NOAA Technical Memorandum NMFS-NE-157

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Contaminant Levels in Muscle of Four Species of Recreational Fish from the New York Bight Apex

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EXECUTIVE SUMMARY

A survey was conducted to establish a benchmark for concentrations of selected trace metals and organic contaminants in the edible flesh of four species of fish important to the recreational fishery of the New York Bight Apex. Bluefish *(Pomatomus saltatrix)*, summer flounder *(Paralichthys dentatus)*, black sea bass *(Centropristes striatus)*, and tautog *(Tautoga onitis)* were caught by rod and reel during September-December 1993 at 15 sites in the New York Bight Apex. Fourteen composite samples of muscle tissue from each fish species were analyzed for 9 trace metals, 25 polychlorinated biphenyl (PCB) congeners, 17 organochlorine pesticides, 24 polycyclic aromatic hydrocarbons (PAHs), seven 2,3,7,8-substituted polychlorinated dibenzo[p]dioxins (PCDDs), and ten 2,3,7,8-substituted polychlorinated dibenzofurans (PCDFs).

Concentrations of trace metals were low and within the range of values normally found in muscle tissues of finfish from relatively pristine ecosystems. Total mercury levels in all fish composites were <0.11 μg/g (ppm) wet weight, which is an order of magnitude below the U.S. Food and Drug Administration (FDA) action level of 1.0 μg/g (ppm) wet weight for methylmercury.

PCB and organochlorine pesticide concentrations were relatively low and were related to the lipid content of the muscle tissue. The "Aroclor-based" estimates (see "Glossary..." for definition) for all composite samples were below the FDA tolerance level of 2.0 μg/g (ppm) wet weight for PCBs. Average sums of 23 PCB congeners were 0.37 μg/g for bluefish, <0.05 μg/g (*i.e.*, below the detection limit) for summer flounder, 0.08 μg/g for black sea bass, and 0.06 μg/g for tautog.

Average sums of DDTs and their metabolites for all composite samples were well below the FDA action level of 5.0 μg/g (ppm) wet weight. Average sums of DDTs and their metabolites were 0.16 μg/g for bluefish, <0.009 μg/g (*i.e.*, below the detection limit) for summer flounder, 0.02 μg/g for black sea bass, and 0.014 μg/g for tautog.

Average sums of chlordanes for each species, which ranged from 0.04 to 0.08 μg/g, were below the FDA action level of 0.3 μg/g (ppm) wet weight.

With few exceptions, PAHs were undetected.

Concentrations of 2,3,7,8-tetrachlorodibenzo[p]dioxin (TCDD) in all composite samples were below the FDA advisory level of 25 pg/g (pptr) wet weight for limited consumption. Concentrations of 2,3,7,8-TCDD were below the method detection limit of 1.63 pg/g in all summer flounder and black sea bass composites, 10 of 14 tautog composites, and 4 of 14 bluefish composites. The concentrations of 2,3,7,8-TCDD were near the detection limit in the 4 remaining tautog composites, and in 9 of 10 remaining bluefish composites. The remaining bluefish composite contained the highest concentrations of PCBs (0.57 μg/g), DDTs (0.27 μg/g), chlordanes (0.062 μg/g), and 2,3,7,8-TCDD (7.27 pg/g). This bluefish composite had the highest average composite weight, included the heaviest individual specimen, and had the highest lipid content.

Glossary of Technical Terms, Acronyms, and Units of Measure

amu -- atomic mass unit. A measure of atomic mass which is equal to 1/12 of the mass of a carbon atom of mass 12.

Aroclor -- Aroclor is a trademark, registered to Monsanto Corporation, for naming mixtures of individual chlorinated biphenyls and chlorinated polyphenyls. Monsanto Corporation was the major producer of Aroclors from 1930 to 1977. Aroclors were used in a wide variety of applications, including dielectric fluids in capacitors and transformers, heat transfer fluids, hydraulic fluids, lubricating and cutting oils, and as additives in pesticides, paints, copying paper, carbonless copy paper, adhesives, sealants, and plastics. Each Aroclor is assigned a four digit number. The last two digits indicate the approximate percentage in weight of chlorine in the product, and the first two digits indicate the type of material as follows: 12 -- chlorinated biphenyls, 25 -- blend of chlorinated biphenyls and chlorinated terphenyls (75:25), 44 -- blend of chlorinated biphenyls and chlorinated terphenyls (60:40), and 54 -- chlorinated terphenyls.

Aroclor-based PCB concentration -- PCB analysis where calibration is based on one or more mixtures of Aroclors rather than on individual PCB congeners.

BHCs -- benzenehexachlorides, trade names for hexachlorocyclohexanes.

BZ # -- Ballschmiter and Zell number for a designated PCB congener.

CAS No. -- Chemical Abstracts Service Registry Number is a unique serial number assigned to a given compound. There is no inherent significance to the registry number.

congener -- a member of a series of structurally similar compounds.

DDD -- see DDT.

DDE -- see DDT.

DDI -- double-deionized, such as in double-deionized water.

DDT -- insecticide dichlorodiphenyltrichloroethane. DDT metabolites include DDD (dichlorodiphenyldichloroethane) and DDE (dichlorodiphenyldichloroethylene).

dioxin -- term commonly used to refer to a group of seven 2,3,7,8-substituted polychlorinated dibenzo[p]dioxin (PCDD) congeners and ten 2,3,7,8-substituted polychlorinated dibenzofuran (PCDF) congeners. When the number of chlorine atoms per molecule is four, the terms tetrachlorodibenzo[p]dioxin (TCDD) and tetrachlorodibenzofuran (TCDF) are often used. 2,3,7,8-TCDD is the most toxic of all PCDD and PCDF congeners. (See TE.)

DOB -- 4,4'-dibromooctafluorobiphenyl.

DQO -- data quality objective.

EMAP -- EPA's Environmental Monitoring and Assessment Program.

EMDL -- estimated method detection limit. See MDL.

EPA -- U.S. Environmental Protection Agency.

FDA -- U.S. Food and Drug Administration.

fillet -- a slice of boneless muscle tissue of fish.

formula -- molecular formula of a chemical compound.

GC/ECD -- gas chromatography with electron capture detection.

GC-MS -- gas chromatography - mass spectrometry.

HEPA -- high-efficiency particle air, such as in high-efficiency particle air laminar-flow hood.

high-molecular-weight PAH -- PAHs with ≥4 rings and molecular weights ≥202 amu.

HPLC -- high-performance liquid chromatography.

IDL -- instrumental detection limit. Calculated by multiplying the standard deviation of the replicate measurements by 3.143 (EPA 1984b).

lipid -- fats and other esters that are insoluble in water, but are extracted by solvents such as alcohol, ether, and (in this study) methylene chloride.

low-molecular-weight PAH -- PAHs with ≤3 rings and molecular weights ≤192 amu.

MDL -- method detection limit. Calculated by multiplying the standard deviation of the replicate measurements by the Student's t value.

MW -- nominal molecular weight of the compound. Chlorine isotope ^{35}Cl was used in the calculation of molecular weight of chlorinated compounds.

µg/g -- micrograms/gram.

ng/g -- nanograms/gram.

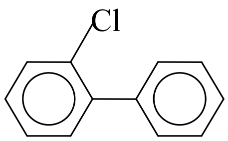
New York Bight -- 39,000-km^2 sector of the Middle Atlantic Bight continental shelf between Montauk Point, New York, and Cape May, New Jersey, and approximately 1,280 km wide from the Hudson-Raritan Estuary to the shelf edge.

New York Bight Apex -- the New York Bight Apex is bound by the coasts of New Jersey and Long Island, 73°30'W longitude, and 40°15'N latitude.

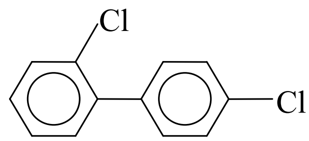
NIST -- U.S. Department of Commerce's National Institute of Standards and Technology.
OCDD -- octachlorodibenzo[p]dioxin.
OCDF -- octachlorodibenzofuran.
PAHs -- polycyclic aromatic hydrocarbons.
PCBs -- polychlorinated biphenyls. A PCB is one of 209 compounds having the formula $C_{12}H_{10-n}Cl_n$, where n = 1-10, *i.e.*, monochlorobiphenyls through decachlorobiphenyl. The term PCBs is used to refer to the entire class or any subset of one or more such compounds. The entire set of 209 PCBs forms a set of congeners. When PCBs are subdivided by degree of chlorination, the term homolog is used, *e.g.*, the pentachlorobiphenyl homolog. PCBs of a given homolog with different chlorine substitution positions are called isomers, *e.g.*, 2,3,4-trichlorobiphenyl and 3,3',5-trichlorobiphenyl are two of the twelve trichlorobiphenyl isomers (Erickson 1992).
PCDD -- see dioxin.
PCDF -- see dioxin.
pg/g -- picograms/gram.
pg/µL -- picograms/microliter.
physiological condition -- refers to the relationship between a fish's length and weight. As a fish's weight increases for a given length (*i.e.*, the fish becomes "plumper"), its physiological condition is considered to be better, or at a higher level. When such length-weight relationships are used as indices of physiological condition, they are called "condition factors."
ppb -- parts per billion. ng/g.
ppm -- parts per million. µg/g.
pptr -- parts per trillion. pg/g.
QA -- quality assurance.
QC -- quality control.
RPD -- relative percent difference. Calculated by dividing the difference of duplicate values by the duplicate mean, then multiplying by 100.
RSD -- relative standard deviation. Calculated by dividing the standard deviation by the mean value.
ΣBHCs -- sum of β-BHC, γ-BHC (lindane), and δ-BHC.
Σchlordanes -- sum of α-chlordane, γ-chlordane, trans-nonachlor, heptachlor, heptachlor epoxide, and oxychlordane.
SRM -- standard reference material.
TCB -- 1,2,3-trichlorbenzene.
TCDD -- see dioxin.
TCDF -- see dioxin.
TE -- toxic equivalent. A means of summarizing dioxin data, including the less toxic, chlorinated dibenzo[p]dioxin and dibenzofuran congeners together with 2,3,7,8-TCDD (EPA Method 8290, September 1994). The 2,3,7,8-TCDD congener is assigned a TE factor of 1.0.
z-score -- a number calculated to compare concentration values obtained for an SRM with consensus concentration values (IUPAC 1993). Obtained by the difference between the individual result and the consensus result, divided by the consensus standard deviation. An absolute z-score of < 2 is considered satisfactory, 2-3 questionable, and >3 unsatisfactory (Parris 1995).

CHEMICAL STRUCTURES OF ORGANIC ANALYTES

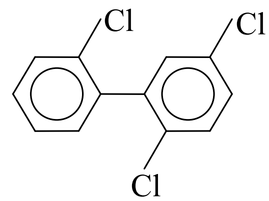
Polychlorinated Biphenyl Congeners



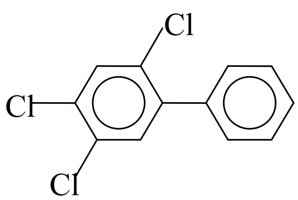
BZ #1
CAS No: 2051-60-7
Formula: $C_{12}H_9Cl$
MW: 188



BZ #8
CAS No: 34883-43-7
Formula: $C_{12}H_8Cl_2$
MW: 222



BZ #18
CAS No: 37680-65-2
Formula: $C_{12}H_7Cl_3$
MW: 256



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Formula: $C_{12}H_7Cl_3$
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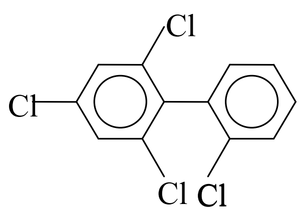
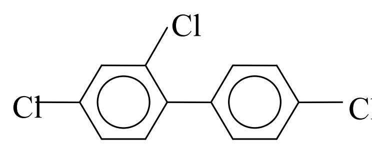


BZ #50
CAS No: 62796-65-8
Formula: $C_{12}H_6Cl_4$
MW: 290



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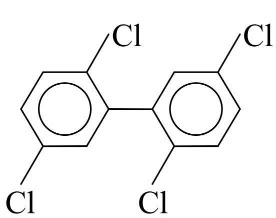
CAS No: 7012-37-5
Formula: $C_{12}H_7Cl_3$
MW: 256



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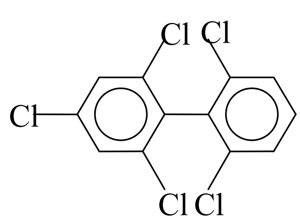
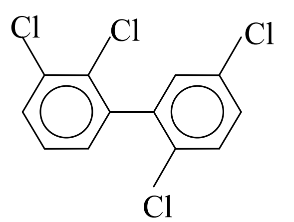
Formula: $C_{12}H_6Cl_4$
MW: 290



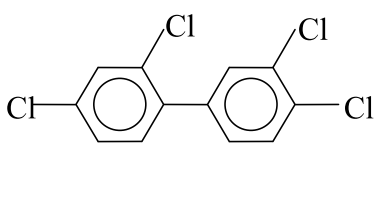
BZ #104
CAS No: 56558-16-8
Formula: $C_{12}H_5Cl_5$
MW: 324



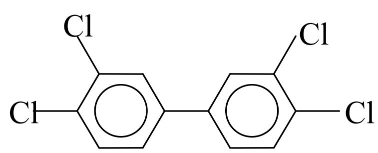
BZ #44
CAS No: 41464-39-5
Formula: $C_{12}H_6Cl_4$
MW: 290

CHEMICAL STRUCTURES OF ORGANIC ANALYTES (Cont.)

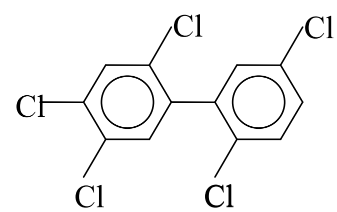
Polychlorinated Biphenyl Congeners



BZ #66
CAS No: 32598-10-0
Formula: $C_{12}H_6Cl_4$
MW: 290



BZ #77
CAS No: 32598-13-3
Formula: $C_{12}H_6Cl_4$
MW: 290



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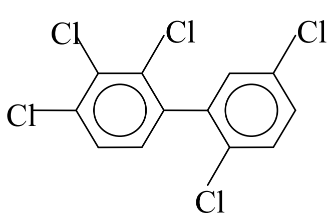
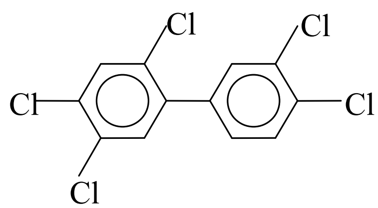
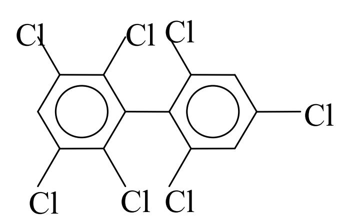
Formula: $C_{12}H_5Cl_5$
MW: 324



BZ #87
CAS No: 38380-02-8
Formula: $C_{12}H_5Cl_5$
MW: 324



BZ #118
CAS No: 31508-00-6
Formula: $C_{12}H_5Cl_5$
MW: 324



BZ #188
CAS No: 74487-85-7
Formula: $C_{12}H_3Cl_7$
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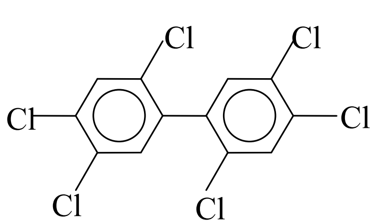
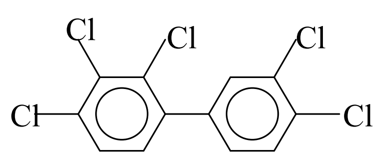
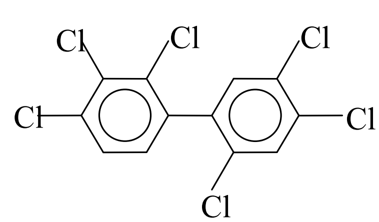


BZ #153
CAS No: 35065-27-1
Formula: $C_{12}H_4Cl_6$
MW: 358



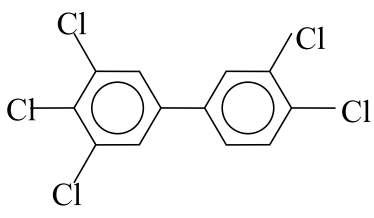
BZ #105
CAS No: 32598-14-4
Formula: $C_{12}H_5Cl_5$
MW: 324



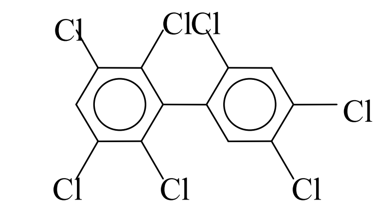
BZ #138
CAS No: 35065-28-2
Formula: $C_{12}H_4Cl_6$
MW: 358

CHEMICAL STRUCTURES OF ORGANIC ANALYTES (Cont.)

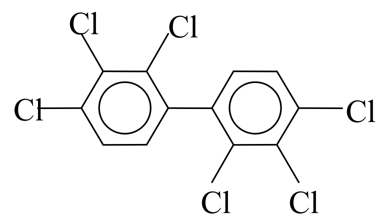
Polychlorinated Biphenyl Congeners



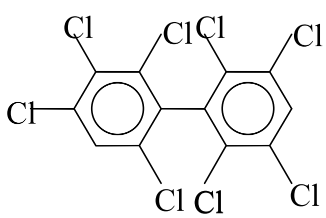
BZ #126
CAS No: 57465-28-8
Formula: $C_{12}H_5Cl_5$
MW: 324



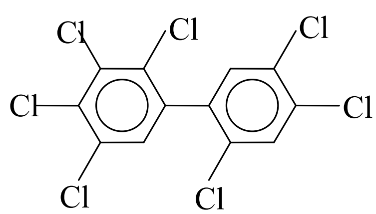
BZ #187
CAS No: 52663-68-0
Formula: $C_{12}H_3Cl_7$
MW: 392



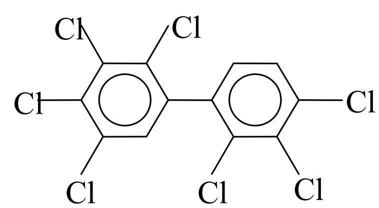
BZ #128
CAS No: 38380-07-3
Formula: $C_{12}H_4Cl_6$
MW: 358



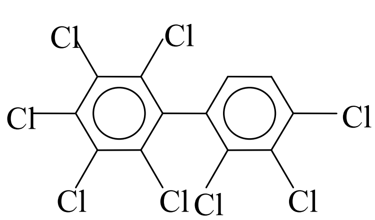
BZ #200
CAS No: 40186-71-8
Formula: $C_{12}H_2Cl_8$
MW: 426



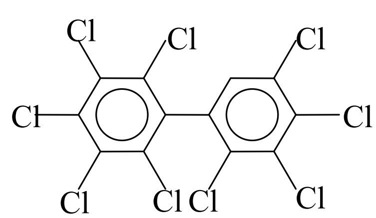
BZ #180
CAS No: 35065-29-3
Formula: $C_{12}H_3Cl_7$
MW: 392



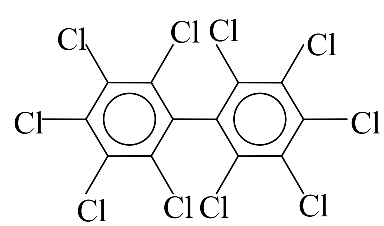
BZ #170
CAS No: 35065-30-6
Formula: $C_{12}H_3Cl_7$
MW: 392



BZ #195
CAS No: 52663-78-2
Formula: $C_{12}H_2Cl_8$
MW: 426



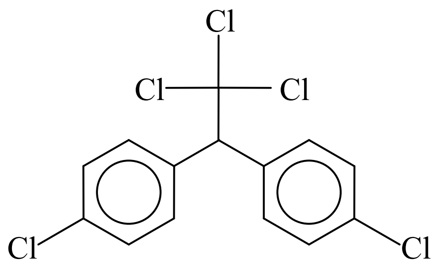
BZ #206
CAS No: 40186-72-9
Formula: $C_{12}HCl_9$
MW: 460



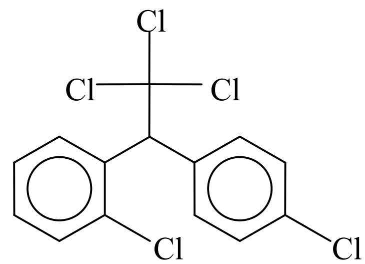
BZ #209
CAS No: 2051-24-3
Formula: $C_{12}Cl_{10}$
MW: 494

CHEMICAL STRUCTURES OF ORGANIC ANALYTES (Cont.)

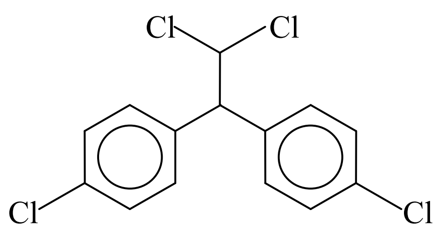
DDTs and Metabolites



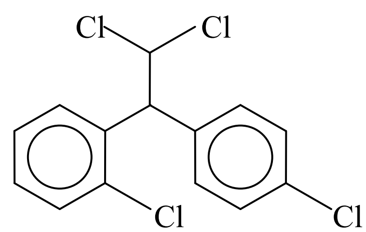
4,4'-DDT
CAS No: 50-29-3
Formula: $C_{14}H_9Cl_5$
MW: 352



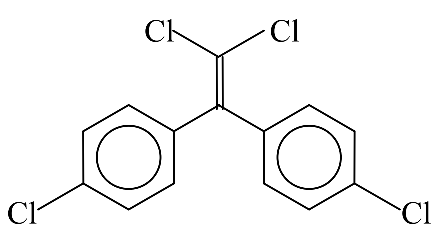
2,4'-DDT
CAS No: 789-02-6
Formula: $C_{14}H_9Cl_5$
MW: 352



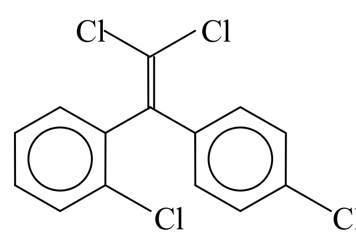
4,4'-DDD
CAS No: 72-54-8
Formula: $C_{14}H_{10}Cl_4$
MW: 318



2,4'-DDD
CAS No: 53-19-0
Formula: $C_{14}H_{10}Cl_4$
MW: 318



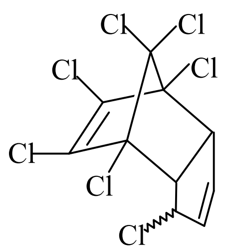
4,4'-DDE
CAS No: 72-55-9
Formula: $C_{14}H_8Cl_4$
MW: 316



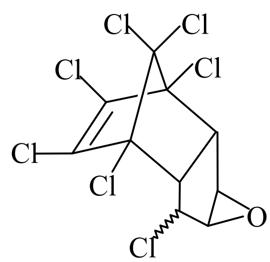
2,4'-DDE
CAS No: 3424-82-6
Formula: $C_{14}H_8Cl_4$
MW: 316

CHEMICAL STRUCTURES OF ORGANIC ANALYTES (Cont.)

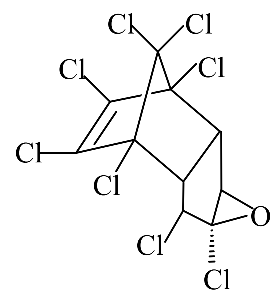
Chlordanes



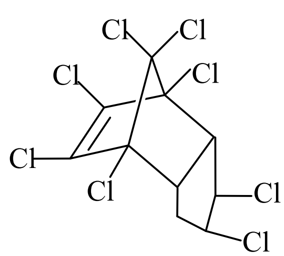
Heptachlor
CAS No: 76-44-8
Formula: $C_{10}H_5Cl_7$
MW: 370



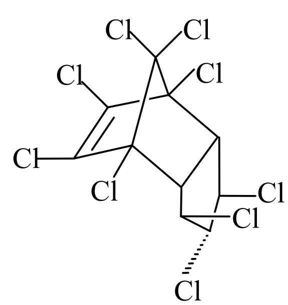
Heptachlor epoxide
CAS No: 72-55-9
Formula: $C_{10}H_5Cl_7O$
MW: 386



Oxychlordane
CAS No: 27304-13-8
Formula: $C_{10}H_4Cl_8O$
MW: 420



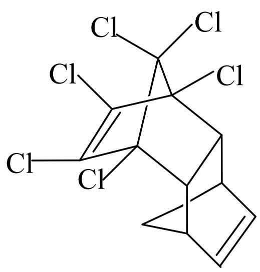
alpha-Chlordane
CAS No: 5103-71-9
Formula: $C_{10}H_6Cl_8$
MW: 406



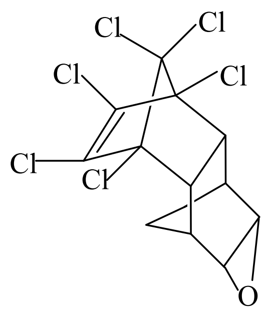
trans-Nonachlor
CAS No: 39765-80-5
Formula: $C_{10}H_5Cl_9$
MW: 440

CHEMICAL STRUCTURES OF ORGANIC ANALYTES (Cont.)

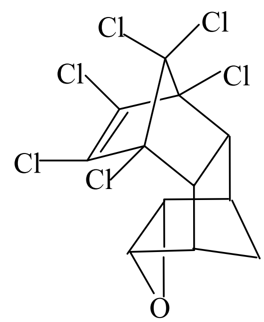
Other Pesticides and Lindane



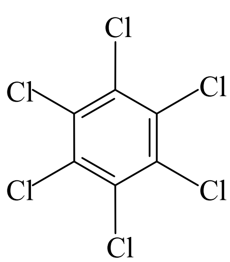
Aldrin
CAS No: 309-00-2
Formula: $C_{12}H_8Cl_6$
MW: 362



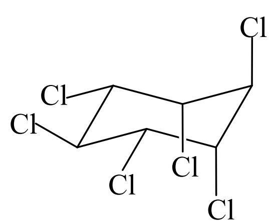
Dieldrin
CAS No: 60-57-1
Formula: $C_{12}H_8Cl_6O$
MW: 378



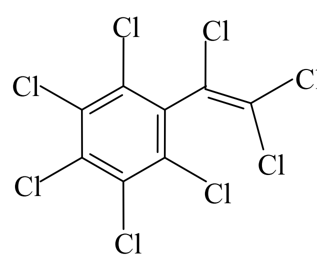
Endrin
CAS No: 72-20-8
Formula: $C_{12}H_8Cl_6O$
MW: 378



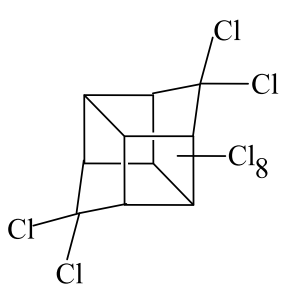
Hexachlorobenzene
CAS No: 118-74-1
Formula: C_6Cl_6
MW: 282



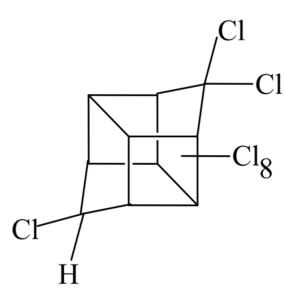
Lindane
CAS No: 58-89-9
Formula: $C_6H_6Cl_6$
MW: 288



Octachlorostyrene
CAS No: 29082-74-4
Formula: C_8Cl_8
MW: 376



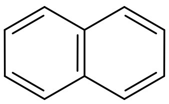
Mirex
CAS No: 2385-85-5
Formula: $C_{10}Cl_{12}$
MW: 540



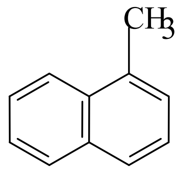
Photomirex
CAS No: 39801-14-4
Formula: $C_{10}HCl_{11}$
MW: 506

CHEMICAL STRUCTURES OF ORGANIC ANALYTES (Cont.)

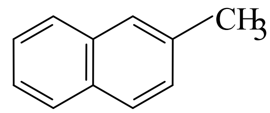
Low-Molecular-Weight Polycyclic Aromatic Hydrocarbons



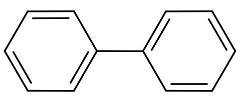
Naphthalene
CAS No: 91-20-3
Formula: $C_{10}H_8$
MW: 128



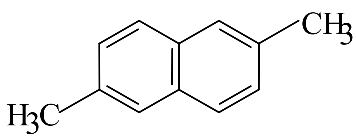
1-Methylnaphthalene
CAS No: 90-12-0
Formula: $C_{11}H_{10}$
MW: 142



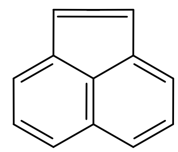
2-Methylnaphthalene
CAS No: 91-57-6
Formula: $C_{11}H_{10}$
MW: 142



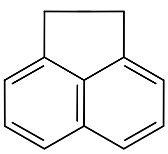
Biphenyl
CAS No: 92-52-4
Formula: $C_{12}H_{10}$
MW: 154



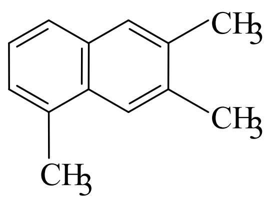
2,6-Dimethylnaphthalene
CAS No: 581-42-0
Formula: $C_{12}H_{12}$
MW: 156



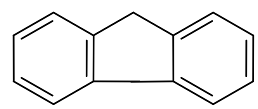
Acenaphthylene
CAS No: 208-96-8
Formula: $C_{12}H_8$
MW: 152



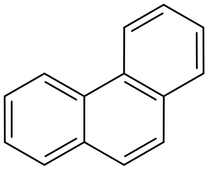
Acenaphthene
CAS No: 83-32-9
Formula: $C_{12}H_{10}$
MW: 154



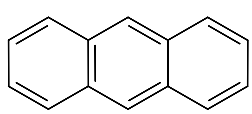
2,3,5-Trimethylnaphthalene
CAS No: 2245-38-7
Formula: $C_{13}H_{14}$
MW: 170



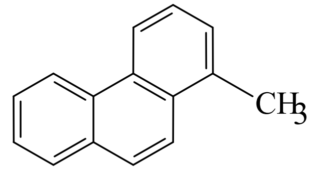
Fluorene
CAS No: 86-73-7
Formula: $C_{13}H_{10}$
MW: 166



Phenanthrene
CAS No: 85-01-8
Formula: $C_{14}H_{10}$
MW: 178



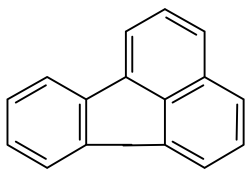
Anthracene
CAS No: 120-12-7
Formula: $C_{14}H_{10}$
MW: 178



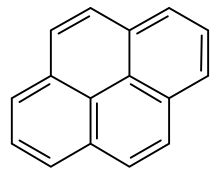
1-Methylphenanthrene
CAS No: 832-69-9
Formula: $C_{15}H_{12}$
MW: 192

CHEMICAL STRUCTURES OF ORGANIC ANALYTES (Cont.)

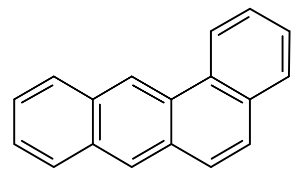
High-Molecular-Weight Polycyclic Aromatic Hydrocarbons



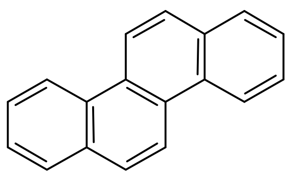
Fluoranthene



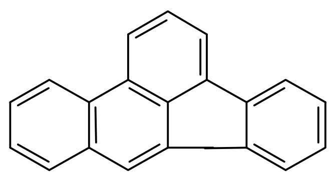
Pyrene



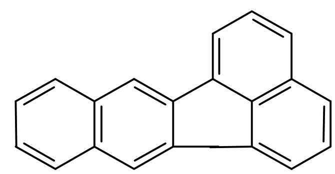
Benz[a]anthracene



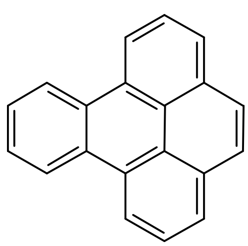
Chrysene



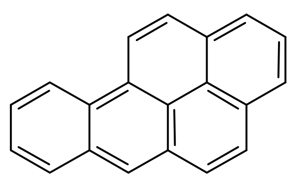
Benzo[b]fluoranthene



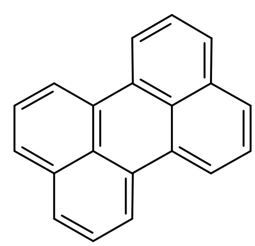
Benzo[k]fluoranthene



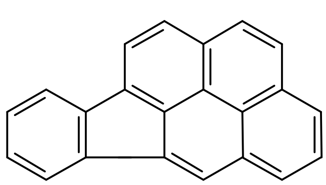
Benzo[e]pyrene



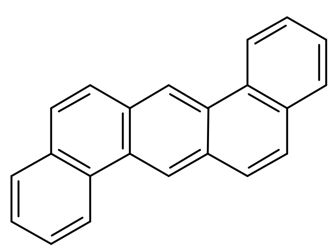
Benzo[a]pyrene



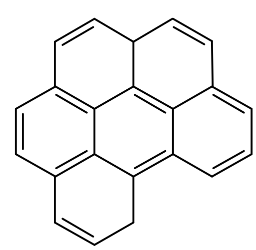
Perylene



Indeno[1,2,3-cd]pyrene



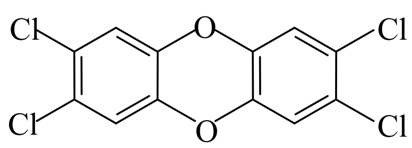
Dibenz[a,h]anthracene



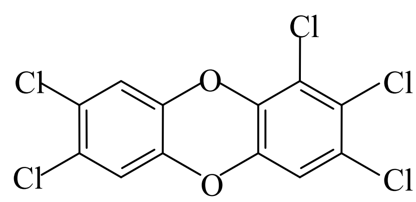
Benzo[ghi]perylene

CHEMICAL STRUCTURES OF ORGANIC ANALYTES (Cont.)

