	ND	ND	ND	ND	ND	ND	ND
31, 28	1.19	1.03	1.08	1.10	2.02	3.74	2.88	4.12
33,21,53	0.77	0.80	1.78	1.12	6.13	4.63	5.38	4.50
51	0.12	0.15	0.31	0.20	1.38	1.63	1.50	2.01
22	0.37	0.29	ND	0.33	0.50	0.63	0.56	0.82
45	0.60	0.61	1.16	0.79	4.36	3.62	3.99	3.62
46	0.02	0.45	0.39	0.28	1.62	2.02	1.82	2.65
52	1.43	1.31	2.19	1.65	4.46	8.04	6.25	9.08
49	ND	ND	ND	ND	ND	ND	ND	ND
47,48	1.70	1.25	4.03	2.33	16.76	10.41	13.59	10.86
44	1.09	1.00	0.92	1.00	3.61	5.92	4.76	6.64
37,42	0.66	0.78	1.13	0.86	3.73	4.49	4.11	4.63
41,64,71	1.30	1.23	2.91	1.81	9.98	6.49	8.23	7.01
40	0.17	0.27	0.27	0.24	1.39	1.97	1.68	2.22
100	0.29	0.34	0.71	0.45	2.24	2.40	2.32	2.88
63	0.20	0.18	0.19	0.19	0.83	0.99	0.91	1.05
74	0.99	0.97	1.73	1.23	6.03	4.70	5.36	5.24
70,76	1.44	1.51	1.03	1.33	1.85	8.60	5.23	10.69
66,95	4.08	4.08	8.76	5.64	20.49	28.29	24.39	33.35
91	0.46	0.51	1.08	0.68	3.06	3.38	3.22	4.08
56,60/92,84	2.49	2.03	3.88	2.80	9.03	11.91	10.47	13.46
89	3.04	3.83	2.01	2.96	23.03	45.22	34.12	58.57
101	2.45	2.54	4.92	3.30	13.81	14.75	14.28	18.15
99	1.24	1.44	2.62	1.77	9.92	8.29	9.11	10.43
119	0.42	0.48	1.17	0.69	2.05	2.24	2.15	3.03
83	0.33	0.31	0.43	0.36	1.79	2.81	2.30	3.55
97	4.11	4.68	5.92	4.90	17.59	22.19	19.89	25.50
81,87	0.21	0.30	0.44	0.31	1.39	1.29	1.34	1.72
85	0.83	0.78	1.36	0.99	5.10	5.23	5.17	5.84
136	0.20	0.27	0.35	4.53	0.77	2.09	14.53	2.63
77,110	3.51	3.67	7.89	5.03	22.48	24.26	23.37	32.07
82, 151	0.21	0.21	0.65	0.36	2.12	2.11	2.11	2.78
135,144	0.66	0.66	0.86	0.72	4.60	4.83	4.72	6.68
107	0.29	0.29	0.56	0.38	2.41	1.85	2.13	2.62
123,149	3.41	3.57	7.19	4.72	22.49	19.33	20.91	24.65
118	2.75	2.61	4.71	3.36	18.54	14.68	16.61	21.85
134	0.26	0.22	0.72	0.40	1.88	1.80	1.84	1.55
146	1.42	1.48	2.53	1.81	12.23	7.44	9.84	8.95
132,105,153	11.93	11.50	20.40	14.61	92.42	53.59	73.01	65.74
141	1.21	1.47	1.39	1.36	14.22	8.35	11.28	11.50
137,130,176	0.47	0.47	0.79	0.58	3.72	2.29	3.01	2.93
163,138	7.68	8.05	14.27	10.00	66.47	39.57	53.02	49.07
158	0.45	0.46	0.68	0.53	2.73	1.46	2.10	1.88
129,178	0.76	0.88	1.22	0.95	8.43	4.51	6.47	5.38
187,182	3.34	3.64	6.41	4.47	28.32	15.42	21.87	18.12
183	1.81	1.87	2.95	2.21	15.66	8.74	12.20	11.22
128	0.63	0.72	1.36	0.90	6.22	4.05	5.14	5.47
185	0.30	0.33	0.12	0.25	2.68	1.62	2.15	1.98
174	1.22	1.37	2.23	1.61	13.06	6.15	9.61	8.09
177	1.31	0.99	1.85	1.38	11.48	4.22	7.85	5.53
202,171,156	1.35	1.43	1.90	1.56	10.73	6.86	8.80	9.43
157,200	0.40	0.43	0.64	0.49	4.25	2.25	3.25	2.84
172,197	0.61	0.57	0.78	0.65	5.62	2.99	4.30	3.99
180	4.91	5.06	5.80	5.26	54.97	25.24	40.10	33.06
193	5.24	3.57	5.79	4.87	10.97	15.69	13.33	24.20
191	0.14	0.11	0.21	0.16	1.25	0.67	0.96	0.87
199	ND	ND	ND	ND	ND	ND	ND	ND
170,190	2.02	2.08	2.73	2.27	22.35	11.28	16.81	15.74
198	0.12	0.11	0.05	0.09	0.98	0.56	0.77	0.62
201	1.33	1.41	2.04	1.60	12.38	6.58	9.48	8.06
203,196	2.61	2.65	1.83	2.36	21.54	12.12	16.83	15.36
189	0.10	0.06	0.11	0.09	0.58	0.29	0.44	0.43
208,195	0.84	0.81	1.06	0.90	8.18	5.16	6.67	6.38
207	0.16	0.15	0.19	0.17	1.30	0.99	1.14	1.15
194	0.79	0.74	0.89	0.81	7.79	3.63	5.71	4.75
205	0.08	0.05	0.06	0.06	0.50	0.21	0.35	0.26
206	0.90	0.87	0.72	0.83	9.80	7.76	8.78	9.87
209	0.36	0.34	0.41	0.37	4.11	3.84	3.98	4.68
Total PCBs	**103**	**103**	**167**	**129**	**733**	**572**	**666**	**707**
Recovery								
14	103%	82%	75%	86%	106%	179%	142%	143%
65	NM	NM	NM	NM	NM	NM	NM	NM
166	51%	51%	53%	52%	80%	86%	83%	86%

B-12. PCB concentrations in Prey FIsh (ng/g) from Spring 2002 Core Study

Field ID	4 SED2 SFA2	4 SED2 SFA3	4 SED2 SFB	4 SED2 SFC	4 CORE SF	5 SED3 SFA	5 SED3 SFB	5 CORE SF
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Zone	4	4	4	4	4	5	5	5
Description	Juvenile White Perch	Juvenile White Perch	YOY Channel Catfish	Spottail shiner	Prey Fish	Juvenile White Perch	YOY Channel Catfish	Prey Fish
Replicate analysis?	Rep B	Rep C						
Analyzed by	CBL	CBL	CBL	CBL	CBL	CBL	CBL	CBL
Lipid Content (%)	2.7%	2.7%	1.8%	5.0%	3.0%	2.4%	1.9%	2.1%
1	ND	0.12	0.08	0.29	0.16	ND	0.06	0.06
3	0.20	1.67	0.82	2.34	1.46	0.97	0.81	0.89
4,10	0.46	0.39	0.40	1.10	0.55	0.36	0.33	0.34
7,9	0.11	0.13	0.10	0.04	0.09	0.08	0.05	0.07
6	0.06	0.07	0.05	0.07	0.06	0.03	0.04	0.04
8,5	10.08	8.92	5.84	11.78	9.05	2.00	2.56	2.28
19	0.24	0.21	0.06	0.13	0.17	0.11	0.11	0.11
12,13	0.16	0.15	0.16	0.25	0.18	0.08	0.07	0.07
18	2.84	3.46	3.28	3.34	3.11	1.12	1.09	1.11
17	1.56	1.61	1.24	1.65	1.50	0.63	0.68	0.65
24	0.16	0.14	0.11	0.19	0.14	0.04	0.05	0.05
16,32	2.35	2.36	1.44	1.71	2.00	0.70	0.72	0.71
29	0.13	0.15	0.13	0.17	0.14	0.05	0.06	0.05
26	0.61	0.60	ND	0.83	0.68	0.11	0.17	0.14
25	ND	ND	ND	ND	ND	ND	ND	ND
31, 28	4.13	4.02	1.80	7.83	4.38	0.62	0.62	0.62
33,21,53	4.74	5.15	2.62	4.09	4.22	1.18	1.07	1.13
51	2.07	2.15	0.72	0.47	1.48	0.24	0.31	0.27
22	0.68	0.79	ND	1.22	0.88	0.25	0.22	0.23
45	3.71	4.10	2.64	4.53	3.72	0.75	1.00	0.88
46	2.87	2.42	1.31	0.73	2.00	0.32	0.37	0.35
52	9.53	9.32	5.55	14.94	9.68	1.85	1.78	1.82
49	ND	ND	ND	ND	ND	ND	ND	ND
47,48	11.37	11.80	5.93	13.28	10.65	2.62	3.21	2.92
44	6.86	6.76	3.21	10.26	6.75	1.27	1.23	1.25
37,42	4.96	4.82	2.97	6.43	4.76	0.90	1.14	1.02
41,64,71	9.42	7.17	6.25	10.12	8.00	1.29	2.31	1.80
40	2.11	2.30	0.89	3.05	2.11	0.46	0.43	0.45
100	3.03	2.91	1.66	2.28	2.55	0.39	0.50	0.45
63	1.09	0.97	0.72	1.05	0.98	0.22	0.44	0.33
74	5.49	5.31	3.67	5.58	5.06	1.00	1.16	1.08
70,76	11.28	10.63	1.26	12.60	9.29	1.34	0.34	0.84
66,95	34.82	33.77	17.35	47.50	33.36	6.03	5.58	5.81
91	4.24	4.13	3.01	5.51	4.19	0.82	1.08	0.95
56,60/92,84	14.03	13.28	6.47	19.09	13.27	2.17	3.17	2.67
89	58.49	53.87	16.82	61.60	49.87	5.06	5.93	5.49
101	18.47	18.29	13.82	24.70	18.69	3.53	3.99	3.76
99	10.48	10.46	9.46	12.94	10.76	2.44	3.43	2.93
119	2.92	2.88	1.63	2.31	2.55	0.52	0.64	0.58
83	3.75	3.35	1.88	5.31	3.57	0.48	0.70	0.59
97	26.32	27.06	23.11	35.07	27.41	6.50	5.22	5.86
81,87	1.73	1.63	1.07	2.46	1.72	0.20	0.34	0.27
85	6.62	6.00	4.31	6.76	5.91	0.82	1.23	1.02
136	2.73	2.69	0.67	3.01	24.00	0.46	0.26	4.71
77,110	33.28	32.10	22.02	44.86	32.86	4.69	6.77	5.73
82, 151	2.80	2.71	1.80	2.51	2.52	0.44	0.55	0.49
135,144	6.60	6.54	4.59	6.80	6.24	1.08	1.29	1.19
107	2.52	2.50	1.89	2.44	2.39	0.42	0.70	0.56
123,149	24.83	24.96	20.94	28.38	24.75	5.27	6.47	5.87
118	21.79	21.24	14.99	23.96	20.76	2.30	3.95	3.13
134	1.82	1.70	1.43	3.00	1.90	0.47	0.74	0.60
146	8.80	8.83	10.49	8.92	9.20	2.59	3.88	3.23
132,105,153	67.11	66.42	71.04	77.63	69.59	11.56	21.80	16.68
141	11.24	11.02	11.14	12.50	11.48	1.82	2.85	2.33
137,130,176	2.90	2.87	3.06	4.05	3.16	0.64	1.09	0.87
163,138	49.47	49.07	51.74	57.57	51.38	9.50	14.85	12.18
158	1.79	1.77	1.68	2.10	1.84	0.67	0.66	0.67
129,178	5.24	5.32	6.42	5.72	5.62	1.47	2.30	1.89
187,182	17.74	17.91	22.08	14.32	18.03	5.31	10.47	7.89
183	10.67	10.81	11.29	9.69	10.74	2.60	3.56	3.08
128	5.62	5.16	4.64	6.20	5.42	0.79	1.30	1.04
185	1.95	1.93	2.32	1.95	2.03	0.44	0.69	0.56
174	8.05	7.98	11.19	10.36	9.14	2.01	3.67	2.84
177	5.44	5.34	7.74	7.46	6.30	1.16	2.75	1.95
202,171,156	8.86	8.78	8.93	8.82	8.96	2.45	3.60	3.03
157,200	2.70	2.76	4.52	3.56	3.28	1.43	2.53	1.98
172,197	3.59	3.58	4.90	4.00	4.01	1.17	1.97	1.57
180	30.97	31.07	41.96	30.71	33.55	7.07	12.21	9.64
193	21.71	21.75	7.44	9.61	16.94	1.70	2.11	1.91
191	0.78	0.80	0.81	0.93	0.84	0.12	0.22	0.17
199	ND	ND	ND	ND	ND	ND	ND	ND
170,190	14.37	14.22	17.03	14.63	15.20	2.72	5.10	3.91
198	0.59	0.59	1.29	1.00	0.82	0.35	0.84	0.59
201	7.33	7.35	14.22	10.00	9.39	3.89	8.21	6.05
203,196	13.73	13.83	21.55	16.27	16.15	6.19	10.74	8.46
189	0.37	0.38	0.43	0.39	0.40	0.09	0.16	0.12
208,195	5.69	5.59	15.34	11.16	8.83	5.19	12.20	8.69
207	1.02	1.04	2.87	2.34	1.68	1.61	2.86	2.24
194	4.08	4.13	7.16	4.99	5.02	1.22	2.54	1.88
205	0.23	0.22	0.49	0.41	0.32	0.13	0.19	0.16
206	8.45	8.33	25.79	18.34	14.16	9.55	21.21	15.38
209	3.97	3.87	13.13	9.13	6.96	5.57	12.58	9.08
Total PCBs	**705**	**692**	**625**	**825**	**733**	**156**	**244**	**204**
Recovery								
14	144%	130%	106%	180%	141%	122%	114%	118%
65	NM	NM	NM	NM	NM	NM	NM	NM
166	86%	76%	78%	72%	80%	54%	59%	57%

