1999 annual fish and shellfish report

Massachusetts Water Resources Authority

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EXECUTIVE SUMMARY

The Massachusetts Water Resources Authority (MWRA) continued to conduct its biomonitoring program for fish and shellfish in 1999. The 1999 activities represent the latest year in a continuing biomonitoring program that supports evaluation of the MWRA effluent discharged into Massachusetts Bay. The goal of the biomonitoring program is to obtain baseline data that may be used to assess the potential environmental impact of the effluent discharge on Massachusetts Bay, and to evaluate the facility's compliance against the NPDES effluent discharge permit.

The specific objective of the 1999 fish and shellfish monitoring program was to further define the baseline condition of three indicator species: winter flounder (*Pleuronectes americanus*), lobster (*Homarus americanus*), and blue mussel (*Mytilus edulis*). Flounder and lobster specimens were collected from three core sites in Boston Harbor and the Bays: Deer Island Flats (DIF), the Outfall Site (OS) and East Cape Cod Bay (ECCB). Flounder were collected also at two ancillary sites, Broad Sound (BS) and off Nantasket Beach (NB), to provide information on flounder in the general area of the existing Deer Island outfall. Caged mussels, collected from Gloucester and Sandwich, were deployed at four sites in Boston Harbor and the Bays to evaluate bioaccumulation potential. All collection and deployment sites are discussed in the 1999 Fish and Shellfish Report in terms of chemical contaminants and histological parameters in flounder.

Baseline conditions of the species collected were characterized in terms of biological parameters (*e.g.* length, weight, biological condition); external condition; and concentrations of organic and inorganic compounds in both edible and liver/hepatopancreas tissue. Flounder livers were examined for the extent and severity of lesions. The monitored parameters were examined for spatial distribution among stations in 1999 and inter-annual variations from previous monitoring data. In addition, body burdens of certain pesticides, PCBs, lead and mercury were compared to FDA Action Limits and monitoring program caution and warning levels to evaluate potential risk or trends.

Flounder

Winter flounder were collected at the five established monitoring locations in 1999. The mean length of fish collected at DIF was significantly higher than the other stations. Although this is unlikely to be biologically significant, it is consistent with findings from previous years. The external condition of fish indicated few abnormalities. Fin erosion at Deer Island was not significantly different than at the other stations and was extremely low at all stations.

Flounder liver histology results indicated that the prevalence of tubular and centrotubular hydropic vacuolation (CHV) was highest at BS and lowest at ECCB. Inter-annual comparison showed that CHV prevalence has not changed substantially at any of the stations since 1991. However, CHV prevalence at DIF has shown a decrease over the period 1987-1999 and in 1999 had the lowest recorded prevalence measured during the program. Neoplasia was absent from all fish collected in 1999. Neoplasm prevalence at DIF has fallen from elevated levels in the 1980's to undetectable levels during the period 1992-1999.

Fifteen winter flounder were collected at each of the five monitoring locations for chemical analysis of edible and liver tissues. The spatial patterns of tissue contaminant levels in winter flounder were examined. Mean 1999 concentrations of organic compounds in fillets were generally highest at NB and OS and lowest at ECCB. Mean 1999 concentrations of organic compounds in liver tissue were generally highest at DIF and lowest at ECCB. Mercury was slightly higher at OS in fillet tissue and higher at NB in liver tissue than at other sites. Other metals (Ag, Cd, Cr, Cu, Ni, Pb and Zn) measured in liver tissue showed station-to-station variation with no consistent spatial trend.

Tissue organic contaminant levels for 1999 were consistently similar or lower than those measured in the period 1992-1998 at all stations. The highest concentrations are historically found at DIF and the lowest in ECCB. This trend continued in 1999 for liver tissue, but not for fillet tissue, where levels at OS were similar or higher than at DIF. Chlorinated pesticides show relatively stable concentrations (DDT, chlordane, and hexachlorobenzene) or a slight increase (dieldrin in fillets), since 1992. Mercury concentrations measured in edible tissue and liver were within the measured range of previous years. Concentrations of other metals were variable over the period from 1992-1999. Spatially, overall levels of most metals appeared to be slightly higher at OS, rather than DIF.

As in previous years, organic contaminant body burdens appeared to be predictive of liver histopathology. Although 1999 body burdens are on the low end of the contaminant burdens measured since 1992, a general relationship between body burden and prevalence of centrotubular hydropic vacuolation was still observed.

Comparison was made between flounder edible tissue contaminant levels, MWRA Caution and Warning Levels, based on the 1992-1998 data, and FDA Action Limits. The 1999 levels (determined on a wet weight basis), like those detected in previous monitoring years (1992-1998), were well below the federal action limits. Dieldrin at OS in 1999, however, exceeded the MWRA Caution Level, based on the 1992-1998 baseline period.

Lobster

Fifteen lobsters were collected at the three core monitoring stations for the 1999 study (DIF, OS, and ECCB). All lobsters were obtained from commercial traps located within the vicinity of the designated sampling stations. The size, sex and external appearance (*i.e*. black gill disease, shell erosion, external tumors, etc.) were determined for the collected lobsters. Little difference in length and weight were noted between stations. The ratio of males and females, however, differed greatly between stations, with mostly males found at DIF and ECCB and mostly females collected at OS. No deleterious external conditions were noted.

Mean 1999 concentrations of organic compounds in edible tail meat tissue and the hepatopancreas were generally highest at DIF and lowest in ECCB. Mean mercury concentrations in the meat and hepatopancreas were highest at DIF and OS. Comparison of 1999 data with previous years (1992-1998) indicates that most spatial distributions were similar. Concentrations of total PCB, silver and copper in lobster hepatopancreas continued to show an upward trend in 1999 at OS and DIF.

Comparison was made between contaminant levels in lobster edible tissue, MWRA Caution and Warning levels, based on the 1992-1998 data, and FDA Action Limits for pesticides, PCBs and mercury. The 1999 levels, like other monitoring years, were well below the federal action limits and indicate no risk for human consumption. However, concentrations of PCBs in hepatopancreas have slightly exceeded the FDA Action Limits in lobsters collected from the Deer Island location since 1996 and concentrations of PCBs at the OS have approached the FDA limits since 1995. This is consistent with the current Massachusetts State Advisory regarding consumption of lobster tomalley for lobsters caught in Massachusetts' waters.

Mussels

Mussels were collected at two reference sites (Gloucester, Sandwich) and deployed for up to 60 days in arrays at Deer Island (DI), OS and Cape Cod Bay (CCB), as well as BIH. Gloucester mussels were used to assess organic bioaccumulation, and Sandwich mussels were used to assess inorganic bioaccumulation. A full set of arrays was successfully retrieved at sixty-days from BIH, OS, and CCB. No arrays were obtained from DI. Mussel survival within the deployed arrays upon recovery was high (≥86%).

The 1999 data were similar to previous years with the highest body burdens of contaminants observed in mussels deployed in BIH. Contaminant levels overall were among the lowest measured since 1991. The lowest concentrations overall were found in mussels deployed at OS and CCB. CCB was added in 1998 as an outer harbor reference site.

Comparison was made between mussel tissue contaminant levels and MWRA Caution and Warning levels, based on the 1992-1998 data, and FDA Action Limits for mercury and lead. The 1999 levels, like other monitoring years, were well below the federal action limits and indicate no risk for human consumption.

Evaluation of Monitoring Thresholds

MWRA has set Caution and Warning Levels to ensure the protection of human health. Caution Levels are set at two times the baseline arithmetic averages of annual means (of composite samples) for organisms collected or deployed at OS during the baseline period to date (1992 through 1999). The significant increase value is the 95th percentile upper confidence limit (based on the "t" distribution) of the arithmetic mean of the annual means of the baseline period. Warning Levels have been set at 80% of the FDA Action Limit.

Caution Levels are statistically different from the baseline means, and significant increases can be detected prior to reaching Caution Levels. In addition, current tissue concentrations are generally an order of magnitude or more below Warning Levels and FDA Action Limits. Similarly, the monitoring hypothesis regarding future increases of the prevalence of flounder liver centrotubular hydropic vacuolation at OS relative to baseline levels measured in outer Boston Harbor is sufficiently sensitive to detect trends based on current data.

1.0 INTRODUCTION

The Massachusetts Water Resources Authority (MWRA) has implemented a long-term Harbor and Outfall Monitoring (HOM) Program for Massachusetts and Cape Cod Bays. The objectives of the HOM Program are to test whether the environmental impacts of the MWRA discharge are consistent with SEIS projections and do not exceed any Contingency Plan thresholds. A detailed description of the monitoring and its rationale is provided in the Effluent Outfall Monitoring Plan developed for the baseline period and the post discharge monitoring plan (MWRA 1997, 1999).

One aspect of the MWRA HOM program is a long-term biomonitoring program for fish and shellfish (MWRA, 1991). The goal of the biomonitoring is to provide data that may be used to assess potential environmental impact of effluent discharge into Massachusetts Bay. This data will be used to ensure that discharge from the new outfall does not result in adverse impacts to fish and shellfish by comparing values with established thresholds (MWRA 1997a).

The objective of the fish and shellfish monitoring is to define the condition of three indicator species: winter flounder (*Pleuronectes americanus),* lobster (*Homarus americanus),* and blue mussel *(Mytilus edulis*). Measured parameters include length, weight, biological condition, the presence of external or internal disease, and inorganic and organic contaminant tissue concentrations. This baseline characterization of the health of winter flounder, lobster and mussel in Boston Harbor, Massachusetts Bay, and Cape Cod Bay (hereafter: Boston Harbor and the Bays) forms the basis for assessing potential changes resulting from the relocation of the outfall discharge (Figure 1-1).

The scope of the 1999 fish and shellfish report is focused primarily towards providing a compilation of the biomonitoring data collected during 1999 and a comparison of the 1999 data with data collected from 1992 through 1998. The report first provides a summary of the survey and laboratory methods (Section 2). Section 3 presents the results of biomonitoring data from surveys conducted during 1999, as well as selected data from previous studies, and Section 4 presents the conclusions drawn from the 1999 survey results and historical trends. Finally, recommendations for future sampling and analyses are summarized in Section 5.

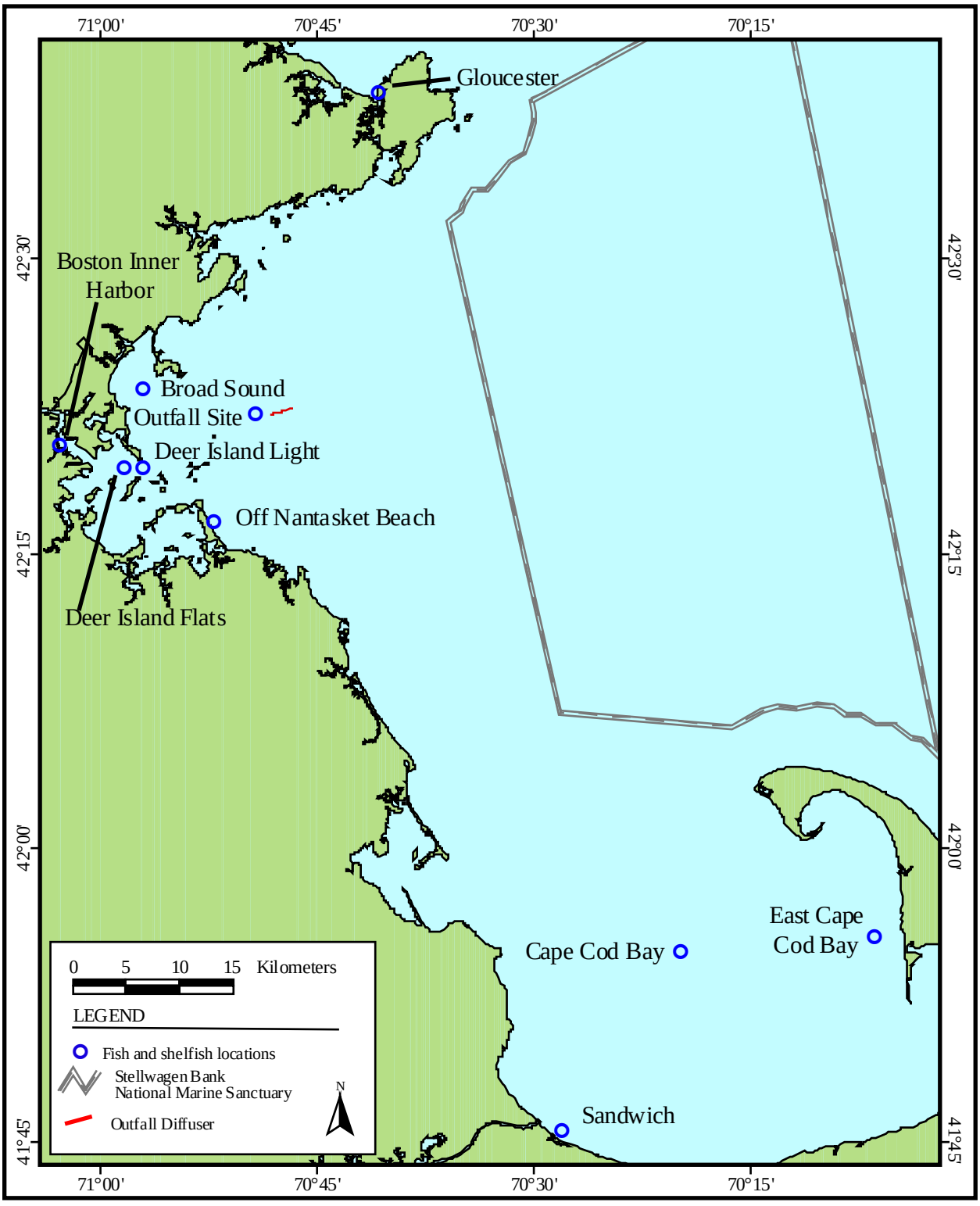


Figure 1-1. Boston Harbor and the Bays with Outfall Site.

2.0 METHODS

This section provides an overview of the methods and protocols used in the three surveys conducted to collect biological specimens. More detailed descriptions of the methods are contained in *Combined Work/Quality Assurance Project Plan (CW/QAPP) for the Fish and Shellfish Monitoring: 1998 ((Fish and Shellfish Monitoring CW/QAPP)* Lefkovitz *et al.* 1998).

2.1 Winter Flounder Monitoring

Winter flounder *(Pleuronectes americanus)* were collected from 5 locations in Boston Harbor and the Bays to obtain specimens for age, weight, and length determination, gross examination of health, histology of livers, and chemical analyses of tissues to determine contaminant exposure. Chemical data were used to determine whether contaminant tissue burdens approach human health consumption limits.

2.1.1 Stations and Sampling

The 1999 flounder survey was conducted between April 14, 1999 and May 10, 1999. Five sites were sampled to collect winter flounder for histological and chemical analyses:

- Deer Island Flats (DIF)
- Off Nantasket Beach (NB)
- Broad Sound (BS)
- Outfall Site (OS)
- East Cape Cod Bay (ECCB).

Table 2-1 provides the planned and actual sampling sites and locations for the 1999 flounder sampling. Adjustments in location and time were made to ensure that the required 50 flounder per site were captured. Figure 2-1 shows the monitoring locations.

At each of the five designated sampling sites, otter-trawl tows were conducted from the F/V *Odessa* (captained by Captain William Crossen) to collect 50 sexually mature (4-5 years old) winter flounder. Thirty-five fish were assigned unique identification numbers to indicate date, time, and site of collection. These fish were killed at sea by cervical section and used for histological processing. They were examined externally and their external condition noted prior to histological processing. The gonads of each flounder were examined to determine sexual maturity. All specimens were weighed, and standard and total fork length was determined. Scales were then taken from each specimen for age determination.

Of the 50 flounder collected from each site, 15 were designated for tissue chemical analysis. Because contaminant-free conditions were not available on board the vessel, the fish used for chemical analysis were returned to the laboratory for organ dissection. These fish were maintained alive on-board and transported to Battelle, Duxbury for histological and chemical analysis. These fish were also examined for external condition in the laboratory. Fifteen additional unique sample identification numbers were generated at sea at the time of fish collection, however, actual assignment of IDs to individual fish did not occur until the fish were sacrificed at the laboratory.

2.1.2 Age Determination

Scales from each specimen were collected for age determination. Scales were removed after first removing any mucus, debris, and epidermis from the dorsum of the caudal peduncle by wiping in the direction of the tail with a blunt-edged table knife. Scales were then collected from the cleaned area by

applying quick, firm, scraping motions in the direction of the head. The loosened scales were placed in the labeled age-sample envelope by inserting the knife between the liner of the sample envelope and scraping off the scales. The age of each flounder was determined by scientists at the National Marine Fisheries Services (NMFS) in Woods Hole, Massachusetts through analysis of growth rings (annuli).

2.1.3 Dissection of Fish

The flounder tissues were removed in the laboratory under contaminant-free conditions. Tissue processing was conducted in a Class-100 clean room. The fillets (muscle) were removed from the flounder and the skin was removed from the fillet, using a pre-cleaned (*i.e.*, rinsed with 10% HCL, Milli-Q (18 megohm) water, acetone, DCM, and hexane) stainless steel knife.

From each site, three composites were prepared; each composed of approximately equal masses of top and bottom tissue from five randomly chosen fish. Homogenization was performed using a stainless steel TEKMAR® tissuemizer. Each composite was placed in a sample container clearly identified with the unique sample identifier.

Livers from the 15 fish selected for chemical analyses were removed using a titanium knife and analyzed for chemical parameters, after sectioning for histopathology analysis. (Livers from the remaining 35 fish not used for chemical analyses were removed shipboard and processed as described below). Following the processing for histology analysis, the livers were individually homogenized by finely chopping with the titanium knife and divided into three separate composites to correspond to the composites made for the fillets (*e.g.*, the livers of the same five specimens used for each edible tissue composite were combined). This was done to ensure comparability between fillet and liver chemical analyses. Each composite was placed in a sample container clearly identified with the unique sample identifier. This resulted in 30 pooled samples for analysis in 1999 (15 pooled fillets and 15 pooled livers). The homogenized tissue and liver samples were frozen and stored. Any remaining tissue from each specimen was archived frozen in case additional analysis was required.

At least one homogenization blank was carried out for each batch of 20 fish to monitor for sample contamination during the homogenization process. For the blank sample, a known quantity (about 100 ml) of Milli-Q water was transferred to a clear glass jar and "tissuemized" for two minutes. The blank was held for analysis of both PCB/Pesticides and Hg (fillet measurements only).

2.1.4 Histological Processing

After the fish were completely examined and scales removed, the livers were removed (either on-board the ship or in the lab, as described above) and examined for visible gross abnormalities. The livers were then preserved in 10% neutral buffered formalin for histological analysis. Liver samples from each fish were placed in a separate clearly labeled sample container.

2.1.5 Histological Analysis

Livers of 50 flounder from each site were prepared for histological analysis by Experimental Pathology Laboratories in Herndon, VA. Transverse sections of flounder livers fixed as part of tissue sample processing were removed from the buffered formalin after at least 24 hours, rinsed in running tap water, dehydrated through a series of ethanols, cleared in xylene, and embedded in paraffin. Paraffin-embedded material was sectioned on a rotary microtome at a thickness of 5 μm. Each block contained three liver slices, resulting in one slide with three slices per slide per fish and a total of 250 slides (50 fish X 5 sites). The sections were stained in hematoxylin and eosin.

Each slide was examined under bright-field illumination at 25x, 100x, and 200x to quantify the presence and extent of:

- Three types of vacuolation (centrotubular, tubular, and focal)
- Macrophage aggregation
- Biliary duct proliferation
- Neoplasia

The severity of each lesion was rated on a scale of 0 to 4, where: 0 = absent; 1 = minor; 2 = moderate; 3 = severe; and 4 = extreme. For each lesion and each fish, a histopathological index was then calculated as a mean of scores from three slices on one slide.

2.1.6 Tissue Processing and Chemical Analyses

Chemical analyses were performed on composite samples of flounder from DIF, NB, BS, OS, and ECCB. Two tissue types (fillet, liver) were analyzed. Flounder fillet and livers were analyzed for PCBs/Pesticides, lipids, and mercury. In addition, flounder livers were analyzed for PAHs, lead, silver, cadmium, chromium, copper, nickel, and zinc. The individual steps involved in the tissue processing and chemical analyses of these samples are detailed in Section 2.4 Chemical Analysis of Tissues.

2.1.7 Data Reduction and Statistical Analyses

Data reduction was conducted as described in the Fish and Shellfish Monitoring CW/QAPP (Lefkovitz *et al.*, 1998) and in Section 2.5 of this report. Histopathological indices and prevalence of lesions were compared between classes of flounder by differences in station, age, sex and length. Chemical constituents were presented graphically and compared among stations using ANOVA analysis.

Histopathological observations of the livers of the winter flounder from all sites were conducted and, where possible, comparisons of the results with those of previous years were made. Possible relationships between observed lesions and contaminant body burdens were also investigated.

In addition to reporting the prevalence and lesion index of hydropic vacuolation, historical data has included several other lesions, including macrophage aggregates, biliary proliferation, neoplasia, and a lesion unreported before 1993, referred to as “balloon hepatocytes” (Hillman & Peven, 1995).

The levels of contaminants measured in edible tissues were compared to Food and Drug Administration (FDA) Action Levels (U.S. EPA 1989) for those contaminants.

2.1.8 Deviations From the CW/QAPP

Only four fish were caught from Deer Island on April 14th. Sampling of this site on May 5th proved to be successful and a more than adequate number of fish were captured for analyses. The four fish from the April collection were processed for histology but were not included in the histology or chemistry analysis. Those samples were labeled F99 1001 through 1004. The first four of 50 fish sampled from Deer Island on May 5th were labeled F99 1001a through 1004a and were used in the analysis. The balance used aboard the vessel began to malfunction on May 5th. Due to questions relating to the collection of weight data in the field (balance performance and units/conversions used), the weights of only the 15 fish per station used for chemical analyses are presented in this report. Age data for two flounder (FF913017 and FF9914002) were inadvertently not collected during the survey.

2.2 Lobster Monitoring

Lobster *(Homarus americanus)* were collected from three sampling sites for gross examination (to determine specimen health) and chemical analyses to determine tissue burden of contaminants.

2.2.1 Stations and Sampling

Lobster surveys were conducted on July 29, 1999 (DIF), September 09, 1999 (ECCB) and November 12, 1999 (OS). Lobster surveys originally scheduled to take place in July were postponed to September and November, when lobsters were more abundant in the sampling locations.

Table 2-2 provides the planned and actual sampling sites and locations for the lobster surveys. Figure 2-2 illustrates the sampling locations in Boston Harbor and the Bays.

Lobsters were purchased from commercial lobstermen. The location was verified by placing a Battelle staff member on board during collection operations. Individual lobsters retained for analyses were assigned a unique identification number to indicate date, time, and site of collection. Lobsters were measured for carapace length and width and the gender was determined. Lobster specimens were visually examined and the condition noted. Processing of the hepatopancreas and edible tissue samples were conducted in the laboratory.

2.2.2 Size and Sex Determination

Carapace length was determined with calipers by measuring the distance from the tip of the rostrum to the posterior edge of the median uropod. Measurements were recorded to the nearest millimeter. Specimen weight was recorded to the nearest gram. Specimens were visually examined for the presence and severity of gross external abnormalities, such as black gill disease, shell erosion, and parasites. Data for each specimen were recorded on a lobster sample collection log.

2.2.3 Dissection of Lobster

The hepatopancreas was removed and frozen for chemical analysis. The tail and claw meat (edible tissue) was stored frozen in the shells until processed in the laboratory. Samples were placed in sample containers that were clearly identified with a bar-coded or conventional label containing the pertinent sample information.

The 15 lobsters collected at each site were randomly divided into three groups of five lobsters each. Within each of the three groups, edible meat (tail and claw) and hepatopancreas from the five lobsters were pooled by tissue type. Homogenization of lobster meat was performed using a stainless steel TEKMAR® tissuemizer. Hepatopancreas samples were homogenized using a titanium knife to avoid metals contamination. Each composite was placed in a sample container clearly identified with the unique sample identifier. This resulted in 18 pooled samples for analysis in 1999.

2.2.4 Tissue Processing and Chemical Analyses

Chemical analyses were performed on the composite samples of lobster (hepatopancreas and edible meat). Edible lobster meat and hepatopancreas were analyzed for PCBs/Pesticides, lipids, and mercury. In addition, hepatopancreas samples were analyzed for PAHs, lead, silver, cadmium, chromium, copper, nickel, and zinc. The individual steps involved in the tissue processing and chemical analyses of these samples are detailed in Section 2.4 Chemical Analysis of Tissues.

2.2.5 Data Reduction and Statistical Analyses

Data reduction was conducted as described in the Fish and Shellfish Monitoring CW/QAPP (Lefkovitz *et al.*, 1998) and Section 2.5 of this report. Temporal patterns of contaminants in edible lobster tissue and hepatopancreas tissue were evaluated through available data from 1992 through 1998. Spatial distributions were analyzed among stations using ANOVA analysis. Comparisons were made to the FDA Action Limits and other appropriate levels of regulatory concern.