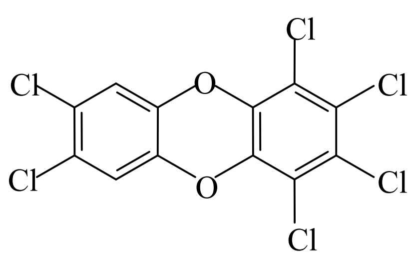
2,3,7,8-Substituted Polychlorinated Dibenzo[p]dioxins



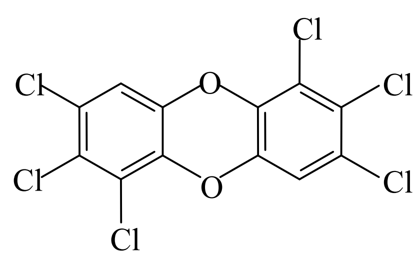
2,3,7,8-Tetrachlorodibenzo[p]dioxin
CAS No: 1746-01-6
Formula: $C_{12}H_4Cl_4O_2$
MW: 320



1,2,3,7,8-Pentachlorodibenzo[p]dioxin
CAS No: 40321-76-4
Formula: $C_{12}H_3Cl_5O_2$
MW: 354



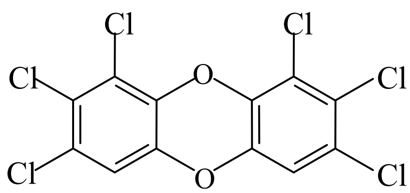
1,2,3,4,7,8-Hexachlorodibenzo[p]dioxin
CAS No: 39227-28-6
Formula: $C_{12}H_2Cl_6O_2$
MW: 388



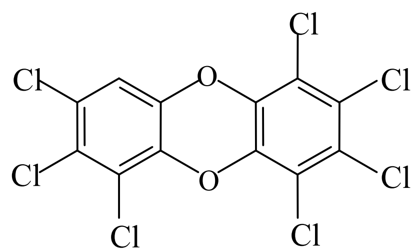
1,2,3,6,7,8-Hexachlorodibenzo[p]dioxin
CAS No: 57653-85-7
Formula: $C_{12}H_2Cl_6O_2$
MW: 388

CHEMICAL STRUCTURES OF ORGANIC ANALYTES (Cont.)

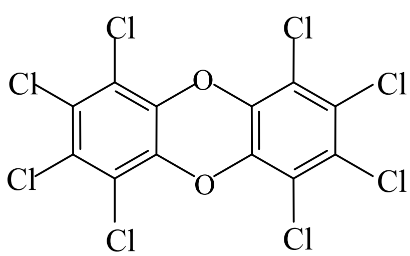
2,3,7,8-Substituted Polychlorinated Dibenzo[p]dioxins



1,2,3,7,8,9-Hexachlorodibenzo[p]dioxin
CAS No: 19408-74-3
Formula: $C_{12}H_2Cl_6O_2$
MW: 388



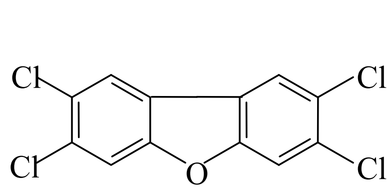
1,2,3,4,6,7,8-Heptachlorodibenzo[p]dioxin
CAS No: 35822-39-4
Formula: $C_{12}HCl_7O_2$
MW: 422



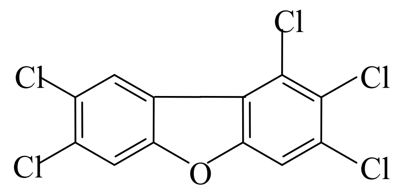
Octachlorodibenzo[p]dioxin
CAS No: 3268-87-9
Formula: $C_{12}Cl_8O_2$
MW: 456

CHEMICAL STRUCTURES OF ORGANIC ANALYTES (Cont.)

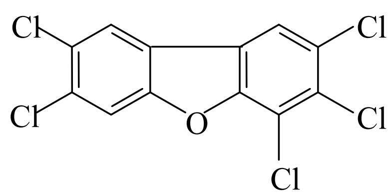
2,3,7,8-Substituted Polychlorinated Dibenzofurans



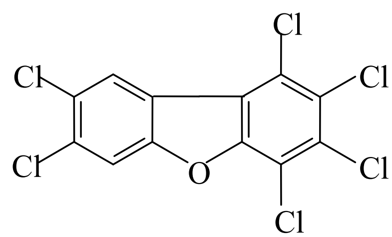
2,3,7,8-Tetrachlorodibenzofuran
CAS No: 51207-31-9
Formula: $C_{12}H_4Cl_4O$
MW: 304



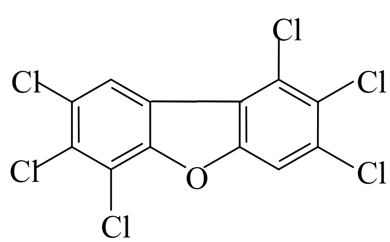
1,2,3,7,8-Pentachlorodibenzofuran
CAS No: 57117-41-6
Formula: $C_{12}H_3Cl_5O$
MW: 338



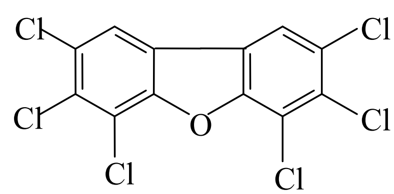
2,3,4,7,8-Pentachlorodibenzofuran
CAS No: 57117-31-4
Formula: $C_{12}H_3Cl_5O$
MW: 338



1,2,3,4,7,8-Hexachlorodibenzofuran
CAS No: 70648-26-9
Formula: $C_{12}H_2Cl_6O$
MW: 372



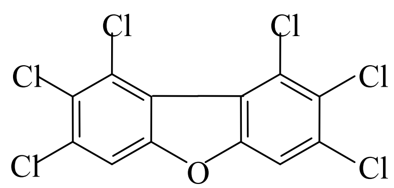
1,2,3,6,7,8-Hexachlorodibenzofuran
CAS No: 57117-44-9
Formula: $C_{12}H_2Cl_6O$
MW: 372



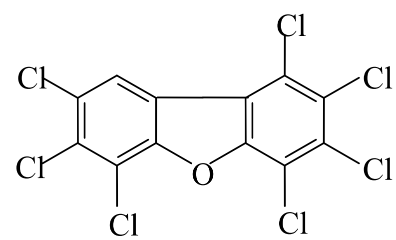
2,3,4,6,7,8-Hexachlorodibenzofuran
CAS No: 60851-34-5
Formula: $C_{12}H_2Cl_6O$
MW: 372

CHEMICAL STRUCTURES OF ORGANIC ANALYTES (Cont.)

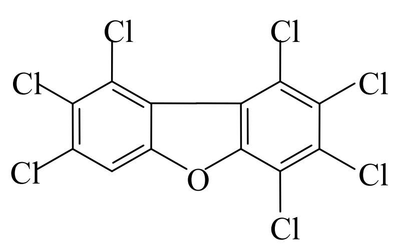
2,3,7,8-Substituted Polychlorinated Dibenzofurans



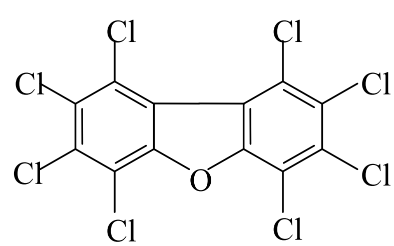
1,2,3,7,8,9-Hexachlorodibenzofuran
CAS No: 72918-21-9
Formula: $C_{12}H_2Cl_6O$
MW: 372



1,2,3,4,6,7,8-Heptachlorodibenzofuran
CAS No: 67562-39-4
Formula: $C_{12}HCl_7O$
MW: 406



1,2,3,4,7,8,9-Heptachlorodibenzofuran
CAS No: 55673-89-7
Formula: $C_{12}HCl_7O$
MW: 406



Octachlorodibenzofuran
CAS No: 39001-02-0
Formula: $C_{12}Cl_8O$
MW: 440

INTRODUCTION

A survey was conducted to establish a benchmark for concentrations of selected trace metals and organic contaminants in the edible flesh of fish species important to the recreational fishery of the New York Bight Apex (*i.e.*, the area bounded by the coasts of New Jersey and Long Island, 73°30'W longitude, and 40°15'N latitude; Bowman and Wunderlich 1976; Figure 1). Four species were targeted based on their importance to the recreational fishery, their life habits, and the regional ecology: bluefish, *Pomatomus saltatrix* (pelagic habitat); summer flounder, *Paralichthys dentatus* (demersal habitat); black sea bass, *Centropristis striata* (reef habitat); and tautog, *Tautoga onitis* (reef habitat). Refer to Figure 2 for species illustrations and synoptic descriptions of range, habitat use, spawning, stock structure, migratory behavior, predation, and management.

The survey collected and analyzed fish caught by local recreational fishermen during the fall when fish physiological condition and lipid (*i.e.*, fat) levels would likely be highest. To the extent that any metal or contaminant concentration is positively associated with lipid levels, the timing of the sampling would be most useful from a public health standpoint. Measured concentrations were compared with the U.S. Food and Drug Administration's guidelines for human consumption.

METHODS

SAMPLE COLLECTION, DISSECTION, AND COMPOSITING

Bluefish, summer flounder, black sea bass, and tautog were caught by rod and reel during September-December 1993 at 15 sites in the New York Bight Apex selected on the basis of their popularity with fishermen (Figure 1; Appendix Table A1). Site locations were determined by LORAN-C.

Guidelines of NOAA-FDA-EPA (1986) were used for handling the fish. Whole fish were returned to the laboratory on ice, and dissected within 48 hr. In the laboratory, each whole specimen was weighed to the nearest gram and measured to the nearest millimeter. Total length was measured for summer flounder, black sea bass, and tautog; fork length was measured for bluefish. Individual specimens were also examined for gross abnormalities and sex. In keeping with local consumption practices, fillets (*i.e.*, boneless muscle tissue) of summer flounder and tautog were prepared with the skin and scales removed. Bluefish and black sea bass fillets included the skin, with the scales removed.

Dissections were performed in the laboratory under a high-efficiency particle air (HEPA) laminar-flow hood. Dissecting implements and containers were cleaned in a manner appropriate for the specific analyses. Implements were cleaned with ultrapure 10% nitric acid, double-deionized (DDI) water, methanol, and methylene chloride from a commercial supplier. Plastic containers for trace metals samples were washed in dilute Micro™ liquid laboratory cleaner, rinsed in tap water, washed in 10% nitric acid, triple rinsed in DDI water, and dried under a HEPA clean-air hood. For trace metal analyses, three adjoining pieces (approximately 2 cm^3 each) of white muscle were excised from the anterior dorsal portion of each fillet and stored in acid-cleaned plastic vials at -20°C (Figure 3). For organic contaminant analyses, the remainder of each dorsal fillet was homogenized in a stainless steel blender, and stored in precleaned glass jars at -80°C. Both dorsal and ventral fillets from each summer flounder, and small samples from other species, were homogenized to obtain an adequate sample size.

Allocation of muscle tissue from individual specimens to composites was based on fish length. Outlier specimens for each species at each site were identified using the Dixon outlier test (Sokal and Rohlf 1981); those specimens were excluded from further consideration. The number of composites for each species for each station was based on the number of normally distributed specimens and the need for three specimens per composite. A random number was then assigned to each of the normally distributed specimens. Given that N specimens were to be composited for a specific station, we selected the N specimens with the lowest random number from the available specimen pool. For example, if five composites were to be prepared for a particular station, specimens with the lowest 15 random numbers were selected. The selected specimens were sorted by length and grouped in sets of three to form the five composites (Appendix Tables A2-A5). The specimens identified as outliers and those not randomly selected for the composite preparations are listed in Appendix Tables A6-A9.

SAMPLE ANALYSIS

Trace Metals

Analyses of nine trace metals (Appendix Table B1) in the muscle composite samples were performed in two separate batches following the procedures of Zdanowicz *et al*. (1993). Each batch included 28 muscle composites (*i.e.*, 14 for each of two species), three replicates of dogfish liver standard reference material (SRM; DOLT-1, National Research Council of Canada), three method blanks, and one composite in duplicate for each of the two fish species. Quality assurance (QA) and quality control (QC) procedures included participation in the annual NOAA-NRC [National Research Council Canada] intercomparison exercise (Willie and Berman 1995).

Approximately 0.5 g of muscle from each of three individual specimens constituting a composite were placed in acid-cleaned teflon vials and dried overnight at 60-65°C. Five milliliters of ultrapure, concentrated nitric acid was added to each vial, and the vials were allowed to stand at room temperature for 2-4 hr. Vials were then placed inside teflon-lined bombs, and the tissue was digested overnight at 120°C. After cooling, the bombs were vented, the vials removed, and the digests allowed to degas at room temperature overnight. The digests were then quantitatively transferred to 25-ml glass graduated cylinders, brought to volume using double-deionized water, and analyzed for arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni), silver (Ag), and zinc (Zn) using atomic absorption spectrophotometry or inductively coupled plasma mass spectrometry. Wet weight and dry weight for each muscle composite were used in the percent water determinations.

PCBs, Organochlorine Pesticides, and PAHs

Analyses of 25 PCB congeners (Appendix Table B2), 17 organochlorine pesticides (Appendix Table B3), and 24 PAHs (Appendix Table B4) in muscle composites were performed in six separate batches following the guidelines of NOAA (Krahn *et al*. 1988; Sloan *et al*. 1993) and the EMAP [Environmental Monitoring and Assessment Program] procedures of the U.S. Environmental Protection Agency (EPA 1993a). Each batch of 24 extractions included one method blank, one matrix spike, one mussel tissue SRM (mussel tissue V, QA93TIS5 - SRM 1974a, NIST [National Institute of Standards and Technology]), and one muscle composite in triplicate. One batch included seven spiked replicates of a summer flounder muscle composite for the method detection limit (MDL) determination. The remaining soxhlet extraction setups in this latter batch were allocated to the analyses of other QA samples and the muscle composite samples. QA and QC procedures followed EMAP protocols (Valente *et al*. 1992), and included participation in the annual NIST/ NOAA/NS&T/EPA EMAP intercomparison exercise (Parris 1995). A separate sample of each composite was dried overnight in an oven at 120°C, and reweighed to determine the percent wet weight (Appendix Tables A2-A5). Although all values in this report are wet weight concentrations, this measurement allows the reader to convert concentrations to a dry-weight basis. In addition, the lipid content of each composite was determined gravimetrically.

Approximately 4 g of muscle from each of the three individual specimens constituting a composite were placed in a mortar and mixed, using a pestle, with anhydrous sodium sulfate until the composite was dry. The mixture was soxhlet extracted with methylene chloride following NIST protocols (Wise *et al*. 1991). Twenty percent of the methylene chloride extract was evaporated to dryness for lipid determination. Silica gel/alumina/florisil column chromatography was used to remove the bulk biogenic and other polar interferences from the remaining extract. The cleaned fraction was further purified using size-exclusion, high-performance liquid chromatography (HPLC).

PCBs and chlorinated pesticides were analyzed by capillary gas chromatography with electron-capture detection (GC/ECD; EPA 1993a). Nomenclature for PCB compounds follows that of Ballschmiter and Zell (1980). Specific PCB congeners were not verified by gas chromatography - mass spectrometry (GC-MS), and the apparent concentrations of specific congeners may be affected by contribution(s) from the coeluting compound(s) (Appendix Table B2). PAHs were analyzed by capillary GC-MS in selected ion monitoring mode (EPA 1993a).

2,3,7,8-Substituted PCDD and PCDF Congeners

Dibenzo[p]dioxin and dibenzofuran are the base structures for two sets of compounds in which chlorine atoms are added to form PCDDs and PCDFs. There are 75 PCDD and 135 PCDF congeners. Those congeners with chlorine atoms in the 2,3,7, and 8 positions (of which there are 7 PCDDs and 10 PCDFs; Appendix Table B5) are considered toxic, with 2,3,7,8-TCDD being the most toxic of all PCDD and PCDF congeners (EPA 1989).

Muscle composites were analyzed for the seven 2,3,7,8-substituted PCDD congeners and ten 2,3,7,8-substituted PCDF congeners in three separate batches, using EPA Method 8290 with selected modifications from EPA Method 1613 (EPA 1993b, 1994; Battelle 1996). Each batch of 18-20 samples included one method blank, one matrix spike, one fish SRM (EDF-2526, Cambridge Isotope Laboratory), and one muscle composite in triplicate. One batch included four replicates of a summer flounder muscle composite for the MDL verification. Internal standards used in identification and quantification of PCDD and PCDF congeners were ^{13}C-labeled analogs of each dioxin congener except for 1,2,3,7,8,9-hexachlorodibenzo[p]dioxin, and of each dibenzofuran except for octachlorodibenzofuran. Isomers of each homolog series were resolved on a DB-5 column and analyzed by high-resolution MS. Second-column confirmation of 2,3,7,8-TCDF levels above 1 pptr were performed on a DB-Dioxin column.

STATISTICAL TESTS

The nonparametric Kruskal-Wallis test (SAS 1989) was performed to examine the statistically significant differences among stations for those analytes in which the mean concentration value from at least one station was three times the method detection limit. For composites for which a specific congener was not detected, one-half perform the test of interstation differences.

The Spearman rank order correlation test was used to determine associations among PCBs, DDTs, lipid content, and average composite length. Nondetectable values were not used in the Spearman rank order correlation test.

QUALITY ASSURANCE

Precision and accuracy are the measures of QA determined in this study. For trace metals, QA for precision included analyses of MDLs and relative percent differences (RPDs), while for accuracy, it included comparative analyses with SRM. For organic contaminants, QA for precision included analyses of laboratory methods blanks, MDLs, and laboratory triplicates, while for accuracy, it included analyses of internal surrogate standards, matrix spike analytes, and SRM. The data quality objectives (DQOs) for organic analyses are listed in Appendix Table B6.

Trace Metals

The MDLs for each metal for each batch were computed as three times the standard deviation of six method blank measurements. The blank values were low and the MDLs were below 1 µg/g dry weight for all metals (Appendix Table B7). The percent recoveries of the nine metals in the DOLT-1 SRM varied between 92 and 104%. The relative standard deviations (RSD) of the dry weight measurements were 10% or less for all metals, except for Cr which had an RSD of 17%.

Based upon the percent water determination in muscles of different fish species (Appendix Tables A2-A5), a nominal water content of 75% was used for muscle composites for the purpose of determination of MDLs on a wet weight basis (Appendix Table B8). For duplicate fish tissue samples, the RPD was computed as the range divided by the mean and then multiplied by 100. Greater than 75% of the duplicate samples exhibited an RPD <20% based on wet weight, with much of the variation attributed to differences in the percent solids between duplicate fillets.

PCBs

GC/ECD analyses were performed on seven replicate solutions of each PCB congener (approximately 40 pg/µL of each congener, 1 µL injected). The instrumental detection limit (IDL) for each PCB congener was determined by multiplying the standard deviation for seven replicate measurements by a Student's t value of 3.143 (EPA 1984b). None of the PCB replicate determinations exceeded the DQO criterion for IDL (Appendix Table B9). The estimated method detection limit (EMDL) for each PCB congener was calculated using the IDL and the nominal values of 10 g wet weight for sample size, 50% for extraction and cleanup recovery efficiency, 250 µL for final extraction volume, and 1 µL for GC injection volumes. The MDL for each PCB congener was determined on seven spiked replicates of summer flounder muscle composites following the procedure outlined in EPA (1984b). The RSD values were <10% for most replicate measurements in the MDL determination of PCB congeners (Appendix Table B10). The fact that the MDL is greater than the EMDL indicates that the method is limited by random variation in the recovery from samples at low concentrations rather than by the sensitivity of the instrument. None of the laboratory method blank values exceeded the DQO criterion (Appendix Table B6). Approximately 90% of laboratory triplicate values met the DQO criterion (Appendix Tables B11-B12).

Consistent recoveries (*i.e.*, 85.3-94.9%) were found for the relatively nonvolatile BZ #198 (Appendix Tables B13-B16), while recoveries for the surrogate 4-4'-dibromooctafluorobiphenyl ranged between 46 and 70%. The higher apparent recoveries (*i.e.*, 167%) of HPLC surrogate 1,2,3-trichlorobenzene (TCB) in bluefish may be due to the coelution of unknown interfering compound(s) with the TCB peak. Approximately 69% of PCB congeners (Appendix Table B17) met the matrix spike DQO criterion. For PCB congeners, 99% of analyses met the DQO criterion for analysis of accuracy based on reference material (Appendix Table B18).

Organochlorine Pesticides

GC/ECD analyses were performed on seven replicate solutions of organochlorine pesticides (approximately 40 pg/µL of each pesticide, 1 µL injected). The IDL for each pesticide analyte was determined by multiplying the standard deviation for seven replicate measurements by a Student's t value of 3.143 (EPA 1984b). One of 19 pesticide replicate determinations exceeded the DQO criterion for IDL (Appendix Table B19), although this value (5.52%) was near the DQO target of 5%. The MDLs were determined on seven spiked replicates of summer flounder muscle composites following the procedure outlined in EPA (1984b), and were greater than the EMDLs. The RSD values were <10% for most replicate measurements in the MDL determination of pesticide analytes (Appendix Table B20). Approximately 65% of pesticide analytes met the DQO criterion for analysis of laboratory triplicate samples (Appendix Tables B21-B22).

Approximately 82% of recovery values for internal pesticide surrogate standards met the DQO criterion (Appendix Tables B13-B16). Approximately 79% of pesticide analytes met the matrix spike DQO criterion (Appendix Table B23). For pesticide analytes, 100% of the determinations met the DQO criterion for analysis of accuracy based on reference material (Appendix Table B24).

PAHs

GC-MS analyses were performed on seven replicate solutions of PAH analytes (approximately 200 pg/µL of each congener, 1 µL injected). The IDL for each PAH analyte was determined by multiplying the standard deviation for seven replicate measurements by a Student's t value of 3.143 (EPA 1984b). Seven of 24 PAH replicate determinations exceeded the DQO criterion for IDL (Appendix Table B25a,b), although the highest RSD value was only 8.3%. The MDLs for PAH analytes were determined on seven spiked replicates of summer flounder muscle composites following the procedure outlined in the EPA (1984b). The overspiking of PAHs resulted in high MDL values. The reported detection limits for PAHs were computed from the replicate analyses of mussel tissue SRM (Appendix Table B26a,b). For four PAH compounds for which peaks were not found in the chromatograms, the detection limits were estimated to be 10 ppb wet weight based on the following assumptions: 1) 10 g wet weight of muscle tissue, 2) 50% efficiency in sample extraction and cleanup steps, 3) 250 µL as the final sample volume, and 4) an IDL (*i.e.*, GC-MS) of 200 pg/µL. Of the three samples that exhibited one PAH value above the MDL, all analyses met the DQO for analysis of laboratory triplicates (Appendix Tables B27a,b-B28a,b).

Approximately 75% of recovery values for internal surrogate standards met the DQO criterion (Appendix Tables B13-16). The low recoveries (*i.e.*, 23%) for deuterium-labeled naphthalene are not unexpected considering the volatility of this compound. Only 37.5% of PAH determinations (Appendix Table B29a,b) met the matrix spike DQO criterion. The matrix spike recovery data for PAHs are apparently skewed by the low-molecular-weight PAHs. These compounds are somewhat more volatile than their high-molecular-weight counterparts, and thus, are prone to evaporative losses during sample preparation. There seems to be no apparent explanation for the lower recoveries of perylene. The analysis of NIST SRM 1974a (intercomparison sample QA93TIS5) with each analytical batch indicates good precision from batch to batch, although this material contained low concentrations of contaminants (Appendix Table B30).

2,3,7,8-Substituted PCDD and PCDF Congeners

The MDLs for the PCDD and PCDF congeners were calculated using only three replicates because one of the four replicates used in the MDL verification exercise was lost during preparation (Appendix Table B31a,b). None of the laboratory triplicate analyses exceeded the DQO criterion of ≤25% RSD for analytes that had concentrations greater than 10 times the MDL (Appendix Tables B32a,b-B33a,b).

Approximately 98% of internal surrogates and 96% of cleanup surrogates for dioxin analyses met the DQO criterion (Appendix Tables B34a,b-37a,b). Recoveries of internal surrogate standards varied from 7 to 116%, with an average of 73% (RSD = 21%). Recoveries of a cleanup standard, in which all four chlorines of 2,3,7,8-TCDD were labeled with ^{37}Cl, ranged from 16 to 385%, with an average of 104% (RSD = 41%). All internal standard DQOs were exceeded for one tautog composite (*i.e.*, composite #155). For tautog composite #155, the average recovery of congeners in which all 12 carbons were labeled with ^{13}C was 12.1% (range of 7-17%), and the recovery of the cleanup standard, ^{37}Cl-labeled 2,3,7,8-TCDD, was 16%. The highest recovery for this composite is below the lowest recovery in any other composite (*i.e.*, 29%). Therefore, values for tautog composite #155 should be used with caution.

Approximately 94% of the matrix spike analytes met the DQO criterion (Appendix Table B38a,b). None of the PCDD and PCDF analyses of the accuracy-based SRM exceeded the DQO criterion (Appendix Table B39a,b).

Quality Assurance Summary

The MDLs for metals were low, and the accuracy and precision of the SRM measurements were generally within 10%. Duplicate analysis of fish tissue samples resulted in RPD measurements which exceeded 20% in 25% of the samples, partially due to differences in tissue density.

For organic contaminants, some of the quality assurance goals were not met, but the overall quality assurance compliance is judged typical of organic analytical data. The potential exists that organic data can be affected by interfering compounds coeluting with contaminant analyte peaks. Because each sample matrix is different, methods do not exist for adjustment of the data for these variations. The number of replicates per site, the number of fish per composite, and the agreement with other laboratories participating in the NIST/NOAA/NS&T/EPA EMAP intercomparison exercise do, however, provide confidence in the final estimates. As a practical matter, the general conclusions derived from this survey are not limited by the quality assurance data, but data should be interpreted with caution for specific samples in which quality assurance goals were not met.

RESULTS AND DISCUSSION

GENERAL CHARACTERISTICS OF FISH COMPOSITES

Bluefish had significantly higher lipid content (*i.e.*, 6.80%) than the other three species (Figure 4A). Tautog and black sea bass had similar lipid content (*i.e.*, 2.03 and 2.09%, respectively), while the lipid content of summer flounder was 0.56%. For all four species, there were no significant differences in lipid content among stations (Table 3, Appendix Tables A2-A5).

The bluefish caught at Station BL1 were shorter, lighter, and less dense (*i.e.*, more water) than the bluefish caught at Stations BL2 and BL3. The black sea bass caught at Station SB1 had significantly higher water content than those caught at Stations SB2 and SB3. Within the four species, there was a significant correlation between average length of the composite and average weight (Table 1), in part because randomly selected specimens were sorted into composite samples by length.

A correlation between percent lipids and average length (or weight) was observed only for tautog (Table 1).

CONTAMINANT CONCENTRATIONS IN FISH COMPOSITES

Trace Metals

Complete listings of analytical results for metals in each composite are given in Appendix Tables C1-C4. Metal concentrations in all muscle composites were above the detection limits. These concentrations were generally low (Table 2) and well within the ranges expected for metals in muscle of fish from relatively uncontaminated locations. Values on a wet weight basis were <0.05 µg/g (ppm) for Ag; 0.1-0.5 µg/g for Cd, Cr, Cu, Ni, and Pb; 3.5-13.8 µg/g for Zn; and 0.4-3.8 µg/g for As. The Hg analyses in this study determined total Hg content, a measurement which encompasses all species of mercury present, including methyl mercury. The highest value of total mercury in this study was 0.11 µg/g which was an order of magnitude lower than the FDA action level of 1.0 µg/g wet weight for methyl mercury in fish or shellfish for human consumption (Kennedy 1979).

Statistically significant differences in metal concentrations among locations were not detected for any metal (*i.e., P* values > 0.05 for all metals for all species; Appendix Tables C1-C4). Therefore, data from all sites were pooled by species, and mean species concentrations (Table 2) were compared (Figure 5). The following significant differences in mean metal levels were found: Cr: bluefish = black sea bass > tautog = summer flounder; Zn: bluefish > tautog = summer flounder = black sea bass; As: black sea bass > summer flounder > tautog > bluefish; and Hg: tautog = bluefish > summer flounder = black sea bass.

These differences are probably related to the unique nature, diet, and behavior of each species. It is not uncommon to find differences in contaminant levels among species (Zdanowicz *et al*. 1992). The differences, however, do not appear to be related to habitat type.

PCBs

A significant number of composite-congener combinations had PCB concentrations that were below the MDL (*i.e.*, 20% for bluefish, 91% for summer flounder, 57% for black sea bass, and 63% for tautog). Two PCB congeners were not detected in any composite (Appendix Table C5), and were not included in subsequent calculations. Complete listings of analytical results for PCB concentrations for each composite are given in Appendix Tables C6-C9.

Of the 16 PCB congeners which were found in bluefish and which were statistically analyzed (Appendix Table C6), two low-concentration congeners (*i.e.*, BZ #8 and BZ #128) and one high-concentration congener (*i.e.*, BZ #153) were found to be significantly higher at Station BL3 ($P < 0.05$). Differences among the stations were not observed for the remaining 13 congeners, nor for the sum of 23 PCB congeners ($P = 0.37$). No interstation difference was assumed, and therefore, the bluefish means for the 14 composites are given in Table 3. Bluefish muscle composites contained the highest mean PCB concentrations of the four species. The sum of 23 PCB congeners (*i.e.*, ΣPCBs) ranged from 0.21 to 0.57 µg/g (ppm), with a mean of 0.37 ppm (Appendix Table C6). The PCB congener composition in bluefish composites was dominated by seven congeners: BZ #1 (monochloro), BZ #66 (tetrachloro), BZ #101 (pentachloro), BZ #118 (pentachloro), BZ #153 (hexachloro), BZ #138 (hexachloro), and BZ #180 (heptachloro). The maximum concentration of 0.57 ppm for ΣPCBs was found in a bluefish composite (*i.e.*, #113; Appendix Table C6). The sum of concentrations of 18 specific PCB congeners was multiplied by 2 to generate an approximation of "Aroclor-based" total PCB data for comparison with the historical total PCB data; the approximations are shown in the second data column of Table 3 and in the last column of Appendix Tables C6-C9 (NOAA 1989; ACE-EPA 1992). The highest of these estimates was 0.9 ppm, which is below the FDA tolerance level of 2 ppm wet weight (FDA 1991).

No PCB congener had a concentration greater than 3 times the MDL in summer flounder composites. Of the six congeners (*i.e.*, BZ #1, BZ #66, BZ #101, BZ #118, BZ #153, and BZ #138) detected in summer flounder composites, only one (*i.e.*, BZ #1) was found at all stations.

The PCB levels in black sea bass composites were considerably lower than those found in bluefish composites. The ΣPCBs in black sea bass composites ranged from 0.043 to 0.14 ppm, with a mean of 0.079 ppm (Appendix Table C8). The PCB congener composition in black sea bass composites was dominated by five congeners: BZ #66, BZ #101, BZ #118, BZ #153, and BZ #138. Of the six congeners (*i.e.*, the aforementioned five plus BZ #1) in black sea bass composites for which statistics were performed (*i.e.*, those where the station mean concentrations were greater than 3 times the MDL), interstation differences were found for four congeners (*i.e.*, BZ #66, BZ #101, BZ #118, and BZ #138; Appendix Table C8). Since higher PCB concentrations were found at Station SB3 for the majority of congeners and for ΣPCBs ($P = 0.02$), we consider black sea bass at the entrance to Ambrose Channel (Station SB3; Figure 1) to have higher PCB concentrations than black sea bass at the two stations farther south (Table 3).

Mean PCB levels in tautog composites were similar to those in black sea bass composites. The ΣPCBs in tautog composites ranged from 0.038 to 0.12 ppm, with a mean of 0.059 ppm (Appendix Table C9). The PCB congener composition in tautog composites was dominated by three congeners: BZ #1, BZ #101, and BZ #153. No interstation differences were detected for PCB levels in tautog composites.

The trend in PCB concentrations among species (Figure 4B) follows the trend in lipid content (Figure 4A). Among composite samples of bluefish, black sea bass, and tautog, PCB concentrations increased with lipid content in each species (Figure 6A). Correlation of PCBs and lipids in the pelagic bluefish ($r = 0.724$) was similar to the correlation for the two reef fish, black sea bass ($r = 0.763$) and tautog ($r = 0.814$) (Table 1). PCB concentrations in tautog composites were also correlated with tautog length ($r = 0.695$; Table 1; Figure 6B), probably because tautog length is correlated with the muscle lipid content ($r = 0.559$).

Organochlorine Pesticides

A significant number of station means for chlorinated pesticides were below the MDL (*i.e.*, 29% for bluefish, 96% for summer flounder, 73% for black sea bass, and 80% for tautog). Four chlorinated pesticides were not detected in any of the 56 muscle composites (Appendix Table C5). The complete listing of the remaining 13 chlorinated pesticides is given in Appendix Tables C10-C13, and summarized in Table 3.

The pesticide composition in bluefish and black sea bass composites was dominated by total chlordanes and total DDTs. No pesticide analyte had a concentration greater than 3 times the MDL in summer flounder composites. The pesticide composition in tautog was dominated by total DDTs. No interstation differences were detected for total chlordanes or total DDTs in any fish species.

When total DDT concentrations were compared among species, the observed trend was similar to the pattern for lipids and ΣPCBs (*i.e.*, bluefish > black sea bass = tautog > summer flounder; Figure 4). The DDTs were correlated with lipid content in black sea bass ($r = 0.918$) and tautog ($r = 0.757$) composites, and to a lesser degree in bluefish composites ($r = 0.512$) (Figure 6C). The ΣDDTs were correlated with tautog composite length (Figure 6B), which covaried with the lipid content (Table 1). The ΣDDTs correlated with ΣPCBs (Figure 6D) in bluefish, black sea bass, and tautog muscle composites. This relationship was stronger for black sea bass and tautog composites than for bluefish composites (Table 1).

The trend for total chlordane concentrations among species followed the same order as ΣPCBs, ΣDDTs, and lipids for bluefish, black sea bass, and summer flounder composites (Figure 4D).

Average sums of DDTs and metabolites for all composite samples (*i.e.*, 0.014-0.16 μg/g) were below the FDA action level of 5.0 μg/g (ppm) wet weight, and average sums of chlordanes for all composite samples (*i.e.*, 0.04-0.08 μg/g) were below the FDA action level of 0.3 μg/g (ppm) wet weight (FDA 1986, 1987).

PAHs

Nineteen of the 24 PAHs were undetected in any fish muscle composite (Appendix Table C5). The detected PAHs were not consistently found among fish species. The concentrations of the five PAHs that were detected in at least one composite are listed in Appendix Table C14. Acenaphthene was found only in bluefish composites, while benz[a]anthracene was detected only in summer flounder, black sea bass, and tautog composites. The PAH 2-methylnaphthalene was detected only in summer flounder and tautog. Summer flounder was the only species with measurable concentrations of naphthalene and 1-methylnaphthalene. The station mean for acenaphthene in bluefish was above the MDL for all three stations (Table 3; Appendix Table C14). The station mean for benz[a]anthracene was above the MDL for one black sea bass station and two tautog stations.