B-13. PCB concentrations in Prey FIsh (ng/g) from Spring 2002 Variability Study

Field ID	**2 CC SFA**	**5 SED1 SFA**	**5 SED1 SFB**	**5 SED1 SFC**	**5 SED1 SF**
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Zone	2	5	5	5	5
Description	Gizzard shad	Juvenile White Perch	Hogchoker	YOY Channel Catfish	Prey Fish
Replicate analysis?					
Analyzed by	CBL	CBL	CBL	CBL	CBL
Lipid Content (%)	1.8%	2.9%	1.8%	1.7%	2.0%
1	0.06	ND	0.12	0.08	0.10
3	0.21	ND	0.13	1.29	0.71
4,10	0.48	0.34	0.36	0.32	0.34
7,9	0.12	0.08	0.03	0.08	0.06
6	0.02	0.06	0.02	0.02	0.03
8,5	22.46	3.36	0.68	4.26	2.77
19	0.19	0.07	0.06	0.22	0.12
12,13	0.10	0.06	0.02	0.12	0.07
18	3.29	1.23	0.53	1.97	1.24
17	1.56	0.77	0.21	0.94	0.64
24	0.14	0.05	0.03	0.08	0.05
16,32	2.24	0.75	0.28	1.20	0.74
29	0.14	0.06	0.03	0.09	0.06
26	0.92	0.21	ND	0.08	0.15
25	0.63	ND	ND	ND	ND
31, 28	6.67	1.25	0.25	1.19	0.90
33,21,53	4.07	2.13	0.40	1.87	1.47
51	0.71	0.48	0.06	0.57	0.37
22	1.49	0.57	ND	0.23	0.40
45	2.11	1.50	0.39	2.09	1.33
46	0.77	0.64	0.10	0.51	0.42
52	6.36	4.92	0.74	3.61	3.09
49	ND	ND	ND	ND	ND
47,48	6.29	2.49	1.21	3.56	2.42
44	5.48	3.24	0.31	2.63	2.06
37,42	3.72	2.20	0.27	2.44	1.64
41,64,71	5.64	3.28	0.68	4.75	2.90
40	1.49	0.86	0.13	0.74	0.58
100	1.60	0.80	0.17	1.07	0.68
63	0.60	0.50	0.05	0.60	0.39
74	4.46	2.46	0.42	2.67	1.85
70,76	7.93	5.11	0.50	0.87	2.16
66,95	18.97	16.71	2.21	11.95	10.29
91	1.90	2.02	0.37	2.07	1.49
56,60/92,84	11.86	6.18	1.91	6.05	4.71
89	12.34	13.96	2.33	14.48	10.26
101	8.15	9.25	1.34	8.52	6.37
99	4.29	6.09	1.08	6.37	4.52
119	4.01	0.96	0.22	1.26	0.81
83	1.66	1.43	0.19	1.43	1.02
97	13.26	12.74	1.91	15.60	10.08
81,87	0.92	0.77	0.23	0.76	0.59
85	2.90	2.99	0.26	2.99	2.08
136	1.21	1.00	0.12	0.52	6.41
77,110	14.25	14.37	1.64	14.84	10.28
82, 151	1.12	1.02	0.15	1.07	0.74
135,144	2.55	2.53	0.40	2.69	1.87
107	0.92	1.10	0.18	1.23	0.83
123,149	11.14	10.42	2.19	12.75	8.46
118	8.34	9.68	0.88	10.03	6.86
134	1.34	1.08	0.33	1.22	0.87
146	3.68	5.03	1.23	6.66	4.31
132,105,153	31.16	33.25	6.67	45.81	28.58
141	4.53	4.56	0.61	6.14	3.77
137,130,176	1.55	1.44	0.34	3.41	1.73
163,138	22.56	24.40	3.69	33.02	20.37
158	0.89	0.88	0.63	1.12	0.88
129,178	2.61	2.63	0.76	4.40	2.60
187,182	7.80	8.74	2.55	14.29	8.53
183	4.66	4.73	1.04	7.18	4.31
128	2.30	2.52	0.26	3.08	1.95
185	1.00	0.66	0.20	1.46	0.77
174	4.79	3.36	1.27	6.92	3.85
177	3.25	2.23	0.94	6.04	3.07
202,171,156	4.91	4.69	1.49	6.56	4.25
157,200	1.34	1.85	1.25	3.80	2.30
172,197	1.69	2.07	0.74	3.43	2.08
180	13.74	14.26	2.85	27.92	15.01
193	5.08	3.12	0.42	4.61	2.72
191	0.41	0.32	0.05	0.35	0.24
199	ND	2.31	2.54	3.41	2.75
170,190	6.01	6.19	1.26	12.08	6.51
198	0.32	0.60	0.30	1.28	0.73
201	3.85	6.87	2.88	13.25	7.67
203,196	6.96	10.07	3.68	19.46	11.07
189	0.27	0.18	0.04	0.37	0.20
208,195	2.43	7.80	5.37	19.37	10.85
207	0.47	1.99	1.44	3.99	2.47
194	2.34	2.25	0.82	6.08	3.05
205	0.15	0.16	0.06	0.49	0.24
206	2.74	15.77	9.67	37.14	20.86
209	1.32	8.08	5.96	20.13	11.39
Total PCBs	**358**	**337**	**87**	**479**	**307**
Recovery					
14	136%	127%	98%	95%	107%
65	NM	NM	NM	NM	NM
166	51%	78%	59%	66%	68%

B-14. PCB concentrations in Invertebrates (ng/g) from Fall 2001 Core Study

Field ID	2 CORE INV	3 CORE INV	4 CORE INV	5 CORE INV	5 CORE MACRO INV
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	2	3	4	5	5
Description	Amphipods	Amphipods	Amphipods	Amphipods	Grass shrimp
Replicate analysis?					
Analyzed by	CBL	CBL	CBL	CBL	CBL
Lipid Content (%)	0.6%	0.4%	0.8%	0.6%	1.1%
1	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND
4,10	ND	ND	ND	ND	ND
7,9	ND	ND	ND	ND	ND
6	ND	0.12	0.05	ND	ND
8,5	ND	ND	4.16	ND	ND
19	ND	ND	ND	ND	ND
12,13	ND	0.08	0.08	ND	0.02
18	0.45	0.45	1.38	0.12	0.11
17	0.33	0.42	0.71	ND	0.12
24	0.11	0.21	0.11	0.18	0.03
16,32	ND	ND	1.66	ND	ND
29	ND	ND	ND	ND	ND
26	ND	ND	0.15	ND	ND
25	0.12	0.20	0.17	0.37	ND
31, 28	1.07	1.78	1.52	ND	0.36
33,21,53	1.10	1.74	2.36	0.92	0.36
51	0.19	0.32	0.43	ND	0.04
22	ND	ND	ND	ND	ND
45	0.36	0.42	0.96	0.27	0.10
46	ND	ND	ND	ND	ND
52	0.63	0.70	2.01	0.24	0.14
49	ND	ND	ND	ND	ND
47,48	1.51	2.75	1.83	1.87	0.92
44	0.52	0.68	1.41	0.36	0.13
37,42	0.35	0.78	0.61	0.46	0.09
41,64,71	1.74	3.17	3.69	ND	0.54
40	0.19	0.22	0.47	ND	0.05
100	0.31	0.32	0.53	ND	0.08
63	0.24	0.29	0.13	ND	0.05
74	0.65	1.55	1.20	0.50	0.36
70,76	0.74	ND	2.07	ND	0.16
66,95	2.61	3.65	10.95	1.58	0.74
91	0.27	0.35	0.93	0.21	0.06
56,60/92,84	1.98	3.83	5.49	1.85	0.76
89	1.26	1.57	4.66	0.81	0.26
101	1.09	1.87	3.90	0.79	0.40
99	0.43	0.68	1.96	0.28	0.82
119	ND	ND	0.56	ND	ND
83	0.58	0.28	0.49	0.08	0.03
97	ND	3.95	5.97	ND	1.28
81,87	ND	ND	ND	ND	ND
85	ND	ND	0.98	ND	0.21
136	0.14	0.17	0.73	0.13	0.04
77,110	1.55	1.65	7.13	0.92	0.52
82, 151	0.15	0.29	0.42	0.09	0.04
135,144	0.37	0.56	1.47	0.33	0.09
107	0.16	0.64	0.62	0.26	0.17
123,149	1.53	2.23	6.21	1.42	0.58
118	1.23	1.75	3.41	0.48	1.02
134	0.24	0.38	0.27	0.32	0.08
146	ND	4.66	3.06	ND	1.21
132,105,153	6.79	20.04	17.80	7.79	5.73
141	0.41	0.82	1.54	0.21	0.22
137,130,176	ND	ND	ND	ND	ND
163,138	2.27	9.21	10.41	1.58	2.82
158	ND	ND	ND	ND	ND
129,178	0.19	0.78	1.17	0.23	0.26
187,182	1.51	7.03	5.18	2.18	2.83
183	0.47	2.09	1.29	ND	0.79
128	0.10	0.20	0.79	ND	0.17
185	0.18	0.18	0.45	0.18	0.05
174	0.50	0.76	1.88	0.40	0.29
177	0.49	2.23	1.97	0.36	0.52
202,171,156	0.43	1.59	1.87	0.77	0.70
157,200	0.08	0.40	0.73	0.30	0.21
172,197	ND	1.28	1.07	0.91	0.41
180	1.22	7.13	5.21	1.43	2.17
193	0.61	1.34	1.22	ND	0.26
191	ND	ND	ND	ND	ND
199	ND	ND	ND	ND	ND
170,190	0.45	3.09	2.25	0.63	0.62
198	ND	0.16	0.24	0.20	0.06
201	0.28	2.17	2.10	1.85	1.15
203,196	0.69	2.85	3.31	2.35	1.40
189	ND	ND	ND	ND	ND
208,195	0.23	1.92	2.70	3.85	1.09
207	ND	0.31	0.56	0.95	0.25
194	ND	0.88	0.72	0.41	0.19
205	ND	ND	0.12	ND	ND
206	0.16	1.90	3.42	6.09	1.13
209	ND	1.52	2.39	4.88	1.02
Total PCBs	**41**	**115**	**157**	**52**	**36**
Recovery					
14	107%	98%	101%	83%	73%
65	NM	NM	NM	NM	NM
166	92%	84%	91%	73%	64%

B-15. PCB concentrations in Invertebrates (ng/g) from Fall 2001 Variability Study

Field ID	2 CC INV	2 CC MACRO INV	4 CC INV	5 SD2 INV
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	2	2	4	5
Description	Amphipods	Blue crab	Amphipods	Grass Shrimp
Replicate analysis?				
Analyzed by	CBL	CBL	CBL	CBL
Lipid Content (%)	0.6%	2.1%	0.6%	0.8%
1	ND	ND	ND	ND
3	ND	0.54	1.04	ND
4,10	ND	ND	ND	ND
7,9	0.22	0.07	ND	ND
6	0.04	0.04	ND	0.03
8,5	1.74	1.77	ND	ND
19	ND	ND	ND	ND
12,13	0.03	0.07	ND	ND
18	0.43	1.07	0.45	0.16
17	0.20	0.62	0.23	ND
24	0.04	0.02	0.06	0.06
16,32	0.51	0.34	0.66	ND
29	ND	ND	ND	ND
26	ND	0.04	ND	ND
25	0.04	0.05	0.04	ND
31, 28	0.57	1.44	0.39	0.44
33,21,53	0.74	1.03	0.77	0.49
51	0.14	0.07	0.14	ND
22	0.51	0.20	ND	ND
45	0.36	0.47	0.36	0.16
46	0.31	0.23	ND	ND
52	0.77	0.07	0.86	0.55
49	ND	ND	ND	ND
47,48	1.13	1.78	1.34	0.82
44	0.64	0.21	0.58	0.34
37,42	0.51	0.28	0.36	0.26
41,64,71	1.27	0.92	1.23	0.89
40	0.21	0.12	0.19	0.07
100	0.15	0.53	0.24	0.09
63	0.06	0.04	0.09	0.04
74	0.49	1.76	0.37	0.37
70,76	0.74	0.34	0.54	ND
66,95	3.15	3.33	3.58	1.22
91	0.31	0.06	0.33	0.05
56,60/92,84	1.13	2.56	2.36	1.26
89	1.78	0.63	1.65	0.28
101	1.14	0.71	1.30	0.47
99	0.57	2.97	0.61	0.41
119	0.23	0.29	ND	ND
83	0.18	0.20	0.17	0.07
97	1.97	2.32	1.82	1.38
81,87	ND	ND	ND	ND
85	0.33	1.19	0.29	ND
136	0.22	0.09	0.24	0.06
77,110	2.07	1.02	2.10	0.38
82, 151	0.21	0.07	0.21	0.11
135,144	0.47	0.14	0.50	0.14
107	0.18	0.21	0.17	0.13
123,149	2.04	0.87	2.05	0.54
118	1.11	4.73	1.16	0.89
134	0.09	0.14	0.11	0.15
146	0.85	1.87	1.24	1.50
132,105,153	5.36	15.69	5.84	4.70
141	0.67	0.20	0.46	0.39
137,130,176	ND	ND	ND	ND
163,138	3.08	8.75	2.81	1.89
158	ND	ND	ND	ND
129,178	0.36	1.10	0.35	0.38
187,182	1.57	3.89	1.71	2.25
183	0.62	2.37	0.63	0.36
128	0.16	0.70	0.01	ND
185	0.19	0.10	0.16	0.12
174	0.79	0.41	0.57	0.61
177	0.70	0.14	0.58	0.49
202,171,156	0.64	2.42	0.57	0.84
157,200	0.08	0.93	0.16	0.29
172,197	0.22	0.51	0.21	0.69
180	1.63	3.89	1.14	2.25
193	0.74	1.06	0.38	0.26
191	ND	0.10	ND	ND
199	ND	ND	ND	ND
170,190	0.67	1.58	0.50	0.77
198	0.05	0.22	0.05	0.13
201	0.45	1.48	0.50	1.38
203,196	0.90	3.43	0.82	1.77
189	ND	0.05	ND	ND
208,195	0.28	3.30	0.59	1.99
207	0.06	0.82	0.13	0.39
194	0.21	0.47	0.14	0.43
205	0.03	0.03	ND	ND
206	0.27	3.71	0.67	2.97
209	0.17	2.92	0.46	1.81
Total PCBs	**50**	**98**	**49**	**41**
Recovery				
14	105%	119%	68%	77%
65	NM	NM	NM	NM
166	92%	96%	66%	68%