2.2.6 Deviations from the CW/QAPP

There were no deviations from the CW/QAPP, other than the extended sampling period due to lack of lobster at the collection sites.

2.3 Mussel Bioaccumulation Monitoring

Blue mussels *(Mytilus edulis)* were collected from two reference locations and deployed in suspended cages at four sites in Boston Harbor and the Bays. Mussels were recovered for determination of short-term accumulation of anthropogenic contaminants in soft tissues.

2.3.1 Stations and Reference Area

During the 1999 surveys, mussels were collected from reference sites in Gloucester and Sandwich and deployed at four sites:

- Off Deer Island Light (DI) (~2 m above bottom)
- In vicinity of the Outfall Site (OS)
- Reference Station in Boston's Inner Harbor (BIH)
- New offshore Reference Station (Cape Cod Bay- CCB).

Table 2-3 provides the planned and actual sampling sites and locations. Figure 2-3 illustrates the sampling locations in Boston Harbor and Massachusetts Bay.

2.3.2 Mussel Collection

In late June, approximately 1200 mussels were collected from Gloucester, MA to be used for organic contaminant analysis and 700 from Sandwich, MA for inorganic analysis. Control mussels were collected from two sites because historical data have shown Sandwich mussels to have high body burdens of pesticides and Gloucester mussels to have high body burdens of metals. Mussels were harvested during low tide and individually checked for length. Only mussels measuring between 55-65 mm were used for this study. A sub-sample of 80 Gloucester and 40 Sandwich mussels were randomly selected and set aside for pre-deployment biological and chemical analyses.

2.3.3 Mussel Deployment

After collection, the mussels were randomly distributed to plastic cages for deployment as an array (*i.e.*, set of cages) in sufficient number to provide the necessary biological material. At least 10% additional mussels were included to account for potential mortality. Mussels were deployed on June 30 and July 1 in replicate arrays at the four sites (Table 2-3 and Figure 2-3). Table 2-4 lists the minimum numbers of mussels and the number of cages and corresponding arrays that were deployed at each location.

At each location, a minimum of three arrays was deployed except for the offshore locations (OS and CCB), where four arrays were deployed. Each array was deployed on a separate mooring and each with enough mussels to provide sufficient tissue to complete the study. The locations of the arrays were recorded using Differential Global Positioning System (DGPS).

2.3.4 Mussel Retrieval

Mussel retrieval was planned for two occasions with collection of up to one half of the mussels at 40-days to provide tissue in the event of failure of the 60-day collection. At BIH, OS, and CCB, 60-day mussels were retrieved. No arrays, thus no samples, were recovered at Deer Island at either 40 or 60 days, even after

search and recovery efforts with a side scan sonar and hard hat divers. Actual mussel recovery is discussed in Section 3.3. The amount of biofouling of the arrays was also assessed at 40 days.

2.3.5 Tissue Processing and Chemical Analyses

Individual mussels were pooled for organic and inorganic analyses separately. For organic analysis, composite groups of 10 mussels were pooled from the 50 Gloucester mussels deployed and collected to create five pooled samples per site. At the OS and Cape Cod sites, eight pooled samples were created from 80 Gloucester mussels. For inorganic analysis composites (Hg and Pb), groups of five mussels were pooled from 25 Sandwich mussels deployed and collected to create five pooled samples per site. At the OS and Cape Cod Bay site, eight pooled samples were created from 40 Sandwich mussels. Gloucester and Sandwich pre-deployment mussels were also analyzed for organic and inorganic parameters, respectively. Details of actual mussel retrievals are discussed in Section 3.3.

Mussel composites were prepared from individual mussels by cleaning of attached material, removing all byssal threads and placing all soft tissue including fluids directly into the appropriate container (500-ml I-Chem clean bottle for organics and a pre-cleaned 4 ounce plastic jar for metals). Mussel composite samples were prepared for organic chemical analyses by homogenization using a stainless steel Tekmar "tissumizer" rinsed with methanol and de-ionized water prior to use. Mussel composite samples for metal analyses were prepared by freeze drying and subsequent ball milling, to achieve homogenization.

Chemical analyses were performed on composite samples of mussel tissue. The Gloucester mussel tissue was analyzed for PCBs/Pesticides, PAHs, and lipids. The Sandwich mussel tissue was analyzed for mercury and lead. The individual steps involved in the tissue processing and chemical analyses of these samples are detailed in Section 2.4 Chemical Analysis of Tissue Samples.

2.3.6 Data Reduction and Statistical Analyses

The extent of bioaccumulation of contaminants in the mussels was evaluated. Data reduction was conducted as described in the Fish and Shellfish Monitoring CW/QAPP (Lefkovitz *et al.*, 1998) and in Section 2.5 of this report. The 1999 results were compared statistically to initial contaminant levels in the control mussels using two-sample t-tests. Further evaluation focused on spatial and temporal patterns in contaminant accumulation by ANOVA analysis.

2.3.7 Deviations from the CW/QAPP

Retrieval of mussels was limited due to loss of part or all of some arrays. Deviations from the original CW/QAPP are as follows:

- Deer Island (DI) – No arrays and no samples could be recovered. Therefore, there are no data for this station.

2.4 Chemical Analyses of Tissue Samples

Table 2-5 summarizes the analyses performed on each type of tissue sample. Table 2-6 lists the analysis methods, units of measurement and method reference. The chemical analytes of interest are listed in Table 2-7. The same analytical methods were used for all tissues.

2.4.1 Organic Tissue Extraction

Tissues were extracted and cleaned following the procedures of Peven and Uhler (1993) as described in Battelle SOP 5-190. Approximately 30-g of tissue homogenate was weighed into a Teflon extraction jar, spiked with the appropriate surrogate internal standard (SIS), combined with 75 mL dichloromethane (DCM) and sodium sulfate, macerated with a Tissumizer and centrifuged. An aliquot of the original

sample was also taken for dry weight determination. The extract was decanted into an Erlenmeyer flask. This process was repeated once using 75 mL DCM. After each maceration, the centrifuged solvent extracts were combined in the Erlenmeyer flask. An additional extraction was performed using 50 mL DCM and shaking techniques, the sample centrifuged a third time, and the extract combined with the other two. A 10-mL aliquot of the combined extracts was removed for lipid weight determination. Lipid results were gravimetrically measured by evaporating the aliquot of organic extract and weighing the remaining residue. Results were reported in percent dry weight.

The combined extract was dried over sodium sulfate, processed through an alumina cleanup column, and concentrated to approximately 900-µL for additional HPLC cleanup. Raw extracts (post-alumina) were fractionated by HPLC (BOS SOP 5-191). The post-HPLC extract was concentrated under nitrogen to approximately 0.5 mL, and spiked with recovery internal standard (RIS). Dry weight determinations were performed by oven drying a portion of each composite sample.

Extracts requiring both PCB/Pesticide and PAH analyses were split for analysis, one half remaining in DCM for PAH analysis, and the other half solvent-exchanged with isooctane for PCB and pesticide analysis.

2.4.2 Metals Tissue Digestion

Flounder Liver and Fillet; Lobster Hepatopancreas and Edible Tissue - To prepare tissue samples for metals analysis, samples were freeze-dried and homogenized in a ball-mill. A 200- to 300-mg aliquot of each dried, homogeneous sample was digested using aqua regia (nitric and hydrochloric acids at a ratio of 5.0 mL: 3.5 mL) according to Battelle SOP MSL-I-006 *Aqua Regia Sediment and Tissue Digestion*. The freeze-dried tissue and digestion acids were combined in a Teflon bomb and heated in an oven at 130 ºC (±10 ºC) overnight. After heating and cooling, deionized water was added to the acid-digested tissue and the digestates were submitted for analysis.

Mussel Tissue - To prepare tissue samples for metals analysis, samples were freeze-dried and homogenized in a ball-mill. An approximately 300-mg aliquot of each dried, homogeneous sample was digested using nitric acid according to Battelle SOP MSL-I-005 *Hot Nitric Acid Digestion of Sediments and Tissues*. The freeze-dried tissue and digestion acid were combined in a glass vial. The vials were loosely capped and heated on a hot plate at a temperature just high enough to boil the acid, without boiling over or evaporating the sample to dryness. After heating and cooling, deionized water was added to the acid-digested tissue and the digestates were submitted for analysis.

2.4.3 Organic Analyses

Organic analyses performed on the flounder, lobster, and mussel tissues included PAHs and PCB/Pesticides as summarized in Table 2-5.

PAH Analysis - Trace level organic compounds (PAH) were identified using electron impact gas chromatography/mass spectrometry (GC/MS). Target compounds were separated using an HP 5890 Series II gas chromatograph, equipped with a 60-m x 0.25-mm-inner diameter (0.25-um film thickness) DB-5 column (J&W Scientific), and measured using a HP 5972a mass selective detector operated in the selective ion monitoring (SIM) mode following Battelle SOP 5-157. Concentrations for all target analytes were determined by the method of internal standard, using SISs for quantification. All PAH results were reported in ng/g dry wt.

PCB/Pesticide Analysis - Pesticides and PCB congeners were analyzed and quantified using gas chromatography/electron capture detection (GC/ECD) (Hewlett Packard 5890 Series 2 GC) using a 60-m DBS column and hydrogen as the carrier gas following Battelle SOP 5-128, including a second column

for confirmation. Concentrations for all target analytes were determined by the method of internal standard, using SISs for quantification. All PCB and pesticide results were reported in ng/g dry wt.

2.4.4 Metals Analyses

Analysis of Hg - Sample digestates were analyzed for Hg using cold-vapor atomic absorption spectroscopy (CVAA) according to Battelle SOP MSL-I-016 *Total Mercury in Tissues and Sediments by Cold Vapor Atomic Absorption*, which is based on EPA Method 245.6 *Determination of Mercury in Tissues by Cold Vapor Atomic Absorption Spectrometry* (EPA 1991a). Results were reported in units of µg/g on a dry-weight basis.

Analysis of As, Cd, Cr, Cu, Ni, Pb, and Zn - For analysis of multiple metals simultaneously, sample digestates were analyzed for As, Cd, Cr, Cu, Ni, Pb, and Zn using inductively coupled plasma - mass spectrometry (ICP-MS) according to Battelle SOP ML-I-022 *Determination of Elements in Aqueous and Digestate Samples by ICP/MS*. This procedure is based on two methods modified and adapted for analysis of solid sample digestates, EPA Method 1638 *Determination of Trace Elements in Ambient Waters by Inductively Coupled Plasma - Mass Spectrometry* (EPA 1996) and EPA Method 1640 *Determination of Trace Elements in Water by Preconcentration and Inductively Coupled Plasma - Mass Spectrometry* (EPA 1997). Results were reported in units of µg/g on a dry-weight basis.

Sample digestates were also analyzed by graphite furnace atomic absorption (GFAA) when analysis of a single element was required. GFAA analysis was conducted according to Battelle SOP MSL-I-029 *Determination of Metals in Aqueous and Digestate Samples by GFAA*. This procedure is based on EPA Method 200.9 *Determination of Trace Elements by Stabilized Temperature Graphite Furnace Atomic Absorption Spectrometry* (EPA 1991b).

2.4.5 Corrective Actions in Metals Analyses

In some instances, analytical results for certain metals, particularly the analysis of flounder liver tissue for Cr, initially did not meet data quality objectives. This condition was most likely due to chloride interferences in the ICP-MS analysis from the hydrochloric acid used in the sample digestion. In these cases, a portion of the nitric and hydrochloric acid digestates were evaporated to dryness then returned to volume using only nitric acid. The nitric acid digestates were reanalyzed by ICP-MS for Cr and acceptable results were achieved.

2.5 General Data Treatment and Reduction

This section describes the data reduction performed on 1999 Fish and Shellfish data, as well as historical data, as part of the 1999 MWRA Harbor and Outfall Monitoring Project.

Specifics of data handling are as follows:

- All 1999 chemical data were generated at Battelle and loaded directly into the HOM database. During the preparation of the 1998 Fish and Shellfish Annual Report, data issues and inconsistencies in the historical data were identified and corrections were made to the database.
- All fish and shellfish data (1999 and historical) were extracted directly from the HOM database and exported into Excel files, where graphical presentations and statistical analyses were preformed.
- All laboratory duplicates for pre-1998 data were averaged for reporting and calculating. No laboratory duplicate data were entered for 1999 data.

- Contaminant data were reported as mean, standard error and *n* by station and year.
- 1993 lobster selection consisted of two animals collected in June and one in August. Results were calculated by taking the average of these three animals ($n = 3$). The difference in sample collection times was footnoted.
- Total PCB was calculated as the sum of twenty PCB congeners (Table 2-7).
- Total DDT was calculated as the sum of six DDT-related compounds: 2,4'-DDD, 4,4'-DDD, 2,4'-DDE, 4,4'-DDE, 2,4'-DDT, and 4,4'-DDT (Table 2-7).
- Total chlordane was calculated as the sum of five compounds: heptachlor, heptachlorepoxide, alpha-chlordane, cis-chlordane, and trans-nonachlor (Table 2-7).
- For the temporal presentation and analysis of data, the "Historical NOAA List" was used to calculate Total PAHs (Table 3-17). For the spatial presentation and analysis of data, the "Total PAH List" was used to calculate Total PAHs.
- In 1995, the individual five alkylated PAHs on the "Historical NOAA List" were not measured in mussels. Instead, the C1, C2 and C3-napthalene homologue groups were quantified. To make 1995 results more comparable to the "Historical NOAA List", values for the individual naphthalene compounds were estimated using ratios of the individuals to their respective homologue groups from 1996 and 1997 data sets.
- The "f" qualifier was used to indicate compounds that were quantified but were below the detection limit. "f"-flagged data were included in the graphical presentation of results and the calculations of thresholds and baseline means.
- The "G" qualifier was used to indicate compounds that co-eluted with a second known/unknown compound. The values for "G"-flagged data are estimated values and were included in the graphical presentations of results and the calculations of thresholds and baseline means.
- The "s" qualifier was used to indicate suspect data. "s"-flagged data were not included in any calculations or graphs.
- All non-detects used in calculations and trend analyses in this report were treated as zero.
- All data entered into the database are in dry weight units.
- Wet weight tissue concentrations were calculated from the wet/dry ratio and used in comparison to MWRA thresholds and FDA action levels.

2.5.1 Statistical Analyses

Statistical analyses were conducted to evaluate whether the various contaminant concentrations in flounder tissue (fillet and liver), lobster tissue (edible meat and hepatopancreas), and mussel tissue were significantly different between sampling sites. Table 2-8 presents the various chemical contaminant analyses for a given tissue type. A Single Factor Analysis of Variance (ANOVA) was used to evaluate each particular contaminant-tissue type combination (*e.g.*, total PCBs in flounder liver; total DDTs in flounder fillet; mercury in lobster meat; etc.).

All ANOVAs were run in Microsoft Excel version 7.0. Data were tested for normality and equality of variances. Homogeneity of variance was checked prior to running each ANOVA. In the few cases where the variances were not equal, data were log transformed and the ANOVA run. The log transformed

ANOVA results were no different from non-transformed ANOVA results; therefore, the results presented in the report are based on non-transformed data. Following each ANOVA, individual comparisons between any two sites (for any particular tissue-contaminant combination) were conducted using simple two-sample t-tests. ANOVA results and individual site comparisons are presented by tissue type in Section 3.

Table 2-1. Planned and Actual Sampling and Locations for Flounder Surveys.

Station #	Station Abbrev.	Sampling Site	Number of Tows	Planned Locations		Actual Locations[1]	
				N Latitude	W Longitude	N Latitude	W Longitude
1	DIF	Deer Island Flats	4	42º20.4’	70º58.4’	42º20.8’	70º58.1’
2	NB	Off Nantasket Beach	4	42º17.6’	70º52.2’	42º17.5’	70º51.5’
3	BS	Broad Sound	2	42º24.4’	70º57.2’	42º24.3’	70º57.5’
4	OS	Outfall Site	3	42º23.1’	70º49.3’	42º23.3’	70º49.8’
5	ECCB	East Cape Cod Bay	1	41º56.2’	70º06.6’	41º58.1’	70º06.7’

[1]Based on an average of the Latitude and Longitude of several tows

Table 2-2. Planned and Actual Sampling and Locations for Lobster Surveys.

Station #	Station Abbrev.	Sampling Site	Planned Location		Actual Location	
			N Latitude	W Longitude	N Latitude	W Longitude
1	DIF	Deer Island Flats/3 taken[a]	42º20.4’	70º58.4’	42º20.19’	70º58.55’
1	DIF	Deer Island Flats/12 taken[a]	42º20.4’	70º58.4’	42º20.21’	70º58.34’
4	OS	Outfall Site[b]	42º23.1’	70º49.3’	42º22.14’	70º47.84’
5	ECCB	East Cape Cod Bay[c]	41º58.02’	70º07.26’	41º54.20’	70º07.02’

[a]July 29, 1999
[b]November 12, 1999
[c]September 9, 1999

Table 2-3. Planned and Actual Sampling and Locations for Mussels Surveys.

Station #	Station Abbrev.	Sampling Site	Planned Location		Actual Location	
			N Latitude	W Longitude	N Latitude	W Longitude
1M	DI	Deer Island Light	42º20.4’	70º57.2’	NA[a]	NA[a]
M4	OS	Outfall Site	42º23.1’	70º49.3’	42°22.68’	70°46.98’
6	BIH	Boston Inner Harbor	42º21.5’	71º02.9’	42°21.50’	71°02.90’
7	Glouceste r	Gloucester - Pre-deployment	42º35.0’	70º40.0’	42°40.20’	70°40.20’
8	Sandwich	Sandwich/Cape Cod – Pre-deployment	41º50.0’	70º30.0’	41°45.60’	70°28.50’
9	CCB	Cape Cod Bay	41º55.5’	70º20.0’	41°56.28’	70°19.74

[a]Within the Deer Island effluent plume

Table 2-4. Summary of Mussels Deployment Scheme.

Site	Description/ Location	Water Depth	Cage Height Above Bottom	# Arrays	# Cages/Array	# Mussels/ Cage
DI	Deer Island Light	Various	2m	3	2 Gloucester/ 1 Sandwich	30
BIH	Boston Inner Harbor	8-11m	1.5-4.5m[1]	3	2 Gloucester/ 1 Sandwich	30
OS	42°22.68′ 70°46.98′	33m	15m	4	2 Gloucester/ 1 Sandwich	48 30
CCB	41°56.28′ 70°19.74′	40m	15m	4	2 Gloucester/ 1 Sandwich	48 30

[1] Rise and fall with tide, so that its constant depth below the water surface is 5 meters.

Table 2-5. Summary of Chemical Analyses Performed by Organism.

Sample Type	Number of Samples	Metals (1) (other than Hg and Pb)	Hg	Pb	PCBs	PAHs	Pesticides	Lipids
Flounder Meat	15	NR	*	NR	*	NR	*	*
Flounder Liver	15	*	*	*	*	*	*	*
Lobster Meat	9	NR	*	NR	*	NR	*	*
Lobster Hepatopancreas	9	*	*	*	*	*	*	*
Mussel Tissue								
Gloucester	26	NR	NR	NR	*	*	*	*
Sandwich	26	NR	*	*	NR	NR	NR	NR

*Targeted for Analysis
(1) Additional metals: Ag, Cd, Cr, Cu, Ni, and Zn
NR = Not Required

Table 2-6. Fish and Shellfish Sample Analyses.

Parameter	Unit of Measurement	Method	Reference
Organic Analyses			
Organic Extraction	NA	Tissuemize/Methylene Chloride	Peven and Uhler (1993)
Polycyclic Aromatic Hydrocarbons (PAH)	ng/g dry wt.	GC/MS	Peven and Uhler (1993)
Polychlorinated Biphenyls (PCB)/Pesticides	ng/g dry wt.	GC/ECD	Peven and Uhler (1993)
Metals Analyses			
Trace Metals (Ag, Cd, Cr, Cu, Ni, Pb, Zn, Hg)	µg/g dry wt	Digestion ICP-MS (all metals) GFAA (as required) CVAA-FIAS (Hg)	SOP MSL-I-006-00 and SOP MSL-I-005-01 EPA 1638 (EPA 1996) and EPA 1640 (EPA 1997) EPA 200.9 (EPA 1991b) EPA 245.6 (EPA 1991a)
Ancillary Parameters			
Lipids	% by dry weight	Gravimetric	Peven and Uhler (1993)
Dry Weight	% by dry weight	Gravimetric	Peven and Uhler (1993)

Table 2-7. Specific Chemical Analytes Included in Tissue Chemistry Analyses.

Chemical Analytes	
Trace Metals[a]	**Polynuclear Aromatic Hydrocarbons (PAHs)** (continued)
Ag Silver	C_1-Phenanthrenes/anthracene
Cd Cadmium	C_2-Phenanthrenes/anthracene
Cr Chromium	C_3-Phenanthrenes/anthracene
Cu Copper	C_4-Phenanthrenes/anthracene
Hg Mercury[b,e]	Dibenzothiophene
Ni Nickel	C_1-dibenzothiophenes
Pb Lead[e]	C_2-dibenzothiophenes
Zn Zinc	C_3-dibenzothiophenes
Polychlorinated biphenyls (PCBs)[c,d]	Fluoranthene
2,4'-Cl_2(8)	Pyrene
2,2N,5-Cl_3(18)	C_1-fluoranthenes/pyrene
2,4,4N-Cl_3(28)	C_2-fluoranthenes/pyrene
2,2N,3,5N-Cl_4(44)	C_3-fluoranthenes/pyrene
2,2N,5,5N-Cl_4(52)	Benzo[*a*]anthracene
2,3N,4,4N-Cl_4(66)	Chrysene
3,3N,4,4N-Cl_4(77)	C_1-chrysene
2,2N4,5,5N-Cl_5(101)	C_2-chrysene
2,3,3N,4,4N-Cl_5(105)	C_3-chrysene
2,3N,4,4N5-Cl_5(118)	C_4-chrysene
3,3N,4,4N,5-Cl_5(126)	Benzo[*b*]fluoranthene
2,2N,3,3',4,4N-Cl_6(128)	Benzo[*k*]fluoranthene
2,2N,3,4,4N,5-Cl_6(138)	Benzo[*a*]pyrene
2,2N4,4N,5,5N-Cl_6(153)	Dibenzo[*a*,*h*]anthracene
2,2N3,3',4,4N,5-Cl_7(170)	Benzo[g,h,i]perylene
2,2N,3,4,4N,5,5N-Cl_7(180)	Indeno[1,2,3-*c*,*d*]pyrene
2,2N,3,4',5,5N,6-Cl_7(187)	Perylene
2,2N,3,3N,4,4N,5,6-Cl_8(195)	Biphenyl
2,2N,3,3N4,4N,5,5N,6-Cl_9(206)	Benzo[*e*]pyrene
Decachlorobiphenyl-Cl_{10}(209)	Dibenzofuran
Polynuclear Aromatic Hydrocarbons (PAHs)[a,d]	Benzothiazole
Naphthalene	**Pesticides**[c,d]
C_1-naphthalenes	Hexachlorobenzene
C_2-naphthalenes	Lindane
C_3-naphthalenes	Endrin
C_4-naphthalenes	Aldrin
1-methylnaphthalenes[f]	Dieldrin
2-methylnaphthalenes[f]	Mirex
2,6-methylnaphthalenes[f]	Heptachlor
2,3,5-methylnaphthalenes[f]	Heptachlorepoxide
Acenaphthylene	alpha-chlordane
Acenaphthene	cis-chlordane
Fluorene	trans-Nonachlor
C_1-fluorenes	2,4N-DDD
C_2-fluorenes	4,4N-DDD
C_3-fluorenes	2,4N-DDE
Phenanthrene	4,4N-DDE
1-methylphenanthrene[f]	2,4N-DDT
Anthracene	4,4N-DDT
	DDMU
	Lipids[c,d]

[a] Flounder liver; lobster hepatopancreas
[b] Flounder and lobster edible tissue
[c] Flounder edible tissue and liver; lobster edible tissue and hepatopancreas
[d] Mussel soft tissue (Gloucester)
[e] Mussel soft tissue (Sandwich)

[f] Measured in mussel tissue in 1992–1994 and 1996–1999.

Table 2-8. Statistical Analyses Performed by Tissue Type.

Matrix	Test	Data
Flounder Fillets	ANOVA	Compare 1999 stations for Total PCBs, Pesticides, and mercury.
Flounder Liver	ANOVA	Compare 1999 stations for Total PAHs, Total PCBs, Pesticides, and select metals.
Lobster Meat	ANOVA	Compare 1999 stations for Total PCBs, Pesticides, and mercury.
Lobster Hepatopancreas	ANOVA	Compare 1999 stations for Total PCBs, Total PAHs, Pesticides, and select metals.
Mussels	ANOVA	Compare 1999 40/60 day deployed station data for Total PCBs, Total LMW-PAHs, Total HMW-PAHs, Pesticides, lead, and mercury.
Mussels	t-test	Compare background to 40/60-day data for Total PCBs, Total LMW-PAHs, Total HMW-PAHs, Pesticides, lead, and mercury.