No apparent explanation is evident for the differing presence of these PAH compounds among the species. The absence or low concentration levels of PAHs are expected as these compounds are extensively metabolized by the fish hepatic microsomal enzymes, and the metabolites are temporarily stored in the bile until their excretion (Deshpande 1989; Varanasi *et al*. 1989).

2,3,7,8-Substituted PCDD and PCDF Congeners

Thirteen of the seventeen dioxin and furan congeners were not detected above the MDL in any muscle composite samples analyzed for this study (Appendix Table C5), and were not included in subsequent calculations. Complete listings of the analytical results for the four detected dioxins and furans in each composite are given in Appendix Table C15, and summarized in Table 3.

The dominant PCDD and PCDF congeners were 2,3,7,8-TCDD, octachlorodibenzo[p]dioxin, 2,3,7,8-TCDF, and 1,2,3,4,6,7,8-hepatochlorodibenzo[p]dioxin. The concentrations of 2,3,7,8-TCDD, considered the most toxic dioxin congener (EPA 1989), were below the MDL of 1.63 pg/g wet weight (pptr) in all summer flounder and black sea bass composites. Concentrations of 2,3,7,8-TCDD were below the detection limit in 10 of 14 tautog composites, and near the detection limit in the other four tautog composites (*i.e.*, ranging from 2.36 to 3.39 pg/g wet weight). The overall tautog species mean for 2,3,7,8-TCDD was less than the MDL (Table 3).

The concentrations of 2,3,7,8-TCDD in 4 of 14 bluefish composites were below the MDL. The concentrations ranged from 1.82 to 3.76 pg/g in 9 of 10 remaining bluefish composites. The remaining bluefish composite (*i.e.*, #113; Station BL3) contained 7.27 pg/g of 2,3,7,8-TCDD. This composite also contained the highest concentrations of ΣPCBs (*i.e.*, 566 ng/g), ΣDDTs (*i.e.*, 268 ng/g), Σchlordanes (*i.e.*, 62.4 ng/g), and approximately twice (*i.e.*, 13.2%) the average bluefish muscle lipid content of all composites analyzed in this survey. This composite exhibited the highest average composite weight (*i.e.*, 3.6 kg; Appendix Table A2), and included the heaviest individual (*i.e.*, 4.0 kg; Appendix Table A2) of all bluefish collected. The concentration of 2,3,7,8-TCDD in the other three bluefish muscle composites from Station BL3 were below the MDL of 1.63 pg/g. The station means and the species mean for bluefish muscle composites were only about 50% greater than the MDL of 1.63 pg/g (Table 3). All values for 2,3,7,8-TCDD for all composites are well below the FDA guidance level of 25 pg/g for limited consumption (Cordle 1981; Green 1981; Niemann 1986).

The furan congener 2,3,7,8-TCDF is about one-tenth as toxic as 2,3,7,8-TCDD (EPA 1989). No summer flounder composites had concentrations of 2,3,7,8-TCDF that were above the MDL. Two station means for black sea bass (*i.e.*, Stations SB2 and SB3) were only slightly higher than the MDL, no 2,3,7,8-TCDF was found at the third (*i.e.*, Station SB1), and the species mean was below the MDL. For bluefish and tautog, the three station means were above the MDL, with two station means for bluefish and one for tautog being greater than 3 times the MDL. For tautog, spatial differences were not significant (P = 0.13). In contrast, the mean concentration of 2,3,7,8-TCDF at bluefish Station BL3 (*i.e.*, 7.26 pg/g) was statistically higher than those at Stations BL1 and BL2 (P = 0.02). The higher 2,3,7,8-TCDF concentrations at Station BL3 can partially be explained by the longer, heavier, and more dense bluefish at Station BL3 (Appendix Table A2).

The sum of 2,3,7,8-TCDD toxic equivalent (2,3,7,8-TCDD TE; EPA 1994) values for the three TCDD congeners and one TCDF congener detected in at least one composite ranged from a baseline of 0.90 pg/g (using one-half MDL when all four compounds were below the MDL) to 8.3 pg/g. The 13 congeners that were not detected in any of the 56 composites had a 2,3,7,8-TCDD TE value of 6.2 pg/g wet weight, at concentrations of one-half MDL.

CONCLUSIONS

1. Total mercury levels in all fish composites were <0.11 µg/g wet weight, which is an order of magnitude below the FDA action level of 1.0 µg/g wet weight.

2. PCB concentrations in black sea bass were higher at Station SB3 (*i.e.*, entrance to Ambrose Channel) than at stations farther south along the New Jersey coast.

3. PCB and organochlorine pesticide concentrations were relatively low, and were correlated with the lipid content of the muscle tissue. Bluefish, with its higher lipid content, had both the highest mean PCB and pesticide concentrations. The individual bluefish composite with the highest lipid content also exhibited the highest PCB and pesticide concentrations.

4. The "Aroclor-based" estimate maximum of 0.9 µg/g wet weight was below the FDA tolerance level of 2.0 µg/g (ppm) for PCBs.

5. Average sums of DDTs and metabolites for all composite samples (*i.e.*, 0.014-0.16 µg/g) were below the FDA action level of 5.0 µg/g (ppm) wet weight.

6. Average sums of chlordanes for all composite samples (*i.e.*, 0.04-0.08 µg/g) were below the FDA action level of 0.3 µg/g (ppm) wet weight.

7. Consistent with findings in the scientific literature, PAHs were largely undetected.

8. All but one of the 56 fish muscle composites analyzed in this study had concentrations <4 pg/g for 2,3,7,8-TCDD, the most toxic dioxin congener.

9. Concentrations of 2,3,7,8-TCDD in all composite samples were below the FDA guidance level of 25 pg/g (pptr) wet weight for limited consumption.

10. The bluefish composite with the highest PCB, organochlorine pesticide, and lipid content also had the

highest 2,3,7,8-TCDD concentration (*i.e.*, 7.3 pg/g), which was still well below the FDA guidance level of 25 pg/g (pptr) wet weight for limited consumption.

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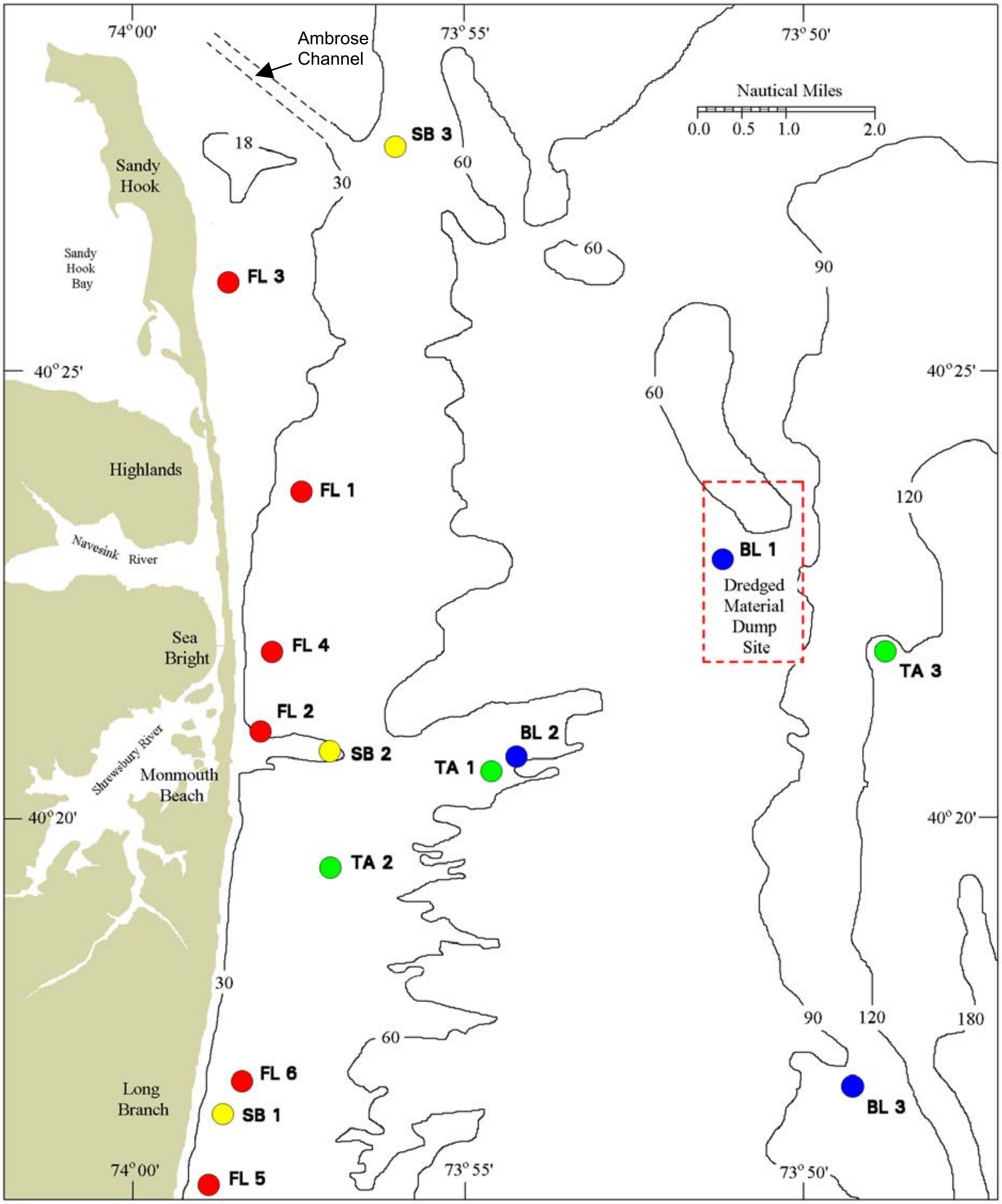
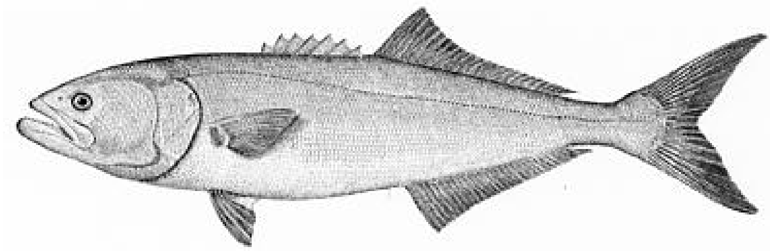


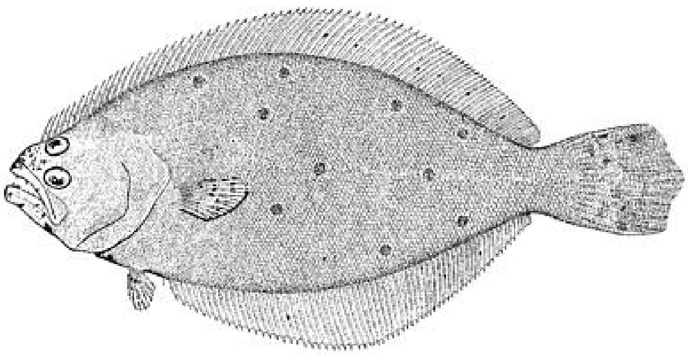
Figure 1. Study area in the New York Bight Apex showing sites of sample collection for bluefish (BL), summer flounder (FL), black sea bass (SB), and tautog (TA).

Bluefish ***(Pomatomus saltatrix)***



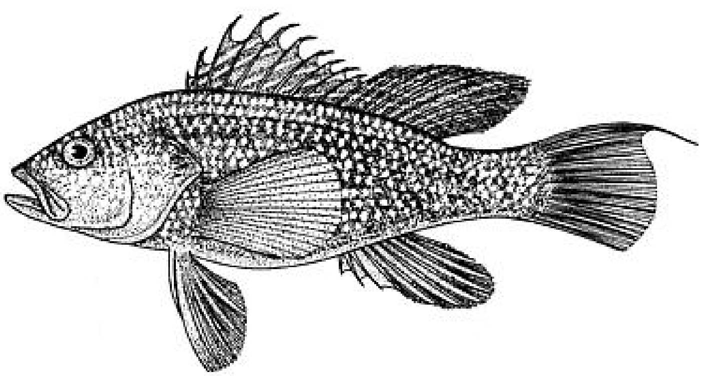
Range: Maine to Florida
Habitat: pelagic; temperate coastal regions
Spawning: spring spawning in South Atlantic Bight, summer spawning in Middle Atlantic Bight; single genetic stock
Migration: northward in spring, southward in fall
Predation: voracious predators; fish and invertebrates
Management: Bluefish Fishery Management Plan, prepared by Mid-Atlantic Fishery Management Council and Atlantic States Marine Fisheries Commission

Summer flounder ***(Paralichthys dentatus)***



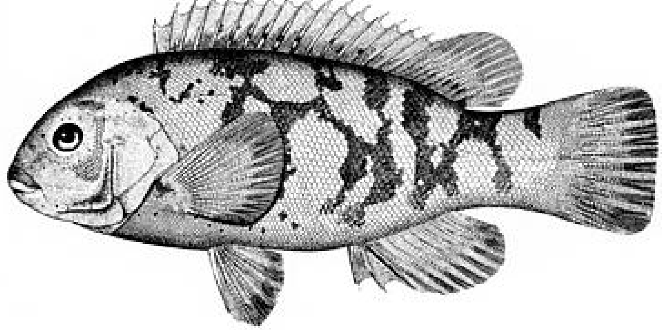
Range: Southern Gulf of Maine to Florida
Habitat: benthic
Spawning: autumn and early winter; multiple stocks
Migration: bays and estuaries from late spring through early autumn, offshore migration to outer continental shelf in winter
Predation: opportunistic feeders; fish and crustaceans
Management: Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan, prepared by Mid-Atlantic Fishery Management Council

Black sea bass ***(Centropristis striata)***



Range: U.S. Atlantic Coast
Habitat: structured bottom habitat (reefs, oyster beds, wrecks)
Spawning: in March off North Carolina and progressively until October further north; three stocks: northern (north of Cape Hatteras), southern, and Gulf of Mexico
Migration: northern stock winters along the 100-m depth counter off Virginia and Maryland, then migrates north and west into inshore waters
Predation: omnivorous feeders; crustaceans, mollusks, echinoderms, fish, and plants
Management: Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan, prepared by Mid-Atlantic Fishery Management Council

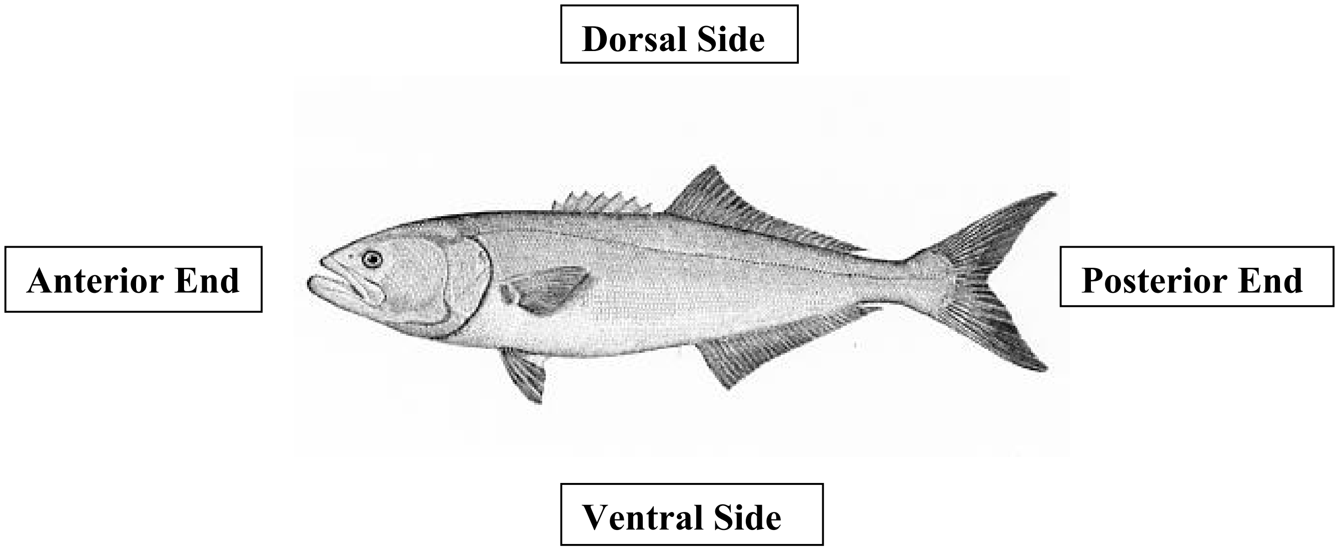
Tautog ***(Tautoga onitis)***



Range: Nova Scotia to South Carolina
Habitat: complexly structured, vegetated or reef-like
Spawning: in spring in southern part of Middle Atlantic Bight and progressively extending to the northern areas until August; multiple stocks
Migration: structured habitats in spring through early autumn, winter migration to perennial offshore areas with rugged topography in water 25-45 m deep
Predation: durophagous; blue mussels and other shellfish
Management: Fishery Management Plan for Tautog, prepared by Atlantic States Marine Fisheries Commission

Figure 2. Illustrations and descriptions of the four recreational fish species analyzed for contaminant levels in muscle tissue.

For Bluefish (shown), Black Sea Bass, and Tautog:



For Summer Flounder:

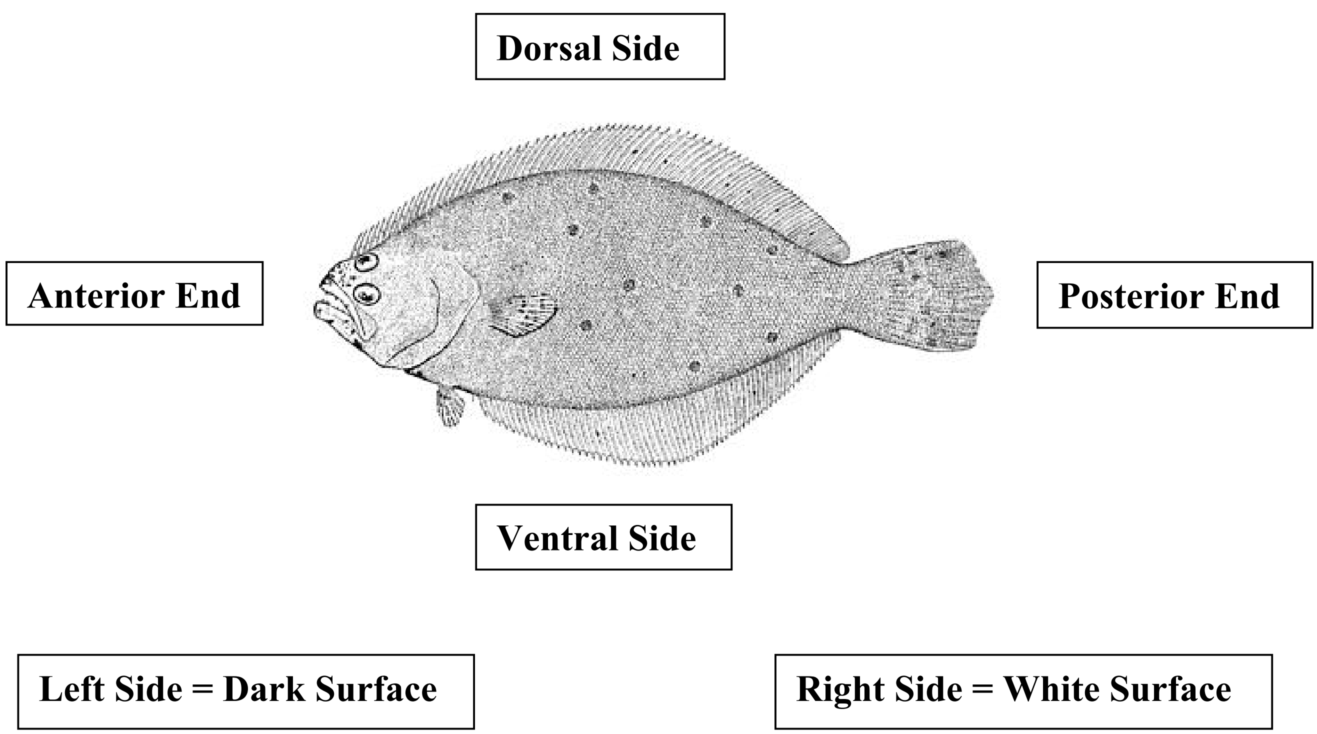


Figure 3. Identification of outer surface areas associated with dissection of fish.

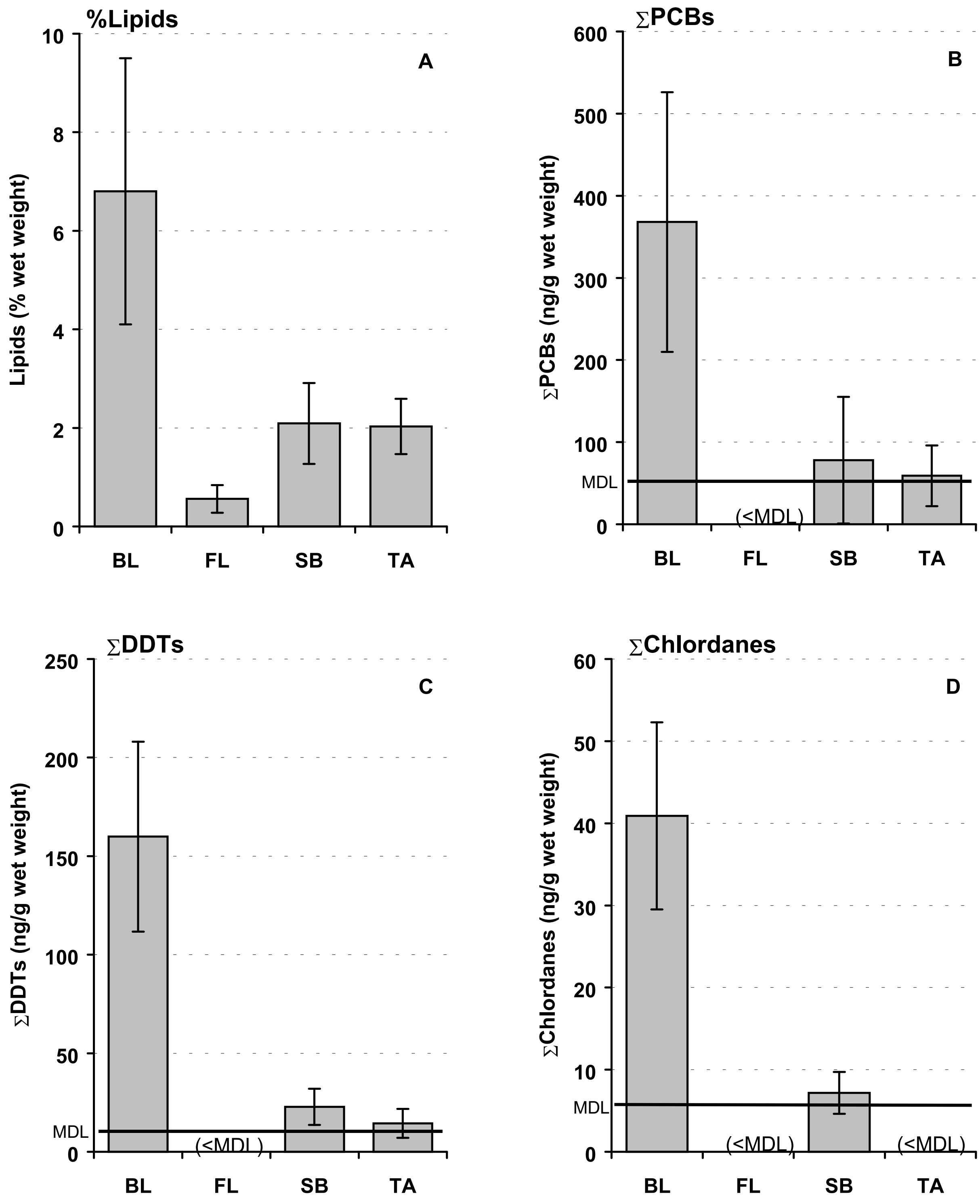


Figure 4. Mean (± standard deviation) percent lipids and concentrations of ΣPCBs, ΣDDTs, and Σchlordanes in muscle of bluefish (BL), summer flounder (FL), black sea bass (SB), and tautog (TA) from the New York Bight Apex. (MDL = method detection limit.)

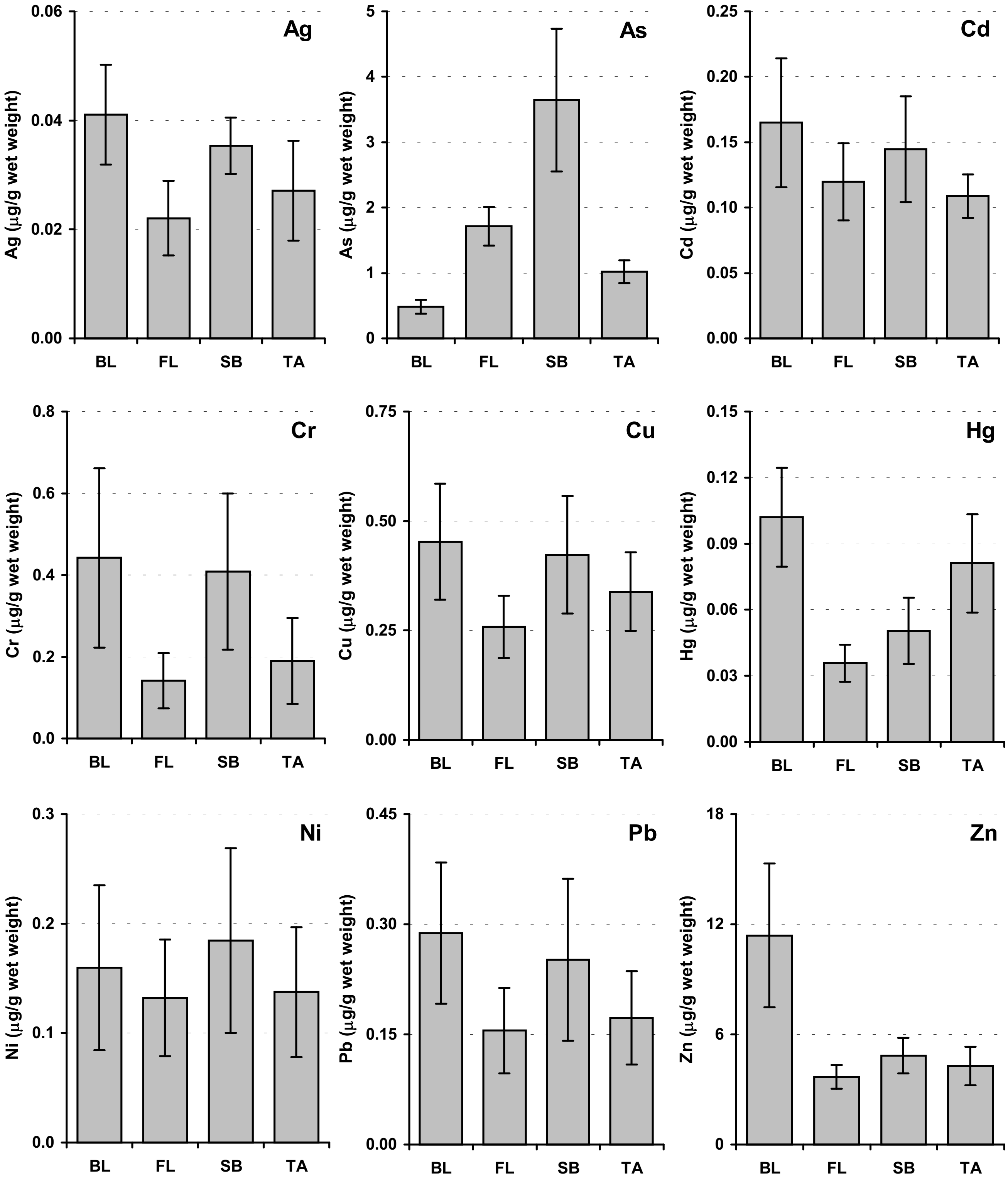


Figure 5. Mean (± standard deviation) concentrations of arsenic (As), cadmium (Cd), chromium (Cr), copper (Cu), lead (Pb), mercury (Hg), nickel (Ni), silver (Ag), and zinc (Zn) in muscle of bluefish (BL), summer flounder (FL), black sea bass (SB), and tautog (TA) from the New York Bight Apex.

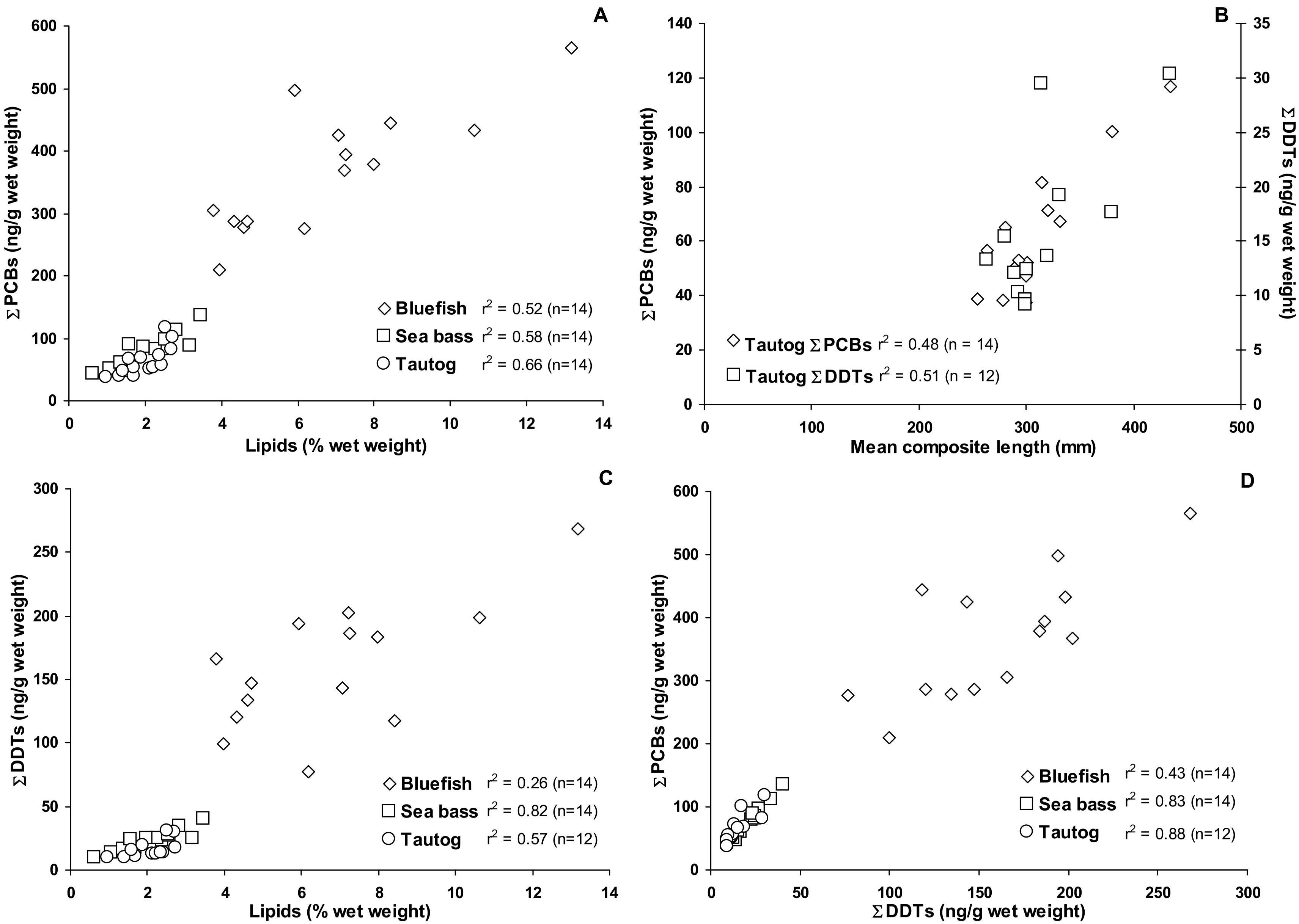


Figure 6. Relationships between: A) ΣPCBs and lipids in bluefish, black sea bass, and tautog; B) ΣPCBs and mean composite length, as well as ΣDDTs and mean composite length, in tautog; C) ΣDDTs and lipids in bluefish, black sea bass, and tautog; and D) ΣPCBs and ΣDDTs in bluefish, black sea bass, and tautog, for muscle tissue composites from the New York Bight Apex.

Table 1. Spearman rank correlations for muscle tissue contaminants (ΣPCBs and ΣDDTs) in, and physical characteristics (average length, average weight, and percent lipids) of, bluefish, summer flounder, black sea bass, and tautog from the New York Bight Apex

Species	**Correlation Coefficient (*r*)**	***P* Value[b]**	**n[c]**
	Average Length vs. Average Weight		
Bluefish	0.896	<0.001	14
Summer flounder	0.886	<0.001	14
Black sea bass	0.982	<0.001	14
Tautog	0.964	<0.001	14
	Average Length vs. Percent Lipids		
Bluefish	0.0264	0.916	14
Summer flounder	0.323	0.251	14
Black sea bass	-0.226	0.425	14
Tautog	0.559	0.036	14
	Average Weight vs. Percent Lipids		
Bluefish	0.117	0.682	14
Summer flounder	0.108	0.704	14
Black sea bass	-0.218	0.444	14
Tautog	0.530	0.049	14
	ΣPCBs vs. Percent Lipids[a]		
Bluefish	0.724	0.003	14
Black sea bass	0.805	<0.001	14
Tautog	0.814	<0.001	14
	ΣDDTs vs. Percent Lipids[a]		
Bluefish	0.512	0.058	14
Black sea bass	0.908	<0.001	14
Tautog	0.713	0.008	12
	ΣPCBs vs. Average Length[a]		
Bluefish	0.132	0.637	14
Black sea bass	0.0924	0.738	14
Tautog	0.695	0.005	14
	ΣDDTs vs. Average Length[a]		
Bluefish	-0.167	0.552	14
Black sea bass	0.0286	0.916	14
Tautog	0.592	0.039	12

Table 1. (Cont.)