B-16. PCB concentrations in Invertebrates (ng/g) from Spring 2002 Core Study

Field ID	2 CORE INV	3 CORE INVA	3 COR INVC	3 CORE INV	3 CORE MACRO INV	4 CORE INV	4 CORE MACRO INV	5 CORE INV
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Zone	2	3	3	3	4	4	4	5
Description	Amphipods	Amphipods	Amphipods	Amphipods	Crayfish	Amphipods	Crayfish	Amphipods
Replicate analysis?								
Analyzed by	CBL	CBL	CBL	CBL	CBL	CBL	CBL	CBL
Lipid Content (%)	1.6%	2.2%	0.9%	1.6%	1.8%	1.3%	1.1%	1.2%
1	ND	ND	ND	ND	0.09	0.11	0.10	0.13
3	ND	2.09	1.85	1.97	0.22	2.63	ND	ND
4,10	2.63	0.96	0.70	0.83	0.20	0.53	0.21	0.57
7,9	ND	0.19	0.10	0.15	0.04	ND	0.04	0.06
6	0.14	0.01	0.02	0.02	0.03	ND	0.02	0.09
8,5	5.58	5.30	2.79	4.04	0.44	1.42	0.27	5.14
19	0.25	0.17	0.13	0.15	0.04	0.07	0.03	0.10
12,13	0.18	0.04	ND	0.04	0.04	ND	0.02	ND
18	2.11	2.31	1.11	1.71	0.40	0.44	0.31	1.08
17	0.72	0.79	0.47	0.63	0.22	0.22	0.09	0.41
24	0.07	0.08	0.05	0.07	0.01	0.03	0.01	0.03
16,32	0.85	1.22	0.85	1.04	0.14	0.41	0.15	0.80
29	0.10	0.07	0.04	0.06	0.03	0.03	0.02	0.03
26	0.15	0.26	0.15	0.21	0.04	ND	0.10	ND
25	ND	ND	ND	ND	ND	ND	ND	ND
31, 28	3.06	2.39	1.26	1.83	1.00	0.80	0.68	1.30
33,21,53	1.98	2.14	1.27	1.71	0.38	0.55	0.34	1.35
51	0.32	0.72	0.45	0.58	0.06	0.20	0.03	0.46
22	0.95	0.57	ND	0.57	0.12	0.38	ND	ND
45	1.53	1.51	0.88	1.19	0.14	0.49	0.09	1.10
46	0.04	0.65	0.51	0.58	0.07	0.24	0.04	0.54
52	3.67	4.30	2.32	3.31	0.80	1.33	1.00	2.24
49	ND	ND	ND	ND	ND	ND	ND	ND
47,48	4.36	3.93	1.04	2.48	0.63	1.03	0.68	1.19
44	2.80	2.60	1.67	2.14	0.17	0.93	0.25	1.62
37,42	1.70	1.61	1.00	1.30	0.12	0.40	0.13	0.97
41,64,71	3.35	2.53	2.21	2.37	0.46	1.18	0.25	1.94
40	0.45	0.69	0.52	0.61	0.07	0.31	0.04	0.56
100	0.74	0.72	0.43	0.57	0.19	1.54	0.06	0.45
63	0.51	0.27	0.22	0.24	0.20	0.20	0.06	0.21
74	2.54	1.96	1.03	1.50	0.95	0.67	0.42	1.05
70,76	3.70	3.43	1.95	2.69	0.63	1.03	0.42	1.82
66,95	10.49	12.26	6.09	9.17	2.44	3.24	1.68	6.19
91	1.19	1.22	0.60	0.91	0.05	0.25	0.07	0.71
56,60/92,84	6.40	5.84	2.62	4.23	1.02	1.53	1.28	6.23
89	7.81	8.32	3.84	6.08	0.35	2.22	0.15	4.47
101	6.29	4.29	2.47	3.38	1.94	1.40	1.06	2.64
99	3.19	2.23	1.28	1.75	1.12	0.81	0.40	1.54
119	1.08	0.81	0.49	0.65	0.10	0.24	0.04	0.58
83	0.85	0.72	0.45	0.59	0.16	0.27	0.05	0.43
97	10.56	5.19	3.48	4.34	1.28	0.97	0.56	3.97
81,87	0.53	0.44	0.47	0.46	0.09	0.15	ND	0.25
85	2.14	1.00	0.60	0.80	0.31	0.25	0.08	0.59
136	0.52	0.83	0.42	0.62	0.05	0.24	0.03	0.44
77,110	9.01	6.68	3.95	5.31	0.44	2.48	0.21	4.42
82, 151	0.54	0.68	0.31	0.50	0.15	0.18	0.07	0.36
135,144	1.69	1.70	0.76	1.23	0.27	0.53	0.17	0.89
107	0.74	0.63	0.26	0.44	0.25	0.19	0.11	0.31
123,149	8.76	6.74	3.18	4.96	1.24	2.00	0.60	3.74
118	7.07	3.55	1.80	2.67	2.50	1.24	0.98	2.06
134	0.67	0.56	0.23	0.40	0.05	0.15	0.07	0.17
146	3.65	2.35	1.28	1.81	1.11	0.72	0.69	1.59
132,105,153	30.65	16.96	8.39	12.68	7.03	4.86	4.02	11.11
141	3.12	2.51	1.03	1.77	1.12	0.67	0.79	1.25
137,130,176	1.21	0.81	ND	0.81	0.23	0.26	0.14	0.49
163,138	19.73	9.27	4.71	6.99	5.39	2.95	2.70	5.68
158	1.15	1.01	0.93	0.97	0.19	ND	0.27	0.81
129,178	1.96	1.30	0.51	0.90	0.57	0.36	0.29	0.74
187,182	8.59	4.58	2.02	3.30	2.45	1.30	1.22	2.93
183	4.64	2.27	0.98	1.62	0.49	0.61	0.29	1.28
128	1.62	0.78	0.38	0.58	0.14	0.23	0.05	0.46
185	0.77	0.50	0.18	0.34	0.11	0.11	0.08	0.25
174	3.13	2.29	1.00	1.64	0.75	0.59	0.55	1.26
177	3.35	1.89	0.78	1.33	0.83	0.49	0.41	0.99
202,171,156	3.47	1.54	0.77	1.15	0.20	0.46	0.11	1.06
157,200	1.02	0.40	0.21	0.30	0.17	0.13	0.10	0.34
172,197	1.56	0.57	0.37	0.47	0.25	0.17	0.15	0.47
180	12.61	5.21	2.30	3.75	3.25	1.45	1.71	3.10
193	13.46	4.89	1.97	3.43	0.69	1.07	0.22	3.07
191	0.36	0.09	ND	0.09	0.06	ND	0.03	ND
199	ND	ND	ND	ND	ND	ND	ND	ND
170,190	5.19	2.32	1.00	1.66	1.01	0.61	0.57	1.30
198	0.31	0.10	0.06	0.08	0.03	0.04	0.02	0.11
201	3.41	1.36	0.76	1.06	0.67	0.51	0.39	1.19
203,196	6.71	2.32	1.15	1.73	0.53	0.76	0.29	1.84
189	0.25	0.05	0.03	0.04	0.03	0.02	0.02	0.03
208,195	2.16	0.72	0.62	0.67	0.29	0.39	0.23	1.06
207	0.41	0.13	0.14	0.13	0.05	0.09	0.04	0.23
194	2.04	0.56	0.25	0.41	0.29	0.20	0.15	0.37
205	0.21	ND	ND	ND	0.02	0.05	0.01	ND
206	2.31	0.74	0.88	0.81	0.17	0.59	0.17	1.35
209	0.94	0.39	0.39	0.39	0.13	0.28	0.10	0.43
Total PCBs	**264**	**175**	**91**	**134**	**50**	**55**	**29**	**110**
Recovery								
14	164%	108%	111%	109%	118%	57%	52%	124%
65	NM	NM	NM	NM	NM	NM	NM	NM
166	82%	65%	81%	73%	58%	37%	39%	64%

B-17. PCB concentrations in Invertebrates (ng/g) from Spring 2002 Variability Study

Field ID	2 CC INV	5 SED1 INVB1	5 SED1 INVB2	5 SED1 INVB3	5 SED1 MACRO INV
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Zone	2	5	5	5	5
Description	Amphipods	Amphipods	Amphipods	Amphipods	White fingered mud crab
Replicate analysis?		Rep A	Rep B	Rep C	
Analyzed by	CBL	CBL	CBL	CBL	CBL
Lipid Content (%)	1.0%	1.4%	1.3%	1.2%	1.4%
1	0.19	0.34	0.06	0.06	0.40
3	0.79	0.37	0.08	0.24	ND
4,10	0.83	0.41	0.15	0.11	0.55
7,9	0.07	0.04	0.02	0.02	0.06
6	0.02	0.01	0.00	ND	0.02
8,5	1.71	1.35	0.73	0.64	0.80
19	0.06	0.06	0.03	0.02	0.04
12,13	0.05	ND	ND	ND	0.03
18	0.49	0.52	0.18	0.14	0.41
17	0.17	0.40	0.40	0.24	0.17
24	0.03	0.03	0.01	0.01	0.03
16,32	0.26	0.33	0.15	0.10	0.28
29	0.02	0.03	0.01	0.01	0.03
26	ND	0.10	0.07	0.08	ND
25	ND	ND	ND	ND	ND
31, 28	0.56	0.53	0.21	0.19	0.20
33,21,53	0.52	0.56	0.24	0.20	0.43
51	0.13	0.14	0.08	0.08	ND
22	ND	0.24	0.15	0.14	ND
45	0.35	0.33	0.16	0.15	0.16
46	0.22	0.17	0.08	0.08	0.08
52	0.91	0.97	0.63	0.57	0.41
49	ND	ND	ND	ND	ND
47,48	ND	0.97	0.47	0.41	1.08
44	0.52	0.65	0.41	0.37	0.21
37,42	0.32	0.44	0.26	0.25	0.25
41,64,71	0.82	0.67	0.46	0.41	0.76
40	0.13	0.26	0.13	0.11	0.08
100	0.13	9.44	9.67	6.54	0.11
63	0.02	0.13	0.04	0.05	0.07
74	0.45	0.45	0.20	0.19	0.68
70,76	0.59	0.72	0.44	0.39	0.30
66,95	3.31	2.78	1.69	1.49	1.15
91	0.28	0.38	0.23	0.20	0.24
56,60/92,84	1.12	1.37	0.91	0.84	0.58
89	2.12	1.57	1.05	0.76	0.36
101	1.08	1.13	0.72	0.64	1.14
99	0.56	0.73	0.48	0.44	0.71
119	0.32	0.23	0.15	0.13	0.21
83	0.16	0.19	0.11	0.11	0.09
97	1.24	1.65	0.74	0.60	2.01
81,87	0.38	0.20	0.05	ND	0.23
85	0.28	0.22	0.16	0.17	0.22
136	0.20	0.18	0.12	0.09	0.05
77,110	1.59	1.90	1.28	1.13	1.80
82, 151	0.16	0.15	0.09	0.08	0.08
135,144	0.49	0.41	0.27	0.24	0.28
107	0.16	0.17	0.11	0.10	0.26
123,149	1.96	1.70	1.09	0.99	1.09
118	0.95	0.87	0.57	0.49	1.09
134	0.11	0.20	0.10	0.11	0.15
146	0.93	0.84	0.51	0.45	1.55
132,105,153	5.61	4.68	2.76	2.57	7.60
141	0.72	0.49	0.31	0.28	0.54
137,130,176	ND	ND	0.09	ND	0.27
163,138	2.40	2.54	1.62	1.49	3.71
158	ND	0.42	ND	ND	0.81
129,178	0.26	0.35	0.20	0.18	0.68
187,182	1.43	1.51	0.92	0.85	3.60
183	0.70	0.58	0.34	0.32	1.01
128	0.23	0.20	0.11	0.12	0.32
185	0.15	0.09	0.05	0.06	0.10
174	0.67	0.53	0.32	0.30	0.67
177	0.55	0.44	0.29	0.27	0.84
202,171,156	0.42	0.56	0.35	0.33	1.19
157,200	0.06	0.19	0.10	0.08	0.61
172,197	ND	0.32	0.19	0.16	0.56
180	1.27	1.54	0.94	0.85	2.75
193	1.63	0.88	0.54	0.49	0.49
191	ND	ND	0.02	ND	0.04
199	ND	ND	ND	ND	ND
170,190	0.57	0.60	0.36	0.35	0.86
198	0.07	0.07	0.04	0.04	0.16
201	0.36	0.78	0.47	0.42	1.94
203,196	0.61	1.13	0.65	0.59	2.36
189	0.03	0.02	0.01	0.02	0.03
208,195	0.18	0.74	0.43	0.38	2.29
207	0.07	0.17	0.10	0.09	0.60
194	0.13	0.22	0.12	0.11	0.41
205	ND	0.01	ND	ND	ND
206	0.12	1.15	0.66	0.56	2.56
209	ND	0.54	0.29	0.25	1.87
Total PCBs	46	58	38	32	60
Recovery					
14	46%	111%	75%	68%	80%
65	NM	NM	NM	NM	NM
166	35%	66%	43%	41%	61%