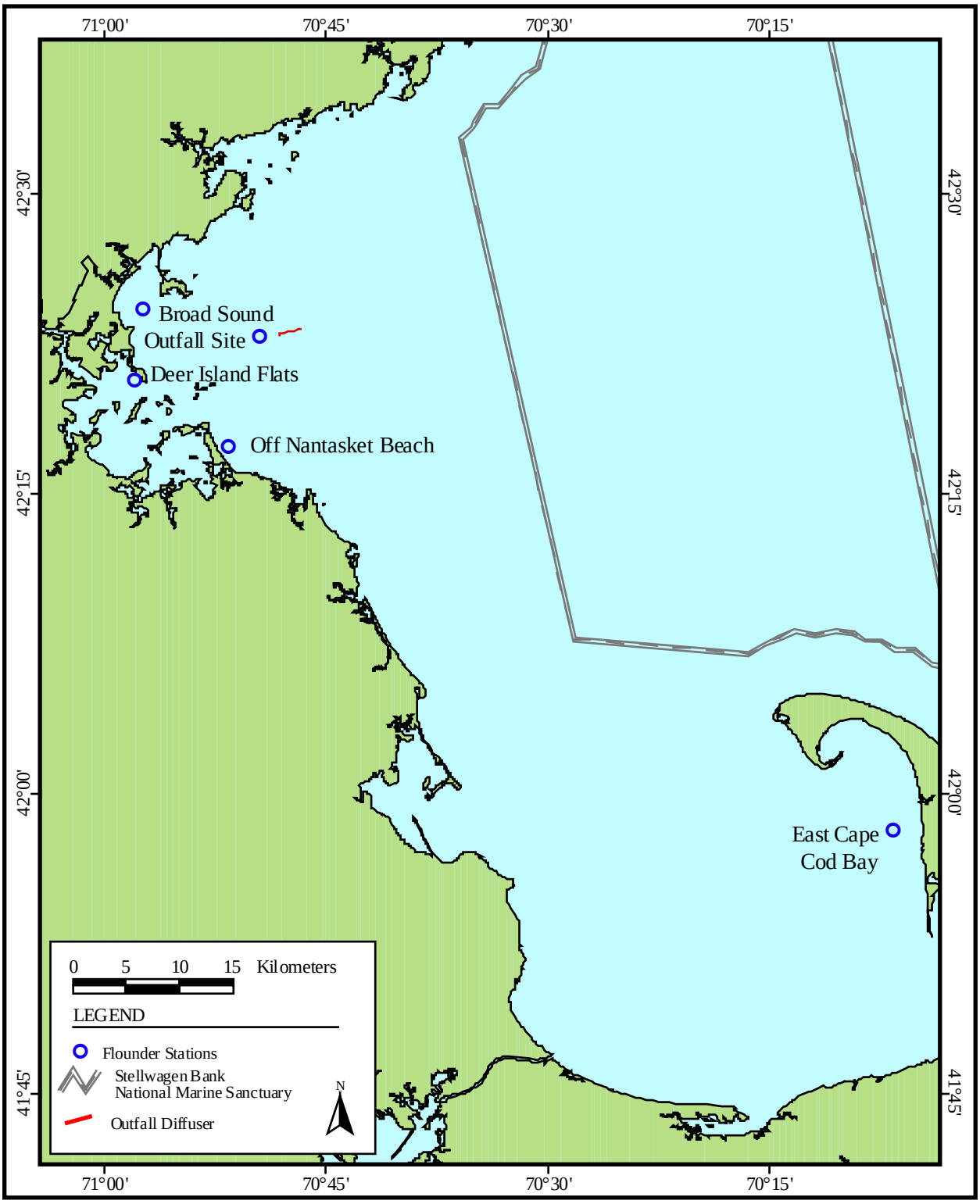


Figure 2-1. Flounder Monitoring Locations.

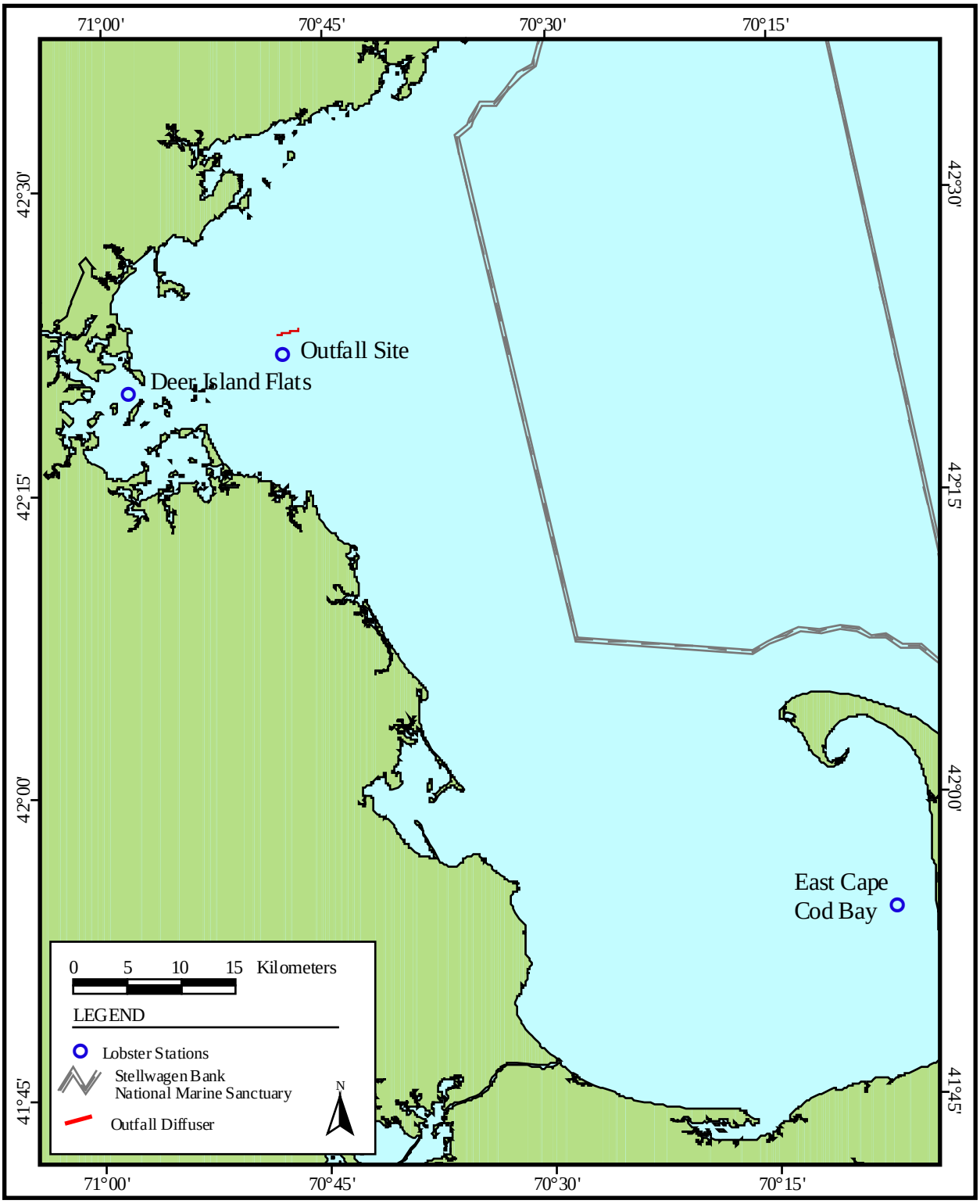


Figure 2-2. Lobster Monitoring Locations.

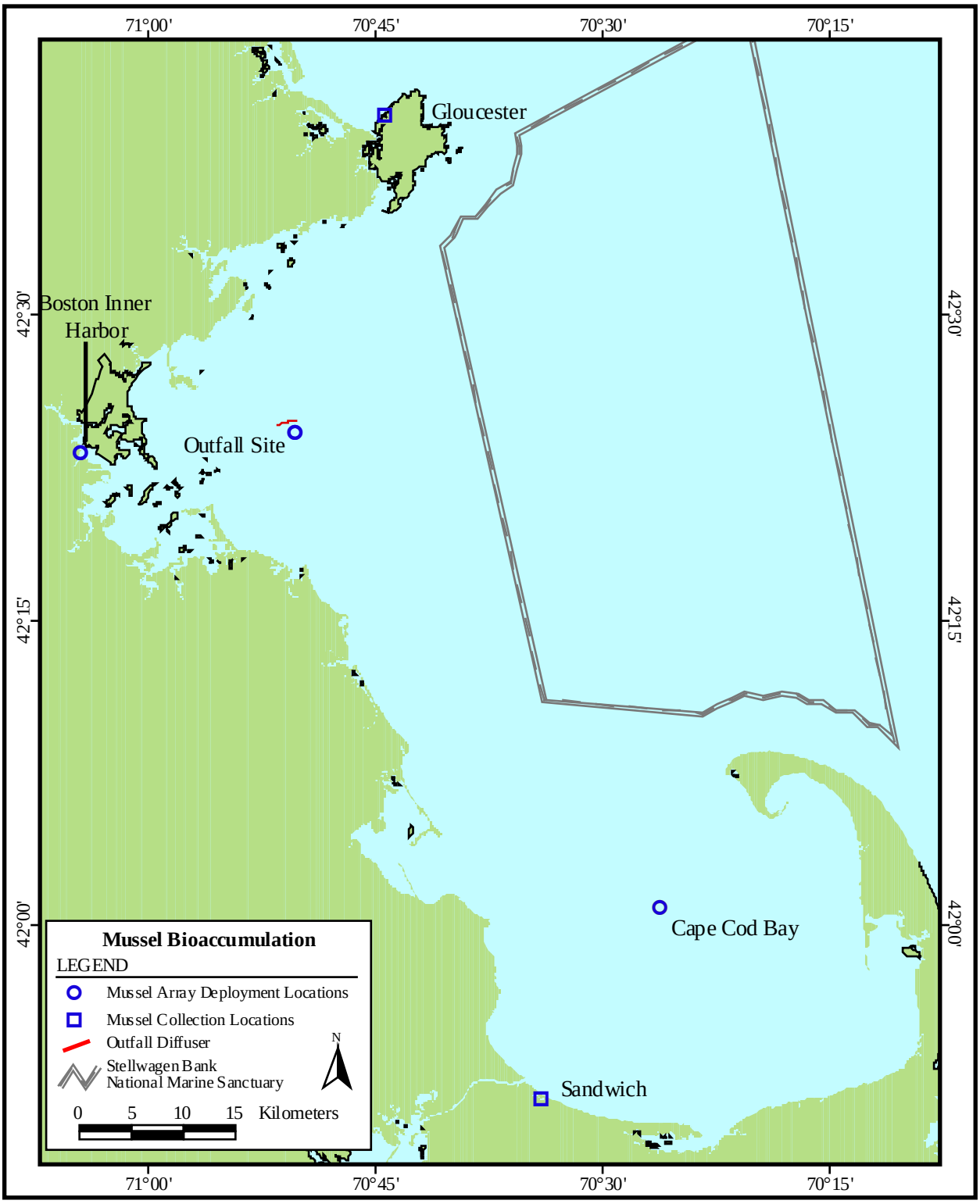


Figure 2-3. Mussel Collection and Deployment Locations.

3.0 RESULTS AND DISCUSSIONS

3.1 Winter Flounder

3.1.1 Fish Collected

Winter flounder, each a minimum 30 cm in length, were collected between April 14 and May 10, 1999 at five stations in the study area (Figure 2-1). Fifty flounder were collected from each station. All fish were sampled for liver histology and age. Fifteen of these fish from each station were sampled for chemical analysis of liver and fillet. The catch per unit effort (CPU), defined as the number of fish obtained per minute of bottom trawling time, is reported per station in Table 3-1. The May catch at Deer Island increases the CPU at that station to the highest level seen in this project. On the other hand, Nantasket Beach CPU has been declining over the past several years to the point that 1999 had the lowest CPU since the program began. CPU for the other sites were within historical ranges.

3.1.2 Age/Length Parameters

The physical characteristics (*i.e*. mean length, weight, age) of the winter flounder collected in 1999 are given in Table 3-2. Mean length at each station ranged from 33 cm at Broad Sound (BS) to 37 cm at DIF. The flounder taken from DIF on May 5th were significantly larger in size than from other sites and from DIF in previous years (Table 3-2). A similar anomalous size grouping was observed in BS in 1991. Mean age ranged from 3.9 years at DIF and BS to 4.4 years at OS.

3.1.3 External Condition

The external conditions (*i.e*. fin erosion, gross abnormalities) of winter flounder collected in 1999 are presented as averages per station in Table 3-2. As described in Section 2.1.5, each of the individual winter flounder collected were assessed for external conditions, and rated on a scale of 0 to 4 (no units), with 0 indicating the absence of the condition and 4 indicating extreme abnormalities (or erosion). As shown in Table 3-2, fin erosion at all stations was at a low level, ranging from 0.1 to 0.3. These levels continue to be extremely low at all stations.

3.1.4 Inter-station Comparison of Liver Lesion Prevalence

Neoplasms and focal hydropic vacuolation in flounder liver were absent from all stations, except for one focal hydropic vacuolation occurrence from DIF (Table 3-3). This sustains the trend of neoplasms being rare to absent since 1992 at Deer Island and Broad Sound (Figure 3-1). They have always been rare or absent at the other three stations.

As found previously in the baseline period, centrotubular hydropic vacuolation (CHV) was the most common form of vacuolation. CHV prevalence at Deer Island (Station 1) was the rarest it has been during the monitoring program (28%). This is the first occasion during the Monitoring Program that Deer Island Flats flounder have shown a lower prevalence of CHV than Nantasket Beach (Figures 3-2 and 3-3). In contrast, in 1999 CHV prevalence rose somewhat at Eastern Cape Cod Bay, Nantasket Beach and Broad Sound relative to 1998 and remained much the same at the Outfall Site. In 1991, when fish were sampled in February, April and May, the CHV prevalences at Deer Island Flats were 50, 72 and 35%, respectively (Moore *et al*., 1992). Because the lowest prevalence of CHV in 1991 at DIF occurred during the May sampling, the low level of vacuolation at DIF in May 1999 should be treated with some caution, given the later sampling date (May 10 as compared to mid-April for the other stations). This could, however, be a real trend showing an ongoing decline of contaminant response at the Deer Island Flats Station.

3.1.5 Relationships Between Age, Length and Lesion Prevalence

There were no obvious relationships between age or length and lesion prevalence, suggesting that lesion prevalence differences observed among stations were not driven by differences in sampling, but by differences in environmental conditions among the stations.

3.1.6 Spatial Comparison of Tissue Contaminant Levels in 1999

The body burdens of contaminants were determined for both edible tissue (fillets) and liver tissue for winter flounder collected in the 1999 survey. All PCB congener 180 data for flounder tissue and liver were considered suspect and not used in the calculation of total PCBs. Since PCB congener 180 tends to contribute five to ten percent of total PCBs, 1999 totals for PCBs are probably low by 5–10 percent. Mean values for selected organic compounds and metals were compared and tested for significance using ANOVA and a two-tailed student t-test assuming equal sampling distribution and variances (Microsoft Excel®) ($p=0.05$). Statistically significant results of the flounder analyses ($p < 0.05$) performed in 1999 are presented in Table 3-4 (for fillets) and Table 3-5 (for livers). A summary of both individual flounder replicate concentrations and mean and standard errors of the replicate analyses for both 1999 fillet and liver tissues are provided in Appendix B and Appendix C, respectively.

3.1.6.1 Edible Tissue

Comparison of the 1999 mean concentrations of organic compounds in fillets across the study area indicates that the concentrations of organic contaminants were numerically similar among all sites except ECCB, where concentrations of all organic contaminants were found to be the lowest (Figures 3-4 and 3-5). The highest concentrations for total DDT and chlordane were found at NB and the highest concentrations for total PCB and dieldrin were found at OS. Mercury, the only metal measured in edible tissue, was highest in fillet samples from OS and lowest at ECCB (Figure 3-6).

Results from the single factor ANOVA evaluating whether contaminants in flounder fillet differ between sampling sites suggest that total PCB, total DDT, total chlordane and mercury concentrations were significantly different between the sampling sites ($p < 0.05$) (Table 3-4). For most of the organic compounds, the concentrations at ECCB were significantly lower than at DIF, NB, and BS. ECCB and OS organic concentrations were not significantly different. For mercury, concentrations at ECCB were significantly lower than at the other four stations.

3.1.6.2 Liver

Comparison of the 1999 mean concentrations of organic compounds in flounder livers across the study area showed a different trend than observed for edible tissue. In general, the highest concentrations of organic contaminants were found in samples from DIF and the lowest at ECCB (Figures 3-7 and 3-8). Metals concentrations in livers, however, were more variable between sites (Figures 3-9 and 3-10). Lead, cadmium, and copper were highest at the OS, similar to the trend observed for organics in fillets. Mercury, silver, and zinc were highest at NB. The highest concentrations of chromium and nickel were found at BS. Unlike the organic compounds, most of the metals were found at their lowest concentrations at DIF. The exceptions were lead and chromium, which were lowest at ECCB.

Of the organic contaminants measured, total PCB, total DDT, total chlordane, and hexachlorobenzene (HCB) were significantly different between DIF and the other sampling sites in 1999 (Table 3-5). Total DDT and total chlordane levels were significantly higher at DIF than at the other four sites. For total PCB, concentrations in 1999 at DIF were significantly higher than those at the other four stations, and concentrations at NB and BS were significantly higher than at ECCB. Of the inorganic contaminants measured, only copper and mercury showed a statistically significant difference in liver contaminant concentrations among any of the five sites tested ($p = 0.035$ and 0.0009, respectively). At DIF, copper

levels were significantly lower than at OS, and mercury levels were significantly lower than at NB, BS, and OS.

3.1.7 Comparison of 1999 Contaminant Levels to Other Baseline Data

Body burdens of selected contaminants have been measured in winter flounder since 1992. This section discusses the temporal trends observed from 1992 through the present. A summary of means and standard errors of the replicate analyses for both 1999 and historical fillet and liver tissues are provided in Appendix C.

3.1.7.1 Edible Tissue

Body burdens of organic compounds monitored in edible tissue in 1999 were consistently similar to or lower than the levels measured in previous years (Figures 3-4 and 3-5). Total PCB and DDT at DIF show an apparent downward trend since 1996. However, dieldrin was slightly higher at all locations compared to previous years. These changes could be due to co-elution encountered during the analysis of PCBs and pesticides in 1999. The concentrations among stations were less variable in 1999 than during previous years.

Mercury was the only metal measured in edible tissue from winter flounder. The 1999 concentrations of mercury at DIF, OS, and ECCB were consistently higher than the concentrations in 1998 (Figure 3-6). Mercury concentrations at all stations have been variable over time, with the lowest concentrations routinely found at ECCB and BS.

Total PCBs and DDTs at NB in 1999 are within the historical range (Figures 3-4 and 3-5). Fillets from fish collected at BS appear to have decreasing levels of PCBs and DDTs since 1992. Mercury concentrations at both NB and BS were within the historical range (Figure 3-6).

3.1.7.2 Liver

Concentrations of organic contaminants (PCBs, chlorinated pesticides, PAHs) in livers from winter flounder in 1999 were generally comparable to or lower than those measured in previous years and very similar to 1998 concentrations. Generally, the highest concentrations in all years were detected in livers from fish collected at DIF and the lowest concentrations were observed at ECCB.

The spatial pattern in metals concentrations, for the most part, did not follow that of organic contaminants (Figures 3-9 and 3-10). Metals concentrations tended to be highest at OS and ECCB throughout the baseline period for the three core sites, rather than at DIF, as observed for organic contaminants. Inorganic contaminants showed no clear trends during the baseline period. 1999 concentrations were generally within the established baseline range at DIF and ECCB. However, in 1999, lead, mercury, cadmium, copper, and silver were at the upper end of the historical range at OS.

1999 total PCB concentrations at NB were within the range of measured values for the baseline period, and BS shows a downward trend in total PCB since 1992 (Figure 3-7). Concentrations of total DDT in 1999 were the lowest measured during the baseline period at NB and similar to the 1996 value at BS (Figure 3-8). Mercury concentrations at NB and BS were within the range of previously measured baseline values. 1999 chromium and silver data for NB suggest possible increasing trends for these metals since 1992 (Figures not given, but data are presented in Appendix C).

3.1.8 Relationship of Contaminant Levels to Histopathology

As previously observed, relationships between contaminant burdens and histopathology varied depending on the compounds and tissue compared. Broadly speaking, the lowest levels of centrotubular hydropic

vacuolation and lowest organic contaminant burden were found at the ECCB, intermediate levels at OS and higher levels at the stations at or around Boston. The relationship for CHV and fillet and liver chlordane is shown as an example in Figures 3-11 and 3-12. For chlordane at DIF, 1999 appears to have been on the low side of what the previous years would have predicted for both chlordane concentrations and CHV prevalence. The relationships between inorganic contaminants and CHV prevalence are, as previously observed, more complex, and show no obvious correlations.

3.1.9 Relationship to Contaminant Levels to FDA Action Limits

The U.S. Food and Drug Administration (FDA) has set action limits for the maximum tissue concentrations of specific contaminants in the edible portions of fish and fishery products. For the MWRA biomonitoring program, Caution Levels are set at 2 times the OS baseline mean (1992-1998). Warning Levels are set at 80% of the FDA Limits (MWRA 1997a – Contingency Plan). Caution and Warning Levels apply to the outfall (OS) only. These two levels provide reference benchmarks for detecting adverse changes (and their potential human health risks) once the new outfall is on line. The means at DIF and ECCB were also compared for information only. The 1999 mean concentrations of target analytes in flounder edible meat, per station, were compared to the FDA's Action Limits and the MWRA caution and warning levels through 1998 for the outfall (Table 3-6). In 1999, the mean value for dieldrin at OS exceeded the MWRA Caution Level. There were no exceedences of the MWRA Warning Levels or the FDA Limits in 1999. No edible winter flounder tissues from previous years exceeded any of the MWRA Warning levels.

3.2 Lobster

3.2.1 Lobster Collection

The 1999 lobster survey was conducted by purchasing lobster from commercial lobstermen (the alternate method presented in the CW/QAPP). Fifteen lobsters were collected from each location. Due to lack of lobsters in the site areas from July until September, samples were not collected at OS until November.

3.2.2 Size, Sex, and External Conditions

The size, sex and external conditions (*i.e*. black gill disease, shell erosion, parasites, external tumors, etc.) were determined for the lobsters collected in the 1999 survey. The mean length and weight of lobsters collected in 1999 are presented in Table 3-7. Little difference in lobster length or weight was observed between the three sampling sites. The ratio of female to male lobster is also presented in Table 3-7. Mostly males were found at DIF and ECCB and mostly females at OS.

Table 3-8 presents the average values for general external observations made for the 15 lobsters collected at each station in the 1999 survey. In general, no deleterious conditions were noted in any of the lobsters collected during the survey.

3.2.3 Spatial Comparison of Tissue Contaminant Levels in 1999

The body burdens of contaminants were determined for both edible tissue (tail and claw meat) and liver tissue (hepatopancreas) for lobster collected in the 1999 survey. Mean values for selected organic compounds and metals were compared and tested for significance using ANOVA and a two-tailed student t-test assuming equal sampling distribution and variances (Microsoft Excel®) ($p=0.05$). Statistically significant results ($p < 0.05$) of the lobster analyses performed in 1999 are presented in Table 3-9 (for meat) and Table 3-10 (for hepatopancreas). All 1999 individual replicate concentrations for each contaminant can be found in Appendix B. Means, standard error, and *n* were determined for all stations and all years, and are presented in Appendix C.

3.2.3.1 Edible Tissue

Comparison of the 1999 mean concentrations of organic compounds in lobster meat across the study area indicate that the highest concentrations were found at DIF and the lowest concentrations were found at ECCB (Figures 3-13 and 3-14). However, for DDT, the lowest concentrations were found at OS. Mercury, the only metal measured in lobster meat, was highest in samples from OS and DIF and lowest at ECCB (Figure 3-15).

Most organic contaminants in lobster edible tissue had statistically significantly result from the ANOVA analysis (Table 3-9). Concentrations at DIF for total PCBs, total DDT, total chlordane and dieldrin were significantly higher than were those at OS and ECCB. Concentrations of all detected organic compounds at DIF were significantly higher than were those at ECCB. OS concentrations were significantly greater than at ECCB, except for Total DDT and mirex. Concentrations of mercury were not significantly different among the three sites.

3.2.3.2 Hepatopancreas

Comparison of the 1999 mean concentrations of organic compounds in lobster hepatopancreas across the study area showed the same spatial pattern as for edible tissue, with the highest concentrations generally found in samples from DIF and the lowest at ECCB (Figures 3-16 through 3-18). This high-to-low pattern is a general one, with HCB and lindane being the exceptions. Metal body burdens were more variable spatially (Figures 3-19 and 3-20). Although there was no clear spatial pattern for the inorganics, a majority of the metals were highest in samples from DIF (Pb, Cu, Zn) or from OS (Hg, Cd, Ag).