Species	Correlation Coefficient (*r*)	*P* Value[b]	n[c]
	ΣPCBs vs. ΣDDTs[a]		
Bluefish	0.656	0.010	14
Black sea bass	0.911	<0.001	14
Tautog	0.930	<0.001	12

[a]PCBs and DDTs were not detected in most summer flounder muscle composites.
[b]Pair(s) of variables with positive correlation coefficients and *P* values <0.050 tend to increase together. For pairs with negative correlation coefficients and *P* values <0.050, one variable tends to decrease while the other increases. For pairs with *P* values >0.050, there is no significant relationship between the two variables (Jandel Corporation 1995).
[c] n = number of composites with values above the MDL.

Table 2. Mean concentrations (µg/g [ppm] wet weight) of arsenic, cadmium, chromium, copper, lead, mercury, nickel, silver, and zinc in muscle of bluefish, summer flounder, black sea bass, and tautog from the New York Bight Apex

	Ag	**Cd**	**Cr**	**Cu**	**Ni**	**Pb**	**Zn**	**As**	**Hg**
Bluefish (n[a]=14)									
Mean	0.0411	0.165	0.442	0.453	0.160	0.288	11.4	0.49	0.1021
Std. dev.	0.0091	0.049	0.219	0.132	0.075	0.096	3.92	0.11	0.0224
Summer Flounder (n[a]=14)									
Mean	0.0221	0.120	0.141	0.259	0.132	0.155	3.69	1.72	0.0358
Std. dev.	0.0069	0.029	0.067	0.071	0.053	0.058	0.64	0.30	0.0084
Black Sea Bass (n[a]=14)									
Mean	0.0353	0.145	0.408	0.423	0.184	0.252	4.83	3.65	0.0504
Std. dev.	.0.0051	0.040	0.190	0.134	0.084	0.110	0.97	1.09	0.0151
Tautog (n[a]=14)									
Mean	0.0271	0.109	0.190	0.339	0.138	0.173	4.28	1.02	0.0811
Std. dev.	0.0092	0.017	0.105	0.090	0.059	0.064	1.04	0.17	0.0223

[a]n = number of composites analyzed.

Table 3. Mean concentrations (ng/g[ppb] wet weight) of total PCBs, total "Aroclor-based" PCBs (Σ18 PCBs x 2), total chlordanes, total DDTs, acenaphthene, and benz[a]anthracene; mean concentrations (pg/g [pptr] wet weight) of 2,3,7,8-TCDD, 2,3,7,8-TCDF, and 2,3,7,8-TCDD toxic equivalents; and percent lipids and water in muscle of bluefish, summer flounder, black sea bass, and tautog from the New York Bight Apex

	ΣPCBs	2 x Σ18 PCBs	ΣChlordanes	ΣDDTs	Acenaphthene	Benz[a]anthracene	2,3,7,8-TCDD	2,3,7,8-TCDF	2,3,7,8-TCDD Toxic Equivalents	%Lipids	%Water	n[c]
Bluefish												
Station 1 & 2 mean								3.34		6.03	71.7	10
Station 1 & 2 std. dev.								0.82		2.20	1.93	
Station 3 mean								7.26		8.72	68.8	4
Station 3 std. dev.								2.66		3.13	2.86	
Species mean	368	624	40.9	159.9	5.22	nd[b]	2.34	4.46	2.82	6.80	70.9	14
Species std. dev.	158	260	11.4	48.2	2.52		1.64	2.31	1.72	2.70	2.5	
Summer Flounder												
Species mean	27	41	3.20	5.28	nd[b]	<MDL	nd[b]	nd[b]	<MDL	0.56	77.5	14
Species std. dev.	5	7	0.46	1.88						0.28	0.9	
Black Sea Bass												
Station 1 & 2 mean	66	112								1.86	77.9	9
Station 1 & 2 std. dev.	21	36								0.81	1.3	
Station 3 mean	105	190								2.48	77.3	5
Station 3 std. dev.	24	39								0.74	0.7	
Species mean	78	136	7.17	22.82	nd[b]	<MDL	nd[b]	1.24	<MDL	2.08	77.7	14
Species std. dev.	77	135	2.56	9.18				0.79		0.82	1.1	
Tautog												
Species mean	59	98	4.97	14.42	nd[b]	2.73	<MDL	2.59	<MDL	2.03	77.1	14
Species std. dev.	37	64	2.02	7.31		0.72		1.20		0.56	0.8	
½ MDL[a]	24	37	2.77	4.30	1.07	1.24	0.81	0.56	0.91			

[a]For summed values, ½MDL is the summation of ½MDL of the individual compounds.
[b]nd = not detected.
[c]n = number of composites analyzed.

Table A1. Field sampling locations and dates

Station	North Latitude	West Longitude	Sample Date	No. of Composites
		Bluefish		
BL1	40°22.9'	73°51.2'	09/23/93	5
BL2	40°20.6'	73°54.7'	09/23/93	5
BL3	40°17.0'	73°49.2'	10/14/93	4
		Summer Flounder		
FL1	40°23.6'	73°57.4'	09/08/93	2
FL2	40°20.9'	73°57.9'	09/08/93	2
FL3	40°26.0'	73°58.4'	09/09/93	3
FL4	40°21.9'	73°57.7'	09/09/93	3
FL5	40°16.7'	73°58.2'	09/14/93	2
FL6	40°18.2'	73°57.9'	09/14/93	2
		Black Sea Bass		
SB1	40°16.7'	73°58.5'	09/16/93	4
SB2	40°20.8'	73°56.9'	09/28/93	5
SB3	40°27.5'	73°56.1'	09/30/93	5
		Tautog		
TA1	40°20.6'	73°55.3'	11/04/93	5
TA2	40°19.5'	73°56.8'	11/09/93	4
TA3	40°21.8'	73°48.8'	12/07/93	5

Table A2. Allocation of bluefish specimens to composites

	Individual Specimen Characteristics			Composite Characteristics			
Composite #	**Length (mm)**	**Wet Weight (g)**	**Sex[a]**	**Mean Length (mm)**	**Mean Wet Weight (g)**	**%Lipids**	**%Water**
				Station BL1			
101	400	922	2	407	948	7.22	71.9
	405	915	2				
	415	1008	2				
102	417	992	2	421	1080	10.6	72.2
	419	1037	2				
	427	1211	2				
103	427	1034	2	428	1081	3.78	73.6
	429	1109	2				
	429	1099	2				
104	430	1071	2	434	1128	4.59	73.4
	431	1122	2				
	440	1191	2				
105	442	1205	2	460	1381	3.96	74.8
	469	1497	2				
	470	1442	2				
				Station BL2			
106	605	2755	2	613	3231	4.69	71.6
	609	2966	2				
	626	3972	2				
107	633	3128	2	634	3178	7.97	68.2
	634	3231	2				
	635	3175	2				
108	637	3096	2	639	3144	7.25	70.6
	640	3540	2				
	640	2795	2				
109	642	3239	2	646	3396	4.33	71.1
	647	3440	2				
	650	3510	2				
110	654	3522	2	656	3635	5.93	69.9
	655	3576	2				
	658	3807	2				
				Station BL3			
111	600	2804	2	608	3038	8.43	69.6
	609	3036	2				
	615	3273	2				
112	617	3017	2	622	3035	7.06	69.4
	622	2927	2				
	628	3161	2				

Table A2. (Cont.)

	Individual Specimen Characteristics			Composite Characteristics			
Composite #	**Length (mm)**	**Wet Weight (g)**	**Sex[a]**	**Mean Length (mm)**	**Mean Wet Weight (g)**	**%Lipids**	**%Water**
113	631	3610	2	634	3637	13.2	64.7
	633	3293	2				
	638	4008	2				
114	640	3219	2	648	3396	6.18	71.4
	646	3368	2				
	657	3602	2				
Probability of interstation differences (*P* values):				0.009	0.011	0.27	0.009
Grouping:				BL2=BL3>BL1	BL2=BL3>BL1		BL1>BL2=BL3

[a]1 = male; 2 = female; 3 = indeterminate.

Table A3. Allocation of summer flounder specimens to composites

Composite #	Individual Specimen Characteristics: Length (mm)	Wet Weight (g)	Sex[a]	Composite Characteristics: Mean Length (mm)	Mean Wet Weight (g)	%Lipids	%Water
				Station FL1			
115	338	359	2	343	394	0.650	78.6
	345	400	1				
	347	423	1				
116	360	460	1	365	482	0.475	77.7
	366	500	1				
	369	486	1				
				Station FL2			
117	352	469	1	357	438	0.457	78.3
	354	402	2				
	364	442	1				
118	368	526	2	373	550	0.476	76.6
	371	558	2				
	381	565	2				
				Station FL3			
119	352	441	2	353	426	0.433	77.4
	353	434	1				
	355	403	1				
120	359	408	2	364	459	1.28	78.5
	366	497	2				
	366	472	1				
121	375	438	2	396	596	1.05	78.6
	400	615	2				
	414	736	2				
				Station FL4			
122	344	370	1	347	402	0.469	77.6
	348	422	1				
	349	415	1				
123	356	462	1	358	470	0.585	76.8
	358	479	1				
	359	468	1				
124	362	438	2	387	560	0.466	78.2
	381	554	1				
	418	689	2				

Table A3. (Cont.)

Composite #	Individual Specimen Characteristics: Length (mm)	Wet Weight (g)	Sex[a]	Composite Characteristics: Mean Length (mm)	Mean Wet Weight (g)	%Lipids	%Water
			Station FL5				
125	336	402	1	337	405	0.392	75.6
	337	378	1				
	337	436	1				
126	338	404	1	351	490	0.320	76.8
	356	413	2				
	359	653	2				
			Station FL6				
127	346	391	2	351	423	0.332	77.3
	353	442	2				
	355	435	2				
128	365	485	1	374	537	0.370	76.6
	374	559	2				
	382	566	2				
Probability of interstation differences (*P* values):				0.55	0.11	0.19	0.48

[a]1 = male; 2 = female; 3 = indeterminate.

Table A4. Allocation of black sea bass specimens to composites

Composite #	Individual Specimen Characteristics Length (mm)	Wet Weight (g)	Sex[a]	Composite Characteristics Mean Length (mm)	Mean Wet Weight (g)	%Lipids	%Water
				Station SB1			
129	222	215	3	224	208	3.18	79.8
	224	210	2				
	226	200	3				
130	244	236	1	254	274	2.40	80.2
	254	274	2				
	264	311	2				
131	270	295	3	285	387	1.70	77.5
	289	391	2				
	296	475	3				
132	302	384	2	313	454	0.623	78.3
	312	525	2				
	324	451	1				
				Station SB2			
133	236	226	1	238	224	1.53	76.9
	239	241	1				
	239	206	1				
134	255	256	1	258	281	1.09	77.5
	260	296	2				
	260	291	3				
135	262	274	1	264	290	1.38	77.2
	264	280	2				
	265	315	2				
136	266	338	2	275	354	2.59	76.5
	271	333	2				
	289	392	1				
137	296	459	2	312	533	2.28	77.0
	300	490	2				
	341	652	1				
				Station SB3			
138	239	214	2	247	251	2.55	78.1
	249	239	1				
	253	300	2				
139	262	298	2	264	296	3.46	77.6
	263	283	2				
	267	307	2				
140	281	362	2	288	371	2.85	76.6
	288	347	2				
	295	405	2				

Table A4. (Cont.)

	Individual Specimen Characteristics			Composite Characteristics			
Composite #	**Length (mm)**	**Wet Weight (g)**	**Sex[a]**	**Mean Length (mm)**	**Mean Wet Weight (g)**	**%Lipids**	**%Water**
141	295	431	1	318	495	1.98	76.6
	325	507	2				
	335	547	2				
142	354	459	1	360	650	1.58	77.4
	356	703	2				
	371	787	1				
Probability of interstation differences (*P* values):				0.48	0.6	0.31	0.038
Grouping:							SB2=SB3>SB1

[a]1 = male; 2 = female; 3 = indeterminate.

Table A5. Allocation of tautog specimens to composites

Composite #	Individual Specimen Characteristics: Length (mm)	Wet Weight (g)	Sex[a]	Composite Characteristics: Mean Length (mm)	Mean Wet Weight (g)	%Lipids	%Water
Station TA1							
143	251	526	2	255	449	1.33	77.4
	255	425	2				
	259	396	2				
144	276	509	2	279	564	1.70	78.2
	279	647	2				
	281	536	2				
145	284	556	2	289	586	2.13	77.1
	291	627	2				
	293	577	2				
146	299	734	2	301	744	2.23	77.4
	301	752	2				
	303	746	2				
147	327	963	2	332	869	1.89	76.8
	332	782	1				
	337	861	2				
Station TA2							
148	261	383	1	263	420	2.44	76.2
	261	418	2				
	268	460	2				
149	287	596	1	293	604	1.70	76.5
	293	592	2				
	298	625	1				
150	299	542	1	299	595	1.43	77.4
	299	620	2				
	300	622	2				
151	318	715	2	320	734	2.38	77.4
	318	725	1				
	325	762	2				
Station TA3							
152	266	401	1	281	503	1.60	78.3
	286	495	2				
	291	613	2				
153	296	560	1	299	598	0.986	78.1
	299	586	2				
	303	648	2				
154	304	629	1	314	691	2.72	77.2
	304	629	2				
	335	815	2				

Table A5. (Cont.)

Composite #	Individual Specimen Characteristics Length (mm)	Wet Weight (g)	Sex[a]	Composite Characteristics Mean Length (mm)	Mean Wet Weight (g)	%Lipids	%Water
155	352	889	2	380	1272	2.75	76.0
	379	1313	2				
	408	1614	2				
156	416	1658	2	434	1896	2.53	76.3
	431	1924	2				
	456	2106	1				
Probability of interstation differences (*P* values):				0.33	0.51	0.67	0.86

[a]1 = male; 2 = female; 3 = indeterminate.

Table A6. Bluefish specimens not randomly selected in composites

Fish #	Length (mm)	Wet Weight (g)	Sex[a]
		Station BL1	
10	455	1299	2
13	410	1069	2
23	447	1179	2
		Station BL2	
39	541	2260	2
41	567	2108	2
48	592	2434	2
		Station BL3	
79[b]	612	2850	2
78	610	2744	2
73	668	3615	2
65	623	3256	2
67	606	2989	2
76	596	2755	2
63	638	3361	2
75	599	2668	2
69	777	6712	2

[a]1 = male; 2 = female; 3 = indeterminate.
[b]This specimen was determined to be an outlier, in the Dixon Outlier Test.

Table A7. Summer flounder specimens not randomly selected in composites

Fish #	Length (mm)	Wet Weight (g)	Sex[a]
		Station FL1	
25	365	457	1
22	392	604	2
18	415	778	1
		Station FL2	
30	346	424	1
31	363	416	2
32	385	531	2
35	415	697	2
		Station FL5	
55	357	404	2
54	354	426	2
53	366	456	2
65	344	376	2
71	345	402	1
72	394	550	2
		Station FL6	
60	376	561	2
57	478	1207	2
59	365	444	2

[a]1 = male; 2 = female; 3 = indeterminate.

Table A8. Black sea bass specimens not randomly selected in composites

Fish #	Length (mm)	Wet Weight (g)	Sex[a]
		Station SB1	
18	245	270	1
13	265	309	2
17	285	349	1
17	285	349	1
11	259	289	3
2	289	400	2
21	276	283	1
16	297	368	1
8	279	387	2
6	271	321	2
		Station SB2	
42	309	394	1
33	299	435	2
25	360	649	2
34	248	254	2
31	237	275	1
		Station SB3	
48	298	502	1
55	275	395	1
63	304	394	1
46	270	313	2
52	321	508	2
59	241	235	1

[a]1 = male; 2 = female; 3 = indeterminate.

Table A9. Tautog specimens not randomly selected in composites

Fish #	Length (mm)	Wet Weight (g)	Sex[a]
		Station TA1	
18	257	519	2
6	382	1295	1
9	384	1356	2
		Station TA2	
31	226	437	2
38	274	478	2
30	283	556	2
37	301	598	1
22	289	518	1
27	366	1083	2
		Station TA3	
67	441	1925	2
68	275	472	1
60	332	774	2
		Station TA4	
2	330	981	2
3	350	1113	2
1	285	631	1

[a]1 = male; 2 = female; 3 = indeterminate.

Table B1. List of trace metal analytes

Metal Analyte	Chemical Symbol
Silver	Ag
Cadmium	Cd
Chromium	Cr
Copper	Cu
Nickel	Ni
Lead	Pb
Zinc	Zn
Arsenic	As
Mercury	Hg

Table B2. List of PCB analytes[a]

PCB Congener #[b]	PCB Congener Structure	Coeluting Analytes
BZ #1 (1 Cl)	Monochlorobiphenyl	
BZ #8 (2 Cl)[c]	2,4'-Dichlorobiphenyl	
BZ #18 (3 Cl)[c]	2,2',5-Trichlorobiphenyl	
BZ #29 (3 Cl)	2,4,5-Trichlorobiphenyl	
BZ #50 (4 Cl)	2,2',4,6-Tetrachlorobiphenyl	
BZ #28 (3 Cl)[c]	2,4,4'-Trichlorobiphenyl	
BZ #52 (4 Cl)[c]	2,2',5,5'-Tetrachlorobiphenyl	
BZ #104 (5 Cl)	2,2',4,6,6'-Pentachlorobiphenyl	
BZ #44 (4 Cl)[c]	2,2',3,5'-Tetrachlorobiphenyl	
BZ #66 (4 Cl)[c]	2,3',4,4'-Tetrachlorobiphenyl	
BZ #77 (4 Cl)	3,3',4,4'-Tetrachlorobiphenyl	o, p' - DDD
BZ #101 (5 Cl)[c]	2,2',4,5,5'-Pentachlorobiphenyl	
BZ #87 (5 Cl)	2,2',3,4,5'-Pentachlorobiphenyl	Dieldrin
BZ #118 (5 Cl)[c]	2,3',4,4',5-Pentachlorobiphenyl	
BZ #188 (7 Cl)	2,2',3,4',5,6,6'-Heptachlorobiphenyl	
BZ #153 (6 Cl)[c]	2,2',4,4',5,5'-Hexachlorobiphenyl	
BZ #105 (5 Cl)[c]	2,3,3',4,4'-Pentachlorobiphenyl	
BZ #138 (6 Cl)[c]	2,2',3,4,4',5'-Hexachlorobiphenyl	
BZ #126 (5 Cl)	3,3',4,4',5-Pentachlorobiphenyl	
BZ #187 (7 Cl)[c]	2,2',3,4',5,5',6-Heptachlorobiphenyl	
BZ #128 (6 Cl)[c]	2,2',3,3',4,4'-Hexachlorobiphenyl	
BZ #200 (8 Cl)	2,2',3,3',4,5',6,6'-Octachlorobiphenyl	
BZ #180 (7 Cl)[c]	2,2',3,4,4',5,5'-Heptachlorobiphenyl	
BZ #170 (7 Cl)[c]	2,2',3,3',4,4',5-Heptachlorobiphenyl	
BZ #195 (8 Cl)[c]	2,2',3,3',4,4',5,6-Octachlorobiphenyl	
BZ #206 (9 Cl)[c]	2,2',3,3',4,4',5,5',6-Nonachlorobiphenyl	
BZ #209 (10 Cl)[c]	2,2',3,3',4,4',5,5',6,6'-Decachlorobiphenyl	

[a]Additional data with limited QA/QC are available upon request from the senior author on the following PCB congeners: BZ #49, BZ #184, BZ #183, BZ #156, and BZ #169.
[b]Congeners numbered according to Ballschmiter and Zell (1980).
[c]The sum concentrations of these 18 PCB congeners were multiplied by 2 to approximate "Aroclor-based" total PCB data (NOAA1989; ACE-EPA 1992).

Table B3. List of chlorinated pesticide analytes[a]

Compound	Coeluting Analytes
Chlordanes	
Heptachlor	
Heptachlor epoxide	
Oxychlordane	
α-chlordane	
trans-nonachlor	
DDTs and Metabolites	
o,p'-DDE	
p,p'-DDE	
o,p'-DDD	BZ #77
p,p'-DDD	
o,p'-DDT	
p,p'-DDT	
Other Pesticides	
Hexachlorobenzene	
Aldrin	
Dieldrin	BZ #87
Endrin	
Octachlorostyrene	
Photomirex	
Mirex	
BHCs	
Lindane (γ-BHC)	

[a]Additional data with limited QA/QC are available upon request from the senior author on the following pesticides: α-BHC, β-BHC, γ-chlordane, cis-nonachlor, endosulfan I, endosulfan II, and endosulfan sulfate.

Table B4. List of PAH analytes

Low-Molecular-Weight PAH Analyte	**High-Molecular-Weight PAH Analyte**
Naphthalene	Fluoranthene
2-Methylnaphthalene	Pyrene
1-Methylnaphthalene	Benz[a]anthracene
Biphenyl	Chrysene
2,6-Dimethylnaphthalene	Benzo[b]fluoranthene
Acenaphthylene	Benzo[k]fluoranthene
Acenaphthene	Benzo[e]pyrene
2,3,5-Trimethylnaphthalene	Benzo[a]pyrene
Fluorene	Perylene
Phenanthrene	Indeno[1,2,3-cd]pyrene
Anthracene	Dibenz[a,h]anthracene
1-Methylphenanthrene	Benzo[ghi]perylene

Table B5. List of 2,3,7,8-substituted PCDD and PCDF congeners

Congener Abbreviation	Congener Structure	TEF[a]	TDL[b]
Dioxins			
2,3,7,8-TCDD	2,3,7,8-Tetrachlorodibenzo[p]dioxin	1	1
1,2,3,7,8-PeCDD	1,2,3,7,8-Pentachlorodibenzo[p]dioxin	0.5	5
1,2,3,4,7,8-HxCDD	1,2,3,4,7,8-Hexachlorodibenzo[p]dioxin	0.1	5
1,2,3,6,7,8-HxCDD	1,2,3,6,7,8-Hexachlorodibenzo[p]dioxin	0.1	5
1,2,3,7,8,9-HxCDD	1,2,3,7,8,9-Hexachlorodibenzo[p]dioxin	0.1	5
1,2,3,4,6,7,8-HpCDD	1,2,3,4,6,7,8-Heptachlorodibenzo[p]dioxin	0.01	5
OCDD	Octachlorodibenzo[p]dioxin	0.001	10
	Furans		
2,3,7,8-TCDF	2,3,7,8-Tetrachlorodibenzofuran	0.1	1
1,2,3,7,8-PeCDF	1,2,3,7,8-Pentachlorodibenzofuran	0.05	5
2,3,4,7,8-PeCDF	2,3,4,7,8-Pentachlorodibenzofuran	0.5	5
1,2,3,4,7,8-HxCDF	1,2,3,4,7,8-Hexachlorodibenzofuran	0.1	5
1,2,3,6,7,8-HxCDF	1,2,3,6,7,8-Hexachlorodibenzofuran	0.1	5
2,3,4,6,7,8-HxCDF	2,3,4,6,7,8-Hexachlorodibenzofuran	0.1	5
1,2,3,7,8,9-HxCDF	1,2,3,7,8,9-Hexachlorodibenzofuran	0.1	5
1,2,3,4,6,7,8-HpCDF	1,2,3,4,6,7,8-Heptachlorodibenzofuran	0.01	5
1,2,3,4,7,8,9-HpCDF	1,2,3,4,7,8,9-Heptachlorodibenzofuran	0.01	5
OCDF	Octachlorodibenzofuran	0.001	10

[a]TEF = toxicity equivalency factor (EPA 1992).
[b]TDL = target method detection limit (pg/g wet weight).

Table B6. Data quality objectives for organic analyses

Parameters/QC Measurements	Frequency	Control Limit Criteria
Laboratory method blank	1 per 20 samples	Warning limit -- analyst should use best judgement if analytes are detected ≤3 times the method detection limit Action limit -- no analyte should be detected at >3 times the method detection limit
Instrumental detection Limit	1 per project	≤5% relative standard deviation for seven replicate measurements
Method detection limit	1 per project	Analyst should use best judgement if the calculated method detection limits are higher than the target method detection limit of 2.0 ppb wet weight for PCBs and pesticides, 10.0 ppb wet weight for PAHs, and within a range of 1-10 pptr for each PCDD and PCDF congener as specified in Table B5
Surrogate internal standards	Each sample	40-150% recovery Recommended control limit for percent difference between accuracy-based material surrogate recoveries and sample surrogate recoveries is <50%
Matrix spike	1 per 20 samples	Recovery should be within 50-120% for at least 80% of the analytes
Laboratory triplicates	1 per 20 samples	≤25% relative standard deviation for analytes >10 times the method detection limit
Accuracy-based material	1 per 20 samples	Recommended control limit for percent difference of certified or consensus value on average for analytes >10 times the method detection limit is ≤30%

Table B7. Concentrations (µg/g [ppm] dry weight) of trace metals found in DOLT-1 standard reference material

	Ag	Cd	Cr	Cu	Ni	Pb	Zn	As	Hg
Detection Limits									
	0.052	0.016	0.052	0.12	0.038	0.025	0.65	0.91	0.045
Mean (n=6)	1.03	4.02	0.41	19.3	0.26	1.33	92.4	10.5	0.217
Std. dev.	0.04	0.17	0.07	1.2	0.02	0.08	2.6	1.1	0.015
RSD(%)	3.9	4.2	17.1	6.2	7.7	6.0	2.8	10.5	6.9
Certified	[1.00][a]	4.18	0.40	20.8	0.26	1.36	92.5	10.1	0.225
+/-	-	0.28	0.07	1.2	0.06	0.29	2.3	1.4	0.037
Recovery (%)	103	96	102	93	99	98	100	104	96

[a]Consensus value from NOAA-National Research Council Canada intercomparison exercises.

Table B8. Results (µg/g wet weight) of duplicate analyses for trace metals in bluefish, summer flounder, black sea bass, and tautog muscle composites

Composite #	Trace Metal								
	Ag	Cd	Cr	Cu	Ni	Pb	Zn	As	Hg
					Detection Limits				
	0.013	0.004	0.013	0.030	0.0095	0.006	0.16	0.23	0.011
					Bluefish				
105-A	0.0323	0.173	0.425	0.456	0.136	0.293	10.8	0.37	0.1069
105-B	0.0285	0.172	0.480	0.419	0.126	0.275	10.1	0.38	0.0963
Mean	0.0304	0.173	0.453	0.438	0.131	0.284	10.4	0.38	0.1016
RPD[a]	12.5	0.6	12.1	8.4	7.6	6.3	6.7	2.6	10.4
					Summer Flounder				
124-A	0.0210	0.138	0.084	0.235	0.088	0.163	3.81	1.70	0.0391
124-B	0.0244	0.137	0.074	0.222	0.101	0.163	3.63	1.77	0.0373
Mean	0.0227	0.138	0.079	0.229	0.095	0.163	3.72	1.74	0.0382
RPD[a]	15.0	0.7	12.7	5.7	13.7	0.0	4.8	4.0	4.7
					Black Sea Bass				
131-A	0.0296	0.144	0.420	0.577	0.111	0.223	5.86	3.59	0.0477
131-B	0.0215	0.108	0.336	0.488	0.083	0.184	4.44	2.62	0.0344
Mean	0.0256	0.126	0.378	0.533	0.097	0.204	5.15	3.11	0.0411
RPD[a]	31.6	28.6	22.2	16.7	28.9	19.1	27.6	31.2	32.4
					Tautog				
153-A	0.0265	0.132	0.148	0.237	0.143	0.226	3.86	0.95	0.0679
153-B	0.0249	0.101	0.134	0.232	0.129	0.215	3.18	0.88	0.0621
Mean	0.0257	0.117	0.141	0.235	0.136	0.221	3.52	0.92	0.0650
RPD[a]	6.2	26.5	9.9	2.1	10.3	5.0	19.3	7.6	8.9

[a]RPD (relative percent difference) for duplicate analyses = (100 x absolute value for range)/mean.

Table B9. Instrumental detection limit (IDL) and estimated method detection limit (EMDL) for PCB congeners

	BZ #																		
	8	**18**	**28**	**52**	**66**	**101**	**77**	**118**	**153**	**105**	**138**	**126**	**187**	**128**	**180**	**170**	**195**	**206**	**209**
Concentration of Solvent Spiked at Low Levels (ng/µL)																			
Replicate 1	0.042	0.042	0.042	0.045	0.044	0.044	0.040	0.042	0.044	0.043	0.044	0.050	0.044	0.044	0.044	0.044	0.045	0.045	0.046
Replicate 2	0.043	0.043	0.041	0.044	0.044	0.044	0.039	0.042	0.043	0.041	0.043	0.051	0.043	0.042	0.042	0.042	0.044	0.044	0.044
Replicate 3	0.040	0.040	0.040	0.043	0.043	0.043	0.038	0.042	0.044	0.042	0.043	0.047	0.044	0.043	0.043	0.043	0.044	0.045	0.045
Replicate 4	0.041	0.041	0.041	0.043	0.044	0.044	0.040	0.042	0.044	0.042	0.043	0.049	0.044	0.043	0.043	0.043	0.044	0.044	0.045
Replicate 5	0.040	0.041	0.041	0.044	0.046	0.044	0.041	0.043	0.044	0.043	0.044	0.050	0.044	0.044	0.044	0.044	0.045	0.046	0.046
Replicate 6	0.039	0.040	0.040	0.043	0.044	0.044	0.041	0.043	0.044	0.043	0.044	0.048	0.044	0.043	0.044	0.044	0.045	0.045	0.045
Replicate 7	0.039	0.040	0.040	0.043	0.045	0.044	0.042	0.043	0.045	0.044	0.044	0.050	0.044	0.044	0.045	0.045	0.046	0.046	0.046
Mean	0.041	0.041	0.041	0.044	0.044	0.044	0.040	0.043	0.044	0.042	0.044	0.049	0.044	0.043	0.044	0.044	0.045	0.045	0.045
Std. dev.	0.002	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.000	0.001	0.000	0.001	0.000	0.001	0.001	0.001	0.001	0.001	0.001
RSD (%)	4.1	3.1	1.5	1.7	2.4	0.56	2.7	1.2	0.92	2.2	1.1	2.5	0.88	1.5	1.6	1.6	1.6	1.6	1.4
IDL[a]	0.005	0.004	0.002	0.002	0.003	0.001	0.003	0.002	0.001	0.003	0.002	0.004	0.001	0.002	0.002	0.002	0.002	0.002	0.002
Corresponding Concentration in a Typical Tissue (ng/g wet weight)[b]																			
Mean	1.02	1.03	1.02	1.09	1.11	1.09	1.01	1.06	1.10	1.06	1.09	1.24	1.10	1.08	1.09	1.09	1.12	1.12	1.13
Std. dev.	0.04	0.03	0.01	0.02	0.03	0.01	0.03	0.01	0.01	0.02	0.01	0.03	0.01	0.02	0.02	0.02	0.02	0.02	0.02
RSD (%)	4.1	3.1	1.5	1.7	2.4	0.6	2.7	1.2	0.92	2.2	1.1	2.5	0.88	1.5	1.6	1.6	1.6	1.6	1.4
EMDL[c]	0.13	0.10	0.047	0.059	0.083	0.019	0.087	0.042	0.032	0.072	0.039	0.097	0.031	0.051	0.055	0.055	0.055	0.057	0.048

[a]Instrumental detection limit is based on 3.143 times the standard deviation of seven replicate measurements.
[b]Assumed 10g wet weight of muscle tissue, 50% recovery in the extraction and cleanup steps, 250 µL final sample volume, and 1 µL sample injection volume.
[c]Estimated method detection limit is based on 3.143 times the standard deviation of a typical tissue.

Table B10. Analyses (ng/g [ppb] wet weight) of spiked replicates of summer flounder muscle for determination of the method detection limit (MDL) for PCB congeners

	BZ #																								
	1	**8**	**18**	**29**	**50**	**28**	**52**	**104**	**44**	**66**	**101**	**118**	**188**	**153**	**105**	**138**	**126**	**187**	**128**	**200**	**180**	**170**	**195**	**206**	**209**
Replicate 1	3.57	6.54	5.91	6.49	6.15	6.65	6.77	7.03	6.89	10.2	9.76	11.3	8.94	11.4	10.0	10.9	12.1	9.95	10.2	9.13	10.5	10.4	10.2	9.92	8.17
Replicate 2	3.36	6.59	5.90	6.32	6.14	6.49	6.70	6.87	6.76	9.46	9.08	10.5	8.34	10.7	9.10	10.1	10.9	9.14	9.40	8.35	9.71	9.62	9.42	9.58	7.97
Replicate 3	2.82	6.30	5.79	6.22	6.16	6.48	6.65	6.98	6.83	9.07	8.51	9.95	7.76	10.0	8.69	9.52	9.92	8.34	8.87	7.96	9.30	9.18	9.02	9.21	7.61
Replicate 4	2.94	5.83	5.00	5.44	5.28	5.56	5.64	5.81	5.74	9.24	8.66	10.2	8.06	10.3	8.99	9.73	10.7	8.52	9.04	8.07	9.37	9.21	9.05	9.26	7.82
Replicate 5	3.35	6.75	6.34	6.35	6.30	6.50	6.60	6.93	6.65	9.04	8.41	9.94	7.83	9.93	8.85	9.65	10.1	8.41	8.85	7.98	9.29	9.08	9.01	9.37	7.94
Replicate 6	2.60	5.95	5.34	5.60	5.51	5.80	5.90	6.24	6.05	8.67	8.23	10.2	7.71	9.91	8.76	9.43	10.1	8.28	8.72	7.92	9.24	8.93	8.94	9.38	8.06
Replicate 7	3.07	5.61	6.27	7.06	7.21	7.57	8.51	8.95	8.52	8.72	8.73	11.2	8.76	11.1	9.66	10.7	11.5	9.93	10.0	9.68	11.0	10.7	11.0	11.3	9.78
Mean	3.10	6.23	5.79	6.21	6.11	6.43	6.68	6.97	6.78	9.19	8.77	10.5	8.20	10.5	9.16	10.0	10.8	8.94	9.30	8.44	9.78	9.60	9.51	9.71	8.19
Std. dev.	0.34	0.43	0.48	0.55	0.62	0.65	0.92	0.99	0.88	0.51	0.51	0.56	0.50	0.62	0.51	0.57	0.82	0.74	0.60	0.69	0.71	0.71	0.78	0.73	0.72
RSD (%)	11	6.9	8.3	8.9	10	10	14	14	13	5.5	5.9	5.3	6.0	5.9	5.5	5.7	7.6	8.3	6.5	8.2	7.3	7.4	8.2	7.5	8.8
MDL[a]	1.1	1.4	1.5	1.7	1.9	2.0	2.9	3.1	2.8	1.6	1.6	1.8	1.6	1.9	1.6	1.8	2.6	2.3	1.9	2.2	2.2	2.2	2.5	2.3	2.3

[a]MDL ≡ σt, where σ = standard deviation and t = Student's "t" value of 3.143 with n-1 degrees of freedom and α = 0.01 (one tailed).