APPENDIX C: PCB CONCENTRATIONS IN SEDIMENT

C-1. PCB concentrations in Sediments (ng/g) from Fall 2001 Core Study

Field ID	02sed1	02sed1	02sed1	2 CORE	03sed1	03sed1	03sed1	3 CORE	04sed1	04sed1	04sed2	4 CORE	05sed2
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	2	2	2	2	3	3	3	3	4	4	4	4	5
Description	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Replicate analysis?	Rep A	Rep B	Rep C		Rep A	Rep B	Rep C		Rep A	Rep B			Rep A
Analyzed by	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS
Amt. Nitrogen (mg)	0.24		0.24	0.24	0.21	0.20		0.21	0.04	0.10	0.03	0.07	0.00
Amt. Carbon (mg)	3.77		3.60	3.69	5.95	6.59		6.27	1.47	2.04	6.59	4.32	0.64
Sediment % Solid	42	40	41	41	41	42	39	40	54	55	72	61	69
Sediment % Water	58	60	59	59	59	58	61	60	46	45	28	39	31
1	ND	Sample Lost	ND	ND	0.23	ND	ND	0.23	0.53	ND	ND	0.38	ND
3	ND		ND	ND	ND	ND	ND	ND	ND	0.87	0.46	0.66	ND
4,10	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7,9	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	0.11		0.04	0.08	0.08	0.09	0.13	0.10	0.03	0.03	0.02	0.04	ND
8,5	0.71		0.89	0.80	0.60	0.45	0.57	0.54	0.47	0.39	0.32	0.39	ND
19	0.09		0.05	0.07	0.06	0.09	0.29	0.15	0.03	0.04	0.05	0.06	ND
12,13	0.02		0.03	0.02	0.31	0.07	0.02	0.14	0.01	0.01	0.01	0.03	0.01
18	0.19		0.28	0.23	1.34	1.23	1.73	1.43	0.21	0.22	0.17	0.40	0.17
17	0.36		0.42	0.39	0.72	0.66	0.88	0.75	0.23	0.24	0.27	0.34	0.02
24	ND		ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
16,32	0.42		0.30	0.36	1.04	0.96	1.36	1.12	0.25	0.24	0.17	0.35	ND
29	ND		ND	ND	ND	ND	ND	ND	0.01	ND	0.00	ND	ND
26	ND		0.02	0.02	0.37	0.39	0.56	0.44	0.16	0.13	0.16	0.20	0.04
25	ND		ND	ND	0.37	0.22	0.27	0.29	0.10	0.11	0.09	0.13	0.09
31, 28	0.93		0.99	0.96	8.36	4.55	6.43	6.45	0.80	1.20	1.34	2.08	0.18
33,21,53	0.57		0.34	0.45	2.02	1.93	2.64	2.20	0.54	0.39	0.27	0.66	0.08
51	0.07		0.07	0.07	0.26	0.26	0.31	0.28	0.08	0.07	0.05	0.09	0.00
22	0.25		0.22	0.23	0.93	0.89	1.24	1.02	0.23	0.16	0.19	0.33	ND
45	0.19		0.11	0.15	0.49	0.45	0.60	0.51	0.16	0.12	0.08	0.17	0.01
46	0.08		0.11	0.09	0.24	0.22	0.30	0.25	0.06	0.06	0.03	0.08	0.01
52	0.74		1.84	1.29	3.37	3.21	4.55	3.71	1.09	0.79	0.78	1.32	0.13
49	0.82		1.06	0.94	2.95	2.84	3.88	3.22	0.92	0.69	0.61	1.11	0.13
47,48	1.17		1.06	1.11	3.98	3.71	5.30	4.33	1.08	0.77	0.56	1.31	0.10
44	0.72		1.22	0.97	3.65	3.43	4.98	4.02	1.08	0.68	0.59	1.26	0.08
37,42	0.56		0.56	0.56	2.17	2.06	2.93	2.39	0.67	0.45	0.36	0.77	0.06
41,64,71	0.93		0.93	0.93	5.26	3.48	6.94	5.22	1.45	1.03	0.52	1.55	0.23
40	0.14		0.26	0.20	0.65	0.67	0.84	0.72	0.25	0.13	0.11	0.24	0.01
100	ND		ND	ND	0.10	0.11	0.16	0.12	ND	ND	ND	0.12	ND
63	ND		ND	ND	0.12	0.14	0.19	0.15	ND	ND	0.03	0.09	ND
74	0.29		0.50	0.39	2.19	2.10	2.98	2.42	0.67	0.32	0.36	0.75	0.09
70,76	1.02		2.43	1.73	6.32	6.20	8.76	7.09	2.30	1.25	1.53	2.54	0.22
66,95	3.60		5.68	4.64	15.63	13.66	19.97	16.42	4.02	2.24	3.23	5.40	0.49
91	0.20		0.36	0.28	0.52	0.55	0.81	0.63	0.29	0.20	0.14	0.26	0.03
56,60/92,84	2.93		1.70	2.31	4.82	7.99	10.79	7.87	3.48	2.03	2.15	3.31	0.57
89	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
101	1.07		2.22	1.65	3.35	3.38	4.72	3.82	1.28	0.90	0.85	1.43	0.14
99	0.71		1.14	0.93	1.47	1.52	2.03	1.67	0.72	0.48	0.45	0.70	0.09
119	NA		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
83	0.12		0.16	0.14	0.19	0.20	0.26	0.22	0.13	0.10	0.07	0.11	0.02
97	0.41		0.77	0.59	0.78	0.74	1.06	0.86	0.44	0.28	0.26	0.39	0.05
81,87	ND		ND	ND	0.23	0.23	0.32	0.26	0.13	ND	ND	0.19	ND
85	0.23		0.30	0.27	0.49	0.48	0.68	0.55	0.27	0.18	0.12	0.22	ND
136	0.19		0.26	0.22	0.60	0.59	0.81	0.67	0.14	0.12	0.09	0.20	0.01
77,110	2.04		4.27	3.15	5.24	5.53	7.50	6.09	2.56	1.78	1.71	2.59	0.24
82, 151	0.93		1.29	1.11	2.75	2.71	3.63	3.03	0.77	0.56	0.47	0.96	0.08
135,144	0.43		0.67	0.55	1.40	1.37	1.84	1.53	0.40	0.31	0.24	0.49	0.06
107	0.11		0.19	0.15	0.35	0.35	0.51	0.40	0.13	0.08	0.08	0.14	0.03
123,149	1.88		2.76	2.32	6.65	6.81	9.00	7.49	1.48	1.23	0.93	2.17	0.15
118	1.12		2.58	1.85	2.66	2.87	3.83	3.12	1.40	0.83	0.96	1.37	0.11
134	ND		0.02	0.02	0.03	ND	0.06	0.04	0.02	0.03	0.01	0.02	ND
146	0.22		0.29	0.25	0.77	0.78	0.12	0.55	0.23	0.16	0.12	0.22	0.02
132,105,153	3.83		5.35	4.59	14.32	14.32	19.06	15.90	2.80	2.22	1.84	4.41	0.33
141	0.40		0.38	0.39	1.17	1.10	1.39	1.22	0.25	0.20	0.15	0.35	0.04
137,130,176	0.12		0.34	0.23	0.57	0.56	0.71	0.61	0.16	0.11	0.08	0.19	0.03
163,138	3.74		6.12	4.93	12.48	12.92	17.12	14.17	2.94	2.22	1.85	4.15	0.26
158	0.03		0.04	0.04	0.06	0.06	0.08	0.07	0.02	0.01	ND	0.03	ND
129,178	0.36		0.43	0.39	0.90	0.84	1.14	0.96	0.27	0.20	0.14	0.31	0.07
187,182	1.63		1.64	1.63	4.11	3.95	5.14	4.40	1.00	0.76	0.55	1.30	0.15
183	0.84		0.69	0.76	2.52	2.43	3.04	2.66	0.40	0.31	0.26	0.69	0.10
128	0.20		0.38	0.29	0.47	0.49	0.62	0.53	0.18	0.13	0.10	0.19	0.07
185	0.23		0.20	0.22	0.45	0.41	0.53	0.46	0.07	0.06	0.07	0.14	0.02
174	0.88		0.95	0.91	3.10	3.04	3.92	3.35	0.57	0.45	0.38	0.92	0.08
177	0.89		0.93	0.91	2.49	2.34	2.96	2.60	0.54	0.40	0.32	0.75	0.07
202,171,156	0.73		0.89	0.81	3.20	3.04	4.25	3.50	0.51	0.36	0.26	0.86	0.08
157,200	0.29		0.33	0.31	0.85	0.82	1.13	0.93	0.19	0.12	0.08	0.25	0.04
172,197	0.16		0.16	0.16	0.42	0.39	0.49	0.43	0.08	0.09	0.06	0.13	ND
180	3.00		3.56	3.28	11.83	11.29	14.69	12.60	1.86	1.39	1.23	3.26	0.19
193	0.22		0.31	0.26	0.90	0.76	1.11	0.92	0.16	0.07	0.03	0.21	ND
191	0.05		0.03	0.04	0.17	0.11	0.17	0.15	0.02	0.03	0.03	0.05	0.01
199	0.08		0.09	0.08	0.24	0.21	0.29	0.25	0.05	0.04	0.03	0.07	0.02
170,190	2.38		2.53	2.45	8.51	8.07	10.43	9.01	1.26	1.13	1.01	2.40	0.31
198	0.06		0.10	0.08	0.43	0.40	0.59	0.47	0.06	0.04	0.02	0.11	ND
201	1.72		3.53	2.63	8.45	7.98	11.62	9.35	1.24	1.03	0.54	2.20	0.23
203,196	1.93		4.56	3.25	8.20	7.72	11.18	9.03	1.23	0.95	0.59	2.16	0.26
189	0.08		0.16	0.12	0.30	0.34	0.35	0.33	0.09	0.03	0.05	0.10	0.06
208,195	0.65		0.85	0.75	2.55	1.39	3.45	2.46	0.23	0.19	0.20	0.58	ND
207	0.13		0.30	0.21	1.84	1.56	2.41	1.94	0.18	0.18	0.06	0.41	0.04
194	0.87		2.28	1.57	2.76	2.50	3.63	2.96	0.52	0.35	0.28	0.78	0.06
205	0.14		0.04	0.09	0.11	0.13	0.21	0.15	0.03	0.01	0.02	0.04	0.01
206	1.81		9.34	5.58	27.52	26.87	39.09	31.16	3.69	3.77	1.06	6.97	0.93
209	0.13		0.21	0.17	4.09	3.72	5.75	4.52	0.39	0.36	0.11	0.93	0.10
Total PCBs	**54**		**85**	**70**	**221**	**210**	**293**	**242**	**52**	**39**	**32**	**73**	**7**
Recovery													
14	132%		127%	129%	110%	123%	150%	128%	141%	142%	148%	148%	145%
65	111%		103%	107%	82%	92%	112%	95%	115%	112%	116%	116%	115%
166	111%		107%	109%	86%	103%	125%	105%	123%	121%	121%	121%	117%

C-1. PCB concentrations in Sediments (ng/g) from Fall 2001 Core Study

Field ID	05sed2	05sed2	05sed3	05sed3	5 CORE
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Zone	5	5	5	5	5
Description	Sediment	Sediment	Sediment	Sediment	Sediment
Replicate analysis?	Rep B	Rep C	Rep A	Rep B	
Analyzed by	ANS	ANS	ANS	ANS	ANS
Amt. Nitrogen (mg)	0.02		0.00	0.00	0.01
Amt. Carbon (mg)	0.88		0.69	0.64	0.71
Sediment % Solid	73	72	71	69	60
Sediment % Water	27	28	29	31	40
1	ND	ND	ND	ND	ND
3	0.46	ND	ND	0.48	0.47
4,10	ND	ND	ND	ND	ND
7,9	ND	ND	ND	ND	ND
6	ND	ND	ND	0.04	0.02
8,5	ND	ND	ND	0.29	0.18
19	ND	0.02	0.02	0.01	0.02
12,13	0.00	0.08	0.01	0.08	0.03
18	0.13	0.20	0.03	0.07	0.17
17	0.06	0.05	0.07	0.11	0.05
24	ND	ND	ND	ND	ND
16,32	0.05	0.04	0.05	0.05	0.05
29	ND	ND	ND	0.00	0.00
26	0.05	0.03	0.03	0.05	0.03
25	0.04	0.06	0.07	0.07	0.08
31, 28	0.23	0.18	0.27	0.43	0.24
33,21,53	0.10	0.07	0.08	0.17	0.08
51	0.01	0.01	0.01	0.01	0.01
22	ND	0.07	0.05	0.09	0.07
45	0.04	0.01	0.02	0.03	0.04
46	0.01	0.01	0.01	0.01	0.01
52	0.26	0.12	0.16	0.18	0.14
49	0.22	0.11	0.19	0.45	0.18
47,48	0.18	0.16	0.16	0.15	0.18
44	0.18	0.15	0.14	0.15	0.12
37,42	0.10	0.05	0.10	0.25	0.10
41,64,71	0.27	0.14	0.27	0.18	0.19
40	0.04	0.03	0.03	0.04	0.03
100	ND	ND	ND	ND	ND
63	ND	ND	ND	ND	ND
74	0.07	0.06	0.08	0.11	0.06
70,76	0.31	0.20	0.30	0.35	0.19
66,95	0.67	0.47	0.78	0.77	0.46
91	0.07	0.04	0.03	0.04	0.04
56,60/92,84	1.39	0.48	0.56	0.75	0.74
89	NA	NA	NA	NA	NA
101	0.28	0.15	0.17	0.19	0.15
99	0.14	0.09	0.10	0.11	0.09
119	NA	NA	NA	NA	NA
83	0.02	0.01	0.02	0.02	0.02
97	0.07	0.05	0.06	0.06	0.05
81,87	ND	ND	ND	ND	ND
85	0.03	0.02	0.03	0.02	0.03
136	0.05	0.02	0.02	0.03	0.04
77,110	0.46	0.28	0.34	0.39	0.22
82, 151	0.22	0.08	0.09	0.11	0.08
135,144	0.12	0.05	0.06	0.06	0.05
107	0.02	0.01	0.01	0.02	0.02
123,149	0.47	0.19	0.22	0.25	0.21
118	0.18	0.13	0.17	0.20	0.12
134	ND	ND	ND	ND	0.03
146	0.05	0.03	0.03	0.04	0.06
132,105,153	0.89	0.38	0.44	0.50	0.37
141	0.09	0.04	0.04	0.05	0.06
137,130,176	0.03	0.01	0.02	0.02	0.02
163,138	0.72	0.35	0.39	0.47	0.30
158	ND	ND	ND	ND	ND
129,178	0.08	0.03	0.04	0.04	0.07
187,182	0.28	0.15	0.21	0.27	0.38
183	0.15	0.08	0.07	0.07	0.18
128	0.02	0.04	0.03	0.03	0.03
185	0.04	0.02	0.02	0.02	0.03
174	0.20	0.06	0.07	0.10	0.14
177	0.18	0.10	0.09	0.09	0.08
202,171,156	0.12	0.07	0.08	0.10	0.57
157,200	0.05	0.06	0.02	0.04	0.39
172,197	0.04	0.02	0.02	0.02	0.04
180	0.62	0.25	0.27	0.31	0.24
193	0.06	0.02	0.02	0.02	0.03
191	ND	ND	ND	ND	0.01
199	0.02	0.01	0.01	0.01	0.05
170,190	0.48	0.19	0.23	0.33	0.20
198	0.01	0.01	0.02	0.01	0.15
201	0.34	0.25	0.29	0.38	3.08
203,196	0.34	0.22	0.29	0.25	2.44
189	0.04	0.02	0.00	0.03	0.03
208,195	ND	ND	ND	ND	0.49
207	0.08	0.06	0.06	0.06	1.13
194	0.14	0.07	0.09	0.10	0.25
205	0.00	0.00	0.01	0.01	0.04
206	0.95	1.09	1.21	1.17	21.44
209	0.11	0.13	0.12	0.11	1.68
Total PCBs	**13**	**8**	**9**	**12**	**39**
Recovery					
14	136%	NM	139%	138%	131%
65	110%	125%	114%	112%	109%
166	117%	131%	126%	121%	120%