Total PCB, total PAH, total DDT, total chlordane and dieldrin levels all had statistically significant differences in contaminant concentrations between two or more of the sampling sites, and all but dieldrin were significantly higher at DIF than at OS and ECCB (Table 3-10). Concentrations of total PCB, total chlordane and dieldrin were significantly lower at ECCB than at DIF and OS. Of the inorganic contaminants, cadmium, copper, lead, mercury and zinc concentrations were found to be significantly different among two or more of the sampling sites. Levels of lead and copper in samples from DIF were significantly higher than in samples from ECCB. Cadmium and mercury concentrations in samples from OS were significantly higher than were those from DIF. Zinc levels at DIF and ECCB were significantly higher than were those at OS.

3.2.4 Comparison of 1999 Tissue Contaminant Levels to Other Baseline Data

Body burdens of selected contaminants have been measured in lobster since 1992. The data for stations DIF, OS, and ECCB are presented below.

3.2.4.1 Edible Tissues

The general spatial pattern observed in 1999 (*i.e.*, DIF having the highest and ECCB the lowest body burdens of organic contaminants) is consistent with the historical spatial patterns (Figure 3-13 and 3-14). Concentrations were within the historical range of values, though 1999 levels were slightly higher than 1998 levels.

The spatial pattern of mercury body burdens observed in 1999 (*i.e.*, OS generally the highest and ECCB the lowest) was consistent with historical trends (Figure 3-15). 1999 mercury concentrations at all three stations tended to be in the middle of the historical range.

3.2.4.2 Hepatopancreas

In general, the spatial pattern of organic contaminants observed in lobster hepatopancreas in 1999 was consistent with historical patterns (*i.e.*, DIF having the highest and ECCB the lowest body burdens of

organic contaminants) (Figures 3-16 through 3-18). 1999 total PCBs and DDTs continued apparent upward trends since 1994 at all three stations but especially at DIF. An upcoming Toxics Review will address this issue. Total PAHs appear to have decreased during the baseline period.

Historically, metal body burdens have been more variable than the organic burdens, with ECCB and OS metals often being as high or higher than those from DIF (Figures 3-19, 3-20, and 3-21). In 1999, tissue concentrations of silver at all three sites and of copper at DIF and OS continued an apparent upward trend and were the highest detected during the program. Lead concentration in DIF lobster hepatopancreas in 1999 were notably higher than any previously observed. Concentrations of lead in CCB lobster hepatopancreas were slightly higher in 1998 and 1999 in relation to concentrations from 1993 to 1997.

3.2.5 Relationship of Contaminant Levels to FDA Action Limits

The U.S. Food and Drug Administration (FDA) has set action limits for the maximum tissue concentrations of specific contaminants in the edible portions of fish and fishery products. For the MWRA biomonitoring program, Caution Levels are set at 2 times the OS baseline mean (1992-1998). Warning Levels are set at 80% of the FDA Limits (MWRA 1997a – Contingency Plan). Caution and Warning Levels apply to the outfall (OS) only. These two levels provide reference benchmarks for detecting adverse changes (and their potential human health risks) once the new outfall is on line. The means at DIF and ECCB were also compared for information only. The 1999 mean concentrations of target analytes in lobster edible meat, per station, were compared to the FDA's Action Limits and the MWRA caution and warning levels through 1998 for the outfall (Table 3-11). No exceedances of the MWRA Caution (1992-1998 baseline) and Warning Levels or the FDA Limits were noted in 1999 for lobster meat. To date, no lobster meat tissues have exceeded any of the FDA Action Limits. However, concentrations of PCBs in hepatopancreas have slightly exceeded the FDA Action Limits at DIF since 1996. Concentrations of PCBs in hepatopancreas tissue in lobsters from the OS have also come close to FDA limits since 1995. This is consistent with the current MA State Advisory regarding consumption of lobster tomalley (*i.e*. hepatopancreas) for lobsters caught in Massachusetts' waters.

3.3 Blue Mussel

3.3.1 Mussels Collected

The 40-day mussel retrieval was performed on August 9 and 10, 1999. Samples were successfully collected at BIH, OS and CCB stations (Table 3-12). No arrays and no samples were recovered at Deer Island. As all four arrays were still present at CCB, only one array containing the short count of Sandwich mussels (13) was recovered for archival.

On August 20, 1999, a supplemental effort was mounted to search for and recover the missing moorings from the Deer Island station. A side scan sonar system was used to search a large area (approximately 1/4 mile by 1/4 mile) at and around the mooring deployment location just south of the old Outfall structure. Hard hat divers were used to search and recover targets identified by the side scan sonar. The moorings were not found.

The 60-day retrieval was performed on August 30 and September 2, 1999. Samples were successfully recovered at BIH, OS and CCB stations (see Table 3-13). Because of the limited number of Sandwich Mussels collected, two of the three mooring arrays collected at CCB contained only 13 mussels each. The third contained the standard 30. With all CCB moorings recovered and very low mortality, there were more than enough samples collected for analysis.

3.3.1.1 Survival

The percent survival observed in the caged mussels was high (*i.e.*, ≥ 86%) for both the 40- and 60-day harvested mussels (Table 3-14). OS showed no mortality in either the 40- or 60-day collections. Survival at CCB was also high (97% and 100%, respectively). The lowest survival rates were observed at BIH for both the 40-day collection (86%) and the 60-day collection (87%).

3.3.2 Spatial Comparison of Tissue Contaminant Levels in 1999

The differences in mussel tissue contaminant levels were examined across the various sampling and deployment locations. Mean values for selected organic compounds and metals were compared among deployment stations and compared to pre-deployment means and tested for significance using a two-tailed student t-test assuming equal sampling distribution and variances (Microsoft Excel®) (p=0.05). Details of the results of the mussel analyses performed in 1999 are presented in Tables 3-15 and 3-16 and discussed below. Summary tables of organic and inorganic contaminant concentrations for individual mussel composites are included in Appendix B. Concentrations of station means, standard errors of the means and *n* values are summarized in Appendix C.

3.3.2.1 Mercury and Lead

Mercury tissue concentrations were highest at BIH (0.099 μg/g) and lowest at CCB (0.053 μg/g) (Figure 3-22). The concentrations of mercury at all three deployment sites were significantly different from one another (Table 3-15). Mercury concentrations at CCB were significantly lower than in the pre-deployed Sandwich mussels (Table 3-16). Mercury levels at BIH were significantly higher than levels in the Sandwich mussels. There was a significant difference between the mercury concentrations in mussels from OS and Sandwich.

Lead concentrations in mussels at BIH were significantly higher than at OS and CCB and were significantly higher than in the pre-deployed Sandwich mussels (Figure 3-23). Mussels at OS had lead concentrations significantly lower than the Sandwich mussels. CCB mussel lead concentrations were not significantly different than the pre-deployed values.

3.3.2.2 Polychlorinated Biphenyls

Mussel tissues were analyzed for 20 polychlorinated biphenyl (PCB) congeners. The total concentrations of these 20 PCBs were significantly higher at BIH (491.8 ng/g) than at the other stations (Figure 3-24). All three stations had concentrations of total PCBs that were significantly different from one another (Table 3-15). Concentrations of total PCBs in BIH deployed mussels were significantly higher than the pre-deployed Gloucester mussels (Table 3-16). Total PCB concentrations in mussels at OS were significantly lower than in the pre-deployed Gloucester mussels. The concentrations found at CCB and Gloucester were not significantly different.

3.3.2.3 Pesticides

Mussel tissues were analyzed for individual chlorinated pesticides. Most pesticides measured were detected in mussels from at least one location. Only aldrin and endrin were not detected in any of the samples. In general, highest pesticide concentrations were found in mussels deployed at BIH (Figure 3-25). Total chlordane, dieldrin and mirex concentrations were significantly higher in mussels deployed at BIH than at OS and CCB (Table 3-15) Total DDT and lindane concentrations were significantly different among all three stations. Concentrations of HCB in OS deployed mussels were significantly lower than concentrations in BIH and CCB deployed mussels.

The concentrations at BIH were significantly higher than in the pre-deployed mussels for total DDT, total chlordane, dieldrin and mirex (Table 3-16). Concentrations of all pesticides were either not significantly

different or were significantly lower at OS and CCB than in the pre-deployment mussels. Concentrations of lindane, however, were significantly higher at OS and CCB than pre-deployment levels.

3.3.2.4 PAH Compounds

Total PAHs, as well as total low and high molecular weight PAHs, have been calculated by different methodologies during the course of this study. For purposes of comparison across multiple study years, the method common to most years was used for evaluating temporal trends (see section 3.3.3). This method is referred to here as the "Historical NOAA List" (see Table 3-17). This list is much less comprehensive than the current list, referred to as the "Total PAH List"(Table 3-17). The historical NOAA list includes primarily parent PAH compounds and only five individual alkylated naphthalenes. The lack of quantitation of additional alklyated groups (*e.g*. alkyl dibenzothiophenes, phenanthrenes, anthracenes etc.) results in a significantly lower calculated total PAH value. In addition, in 1995, the individual five alkylated "NOAA" PAHs were not measured. Instead, the C1, C2 and C3-napthalene homologue groups were quantified. To make 1995 results more comparable to the NOAA historical list, values for the individual naphthalene compounds were estimated using ratios of the individuals to their respective homologue groups from 1996 and 1997 data sets.

Current data are discussed in terms of the more recent "Total PAH List". Temporal trends, discussed in Section 3.3.3, are presented using the "Historical NOAA List".

The target list of PAH compounds analyzed in 1999 is presented in Table 3-17 and includes all compounds in the "Total PAH List".

Summary tables of total low molecular weight PAHs (LMW-PAH) (defined as those target 2 and 3 ringed compounds) and total high molecular weight PAHs (HMW-PAH) (defined 4, 5 and 6 ringed compounds) for individual mussel composites are included in Appendix B. Mean concentrations of total LMW-PAH and total HMW-PAH are presented in Appendix C, as are the standard errors and *n* values associated with these means for each station. The concentrations of LMW and HMW-PAHs at all locations are shown in Figure 3-26.

The 1999 average body burdens of Total LMW and HMW PAH were highest in mussels deployed at BIH, and the concentrations of PAH were significantly different among the three stations (Table 3-15). Concentrations at BIH were significantly higher than the pre-deployed concentrations observed at Gloucester (Table 3-16). LMW and HMW PAH concentrations in mussels deployed at OS and CCB were significantly lower than pre-deployment levels.

3.3.2.5 Lipid Results

Lipid concentrations were measured in all mussel composites (Appendix B). Values in 1999 were very similar for BIH (6.13 ±0.2% dry), and Gloucester (6.59 ± 0.5% dry) and slightly higher for OS (8.15 ± 0.2% dry) and CCB (11.9 ± 0.5% dry). Based on the findings of Mitchell *et al.* (1998), it does not appear that normalization for lipid content elucidates any trends in chemical concentrations. No lipid normalization of mussel data was performed.

3.3.3 Comparison of 1999 Contaminants Levels to Other Baseline Data

Mussel tissue burdens were also compared across the various study years. In the past, when an analyte was reported as not detected, the detection limit value was used in calculations. For consistency with other fish and shellfish data and to avoid the problems introduced by the use of varying magnitudes of reporting/detection limits used over the years, all non-detects were equated with "zero" in this report. The

following section provides a discussion of trends observed for the analytes measured. Selected figures are presented to illustrate these trends.

3.3.3.1 Mercury and Lead

Mercury concentrations measured in mussels in 1999 at all sites were similar to the concentrations and to the spatial pattern in 1998, though measured concentrations were slightly lower in 1999 (Figure 3-27). In fact, the levels at all four stations were among the lowest measured values for mercury since 1993.

Lead concentrations measured in 1999 at Sandwich (1.56 μg/g) and OS (1.09 μg/g) were among the lowest measured since the beginning of the program (Figure 3-28). Lead concentrations measured at BIH in 1999 were similar to 1998 levels and more than 2 times lower than 1997 levels.

3.3.3.2 Polychlorinated Biphenyls

Data for 1999 PCBs at most stations were in the low end of the historical range. The spatial pattern observed in 1999 was similar to the pattern observed in previous years, with BIH having the highest concentrations and OS the lowest concentrations. Figure 3-29 shows the distribution of total PCBs since 1991 at Gloucester, BIH, DI, OS and CCB.

3.3.3.3 Pesticides

1999 concentrations of total DDTs, chlordanes, and dieldrin were similar to or lower than concentrations observed in previous years (Figure 3-30 and Appendix C). Spatial patterns have remained constant over time, with concentrations in BIH mussels higher than at other stations.

3.3.3.4 PAHs

Pre-deployment total PAHs in mussels collected in 1999 were the highest measured since 1991 (Figure 3-31). This was mainly due to the HMW PAHs. At the other stations, PAHs were within the historical range.

3.3.4 Relationship of Contaminants to FDA Action Limits

The U.S. Food and Drug Administration (FDA) has set action limits for the maximum tissue concentrations of specific contaminants in the edible portions of fish and fishery products. For the MWRA biomonitoring program, Caution Levels are set at 2 times the OS baseline mean (1992-1998). Warning Levels are set at 80% of the FDA Limits (MWRA 1997a – Contingency Plan). Caution and Warning Levels apply to the outfall (OS) only. These two levels provide reference benchmarks for detecting adverse changes (and their potential human health risks) once the new outfall is on line. The 1999 mean concentrations of target analytes in mussel tissue, per station, were compared to the FDA's Action Limits and the MWRA caution and warning levels through 1990 for the outfall (Table 3-18). In 1999, there were no exceedences of the MWRA Caution and Warning Levels or for the federal limits.

Table 3-1. Catch per Unit Effort (CPU) for Winter Flounder Trawled in April/May.

Location	1991	1992	1993	1994	1995	1996	1997	1998	1999
Deer Island	0.38	0.23	0.15	0.16	0.10	0.16	0.16	0.56	1.09
Nantasket Beach	0.48	1.29	1.52	0.88	0.88	0.77	0.43	0.41	0.21
Broad Sound	1.26	2.80	0.49	0.46	0.29	0.23	0.59	0.69	0.38
Outfall Site	0.10	0.48	0.62	0.25	0.60	0.31	0.81	0.42	0.31
East Cape Cod Bay	0.67	0.49	0.77	0.45	0.50	1.38	0.32	0.50	0.92

CPU = # fish caught per minute of bottom time
The same vessel and net were used at all times

Table 3-2. Summary of Physical Characteristics of Winter Flounder Collected in 1999.

Station Name		DIF	NB	BS	OS	ECCB
Station Number		**1**	**2**	**3**	**4**	**5**
N		50	50	50	50	50
Total Length (mm)	Mean	372.3	336.2	327.6	347.4	342.7
	Std. Dev.	35.6	32.8	26.7	36.5	28.4
	AVOVA*	2,3,4,5	1,4,5	1,4,5	1,2,3,5	1,2,3,4
Weight (g)**	Mean	728.5	493.9	502.7	555.9	513.7
	Std. Dev.	163.8	182.1	231.1	243.1	158.2
	ANOVA	2,3,4,5	1	1	1	1
Age (years)	Mean	3.9 ***	4.1	3.9	4.4	4.1
	Std. Dev.	0.8	0.8	0.7	0.8	0.7
	ANOVA	4	4		1,2,5	4
Fin erosion (0-4)	Mean	0.3	0.3	0.1	0.2	0.1
	Std. Dev.	0.5	0.6	0.4	0.5	0.4
	ANOVA					
Gross liver score (0-4)	Mean	0.0	0.0	0.1	0.0	0.0
	Std. Dev.	0.1	0.1	0.3	0.0	0.1
	ANOVA					

* Differences by ANOVA given as the station(s) that differed significantly from the station in that column
** Sample size = 15 (first 15 fish collected at each station)
*** Sample size = 48

Table 3-3. Prevalence (%) of Lesions in Winter Flounder Liver from Five Stations in Massachusetts and Cape Cod Bays – 1999.

Station Name		DIF	NB	BS	OS	ECCB
Station Number		**1**	**2**	**3**	**4**	**5**
N		50	50	50	50	50
Lesion type*	Neoplasm	0	0	0	0	0
	Focal HV	2	0	0	0	0
	Tubular HV	14	14	32	6	2
	Centrotubular HV	28	36	44	22	14
	Macrophage Aggregation	42	68	86	66	54
	Biliary Proliferation	4	20	28	12	12

*Prevalence calculated as the percentage of fish from each station showing each lesion type
HV – Hydropic Vacuolation

Table 3-4. ANOVA Results Comparing Contaminant Concentrations in Flounder Fillets in 1999.

Station Name		DIF	NB	BS	OS	ECCB
Station Number		**1**	**2**	**3**	**4**	**5**
N		3	3	3	3	3
Mercury (p=0.0006)	Mean	0.35	0.53	0.42	0.54	0.22
	Std. Dev.	0.02	0.12	0.02	0.08	0.02
	ANOVA*	3, 4, 5	5	1,5	1,5	1,2,3,4
Total PCB (p=0.019)	Mean	141.5	133.3	111.4	166.2	51.70
	Std. Dev.	7.67	19.36	13.39	71.26	10.04
	ANOVA	3, 5	5	1,5		1,2,3
Total DDT (p=0.046)	Mean	21.40	23.29	17.07	22.31	11.74
	Std. Dev.	2.30	2.80	4.31	7.71	2.07
	ANOVA	5	5			1,2
Total Chlordane (p=0.019)	Mean	9.73	10.10	8.84	7.12	2.34
	Std. Dev.	0.59	2.00	1.55	4.83	0.85
	ANOVA	5	5	5		1,2,3

*Differences by ANOVA given as the station(s) that differed significantly from the station in that column

Table 3-5. ANOVA Results Comparing Contaminant Concentrations in Flounder Livers in 1999.

Station Name		DIF	NB	BS	OS	ECCB
Station Number		**1**	**2**	**3**	**4**	**5**
N		3	3	3	3	3
Copper (p=0.035)	Mean	33.51	90.58	67.98	129.94	70.89
	Std. Dev.	4.79	48.60	22.16	32.08	28.16
	ANOVA*	4			1	
Mercury (p=0.0009)	Mean	0.22	0.74	0.49	0.65	0.31
	Std. Dev.	0.006	0.12	0.03	0.21	0.07
	ANOVA	2,3,4	1,3,5	1,2,5	1	2,3
Total PCB (p=0.00001)	Mean	2761.07	825.35	1213.75	1270.92	360.31
	Std. Dev.	56.09	170.34	178.78	565.57	192.83
	ANOVA	2,3,4,5	1,5	1,5	1	1,2,3
Total DDT (p=0.00002)	Mean	484.47	116.34	187.00	181.02	80.56
	Std. Dev.	42.64	27.01	55.79	77.57	46.05
	ANOVA	2,3,4,5	1	1	1	1
Total Chlordane (p=0.0001)	Mean	225.85	41.68	68.38	47.80	15.42
	Std. Dev.	18.22	18.81	63.29	26.48	10.65
	ANOVA	2, 3, 4, 5	1	1	1	1
HCB (p=0.018)	Mean	6.53	2.97	4.43	3.84	3.49
	Std. Dev.	0.44	0.42	0.95	0.46	2.07
	ANOVA	2, 3, 4	1	1	1	

*Differences by ANOVA given as the station(s) that differed significantly from the station in that column

Table 3-6. Comparison of FDA and MWRA Thresholds to Mean 1999 Flounder Fillet Concentrations for Selected Parameters.

Station	Total PCB (ng/g wet wt.)			Total DDT (ng/g wet wt.)			Total Chlordane (ng/g wet wt.)			Dieldrin (ng/g wet wt.)			Mercury (μg/g wet wt.)		
	mean	**se**	**n**	**mean**	**se**	**n**	**mean**	**se**	**n**	**mean**	**se**	**n**	**mean**	**se**	**n**
Deer Island Flats	24.87	0.60	3	3.76	0.20	3	1.71	0.06	3	0.65	0.19	3	0.06	0.00	3
Nantasket Beach	23.19	1.55	3	4.05	0.13	3	1.76	0.18	3	0.52	0.04	3	0.09	0.01	3
Broad Sound	20.43	2.16	3	3.14	0.53	3	1.60	0.13	3	0.49	0.08	3	0.08	0.00	3
Outfall Site	26.63	7.52	3	3.57	0.84	3	1.15	0.49	3	0.77	0.29	3	0.09	0.01	3
ECCB	8.62	0.89	3	1.96	0.18	3	0.39	0.08	3	0.12	0.03	3	0.04	0.00	3
FDA Limit	2000			5000			300			300			1		
MWRA Caution Level (2x baseline, 1992-1998)	76.22			7.99			2.88			0.55			0.17		
MWRA Warning Level (80% FDA)	1600			4000			240			240			0.8		

Table 3-7. Mean Length, Weight, and Sex Ratio of Lobsters Collected in 1999.

Parameter	N	DIF		OS		ECCB	
		Station Mean	S.E.	Station Mean	S.E.	Station Mean	S.E.
Carapace Length (mm)	15	112.9	10.8	117.9	3.2	115.2	7.5
Weight (g)	15	521.5	159.2	535.0	40.0	555.8	72.2
RATIO Male/Female*	15	12/3	NA	1/14	NA	13/2	NA

S.E. = Standard Error

Table 3-8. Mean Score – 1999 Lobster External Condition.

Parameter	N	DIF		OS		ECCB	
		Station Mean	S.E.	Station Mean	S.E.	Station Mean	S.E.
Black Gill	15	0	0	0	0	0	0
External Tumors	15	0	0	0	0	0	0
Parasites	15	0	0	0	0	0	0
Shell Erosion	15	0	0	0	0	0	0

Note: Values range from 0 (absent) to 4 (extreme).
S.E. = Standard Error

Table 3-9. ANOVA Results Comparing Contaminant Concentrations in Lobster Meat in 1999.

Station Name		DIF	OS	ECCB
Station Number		**1**	**4**	**5**
N		3	3	3
Total PCB (p=0.0003)	Mean	154.22	73.73	52.91
	Std. Dev.	22.47	5.51	7.80
	ANOVA*	4, 5	1,5	1,4
Total DDT (p=0.0006)	Mean	15.98	7.36	9.32
	Std. Dev.	1.84	0.17	1.44
	ANOVA	4, 5	1	1
Total Chlordane (p=0.000003)	Mean	5.47	2.30	1.49
	Std. Dev.	0.16	0.40	0.07
	ANOVA	4, 5	1,5	1,4
Dieldrin (p=0.00003)	Mean	6.79	5.15	4.26
	Std. Dev.	0.10	0.26	0.29
	ANOVA	4, 5	1,5	1,4
HCB (p=0.005)	Mean	0.47	0.46	0.33
	Std. Dev.	0.03	0.01	0.05
	ANOVA	5	5	1,4
Mirex (p=0.027)	Mean	0.56	0.31	0.23
	Std. Dev.	0.18	0.07	0.04
	ANOVA	5		1

* Differences by ANOVA given as the station(s) that differed significantly from the station in that column

Table 3-10. ANOVA Results Comparing Contaminant Concentrations in Lobster Hepatopancreas in 1999.

Station Name		DIF	OS	ECCB
Station Number		**1**	**4**	**5**
N		3	3	3
Cadmium (p=0.04)	Mean	4.58	15.53	12.42
	Std. Dev.	0.60	6.67	2.62
	ANOVA*	4, 5	1	1
Copper (p=0.01)	Mean	895.2	830.47	477.97
	Std. Dev.	29.29	178.69	123.50
	ANOVA	5	5	1,4
Lead (p=0.03)	Mean	0.52	0.42	0.25
	Std. Dev.	0.05	0.14	0.05
	ANOVA	5		1
Mercury (p=0.03)	Mean	0.31	0.53	0.32
	Std. Dev.	0.03	0.14	0.03
	ANOVA	4	1	
Zinc (p=0.005)	Mean	88.07	47.37	75.73
	Std. Dev.	12.83	9.33	5.29
	ANOVA	4	1,5	4
Total PCB (p=0.00001)	Mean	10255	6353	3132
	Std. Dev.	217.8	783.0	417.9
	ANOVA	4, 5	1,5	1,4
Total PAH (p=0.0001)	Mean	7597	1563	1310
	Std. Dev.	1403	285.9	135.3
	ANOVA	4, 5	1	1
Total DDT (p=0.00007)	Mean	1297	745.9	559.1
	Std. Dev.	50.00	115.48	57.95
	ANOVA	4, 5	1	1
Total Chlordane (p=0.0005)	Mean	138.0	57.94	31.85
	Std. Dev.	25.11	11.69	5.58
	ANOVA	4, 5	1,5	1,4
Dieldrin (p=0.005)	Mean	59.63	51.66	28.13
	Std. Dev.	6.40	10.94	3.36
	ANOVA	5	5	1,4

* Differences by ANOVA given as the station(s) that differed significantly from the station in that column.

Table 3-11. Comparison of FDA and MWRA Thresholds to Mean 1999 Lobster Concentrations for Selected Parameters.