Table B11. Results (ng/g [ppb] wet weight) of triplicate analyses for PCBs in bluefish and summer flounder muscle composites (nd = <MDL)

Composite	PCB (BZ #)																								
#	1	8	18	29	50	28	52	104	44	66	101	118	188	153	105	138	126	187	128	200	180	170	195	206	209
Bluefish (Station BL2)																									
107	32.7	6.05	2.56	nd	nd	5.97	9.69	nd	4.80	21.2	28.9	31.1	14.8	63.5	10.2	53.3	7.07	21.6	8.90	3.45	31.0	8.78	4.72	6.46	4.91
107-dup.	49.3	4.94	2.65	nd	nd	6.13	9.51	nd	4.66	19.6	26.8	28.8	13.6	59.4	9.00	49.5	6.48	20.1	8.04	3.20	28.5	8.06	4.37	6.08	4.42
107-trip.	42.7	4.51	2.30	nd	nd	6.26	9.99	nd	4.79	21.2	29.2	31.5	nd	65.4	9.64	54.0	6.95	21.8	8.74	3.36	31.3	8.62	4.61	6.53	4.97
Mean	41.6	5.16	2.50	nd	nd	6.12	9.73	nd	4.75	20.7	28.3	30.5	9.72	62.7	9.62	52.3	6.84	21.2	8.56	3.33	30.2	8.49	4.57	6.36	4.77
Std. dev.	8.33	0.80	0.18	-	-	0.15	0.24	-	0.08	0.94	1.31	1.47	0.88	3.04	0.61	2.42	0.31	0.94	0.46	0.12	1.55	0.38	0.18	0.24	0.30
RSD (%)	20	15	7.3	-	-	2.4	2.5	-	1.6	4.6	4.6	4.8	9.1	4.8	6.3	4.6	4.6	4.4	5.3	3.7	5.1	4.5	4.0	3.8	6.3
Summer Flounder (Station FL2)																									
117	2.16	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
117-dup.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
117-trip.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Std. dev.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSD (%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Summer Flounder (Station FL6)																									
127	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
127-dup.	3.44	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
127-trip.	3.63	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean	2.54	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Std. dev.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSD (%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MDL	1.1	1.4	1.5	1.7	1.9	2.0	2.9	3.1	2.8	1.6	1.6	1.8	1.6	1.9	1.6	1.8	2.6	2.3	1.9	2.2	2.2	2.2	2.5	2.3	2.3

Table B12. Results (ng/g [ppb] wet weight) of triplicate analyses for PCBs in black sea bass and tautog muscle composites (nd = <MDL)

Composite	PCB (BZ #)																								
#	1	8	18	29	50	28	52	104	44	66	101	118	188	153	105	138	126	187	128	200	180	170	195	206	209
Black Sea Bass (Station SB3)																									
138	6.40	nd	nd	nd	nd	4.03	7.10	nd	3.95	10.3	9.69	9.53	3.07	15.4	3.45	12.4	nd	5.10	nd	nd	5.62	nd	nd	nd	nd
138-dup.	4.24	1.56	nd	nd	nd	2.52	4.63	nd	nd	6.18	6.16	6.46	2.54	10.4	2.58	8.53	nd	3.77	nd	nd	4.42	nd	nd	nd	nd
138-trip.	10.5	nd	nd	nd	nd	4.07	7.05	nd	3.89	9.99	9.39	9.11	3.03	14.6	3.30	11.7	nd	4.87	nd	nd	5.57	nd	nd	nd	nd
Mean	7.04	nd	nd	nd	nd	3.54	6.26	nd	3.08	8.83	8.41	8.37	2.88	13.5	3.11	10.9	nd	4.58	nd	nd	5.20	nd	nd	nd	nd
Std. dev.	3.18	-	-	-	-	0.88	1.41	-	0.04	2.31	1.96	1.67	0.30	2.64	0.47	2.05	-	0.71	-	-	0.68	-	-	-	-
RSD (%)	45	-	-	-	-	25	23	-	1.3	26	23	20	10	20	15	19	-	16	-	-	13	-	-	-	-
Tautog (Station TA1)																									
146	6.38	1.55	nd	nd	nd	2.35	2.97	nd	nd	2.66	6.36	4.18	2.25	9.06	2.09	2.94	nd	3.77	nd	nd	2.59	nd	nd	nd	nd
146-dup.	4.36	nd	nd	nd	nd	nd	nd	nd	nd	2.44	5.77	3.76	nd	8.04	1.87	2.61	nd	3.30	nd	nd	nd	nd	nd	nd	nd
146-trip.	6.70	1.47	nd	nd	nd	2.18	3.02	nd	nd	2.61	6.15	4.09	nd	8.78	2.05	2.86	nd	3.61	nd	nd	2.47	nd	nd	nd	nd
Mean	5.81	nd	nd	nd	nd	nd	nd	nd	nd	2.57	6.09	4.01	nd	8.63	2.00	2.80	nd	3.56	nd	nd	nd	nd	nd	nd	nd
Std. dev.	1.27	-	-	-	-	-	-	-	-	0.11	0.30	0.22	-	0.52	0.12	0.18	-	0.24	-	-	-	-	-	-	-
RSD (%)	22	-	-	-	-	-	-	-	-	4.4	4.9	5.4	-	6.1	5.9	6.3	-	6.7	-	-	-	-	-	-	-
Tautog (Station TA3)																									
156	12.3	nd	nd	nd	nd	5.48	6.61	nd	nd	6.2	13.0	10.8	nd	25.0	4.95	8.54	nd	10.4	2.00	nd	7.68	2.59	nd	nd	nd
156-dup.	10.9	nd	nd	nd	nd	4.21	4.84	nd	nd	5.94	11.6	9.90	nd	22.3	4.42	7.75	nd	8.92	nd	nd	6.94	2.32	nd	nd	nd
156-trip.	5.56	nd	nd	nd	nd	4.15	5.12	nd	nd	5.70	11.6	9.67	nd	22.2	4.44	7.74	nd	9.12	nd	nd	6.82	2.29	nd	nd	nd
Mean	9.57	nd	nd	nd	nd	4.61	5.52	nd	nd	5.95	12.1	10.1	nd	23.2	4.60	8.01	nd	9.47	nd	nd	7.15	2.40	nd	nd	nd
Std. dev.	3.54	-	-	-	-	0.75	0.95	-	-	0.25	0.82	0.60	-	1.61	0.30	0.46	-	0.79	-	-	0.46	0.17	-	-	-
RSD (%)	37	-	-	-	-	16	17	-	-	4.2	6.8	6.0	-	7.0	6.5	5.7	-	8.3	-	-	6.5	6.9	-	-	-
MDL	1.1	1.4	1.5	1.7	1.9	2.0	2.9	3.1	2.8	1.6	1.6	1.8	1.6	1.9	1.6	1.8	2.6	2.3	1.9	2.2	2.2	2.2	2.5	2.3	2.3

Table B13. Recovery (percent) of PCB, pesticide, and PAH surrogate internal standards in bluefish muscle composites

Composite #	PCBs and Pesticides				PAHs[a]				
	4,4'-dibromoocta-fluorobiphenyl	BZ #198	1,2,3-trichloro-benzene	Ronnel	Naphthalene	Acenaphthylene	Chrysene	Pyrene	Benzo[ghi]-perylene
Station BL1									
101	80	95	81	136	27	48	134	97	90
102	67	89	65	93	17	50	104	104	139
103	59	90	84	85	33	50	158	84	10
104	69	90	70	73	27	46	111	91	50
105	64	94	115	107	23	46	61	82	22
Station BL2									
106	62	102	61	81	25	53	120	100	13
107	72	95	154	81	16	44	101	102	18
107-dup.	75	96	164	86	23	50	115	102	31
107-trip.	72	101	84	87	29	59	95	101	16
107 mean (n = 3)	73	97	134	85	23	51	104	102	21
108	68	99	102	84	28	53	75	98	8
109	58	90	74	73	37	57	117	97	11
110	66	83	81	88	32	47	79	77	0
Station BL3									
111	77	84	460	87	34	56	146	103	15
112	69	95	108	72	55	67	188	104	26
113	87	69	564	85	32	53	66	68	9
114	78	91	337	101	54	61	132	115	0
Mean (n = 14)	70	91	167	89	32	53	114	95	30
Std. dev.	8	8	157	16	11	6	35	12	38

[a]All aromatic hydrogen atoms labeled with deuterium [^{2}H] atoms: naphthalene and acenaphthylene with 8 x [^{2}H], pyrene with 10 x [^{2}H], and chyrsene and benzo[ghi]perylene with 12 x [^{2}H].

Table B14. Recovery (percent) of PCB, pesticide, and PAH surrogate internal standards in summer flounder muscle composites

Composite #	PCBs and Pesticides: 4,4'-dibromoocta-fluorobiphenyl	BZ #198	1,2,3-trichloro-benzene	Ronnel	PAHs[a]: Naphthalene	Acenaphthylene	Chrysene	Pyrene	Benzo[ghi]-perylene
Station FL1									
115	37	73	58	37	17	40	76	65	65
116	43	85	48	50	22	47	107	76	175
Station FL2									
117	36	77	67	15	21	45	139	71	97
117-dup.	38	89	68	14	23	45	144	78	148
117-trip.	39	82	58	1	23	45	90	75	64
117 mean (n = 3)	38	83	64	10	22	45	124	75	103
118	41	74	69	31	22	45	180	81	205
Station FL3									
119	40	69	67	16	2	26	278	113	206
120	69	115	130	55	32	57	151	116	79
121	65	106	141	66	31	55	142	113	88
Station FL4									
122	43	81	68	50	23	46	103	76	37
123	38	81	71	1	22	44	93	66	28
124	34	83	110	23	23	48	153	91	17
Station FL5									
125	52	85	77	42	24	45	172	84	143
126	48	83	81	29	26	47	140	77	114

Table B14. (Cont.)

Composite #	PCBs and Pesticides				PAHs[a]				
	4,4'-dibromoocta-fluorobiphenyl	BZ #198	1,2,3-trichloro-benzene	Ronnel	Naphthalene	Acenaphthylene	Chrysene	Pyrene	Benzo[ghi]-perylene
Station FL6									
127	9	83	0	35	0	1	113	82	79
127-dup.	47	84	77	34	22	44	130	75	113
127-trip.	47	86	77	20	26	49	129	72	70
127 mean (n = 3)	34	84	52	30	16	31	124	76	87
128	54	92	80	39	31	52	169	84	144
Mean (n = 14)	45	85	80	34	23	45	144	85	107
Std.dev.	11	12	28	18	8	8	49	17	62

[a]All aromatic hydrogen atoms labeled with deuterium [^{2}H] atoms: naphthalene and acenaphthylene with 8 x [^{2}H], pyrene with 10 x [^{2}H], and chyrsene and benzo[ghi]perylene with 12 x [^{2}H].

Table B15. Recovery (percent) of PCB, pesticide, and PAH surrogate internal standards in black sea bass muscle composites

Composite #	PCBs and Pesticides				PAHs[a]				
	4,4'-dibromoocta-fluorobiphenyl	BZ #198	1,2,3-trichloro-benzene	Ronnel	Naphthalene	Acenaphthylene	Chrysene	Pyrene	Benzo[ghi]-perylene
Station SB1									
129	74	107	124	106	36	58	87	111	41
130	81	115	107	118	32	56	85	108	129
131	67	86	78	90	29	51	114	87	28
132	56	93	78	51	26	47	118	85	59
Station SB2									
133[b]	58	83	68	73					
134	70	91	78	79	30	52	139	94	44
135	59	84	78	50	27	47	107	85	37
136	62	91	74	61	33	51	91	96	34
137	59	95	76	63	36	54	100	97	40
Station SB3									
138	62	86	78	60	32	53	80	88	23
138-dup.	55	90	76	15	33	54	73	85	41
138-trip.	66	85	83	74	37	55	133	97	88
138 mean (n = 3)	61	87	79	50	34	54	95	90	51
139	65	82	80	39	38	56	132	93	86
140	50	82	60	52	30	46	129	83	71
141	53	89	64	65	29	50	176	97	200
142	45	82	66	51	30	49	159	73	373
Mean (n = 14)	62	91	80	67	32	52	118	92	92
Std. dev.	10	10	17	24	3	4	28	10	97

[a]All aromatic hydrogen atoms labeled with deuterium [^{2}H] atoms: naphthalene and acenaphthylene with 8 x [^{2}H], pyrene with 10 x [^{2}H], and chyrsene and benzo[ghi]perylene with 12 x [^{2}H].
[b]PAHs were not analyzed for this muscle composite.

Table B16. Recovery (percent) of PCB, pesticide, and PAH surrogate internal standards in tautog muscle composites

	PCBs and Pesticides				PAHs[a]				
Composite #	4,4'-dibromoocta-fluorobiphenyl	BZ #198	1,2,3-trichloro-benzene	Ronnel	Naphthalene	Acenaphthylene	Chrysene	Pyrene	Benzo[ghi]-perylene
Station TA1									
143	53	87	75	70	34	51	154	100	40
144	50	81	72	62	25	50	121	96	69
145	56	85	81	74	24	47	125	92	68
146	60	94	90	81	27	51	145	96	50
146-dup.	53	85	79	71	29	52	317	105	190
146-trip.	50	92	82	75	27	51	205	96	82
146 mean (n = 3)	54	90	84	76	28	52	223	99	108
147	60	78	99	79	31	57	194	90	54
Station TA2									
148	58	104	88	80	34	59	189	105	64
149	59	100	93	83	25	53	113	98	33
150	60	105	94	85	29	58	123	100	36
151	69	116	106	98	28	62	146	110	50
Station TA3									
152	58	93	90	69	32	57	156	109	54
153	46	89	67	63	26	44	168	108	92
154	63	102	78	80	19	47	88	75	5
155	73	103	116	87	35	59	115	108	7
156	71	98	143	97	30	51	111	141	5
156-dup.	59	96	98	83	35	55	80	100	5
156-trip.	61	97	114	85	32	57	170	100	13
156 mean (n = 3)	64	97	118	88	32	54	121	113	8
Mean (n = 14)	59	95	90	78	29	54	145	100	49
Std. dev.	7	11	15	10	5	5	37	10	31

[a]All aromatic hydrogen atoms labeled with deuterium [^{2}H] atoms: naphthalene and acenaphthylene with 8 x [^{2}H], pyrene with 10 x [^{2}H], and chyrsene and benzo[ghi]perylene with 12 x [^{2}H].

Table B17. Recovery (percent) of PCB congeners added to matrix spike muscle composites

Composite #	Station	BZ # 1	8	18	29	50	28	52	104	44	66	101	118	188	153	105	138	126	187	128	200	180	170	195	206	209
107	BL2	95	77	61	67	74	62	75	66	71	85	84	87	0	0	332	0	0	2	30	92	5	41	8	2	2
117	FL2	47	48	54	56	52	60	58	58	63	80	71	88	72	78	80	80	76	72	74	72	75	76	77	78	77
127	FL6	34	55	50	52	51	53	55	56	57	71	68	81	70	74	73	79	76	72	77	73	77	78	79	79	76
138	SB3	108	59	54	57	0	110	75	57	71	97	92	36	0	0	181	0	0	1	0	26	1	61	0	0	0
146	TA1	34	64	61	65	62	71	74	70	71	83	84	103	94	90	90	91	82	89	86	83	90	97	89	90	95
156	TA3	30	72	65	65	0	113	77	68	72	87	89	19	3	0	225	0	0	3	0	40	1	67	6	1	0

Table B18. Concentrations (ng/g [ppb]) of PCB congeners found in NIST mussel tissue V (QA93TIS5)

	Wet Weight Basis						Dry Weight Basis					
	Measured			Consensus[a]			Measured			Consensus		
PCB Analyte	n	Mean	Std. Dev.	Value	Std. Dev.	z-Score[b]	n	Mean	Std. Dev.	Value	Std. Dev.	z-Score[b]
BZ #8	8	0.867	0.462	0.623	0.253	1	8	7.42	3.98	5.72	2.32	0.7
BZ #18	8	1.88	0.203	3.35	0.88	-1.7	8	16.1	1.79	30.7	8.1	-1.8
BZ #28	8	8.05	0.633	7.17	2.69	0.3	8	68.9	5.86	65.8	24.7	0.1
BZ #52	8	7.51	0.653	11.3	4.03	-0.9	8	64.3	5.81	104	37	-1.1
BZ #44	8	5.12	0.42	6.74	2.98	-0.5	8	43.8	3.8	61.8	27.3	-0.7
BZ #66	8	14.6	1.52	11.2	3.4	1	8	125	13.8	103	31	0.7
BZ #101	8	10.8	0.999	14.1	4.8	-0.7	8	92.1	9.16	129	44	-0.8
BZ #118	8	9.95	1.19	14.5	3.6	-1.3	8	85.2	10.8	133	33	-1.4
BZ #153	8	12.4	1.87	16	4.1	-0.9	8	106	16.8	147	38	-1.1
BZ #105	8	5.28	0.538	6.06	2.02	-0.4	8	45.2	4.71	55.6	18.5	-0.6
BZ #138	8	11.1	1.28	16	3.9	-1.2	8	95.3	11.5	147	36	-1.4
BZ #187	8	2.95	0.251	3.51	0.97	-0.6	8	25.2	2.29	32.2	8.9	-0.8
BZ #128	8	1.62	0.177	2.37	0.69	-1.1	8	13.9	1.6	21.7	6.3	-1.2
BZ #180	8	2.75	0.478	1.44	0.36	3.6	8	23.6	4.29	13.2	3.3	3.1
BZ #170	8	0.81	0.117	0.479	0.254	1.3	8	6.93	1.04	4.39	2.33	1.1
BZ #195	8	0.35	0.064	0.074	0.041	6.7	8	3	0.572	0.68	0.38	6.1
BZ #206	8	0.256[c]	0.273	0.057	0.044	4.6	8	2.20[c]	2.35	0.52	0.4	4.2
BZ #209	8	0.224	0.146	0.119	0.15	0.7	8	1.92	1.27	1.09	1.38	0.6

[a]Consensus values from 1993 NIST/NOAA/NS&T/EPA EMAP intercomparison exercise (NIST 1993).
[b]z-score = (measured mean - consensus value) / consensus standard deviation.
[c]Includes two values (-0.03 and -0.08 ppb, wet weight) which were treated as zero.

Table B19. Instrumental detection limit (IDL) and estimated method detection limit (EMDL) for pesticide analytes

	Hexa-chloro-benzene	Lindane	Heptachlor	Aldrin	Octa-chloro-styrene	Hepta-chlor-epoxide	Oxy-chlordane	o,p'-DDE	α-chlor-dane	trans-nonachlor	Dieldrin	p,p'-DDE	o,p'-DDD	Endrin	p,p'-DDD	o,p'-DDT	p,p'-DDT	Photo-mirex	Mirex
Concentration of Solvent Spiked at Low Levels (ng/μL)																			
Replicate 1	0.047	0.045	0.046	0.043	0.044	0.044	0.045	0.044	0.043	0.043	0.043	0.041	0.043	0.045	0.043	0.043	0.044	0.044	0.044
Replicate 2	0.045	0.044	0.045	0.042	0.043	0.045	0.046	0.044	0.043	0.042	0.042	0.041	0.042	0.043	0.042	0.043	0.042	0.043	0.044
Replicate 3	0.045	0.044	0.045	0.044	0.045	0.044	0.046	0.045	0.044	0.044	0.043	0.042	0.043	0.041	0.043	0.045	0.043	0.045	0.045
Replicate 4	0.044	0.044	0.046	0.044	0.043	0.048	0.051	0.045	0.044	0.044	0.044	0.043	0.044	0.043	0.044	0.046	0.044	0.045	0.045
Replicate 5	0.044	0.043	0.044	0.043	0.044	0.044	0.045	0.044	0.044	0.044	0.044	0.042	0.043	0.044	0.043	0.046	0.044	0.046	0.046
Replicate 6	0.042	0.040	0.041	0.040	0.043	0.042	0.044	0.043	0.042	0.042	0.042	0.040	0.041	0.043	0.041	0.044	0.042	0.044	0.044
Replicate 7	0.044	0.042	0.044	0.042	0.046	0.043	0.047	0.046	0.045	0.045	0.046	0.045	0.046	0.048	0.049	0.047	0.046	0.048	0.047
Mean	0.045	0.043	0.045	0.042	0.044	0.044	0.046	0.044	0.043	0.044	0.043	0.042	0.043	0.044	0.043	0.045	0.044	0.045	0.045
Std. dev.	0.001	0.002	0.002	0.002	0.001	0.002	0.002	0.001	0.001	0.001	0.001	0.002	0.001	0.002	0.002	0.001	0.001	0.001	0.001
RSD (%)	3.2	4.0	3.8	3.6	2.7	4.0	4.8	2.4	2.4	2.6	2.8	4.1	3.3	4.9	5.5	3.0	3.4	3.3	2.8
IDL[a]	0.004	0.005	0.005	0.005	0.004	0.006	0.007	0.003	0.003	0.004	0.004	0.005	0.005	0.007	0.008	0.004	0.005	0.005	0.004
Corresponding Concentration in a Typical Tissue (ng/g wet weight)[b]																			
Mean	1.11	5.40	5.57	5.31	5.49	5.53	5.76	5.54	5.44	5.44	5.43	5.27	5.39	5.48	5.43	5.62	5.48	5.63	5.64
Std. dev.	0.036	0.219	0.213	0.191	0.147	0.221	0.275	0.131	0.132	0.144	0.154	0.214	0.180	0.269	0.300	0.169	0.185	0.185	0.160
RSD (%)	3.2	4.0	3.8	3.6	2.7	4.0	4.8	2.4	2.4	2.6	2.8	4.1	3.3	4.9	5.5	3.0	3.4	3.3	2.8
EMDL[c]	0.11	0.69	0.67	0.60	0.46	0.69	0.86	0.41	0.42	0.45	0.48	0.67	0.57	0.85	0.94	0.53	0.58	0.58	0.50

[a]Instrumental detection limit is based on 3.143 times the standard deviation of seven replicate measurements.
[b]Assumed 10g wet weight of muscle tissue, 50% recovery in the extraction and cleanup steps, 250 μL final sample volume, and 1 μL sample injection volume.
[c]Estimated method detection limit is based on 3.143 times the standard deviation of a typical tissue.

Table B20. Analyses (ng/g [ppb] wet weight) of spiked replicates of summer flounder muscle for determination of the method detection limit (MDL) for pesticides

	Hexachloro-benzene	Lindane	Heptachlor	Aldrin	Octachloro-styrene	Heptachlor epoxide	Oxy-chlordane	o,p'-DDE	α-chlor-dane	trans-nonachlor	p,p'-DDE	Endrin	p,p'-DDD	o,p'-DDT	p,p'-DDT	Photo-mirex	Mirex
Replicate 1	6.27	2.59	6.18	7.13	7.17	6.01	3.82	11.5	8.82	8.33	16.1	10.6	6.24	6.92	5.68	8.07	7.71
Replicate 2	6.27	2.08	5.98	7.02	6.87	7.12	4.72	10.7	8.14	7.81	15.4	9.35	5.96	6.16	4.61	7.85	7.79
Replicate 3	6.31	2.55	6.24	7.68	6.52	7.06	4.72	10.1	7.85	7.55	14.1	9.08	6.06	6.31	5.56	7.57	7.51
Replicate 4	5.29	2.30	5.43	6.04	6.67	6.9	4.50	10.3	7.93	7.79	14.5	9.22	5.99	6.30	5.70	7.78	7.52
Replicate 5	6.32	2.60	6.39	7.81	6.64	7.28	4.79	10.2	7.77	7.52	14.0	9.06	6.06	5.77	5.31	7.56	7.83
Replicate 6	5.66	1.80	5.70	6.84	6.23	6.82	4.18	10.1	7.48	7.29	14.7	8.68	4.76	5.20	4.27	7.56	7.90
Replicate 7	6.41	1.67	5.55	8.18	6.08	4.86	3.15	9.92	7.78	8.14	15.4	7.16	4.93	4.93	3.60	9.06	9.21
Mean	6.08	2.23	5.92	7.24	6.60	6.58	4.27	10.4	7.97	7.78	14.9	9.03	5.71	5.94	4.96	7.92	7.92
Std. dev.	0.43	0.38	0.37	0.71	0.37	0.87	0.60	0.55	0.42	0.36	0.77	1.03	0.60	0.69	0.82	0.54	0.59
RSD (%)	7.1	17	6.2	9.9	5.6	13	14	5.2	5.3	4.7	5.2	11	11	12	16	6.8	7.4
MDL[a]	1.3	1.2	1.2	2.2	1.2	2.7	1.9	1.7	1.3	1.1	2.4	3.2	1.9	2.2	2.6	1.7	1.8

[a]MDL ≡ σt, where σ = standard deviation and t =Student's "t" value of 3.143 with n-1 degrees of freedom and α = 0.01 (one tailed).

Table B21. Results (ng/g [ppb] wet weight) of triplicate analyses for pesticides in bluefish and summer flounder muscle composites (nd = <MDL)

Composite #	Pesticide																
	Hexachloro-benzene	Lindane	Aldrin	Octachloro-styrene	Endrin	Heptachlor	Heptachlor epoxide	Oxy-chlordane	α-chlor-dane	trans-nonachlor	o,p'-DDE	p,p'-DDE	p,p'-DDD	o,p'-DDT	p,p'-DDT	Photo-mirex	Mirex
Bluefish (Station BL2)																	
107	nd	2.35	nd	nd	4.77	nd	nd	2.53	28.2	16.6	13.1	114	55.9	nd	7.25	7.45	nd
107-dup.	nd	2.58	nd	nd	4.38	nd	nd	2.21	25.7	15.0	11.7	106	49.6	nd	6.43	6.77	nd
107-trip.	nd	1.42	nd	nd	4.61	nd	nd	2.38	28.5	16.2	12.4	115	54.2	nd	6.72	7.30	nd
Mean	nd	2.12	nd	nd	4.59	nd	nd	2.37	27.5	15.9	12.4	111	53.2	nd	6.80	7.18	nd
Std. dev.	-	0.61	-	-	0.20	-	-	0.16	1.54	0.82	0.69	4.79	3.26	-	0.42	0.36	-
RSD (%)	-	29	-	-	4.3	-	-	6.8	5.6	5.2	5.6	4.3	6.1	-	6.1	5.0	-
Summer Flounder (Station FL2)																	
117	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
117-dup	nd	nd	nd	nd	nd	nd	nd	nd	1.42	nd	nd	nd	nd	nd	nd	nd	nd
117-trip.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Std. dev.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSD (%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Summer Flounder (Station FL6)																	
127	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
127-dup.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
127-trip.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Std. dev.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RSD (%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MDL	1.3	1.2	1.2	2.2	1.2	2.7	1.9	1.7	1.3	1.1	2.4	3.2	1.9	2.2	2.6	1.7	1.8

Table B22. Results (ng/g [ppb] wet weight) of triplicate analyses for pesticides in black sea bass and tautog muscle composites (nd = <MDL)

Composite #	Pesticide																
	Hexachloro-benzene	**Lindane**	**Aldrin**	**Octachloro-styrene**	**Endrin**	**Heptachlor**	**Heptachlor epoxide**	**Oxy-chlordane**	**α-chlor-dane**	**trans-nonachlor**	**o,p'-DDE**	**p,p'-DDE**	**p,p'-DDD**	**o,p'-DDT**	**p,p'-DDT**	**Photo-mirex**	**Mirex**
Black Sea Bass (Station SB3)																	
138	nd	nd	nd	nd	nd	nd	nd	nd	4.89	3.20	3.42	16.6	10.7	nd	nd	1.71	nd
138-dup.	nd	nd	nd	nd	nd	nd	nd	nd	3.00	2.09	2.07	9.60	7.41	nd	nd	nd	nd
138-trip.	nd	nd	nd	nd	nd	nd	nd	nd	4.73	3.07	3.25	15.1	9.97	nd	nd	nd	nd
Mean	nd	nd	nd	nd	nd	nd	nd	nd	4.21	2.79	2.91	13.7	9.34	nd	nd	nd	nd
Std. dev.	-	-	-	-	-	-	-	-	1.04	0.61	0.74	3.66	1.71	-	-	-	-
RSD (%)	-	-	-	-	-	-	-	-	25	22	25	27	18	-	-	-	-
Tautog (Station TA1)																	
146	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.97	nd	4.80	5.95	nd	nd	nd	nd
146-dup.	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.79	nd	4.27	5.38	nd	nd	nd	nd
146-trip.	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.91	nd	4.48	5.83	nd	nd	nd	nd
Mean	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.89	nd	4.52	5.72	nd	nd	nd	nd
Std. dev.	-	-	-	-	-	-	-	-	-	0.09	-	0.27	0.30	-	-	-	-
RSD (%)	-	-	-	-	-	-	-	-	-	4.8	-	5.9	5.2	-	-	-	-
Tautog (Station TA3)																	
156	nd	nd	nd	nd	nd	nd	nd	2.48	2.01	4.21	2.31	17.6	11.9	nd	nd	2.00	nd
156-dup.	nd	nd	nd	nd	nd	nd	nd	2.33	1.87	3.81	2.09	14.8	10.7	nd	nd	1.81	nd
156-trip.	nd	nd	nd	nd	nd	nd	nd	2.29	1.82	3.81	2.09	14.8	10.6	nd	nd	1.83	nd
Mean	nd	nd	nd	nd	nd	nd	nd	2.36	1.90	3.94	2.16	15.7	11.1	nd	nd	1.88	nd
Std. dev.	-	-	-	-	-	-	-	0.10	0.10	0.23	0.12	1.64	0.70	-	-	0.10	-
RSD (%)	-	-	-	-	-	-	-	4.2	5.2	5.9	5.8	10	6.4	-	-	5.5	-
MDL	1.3	1.2	1.2	2.2	1.2	2.7	1.9	1.7	1.3	1.1	2.4	3.2	1.9	2.2	2.6	1.7	1.8

Table B23. Recovery (percent) of pesticide analytes added to matrix spike muscle composites

Composite #	Station	Hexachloro-benzene	Lindane	Heptachlor	Aldrin	Octachloro-styrene	Heptachlor epoxide	Oxy-chlordane	o,p'-DDE	α-chlor-dane	trans-nonachlor	p,p'-DDE	Endrin	p,p'-DDD	o,p'-DDT	p,p'-DDT	Photo-mirex	Mirex
107	BL2	61	70	67	86	71	77	70	93	91	87	93	83	92	136	49	146	3
117	FL2	54	23	48	55	59	45	50	78	70	72	109	8	55	64	49	64	62
127	FL6	54	33	39	53	56	27	54	69	66	63	94	22	56	68	57	62	66
138	SB3	55	46	56	61	71	67	68	86	88	82	122	104	94	81	0	96	0
146	TA1	59	65	65	67	74	74	84	85	83	84	108	97	101	88	95	76	87
156	TA3	64	60	62	71	75	74	76	87	84	89	110	107	0	0	0	138	3

Table B24. Concentrations (ng/g [ppb]) of pesticide analytes found in NIST mussel tissue V (QA93TIS5)

Pesticide	Wet Weight Basis						Dry Weight Basis					
	Measured			Consensus[a]			Measured			Consensus		
Analyte	n	Mean	Std. Dev.	Value	Std. Dev.	z-Score[b]	n	Mean	Std. Dev.	Value	Std. Dev.	z-Score[b]
Hexachlorobenzene	8	0.465	0.306	0.024	0.008	57.8[c]	8	4	2.66	0.22	0.07	54[c]
Lindane	8	0.465	0.141	0.298	0.313	0.5	8	3.98	1.21	2.73	2.87	0.4
Aldrin	3	0.91	0.698	0.761	0.898	0.2	3	7.87	6.07	6.98	8.24	0.1
Heptachlor	8	0.511	0.081	0.489	0.455	0	8	4.38	0.71	4.49	4.17	0
Heptachlor epoxide	8	0.759	0.266	0.525	0.396	0.6	8	6.5	2.3	4.82	3.63	0.5
α-chlordane	8	5.92	0.584	1.7	0.305	13.8	8	50.7	5.33	15.6	2.8	12.5
trans-nonachlor	8	1.71	0.167	1.91	0.676	-0.3	8	14.6	1.53	17.5	6.2	-0.5
o,p'-DDE	8	4.13	0.723	0.989	0.9	3.5	8	35.3	6.47	9.07	8.26	3.2
p,p'-DDE	8	6.27	0.626	5.5	1.48	0.5	8	53.7	5.65	50.5	13.6	0.2
p,p'-DDD	8	7.49	1.534	4.59	1.4	2.1	8	64.2	13.7	42.1	12.8	1.7
o,p'-DDT	8	nf[d]	-	0.649	0.344	-	8		-	5.95	3.16	-
p,p'-DDT	8	0.887	0.247	0.332	0.12	4.6	8	7.61	2.19	3.05	1.1	4.1
Mirex	8	0.581	0.499	0.153	0.11	3.9	8	4.99	4.31	1.4	1.01	3.6

[a]Consensus values from 1993 NIST/NOAA/NS&T/EPAEMAP intercomparison exercise (NIST 1993).
[b]z-score = (measured mean - consensus value) / consensus standard deviation.
[c]Inflated z-score probably resulted from very low consensus value for hexachlorobenzene.
[d]nf = peaks not found.