C-2. PCB concentrations in Sediments (ng/g) from Fall 2001 Variability Study

Field ID	4 CC	05sed1	05sed1	05sed1	05sedvar1	05sedvar1	05sedvar1	05sedvar2	05sedvar2	05sedvar2	05sedvar2
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Matrix	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Zone	4	5	5	5	5	5	5	5	5	5	5
Replicate analysis?		Rep A	Rep B	Rep C	Rep A	Rep B	Average	Rep A	Rep A dup	Rep B	Average
Analyzed by	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS
Amt. Nitrogen (mg)	0.01	0.00	0.04		0.12	0.11	0.12	0.12		0.11	0.11
Amt. Carbon (mg)	1.18	1.97	1.71		1.86	2.10	1.98	1.85		1.73	1.79
Sediment % Solid	65	65	63	63	46	46	46	50	51	53	52
Sediment % Water	35	35	37	37	54	54	54	50	49	47	48
1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
3	0.49	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4,10	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
7,9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
6	ND	ND	ND	ND	ND	0.01	0.01	ND	ND	ND	ND
8,5	ND	ND	ND	ND	0.07	ND	0.07	ND	ND	ND	ND
19	0.02	0.03	ND	0.02	0.02	ND	0.02	ND	ND	ND	ND
12,13	0.01	0.01	0.01	0.02	ND	ND	ND	ND	0.00	ND	0.00
18	ND	0.05	0.22	0.69	ND	0.13	0.13	ND	0.18	0.51	0.35
17	0.03	0.04	0.04	ND	0.03	0.02	0.03	0.02	0.02	0.02	0.02
24	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
16,32	0.04	0.04	ND	ND	ND	ND	ND	ND	ND	ND	ND
29	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
26	0.02	0.03	0.02	0.02	0.01	ND	0.01	0.02	0.02	ND	0.02
25	ND	ND	ND	0.10	0.07	0.07	0.07	ND	0.08	ND	0.08
31, 28	0.05	0.12	0.26	0.18	ND	ND	ND	ND	ND	ND	ND
33,21,53	0.03	0.07	0.11	0.06	ND	0.04	0.04	0.04	ND	ND	0.04
51	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	ND	ND	0.00
22	ND	ND	ND	ND	ND	ND	ND	ND	0.14	ND	0.14
45	0.02	0.02	0.02	0.19	ND	ND	ND	ND	ND	0.01	0.01
46	0.01	0.01	ND	0.01	ND	ND	ND	ND	ND	0.01	0.01
52	0.14	0.12	0.15	0.13	0.09	ND	0.09	0.08	0.09	ND	0.08
49	0.11	0.13	0.18	0.17	0.09	0.06	0.07	0.06	0.06	0.04	0.05
47,48	0.16	0.30	0.19	0.22	0.17	0.16	0.16	0.14	0.14	0.15	0.15
44	0.09	0.07	0.10	0.09	ND	ND	ND	ND	ND	ND	ND
37,42	0.05	0.04	0.09	0.05	ND	ND	ND	ND	ND	ND	ND
41,64,71	0.19	0.09	0.19	0.13	ND	0.17	0.17	0.18	0.21	0.04	0.12
40	0.03	0.03	0.04	0.05	ND	ND	ND	ND	ND	ND	ND
100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
63	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
74	0.05	0.03	0.06	0.04	0.04	0.04	0.04	0.02	0.02	ND	0.02
70,76	0.14	0.14	0.18	0.14	0.06	0.04	0.05	0.03	0.04	0.03	0.03
66,95	261.56	0.42	0.38	0.38	0.17	0.11	0.14	0.14	0.32	0.08	0.15
91	0.04	0.02	0.03	0.03	ND	ND	ND	0.01	ND	ND	0.01
56,60/92,84	0.30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
101	0.12	0.09	0.08	0.08	ND	ND	ND	ND	ND	ND	ND
99	0.07	0.06	0.07	0.06	ND	ND	ND	0.03	ND	ND	0.03
119	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
83	0.01	0.01	0.01	ND	ND	ND	ND	ND	ND	ND	ND
97	0.04	0.03	0.02	0.03	ND	ND	ND	ND	ND	ND	ND
81,87	0.00	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
85	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
136	0.01	0.05	0.06	0.05	ND	ND	ND	ND	ND	ND	ND
77,110	0.23	0.12	0.12	0.11	0.08	0.06	0.07	ND	ND	ND	ND
82, 151	0.06	0.06	0.05	0.07	0.03	0.02	0.03	0.02	0.02	0.01	0.01
135,144	0.04	0.05	0.06	0.06	0.01	0.01	0.01	ND	ND	ND	ND
107	0.01	0.02	0.02	0.02	0.01	ND	0.01	0.01	ND	ND	0.01
123,149	0.16	0.26	0.29	0.29	0.06	ND	0.06	ND	ND	ND	ND
118	0.10	0.06	0.05	0.03	ND	ND	ND	ND	ND	ND	ND
134	ND	0.03	0.04	ND	ND	ND	ND	ND	ND	ND	ND
146	ND	0.10	0.13	0.11	ND	ND	ND	ND	ND	ND	ND
132,105,153	0.30	0.33	0.38	0.34	0.15	0.12	0.13	ND	ND	ND	ND
141	0.02	0.12	0.14	0.13	0.02	0.01	0.02	ND	ND	ND	ND
137,130,176	0.02	0.03	0.04	0.02	0.01	ND	0.01	0.01	0.01	ND	0.01
163,138	0.27	0.17	0.16	0.15	0.17	0.14	0.16	0.11	0.11	0.10	0.11
158	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
129,178	0.02	0.12	0.17	0.13	0.05	0.05	0.05	0.03	0.02	0.02	0.02
187,182	0.10	0.61	0.88	0.65	ND	ND	ND	ND	ND	ND	ND
183	0.05	0.39	0.57	0.45	0.06	0.06	0.06	0.06	0.05	0.05	0.05
128	0.01	0.00	0.03	0.02	0.02	0.02	0.02	0.03	0.03	0.02	0.02
185	0.01	0.03	0.07	0.04	ND	ND	ND	ND	ND	ND	ND
174	0.04	0.23	0.26	0.16	ND	ND	ND	ND	ND	ND	ND
177	0.06	0.08	0.08	0.06	0.04	0.03	0.03	0.04	0.11	0.06	0.07
202,171,156	0.03	2.00	2.39	1.85	0.02	0.03	0.02	0.01	0.04	0.02	0.02
157,200	ND	1.02	1.25	1.03	ND	ND	ND	ND	ND	ND	ND
172,197	ND	0.05	0.06	0.05	ND	ND	ND	ND	ND	ND	ND
180	0.13	0.26	0.29	0.26	0.05	0.04	0.04	0.02	0.02	0.02	0.02
193	ND	0.01	0.02	0.01	ND	ND	ND	ND	ND	ND	ND
191	ND	ND	0.00	ND	ND	ND	ND	ND	ND	ND	ND
199	0.00	0.18	0.22	0.13	0.01	0.01	0.01	0.01	0.01	ND	0.01
170,190	0.11	0.15	0.23	0.11	0.05	0.03	0.04	0.01	0.02	0.03	0.02
198	0.02	0.43	0.51	0.38	ND	ND	ND	ND	ND	ND	ND
201	0.13	10.61	13.65	10.72	0.06	0.05	0.05	0.02	0.02	0.01	0.02
203,196	0.16	8.50	10.53	8.43	0.05	0.06	0.05	0.03	0.04	0.03	0.03
189	0.01	0.02	0.02	0.03	ND	ND	ND	ND	0.03	0.04	0.03
208,195	0.03	0.49	ND	ND	ND	ND	ND	ND	ND	ND	ND
207	0.03	3.07	3.91	2.82	ND	ND	ND	ND	ND	ND	ND
194	0.05	0.75	0.90	0.76	0.02	0.01	0.01	0.01	0.01	0.01	0.01
205	ND	0.07	0.15	0.07	ND	ND	ND	ND	ND	ND	ND
206	0.58	74.80	98.24	77.14	0.26	0.14	0.20	0.12	0.08	0.07	0.08
209	0.07	6.04	7.65	5.78	0.03	0.01	0.02	0.02	0.01	0.01	0.01
Total PCBs	**267**	**113**	**146**	**115**	**2**	**2**	**2**	**1**	**2**	**1**	**2**
Recovery											
14	135%	145%	144%	140%	126%	120%	123%	122%	129%	105%	115%
65	108%	114%	117%	111%	109%	103%	106%	103%	108%	91%	98%
166	118%	118%	124%	115%	120%	113%	116%	111%	117%	101%	108%

C-2. PCB concentrations in Sediments (ng/g) from Fall 2001 Variability Study

Field ID	05sedvar3	05sedvar3	05sedvar3	05sedvar4	05sedvar4	05sedvar4	05sedvar4
Collected	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001	Fall 2001
Matrix	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Zone	5	5	5	5	5	5	5
Replicate analysis?	Rep A	Rep B	Average	Rep A	Rep A dup	Rep B	Average
Analyzed by	ANS	ANS	ANS	ANS	ANS	ANS	ANS
Amt. Nitrogen (mg)	0.00	0.00	0.00	0.00		0.00	0.00
Amt. Carbon (mg)	0.19	0.18	0.19	0.11		0.12	0.11
Sediment % Solid	76	74	75	80	80	83	81
Sediment % Water	24	26	25	20	20	17	19
1	ND	ND	ND	ND	ND	ND	ND
3	ND	ND	ND	ND	ND	ND	ND
4,10	ND	ND	ND	ND	ND	ND	ND
7,9	ND	ND	ND	ND	ND	ND	ND
6	ND	0.00	0.00	0.00	0.00	ND	ND
8,5	ND	ND	ND	ND	ND	ND	ND
19	ND	ND	ND	ND	ND	ND	ND
12,13	ND	0.00	0.00	ND	ND	ND	ND
18	ND	ND	ND	0.08	0.08	0.08	0.08
17	ND	0.01	0.01	0.01	0.01	ND	0.01
24	ND	ND	ND	ND	ND	ND	ND
16,32	ND	ND	ND	ND	ND	ND	ND
29	ND	ND	ND	ND	ND	ND	ND
26	0.01	0.00	0.01	0.01	0.00	0.00	0.00
25	ND	ND	ND	0.03	ND	ND	0.03
31, 28	0.04	ND	0.04	ND	ND	ND	ND
33,21,53	ND	0.02	0.02	ND	ND	ND	ND
51	0.01	0.00	0.01	0.00	0.00	0.00	0.00
22	ND	ND	ND	ND	ND	ND	ND
45	ND	ND	ND	ND	ND	ND	ND
46	0.01	ND	0.01	ND	ND	ND	ND
52	0.07	0.05	0.06	ND	0.04	ND	0.04
49	0.09	0.05	0.07	0.03	0.05	0.02	0.03
47,48	0.21	0.07	0.14	0.07	0.06	0.07	0.07
44	ND	ND	ND	ND	ND	ND	ND
37,42	0.04	ND	0.04	0.02	ND	ND	0.02
41,64,71	0.02	0.09	0.05	0.00	0.03	ND	0.01
40	ND	ND	ND	ND	ND	ND	ND
100	ND	ND	ND	ND	ND	ND	ND
63	ND	ND	ND	ND	ND	ND	ND
74	0.02	0.02	0.02	0.01	0.01	0.01	0.01
70,76	0.10	0.06	0.08	0.04	0.04	0.03	0.04
66,95	0.31	0.13	0.22	0.10	0.11	0.05	0.08
91	0.01	0.01	0.01	0.01	0.01	ND	0.01
56,60/92,84	0.24	ND	0.24	ND	ND	ND	ND
89	NA	NA	NA	NA	NA	NA	NA
101	0.07	0.04	0.06	0.03	0.03	ND	0.03
99	0.04	0.03	0.03	0.02	0.02	ND	0.02
119	NA	NA	NA	NA	NA	NA	NA
83	0.01	ND	0.01	ND	ND	ND	ND
97	0.02	ND	0.02	ND	ND	ND	ND
81,87	ND	ND	ND	ND	ND	ND	ND
85	ND	ND	ND	ND	ND	ND	ND
136	0.01	ND	0.01	ND	ND	ND	ND
77,110	0.13	0.07	0.10	0.06	0.06	0.04	0.05
82, 151	0.04	0.03	0.03	0.03	0.02	0.01	0.02
135,144	0.03	0.02	0.02	0.01	0.01	0.01	0.01
107	0.01	ND	0.01	0.00	0.00	ND	0.00
123,149	0.09	0.07	0.08	0.05	0.04	0.03	0.04
118	0.06	0.02	0.04	0.03	0.02	ND	0.03
134	ND	ND	ND	ND	ND	ND	ND
146	ND	ND	ND	ND	ND	ND	ND
132,105,153	0.18	0.14	0.16	0.12	0.10	0.08	0.10
141	0.01	0.01	0.01	0.01	0.01	0.01	0.01
137,130,176	0.01	0.01	0.01	0.01	0.01	0.01	0.01
163,138	0.19	0.11	0.15	0.10	0.08	0.06	0.07
158	ND	ND	ND	ND	ND	ND	ND
129,178	0.01	0.01	0.01	0.01	0.01	0.01	0.01
187,182	0.11	0.09	0.10	0.08	0.09	ND	0.08
183	0.03	0.02	0.03	0.02	0.02	0.01	0.02
128	0.01	0.01	0.01	0.01	0.00	0.00	0.00
185	ND	ND	ND	ND	0.01	ND	0.01
174	0.04	0.02	0.03	0.02	0.02	0.01	0.02
177	0.04	0.02	0.03	0.02	0.02	0.01	0.02
202,171,156	0.04	0.02	0.03	0.02	0.02	0.01	0.02
157,200	ND	ND	ND	0.01	ND	ND	0.01
172,197	0.03	ND	0.03	ND	ND	ND	ND
180	0.13	0.08	0.11	0.08	0.06	0.04	0.06
193	ND	ND	ND	ND	ND	0.00	0.00
191	ND	ND	ND	0.00	ND	ND	0.00
199	0.00	0.00	0.00	0.00	ND	0.00	0.00
170,190	0.10	0.06	0.08	0.07	0.06	0.05	0.05
198	0.00	ND	0.00	0.00	0.01	ND	0.01
201	0.10	0.06	0.08	0.07	0.06	0.05	0.06
203,196	0.10	0.06	0.08	0.07	0.06	0.05	0.06
189	0.01	ND	0.01	ND	ND	0.01	0.01
208,195	ND	ND	ND	ND	ND	ND	ND
207	0.02	0.01	0.02	0.01	0.01	0.01	0.01
194	0.04	0.02	0.03	0.02	0.03	0.01	0.02
205	ND	ND	ND	ND	ND	ND	ND
206	0.38	0.22	0.30	0.32	0.25	0.21	0.25
209	0.05	0.03	0.04	0.03	0.03	0.02	0.03
Total PCBs	**3**	**2**	**3**	**2**	**2**	**1**	**2**
Recovery							
14	113%	85%	99%	118%	121%	115%	117%
65	99%	72%	86%	105%	105%	102%	103%
166	109%	75%	92%	112%	114%	112%	113%