Station	Total PCB (ng/g wet wt.)			Total DDT (ng/g wet wt.)			Total Chlordane (ng/g wet wt.)			Dieldrin (ng/g wet wt.)			Mercury (µg/g wet wt.)		
	mean	se	n	mean	se	n	mean	se	n	mean	se	n	mean	se	n
Deer Island Flats	23.82	2.42	3	2.46	0.17	3	0.85	0.09	3	1.05	0.09	3	0.16	0.04	3
Outfall Site	10.03	0.68	3	1.00	0.04	3	0.31	0.03	3	0.70	0.02	3	0.14	0.03	3
ECCB	6.87	0.59	3	1.21	0.10	3	0.19	0.01	3	0.55	0.02	3	0.09	0.01	3
FDA Limit	2000			5000			300			300			1		
MWRA Caution Level (2x baseline, 1992-1998)	37.28			4.56			0.78			1.80			0.30		
MWRA Warning Level (80% FDA)	1600			4000			240			240			0.8		

Table 3-12. Samples Collected During 40-day Retrieval.

Site	# Cages	Approximate # Mussels/ Cage	Approximate Total # Mussels
BIH	2 Gloucester 1 Sandwich	30	90 (60 Gloucester, 30 Sandwich)
DI	0 Gloucester 0 Sandwich	30	0 (0 Gloucester, 0 Sandwich)
OS	2 Gloucester 1 Sandwich	48 30	126 (96 Gloucester, 30 Sandwich)
CCB	2 Gloucester 1 Sandwich	48 13	109 (96 Gloucester, 13 Sandwich)

Table 3-13. Samples Collected During 60-day Retrieval.

Site	# Cages	Approximate # Mussels/ Cage	Approximate Total # Mussels
BIH	4 Gloucester 2 Sandwich	30	180 (120 Gloucester, 60 Sandwich)
DI	0 Gloucester 0 Sandwich	30	0 (0 Gloucester, 0 Sandwich)
OS	6 Gloucester 3 Sandwich	48 30	378 (288 Gloucester, 90 Sandwich)
CCB	6 Gloucester 3 Sandwich	48 30,13,13	344 (288 Gloucester, 56 Sandwich)

Table 3-14. 1999 Caged Mussels Survival Data.

Collection	Site	Total Mussels	Dead Mussels	Survival Rate
40-day	BIH	90	13	86%
	OS	90	0	100%
	CCB	74	2	97%
60-day	BIH	180	24	87%
	OS	271	1	100%
	CCB	239	0	100%

Table 3-15. ANOVA Results Comparing Contaminant Concentrations in Deployed Mussels in 1999.

Station Name		OS	BIH	CCB
Station Number		**4**	**6**	**9**
N		8	5	8
Lead (p=<0.001)	Mean	1.09	4.69	1.26
	Std. Dev.	0.23	0.80	0.25
	ANOVA*	6	4,9	6
Mercury (p=<0.001)	Mean	0.063	0.099	0.053
	Std. Dev.	0.008	0.009	0.005
	ANOVA	6, 9	4,9	4,6
Total PCB (p=<0.001)	Mean	36.87	491.80	47.66
	Std. Dev.	3.04	46.83	5.47
	ANOVA	6, 9	4,9	4,6
Total HMW PAHs (p=<0.001)	Mean	29.88	3679.7	17.85
	Std. Dev.	2.70	324.58	2.86
	ANOVA	6, 9	4,9	4,6
Total LMW PAHs (p=<0.001)	Mean	36.44	2372.7	45.73
	Std. Dev.	6.14	306.54	6.88
	ANOVA	6, 9	4,9	4,6
Total DDT (p=<0.001)	Mean	12.19	85.90	17.72
	Std. Dev.	1.32	7.03	1.95
	ANOVA	6, 9	4,9	4,6
Total Chlordane (p=<0.001)	Mean	7.72	22.50	7.52
	Std. Dev.	0.71	2.3	0.67
	ANOVA	6	4,9	6
Dieldrin (p=<0.001)	Mean	1.47	9.06	1.57
	Std. Dev.	0.10	1.14	0.22
	ANOVA	6	4,9	6
HCB (p=<0.001)	Mean	0.22	0.45	0.36
	Std. Dev.	0.09	0.07	0.07
	ANOVA	6, 9	4	4
Lindane (p=<0.001)	Mean	0.36	0.28	0.65
	Std. Dev.	0.03	0.05	0.10
	ANOVA	6, 9	4,9	4,6
Mirex (p=<0.001)	Mean	0.05	0.41	0.05
	Std. Dev.	0.02	0.03	0.01
	ANOVA	6	4,9	6

* Differences by ANOVA given as the station(s) that differed significantly from the station in that column.

Table 3-16. T-test Results Comparing Contaminant Levels in Deployed Mussels with Pre-deployed Mussels in 1999.

Station Name		OS	BIH	CCB	Pre-deployed*
Station Number		**4**	**6**	**9**	**7/8**
N		8	5	8	5
Total PCB	Mean	36.87	491.80	47.66	53.73
	Std. Dev.	3.04	46.83	5.47	10.32
	Prob.	0.001	< 0.001	0.19	NA
Total HMW PAHs	Mean	29.88	3679.7	17.85	610.85
	Std. Dev.	2.70	324.58	2.86	304.29
	Prob.	< 0.001	< 0.001	< 0.001	NA
Total LMW PAHs	Mean	36.44	2372.7	45.73	348.06
	Std. Dev.	6.14	306.54	6.88	94.27
	Prob.	< 0.001	< 0.001	< 0.001	NA
Total DDT	Mean	12.19	85.90	17.72	34.34
	Std. Dev.	1.32	7.03	1.95	8.17
	Prob.	< 0.001	< 0.001	< 0.001	NA
Total Chlordane	Mean	7.72	22.50	7.52	7.63
	Std. Dev.	0.71	2.3	0.67	2.18
	Prob.	0.91	< 0.001	0.90	NA
Dieldrin	Mean	1.47	9.06	1.57	1.44
	Std. Dev.	0.10	1.14	0.22	0.26
	Prob.	0.72	< 0.001	0.32	NA
HCB	Mean	0.22	0.45	0.36	0.38
	Std. Dev.	0.09	0.07	0.07	0.17
	Prob.	0.04	0.44	0.80	NA
Lindane	Mean	0.36	0.28	0.65	0.30
	Std. Dev.	0.03	0.05	0.10	0.05
	Prob.	0.01	0.69	< 0.001	NA
Mirex	Mean	0.05	0.41	0.05	0.15
	Std. Dev.	0.02	0.03	0.01	0.04
	Prob.	< 0.001	< 0.001	< 0.001	NA
Lead	Mean	1.09	4.69	1.26	1.56
	Std. Dev.	0.23	0.80	0.25	0.34
	Prob.	0.01	< 0.001	0.10	NA
Mercury	Mean	0.063	0.099	0.053	0.08
	Std. Dev.	0.008	0.009	0.005	0.005
	Prob.	0.01	< 0.001	< 0.001	NA

* Pre-deployed mussels for organic analysis were from Gloucester. Pre-deployed mussels for inorganic analysis were from Sandwich.

Table 3-17. Summary of PAH Lists of Analytes Used for Biaccumulation Study 1992-1999.

Total PAH List	"Historical" NOAA PAH List
Low Molecular Weight PAHs	**Low Molecular Weight PAHs**
1-METHYLNAPHTHALENE	1-METHYLNAPHTHALENE
1-METHYLPHENANTHRENE	1-METHYLPHENANTHRENE
2,3,5-TRIMETHYLNAPHTHALENE	2,3,5-TRIMETHYLNAPHTHALENE
2,6-DIMETHYLNAPHTHALENE	2,6-DIMETHYLNAPHTHALENE
2-METHYLNAPHTHALENE	2-METHYLNAPHTHALENE
ACENAPHTHENE	ACENAPHTHENE
ACENAPHTHYLENE	ACENAPHTHYLENE
ANTHRACENE	ANTHRACENE
BENZOTHIAZOLE *	
BIPHENYL	BIPHENYL
C1-DIBENZOTHIOPHENES	
C1-FLUORENES	
C1-NAPHTHALENES	
C1-PHENANTHRENES/ANTHRACENES	
C2-DIBENZOTHIOPHENES	
C2-FLUORENES	
C2-NAPHTHALENES	
C2-PHENANTHRENES/ANTHRACENES	
C3-DIBENZOTHIOPHENES	
C3-FLUORENES	
C3-NAPHTHALENES	
C3-PHENANTHRENES/ANTHRACENES	
C4-NAPHTHALENES	
C4-PHENANTHRENES/ANTHRACENES	
DIBENZOFURAN	
DIBENZOTHIOPHENE	
FLUORENE	FLUORENE
NAPHTHALENE	NAPHTHALENE
PHENANTHRENE	PHENANTHRENE
High Molecular Weight PAHs	**High Molecular Weight PAHs**
BENZ(A)ANTHRACENE	BENZ(A)ANTHRACENE
BENZO(A)PYRENE	BENZO(A)PYRENE
BENZO(B)FLUORANTHENE	BENZO(B)FLUORANTHENE
BENZO(E)PYRENE	BENZO(E)PYRENE
BENZO(G,H,I)PERYLENE	BENZO(G,H,I)PERYLENE
BENZO(K)FLUORANTHENE	BENZO(K)FLUORANTHENE
C1-CHRYSENES	
C1-FLUORANTHRENES/PYRENES	
C2-CHRYSENES	
C2-FLUORANTHENES/PYRENES	
C3-CHRYSENES	
C3-FLUORANTHENES/PYRENES	
C4-CHRYSENES	
CHRYSENE	CHRYSENE
DIBENZO(A,H)ANTHRACENE	DIBENZO(A,H)ANTHRACENE
FLUORANTHENE	FLUORANTHENE
INDENO(1,2,3-C,D)PYRENE	INDENO(1,2,3-C,D)PYRENE
PERYLENE	PERYLENE
PYRENE	PYRENE

*** Not Included in Total PAH**

Table 3-18. Comparison of FDA and MWRA Thresholds to Mean 1999 Mussel Concentrations for Selected Parameters.

Station	Total PCB (ng/g wet wt.)			Total DDT (ng/g wet wt.)			Total Chlordane (ng/g wet wt.)			Dieldrin (ng/g wet wt.)			Total PAH[1] (ng/g wet wt.)			Mercury (µg/g wet wt.)			Lead (µg/g wet wt.)		
	mean	se	n	mean	se	n	mean	se	n	mean	se	n	mean	se	n	mean	se	n	mean	se	n
Outfall Site	6.85	0.27	8	2.27	0.11	8	1.43	0.06	8	0.27	0.01	8	8.65	0.23	8	0.013	0.001	8	0.22	0.02	8
BIH	57.76	4.92	5	10.10	0.87	5	2.65	0.25	5	1.07	0.12	5	317.15	33.08	5	0.019	0.001	5	0.90	0.07	5
CCB	9.52	0.24	8	3.55	0.11	8	1.51	0.05	8	0.32	0.02	8	10.33	0.51	8	0.012	0.000	8	0.29	0.02	8
FDA Limit	2000			5000			300			300			NA			1.000			3.75		
MWRA Caution Level (2x baseline, 1992-1998)	25.73			6.80			2.47			0.61			31.01			0.041			1.02		
MWRA Warning Level[2] (80% FDA)	1600			4000			240			240			NA			0.800			3		

[1]Based on NOAA PAHs only

[2]Massachusetts Water Resources Authority (MWRA) 1997a. Contingency Plan

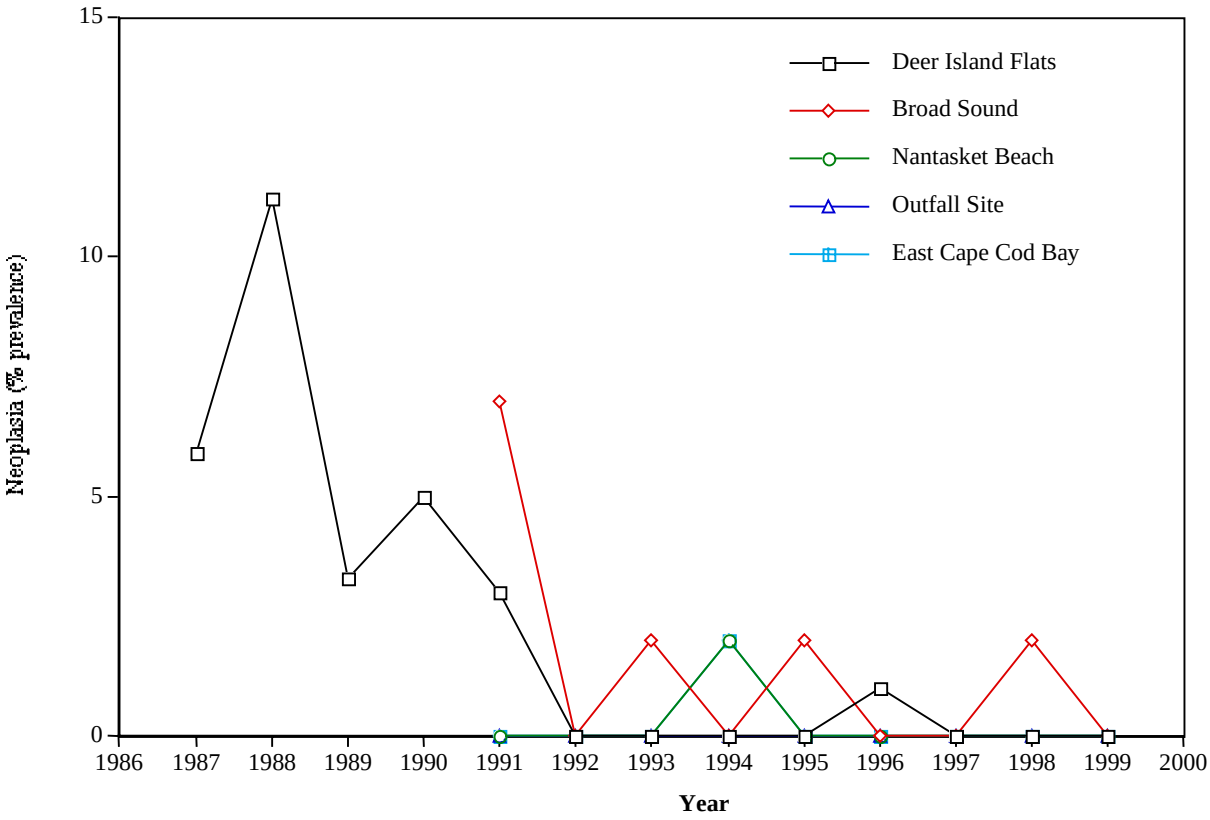


Figure 3-1. Temporal Comparison of Neoplasia Prevalence by Station Over Time.

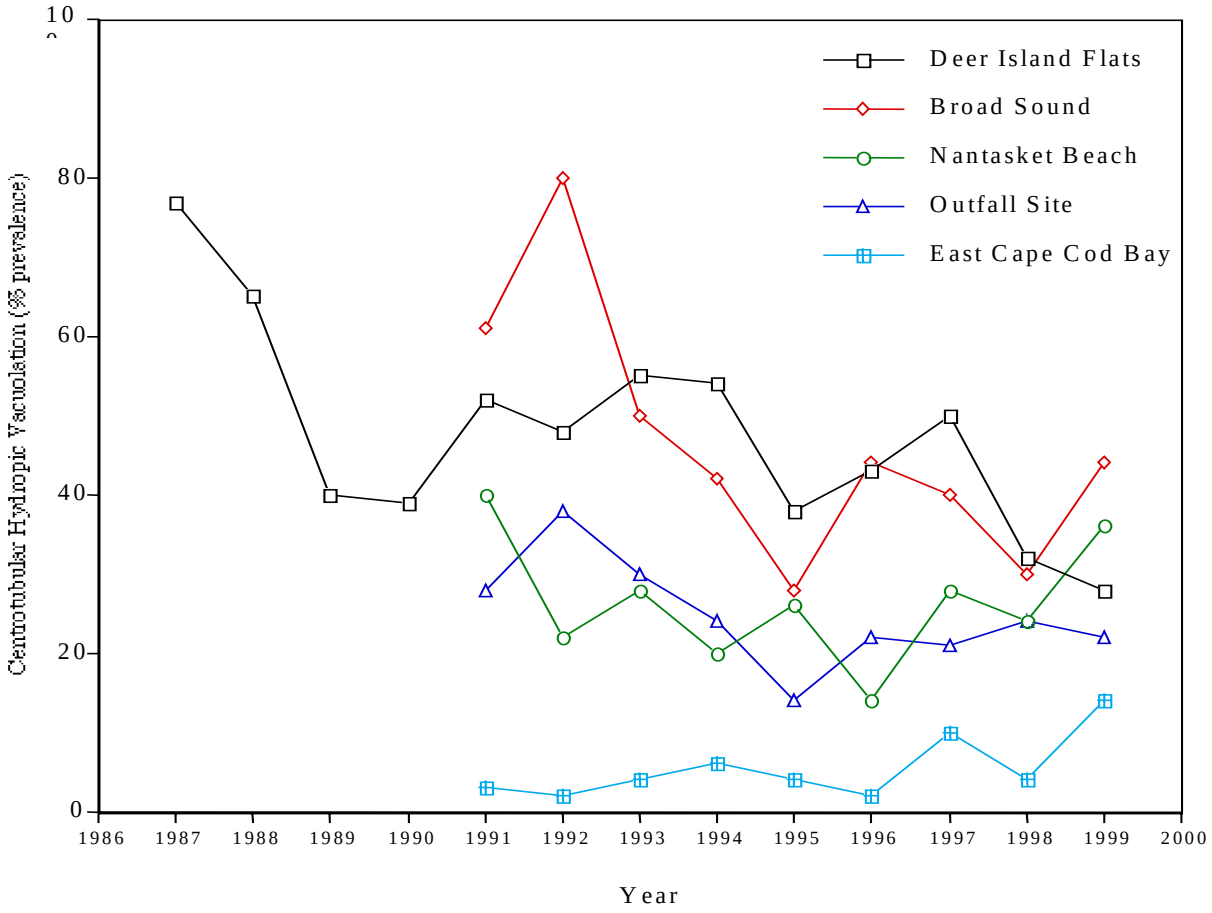


Figure 3-2. Temporal Comparison of Prevalence of Centrotubular Hydropic Vacuolation by Station Over Time.

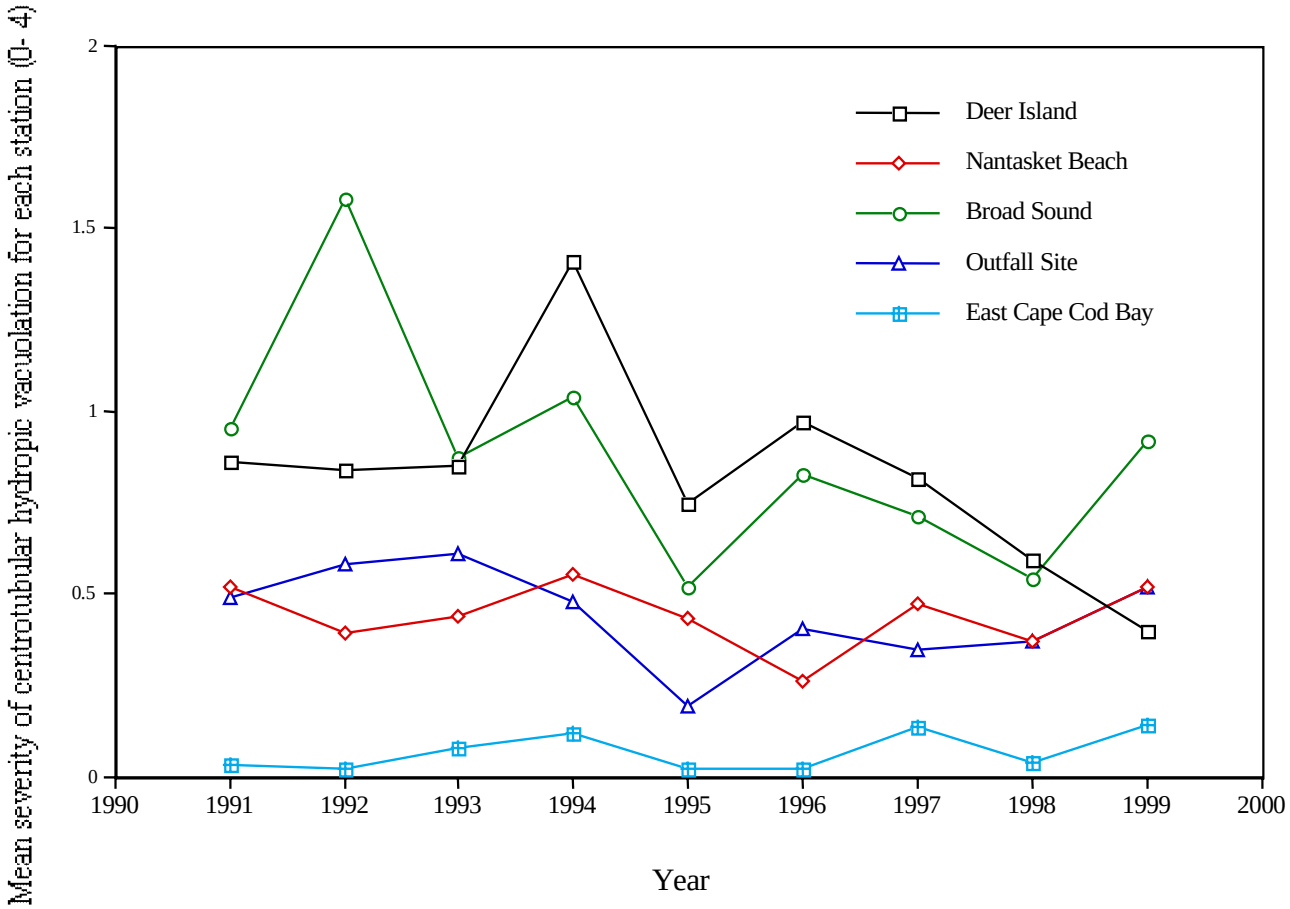


Figure 3-3. Centrotubular Hydropic Vacuolation Severity Compared Between Sites and Years.

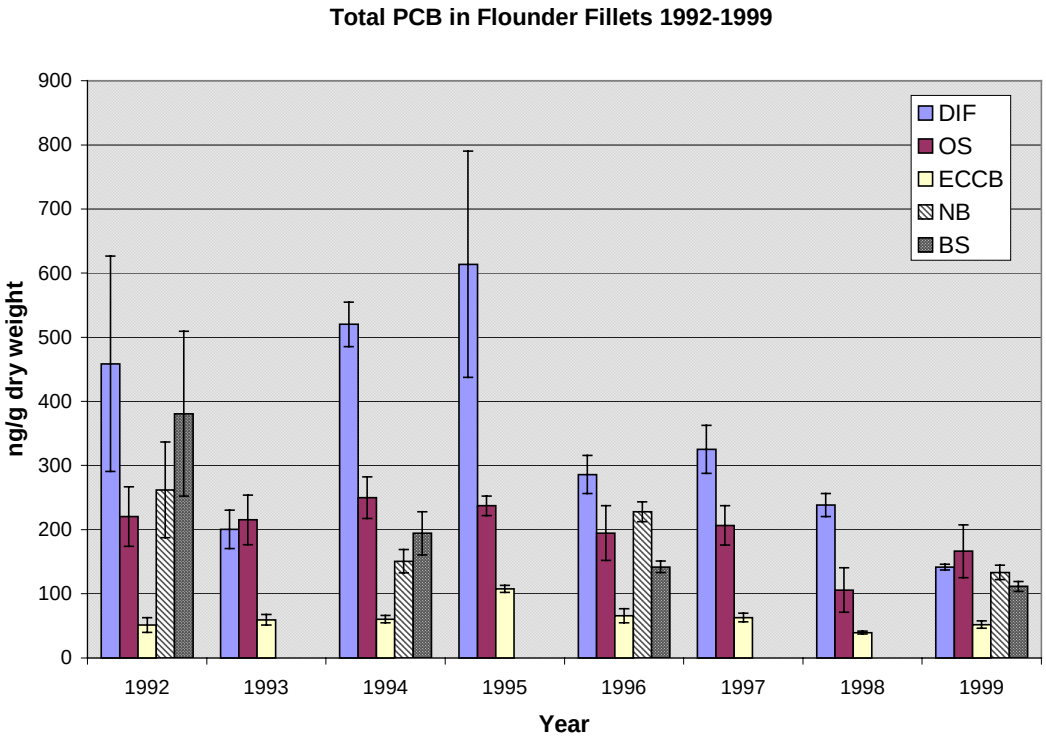


Figure 3-4. Total PCB in Flounder Fillets at the Five Collection Sites from 1992-1999.