Table B25a. Instrumental detection limit (IDL) and estimated method detection limit (EMDL) for low-molecular-weight PAH analytes

	Naph-thalene	2-methyl-naphthalene	1-methyl-naphthalene	Biphenyl	2,6-dimethyl-naphthalene	Acenaph-thylene	Acenaph-thene	2,3,5-trimethyl-naphthalene	Fluorene	Phen-anthrene	Anthra-cene	1-methylphen-anthrene
Concentration of Solvent Spiked at Low Levels (ng/µL)												
Replicate 1	0.211	0.227	0.204	0.220	0.227	0.202	0.222	0.201	0.222	0.211	0.153	0.196
Replicate 2	0.224	0.229	0.221	0.242	0.247	0.215	0.230	0.201	0.218	0.224	0.170	0.221
Replicate 3	0.220	0.204	0.222	0.213	0.248	0.226	0.249	0.182	0.226	0.216	0.168	0.215
Replicate 4	0.222	0.214	0.207	0.218	0.252	0.220	0.241	0.194	0.240	0.222	0.172	0.216
Replicate 5	0.216	0.215	0.205	0.215	0.244	0.223	0.231	0.203	0.220	0.215	0.179	0.212
Replicate 6	0.222	0.213	0.211	0.210	0.219	0.212	0.231	0.193	0.233	0.228	0.188	0.221
Replicate 7	0.235	0.220	0.220	0.220	0.238	0.237	0.263	0.181	0.238	0.223	0.180	0.216
Mean	0.221	0.217	0.213	0.220	0.239	0.219	0.238	0.193	0.228	0.220	0.173	0.214
Std. dev.	0.007	0.009	0.008	0.010	0.012	0.011	0.014	0.009	0.009	0.006	0.011	0.008
RSD (%)	3.4	4.1	3.8	4.7	5.1	5.1	5.8	4.7	4.0	2.8	6.6	3.9
IDL[a]	0.023	0.028	0.025	0.033	0.038	0.035	0.044	0.028	0.029	0.019	0.036	0.026
Corresponding Concentration in a Typical Tissue (ng/g wet weight)[b]												
Mean	5.53	5.44	5.32	5.50	5.98	5.48	5.95	4.84	5.71	5.50	4.32	5.35
Std. dev.	0.185	0.222	0.202	0.259	0.304	0.277	0.348	0.226	0.227	0.153	0.284	0.207
RSD (%)	3.4	4.1	3.8	4.7	5.1	5.1	5.8	4.7	4.0	2.8	6.6	3.9
EMDL[c]	0.58	0.70	0.64	0.81	0.96	0.87	1.1	0.71	0.71	0.48	0.89	0.65

[a]Instrumental detection limit is based on 3.143 times the standard deviation of seven replicate measurements.
[b]Assumed 10g wet weight of muscle tissue, 50% recovery in the extraction and cleanup steps, 250 µL final sample volume, and 1 µL sample injection volume.
[c]Estimated method detection limit is based on 3.143 times the standard deviation of a typical tissue.

Table B25b. Instrumental detection limit (IDL) and estimated method detection limit (EMDL) for high-molecular-weight PAH analytes

	Fluor-anthene	**Pyrene**	**Benz[a]-anthracene**	**Chrysene**	**Benzo[b]-fluoranthene**	**Benzo[k]-fluoranthene**	**Benzo[e]-pyrene**	**Benzo[a]-pyrene**	**Perylene**	**Indeno[1,2,3-cd]pyrene**	**Dibenz[a,h]-anthracene**	**Benzo[ghi]-perylene**
Concentration of Solvent Spiked at Low Levels (ng/µL)												
Replicate 1	0.198	0.225	0.183	0.209	0.213	0.215	0.218	0.203	0.168	0.196	0.182	0.208
Replicate 2	0.228	0.217	0.191	0.228	0.223	0.220	0.224	0.207	0.176	0.205	0.194	0.204
Replicate 3	0.226	0.223	0.194	0.222	0.221	0.224	0.236	0.234	0.186	0.218	0.180	0.205
Replicate 4	0.224	0.220	0.186	0.220	0.226	0.229	0.230	0.213	0.175	0.206	0.163	0.202
Replicate 5	0.243	0.232	0.201	0.225	0.239	0.238	0.240	0.218	0.185	0.208	0.202	0.199
Replicate 6	0.245	0.232	0.204	0.240	0.239	0.237	0.241	0.220	0.185	0.212	0.174	0.198
Replicate 7	0.228	0.227	0.190	0.220	0.211	0.213	0.221	0.205	0.166	0.194	0.162	0.197
Mean	0.227	0.225	0.193	0.223	0.225	0.225	0.230	0.214	0.177	0.206	0.180	0.202
Std. dev.	0.015	0.006	0.008	0.010	0.011	0.010	0.009	0.011	0.008	0.008	0.015	0.004
RSD (%)	6.8	2.5	4.1	4.3	5.0	4.4	4.0	5.1	4.8	4.0	8.3	2.0
IDL[a]	0.049	0.018	0.025	0.030	0.035	0.031	0.029	0.034	0.027	0.026	0.047	0.013
Corresponding Concentration in a Typical Tissue (ng/g wet weight)[b]												
Mean	5.68	5.63	4.82	5.58	5.61	5.63	5.75	5.36	4.44	5.14	4.49	5.05
Std. dev.	0.386	0.143	0.196	0.238	0.278	0.249	0.231	0.271	0.212	0.206	0.372	0.102
RSD (%)	6.8	2.5	4.1	4.3	5.0	4.4	4.0	5.1	4.8	4.0	8.3	2.0
EMDL[c]	1.2	0.45	0.62	0.75	0.87	0.78	0.73	0.85	0.67	0.65	1.2	0.32

[a]Instrumental detection limit is based on 3.143 times the standard deviation of seven replicate measurements.
[b]Assumed 10g wet weight of muscle tissue, 50% recovery in the extraction and cleanup steps, 250 µL final sample volume, and 1 µL sample injection volume.
[c]Estimated method detection limit is based on 3.143 times the standard deviation of a typical tissue.

Table B26a. Analyses (ng/g [ppb] wet weight) of replicates of NIST mussel tissue V (QA93TIS5)[a] for determination of the method detection limit (MDL) for low-molecular-weight PAHs

	Naph-thalene	2-methyl-naphthalene	1-methyl-naphthalene	Biphenyl	2,6-dimethyl-naphthalene	Acenaph-thylene	Acenaph-thene	2,3,5-trimethyl-naphthalene	Fluorene	Phen-anthrene	Anthra-cene	1-methylphen-anthrene
Replicate 1	nf[b]	nf[b]	nf[b]	nf[b]	nf[b]	1.34	nf[b]	nf[b]	nf[b]	1.48	2.14	1.91
Replicate 2	1.03	1.07	0.81	0.89	1.03	0.91	0.81	nf[b]	nf[b]	1.84	1.33	2.02
Replicate 3	0.500	1.05	0.85	1.44	nf[b]	0.91	1.36	nf[b]	nf[b]	2.22	nf[b]	2.36
Replicate 4	0.43	1.13	0.36	0.99	1.44	nf[b]	1.09	nf[b]	nf[b]	2.31	nf[b]	nf[b]
Replicate 5	0.53	0.880	nf[b]	0.98	nf[b]	nf[b]	nf[b]	nf[b]	nf[b]	2.28	nf[b]	nf[b]
Replicate 6	0.66	0.78	0.81	1.39	nf[b]	nf[b]	1.92	nf[b]	nf[b]	2.57	nf[b]	nf[b]
Replicate 7	2.44	1.91	2.06	2.49	nf[b]	2.49	nf[b]	nf[b]	nf[b]	5.16	nf[b]	nf[b]
Replicate 8	nf[b]	0.47	nf[b]	0.27	nf[b]	nf[b]	nf[b]	nf[b]	nf[b]	1.70	1.07	1.74
n =	6	7	5	7	2	4	4	-	-	8	3	4
Mean	0.933	1.04	0.979	1.21	1.23	1.41	1.29	-	-	2.44	1.51	2.01
Std. dev.	0.771	0.444	0.636	0.686	0.288	0.746	0.473	-	-	1.15	0.555	0.261
RSD (%)	83	43	65	57	23	53	37	-	-	47	37	13
Student's "t"	3.36	3.14	3.75	3.14	31.8	4.54	4.54	-	-	3	6.96	4.54
MDL[c]	2.59	1.40	2.38	2.16	9.18	3.39	2.15	10 [b]	10 [b]	3.46	3.87	1.19

[a]NIST mussel tissue V (QA93TIS5) was included in each of eight extraction batches as a part of the QA/QC protocol.
[b]nf = peak not found; assuming 10 g wet weight of mussel tissue, 50% efficiency in the sample extraction and cleanup steps, a 250µL final sample colume, and an instrument (GC/MS) detection limit of 0.2 ng/µL, the MDL calculates to be 10 ppb wet weight.
[c]MDL ≡ σt, where σ = standard deviation and t = Student's "t" value with n-1 degrees of freedom and α = 0.01 (one tailed).

Table B26b. Analyses (ng/g [ppb] wet weight) of replicates of NIST mussel tissue V (QA93TIS5)[a] for determination of the method detection limit (MDL) for high-molecular-weight PAHs

	Fluor-anthene	Pyrene	Benz[a]-anthracene	Chrysene	Benzo[b]-fluoranthene	Benzo[k]-fluoranthene	Benzo[e]-pyrene	Benzo[a]-pyrene	Perylene	Indeno[1,2,3-cd]pyrene	Dibenz[a,h]-anthracene	Benzo[ghi]-perylene
Replicate 1	14.3	14.0	7.81	12.22	8.81	3.88	11.04	1.96	nf[b]	1.37	nf[b]	1.17
Replicate 2	13.0	12.2	6.48	10.53	6.94	3.39	8.32	1.76	nf[b]	0.928	nf[b]	0.675
Replicate 3	13.2	12.1	7.00	9.53	7.63	5.68	8.41	4.84	nf[a]	5.73	nf[a]	5.64
Replicate 4	13.8	12.7	7.75	10.92	8.48	3.77	10.78	2.37	1.66	nf[b]	nf[b]	nf[b]
Replicate 5	12.6	12.0	7.80	10.45	6.87	3.57	8.52	nf[b]	nf[b]	nf[b]	nf[b]	nf[b]
Replicate 6	10.7	10.5	6.13	8.58	5.73	2.88	7.67	1.74	nf[b]	nf[b]	nf[b]	3.36
Replicate 7	11.6	10.8	7.15	8.47	6.70	5.48	7.21	4.98	nf[b]	nf[b]	nf[b]	nf[b]
Replicate 8	15.2	15.8	5.62	8.72	4.24	2.77	4.18	nf[b]	nf[b]	nf[b]	nf[b]	nf[b]
n =	8	8	8	8	8	8	8	6	-	3	-	4
Mean	13.0	12.5	6.97	9.93	6.92	3.93	8.27	2.94	-	2.68	-	2.71
Std. dev.	1.44	1.71	0.828	1.33	1.47	1.09	2.15	1.54	-	2.65	-	2.27
RSD (%)	11	14	12	13	21	28	26	52	-	99	-	84
Student's "t"	3	3	3	2.998	3	3	2.998	3.36	-	6.7	-	4.54
MDL[c]	4.33	5.12	2.48	3.99	4.41	3.28	6.44	5.19	10[b]	17.8	10[b]	10.3

[a]NIST mussel tissue V (QA93TIS5) was included in each of eight extraction batches as a part of the QA/QC protocol.
[b]nf = peak not found; assuming 10 g wet weight of mussel tissue, 50% efficiency in the sample extraction and cleanup steps, a 250µL final sample colume, and an instrument (GC/MS) detection limit of 0.2 ng/µL, the MDL calculates to be 10 ppb wet weight.
[c]MDL ≡ σt, where σ = standard deviation and t = Student's "t" value with n-1 degrees of freedom and α = 0.01 (one tailed).

Table B27a. Results (ng/g [ppb] wet weight) of triplicate analyses for low-molecular-weight PAHs in bluefish and summer flounder muscle composites (nd = <MDL)

Composite #	PAH											
	Naph-thalene	**2-methyl-naphthalene**	**1-methyl-naphthalene**	**Biphenyl**	**2,6-dimethyl-naphthalene**	**Acenaph-thylene**	**Acenaph-thene**	**2,3,5-trimethyl-naphthalene**	**Fluorene**	**Phen-anthrene**	**Anthra-cene**	**1-methylphen-anthrene**
Bluefish (Station BL2)												
107	nd	nd	nd	nd	nd	nd	8.44	nd	nd	nd	nd	nd
107-dup.	nd	nd	nd	nd	nd	nd	8.24	nd	nd	nd	nd	nd
107-trip.	nd	nd	nd	nd	nd	nd	8.33	nd	nd	nd	nd	nd
Mean	nd	nd	nd	nd	nd	nd	8.34	nd	nd	nd	nd	nd
Std. dev.	-	-	-	-	-	-	0.10	-	-	-	-	-
RSD (%)	-	-	-	-	-	-	1.2	-	-	-	-	-
Summer Flounder (Station FL2)												
117	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
117-dup.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
117-trip.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Summer Flounder (Station FL6)												
127	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
127-dup.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
127-trip.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
MDL	4.33	5.12	2.48	3.99	4.41	3.28	6.44	5.19	10	17.8	10	10.3

Table B27b. Results (ng/g [ppb] wet weight) of triplicate analyses for high-molecular-weight PAHs in bluefish and summer flounder muscle composites (nd = <MDL)

Composite #	PAH											
	Fluor-anthene	**Pyrene**	**Benz[a]-anthracene**	**Chrysene**	**Benzo[b]-fluoranthene**	**Benzo[k]-fluoranthene**	**Benzo[e]-pyrene**	**Benzo[a]-pyrene**	**Perylene**	**Indeno[1,2,3-cd]pyrene**	**Dibenz[a,h]-anthracene**	**Benzo[ghi]-perylene**
Bluefish (Station BL2)												
107	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
107-dup.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
107-trip.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Std. dev.	-	-	-	-	-	-	-	-	-	-	-	-
RSD (%)	-	-	-	-	-	-	-	-	-	-	-	-
Summer Flounder (Station FL2)												
117	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
117-dup.	nd	nd	2.49	nd	nd	nd	nd	nd	nd	nd	nd	nd
117-trip.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Summer Flounder (Station FL6)												
127	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
127-dup.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
127-trip.	nd	nd	2.49	nd	nd	nd	nd	nd	nd	nd	nd	nd
MDL	4.33	5.12	2.48	3.99	4.41	3.28	6.44	5.19	10	17.8	10	10.3

Table B28a. Results (ng/g [ppb] wet weight) of triplicate analyses for low-molecular-weight PAHs in black sea bass and tautog muscle composites (nd = <MDL)

Composite #	PAH											
	Naph-thalene	2-methyl-naphthalene	1-methyl-naphthalene	Biphenyl	2,6-dimethyl-naphthalene	Acenaph-thylene	Acenaph-thene	2,3,5-trimethyl-naphthalene	Fluorene	Phen-anthrene	Anthra-cene	1-methylphen-anthrene
Black Sea Bass (Station SB3)												
138	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
138-dup.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
138-trip.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Tautog (Station TA1)												
146	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
146-dup.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
146-trip.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Std. dev.	-	-	-	-	-	-	-	-	-	-	-	-
RSD (%)	-	-	-	-	-	-	-	-	-	-	-	-
Tautog (Station TA3)												
156	nd	1.41	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
156-dup.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
156-trip.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Std. dev.	-	-	-	-	-	-	-	-	-	-	-	-
RSD (%)	-	-	-	-	-	-	-	-	-	-	-	-
MDL	2.59	1.40	2.38	2.16	9.18	3.39	2.15	10	10	3.46	3.87	1.19

Table B28b. Results (ng/g [ppb] wet weight) of triplicate analyses for high-molecular-weight PAHs in black sea bass and tautog muscle composites (nd = <MDL)

Composite #	PAH											
	Fluor-anthene	Pyrene	Benz[a]-anthracene	Chrysene	Benzo[b]-fluoranthene	Benzo[k]-fluoranthene	Benzo[e]-pyrene	Benzo[a]-pyrene	Perylene	Indeno[1,2,3-cd]pyrene	Dibenz[a,h]-anthracene	Benzo[g,h,i]-perylene
Black Sea Bass (Station SB3)												
138	nd	nd	2.89	nd	nd	nd	nd	nd	nd	nd	nd	nd
138-dup.	nd	nd	3.12	nd	nd	nd	nd	nd	nd	nd	nd	nd
138-trip.	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Tautog (Station TA1)												
146	nd	nd	2.59	nd	nd	nd	nd	nd	nd	nd	nd	nd
146-dup.	nd	nd	2.88	nd	nd	nd	nd	nd	nd	nd	nd	nd
146-trip.	nd	nd	2.60	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean	nd	nd	2.69	nd	nd	nd	nd	nd	nd	nd	nd	nd
Std. dev.	-	-	0.16	-	-	-	-	-	-	-	-	-
RSD (%)	-	-	6.1	-	-	-	-	-	-	-	-	-
Tautog (Station TA3)												
156	nd	1.41	3.82	nd	nd	nd	nd	nd	nd	nd	nd	nd
156-dup.	nd	nd	3.54	nd	nd	nd	nd	nd	nd	nd	nd	nd
156-trip.	nd	nd	3.60	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean	nd	nd	3.65	nd	nd	nd	nd	nd	nd	nd	nd	nd
Std. dev.	-	-	0.15	-	-	-	-	-	-	-	-	-
RSD (%)	-	-	4.1	-	-	-	-	-	-	-	-	-
MDL	4.33	5.12	2.48	3.99	4.41	3.28	6.44	5.19	10	17.8	10	10.3

Table B29a. Recovery (percent) of low-molecular-weight PAH analytes added to matrix spike muscle composites

Composite #	Station	Naph-thalene	2-methyl-naphthalene	1-methyl-naphthalene	Biphenyl	2,6-dimethyl-naphthalene	Acenaph-thylene	Acenaph-thene	2,3,5-trimethyl-naphthalene	Fluorene	Phen-anthrene	Anthra-cene	1-methylphen-anthrene
107	BL2	26	38	41	39	46	42	45	49	43	71	58	85
117	FL2	15	22	22	25	28	29	30	38	39	48	60	63
127	FL6	28	32	32	33	36	37	37	41	43	52	59	63
138	SB3	40	46	46	46	47	52	46	46	44	59	65	63
146	TA1	30	36	36	39	42	44	44	47	47	62	68	70
156	TA3	22	27	27	31	33	35	33	40	35	32	40	53

Table B29b. Recovery (percent) of high-molecular-weight PAH analytes added to matrix spike muscle composites

Composite #	Station	Fluor-anthene	Pyrene	Benz[a]-anthracene	Chrysene	Benzo[b]-fluoranthene	Benzo[k]-fluoranthene	Benzo[e]-pyrene	Benzo[a]-pyrene	Perylene	Indeno[1,2,3-cd]pyrene	Dibenz[a,h]-anthracene	Benzo[ghi]-perylene
107	BL2	88	82	52	50	19	18	17	12	7	30	22	28
117	FL2	69	71	101	90	76	76	62	47	1	32	26	21
127	FL6	64	64	87	77	73	72	67	42	1	55	38	36
138	SB3	69	70	104	88	69	69	57	58	40	34	23	26
146	TA1	73	75	107	94	93	91	79	73	50	82	69	65
156	TA3	60	46	50	43	28	29	23	24	22	14	10	11

Table B30. Concentrations (ng/g[ppb]) of PAH analytes found in NIST mussel tissue V (QA93TIS5)

PAH	Wet Weight Basis						Dry Weight Basis					
	Measured			Consensus[a]			Measured			Consensus		
Analyte	n	Mean	Std. Dev.	Value	Std. Dev.	z-Score[b]	n	Mean	Std. Dev.	Value	Std. Dev.	z-Score[b]
Naphthalene	3	1.38	0.941	1.62	0.927	-0.3	6	7.99	6.66	14.9	8.5	-0.8
2-methylnaphthalene	6	1.14	0.401	0.791	0.335	1	7	8.92	3.84	7.26	3.07	0.5
1-methylnaphthalene	4	1.13	0.618	0.481	0.202	3.2	4	9.74	5.34	4.41	1.85	2.9
Biphenyl	6	1.36	0.599	0.445	0.147	6.2	6	11.7	5.21	4.08	1.35	5.6
2,6-dimethylnaphthalene	2	1.23	0.288	0.63	0.461	1.3	2	10.6	2.52	5.78	4.23	1.1
Acenaphthylene	4	1.41	0.746	0.532	0.215	4.1	4	12.1	6.44	4.88	1.97	3.7
Acenaphthene	3	1.45	0.426	0.342	0.118	9.4	4	11.1	4.08	3.14	1.08	7.4
2,3,5-trimethylnaphthalene		nf[c]	-	0.549	0.274			nf[c]	-	5.04	2.51	
Fluorene		nf[c]	-	0.462	0.085			nf[c]	-	4.24	0.78	
Phenanthrene	8	2.44	1.15	1.95	0.556	0.9	8	20.9	9.97	17.9	5.1	0.6
Anthracene	3	1.51	0.555	0.79	0.3	2.4	3	13	4.68	7.25	2.75	2.1
1-methylphenanthrene	4	2.01	0.261	1.16	0.327	2.6	4	17.3	2.21	10.6	3	2.2
Fluoranthene	8	13	1.44	20.4	6	-1.2	8	112	12.8	187	55	-1.4
Pyrene	8	12.5	1.71	19.4	4.69	-1.5	8	107	15.1	178	43	-1.7
Benz[a]anthracene	8	6.97	0.828	4.08	1	2.9	8	59.6	6.7	37.4	9.2	2.4
Chrysene	8	9.93	1.33	9.7	2.39	0.1	8	84.9	11	89	21.9	-0.2
Benzo[e]pyrene	8	8.27	2.15	9.95	2.29	-0.7	8	70.7	18.2	91.3	21	-1
Benzo[a]pyrene	6	2.94	1.54	1.91	0.414	2.5	6	25.3	13.3	17.5	3.8	2
Perylene		nf[c]	-	0.789	0.239			nf[c]	-	7.24	2.19	
Indeno[1,2,3-cd]pyrene	3	2.68	2.65	1.75	0.501	1.8	3	23	22.8	16.1	4.6	1.5
Dibenz[a,h]anthracene		nf[c]	-	0.286	0.119			nf[c]	-	2.62	1.09	
Benzo[ghi]perylene	4	2.71	2.27	3	0.73	-0.4	4	23.3	19.6	27.5	6.7	-0.6
Benzo[b]fluoranthene	8	6.92	1.47				8	59.2	12.5			
Benzo[k]fluoranthene	8	3.93	1.09				8	33.6	9.47			
Benzo[b]+[k]fluoranthenes		10.8		9.74	1.81	0.6		92.9		89.4	16.6	0.2

[a]Consensus values from 1993 NIST/NOAA/NS&T/EPA EMAP intercomparison exercise (NIST 1993).
[b]z-score = (measured mean - consensus value) / consensus standard deviation.
[c]nf = peaks not found.

Table B31a. Analyses (pg/g [pptr] wet weight) of spiked replicates of summer flounder muscle for determination of the method detection limit (MDL) for 2,3,7,8-substituted PCDD congeners

	Congener						
Composite #	**2,3,7,8-TCDD**	**1,2,3,7,8-PeCDD**	**1,2,3,4,7,8-HxCDD**	**1,2,3,6,7,8-HxCDD**	**1,2,3,7,8,9-HxCDD**	**1,2,3,4,6,7,8-HpCDD**	**OCDD**
Replicate 1	5.80	29.98	24.38	21.29	22.66	22.40	47.29
Replicate 2	5.34	29.19	24.99	22.13	24.35	24.23	46.14
Replicate 3	5.64	27.90	24.14	21.28	21.24	22.95	46.82
Mean	5.59	29.02	24.50	21.57	22.75	23.19	46.75
Std. dev.	0.23	1.05	0.44	0.49	1.56	0.94	0.58
RSD (%)	4.2	3.6	1.8	2.3	6.8	4.0	1.2
MDL[a]	1.63	7.31	3.05	3.40	10.8	6.54	4.03
Target MDLs	1	5	5	5	5	5	10

[a]MDL ≡ σt, where σ = standard deviation and t = Student's "t" value, where t has the value of 6.965 for n = 3 with n-1 degrees of freedom and α = 0.01 (one tailed). Note that there is a potential that the calculated MDLs are inflated when three replicates are used, since a larger Student's t value is used.

Table B31b. Analyses (pg/g [pptr] wet weight) of spiked replicates of summer flounder muscle for determination of the method detection limit (MDL) for 2,3,7,8-substituted PCDF congeners

	Congener									
Composite #	**2,3,7,8-TCDF[a]**	**1,2,3,7,8-PeCDF**	**2,3,4,7,8-PeCDF**	**1,2,3,4,7,8-HxCDF**	**1,2,3,6,7,8-HxCDF**	**1,2,3,7,8,9-HxCDF**	**2,3,4,6,7,8-HxCDF**	**1,2,3,4,6,7,8-HpCDF**	**1,2,3,4,7,8,9-HpCDF**	**OCDF**
Replicate 1	5.41	23.81	24.82	24.59	25.15	27.08	24.19	23.89	27.22	38.11
Replicate 2	5.25	21.73	22.33	25.66	24.43	25.02	25.02	24.30	27.41	45.49
Replicate 3	5.09	23.44	23.50	25.57	24.75	24.18	23.91	22.73	24.35	44.24
Mean	5.25	22.99	23.55	25.27	24.78	25.43	24.37	23.64	26.33	42.61
Std. dev.	0.16	1.11	1.25	0.59	0.36	1.49	0.58	0.81	1.71	3.95
RSD (%)	3.0	4.8	5.3	2.3	1.5	5.9	2.4	3.4	6.5	9.3
MDL[a]	1.11	7.73	8.68	4.13	2.51	10.4	4.02	5.67	11.9	27.5
Target MDLs	1	5	5	5	5	5	5	5	5	10

[a]MDL ≡ σt, where σ = standard deviation and t = Student's "t" value, where t has the value of 6.965 for n = 3 with n-1 degrees of freedom and α = 0.01 (one tailed). Note that there is a potential that the calculated MDLs are inflated when three replicates are used, since a larger Student's t value is used.

Table B32a. Results (pg/g [pptr] wet weight) of triplicate analyses for 2,3,7,8-substituted PCDD congeners in bluefish muscle composites (Station BL1; nd = <MDL)

	Congener						
Composite #	**2,3,7,8-TCDD**	**1,2,3,7,8-PeCDD**	**1,2,3,4,7,8-HxCDD**	**1,2,3,6,7,8-HxCDD**	**1,2,3,7,8,9-HxCDD**	**1,2,3,4,6,7,8-HpCDD**	**OCDD**
104	2.17	nd	nd	nd	nd	nd	nd
104-dup.	2.44	nd	nd	nd	nd	nd	nd
104-trip.	2.26	nd	nd	nd	nd	nd	nd
Mean	2.29						
Std. dev.	0.14						
RSD (%)	6.0						
MDL	1.6	7.3	3.1	3.4	11	6.5	4.0

Table B32b. Results (pg/g [pptr] wet weight) of triplicate analyses for 2,3,7,8-substituted PCDF congeners in bluefish muscle composites (Station BL1; nd = <MDL)

	Congener									
Composite #	**2,3,7,8-TCDF[a]**	**1,2,3,7,8-PeCDF**	**2,3,4,7,8-PeCDF**	**1,2,3,4,7,8-HxCDF**	**1,2,3,6,7,8-HxCDF**	**1,2,3,7,8,9-HxCDF**	**2,3,4,6,7,8-HxCDF**	**1,2,3,4,6,7,8-HpCDF**	**1,2,3,4,7,8,9-HpCDF**	**OCDF**
104	2.18	nd	nd	nd	nd	nd	nd	nd	nd	nd
104-dup.	2.44	nd	nd	nd	nd	nd	nd	nd	nd	nd
104-trip.	1.90	nd								
Mean	2.17									
Std. dev.	0.27									
RSD (%)	12.4									
MDL	1.1	7.7	8.7	4.1	2.5	10	4.0	5.7	12	28

[a]Value for 2,3,7,8-TCDF in Batch 3 is taken from "DB-Dioxin" second-column confirmation.

Table B33a. Results (pg/g [pptr] wet weight) of triplicate analyses for 2,3,7,8-substituted PCDD congeners in tautog muscle composites (Station TA1; nd = <MDL)

Composite #	Congener						
	2,3,7,8-TCDD	**1,2,3,7,8-PeCDD**	**1,2,3,4,7,8-HxCDD**	**1,2,3,6,7,8-HxCDD**	**1,2,3,7,8,9-HxCDD**	**1,2,3,4,6,7,8-HpCDD**	**OCDD**
144	nd	nd	nd	nd	nd	nd	nd
144-dup.	nd	nd	nd	nd	nd	nd	nd
144-trip.[a]							
Mean							
Std. dev.							
RPD[b]							
MDL	1.6	7.3	3.1	3.4	11	6.5	4.0

[a]Triplicate results not included due to 8-fold dilution required for analysis. RPD reported instead.
[b]RPD (relative percent difference) for duplicate analyses = (100 x absolute value for range)/mean.

Table B33b. Results (pg/g [pptr] wet weight) of triplicate analyses for 2,3,7,8-substituted PCDF congeners in tautog muscle composites (Station TA1; nd = <MDL)

Composite #	Congener									
	2,3,7,8-TCDF[a]	**1,2,3,7,8-PeCDF**	**2,3,4,7,8-PeCDF**	**1,2,3,4,7,8-HxCDF**	**1,2,3,6,7,8-HxCDF**	**1,2,3,7,8,9-HxCDF**	**2,3,4,6,7,8-HxCDF**	**1,2,3,4,6,7,8-HpCDF**	**1,2,3,4,7,8,9-HpCDF**	**OCDF**
144	1.7	nd	nd	nd	nd	nd	nd	nd	nd	nd
144-dup.	1.4	nd	nd	nd	nd	nd	nd	nd	nd	nd
144-trip.[b]										
Mean	1.6									
Std. dev.	0.2									
RPD[c]	19.1									
MDL	1.1	7.7	8.7	4.1	2.5	10	4.0	5.7	12	28

[a]Value for 2,3,7,8-TCDF in Batch 3 is taken from "DB-Dioxin" second-column confirmation.
[b]Triplicate results not included due to 8-fold dilution required for analysis. RPD reported instead.
[c]RPD (relative percent difference) for duplicate analyses = (100 x absolute value for range)/mean.

Table B34a. Recovery (percent) of ^{13}C- and ^{37}Cl-labeled 2,3,7,8-substituted PCDD surrogate internal standards in bluefish muscle composites

Composite #	Station	^{13}C-Labeled[a] 2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	^{37}Cl-Labeled[b] 2,3,7,8-TCDD
101	BL1	52	45	53	57	51	42	84
102	BL1	82	74	83	90	78	69	123
102-MS	BL1	76	83	87	98	66	60	262[c]
103	BL1	57	65	68	78	65	52	77
104	BL1	75	63	67	86	68	59	87
104-dup.	BL1	78	64	74	91	72	64	88
104-trip.	BL1	81	68	86	92	78	72	131
104 mean (n = 3)	BL1	78	65	76	90	73	65	102
105	BL1	57	60	58	74	57	43	79
106	BL2	54	57	56	67	49	45	72
107	BL2	64	56	60	67	60	49	103
108	BL2	59	61	61	79	63	55	75
109	BL2	87	78	84	103	77	56	96
109-MS	BL2	90	76	85	98	79	66	385[c]
110	BL2	82	74	81	93	73	64	103
111	BL3	93	84	86	105	77	61	121
112	BL3	95	85	86	97	78	57	110
113	BL3	85	77	75	96	76	59	96
114	BL3	69	65	69	83	66	36[c]	82
Mean (n = 14)		73	69	72	85	67	56	95
Std. dev.		15	12	12	14	10	8	17

[a]Labeled with ^{13}C at all 12 carbons on the two benzene rings.
[b]Labeled with ^{37}Cl at all four chlorines.
[c]These values exceeded the 40-150% criterion.

Table B34b. Recovery (percent) of ^{13}C-labeled[a] 2,3,7,8-substituted PCDF surrogate internal standards in bluefish muscle composites

Composite #	Station	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF
101	BL1	52	42	31	48	49	45	50	47	43
102	BL1	77	101	39[b]	77	79	80	82	76	69
102-MS	BL1	76	82	78	83	83	74	81	70	57
103	BL1	57	68	68	66	69	63	67	67	61
104	BL1	64	68	67	64	72	64	70	66	61
104-dup.	BL1	65	68	67	67	72	68	71	73	63
104-trip.	BL1	69	70	58	85	83	75	81	68	71
104 mean (n = 3)	BL1	66	69	64	72	76	69	74	69	65
105	BL1	58	63	63	60	61	60	61	56	53
106	BL2	51	59	58	54	58	55	57	52	47
107	BL2	60	52	33	58	60	56	59	58	52
108	BL2	52	61	60	62	65	58	64	63	57
109	BL2	87	88	87	83	87	78	89	77	65
109-MS	BL2	69	76	82	78	83	72	84	82	69
110	BL2	80	83	84	75	82	72	82	63	56
111	BL3	45	91	92	83	87	80	92	73	61
112	BL3	56	89	97	76	79	74	80	78	64
113	BL3	82	81	78	76	80	67	80	77	62
114	BL3	70	70	68	72	76	62	75	65	47
Mean (n = 14)		65	73	71	70	73	66	73	66	57
Std. dev.		13	16	17	11	12	10	13	10	8

[a]Labeled with ^{13}C at all 12 carbons on the two benzene rings.
[b]This value slightly exceeded the 40-150% criterion.

Table B35a. Recovery (percent) of ^{13}C- and ^{37}Cl-labeled 2,3,7,8-substituted PCDD surrogate internal standards in summer flounder muscle composites

Composite #	Station	^{13}C-Labeled[a] 2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	^{37}Cl-Labeled[b] 2,3,7,8-TCDD
115	FL1	72	58	68	91	74	66	92
116	FL1	83	66	81	103	79	74	106
117	FL1	69	64	66	78	59	44	97
117-dup.	FL1	92	93	93	107	85	75	117
117-trip.	FL1	90	92	89	98	75	71	112
117 mean (n = 3)	FL1	84	83	83	94	73	63	109
118	FL2	79	82	77	83	70	49	147
119	FL3	79	69	73	89	77	68	101
120	FL3	70	61	62	80	66	61	112
121	FL3	63	55	55	76	55	50	97
122	FL4	70	64	63	82	62	57	96
123	FL4	89	81	82	107	85	78	130
124	FL4	88	81	78	95	78	63	128
124-MS	FL4	90	85	89	98	85	75	125
125	FL5	87	77	79	100	74	61	118
126	FL5	92	82	87	110	88	81	132
127	FL6	91	77	87	112	82	70	124
128	FL6	87	78	73	100	75	54	99
128-MDL1	FL6	52	48	50	69	51	37[c]	60
128-MDL2	FL6	75	67	68	90	75	65	85
128-MDL3	FL6	85	82	75	101	72	63	95
128-MDL4	FL6	92	90	84	105	83	70	98
128 mean (n = 4)	FL6	76	72	69	91	70	66	85
Mean (n = 18)		80	73	74	94	74	65	108
Std. dev.		11	12	11	12	10	9	20

[a]Labeled with ^{13}C at all 12 carbons on the two benzene rings.
[b]Labeled with ^{37}Cl at all four chlorines.
[c]This value slightly exceeded the 40-150% criterion.