C-3. PCB concentrations in Sediments (ng/g) from Spring 2002 Core Study

Field ID	2 Sed1	2 Sed3	2 Sed4	2 CORE	3 Sed1	3 Sed1	3 Sed2	3 CORE	4 Sed1	4 Sed2	4 CORE	5 Sed1
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Matrix	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Zone	2	2	2	2	3	3	3	3	4	4	4	5
Replicate analysis?					Rep A	Rep B						
Analyzed by	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS	ANS
Amt. Nitrogen (mg)	0.03	0.18	0.00	0.07	0.23	0.22	0.07	0.14	0.12	0.03	0.08	0.06
Amt. Carbon (mg)	2.31	4.80	0.21	2.44	7.59	7.97	1.40	4.69	1.96	1.41	1.69	1.86
Sediment % Solid	63	46	80	63	51	52	74	74	44	73	60	61
Sediment % Water												
1	ND	ND	ND	0.20	ND	ND	0.15	0.15	1.43	ND	1.43	ND
3	ND	1.19	ND	1.19	ND	ND	ND	ND	ND	ND	ND	ND
4,10	ND	0.06	ND	0.05	0.17	0.15	0.03	0.09	0.04	0.02	0.03	ND
7,9	0.02	0.09	ND	0.05	0.02	0.03	0.03	0.03	ND	0.02	0.02	ND
6	0.02	0.27	0.01	0.08	0.19	0.21	0.03	0.12	0.09	0.00	0.05	ND
8,5	0.24	1.66	ND	0.97	0.91	0.95	0.66	0.79	0.33	0.56	0.67	ND
19	0.25	ND	ND	0.25	ND	ND	ND	ND	ND	ND	ND	ND
12,13	ND	0.10	ND	0.06	ND	0.07	0.02	0.05	0.20	0.03	0.10	ND
18	0.78	ND	ND	0.81	8.72	8.46	0.15	4.37	0.16	0.11	0.26	ND
17	ND	0.89	ND	0.47	ND	2.00	0.10	1.05	0.25	0.09	0.55	0.20
24	0.02	0.11	ND	0.05	0.08	0.08	0.01	0.05	0.08	0.01	0.04	ND
16,32	0.24	0.79	ND	0.40	2.76	3.12	0.18	1.56	0.31	0.16	0.26	ND
29	ND	0.02	ND	0.02	0.04	0.04	ND	0.04	ND	ND	8.81	ND
26	ND	ND	ND	ND	1.49	1.70	ND	1.60	ND	ND	0.32	ND
25	ND	ND	ND	ND	ND	1.71	ND	1.71	ND	ND	ND	ND
31, 28	0.33	0.63	ND	0.42	10.52	20.96	0.16	7.95	0.94	0.67	3.55	ND
33,21,53	0.14	0.27	ND	0.22	3.96	2.81	0.34	1.86	0.19	0.32	0.35	ND
51	0.04	0.23	ND	0.11	2.40	2.78	0.03	1.31	0.11	0.03	0.21	0.09
22	0.16	0.42	ND	0.25	2.85	3.32	0.21	1.65	0.17	0.24	0.72	ND
45	0.03	0.05	ND	0.08	1.67	1.89	0.07	0.93	0.09	0.08	0.20	0.10
46	0.08	0.38	0.01	0.12	0.56	0.64	0.02	0.31	0.03	0.02	0.03	ND
52	0.41	0.67	ND	0.40	6.93	8.08	0.33	3.92	0.54	0.36	1.00	ND
49	0.39	0.81	ND	0.45	7.23	8.25	0.28	4.01	0.58	0.45	1.06	0.16
47,48	1.21	1.82	0.60	1.21	4.82	12.78	0.28	4.54	2.14	ND	2.14	0.86
44	0.36	0.49	ND	0.32	10.00	10.14	0.29	5.18	0.51	0.26	0.95	ND
37,42	0.18	0.36	ND	0.20	6.19	5.34	0.12	2.94	0.34	0.16	0.62	0.07
41,64,71	0.58	1.23	ND	0.68	16.72	6.04	0.47	5.92	0.25	0.48	0.74	ND
40	0.15	0.39	ND	0.20	4.02	2.81	0.07	1.74	0.17	0.10	0.32	ND
100	ND	ND	ND	0.03	ND	ND	0.05	0.05	0.07	0.06	0.07	5.71
63	0.04	0.04	ND	0.03	ND	ND	0.05	0.05	0.06	ND	0.25	ND
74	0.20	0.40	ND	0.22	5.08	5.39	0.12	2.68	0.34	0.19	0.64	ND
70,76	0.61	1.11	ND	0.62	12.54	13.88	0.27	6.74	0.91	0.51	3.39	ND
66,95	0.71	1.10	ND	0.72	25.55	31.06	1.01	14.66	0.94	1.15	2.86	0.14
91	0.13	0.29	0.01	0.18	1.21	1.33	0.52	0.89	0.21	0.70	3.11	ND
56,60/92,84	1.23	1.84	ND	1.20	15.59	17.95	0.24	8.50	1.00	0.22	1.49	0.82
89	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
101	0.63	0.73	ND	0.49	6.43	7.31	0.28	3.57	0.66	0.26	0.96	0.06
99	0.44	0.58	0.03	0.28	2.84	3.20	0.16	1.59	0.06	0.17	0.54	0.07
119	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
83	0.20	0.17	0.01	0.11	3.27	2.34	0.05	1.43	0.21	0.00	0.88	0.04
97	0.19	0.25	ND	0.16	1.36	1.57	0.02	0.74	0.20	0.03	0.12	ND
81,87	0.24	0.33	ND	0.23	1.34	1.56	0.14	0.79	0.18	0.15	0.56	ND
85	ND	ND	ND	ND	1.61	2.74	ND	2.18	1.51	ND	1.15	ND
136	ND	ND	ND	ND	1.25	1.35	ND	1.30	ND	ND	0.45	ND
77,110	1.43	1.97	ND	1.23	9.60	10.52	0.56	5.31	1.45	0.68	2.33	0.14
82, 151	0.41	0.49	0.05	0.26	3.35	4.78	0.15	2.11	0.31	0.16	0.83	0.03
135,144	0.19	0.22	0.01	0.12	1.75	2.33	0.12	1.08	0.30	0.12	0.55	0.11
107	0.09	0.10	ND	0.07	1.26	1.32	0.05	0.67	0.09	0.03	0.39	0.11
123,149	0.90	0.96	ND	0.69	6.54	9.55	0.33	4.19	1.05	0.40	1.31	ND
118	0.66	0.86	ND	0.54	3.50	8.43	0.07	3.02	1.94	0.05	0.88	0.36
134	1.19	1.51	0.06	0.75	3.15	7.01	0.04	2.56	2.28	0.03	0.81	0.09
146	0.28	0.33	ND	0.23	1.99	3.95	0.15	1.56	1.19	0.16	0.60	0.35
132,105,153	2.24	2.47	ND	1.73	15.25	26.99	1.09	11.10	4.38	1.20	3.30	0.45
141	0.18	0.22	0.02	0.12	1.30	2.06	0.04	0.86	0.19	0.20	0.47	0.16
137,130,176	0.16	ND	ND	0.16	ND	ND	ND	ND	0.31	0.08	0.22	ND
163,138	2.19	2.38	0.08	1.25	12.89	17.89	0.44	7.91	1.90	0.91	2.46	0.16
158	ND	ND	ND	ND	ND	1.10	ND	1.10	ND	ND	ND	ND
129,178	ND	ND	ND	ND	1.35	2.38	ND	1.86	ND	ND	ND	ND
187,182	0.64	0.82	0.07	0.41	4.81	6.76	0.32	3.05	0.70	0.28	0.79	0.95
183	0.35	0.39	0.01	0.20	3.75	5.35	0.01	2.28	0.44	0.15	0.50	0.58
128	0.26	0.28	ND	0.22	0.78	2.20	0.28	0.88	0.33	0.13	0.35	0.03
185	0.08	0.14	ND	0.08	0.67	0.23	0.01	0.23	0.14	0.04	0.12	0.02
174	0.40	0.54	0.04	0.26	3.63	6.27	0.09	2.52	0.74	0.27	0.75	0.14
177	0.28	0.34	0.01	0.18	2.21	3.71	0.09	1.53	0.76	0.17	0.53	0.05
202,171,156	0.39	0.48	0.03	0.25	2.88	4.16	0.04	1.78	0.49	0.18	0.56	2.52
157,200	0.17	0.21	ND	0.13	0.82	1.16	ND	0.99	ND	ND	ND	1.17
172,197	ND	ND	ND	ND	0.88	ND	ND	0.88	ND	ND	ND	ND
180	1.16	1.31	ND	1.24	10.48	11.40	0.36	5.65	0.58	0.50	1.22	ND
193	1.81	3.25	0.38	1.81	0.32	0.93	ND	0.63	0.26	ND	0.55	ND
191	0.02	ND	0.04	0.03	ND	1.84	0.09	0.97	1.05	0.02	0.38	0.03
199	ND	ND	ND	ND	ND	1.76	ND	1.76	0.55	0.29	0.42	ND
170,190	1.18	1.11	0.02	0.62	6.86	ND	0.14	3.50	1.05	0.31	1.18	0.08
198	0.15	0.07	0.02	0.08	0.35	8.46	0.01	2.21	3.70	0.02	1.31	0.84
201	0.57	0.80	0.05	0.39	6.93	9.68	0.11	4.21	3.60	0.28	2.18	14.08
203,196	0.60	0.88	0.02	0.41	6.84	9.14	0.14	4.07	3.59	0.33	2.28	9.91
189	0.03	ND	ND	0.03	0.20	10.19	ND	5.20	10.15	ND	5.21	0.02
208,195	0.25	0.72	ND	0.34	9.08	ND	0.07	4.58	1.01	ND	1.01	58.17
207	0.03	0.07	ND	0.04	0.68	3.38	0.03	1.03	ND	0.11	0.26	2.92
194	0.24	1.35	ND	0.65	4.35	ND	0.07	2.21	49.06	0.09	16.56	0.88
205	0.21	ND	ND	0.14	ND	ND	ND	ND	76.43	ND	38.23	0.09
206	0.51	0.71	ND	0.47	12.34	13.87	0.17	6.64	31.02	0.77	13.66	ND
209	0.05	0.10	ND	0.06	2.01	3.11	0.03	1.29	ND	0.24	1.40	12.07
Total PCBs	**30**	**45**	**2**	**29**	**313**	**396**	**12**	**200**	**216**	**16**	**144**	**115**
Recovery												
14	124%	108%	84%	106%	103%	94%	69%	69%	231%	82%	139%	161%
65	109%	96%	67%	91%	69%	96%	64%	64%	109%	67%	79%	103%
166	113%	100%	47%	87%	77%	124%	65%	65%	137%	68%	90%	135%

C-3. PCB concentrations in Sediments (ng/g) from Spring 2002 Core Study

Field ID	5 Sed2	5 Sed3	5 Sed2 AMP	5 Sed3 AMP	5 Sed3 AMP	5 CORE
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Matrix	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Zone	5		5	5	5	5
Replicate analysis?				Rep A	Rep B	
Analyzed by	ANS	ANS	ANS	ANS	ANS	ANS
Amt. Nitrogen (mg)	0.00		0.05	0.10	0.11	0.05
Amt. Carbon (mg)	0.41		1.85	1.95	1.95	1.52
Sediment % Solid	78		50	80	30	63
Sediment % Water						
1	ND		ND	ND	ND	ND
3	ND	sample lost	ND	ND	ND	ND
4,10	ND		0.07	ND	0.05	0.06
7,9	ND		0.38	ND	ND	0.38
6	ND		0.05	ND	0.02	0.03
8,5	ND		0.59	ND	ND	0.59
19	ND		ND	ND	ND	ND
12,13	ND		0.08	ND	0.06	0.07
18	ND		ND	ND	ND	ND
17	0.06		0.12	ND	ND	0.13
24	ND		0.02	ND	0.04	0.03
16,32	ND		ND	ND	ND	ND
29	ND		ND	ND	ND	ND
26	ND		ND	ND	ND	ND
25	ND		ND	ND	ND	ND
31, 28	0.42		0.28	0.19	0.17	0.29
33,21,53	ND		ND	ND	ND	ND
51	ND		0.04	ND	0.04	0.06
22	ND		ND	ND	ND	ND
45	0.02		ND	0.01	ND	0.04
46	0.00		0.03	0.00	0.01	0.02
52	0.19		0.26	0.07	0.19	0.20
49	0.39		ND	0.19	0.24	0.26
47,48	ND		ND	ND	ND	0.86
44	0.15		0.18	0.05	0.12	0.14
37,42	0.09		0.15	0.04	0.11	0.10
41,64,71	0.11		ND	0.05	0.12	0.10
40	0.05		0.07	0.02	0.05	0.05
100	0.09		ND	0.02	0.06	1.95
63	0.04		0.07	0.02	0.04	0.05
74	0.06		ND	0.03	0.11	0.06
70,76	0.23		0.29	0.06	0.22	0.22
66,95	0.55		0.39	ND	0.31	0.35
91	1.37		0.09	0.17	0.07	0.53
56,60/92,84	ND		0.81	0.09	0.58	0.66
89	NA		NA	NA	NA	NA
101	0.14		0.28	0.06	0.23	0.16
99	0.11		0.23	0.06	ND	0.12
119	NA		NA	NA	NA	NA
83	0.04		0.15	0.03	0.11	0.08
97	ND		0.09	ND	0.07	0.08
81,87	ND		ND	0.05	0.08	0.07
85	ND		0.76	ND	0.65	0.71
136	ND		ND	ND	ND	ND
77,110	0.43		0.83	0.19	0.57	0.45
82, 151	0.07		0.21	0.05	0.12	0.10
135,144	0.06		0.22	0.03	0.09	0.11
107	0.05		0.14	0.01	0.05	0.08
123,149	0.21		0.66	0.11	0.42	0.38
118	ND		0.44	ND	0.27	0.36
134	ND		0.77	ND	0.48	0.45
146	0.07		0.28	0.04	0.20	0.20
132,105,153	0.47		1.40	0.26	1.04	0.74
141	0.06		0.08	0.03	0.06	0.09
137,130,176	ND		ND	ND	ND	ND
163,138	0.35		1.06	0.17	0.67	0.50
158	ND		ND	ND	ND	ND
129,178	ND		ND	ND	ND	ND
187,182	0.10		0.44	0.07	0.30	0.42
183	0.06		0.19	0.03	0.15	0.23
128	0.07		0.17	0.02	0.05	0.07
185	0.05		ND	0.02	ND	0.03
174	0.10		0.20	0.04	0.12	0.13
177	0.08		0.17	0.04	0.14	0.10
202,171,156	0.10		0.23	0.06	0.12	0.73
157,200	0.01		0.08	0.01	0.07	0.32
172,197	ND		ND	ND	ND	ND
180	ND		ND	ND	ND	ND
193	ND		0.21	0.03	0.19	0.16
191	0.02		0.05	0.01	0.01	0.03
199	ND		ND	ND	ND	ND
170,190	0.15		0.38	0.08	0.29	0.20
198	0.01		0.19	0.01	0.02	0.26
201	0.23		0.62	0.15	0.44	3.80
203,196	0.18		0.57	0.13	0.35	2.73
189	ND		0.22	ND	0.01	0.08
208,195	ND		1.36	0.46	1.15	1.08
207	0.06		0.16	0.04	0.09	0.80
194	0.07		ND	0.03	0.10	0.34
205	ND		ND	ND	ND	0.09
206	0.67		3.06	0.49	1.67	1.60
209	0.18		0.50	0.15	0.31	3.25
Total PCBs	**8**		**20**	**4**	**13**	**28**
Recovery						
14	71%		186%	86%	199%	139%
65	61%		98%	63%	103%	87%
166	61%		132%	63%	126%	110%