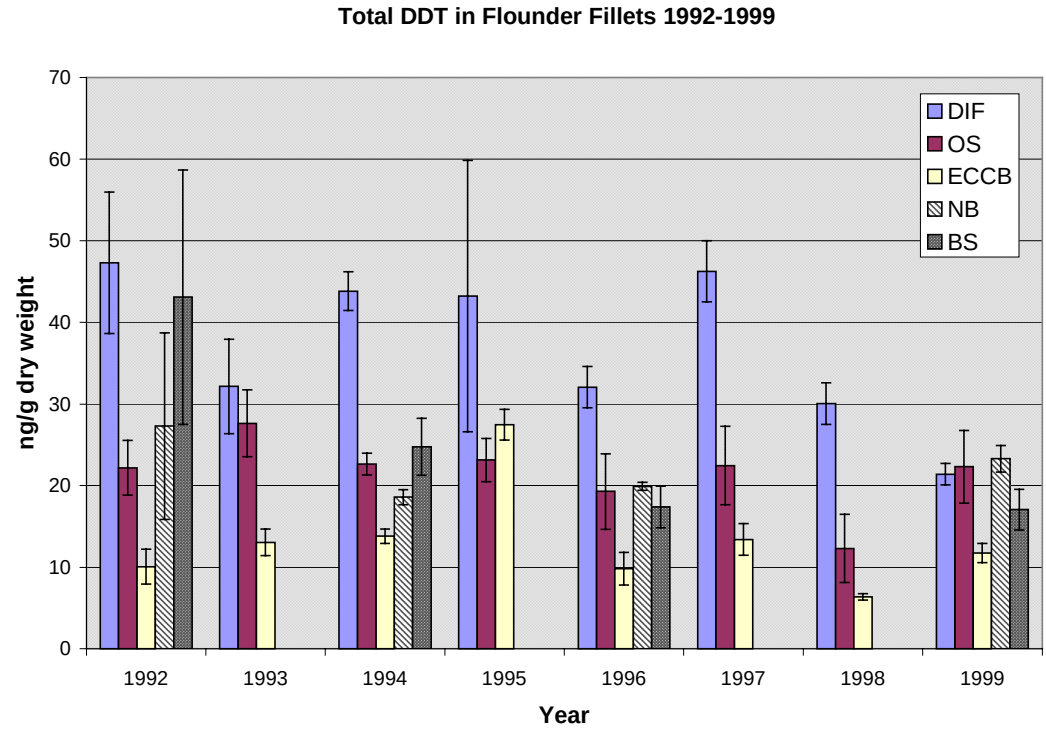


Figure 3-5. Total DDT in Flounder Fillets at the Five Collection Sites from 1992-1999.

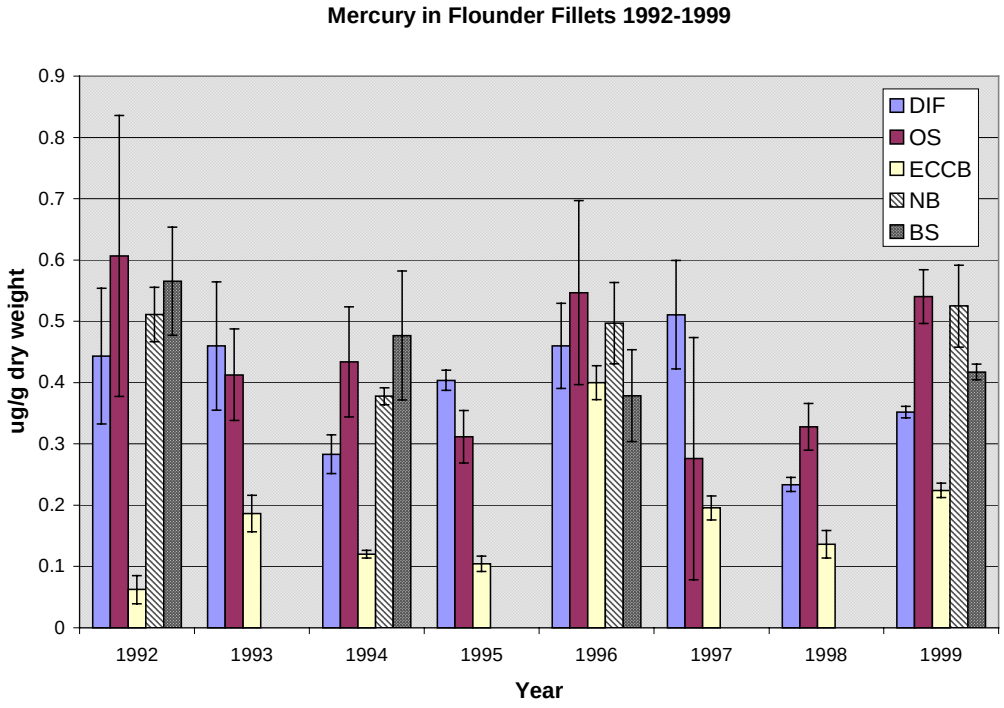


Figure 3-6. Mercury in Flounder Fillets at the Five Collection Sites from 1992-1999.

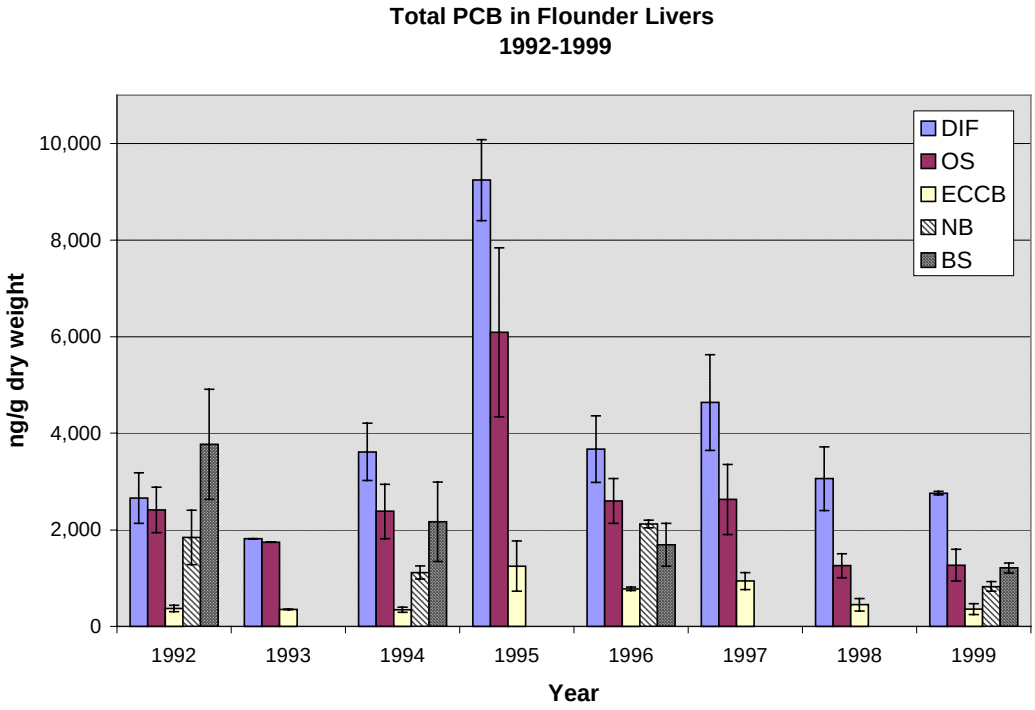


Figure 3-7. Total PCB in Flounder Livers at the Five Collection Sites from 1992-1999.

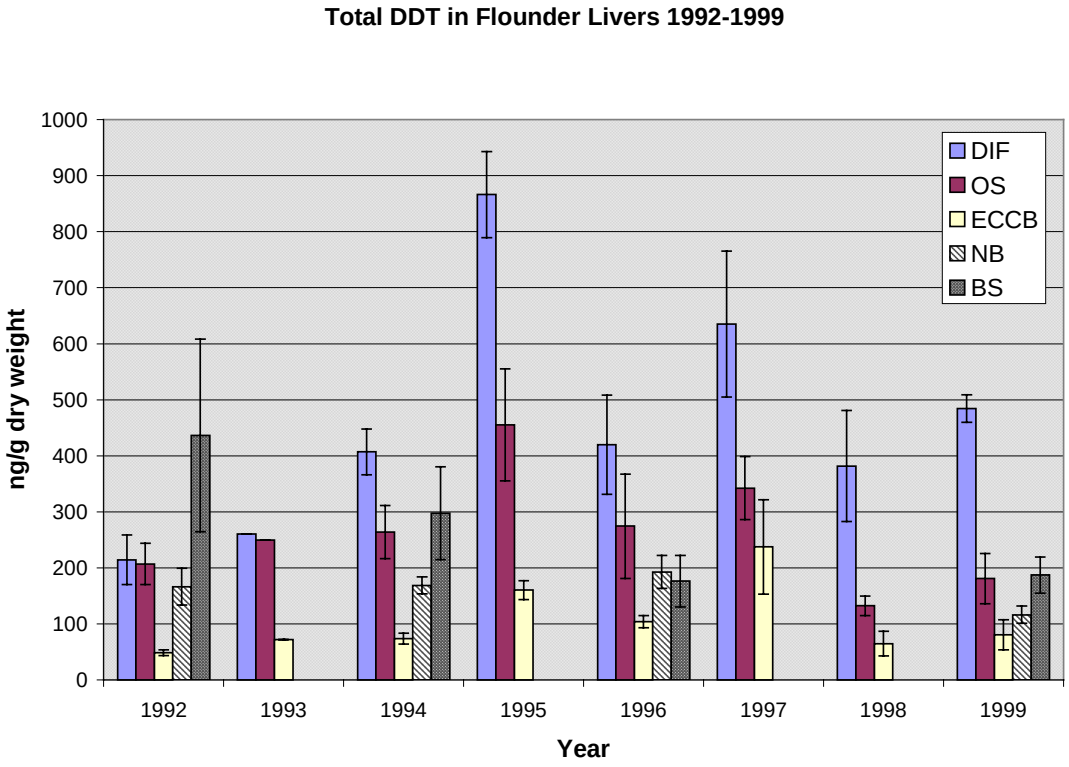


Figure 3-8. Total DDT in Flounder Livers at the Five Collection Sites from 1992-1999.

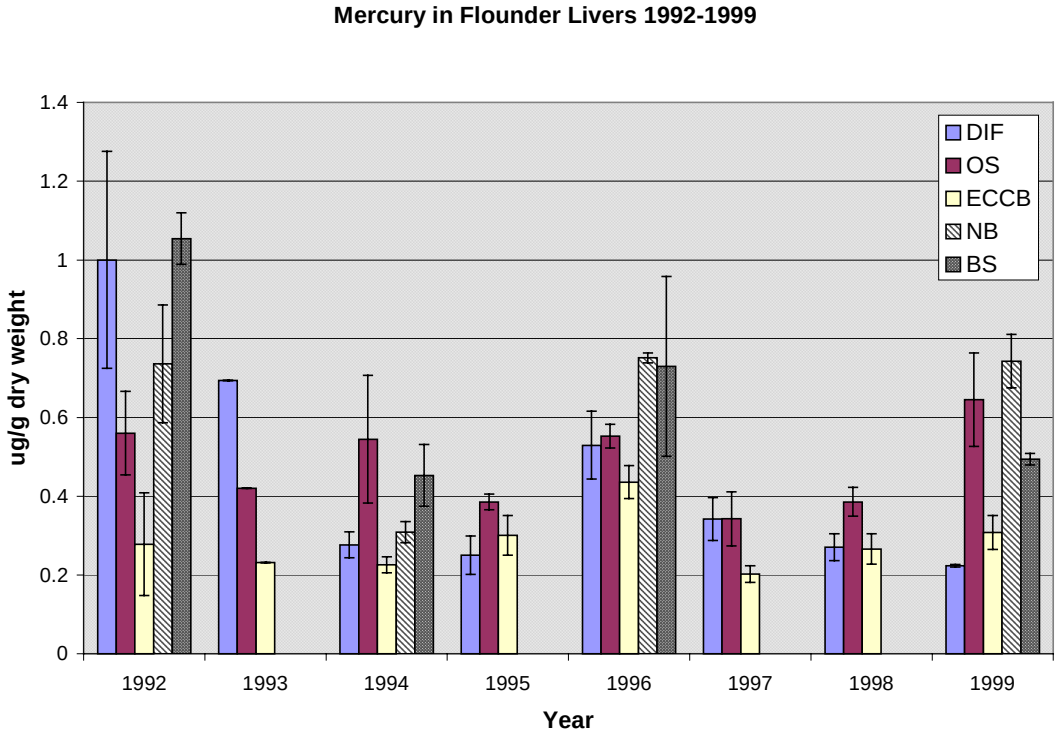


Figure 3-9. Mercury in Flounder Livers at the Five Collection Sites from 1992-1999.

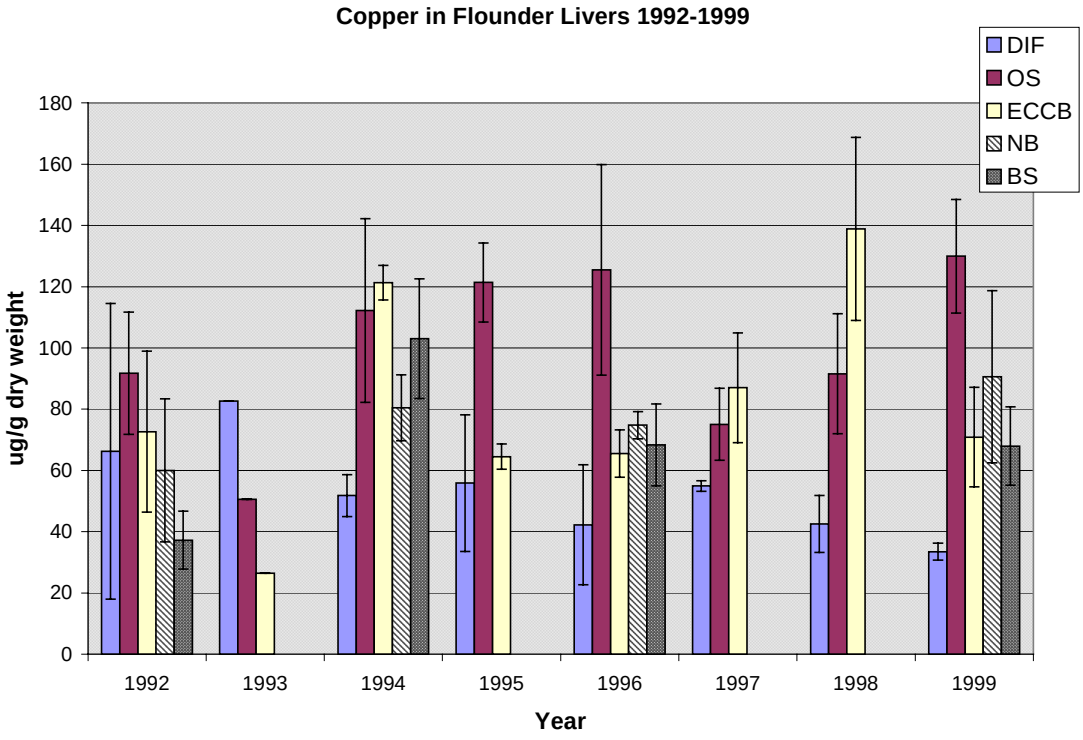


Figure 3-10. Copper in Flounder Livers at the Five Collection Sites from 1992-1999.

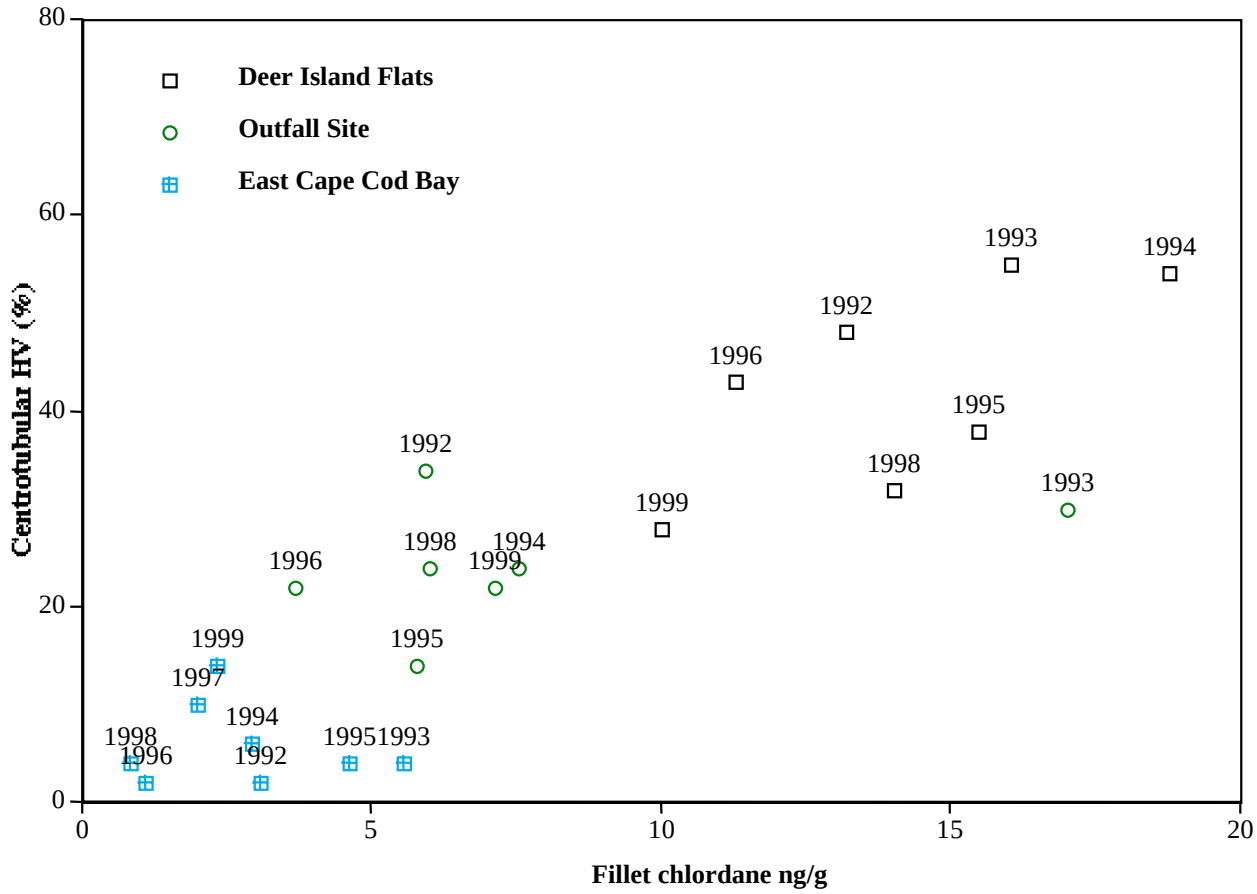


Figure 3-11. Scatter Plot Comparing Centrotubular Hydropic Vacuolation Prevalence with Chlordane Fillet Concentration in Winter Flounder from DIF, OS, and ECCB.

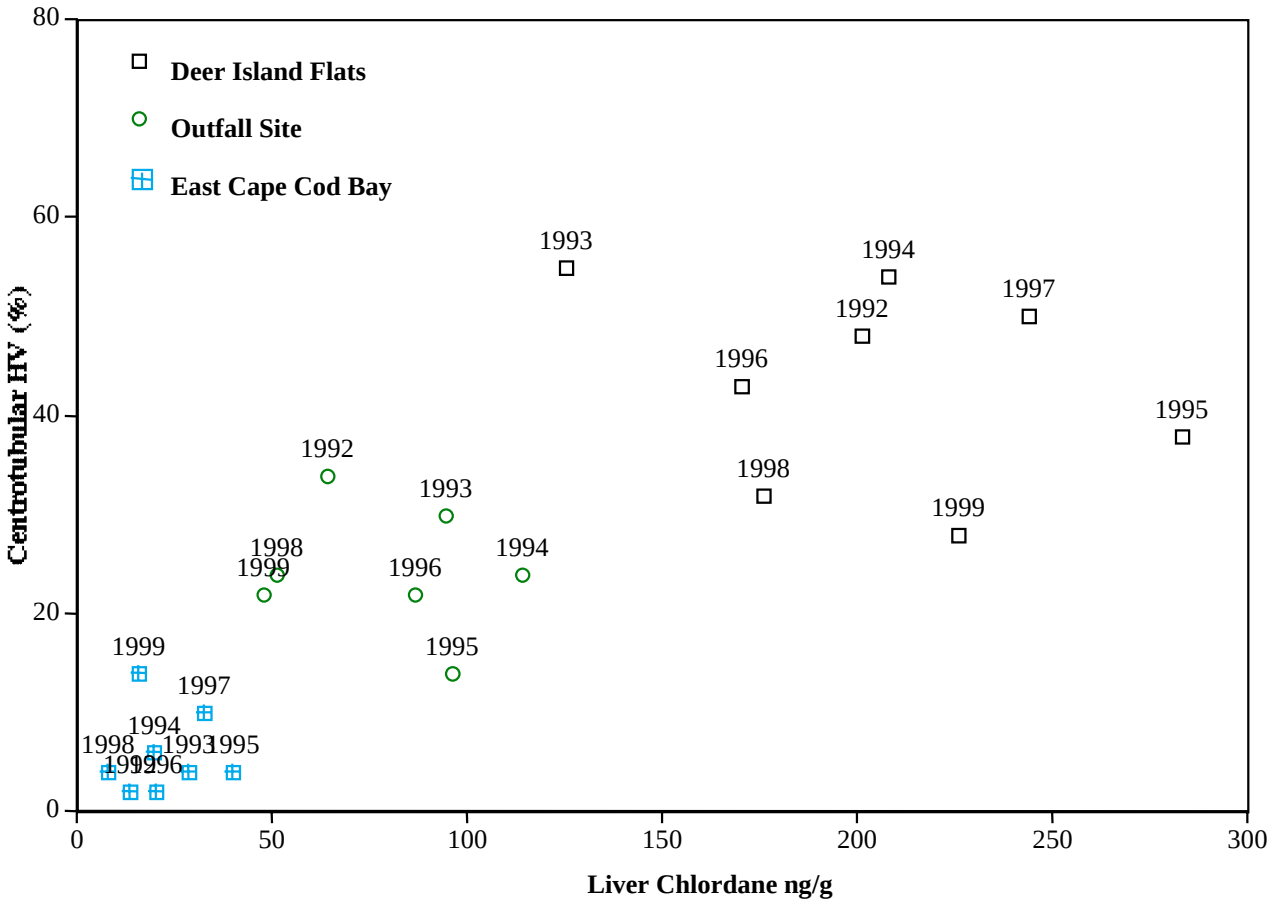


Figure 3-12. Scatter Plot Comparing Centrotubular Hydropic Vacuolation Prevalence with Chlordane Liver Concentration in Winter Flounder from DIF, OS, and ECCB.

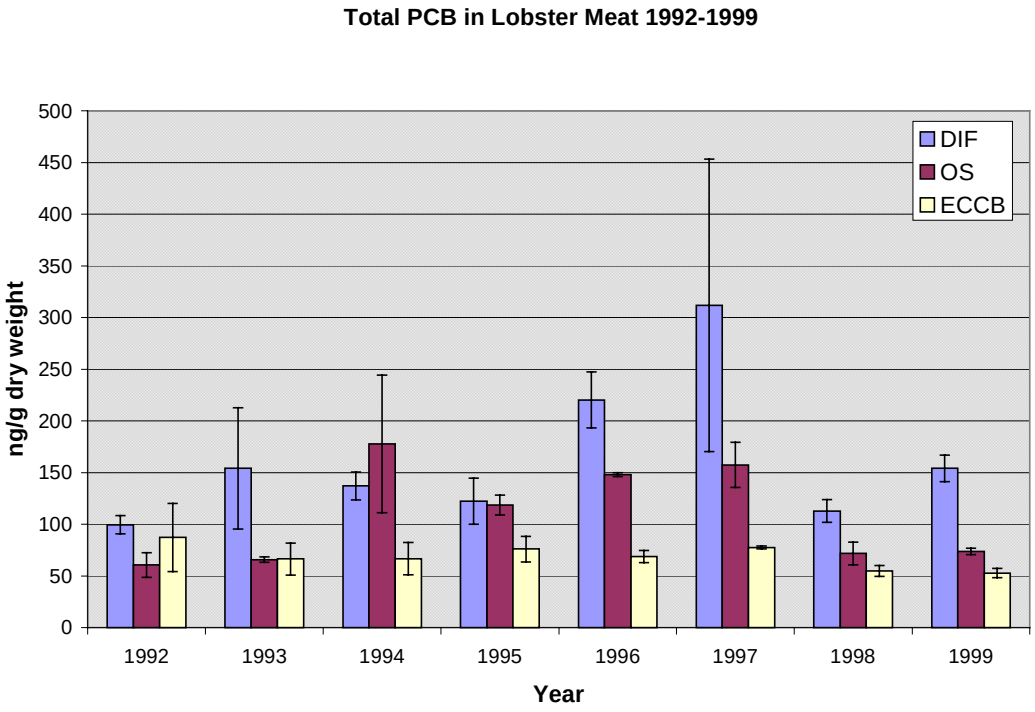


Figure 3-13. Total PCB in Lobster Meat at DIF, OS and ECCB from 1992-1999.