Table B35b. Recovery (percent) of ^{13}C-labeled[a] 2,3,7,8-substituted PCDF surrogate internal standards in summer flounder muscle composites

Composite #	Station	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF
115	FL1	69	67	72	65	73	62	76	73	61
116	FL1	81	79	82	76	83	78	96	79	66
117	FL1	68	64	67	64	64	61	66	58	49
117-dup.	FL1	95	98	99	86	93	80	94	85	72
117-trip.	FL1	98	92	100	87	94	84	90	73	64
117 mean (n = 3)	FL1	87	85	89	79	84	75	83	72	62
118	FL2	94	86	47	77	73	72	83	68	60
119	FL3	72	71	74	70	77	71	75	74	68
120	FL3	62	61	62	59	63	62	65	59	53
121	FL3	67	61	64	53	66	56	66	54	49
122	FL4	71	68	71	62	72	63	67	60	56
123	FL4	88	84	89	81	91	82	92	81	75
124	FL4	90	84	97	73	82	73	78	73	69
124-MS	FL4	92	93	90	82	88	79	87	95	76
125	FL5	83	81	86	70	78	74	92	75	63
126	FL5	92	92	95	82	93	77	87	84	80
127	FL6	96	88	97	77	85	80	109	81	72
128	FL6	85	88	90	75	91	74	84	80	70
128-MDL1	FL6	49	53	54	50	61	48	56	50	42
128-MDL2	FL6	73	75	80	68	82	69	79	74	64
128-MDL3	FL6	87	88	88	73	85	74	81	72	65
128-MDL4	FL6	82	89	90	81	89	83	87	85	72
128 mean (n = 4)	FL6	73	76	78	68	79	69	76	70	61
Mean (n = 14)		80	79	80	71	80	71	81	73	64
Std. dev.		12	12	15	10	10	9	12	11	10

[a]Labeled with ^{13}C at all 12 carbons on the two benzene rings.

Table B36a. Recovery (percent) of ^{13}C- and ^{37}Cl-labeled 2,3,7,8-substituted PCDD surrogate internal standards in black sea bass muscle composites

Composite #	Station	^{13}C-Labeled[a] 2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	^{37}Cl-Labeled[b] 2,3,7,8-TCDD
129	SB1	98	92	91	113	92	76	124
130	SB1	84	85	81	95	77	43	105
131	SB1	95	92	91	104	83	57	107
132	SB1	97	91	95	106	86	74	118
133	SB2	69	62	67	83	69	61	83
134	SB2	80	72	81	99	85	81	93
135	SB2	81	73	81	93	84	69	95
136	SB2	77	67	78	84	76	66	87
137	SB2	81	68	77	98	81	73	93
138	SB3	79	77	74	97	80	62	101
139	SB3	83	78	82	90	81	73	101
140	SB3	70	66	71	77	57	48	80
141	SB3	62	53	96	104	60	36	65
142	SB3	63	59	64	67	58	49	72
Mean (n = 14)		80	74	81	94	76	62	95
Std. dev.		11	13	10	12	11	14	17

[a]Labeled with ^{13}C at all 12 carbons on the two benzene rings.
[b]Labeled with ^{37}Cl at all four chlorines.

Table B36b. Recovery (percent) of ^{13}C-labeled[a] 2,3,7,8-substituted PCDF surrogate internal standards in black sea bass muscle composites

Composite #	Station	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF
129	SB1	105	94	102	87	93	83	93	90	74
130	SB1	90	83	88	78	81	74	81	75	63
131	SB1	100	93	98	89	90	86	92	82	66
132	SB1	96	94	92	94	98	89	94	81	69
133	SB2	72	71	69	75	75	69	72	73	69
134	SB2	82	81	79	86	91	80	84	91	84
135	SB2	82	80	78	81	83	78	84	85	76
136	SB2	76	76	76	74	73	72	69	78	70
137	SB2	79	76	75	77	84	76	86	83	76
138	SB3	78	84	82	82	88	80	83	84	74
139	SB3	81	85	82	83	83	84	82	87	77
140	SB3	68	70	70	73	73	71	73	70	48
141	SB3	57	59	51	100	98	61	64	69	51
142	SB3	60	63	61	61	60	60	63	56	50
Mean (n = 14)		80	79	79	81	84	76	80	79	68
Std. dev.		14	11	14	10	11	9	10	10	11

[a]Labeled with ^{13}C at all 12 carbons on the two benzene rings.

Table B37a. Recovery (percent) of ^{13}C- and ^{37}Cl-labeled 2,3,7,8-substituted PCDD surrogate internal standards in tautog muscle composites

		^{13}C-Labeled[a]						^{37}Cl-Labeled[b]
Composite #	Station	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDD
143	TA1	82	76	83	92	74	62	96
144	TA1	77	71	68	94	69	54	99
144-dup.	TA1	76	80	72	89	69	36	94
144-trip.	TA1	116	87	80	93	75	61	144
144 mean (n = 3)	TA1	90	79	73	92	71	50	112
145	TA1	73	67	71	80	59	52	105
146	TA1	81	76	79	98	72	60	108
147	TA1	72	65	68	82	75	47	114
148	TA1	73	64	66	86	65	45	81
149	TA2	71	61	60	77	60	40	77
150	TA2	83	74	70	96	75	65	101
151	TA2	75	68	66	89	68	56	87
152	TA3	83	72	75	105	78	63	113
153	TA3	80	75	71	93	68	63	93
154	TA3	78	75	70	93	74	63	83
155	TA3	10[c]	12[c]	11[c]	17[c]	14[c]	7[c]	16[c]
156	TA3	79	70	71	90	70	62	90
Mean (n = 14)		78	71	71	90	70	56	97
Std. dev.		5	6	6	8	6	8	13

[a]Labeled with ^{13}C at all 12 carbons on the two benzene rings.
[b]Labeled with ^{37}Cl at all four chlorines.
[c]These values exceeded the 40-150% criterion.

Table B37b. Recovery (percent) of ^{13}C-labeled[a] 2,3,7,8-substituted PCDF surrogate internal standards in tautog muscle composites

Composite #	Station	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF
143	TA1	81	74	90	76	80	72	80	72	59
144	TA1	75	78	60	69	85	68	83	73	62
144-dup.	TA1	81	79	84	73	80	70	78	69	57
144-trip.	TA1	98	94	38[b]	81	82	77	85	75	64
144 mean (n = 3)	TA1	85	84	72	74	82	72	82	72	61
145	TA1	79	71	29[b]	65	67	56	68	56	45
146	TA1	84	79	32[b]	77	80	70	81	72	58
147	TA1	72	68	45	71	74	67	74	73	61
148	TA1	75	67	70	63	70	62	69	67	51
149	TA2	73	62	62	60	68	56	64	61	50
150	TA2	82	81	79	70	84	68	79	73	61
151	TA2	83	73	73	59	72	58	67	67	54
152	TA3	76	78	78	72	84	73	83	77	65
153	TA3	77	76	52	69	76	67	74	68	57
154	TA3	82	84	86	73	85	72	81	74	64
155	TA3	10[b]	12[b]	13[b]	12[b]	14[b]	12[b]	14[b]	13[b]	10[b]
156	TA3	81	78	78	71	80	69	84	73	58
Mean (n = 14)		79	75	71	69	77	66	76	70	57
Std. dev.		4	7	14	6	6	6	7	6	6

[a]Labeled with ^{13}C at all 12 carbons on the two benzene rings.
[b]These values exceeded the 40-150% criterion.

Table B38a. Recovery (percent) of 2,3,7,8-substituted PCDD congeners added to matrix spike muscle composites

Composite #	Station	2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD
102-MS	BL1	131[a]	118	110	87	92	100	87
109-MS	BL2	111	109	94	90	86	98	92
124-MS	FL4	131[a]	133[a]	111	104	103	110	109

[a] These values exceeded the 50- 20% criterion.

Table B38b. Recovery (percent) of 2,3,7,8-substituted PCDF congeners added to matrix spike muscle composites

Composite #	Station	2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF
102-MS	BL1	99	115	111	108	120	114	105	101	117	97
109-MS	BL2	115	115	98	99	114	100	98	94	103	91
124-MS	FL4	120	113	113	116	116	116	112	106	118	114

Table B39a. Concentrations (pg/g [pptr] wet weight) of 2,3,7,8-substituted PCDD congeners found in Cambridge Isotope Laboratory fish tissue EDF-2526 standard reference material

Composite #	Congener 2,3,7,8-TCDD	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDD	1,2,3,7,8,9-HxCDD	1,2,3,4,6,7,8-HpCDD	OCDD
Replicate 1	20.8	44.7	55.8	49.0	51.9	73.7	186
Replicate 2	21.0	45.1	53.0	50.3	48.3	71.8	183
Replicate 3	20.0	43.5	54.6	50.6	43.0	73.1	189
Mean (n = 3)	20.6	44.4	54.5	50.0	47.7	72.9	186
Std. dev.	0.514	0.824	1.45	0.811	4.46	0.944	2.77
Consensus value	19	40	60	56	60	76	192
Recovery (%)	109	111	91	89	80	96	97
Difference (%)	9	11	9	11	20	4	3

Table B39b. Concentrations (pg/g [pptr] wet weight) of 2,3,7,8-substituted PCDF congeners found in Cambridge Isotope Laboratory fish tissue EDF-2526 standard reference material

Composite #	Congener 2,3,7,8-TCDF	1,2,3,7,8-PeCDF	2,3,4,7,8-PeCDF	1,2,3,4,7,8-HxCDF	1,2,3,6,7,8-HxCDF	1,2,3,7,8,9-HxCDF	2,3,4,6,7,8-HxCDF	1,2,3,4,6,7,8-HpCDF	1,2,3,4,7,8,9-HpCDF	OCDF
Replicate 1	19.4	37.2	37.7	82.4	63.5	60.1	57.3	78.7	84.6	183
Replicate 2	20.5	37.4	37.9	82.1	59.6	57.9	56.6	72.0	76.5	176
Replicate 3	20.0	38.9	37.3	85.1	63.2	62.3	60.6	76.0	82.0	206
Mean (n = 3)	20.0	37.8	37.6	83.2	62.1	60.1	58.2	75.6	81.0	188
Std. dev.	0.583	0.930	0.287	1.64	2.17	2.21	2.12	3.38	4.12	15.3
Consensus value	17	40	38	80	63	58	60	83	73	190
Recovery (%)	118	95	99	104	99	104	97	91	111	99
Difference (%)	18	5	1	4	1	4	3	9	11	1

Table C1. Metal concentrations (µg/g [ppm] wet weight) in bluefish muscle composites

Composite #	Trace Metal								
	Ag	Cd	Cr	Cu	Ni	Pb	Zn	As	Hg
					Station BL1				
101	0.0367	0.211	0.112	0.411	0.283	0.118	8.34	0.49	0.1150
102	0.0391	0.159	0.522	0.548	0.359	0.240	14.4	0.63	0.0658
103	0.0308	0.158	0.427	0.457	0.101	0.347	8.65	0.62	0.1425
104	0.0546	0.129	0.352	0.216	0.105	0.368	7.35	0.40	0.0841
105[a]	0.0304	0.173	0.452	0.438	0.131	0.284	10.5	0.38	0.1016
Mean (n = 5)	0.0383	0.166	0.373	0.414	0.196	0.271	9.84	0.50	0.1018
Std. dev.	0.0098	0.030	0.158	0.122	0.118	0.100	2.79	0.12	0.0293
					Station BL2				
106	0.0516	0.198	0.355	0.208	0.171	0.247	11.9	0.60	0.1253
107	0.0429	0.273	0.129	0.481	0.132	0.317	12.5	0.56	0.0887
108	0.0566	0.137	0.734	0.427	0.123	0.207	10.4	0.43	0.1177
109	0.0340	0.155	0.466	0.545	0.142	0.449	23.0	0.46	0.1151
110	0.0329	0.113	0.653	0.632	0.107	0.380	9.79	0.52	0.0885
Mean (n = 5)	0.0436	0.175	0.467	0.459	0.135	0.320	13.5	0.51	0.1071
Std. dev.	0.0105	0.063	0.241	0.160	0.024	0.098	5.41	0.07	0.0173
					Station BL3				
111	0.0442	0.171	0.774	0.516	0.148	0.268	10.6	0.25	0.1065
112	0.0469	0.085	0.172	0.507	0.089	0.387	13.8	0.57	0.1241
113	0.0295	0.224	0.708	0.317	0.157	0.288	8.98	0.46	0.0786
114	0.0446	0.123	0.330	0.636	0.188	0.129	9.31	0.43	0.0754
Mean (n = 4)	0.0413	0.151	0.496	0.494	0.146	0.268	10.7	0.43	0.0962
Std. dev.	0.0080	0.060	0.291	0.132	0.041	0.106	2.20	0.13	0.0233
					Probability of Interstation Differences				
P value[b]	0.65	0.83	0.68	0.61	0.93	0.77	0.28	0.60	0.58
					Summary Statistics				
Mean (n = 14)	0.0411	0.165	0.442	0.453	0.160	0.288	11.4	0.49	0.1021
Std. dev.	0.0091	0.049	0.219	0.132	0.075	0.096	3.92	0.11	0.0224

[a]Mean of duplicates.
[b]*P* values >0.05 indicate no interstation differences.

Table C2. Metal concentrations (µg/g [ppm] wet weight) in summer flounder muscle composites

Composite #	**Trace Metal**								
	Ag	**Cd**	**Cr**	**Cu**	**Ni**	**Pb**	**Zn**	**As**	**Hg**
				Station FL1					
115	0.0169	0.102	0.117	0.223	0.124	0.133	4.56	2.05	0.0380
116	0.0337	0.129	0.199	0.326	0.181	0.260	2.98	1.46	0.0452
Mean (n = 2)	0.0253	0.115	0.158	0.274	0.152	0.196	3.77	1.76	0.0416
Std. dev.	0.0119	0.019	0.058	0.073	0.040	0.090	1.12	0.42	0.0051
				Station FL2					
117	0.0309	0.109	0.084	0.174	0.147	0.122	3.21	2.34	0.0321
118	0.0142	0.111	0.121	0.238	0.074	0.186	4.02	1.57	0.0493
Mean (n = 2)	0.0226	0.110	0.103	0.206	0.110	0.154	3.62	1.96	0.0407
Std. dev.	0.0118	0.001	0.026	0.045	0.052	0.045	0.57	0.54	0.0122
				Station FL3					
119	0.0248	0.103	0.263	0.211	0.195	0.128	3.80	1.22	0.0356
120	0.0170	0.192	0.048	0.300	0.070	0.111	3.53	1.63	0.0239
121	0.0212	0.134	0.097	0.264	0.134	0.228	2.47	1.97	0.0454
Mean (n = 3)	0.0210	0.143	0.136	0.258	0.133	0.156	3.27	1.61	0.0350
Std. dev.	0.0039	0.045	0.113	0.045	0.063	0.063	0.70	0.38	0.0108
				Station FL4					
122	0.0281	0.096	0.145	0.276	0.195	0.081	3.24	2.01	0.0261
123	0.0114	0.133	0.222	0.437	0.054	0.220	4.81	1.50	0.0399
124[a]	0.0227	0.138	0.079	0.229	0.095	0.163	3.72	1.74	0.0382
Mean (n = 3)	0.0207	0.122	0.149	0.314	0.115	0.155	3.92	1.75	0.0347
Std. dev.	0.0085	0.023	0.072	0.109	0.073	0.070	0.80	0.26	0.0075
				Station FL5					
125	0.0257	0.155	0.124	0.198	0.232	0.079	3.31	1.49	0.0283
126	0.0158	0.099	0.149	0.326	0.104	0.201	4.46	1.57	0.0421
Mean (n = 2)	0.0208	0.127	0.136	0.262	0.168	0.140	3.88	1.53	0.0352
Std. dev.	0.0070	0.040	0.018	0.091	0.091	0.086	0.81	0.06	0.0098
				Station FL6					
127	0.0291	0.082	0.248	0.180	0.104	0.090	3.86	1.59	0.0221
128	0.0173	0.092	0.082	0.238	0.143	0.170	3.75	1.87	0.0356
Mean (n = 2)	0.0232	0.087	0.165	0.209	0.124	0.130	3.80	1.73	0.0288
Std. dev.	0.0083	0.007	0.117	0.041	0.028	0.057	0.08	0.20	0.0095

Table C2. (Cont.)

Composite #	**Trace Metal**								
	Ag	**Cd**	**Cr**	**Cu**	**Ni**	**Pb**	**Zn**	**As**	**Hg**
					Probability of Interstation Differences				
P value[b]	0.97	0.33	0.96	0.64	0.92	0.91	0.93	0.82	0.73
					Summary Statistics				
Mean (n = 14)	0.0221	0.120	0.141	0.259	0.132	0.155	3.69	1.72	0.0358
Std. dev.	0.0069	0.029	0.067	0.071	0.053	0.058	0.64	0.30	0.0084

[a]Mean of duplicates.
[b]*P* values >0.05 indicate no interstation differences.

Table C3. Metal concentrations (µg/g [ppm] wet weight) in black sea bass muscle composites

Composite #	Trace Metal Ag	Cd	Cr	Cu	Ni	Pb	Zn	As	Hg
					Station SB1				
129	0.0363	0.079	0.538	0.454	0.268	0.128	6.17	5.32	0.0744
130	0.0289	0.182	0.113	0.646	0.138	0.320	5.42	2.23	0.0539
131[a]	0.0256	0.126	0.378	0.533	0.097	0.204	5.15	3.11	0.0411
132	0.0388	0.145	0.402	0.209	0.112	0.236	3.06	3.73	0.0626
Mean (n = 4)	0.0324	0.133	0.358	0.460	0.154	0.222	4.95	3.60	0.0580
Std. dev.	0.0062	0.043	0.178	0.185	0.078	0.079	1.33	1.30	0.0141
					Station SB2				
133	0.0409	0.135	0.811	0.393	0.114	0.132	5.10	4.43	0.0424
134	0.0334	0.200	0.474	0.444	0.110	0.162	4.48	2.74	0.0576
135	0.0387	0.210	0.192	0.486	0.230	0.382	4.46	3.15	0.0354
136	0.0368	0.090	0.396	0.226	0.410	0.500	5.04	2.33	0.0424
137	0.0443	0.131	0.432	0.408	0.175	0.247	6.19	4.95	0.0690
Mean (n = 5)	0.0388	0.153	0.461	0.391	0.208	0.285	5.05	3.52	0.0494
Std. dev.	0.0041	0.051	0.224	0.099	0.123	0.155	0.70	1.12	0.0137
					Station SB3				
138	0.0340	0.130	0.479	0.420	0.223	0.256	4.23	4.84	0.0512
139	0.0365	0.127	0.399	0.481	0.133	0.338	3.30	4.88	0.0345
140	0.0382	0.200	0.203	0.61	0.153	0.166	4.84	2.31	0.0345
141	0.0344	0.156	0.676	0.385	0.196	0.320	6.03	2.98	0.0742
142	0.0280	0.114	0.225	0.221	0.223	0.131	4.16	4.04	0.0328
Mean (n = 5)	0.0342	0.145	0.396	0.423	0.186	0.242	4.51	3.81	0.0454
Std. dev.	0.0039	0.034	0.195	0.142	0.041	0.092	1.01	1.14	0.0177
					Probability of Interstation Differences				
P value[b]	0.19	0.67	0.83	0.68	0.61	0.71	0.44	0.98	0.29
					Summary Statistics				
Mean (n = 14)	0.0353	0.145	0.408	0.423	0.184	0.252	4.83	3.65	0.0504
Std. dev.	0.0051	0.040	0.190	0.134	0.084	0.110	0.97	1.09	0.0151

[a]Mean of duplicates.
[b]*P* values >0.05 indicate no interstation differences.

Table C4. Metal concentrations (µg/g [ppm] wet weight) in tautog muscle composites

Composite #	Trace Metal Ag	Cd	Cr	Cu	Ni	Pb	Zn	As	Hg
Station TA1									
143	0.0325	0.128	0.175	0.344	0.097	0.122	3.67	0.91	0.1068
144	0.0201	0.100	0.410	0.421	0.141	0.316	6.25	1.14	0.1072
145	0.0258	0.100	0.141	0.327	0.232	0.114	5.05	1.27	0.0789
146	0.0179	0.098	0.101	0.211	0.095	0.198	3.02	0.98	0.0869
147	0.0235	0.141	0.089	0.349	0.149	0.119	4.64	0.84	0.0481
Mean (n = 5)	0.0240	0.113	0.183	0.330	0.143	0.174	4.53	1.03	0.0856
Std. dev.	0.0057	0.020	0.131	0.076	0.056	0.087	1.25	0.18	0.0243
Station TA2									
148	0.0206	0.093	0.337	0.394	0.093	0.213	5.56	0.86	0.0682
149	0.0261	0.139	0.310	0.507	0.207	0.163	5.01	1.32	0.0737
150	0.0478	0.110	0.159	0.460	0.095	0.212	4.20	0.98	0.0979
151	0.0293	0.098	0.124	0.275	0.257	0.100	3.73	1.25	0.0864
Mean (n = 4)	0.0310	0.110	0.232	0.409	0.163	0.172	4.62	1.10	0.0816
Std. dev.	0.0118	0.021	0.107	0.101	0.082	0.053	0.82	0.22	0.0133
Station TA3									
152	0.0173	0.106	0.068	0.280	0.161	0.101	2.90	0.82	0.0451
153[a]	0.0257	0.117	0.141	0.235	0.136	0.221	3.52	0.92	0.0650
154	0.0399	0.099	0.295	0.351	0.096	0.243	5.39	1.09	0.0873
155	0.0360	0.089	0.181	0.215	0.050	0.152	3.31	1.06	0.0634
156	0.0173	0.104	0.125	0.375	0.116	0.141	3.62	0.83	0.1205
Mean (n = 5)	0.0272	0.103	0.162	0.291	0.112	0.172	3.75	0.94	0.0763
Std. dev.	0.0105	0.010	0.085	0.070	0.042	0.059	0.96	0.13	0.0289
Probability of Interstation Differences									
P value[b]	0.51	0.79	0.61	0.23	0.76	0.93	0.23	0.39	0.71
Summary Statistics									
Mean (n = 14)	0.0271	0.109	0.190	0.339	0.138	0.173	4.28	1.02	0.0811
Std. dev.	0.0092	0.017	0.105	0.090	0.059	0.064	1.04	0.17	0.0223

[a]Mean of duplicates.
[b]*P* values >0.05 indicate no interstation differences.

Table C5. Organic analytes not detected in any sample

Analyte	MDL[a]
PCB Congeners	
BZ #29	1.73
BZ #50	1.95
Organochlorine Pesticides	
Aldrin	2.24
Octachlorostyrene	1.16
Heptachlor epoxide	2.72
o,p'-DDT	2.17
PAHs	
Biphenyl	2.16
2,6-dimethylnaphthalene	9.18
Acenaphthylene	3.39
2,3,5-trimethylnaphthalene	10.0
Fluorene	10.0
Phenanthrene	3.46
Anthracene	3.87
1-methylphenanthrene	1.19
Fluoranthene	4.33
Pyrene	5.12
Chrysene	3.99
Benzo[b]fluoranthene	4.41
Benzo[k]fluoranthene	3.28
Benzo[e]pyrene	6.44
Benzo[a]pyrene	5.19
Perylene	10.0
Indeno[1,2,3-cd]pyrene	17.8
Dibenz[a,h]anthracene	10.0
Benzo[ghi]perylene	10.3
2,3,7,8-Substituted PCDD and PCDF Congeners	
1,2,3,7,8-PeCDD	7.31
1,2,3,4,7,8-HxCDD	3.05
1,2,3,6,7,8-HxCDD	3.40
1,2,3,7,8,9-HxCDD	10.8
1,2,3,7,8-PeCDF	7.73
2,3,4,7,8-PeCDF	8.68
1,2,3,4,7,8-HxCDF	4.13
1,2,3,6,7,8-HxCDF	2.51
1,2,3,7,8,9-HxCDF	10.4
2,3,4,6,7,8-HxCDF	4.02
1,2,3,4,6,7,8-HpCDF	5.67
1,2,3,4,7,8,9-HpCDF	11.9
OCDF	27.5

[a]ng/g wet weight for PCBs, pesticides, and PAHs; pg/g wet weight for dioxins and furans.

Table C6. PCB concentrations (ng/g [ppb] wet weight) in bluefish muscle composites

Composite	PCB (BZ #)																							2x
#	1	8	18	28	52	104	44	66	101	118	188	153	105	138	126	187	128	200	180	170	195	206	209	ΣPCBs	Σ18 PCBs
Station BL1																									
101	16.5	3.12	4.52	16.9	26.4	nd	16.0	34.5	31.4	31.8	nd	49.8	13.9	45.6	6.18	20.4	6.65	2.36	28.2	6.88	nd	2.41	nd	368	682
102	45.3	5.31	4.93	14.9	22.9	nd	13.3	35.6	34.1	33.4	12.3	54.9	14.3	49.2	6.95	21.9	7.48	2.99	34.1	8.24	3.21	4.37	nd	432	727
103	13.9	2.91	2.90	10.3	16.9	nd	9.64	26.8	26.7	26.6	nd	45.8	9.33	40.2	5.40	17.3	5.51	2.32	27.4	6.25	nd	4.15	nd	305	562
104	21.2	2.06	3.51	11.5	18.5	nd	10.4	25.0	23.5	22.0	7.85	36.8	8.25	31.5	4.46	12.9	4.45	nd	21.9	4.65	nd	2.69	nd	278	484
105	8.12	nd	1.52	4.69	9.22	nd	5.00	18.7	20.5	18.6	nd	43.5	nd	28.6	5.95	11.8	3.65	nd	16.1	4.26	nd	2.42	nd	210	385
Mean[a]	21.0	2.82	3.48	11.7	18.8	nd	10.9	28.1	27.2	26.5	4.50	46.2	9.32	39.0	5.79	16.9	5.55	<MDL	25.5	6.06	<MDL	3.21	nd	319	568
Std.dev.	14.4	1.69	1.36	4.70	6.52		4.14	7.02	5.57	6.29	5.33	6.79	5.47	8.85	0.928	4.46	1.56		6.82	1.63		0.970		85.2	140
Station BL2																									
106	16.5	2.65	1.76	5.19	9.31	nd	4.48	18.5	22.7	22.0	10.7	47.7	6.65	38.8	5.76	17.3	5.63	2.51	26.2	6.51	4.10	6.13	4.79	287	501
107[b]	41.6	5.17	2.50	6.12	9.73	nd	4.75	20.7	28.3	30.5	9.72	62.7	9.62	52.3	6.84	21.2	8.56	3.33	30.2	8.49	4.57	6.36	4.77	380	633
108	39.7	4.75	2.03	5.42	10.5	nd	5.05	23.0	31.2	33.3	nd	68.6	10.3	56.9	7.25	23.4	8.88	3.48	32.8	9.18	4.72	7.84	4.51	395	685
109	15.0	2.76	1.54	5.04	13.0	nd	5.98	21.2	25.9	26.4	nd	50.6	8.14	42.7	4.70	15.4	6.52	nd	22.8	6.38	2.56	4.02	2.74	287	527
110	143	6.69	6.68	16.2	20.5	nd	11.6	28.7	31.9	31.5	nd	56.8	9.95	47.7	5.44	17.6	7.52	2.69	30.4	7.51	3.62	5.43	3.83	498	688
Mean[a]	51.2	4.40	2.90	7.59	12.6	nd	6.37	22.4	28.0	28.7	4.55	57.3	8.93	47.7	6.00	19.0	7.42	2.62	28.5	7.61	3.91	5.96	4.13	369	607
Std. dev.	52.8	1.71	2.14	4.83	4.64	-	2.98	3.86	3.81	4.54	5.18	8.58	1.52	7.25	1.04	3.24	1.37	0.949	3.96	1.22	0.871	1.39	0.868	87.7	88.0
Station BL3																									
111	49.7	9.34	3.51	8.35	16.3	nd	6.86	28.4	38.1	44.5	nd	74.4	13.1	62.3	6.68	19.4	11.1	3.53	30.4	8.64	2.69	4.34	nd	445	766
112	35.7	6.47	2.35	5.82	13.4	nd	5.86	27.2	37.8	41.1	nd	78.5	11.7	64.8	6.91	22.2	10.3	3.16	33.7	8.57	2.66	3.86	nd	426	755
113	94.7	15.0	8.89	24.5	32.8	3.29	18.5	38.2	38.8	42.1	nd	69.3	16.7	60.9	7.32	21.6	10.8	3.63	39.0	10.0	3.11	3.59	2.34	566	912
114	51.7	7.43	3.07	4.13	6.78	nd	3.30	12.2	17.8	21.3	nd	45.2	5.81	37.6	4.73	14.8	5.56	2.31	18.9	5.49	nd	3.38	nd	276	430
Mean[a]	58.0	9.56	4.46	10.7	17.3	<MDL	8.63	26.5	33.1	37.3	nd	66.9	11.8	56.4	6.41	19.5	9.44	3.16	30.5	8.18	<MDL	3.79	<MDL	428	716
Std. dev.	25.5	3.82	3.00	9.36	11.1		6.75	10.7	10.2	10.7		14.9	4.53	12.6	1.15	3.36	2.61	0.600	8.51	1.91			0.415	119	203
Probability of Interstation Differences																									
P value[c]	0.073	0.014		0.51	0.36			0.37	0.35	0.28	0.26	0.049	0.54	0.093	0.57	0.5	0.043		0.47	0.11				0.37	0.27
Grouping		3>2=1										3>2>1					3>2>1								
Summary Statistics (n = 14)																									
Mean[a]	42.3	5.31	3.55	9.93	16.2	<MDL	8.62	25.6	29.2	30.4	3.46	56.0	9.90	47.1	6.04	18.4	7.33	2.54	28.0	7.22	2.67	4.36	2.29	368	624
Std. dev.	36.8	3.66	2.11	6.13	7.47		4.73	7.27	6.70	8.15	4.48	12.7	4.04	11.4	0.985	3.65	2.34	0.908	6.34	1.73	1.29	1.59	1.53	158	260
MDL	1.08	1.35	1.51	2.04	2.89	3.10	2.78	1.59	1.62	1.76	1.56	1.94	1.59	1.81	2.58	2.33	1.90	2.18	2.24	2.22	2.46	2.30	2.27	47.1	73.2

[a]Means are designated "nd" when all values are <MDL, and designated "<MDL" when at least one value was >MDL but the mean (calculated using a value of ½MDL for individual nondetectable values) was <MDL.
[b]Mean of triplicates.
[c]*P* values >0.05 indicate no interstation differences.

Table C7. PCB concentrations (ng/g [ppb] wet weight) in summer flounder muscle composites

Composite	PCB (BZ #)																							2x
#	1	8	18	28	52	104	44	66	101	118	188	153	105	138	126	187	128	200	180	170	195	206	209	ΣPCBs	Σ18 PCBs
Station FL1																									
115	1.09	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
116	1.18	nd	nd	nd	nd	nd	nd	2.03	1.65	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
Mean[a]	1.14	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
Std.dev.	0.064																								
Station FL2																									
117[b]	1.08	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
118	1.15	nd	nd	nd	nd	nd	nd	2.14	1.71	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
Mean[a]	1.12	nd	nd	nd	nd	nd	nd	<MDL	<MDL	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
Std. dev.	0.05																								
Station FL3																									
119	nd	nd	nd	nd	nd	nd	nd	1.79	1.62	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
120	6.20	nd	nd	nd	nd	nd	nd	2.62	2.30	3.01	nd	5.11	nd	3.26	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
121	6.12	nd	nd	nd	nd	nd	nd	2.08	1.75	2.26	nd	3.72	nd	2.57	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
Mean[a]	4.29	nd	nd	nd	nd	nd	nd	2.16	1.89	2.05	nd	3.27	nd	2.25	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
Std. dev.	3.24							0.421	0.361	1.08		2.11		1.21											
Station FL4																									
122	1.16	nd	nd	nd	nd	nd	nd	1.76	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
123	nd	nd	nd	nd	nd	nd	nd	nd	1.64	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
124	4.36	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
Mean[a]	2.02	nd	nd	nd	nd	nd	nd	<MDL	<MDL	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
Std. dev.	2.05																								
Station FL5																									
125	2.26	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
126	1.84	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
Mean[a]	2.05	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
Std. dev.	0.297																								
Station FL6																									
127[b]	2.54	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
128	3.20	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
Mean[a]	2.87	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
Std. dev.	0.467																								
Probability of Interstation Differences																									
P value[c]	0.57																								
Summary Statistics (n = 14)																									
Mean[a]	2.68	nd	nd	nd	nd	nd	nd	<MDL	<MDL	<MDL	nd	<MDL	nd	<MDL	nd	nd	nd	nd	nd	nd	nd	nd	nd	<MDL	<MDL
Std. dev.	1.92																								
MDL	1.08	1.35	1.51	2.04	2.89	3.10	2.78	1.59	1.62	1.76	1.56	1.94	1.59	1.81	2.58	2.33	1.90	2.18	2.24	2.22	2.46	2.30	2.27	47.1	73.2

[a]Means are designated "nd" when all values are <MDL, and designated "<MDL" when at least one value was >MDL but the mean (calculated using a value of ½MDL for individual nondetectable values) was <MDL.
[b]Mean of triplicates.
[c]*P* values >0.05 indicate no interstation differences.