C-4. PCB concentrations in Sediments (ng/g) from Spring 2002 Variability Study

Field ID	2 CC	2 CC	4 CC	5 Sed1	2 Sed3 VAR1	2 Sed3 VAR2	2 Sed3 VAR3
Collected	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002	Spring 2002
Matrix	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment	Sediment
Zone	2	2	4	5	2	2	2
Replicate analysis?	Rep A	Rep B					
Analyzed by	ANS	ANS	ANS	ANS	ANS	ANS	ANS
Amt. Nitrogen (mg)	0.00	0.00	0.13	0.06	0.18	0.08	0.13
Amt. Carbon (mg)	0.97	0.56	7.36	1.86	4.80	5.33	3.61
Sediment % Solid	75	74	62	61	46	62	52
Sediment % Water							
1	ND	0.20	ND	ND	ND	0.73	0.75
3	ND	ND	ND	ND	1.19	ND	ND
4,10	0.02	0.05	ND	ND	0.06	ND	ND
7,9	0.02	0.02	ND	ND	0.09	0.05	ND
6	ND	0.01	0.04	ND	0.27	0.03	0.05
8,5	ND	1.02	1.13	ND	1.66	0.54	0.33
19	ND	ND	ND	ND	ND	ND	ND
12,13	ND	0.02	0.08	ND	0.10	ND	ND
18	0.83	ND	0.52	ND	ND	0.47	ND
17	ND	0.06	1.33	0.20	0.89	0.42	0.34
24	0.03	0.02	ND	ND	0.11	0.02	0.04
16,32	0.18	0.15	0.31	ND	0.79	0.31	0.39
29	ND	ND	8.81	ND	0.02	ND	0.02
26	ND	ND	0.32	ND	ND	ND	ND
25	ND	ND	ND	ND	ND	ND	ND
31, 28	ND	0.30	9.05	ND	0.63	0.36	0.29
33,21,53	ND	0.24	0.53	ND	0.27	0.16	0.14
51	0.08	0.01	0.47	0.09	0.23	0.07	0.16
22	0.17	0.16	1.76	ND	0.42	0.21	0.29
45	0.24	0.05	0.42	0.10	0.05	0.20	ND
46	0.03	0.03	0.04	ND	0.38	0.01	0.08
52	0.12	0.13	2.08	ND	0.67	0.48	0.48
49	0.13	0.15	2.15	0.16	0.81	0.59	0.78
47,48	ND	ND	ND	0.86	1.82	0.82	1.52
44	0.09	0.13	2.09	ND	0.49	0.34	0.36
37,42	0.05	0.07	1.38	0.07	0.36	0.25	0.22
41,64,71	0.21	0.26	1.48	ND	1.23	0.50	0.58
40	0.04	0.05	0.70	ND	0.39	0.12	0.34
100	ND	0.03	ND	5.71	ND	0.03	0.06
63	0.02	ND	0.44	ND	0.04	ND	0.09
74	0.07	0.07	1.39	ND	0.40	0.26	0.32
70,76	0.12	ND	8.75	ND	1.11	0.68	0.61
66,95	0.36	0.36	6.48	0.14	1.10	0.63	0.71
91	0.03	0.53	8.40	ND	0.29	0.23	0.18
56,60/92,84	0.53	ND	3.26	0.82	1.84	1.21	1.88
89	NA	NA	NA	NA	NA	NA	NA
101	0.11	0.10	1.95	0.06	0.73	0.43	0.59
99	0.08	0.05	1.38	0.07	0.58	0.24	0.40
119	NA	NA	NA	NA	NA	NA	NA
83	0.06	ND	2.43	0.04	0.17	0.14	0.14
97	0.04	0.02	ND	ND	0.25	0.10	0.19
81,87	0.08	0.14	1.36	ND	0.33	0.18	0.25
85	ND	ND	0.80	ND	ND	ND	ND
136	ND	ND	0.45	ND	ND	ND	ND
77,110	0.34	0.24	4.86	0.14	1.97	0.65	1.25
82, 151	0.14	0.06	2.01	0.03	0.49	0.30	0.46
135,144	0.05	0.04	1.22	0.11	0.22	0.13	0.14
107	0.05	0.01	1.04	0.11	0.10	0.10	0.11
123,149	0.24	0.14	2.48	ND	0.96	0.54	0.68
118	0.16	0.02	0.65	0.36	0.86	0.40	0.52
134	0.48	0.03	0.10	0.09	1.51	3.04	1.57
146	0.06	0.08	0.46	0.35	0.33	0.16	0.18
132,105,153	0.43	0.51	4.33	0.45	2.47	1.23	1.77
141	0.04	0.05	1.01	0.16	0.22	0.13	0.22
137,130,176	ND	ND	0.28	ND	ND	ND	0.14
163,138	0.38	0.31	4.57	0.16	2.38	1.10	1.57
158	ND	ND	ND	ND	ND	ND	ND
129,178	ND	ND	ND	ND	ND	ND	ND
187,182	0.11	0.13	1.40	0.95	0.82	0.53	0.67
183	0.09	0.04	0.91	0.58	0.39	0.20	0.32
128	0.08	0.16	0.58	0.03	0.28	0.17	0.29
185	0.02	0.01	0.18	0.02	0.14	0.15	0.16
174	0.07	0.06	1.24	0.14	0.54	0.25	0.33
177	0.15	0.04	0.65	0.05	0.34	0.18	0.29
202,171,156	0.09	ND	1.00	2.52	0.48	0.25	0.37
157,200	0.01	0.01	ND	1.17	0.21	0.06	0.07
172,197	ND	ND	ND	ND	ND	ND	ND
180	ND	ND	2.57	ND	1.31	0.67	0.73
193	ND	ND	0.84	ND	3.25	1.38	2.73
191	ND	0.02	0.07	0.03	ND	0.01	ND
199	ND	ND	ND	ND	ND	ND	ND
170,190	0.22	0.12	2.17	0.08	1.11	0.63	0.65
198	ND	ND	0.21	0.84	0.07	0.26	0.31
201	0.15	0.12	2.65	14.08	0.80	0.48	0.44
203,196	0.17	0.14	2.91	9.91	0.88	0.49	0.47
189	ND	ND	0.27	0.02	ND	0.02	0.01
208,195	0.05	0.03	ND	58.17	0.72	0.36	ND
207	0.02	0.02	0.41	2.92	0.07	0.04	0.04
194	0.68	0.04	0.52	0.88	1.35	0.19	0.23
205	0.07	ND	0.03	0.09	ND	ND	ND
206	0.22	0.16	9.19	ND	0.71	0.47	0.29
209	0.02	0.03	2.56	12.07	0.10	0.02	0.03
Total PCBs	**8**	**7**	**125**	**115**	**45**	**25**	**30**
Recovery							
14	82%	65%	105%	161%	108%	114%	114%
65	79%	64%	60%	103%	96%	98%	94%
166	74%	62%	65%	135%	100%	104%	99%

APPENDIX D: QUALITY ASSURANCE

A-1. Location of Biota and Sediment Collections for Fall 2001

Sample Site ID	STUDY	START Latitude	START Longitude	Date	Time
Sediment Collection					
Zone 2					
02 SED1	CORE	40.10387	74.83698	11/7/2001	1:53:00
Zone 3					
03 SED1	CORE	39.96467	75.09897	11/7/2001	7:55:00
Zone 4					
04 SED1	CORE	39.84375	75.28223	11/6/2001	2:17:00
04 SED2	CORE	39.86788	75.20395	11/6/2001	3:00:00
04 CC	CCVar	39.85238	75.31213	11/6/2001	12:48:09
Zone 5					
05 SED1	CORE	39.58208	75.54306	11/6/2001	10:00:00
05 SED2	CORE	39.68438	75.52755	11/6/2001	11:24:31
05 SED3	CORE	39.75000	75.48330	11/8/2001	~1:30:00
05 Var1	Variability	39.77995	75.46597	11/9/2001	9:51:00
05 Var2	Variability	39.77687	75.46367	11/9/2001	10:06:00
05 Var3	Variability	39.77574	75.46095	11/9/2001	10:16:00
05 Var4	Variability	39.77487	75.45829	11/9/2001	10:23:00
Biota Collection					
Zone 2					
02 CC2	CORE	40.0388	74.9881	11/8/2001	7:30:00
02 CC2	CORE/CC	40.0399	74.9880	11/8/2001	7:54:00
Zone 3					
03 SED1	CORE	39.5799	75.0697	11/9/2001	6:06:00
03 SED2	CORE	40.0005	75.0556	11/9/2001	6:47:00
Zone 4					
04 SED1	CORE	39.8511	75.3016	11/8/2001	3:24:00
04 SED2	CORE	39.8514	75.3018	11/8/2001	3:36:00
04 CC	CCVar	39.8509	75.3005	11/8/2001	3:40:00
Zone 5					
05 CC	CORE/WPVar1	39.6054	75.5773	11/8/2001	12:03:00
05 SED2	CCVar	39.6700	75.5334	11/8/2001	12:42:00
05 SED3	WPVar2	39.7516	75.4778	11/8/2001	1:36:00
05 SED4	WPVar3	39.7854	75.4538	11/8/2001	2:17:18

A-2. Location of Biota and Sediment Collections for Spring 2002

Sample Site ID	STUDY	START Latitude	START Longitude	Date	Time
Sediment Collection					
Zone 2					
02 CC	CC	40.04087	74.97816	3/19/2002	14:05
02 Sed1	Core	40.10405	74.83773	3/19/2002	15:02
02 Sed3	Core/Var	40.15044	74.72394	3/19/2002	16:01
02 Var2	Var	40.08987	74.43357	3/19/2002	
02 Var3	Var	40.14875	74.72126	3/19/2002	
02 Var4	Var	40.14738	74.72089	3/19/2002	
Zone 3					
03 Sed1	Core	39.96407	75.09901	3/19/2002	10:30
03 Sed2	Core	39.99409	75.05546	3/19/2002	11:27
Zone 4					
04 Sed1	Core	39.84375	75.28223	3/18/2002	15:36
04 Sed2	Core	39.86788	75.20395	3/18/2002	16:05
04 CC	CC	39.85238	75.31213	3/18/2002	
Zone 5					
05 Sed1	CC	39.5440	75.54165	3/18/2002	11:52
05 Sed2	Core	39.6700	75.5334	3/18/2002	13:08
05 Sed2 amphipod	Core	39.6888	75.52169	3/18/2002	13:20
05 Sed3	Core	39.7537	75.4673	3/18/2002	14:11
Biota Collection					
Zone 3					
03 SED1	CORE	39.9649	75.1164	3/20/2002	7:03
03 SED2	CORE	40.0000	75.0576	3/20/2002	8:06
Zone 4					
04 SED1	CORE	39.8499	75.2748	3/20/2002	11:11
04 SED2	CORE	39.8662	75.2118	3/20/2002	10:30
04 CC	CC	39.8555	75.3087	3/20/2002	12:19/18:28
Zone 5					
05 SED1	CC	39.5839	75.5532	3/20/2002	14:43/15:23
05 SED2	CORE	39.6824	75.5259	3/20/2002	16:50
05 SED3	CORE	39.7472	75.4780	3/20/2002	17:16
Additional Sampling Trips					
Zone 2					
2CC	CC	40.04	74.97	4/3/2002	
2Sed1	Core	40.1	74.84	4/2/2002	
2Sed3	Core	40.1	74.84	4/2/2002	
2Sed4	Core	40.15	74.72	4/2/2002	
2Sed1	Core	40.15	74.16	5/21/2002	

A-3. Summary of Channel Catfish Samples from Fall 2001 Collections/Analyses

Sample ID	Sex	Age	Length (cm)	Weight(g)	Fillet Whole(g)	Fillet (g)	Whole Remains(g)	Remains(g)	
Zone 2									
110801 02 CC2 CC1	F	9	44.2	761	92.2	69.44	668.8		
110801 02 CC2 CC2	F gravid	19	44.8	799.2	109.24	80.23	689.96		
***02 CC2 CC3**	M	9	40.3	524.2	75.7	25.01	448.5		
***02 CC2 CC4**	M	11	49.2	1020.4	124.71	25.01	895.69		
***02 CC2 CC5**	F	13	47.4	863.4	122.53	24.99	740.87		
***02 CC2 CC6**	F	10	60.2	2170.2	314.71	24.99	1855.49		Whole Fillet+Whole Remains
***second sampling trip**	Average	12		1023.07	139.85		883.22		1023.07
Zone 3									
110901 03 Sed1 CC1	M	9	38.2	475.05	58.84	55.65	416.21	299.6	
110901 03 Sed1 CC2	M	9	38	448.75	55.98	57.68	392.26	299.88	
110901 03 Sed1 CC3	M	10	46.2	907.9	100.99	57.67	807.3	299.62	
110901 03 Sed2 CC1	M	8	47.1	892.42	124.52	57.38	767.9	300.3	
110901 03 Sed2 CC2	M	8	44.5	801.26	127.26	57.75	674	300.04	
110901 03 Sed2 CC3	M	9	38.4	476.42	58.04	57.72	418.38	299.82	
110901 03 Core CCF	Average	9		666.97	87.61		579.34		666.95
110901 03 Core CCR									
Zone 4									
110801 04 Sed 1 CC1	F	8	37.5	406.54	52.24	34.99	200.02		
110801 04 Sed 2 CC1	M	5	35.7	292.81	36.9	35.02	199.55		
110801 04 Sed2 CC2	Discarded								
110801 04 Sed2 CC3	F	5	34.3	282.14	36.53	35.01	199.23		
110801 04 Sed2 CC4	F	5	35.8	358.39	45.72	35.03	199.8		
110801 04 Sed2 CC5	M	7	40.6	500.24	63.75	34.99	201.23		
110801 04 Core CCF	Average	6		368.02	47.03		199.97		246.99
110801 04 Core CCR									
Variability									
110801 04 CC CC1	M	8	33.7	601.9		15			
110801 04 CC CC2	M	7	38.8	597.7		14.99			
110801 04 CC CC3	M	7	35.3	484.7		15			
110801 04 CC CC4	F	5	36	427.5		15.01			
110801 04 CC CC5	M	3	26.7	359.7		15.01			
110801 04 CC CC1-5F	Average	6				71.36			
Zone 5									
110801 05 CC5 CC1	F	4	33.8	291.07	37.41	35.03	235.98	200.01	
110801 05 CC5 CC2	F	8	41.7	579.23	79.27	34.97	479.89	199.96	
110801 05 CC5 CC3	M	9	52	1410.17	146.44	35.02	1151.09	199.97	
110801 05 CC5 CC4	M	5	40.8	535.62	67.37	35.03	453.48	200.03	
110801 05 CC5 CC5	F	7	36.6	366.06	40.05	35.03	327.94	200.08	
110801 05 Core CCF	Average	7		636.43	74.11		529.68		603.78
110801 05 Core CCR									
Variability									
110801 05 Sed2 CC1	F	6	40.5	500.76	63.97	19.96			
110801 05 Sed2 CC2	M	5	41.9	569.79	68.98	19.97			
110801 05 Sed2 CC3	M	8	47.7	963.1	130.16	19.91			
110801 05 Sed2 CC4	F	7	39.7	537.63	66.28	19.91			
110801 05 Sed2 CC5	F	5	29.5	184.82	45.85	19.98			
110801 05 Sed2 CC1-5F	Average	6				66.45			

A-4. Summary of Channel Catfish Samples from Spring 2002 Collections/Analyses

Sample ID	Sex	Age	Length (cm)	Weight(g)	Fillet Whole(g)	Fillet for	Whole Remains(g)	Remains for Composite(g)	
Zone 2									
040202 02 CC1	M?	9	48.9	995.4	138.97	~120	856.43	450.9	
040202 02 CC2	M	12	51.9	1535.5	188.8	~120	1346.7	450.8	
040402 02 CC3	M	10	53.5	1375.9	151.28	~120	1224.62	449.5	
040402 02 CC4	M	10	52.5	1439.6	182.94	~120	1256.66	451.8	
040402 02 CC5	F gravid	11	55.2	1728	230.53	~120	1497.47	450.3	Whole Fish+Whole Remains
040402 02 Core CCF	Average	10.4		1414.88	178.50		1236.38		1414.88
040402 02 Core CCR									
Catfish Variability									
040302 02 CC1	F gravid	10	47	1132.5	112.13	29.98			
040302 02 CC2	M	9	47.4	977.2	116.52	30.02			
040302 02 CC3	M	9	48	952	137.98	30.07			
040302 02 CC4	F	9	45.8	902.9	137.16	29.99			
040302 02 CC5	M	14	51.4	1190.3	117.85	30.05			
040302 02 CC6	M	7	41.9	621.7	149.27*	29.99			
040302 CC1-6F					* 2 fillets				
Zone 3									
032002 03 CC1	M	8	40.5	590.85	78.99	40.02	511.86	349.7	
032002 03 CC2	M	9	52.1	1505.50	222.87	40.00	1282.63	350.31	
032002 03 CC3	F	10	43.7	738.80	57.65	40.05	681.15	349.60	
032002 03 CC4	M	8	44.9	801.10	46.10	40.03	755.00	349.81	
032002 03 CC5	M	7	40.2	526.85	73.26	40.01	453.59		
032002 03 Core CCF	Average	8		832.62	95.77		736.85		832.62
032002 03 Core CCR									
Zone 4									
032002 04 CC1	F gravid	8	409	642.70	57.70	30.02	585.00	232.49	
032002 04 CC2	F	6	384	441.56	47.91	30.04	393.65	231.91	
032002 04 CC6	F gravid	6	353	392.53	42.32	30.03	350.21	232.63	
032002 04 CC7	M	8	350	361.68	42.06	29.98	319.62	232.23	
032002 04 CC8	M	8	340	328.30	33.15	30.02	295.15	232.00	
032002 04 Core CCF	Average	7		433.35	44.63		388.73		433.35
032002 04 Core CCR									
Catfish Variability									
032002 04 CC1	M	7	385	419.80	40.88	10.03			
032002 04 CC2	M	8	375	400.86	42.18	10.04			
032002 04 CC3	M	11	338	336.99	35.55	9.99			
032002 04 CC4	F	10	362	393.81	35.18	10.03			
032002 04 CC5	F	9	365	376.27	31.73	10.00			
032002 04 CC1-5F						46.90			
Zone 5									
032002 05 CC1	F	11	41.5	624.7	58.97	38.78	565.73	349.56	
032002 05 CC2	F	8	40.5	528.27	50.88	38.47	477.39	349.71	
032002 05 CC3	F	9	48	1021.6	92.54	38.54	929.06	349.15	
032002 05 CC4	F	8	41.5	627.1	46.77	38.04	580.33	349.78	
032002 05 CC5	F	7	38.5	470.46	38.89	38.89	431.57	349.25	
032002 05 Core CCF	Average	9		654.43	57.61		596.82		654.43
032002 05 Core CCR									
Catfish Variability									
032002 05 CC1	F	6	385	472.09	56.26	10.03			
032002 05 CC2	M	6	360	357.38	49.68	10.02			
032002 05 CC3	F	7	387	589.47	54.30	9.99			
032002 05 CC4	M	4	275	174.76	20.52	9.98			
032002 05 CC5	M	8	390	513.33	56.72	9.98			
032002 05 CC1-5F						50.00			