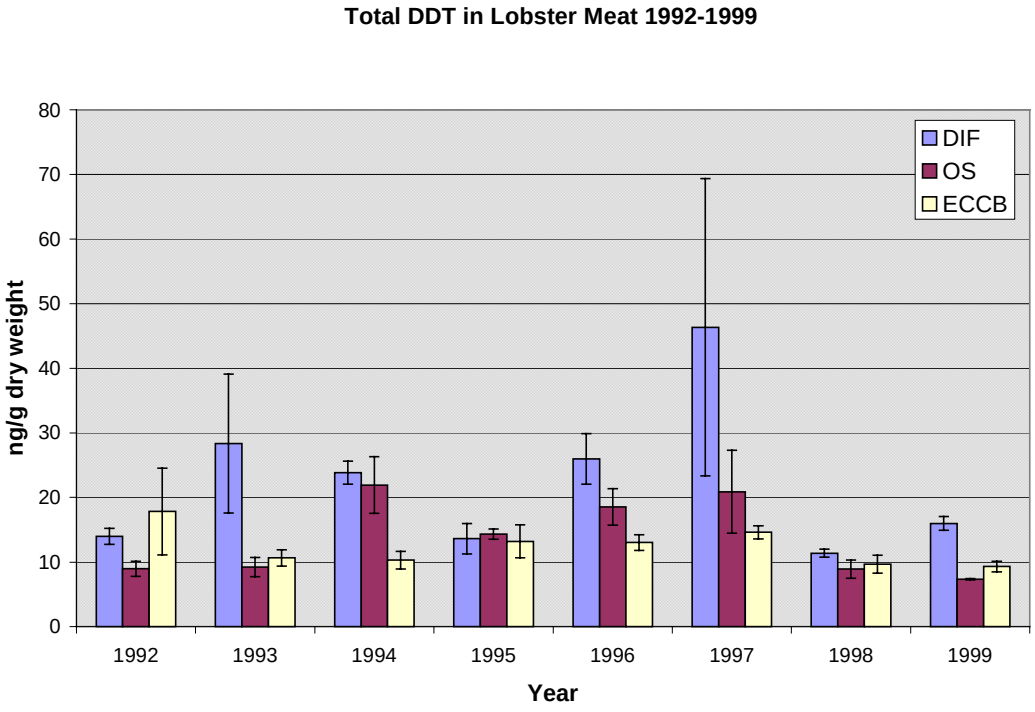


Figure 3-14. Total DDT in Lobster Meat at DIF, OS and ECCB from 1992-1999.

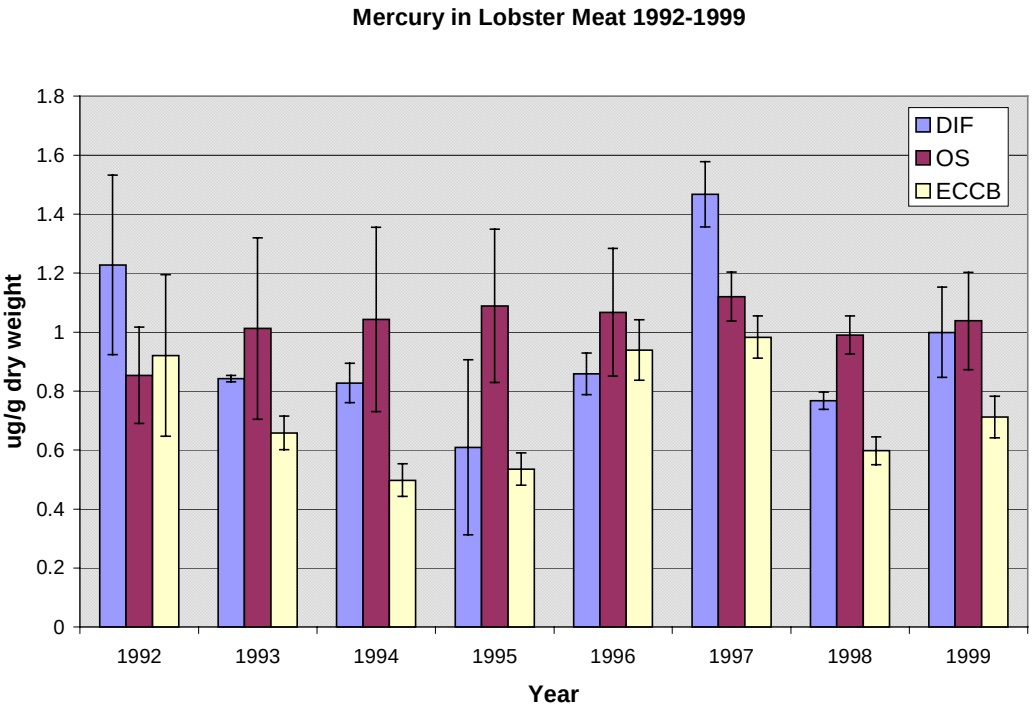


Figure 3-15. Mercury in Lobster Meat at DIF, OS and ECCB from 1992-1999.

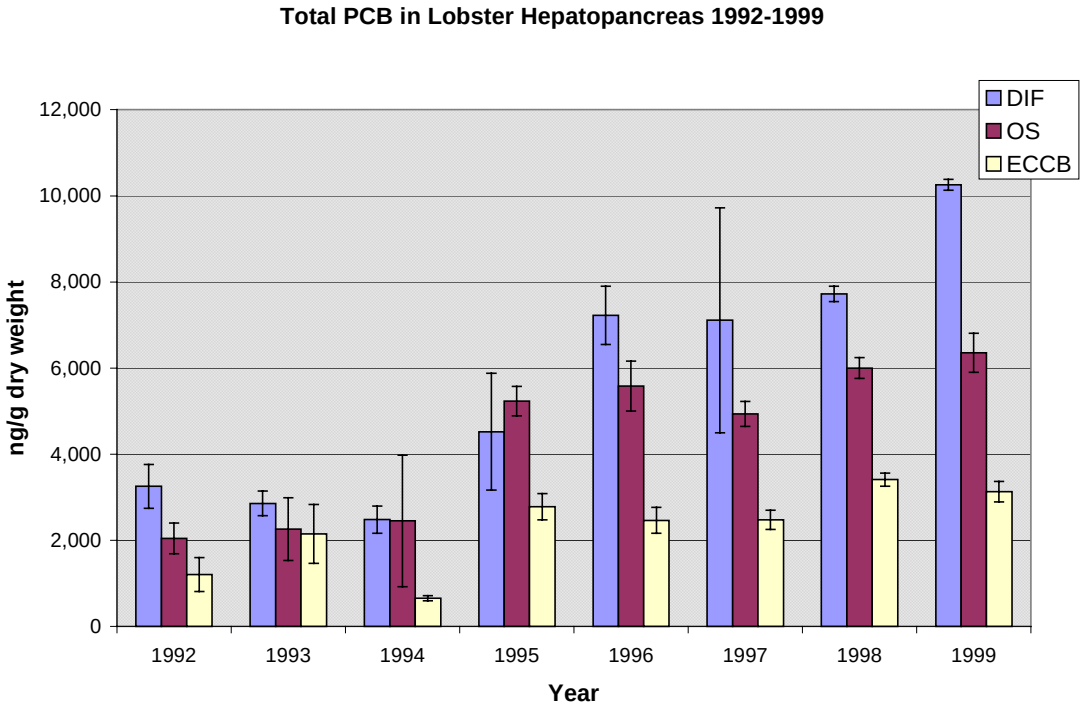


Figure 3-16. Total PCB in Lobster Hepatopancreas at DIF, OS and ECCB from 1992-1999.

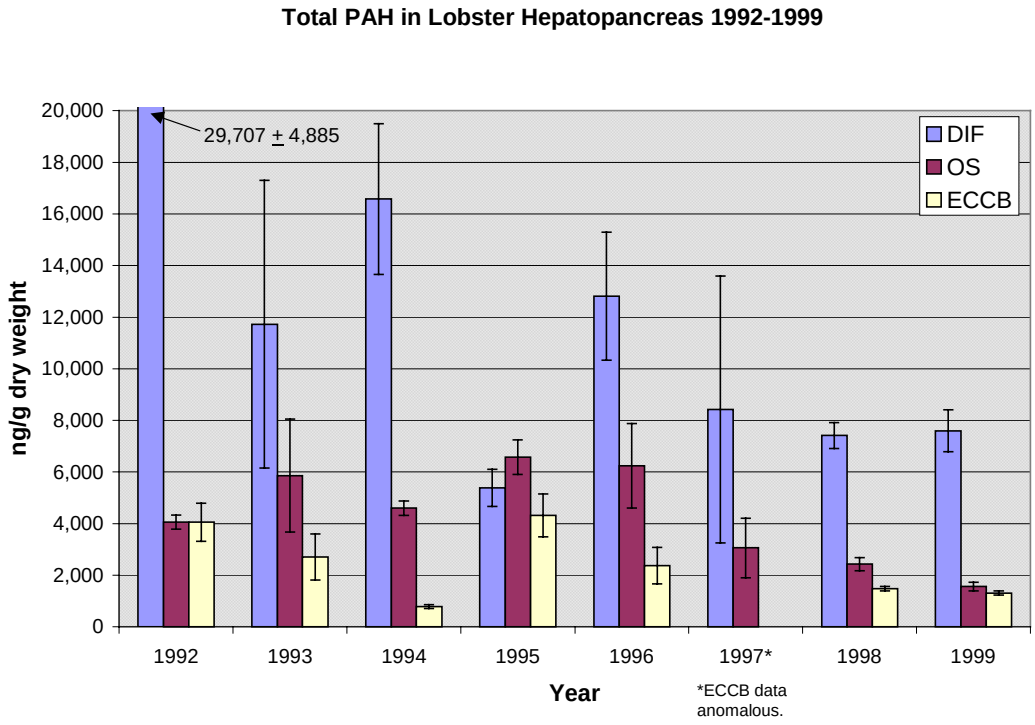


Figure 3-17. Total PAH in Lobster Hepatopancreas at DIF, OS and ECCB from 1992-1999.

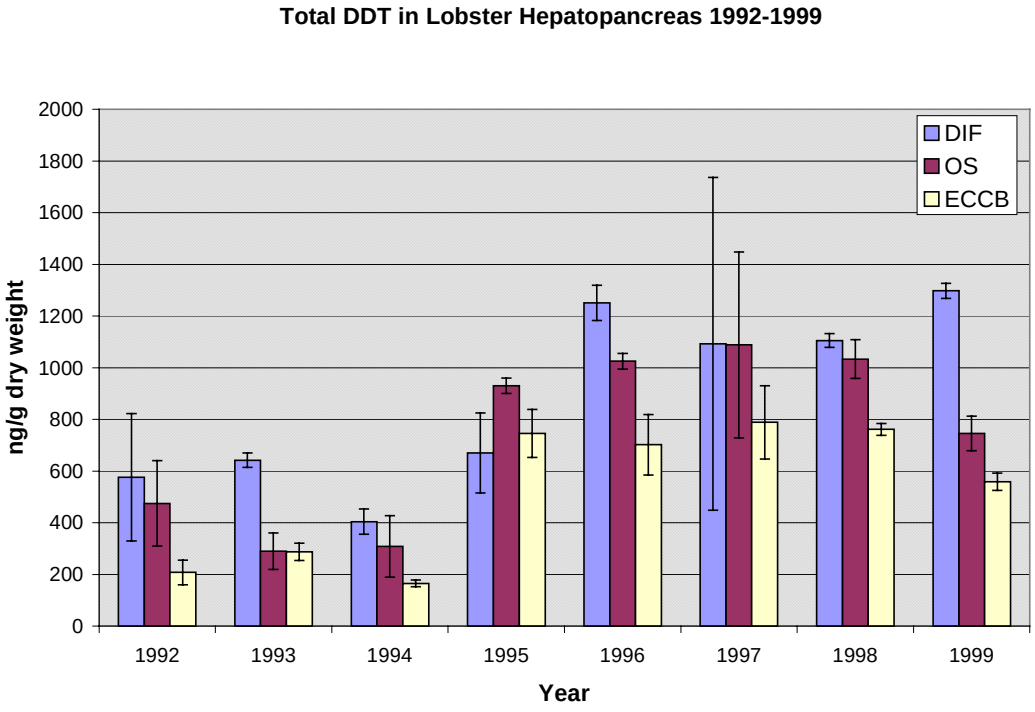


Figure 3-18. Total DDT in Lobster Hepatopancreas at DIF, OS and ECCB from 1992-1999.

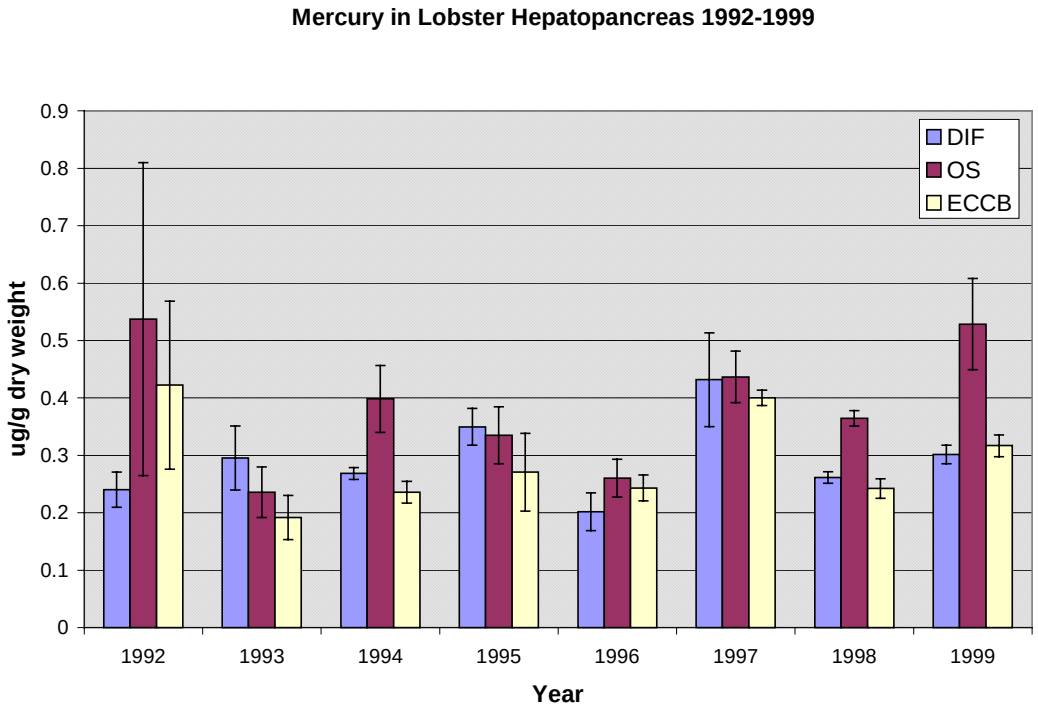


Figure 3-19. Mercury in Lobster Hepatopancreas at DIF, OS and ECCB from 1992-1999.

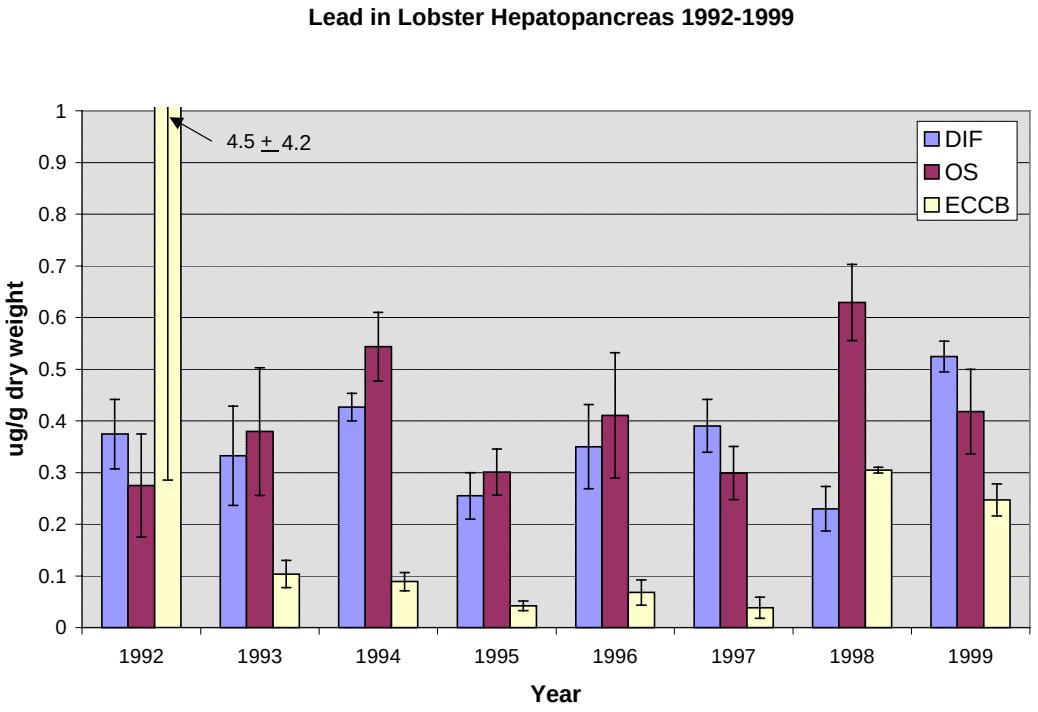


Figure 3-20. Lead in Lobster Hepatopancreas at DIF, OS and ECCB from 1992-1999.

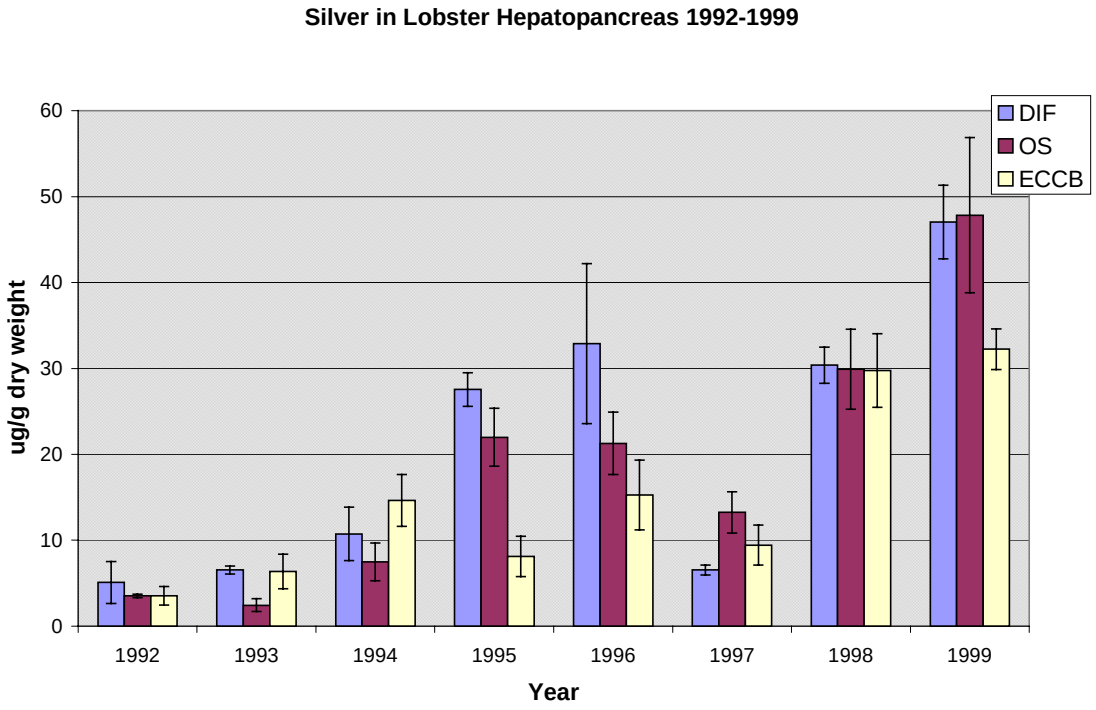


Figure 3-21. Silver in Lobster Hepatopancreas at DIF, OS and ECCB from 1992-1999.

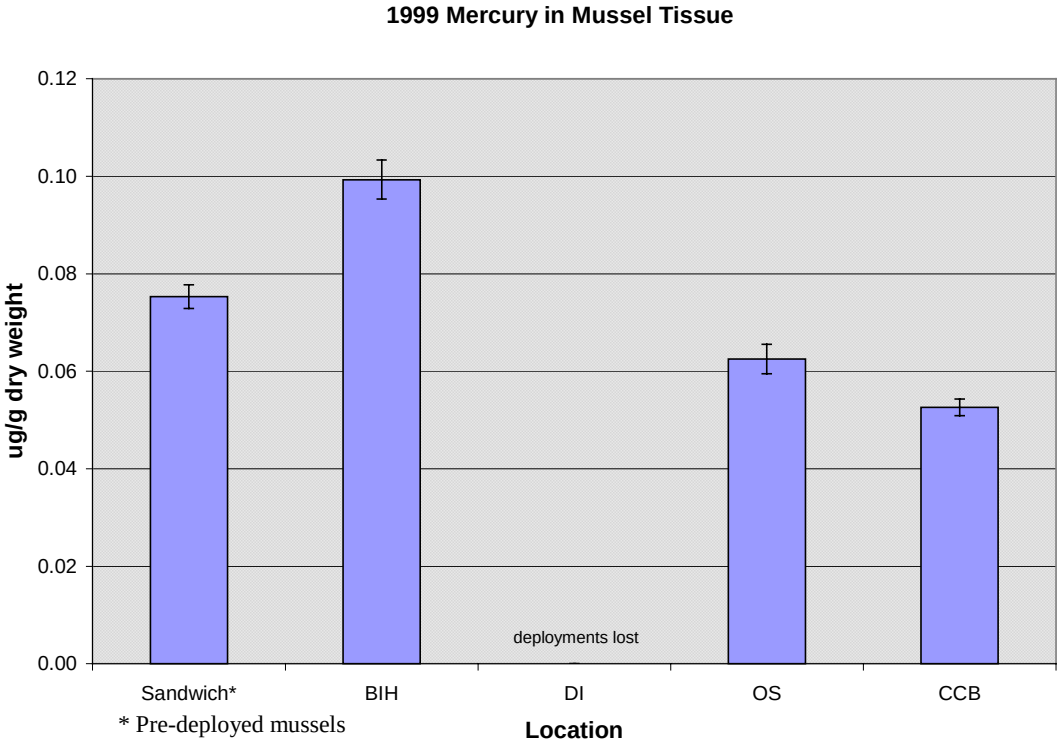
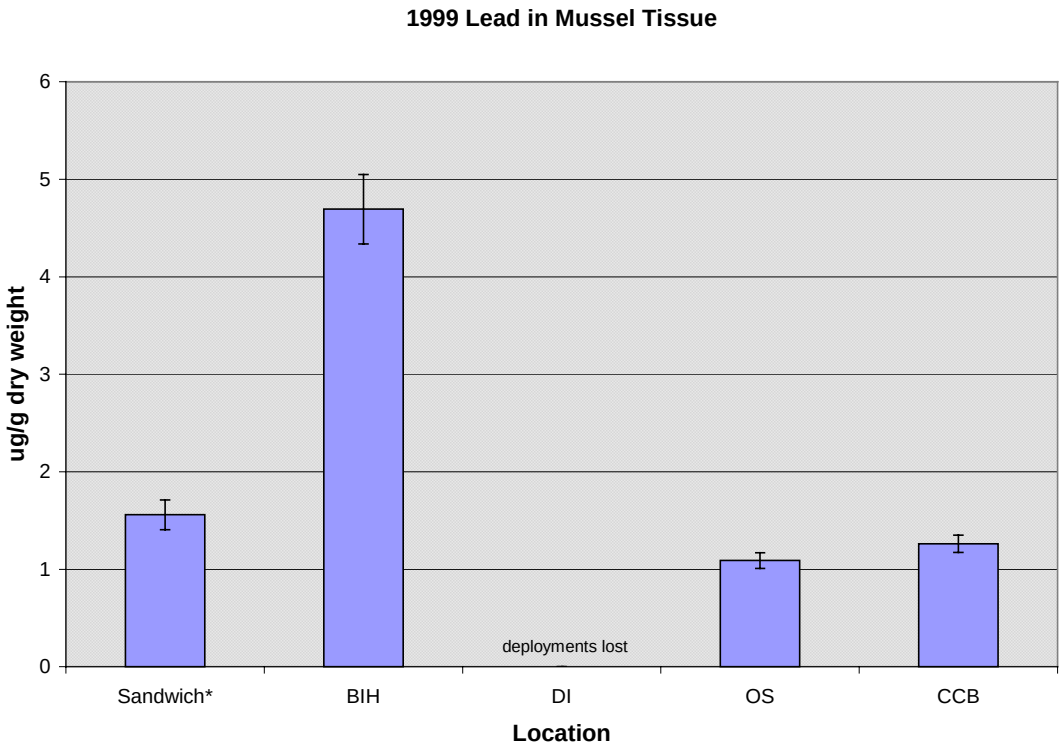
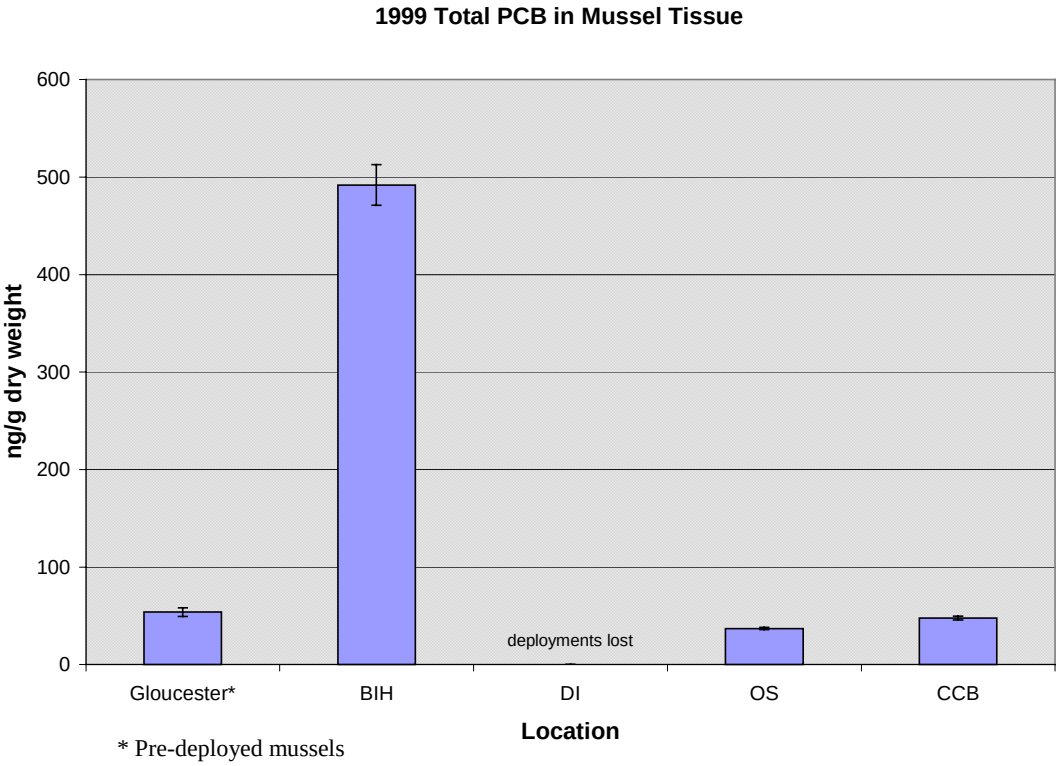


Figure 3-22. Mercury in 1999 Pre-deployed Mussels and Four Deployment Locations.