Table C8. PCB concentrations (ng/g [ppb] wet weight) in black sea bass muscle composites

Composite	PCB (BZ #)																							2x
#	1	8	18	28	52	104	44	66	101	118	188	153	105	138	126	187	128	200	180	170	195	206	209	ΣPCBs	Σ18 PCBs
Station SB1																									
129	7.57	1.63	nd	nd	3.85	nd	nd	7.63	7.41	7.92	nd	16.8	nd	10.5	2.61	4.38	nd	nd	4.30	nd	nd	nd	nd	87.6	148
130	7.68	nd	nd	nd	3.41	nd	nd	6.76	6.40	7.00	nd	15.3	nd	8.83	2.72	3.97	nd	nd	3.99	nd	nd	nd	nd	79.7	132
131	2.64	nd	nd	nd	3.59	nd	nd	5.55	5.28	4.95	nd	8.90	nd	7.12	nd	2.85	nd	nd	3.34	nd	nd	nd	nd	59.1	104
132	1.85	nd	nd	nd	nd	nd	nd	2.71	2.79	3.22	nd	6.24	nd	4.67	nd	2.45	nd	nd	2.27	nd	nd	nd	nd	42.6	72.0
Mean[a]	4.94	<MDL	nd	nd	3.07	nd	nd	5.66	5.47	5.77	nd	11.8	nd	7.78	<MDL	3.41	nd	nd	3.48	nd	nd	nd	nd	67.2	114
Std. dev.	3.12				1.10			2.15	1.99	2.11		5.05		2.49		0.911			0.897					20.3	33.3
Station SB2																									
133	1.73	nd	nd	nd	nd	nd	nd	4.23	4.14	4.07	1.60	6.97	1.59	5.35	nd	nd	nd	nd	2.42	nd	nd	nd	nd	46.9	79.3
134	1.78	nd	nd	nd	nd	nd	nd	4.05	4.02	4.25	1.69	7.19	1.64	5.65	nd	2.35	nd	nd	2.40	nd	nd	nd	nd	49.8	84.8
135	3.80	nd	nd	nd	3.08	nd	nd	5.08	5.11	5.33	nd	9.20	2.00	6.99	nd	3.10	nd	nd	3.00	nd	nd	nd	nd	60.8	105
136	3.15	nd	nd	2.35	4.37	nd	nd	6.82	7.46	7.45	2.84	13.2	2.81	10.2	nd	3.85	nd	nd	4.99	nd	nd	nd	nd	81.8	144
137	6.28	nd	nd	nd	3.91	nd	nd	6.34	6.91	7.34	2.74	13.1	2.76	9.98	nd	3.94	nd	nd	5.04	nd	nd	nd	nd	81.7	137
Mean[a]	3.75	nd	nd	<MDL	3.20	nd	nd	5.57	5.88	6.09	2.01	10.7	2.30	8.21	nd	3.31	nd	1.09	3.86	nd	nd	nd	nd	68.5	118
Std. dev.	1.88				1.29			1.25	1.59	1.57	0.972	2.98	0.577	2.25		0.743			1.36					15.9	27.8
Summary Statistics for Stations SB1 and SB2 (n = 9)																									
Mean[a]	4.05	<MDL	nd	<MDL	<MDL	nd	nd	5.46	5.50	5.73	<MDL	10.8	<MDL	7.70	<MDL	2.99	nd	nd	3.53	nd	nd	nd	nd	65.6	112
Std. dev.	2.39							1.88	1.93	2.01		4.22		2.65		1.36			1.34					21.5	36.5
Station SB3																									
138[b]	7.05	nd	nd	3.54	6.26	nd	3.08	8.83	8.41	8.37	2.88	13.5	3.11	10.9	nd	4.58	nd	nd	5.20	nd	nd	nd	nd	96.6	166
139	10.7	1.46	nd	4.59	8.09	nd	4.19	12.6	11.8	13.0	nd	19.5	4.69	17.1	nd	6.65	2.12	nd	7.57	2.48	nd	nd	nd	136	240
140	7.93	nd	nd	3.52	6.46	nd	3.43	10.9	10.1	10.7	nd	16.7	3.99	14.6	nd	5.65	nd	nd	6.66	nd	nd	nd	nd	112	199
141	2.95	nd	nd	2.49	4.83	nd	nd	7.78	7.89	8.10	nd	13.7	3.04	11.1	nd	4.57	nd	nd	5.04	nd	nd	nd	nd	84.6	154
142	nd	nd	nd	nd	4.10	nd	nd	6.65	7.92	9.65	nd	16.5	3.67	13.2	nd	5.70	nd	nd	6.43	nd	nd	nd	nd	88.5	166
Mean[a]	5.54	<MDL	nd	2.91	5.87	nd	2.60	9.48	9.43	10.4	<MDL	16.6	3.85	14.0	nd	5.64	<MDL	nd	6.43	<MDL	nd	nd	nd	105	190
Std. dev.	4.61			1.52	1.78		1.43	2.75	1.89	2.06		2.37	0.69	2.52		0.850								23.6	38.6
Probability of Interstation Differences																									
P value[c]	0.52							0.031	0.011	0.011		0.061		0.011										0.016	0.011
Grouping								3>2=1	3>2=1	3>2=1				3>2=1										3>2=1	3>2=1
Summary Statistics for All Stations (n = 14)																									
Mean[a]	4.69	<MDL	nd	<MDL	4.02	nd	<MDL	6.85	6.83	7.24	nd	12.6	2.32	9.73	<MDL	3.86	nd	nd	4.48	<MDL	nd	nd	nd	79.1	138
Std. dev.	3.10				1.96			2.66	2.45	2.74		4.24	1.31	3.62		1.67			1.68					26.0	47.4
MDL	1.08	1.35	1.51	2.04	2.89	3.10	2.78	1.59	1.62	1.76	1.56	1.94	1.59	1.81	2.58	2.33	1.90	2.18	2.24	2.22	2.46	2.30	2.27	47.1	73.2

[a]Means are designated "nd" when all values are <MDL, and designated "<MDL" when at least one value was >MDL but the mean (calculated using a value of ½MDL for individual nondetectable values) was <MDL.
[b]Mean of triplicates.
[c]*P* values >0.05 indicate no interstation differences.

Table C9. PCB concentrations (ng/g [ppb] wet weight) in tautog muscle composites

Composite	PCB (BZ #)																							2x
#	**1**	**8**	**18**	**28**	**52**	**104**	**44**	**66**	**101**	**118**	**188**	**153**	**105**	**138**	**126**	**187**	**128**	**200**	**180**	**170**	**195**	**206**	**209**	**ΣPCBs**	**Σ18 PCBs**
												Station TA1													
143	5.28	1.71	nd	nd	nd	nd	nd	2.54	3.00	2.67	nd	5.29	nd	2.27	nd	nd	nd	nd	nd	nd	nd	nd	nd	38.8	57.6
144	6.52	nd	nd	nd	nd	nd	nd	1.82	3.83	2.34	nd	5.24	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	38.1	53.8
145	5.37	nd	nd	nd	nd	nd	nd	2.93	5.55	3.96	nd	8.12	1.79	2.87	nd	3.06	nd	nd	nd	nd	nd	nd	nd	50.3	80.5
146[b]	5.81	nd	nd	nd	nd	nd	nd	2.57	6.09	4.01	nd	8.63	2.00	2.80	nd	3.56	nd	nd	nd	nd	nd	nd	nd	52.2	83.3
147	8.88	nd	nd	2.66	3.71	nd	nd	2.06	7.30	4.40	nd	12.0	2.57	2.88	nd	4.54	nd	nd	3.35	nd	nd	nd	nd	67.5	108
Mean[a]	6.372	<MDL	nd	<MDL	<MDL	nd	nd	2.38	5.15	3.48	nd	7.86	<MDL	<MDL	nd	<MDL	nd	nd	<MDL	nd	nd	nd	nd	49.4	76.6
Std. dev.	1.485							0.442	1.73	0.910		2.80												12.0	21.9
												Station TA2													
148	8.31	1.52	nd	nd	nd	nd	nd	2.68	6.18	3.39	nd	8.64	1.85	2.78	nd	3.98	nd	nd	2.40	nd	nd	nd	nd	56.6	87.2
149	6.55	nd	nd	nd	nd	nd	nd	2.69	5.56	3.95	nd	8.49	1.92	2.91	nd	3.30	nd	nd	2.25	nd	nd	nd	nd	53.2	83.9
150	8.00	nd	nd	nd	nd	nd	nd	2.50	4.27	3.18	nd	6.86	nd	2.92	nd	2.65	nd	nd	nd	nd	nd	nd	nd	47.1	68.7
151	8.01	1.43	nd	2.45	3.35	nd	nd	4.36	6.64	5.55	nd	11.9	2.40	5.55	nd	4.19	nd	nd	3.05	nd	nd	nd	nd	71.3	117
Mean[a]	7.72	<MDL	nd	<MDL	<MDL	nd	nd	3.06	5.66	4.02	nd	8.97	<MDL	3.54	nd	3.53	nd	nd	<MDL	nd	nd	nd	nd	57.0	89.2
Std. dev.	0.792							0.87	1.03	1.07		2.11		1.34		0.699								10.3	20.3
												Station TA3													
152	7.92	nd	nd	2.93	3.12	nd	nd	2.02	7.74	4.14	nd	9.83	2.36	3.15	nd	4.55	nd	nd	4.45	nd	nd	nd	nd	65.3	105
153	6.08	nd	nd	nd	nd	nd	nd	nd	3.78	1.90	nd	5.23	nd	nd	nd	2.43	nd	nd	nd	nd	nd	nd	nd	37.5	53.4
154	8.24	1.44	nd	3.74	4.83	nd	nd	3.22	8.89	5.46	nd	15.1	2.97	3.79	nd	5.64	nd	nd	5.72	nd	nd	nd	nd	81.5	137
155	3.41	1.58	nd	4.80	6.90	nd	nd	5.76	12.3	9.00	nd	18.1	3.89	8.80	2.58	6.87	nd	nd	5.24	nd	nd	nd	nd	100	182
156[b]	9.57	nd	nd	4.61	5.52	nd	nd	5.95	12.1	10.1	nd	23.2	4.60	8.01	nd	9.47	nd	nd	7.15	2.40	nd	nd	nd	117	203
Mean[a]	7.04	<MDL	nd	3.42	4.36	nd	nd	3.55	8.96	6.12	nd	14.3	2.92	4.93	<MDL	5.79	nd	nd	4.51	<MDL	nd	nd	nd	80.3	119
Std. dev.	2.38			1.53	2.12			2.27	3.51	3.40		7.01	1.47	3.36		2.62			2.71					30.8	54.1
												Probability of Interstation Differences													
P value[c]	0.37								0.13	0.36		0.27												0.22	0.22
												Summary Statistics (n = 14)													
Mean[a]	5.20	<MDL	nd	<MDL	3.18	nd	nd	3.18	6.34	4.85	nd	10.7	2.18	4.44	<MDL	4.15	nd	nd	3.24	<MDL	nd	nd	nd	58.7	98.1
Std. dev.	3.21				2.65			1.94	4.11	3.19		6.95	1.80	3.04		3.17			2.65					37.3	64.3
MDL	1.08	1.35	1.51	2.04	2.89	3.10	2.78	1.59	1.62	1.76	1.56	1.94	1.59	1.81	2.58	2.33	1.90	2.18	2.24	2.22	2.46	2.30	2.27	47.1	73.2

[a]Means are designated "nd" when all values are <MDL, and designated "<MDL" when at least one value was >MDL but the mean (calculated using a value of ½MDL for individual nondetectable values) was <MDL.
[b]Mean of triplicates.
[c]*P* values >0.05 indicate no interstation differences.

Table C10. Pesticide concentrations (ng/g [ppb] wet weight) in bluefish muscle composites

Composite #	Pesticide: Hexachloro-benzene	Lindane	Endrin	Heptachlor	Oxy-chlordane	α-chlor-dane	trans-nonachlor	o,p'-DDE	p,p'-DDE	p,p'-DDD	p,p'-DDT	Photo-mirex	Mirex	ΣChlor-danes	ΣDDT
Station BL1															
101	nd	nd	5.39	nd	2.11	26.3	11.7	17.2	96.0	85.9	3.17	6.06	nd	40.7	202
102	nd	1.84	14.6	nd	2.43	30.2	14.5	17.2	102	73.7	5.97	7.31	nd	47.6	198
103	nd	nd	4.12	nd	nd	22.1	9.63	13.4	83.8	65.0	3.70	5.70	nd	33.3	166
104	nd	nd	9.34	nd	nd	19.8	8.63	11.6	68.8	50.5	3.26	4.30	nd	29.9	134
105	nd	nd	3.46	nd	nd	14.4	6.00	7.70	46.6	42.1	3.39	3.77	nd	21.9	100
Mean[a]	nd	<MDL	7.39	nd	<MDL	22.5	10.1	13.4	79.4	63.4	3.90	5.43	nd	34.7	160
Std. dev.			4.65			6.06	3.19	4.03	22.2	17.6	1.18	1.42		9.89	43.5
Station BL2															
106	nd	nd	3.51	nd	nd	21.5	11.8	10.3	88.8	43.0	4.92	5.72	nd	34.9	147
107[b]	nd	2.12	4.59	nd	2.37	27.5	15.9	12.4	111	53.2	6.80	7.18	nd	46.3	184
108	nd	1.95	4.60	nd	2.11	29.3	16.4	12.3	114	54.3	5.90	7.98	nd	48.4	187
109	nd	nd	nd	nd	nd	20.7	9.94	8.13	67.4	37.1	7.38	5.25	1.89	32.1	120
110	nd	2.66	5.31	nd	nd	29.7	14.1	15.3	89.6	76.1	13.3	6.02	3.07	45.4	194
Mean[a]	nd	1.59	3.92	nd	<MDL	25.7	13.6	11.7	94.3	52.8	7.67	6.43	<MDL	41.4	166
Std. dev.		0.936	1.44			4.34	2.73	2.68	19.1	14.9	3.31	1.12		7.37	31.7
Station BL3															
111	1.39	3.94	4.32	nd	2.05	33.4	13.7	8.85	69.1	34.3	5.79	6.93	2.56	49.7	118
112	nd	1.51	4.35	nd	2.31	35.1	17.0	10.6	84.2	40.9	7.18	7.53	3.07	54.9	143
113	nd	5.65	6.56	1.57	2.78	38.1	19.9	20.1	117	105	25.8	8.46	5.30	62.4	268
114	nd	2.38	nd	nd	nd	15.6	8.51	4.25	51.4	17.8	3.49	4.83	3.79	25.6	76.9
Mean[a]	<MDL	3.37	4.21	<MDL	2.02	30.5	14.8	10.9	80.5	49.5	10.6	6.94	3.68	48.2	152
Std. dev.		1.82	2.02		0.775	10.2	4.89	6.65	28.1	38.2	10.3	1.54	1.19	15.9	82.5
Probability of Interstation Differences															
P value[c]						0.2	0.19	0.64	0.6	0.4	0.06	0.32		0.20	0.66
Summary Statistics (n = 14)															
Mean[a]	<MDL	1.83	5.24	<MDL	<MDL	26.0	12.7	12.1	85.0	55.6	7.15	6.22	1.93	40.9	160
Std. dev.		1.48	3.21			7.02	3.85	4.17	21.5	22.5	5.84	1.36	1.39	11.4	48.2
MDL	1.35	1.21	3.22	1.16	1.90	1.33	1.14	1.72	2.43	1.89	2.56	1.69	1.84	5.54	8.60

[a]Means are designated "nd" when all values are <MDL, and designated "<MDL" when at least one value was >MDL but the mean (calculated using a value of ½MDL for individual nondetectable values) was <MDL.
[b]Mean of triplicates.
[c]*P* values >0.05 indicate no interstation differences.

Table C11. Pesticide concentrations (ng/g [ppb] wet weight) in summer flounder muscle composites

Composite #	Pesticide: Hexachloro-benzene	Lindane	Endrin	Heptachlor	Oxy-chlordane	α-chlor-dane	trans-nonachlor	o,p'-DDE	p,p'-DDE	p,p'-DDD	p,p'-DDT	Photo-mirex	Mirex	ΣChlor-danes	ΣDDT
Station FL1															
115	nd	nd	nd	nd	nd	1.37	nd	nd	nd	nd	nd	nd	nd	<MDL	nd
116	nd	nd	nd	nd	nd	1.43	nd	nd	nd	nd	nd	nd	nd	<MDL	nd
Mean[a]	nd	nd	nd	nd	nd	1.43	nd	nd	nd	nd	nd	nd	nd	<MDL	nd
Station FL2															
117[b]	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
118	nd	nd	nd	nd	nd	1.45	nd	nd	nd	nd	nd	nd	nd	<MDL	nd
Mean[a]	nd	nd	nd	nd	nd	<MDL	nd	nd	nd	nd	nd	nd	nd	<MDL	nd
Station FL3															
119	nd	nd	nd	nd	nd	1.38	nd	nd	nd	3.81	nd	nd	nd	<MDL	<MDL
120	nd	nd	nd	nd	nd	1.98	nd	nd	4.12	3.97	nd	nd	nd	<MDL	<MDL
121	nd	nd	nd	nd	nd	1.47	nd	nd	2.48	3.59	nd	nd	nd	<MDL	<MDL
Mean[a]	nd	nd	nd	nd	nd	1.60	nd	nd	2.60	3.79	nd	nd	nd	<MDL	<MDL
Std. dev.						0.326			1.46	0.193					
Station FL4															
122	nd	nd	nd	nd	nd	nd	nd	nd	nd	2.01	nd	nd	nd	nd	<MDL
123	nd	nd	nd	nd	nd	1.54	nd	nd	nd	nd	nd	nd	nd	<MDL	nd
124	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean[a]	nd	nd	nd	nd	nd	<MDL	nd	nd	nd	<MDL	nd	nd	nd	<MDL	<MDL
Station FL5															
125	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
126	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean[a]	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Station FL6															
127[b]	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
128	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Mean[a]	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
Summary Statistics (n = 14)[c]															
Mean[a]	nd	nd	nd	nd	nd	<MDL	nd	nd	<MDL	<MDL	nd	nd	nd	<MDL	<MDL
MDL	1.35	1.21	3.22	1.16	1.90	1.33	1.14	1.72	2.43	1.89	2.56	1.69	1.84	5.54	8.60

[a]Means are designated "nd" when all values are <MDL, and designated "<MDL" when at least one value was >MDL but the mean (calculated using a value of ½MDL for individual nondetectable values) was <MDL.
[b]Mean of triplicates.
[c]No composite mean was >3 x MDL; therefore, interstation differences were not calculated.

Table C12. Pesticide concentrations (ng/g [ppb] wet weight) in black sea bass muscle composites

Composite #	Hexachloro-benzene	Lindane	Endrin	Heptachlor	Oxy-chlordane	α-chlor-dane	trans-nonachlor	o,p'-DDE	p,p'-DDE	p,p'-DDD	p,p'-DDT	Photo-mirex	Mirex	ΣChlor-danes	ΣDDT
	Pesticide														
Station SB1															
129	nd	nd	nd	nd	nd	3.33	2.60	2.91	9.87	10.8	nd	nd	nd	7.46	24.9
130	nd	nd	nd	nd	nd	3.40	2.29	2.52	9.37	9.93	nd	nd	nd	7.22	23.1
131	nd	nd	nd	nd	nd	2.93	2.00	1.81	8.43	5.43	nd	nd	nd	6.46	16.9
132	nd	nd	nd	nd	nd	nd	nd	nd	4.15	3.04	nd	nd	nd	<MDL	9.33
Mean[a]	nd	nd	nd	nd	nd	2.58	1.86	2.02	7.95	7.31	nd	nd	nd	5.98	18.6
Std. dev.						0.207	0.246	0.456	2.25	3.21				1.89	6.09
Station SB2															
133	nd	nd	nd	nd	nd	1.82	1.48	nd	7.16	4.67	nd	nd	nd	<MDL	14.0
134	nd	nd	nd	nd	nd	2.03	1.42	nd	6.62	4.30	nd	nd	nd	<MDL	13.1
135	nd	nd	nd	nd	nd	2.28	1.75	nd	9.20	4.56	nd	nd	nd	5.56	15.9
136	nd	nd	nd	nd	nd	4.38	2.74	2.53	13.8	9.00	nd	nd	nd	8.65	26.6
137	nd	nd	nd	nd	nd	3.49	2.58	2.26	13.2	8.40	nd	nd	nd	7.60	25.1
Mean[a]	nd	nd	nd	nd	nd	2.80	2.00	<MDL	9.98	6.19	nd	nd	nd	6.33	18.9
Std. dev.						0.979	0.558		2.98	2.06				1.53	5.74
Station SB3															
138[b]	nd	nd	nd	nd	nd	4.21	2.79	2.91	13.7	9.34	nd	nd	nd	8.52	27.3
139	nd	nd	nd	nd	nd	5.42	3.47	3.57	24.0	11.6	nd	1.81	nd	10.4	40.4
140	nd	nd	nd	nd	nd	5.76	3.05	3.30	18.6	11.0	nd	1.71	nd	10.3	34.2
141	nd	nd	nd	nd	nd	4.15	2.73	2.48	12.7	8.38	nd	nd	nd	8.41	24.8
142	nd	nd	nd	nd	nd	3.11	2.56	2.05	13.1	7.47	nd	1.93	nd	7.20	23.9
Mean[a]	nd	nd	nd	nd	nd	4.53	2.92	2.86	16.41	9.55	nd	<MDL	nd	8.98	30.1
Std. dev.						0.957	0.316	0.548	4.35	1.55				1.23	6.30
Probability of Interstation Differences															
P value[c]						0.1			0.1	0.2				0.086	0.086
Summary Statistics (n = 14)															
Mean[a]	nd	nd	nd	nd	nd	3.35	2.29	2.13	11.70	7.71	nd	<MDL	nd	7.17	22.8
Std. dev.						1.43	0.849	1.15	5.38	2.97				2.56	9.18
MDL	1.35	1.21	3.22	1.16	1.90	1.33	1.14	1.72	2.43	1.89	2.56	1.69	1.84	5.54	8.60

[a]Means are designated "nd" when all values are <MDL, and designated "<MDL" when at least one value was >MDL but the mean (calculated using a value of ½MDL for individual nondetectable values) was <MDL.
[b]Mean of triplicates.
[c]*P* values >0.05 indicate no interstation differences.

Table C13. Pesticide concentrations (ng/g [ppb] wet weight) in tautog muscle composites

Composite #	Pesticide: Hexachloro-benzene	Lindane	Endrin	Heptachlor	Oxy-chlordane	α-chlor-dane	trans-nonachlor	o,p'-DDE	p,p'-DDE	p,p'-DDD	p,p'-DDT	Photo-mirex	Mirex	ΣChlor-danes	ΣDDT
Station TA1															
143	nd	nd	nd	nd	nd	1.62	1.23	nd	nd	3.08	nd	nd	2.20	<MDL	<MDL
144	nd	nd	nd	nd	nd	nd	nd	nd	2.52	3.40	nd	nd	nd	nd	<MDL
145	nd	nd	nd	nd	nd	nd	1.53	nd	4.90	5.04	nd	nd	nd	<MDL	12.1
146[b]	nd	nd	nd	nd	nd	nd	1.89	nd	4.52	5.72	nd	nd	nd	<MDL	12.4
147	nd	nd	nd	nd	nd	nd	2.46	nd	9.57	7.50	nd	nd	nd	<MDL	19.2
Mean[a]	nd	nd	nd	nd	nd	<MDL	1.54	nd	4.54	4.95	nd	nd	<MDL	<MDL	11.6
Std. dev.							0.706		3.18	1.81		4.95			
Station TA2															
148	nd	nd	nd	nd	nd	nd	1.90	1.82	4.44	5.68	nd	nd	nd	<MDL	13.2
149	nd	nd	nd	nd	nd	nd	1.57	nd	3.32	4.78	nd	nd	nd	<MDL	10.2
150	nd	nd	nd	nd	nd	nd	1.27	nd	3.11	4.33	nd	nd	nd	<MDL	9.58
151	nd	nd	nd	nd	nd	1.81	2.05	1.75	4.66	5.87	nd	nd	nd	<MDL	13.6
Mean[a]	nd	nd	nd	nd	nd	<MDL	1.70	nd	3.88	5.16	nd	nd	nd	<MDL	11.6
Std. dev.							0.351		0.779	0.731					2.03
Station TA3															
152	nd	nd	nd	nd	nd	nd	1.84	nd	7.40	5.83	nd	nd	nd	<MDL	15.4
153	nd	nd	nd	nd	nd	nd	1.35	nd	2.91	4.12	nd	nd	nd	<MDL	9.18
154	nd	nd	nd	nd	3.93	2.37	3.99	2.50	13.6	12.1	nd	nd	nd	9.16	29.5
155	nd	nd	nd	nd	nd	2.28	3.56	2.39	4.52	9.46	nd	nd	nd	7.38	17.6
156[b]	nd	nd	nd	nd	2.36	1.90	3.94	2.16	15.7	11.1	nd	1.88	nd	8.79	30.3
Mean[a]	nd	nd	nd	nd	1.83	<MDL	2.94	nd	8.83	8.53	nd	<MDL	nd	6.58	20.4
Std. dev.					1.32		1.25		5.61	3.43				2.64	9.20
Probability of Interstation Differences															
P value[c]									0.3	0.2				0.37	0.19
Summary Statistics (n = 14)															
Mean[a]	nd	nd	nd	nd	<MDL	<MDL	2.05	nd	5.60	6.19	nd	<MDL	<MDL	<MDL	14.4
Std. dev.							1.05		4.27	2.78					7.31
MDL	1.35	1.21	3.22	1.16	1.90	1.33	1.14	1.72	2.43	1.89	2.56	1.69	1.84	5.54	8.60

[a]Means are designated "nd" when all values are <MDL, and designated "<MDL" when at least one value was >MDL but the mean (calculated using a value of ½MDL for individual nondetectable values) was <MDL.
[b]Mean of triplicates.
[c]*P* values >0.05 indicate no interstation differences.

Table C14. Concentrations (ng/g [ppb] wet weight) of PAHs in muscle composites

Bluefish[a]

Composite #	Acenaphthene
Station BL1	
101	8.93
102	8.39
103	nd
104	5.61
105	3.33
Mean	5.47
Std. dev.	3.33
Station BL2	
106	6.44
107[f]	8.34
108	6.78
109	5.06
110	4.33
Mean	6.19
Std. dev.	1.56
Station BL3	
111	6.36
112	3.68
113	nd
114	3.66
Mean	3.69
Std. dev.	2.16
Summary Statistics[h] (n = 14)	
Mean	5.22
Std. dev.	2.52
MDL	2.15

Summer Flounder[b]

Composite #	Naphthalene	2-methylnaphthalene	1-methylnaphthalene	Benz[a]anthracene
Station FL1				
115	nd	nd	nd	nd
116	nd	nd	nd	nd
Mean[e]	nd	nd	nd	nd
Std. dev.				
Station FL2				
117[f]	nd	nd	nd	nd
118	nd	nd	nd	3.06
Mean	nd	nd	nd	<MDL
Std. dev.				
Station FL3				
119	7.40	12.1	6.73	3.75
120	nd	nd	nd	2.68
121	nd	nd	nd	nd
Mean	3.33	4.49	3.04	2.56
Std. dev.	2.87	6.57	3.20	1.26
Station FL4				
122	nd	nd	nd	2.68
123	nd	nd	nd	2.51
124	nd	nd	nd	3.92
Mean	nd	nd	nd	3.03
Std. dev.				0.773
Station FL5				
125	nd	nd	nd	2.60
126	nd	nd	nd	nd
Mean	nd	nd	nd	<MDL
Std. dev.				
Station FL6				
127[f]	nd	nd	nd	nd
128	nd	nd	nd	nd
Mean	nd	nd	nd	nd
Std. dev.				
Summary Statistics[h] (n = 14)				
Mean	<MDL	1.51	<MDL	<MDL
Std. dev.		3.04		
MDL	2.59	1.40	2.38	2.48

Black Sea Bass[c]

Composite #	Benz[a]anthracene
Station SB1	
129	nd
130	nd
131	nd
132	nd
Mean	nd
Std. dev.	
Station SB2	
133[g]	
134	3.35
135	3.13
136	3.02
137	3.09
Mean	3.15
Std. dev.	0.141
Station SB3	
138[f]	nd
139	nd
140	nd
141	nd
142	nd
Mean	nd
Std. dev.	
Summary Statistics[h] (n = 14)	
Mean	<MDL
Std. dev.	
MDL	2.48

Tautog[d]

Composite #	2-methylnaphthalene	Benz[a]anthracene
Station TA1		
143	nd	2.80
144	nd	2.95
145	nd	2.75
146[f]	nd	2.69
147	nd	2.69
Mean	nd	2.77
Std. dev.		0.111
Station TA2		
148	nd	2.89
149	nd	nd
150	nd	nd
151	nd	3.05
Mean	nd	<MDL
Std. dev.		
Station TA3		
152	nd	2.69
153	nd	2.67
154	nd	3.21
155	1.41	3.73
156[f]	nd	3.65
Mean	<MDL	3.19
Std. dev.		0.507
Summary Statistics[h] (n = 14)		
Mean	<MDL	2.73
Std. dev.		0.719
MDL	1.40	2.48

[a]Naphthalene, 2-methylnaphthalene, 1-methylnaphthalene, and benz[a]anthracene were not found in any of the 14 bluefish composites.
[b]Acenaphthene was not found in any of the 14 summer flounder composites.
[c]Naphthalene, 2-methylnaphthalene, 1-methylnaphthalene, and acenaphthene were not found in any of the 14 black sea bass composites.
[d]Naphthalene, 1-methylnaphthalene, and acenaphthene were not found in any of the 14 tautog composites.
[e]Means are designated "nd" when all values are <MDL, and designated "<MDL" when at least one value was above the MDL but the mean (calculated using a value of ½MDL for individual nondetectable values) was <MDL.
[f]Mean of triplicates.
[g]PAHs were not analyzed for this muscle composite.
[h]No station mean was >3 x MDL; therefore, interstation differences were not calculated.

Table C15. Concentrations (pg/g [pptr] wet weight) of 2,3,7,8-substituted PCDD and PCDF cogeners in muscle composites

Bluefish[a]

Composite #	2,3,7,8-TCDD	OCDD	2,3,7,8-TCDF	2,3,7,8-TCDD TE[d]
Station BL1				
101	2.61	4.42	2.96	2.9
102	nd	18.3	4.26	1.3
103	3.30	nd	2.51	3.6
104	2.29	nd	2.17	2.5
105	2.44	nd	2.31	2.7
Mean[f]	2.29	4.88	2.84	2.61
Std. dev.	0.694	7.58	0.846	0.84
Station BL2				
106	1.64	nd	3.11	2.0
107[e]	2.13	4.63	4.96	2.7
108	1.82	nd	3.66	2.2
109	2.29	nd	3.31	2.7
110	3.76	nd	4.16	4.2
Mean	2.33	<MDL	3.84	2.75
Std. dev.	0.840		0.742	0.87
Summary Statistics for Stations BL1 and BL2 (n = 10)				
Mean			3.34	
Std. Dev.			0.82	
Station BL3				
111	nd	nd	8.93	1.7
112	nd	nd	5.89	1.4
113	7.27	nd	9.99	8.3
114	nd	4.14	4.23	1.3
Mean	2.43	<MDL	7.26	3.19
Std. dev.	3.23		2.66	3.42

Summer Flounder[b]

Composite #	OCDD	2,3,7,8-TCDD TE[d]
Station FL1		
115	2.01	0.90
116	nd	0.90
Mean	<MDL	<MDL
Std. dev.		
Station FL2		
117[e]	nd	0.90
118	5.78	0.91
Mean	<MDL	<MDL
Std. dev.		
Station FL3		
119	nd	0.90
120	nd	0.90
121	nd	0.90
Mean	nd	nd
Std. dev.		
Station FL4		
122	nd	0.90
123	nd	0.90
124	nd	0.90
Mean	nd	nd
Std. dev.		

Black Sea Bass[c]

Composite #	OCDD	2,3,7,8-TCDF	2,3,7,8-TCDD TE[d]
Station SB1			
129	nd	nd	0.90
130	nd	nd	0.90
131	nd	nd	0.90
132	nd	nd	0.90
Mean	nd	nd	nd
Std. dev.			
Station SB2			
133	nd	1.31	0.98
134	nd	nd	0.90
135	nd	1.18	0.97
136	nd	2.63	1.1
137	nd	1.28	0.98
Mean	nd	1.39	<MDL
Std. dev.		0.757	
Station SB3			
138[e]	nd	2.47	1.1
139	nd	1.16	0.96
140	nd	1.48	1.0
141	nd	nd	0.90
142	6.39	nd	0.91
Mean	<MDL	1.24	<MDL
Std. dev.		0.792	

Tautog

Composite #	2,3,7,8-TCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	2,3,7,8-TCDD TE[d]
Station TA1					
143	nd	nd	nd	2.03	1.1
144	nd	11.9	83.0	0.55	1.1
145	nd	nd	nd	2.31	1.1
146[e]	3.39	nd	4.78	2.39	3.7
147	nd	nd	nd	3.07	1.2
Mean	<MDL	<MDL	18.8	1.96	<MDL
Station TA2					
148	nd	nd	nd	2.53	1.1
149	nd	nd	nd	2.43	1.1
150	nd	nd	nd	1.80	1.0
151	nd	nd	nd	2.52	1.1
Mean	nd	nd	nd	2.32	<MDL
Std. dev.				0.350	
Station TA3					
152	2.36	nd	nd	3.41	2.7
153	nd	nd	nd	1.46	0.99
154	nd	nd	nd	4.13	1.3
155	2.95	nd	9.78	4.53	0.50
156[e]	2.64	nd	nd	4.22	3.1
Mean	<MDL	nd	<MDL	3.55	<MDL
Std. dev.				1.24	

Table C15. (Cont.)

Bluefish[a]					Summer Flounder[b]			Black Sea Bass[c]				Tautog					
Composite #	2,3,7,8-TCDD	OCDD	2,3,7,8-TCDF	2,3,7,8-TCDD TE[d]	Composite #	OCDD	2,3,7,8-TCDD TE[d]	Composite #	OCDD	2,3,7,8-TCDF	2,3,7,8-TCDD TE[d]	Composite #	2,3,7,8-TCDD	1,2,3,4,6,7,8-HpCDD	OCDD	2,3,7,8-TCDF	2,3,7,8-TCDD TE[d]
					Station FL5												
					125	nd	0.90										
					126	nd	0.90										
					Mean	nd	nd										
					Std. dev.												
					Station FL6												
					127[e]	4.22	0.91										
					128	nd	0.90										
					Mean	<MDL	<MDL										
					Std. dev.												
Probability of Interstation Differences																	
P value[g]			0.017									*P* value				0.13	
Grouping			3>1=2														
Summary Statistics for All Stations (n=14)																	
Mean	2.34	<MDL	4.46	2.82	Mean	<MDL	<MDL	Mean	<MDL	<MDL	<MDL	Mean	<MDL	<MDL	8.12	2.59	<MDL
Std. dev.	1.64		2.31	1.72	Std. dev.							Std. dev.			21.5	1.20	
MDL	1.63	4.03	1.11	1.81	MDL	4.03	1.81	MDL	4.03	1.11	1.81	MDL	1.63	6.54	4.03	1.11	1.81

[a]1,2,3,4,6,7,8-HpCDD was not found in any of the 14 bluefish composites.
[b]2,3,7,8-TCDD, 1,2,3,4,6,7,8-HpCDD, and 2,3,7,8-TCDF were not found in any of the 14 summer flounder composites.
[c]2,3,7,8-TCDD and 1,2,3,4,6,7,8-HpCDD were not found in any of the 14 black sea bass composites.
[d]TE = toxic equivalents.
[e]Mean of triplicates.
[f]Means are designated "nd" when all values are <MDL, and designated "<MDL" when at least one value was above the MDL but the mean (calculated using a value of ½MDL for individual nondetectable values) was <MDL.
[g]*P* values >0.05 indicate no interstation differences.