A-5. Summary of White Perch Samples from Fall 2001 Collections/Analyses

Sample ID	Sex	Age	Length (cm)	Weight(g)	Fillet Whole(g)	Fillet (g)	Whole Remains(g)	Remains(g)	
Zone 2									
110801 02 CC2 WP1	F gravid	6	21.9	171.3	32.39	15.01	138.91	29.74	
110801 02 CC2 WP2	F gravid	5	19.9	102.7	20.01	14.98	82.69	29.79	
110801 02 CC2 WP3	Discarded			51.86			51.86		
110801 02 CC2 WP4	M ripe	5	18.1	93.26	18.96	15.02	74.3	29.78	
110801 02 CC2 WP5	M ripe	9	21.2	137.66	27.78	15.01	109.88	29.64	
110801 02 CC2 WP6	M ripe	5	17.4	79.9	15.61	15.03	64.29	29.69	
110801 02 CC2 WP7	Discarded								
110801 02 CC2 WP8	M ripe	5	18.7	96.23	19.95	14.97	76.28	29.75	Fillet+Whole Remains
110801 02 Core WPF	Average	6		104.70	22.45		85.46		107.91
110801 02 Core WPR									
Zone 3									
110801 03 Sed1 WP1	M	2	16.5	66.66	12.93	10.82	51.57	29.94	
110801 03 Sed1 WP3	F	3	16.9	65.51	13.84	10.34	50.89	30	
110801 03 Sed1 WP4	M	3	16.6	69.92	13.97	10.68	53.93	30.02	
110801 03 Sed1 WP5	M	5	18	84.64	18.07	10.78	63.55	30.02	
110801 03 Sed1 WP6	M	3	16	53.53	10.6	10.6	40.18	29.99	
110801 03 Sed1 WP2*	F	6	23.4	203.62	38.86	37.78	158.57	69.12	
110801 03 Core WPF	Average	3		68.05	13.88		52.02		65.91
110801 03 Core WPR									
Zone 4									
110801 04 Sed 1 WP1	F(gravid)	3	18.4	88.75	17.13	10.99	71.62	29.99	
110801 04 Sed 1 WP2	F	4	17.3	65.74	14.24	10.99	51.5	30.08	
110801 04 Sed 1 WP3	F	4	17.6	76.98	17.05	10.97	59.93	30.11	
110801 04 Sed 1 WP4	F	3	15.9	51.66	11.45	11.01	40.21	30.14	
110801 04 Sed 2 WP1	F(gravid)	3	18	75.13	15.52	10.97	59.61	29.97	
110801 04 Sed 2 WP2	F	3	16.5	59.74	12.59	11.03	47.15	30.06	
110801 04 Core WPF	Average	3		69.67	14.66		55.00		69.67
110801 04 Core WPR									
Zone 5									
110801 05 CC5 WP1	M ripe	6	22.3	161.38	33.61	15	90.41	42.01	
110801 05 CC5 WP2	M ripe	3	18.6	92.93	18.9	15.01	52.26	42	
110801 05 CC5 WP3	F gravid	7	20.2	129.27	26.22	15.02	71.96	42.01	
110801 05 CC5 WP4	M ripe	6	19.9	125.26	25.72	15.02	68.3	41.99	
110801 05 CC5 WP5	M ripe	6	19	100.89	19.72	14.99	55.78	42	
110801 05 Core/Var WPF	Average	6		121.95	24.83		67.74		92.58
110801 05 Core WPR									
Variability Study									
110801 05 CC5 WP1	M ripe	6	22.3	161.38	31.11	29			
110801 05 CC5 WP2	M ripe	3	18.6	92.93	19.82	17.62			
110801 05 CC5 WP3	F gravid	7	20.2	129.27	24.55	21.55			
110801 05 CC5 WP4	M ripe	6	19.9	125.26	24.45	21.27			
110801 05 CC5 WP5	M ripe	6	19	100.89	20.61	17.97			
110801 05 Var2 WP1	M	4	18.5	84.27	34.55	5.03			
110801 05 Var2 WP2	F	3	17.9	75.03	32.22	5.01			
110801 05 Var2 WP3	F	2	16.2	55.79	25.97	5.01			
110801 05 Var2 WP4	M	5	17.5	66.25	28.83	4.99			
110801 05 Var2 WP5	M	3	15.3	44.88	19.76	5.02			
110801 05 Var2 WP6	F	2	13.5	27.39	12.3	5.01			
110801 05 Var2 WPF						28.32			
110801 05 Var3 WP1	M	5	18.6	91.98	36.62	9			
110801 05 Var3 WP2	M	3	17.3	68.24	29.61	9.01			
110801 05 Var3 WP3	F	2	16.2	52.24	22.01	9.02			
110801 05 Var3 WP4	F	2	15.4	48.56	18.43	8.99			
110801 05 Var3 WP5	M	3	15.8	51.11	21.82	9			
110801 05 Var3 WP6	F gravid	4	16.3	53.32	21.54	8.97			
110801 05 Var3 WPF						41.92			

*individual

A-6. Summary of White Perch Samples from Spring 2002 Collections/Analyses

Sample ID	Sex	Age	Length (cm)	Weight(g)	Fillet Whole(g)	Fillet (g)	Whole Remains(g)	Remains(g)	
Zone 2									
062102 02 WP1*	M	3	15.5	63.23	18.57	10.01	37.76	20	
062102 02 WP2*	F	3	15.2	60.96	14.92	10.03	37.4	20.01	
062102 02 WP3*	M	NA	15.4	64.25	19.26	9.99	37.67	19.97	
062102 02 WP4*	M	2	16.3	65.02	18.4	10.03	43.41	20.05	
062102 02 WP5*	F (gravid)	3	16	66.27	19.9	10.01	42.53	20.02	Whole Fillet+Whole Remains
062102 02 CORE WPF	Average	3		63.95	18.21		39.75		57.96
062102 02 CORE WPR									
***caught by rod & reel by ANS (near Bordentown, NJ)**									
Zone 3									
032002 03 WP1	F	4	18.3	94.66	21.22	9.98	69.48	49.98	
032002 03 WP2	F	4	17.2	87.13	18.87	10.02	65.29	49.99	
032002 03 WP3	M	5	16.7	62.12	22.18	9.97	73.98	50.02	
032002 03 WP4	M	3	19	99.02	13.95	9.98	45.89	44.27	
032002 03 WP5	F	3	17.7	79.8	15.02	10.01	58.59	49.97	
032002 03 Core WPF	Average	4		84.55	18.25		62.65		80.89
032002 03 Core WPR									
Zone 4									
032002 04 WP1	F	4	184	90.79	19.34	10.01	71.45	49.13	
032002 04 WP2	M	4	196	119.81	19.31	10.00	100.50	49.60	
032002 04 WP3	M	4	183	89.10	15.91	10.03	73.19	49.29	
032002 04 WP4	M	5	179	90.82	16.76	9.99	74.06	49.49	
032002 04 WP5	M	4	165	67.34	12.98	10.00	54.36	48.53	
032002 04 Core WPF	Average	4		91.57	16.86		74.71		91.57
032002 04 Core WPR									
Zone 5									
032002 05 WP1	F	9	23.8	220	38.33	25	195	59.99	
032002 05 WP2	F	9	20.8	183	34.93	24.99	158.01	59.69	
032002 05 WP4	F	6	20.9	177	33.38	24.98	152.02	60.25	
032002 05 WP6	M	6	20.8	162	29.68	24.98	137.02	59.78	
032002 05 WP8	M	5	19.1	115	42.09	24.99	90.01	60.48	
032002 05 Core WPF	Average	7		171.4	35.68		146.41		182.09
032002 05 Core WPR									

A-7. Summary of Prey Fish from Fall 2001 Collections/Analyses

Sample ID	Species	
Zone 3		
110801 03 SED1 SFA	4 YOY Channel Catfish	*Ictalurus punctatus*
110801 03 SED1 SFB	1 Hogchoker	*Trinectes maculatus*
110801 03 SED2 SFA	YOY Catfish	*Ictalurus punctatus*
110801 03 SED2 SFB	YOY Catfish	*Ictalurus punctatus*
110801 03 SED2 SFC	YOY Catfish	*Ictalurus punctatus*
Zone 4		
110801 04 CC SFA	4 YOY Channel Catfish	*Ictalurus punctatus*
110801 04 SED1 SFA	16 Croaker	*Micropogonias undulatus*
110801 04 SED1 SFB	15 Croaker	*Micropogonias undulatus*
110801 04 SED1 SFC	5 Hogchoker	*Trinectes maculatus*
110801 04 SD1 SFD	10 YOY Channel Catfish	*Ictalurus punctatus*
110801 04 SD1 SFE	1 Spottailed Shiner	*Notropis hudsonius*
110801 04 SED1 SFF	Tesselated Darter	*Etheostoma olmstedi*
110801 04 SED1 SFG	4 White perch	*Morone americanus*
Zone 5		
110801 05 SED2 SFA	1 YOY Channel Catfish	*Ictalurus punctatus*
110801 05 SED2 SFB	Croaker	*Micropogonias undulatus*
110801 05 SED2 SFC	Croaker	*Micropogonias undulatus*
110801 05 CC SFA	3 American Eels	*Anguilla rostrata*
110801 05 CC SFB	4 Hogchoaker	*Trinectes maculatus*

*Individual species analyzed and composited by zone
**No Zone 2 SF
***YOY= Young of the Year

A-8. Summary of Prey Fish from Spring 2002 Collections/Analyses

Small Fish	Species	
Zone 2		
040202 2CC SFA	Gizzard shad	*Dorosoma cepedianum*
040302 02CORE SFA	Spot-tailed Shiners	*Notropis hudsonius*
040302 02CORE SFB	Tessalated Darter	*Etheostoma olmstedi*
040302 02CORE SFC	Banded Killifish	*Fundulus diaphanus*
Zone 3		
032002 03 CORE SFA	YOY Channel Catfish	*Ictalurus punctatus*
032002 03 CORE SFB	Juvenile White Perch	*Morone americanus*
Zone 4		
032002 04 SED2 SFA1	Juvenile White Perch	*Morone americanus*
032002 04 SED2 SFA2	Juvenile White Perch	*Morone americanus*
032002 04 SED2 SFA3	Juvenile White Perch	*Morone americanus*
032002 04 SED2 SFB	YOY Channel Catfish	*Ictalurus punctatus*
032002 04 SED2 SFC	Spottail shiner	*Notropis hudsonius*
Zone 5		
032002 05 SED1 SFA	Juvenile White Perch	*Morone americanus*
032002 05 SED1 SFB	Hogchoker	*Trinectes maculatus*
032002 05 SED1 SFC	YOY Channel Catfish	*Ictalurus punctatus*
032002 05SED3 SFA	Juvenile White Perch	*Morone americanus*
032002 05SED3 SFB	YOY Channel Catfish	*Ictalurus punctatus*

*Individual species analyzed and composited by zone
**YOY= Young of the Year

A-9. Summary of Invertebrate Samples from Fall 2001 Collections/Analyses

Sample ID	Species	
Zone 2		
110801 02 CC INVA	Amphipods	*Gammarus* spp.
110801 02 CC INVB	Blue crab	*Callinectes sapidus*
110801 02 SED1 INV	Amphipods	*Gammarus* spp.
Zone 3		
110801 03 SED1 INV	Amphipods	*Gammarus* spp.
Zone 4		
110801 04 CC INV	Amphipods	*Gammarus* spp.
110801 04 SED1 INV	Amphipods	*Gammarus* spp.
Zone 5		
110801 05 CC INVA	Amphipods	*Gammarus* spp.
110801 05 CC INVB	Grass shrimp	*Palaemonetes* spp.
110801 05 SED2 INV	Grass Shrimp	*Palaemonetes* spp.

A-10. Summary of Invertebrate Samples from Spring 2002 Collections/Analyses

Site	Species	
Zone 2		
040302 02 CC INV	Amphipods	*Gammarus* spp.
040302 02 CORE INV	Amphipods	*Gammarus* spp.
Zone 3		
032002 03 CORE INV	Amphipods	*Gammarus* spp.
032002 03 CORE MACRO INV	Crayfish	Decopoda
Zone 4		
032002 04 CORE INV	Amphipods	*Gammarus* spp.
032002 04 CORE MACRO	Crayfish	Decopoda
Zone 5		
032002 05 CORE INV	Amphipods	*Gammarus* spp.
032002 05 SED1 INV	Amphipods	*Gammarus* spp.
032002 05 SED1 MACRO INV	White fingered mud crab	*Rhithropanopeus harrisii*

A-11. Summary of Sediment Samples from Fall

Sample ID
Zone 2
02 Sed1
Zone 3
03 Sed1
Zone 4
04 Sed1
04 Sed2
04 CC
Zone 5
05 Sed1
05 Sed2
05 Sed3
Variability
05 Sed Var1
05 Sed Var2
05 Sed Var3
05 Sed Var4

A-12. Summary of Sediment Samples from Spring :

Sample ID
Zone 2
02 CC
02 Sed1
02 Sed3
02 Var2
02 Var3
02 Var4
Zone 3
03 Sed1
03 Sed2
Zone 4
04 Sed1
04 Sed2
04 CC
Zone 5
05 Sed1
05 Sed2
05 Sed2 amphipod
05 Sed3

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