* Pre-deployed mussels

Figure 3-23. Lead in 1999 Pre-deployed Mussels and Four Deployment Locations.



* Pre-deployed mussels

Figure 3-24. Total PCB in 1999 Pre-deployed Mussels and Four Deployment Locations.

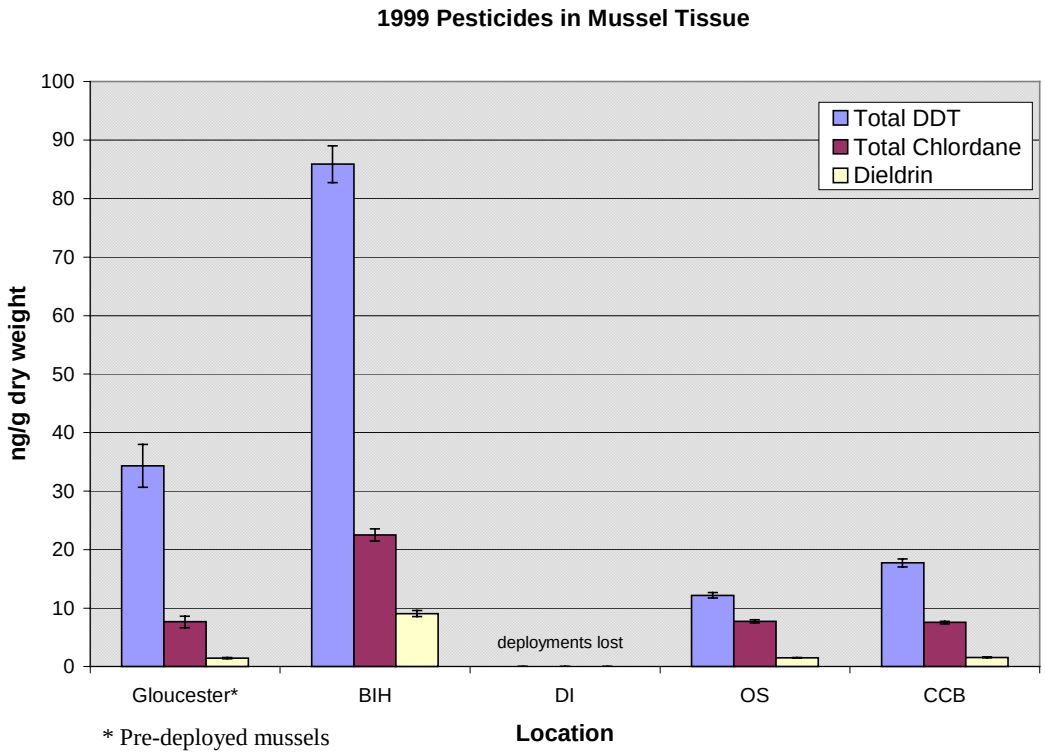


Figure 3-25. Pesticides in 1999 Pre-deployed Mussels and Four Deployment Locations.

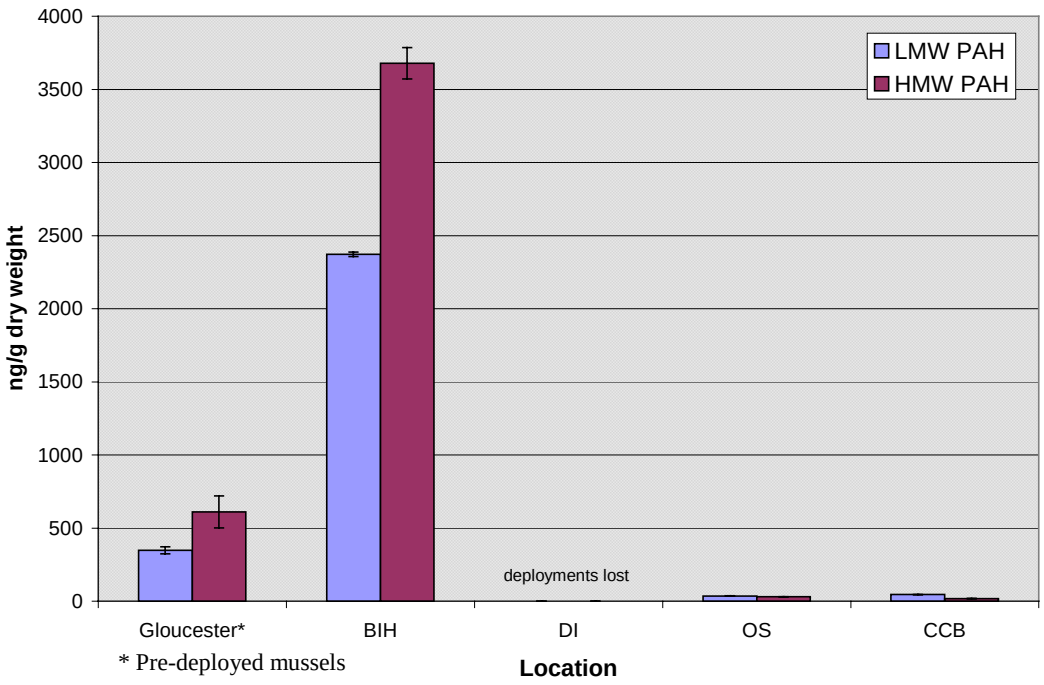
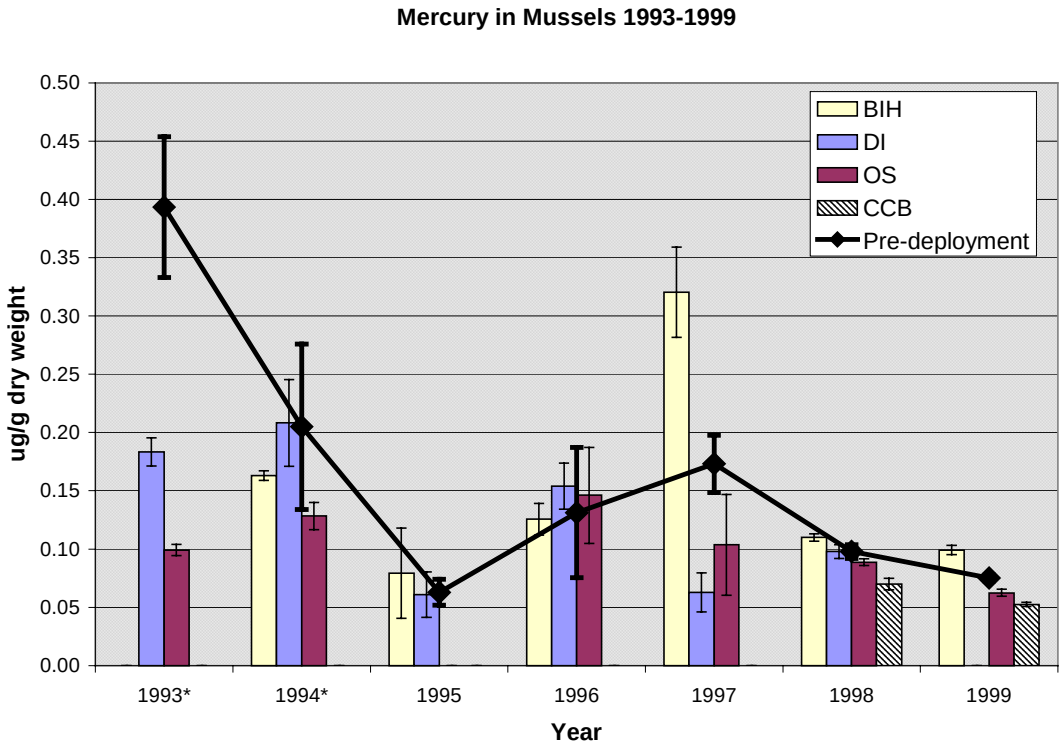
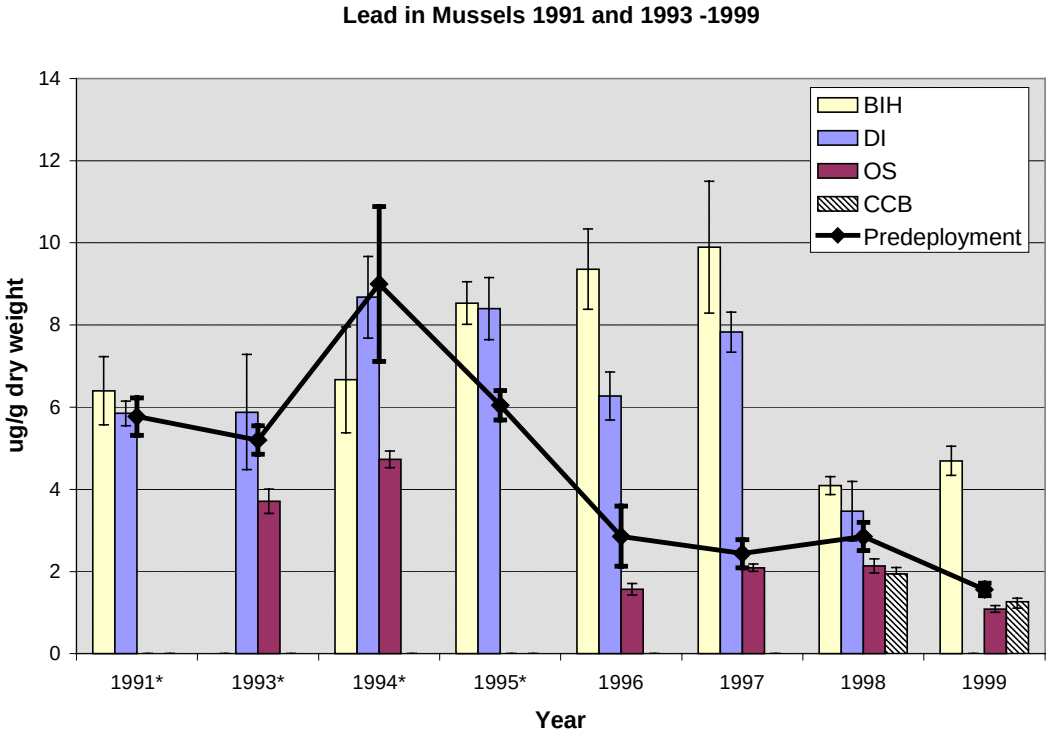


Figure 3-26. Total Low and High Molecular Weight PAHs in 1999 Pre-deployed Mussels and Four Deployment Locations Using the Total PAH List.



* Pre-deployed mussels from Gloucester, rather than from Sandwich, were analyzed in 1993 and 1994.

Figure 3-27. Mercury in Pre-deployed and Deployed Mussels from 1993-1999.



* Pre-deployed mussels from Gloucester, rather than from Sandwich, were analyzed 1991-1995.

Figure 3-28. Lead in Pre-deployed and Deployed Mussels from 1991 and 1993-1999.

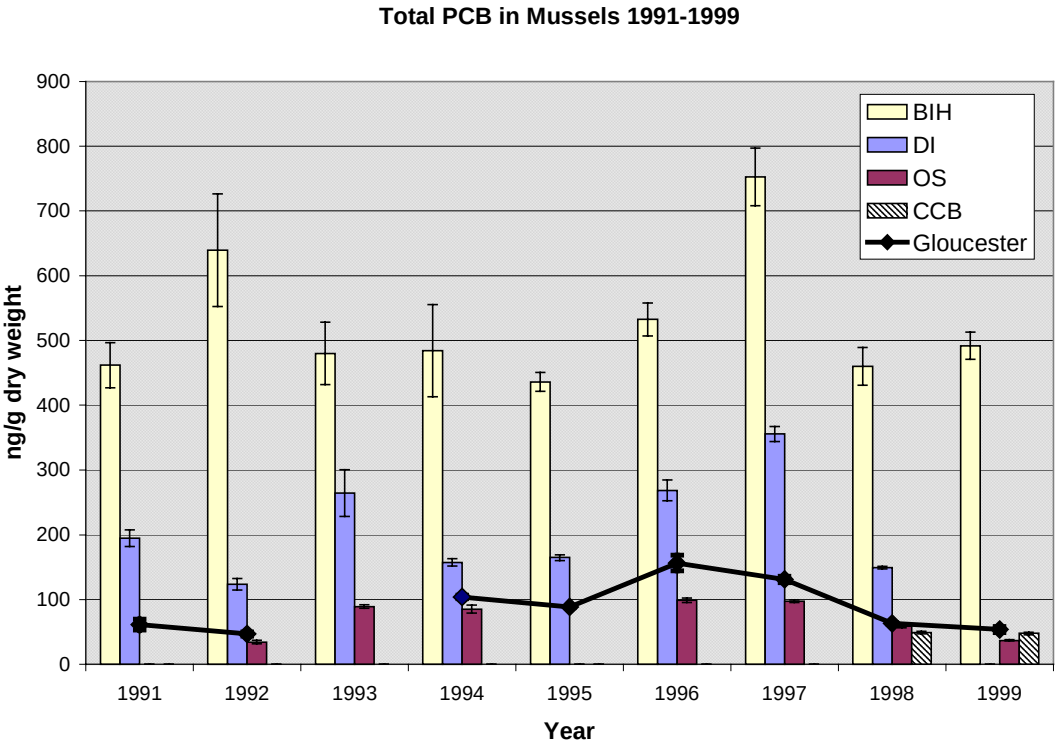


Figure 3-29. Total PCB in Pre-deployed and Deployed Mussels from 1991-1999.

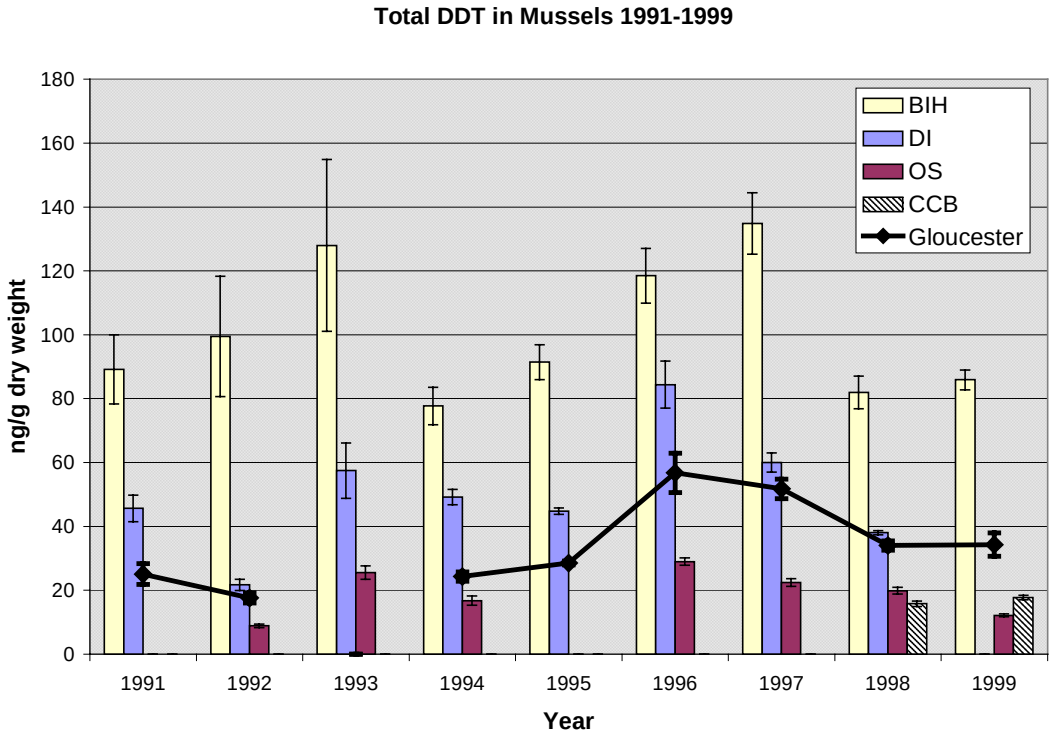
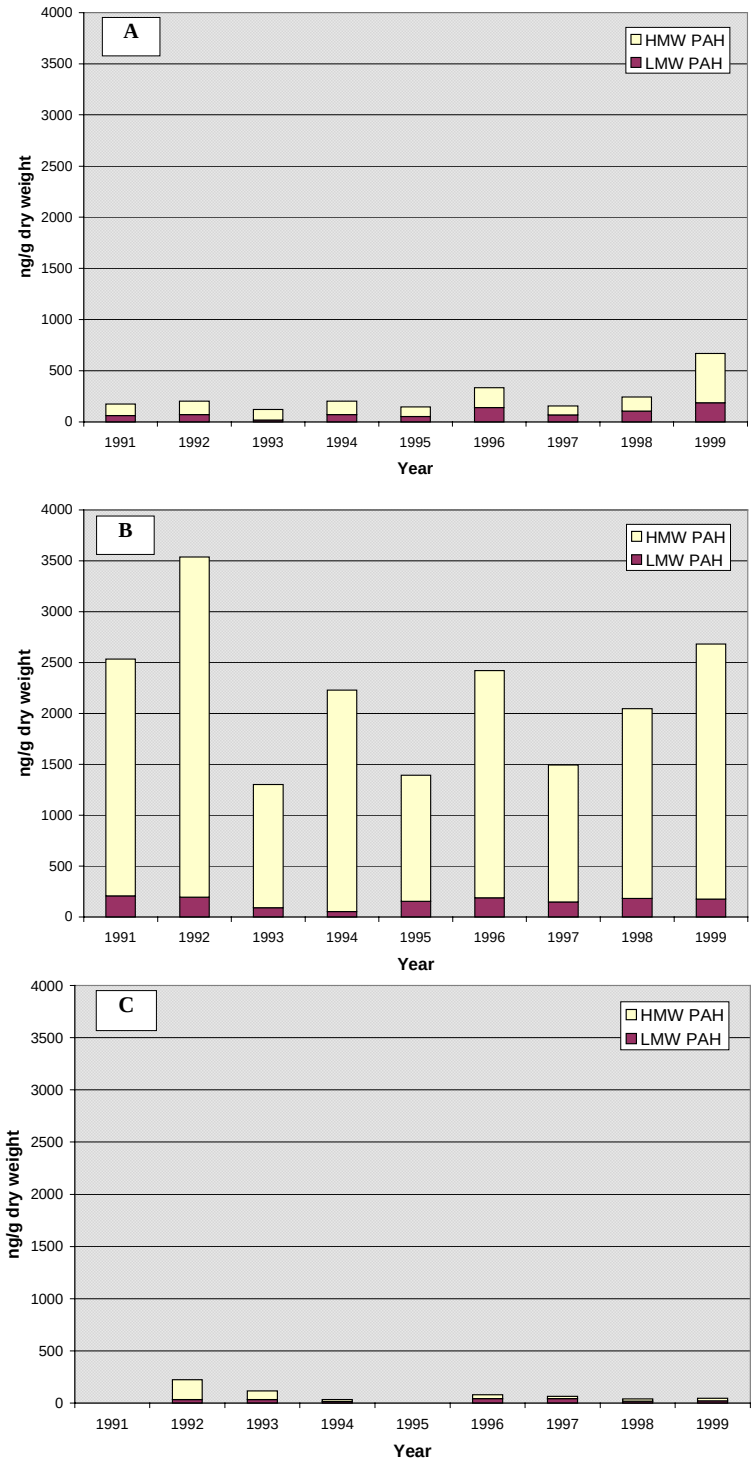


Figure 3-30. Total DDT in Pre-deployed and Deployed Mussels from 1991-1999.



A = Gloucester (Pre-deployment), B = BIH (Deployed), C = OS (Deployed)

Figure 3-31. Total PAHs (Using the "Historical NOAA List") in Pre-deployed and Deployed Mussels from 1991-1999.

4.0 CONCLUSIONS

The 1999 Fish and Shellfish Monitoring Program was completed successfully, except for the DI mussel recovery, and generated data consistent with past years. Results provided in this report further document pre-effluent baseline conditions. Biological conditions in all organisms are stable or improving since the beginning of the program in 1992. There are some apparent upward trends in contaminant concentrations since 1996, especially in the lobster hepatopancreas. Conclusions for the various animals from the surveys are given below.

4.1 Winter Flounder

The 1999 Flounder Survey provided samples from three locations (DIF, OS and ECCB) and was conducted in a manner consistent with previous surveys. Catch per unit effort at DIF was the highest of any year since the project began in 1991. Flounder continue to be in reasonable health from all stations. There is none of the high neoplasm prevalence characteristic of fish from Deer Island Flats in the mid- to late-1980s. The differences between stations continue to be discernible and relatively stable, but at a more subtle level than observed early in the baseline period. East Cape Cod Bay continues to be a useful reference site, although the increasing prevalence of centrotubular hydropic vacuolation bears scrutiny over the next few years.

The levels of most tissue contaminant concentrations were similar to or lower than those measured in previous years. Highest concentrations are routinely found at DIF and the lowest concentrations are found in ECCB. All fillet chemical concentrations were below both FDA and MWRA Warning limits. Dieldrin was slightly above the MWRA Caution Level in edible tissue from OS. This increase in dieldrin could be due to co-elution encountered during the analysis of PCBs and pesticides in 1999 and may not reflect a real trend in dieldrin concentrations.

Concentrations of contaminants in flounder fillet and liver from NB and BS were similar to or lower than those measured in previous years. There were slight downward trends in fillet and liver total PCB body burdens at BS since 1992.

4.2 Lobster

The 1999 Lobster Survey collected specimens from three sampling locations by direct shipboard collection from commercial lobstermen. The spatial pattern of tissue contaminants was similar to that measured in past years, with the highest concentrations generally found at DIF and the lowest at ECCB reference location. This gradient in lobster tissue concentrations between sampling locations supports the premise that legal-sized lobsters exhibit sufficient fidelity to an area to allow establishment of a predictable trend in tissue body burdens due to relative contaminant exposure. Concentrations of total PCB in lobster hepatopancreas continued to show an upward trend in 1999 at OS and DIF. This trend may be real or it may be an analytical artifact caused by the co-elution of PCB congeners and pesticides, observed in 1999. Silver, copper and lead were notably higher in lobster hepatopancreas than previously observed during the baseline period. Lobster edible tissue contaminant concentrations were below the FDA Action Limits and the Caution and Warning Levels set by MWRA.

4.3 Blue Mussel

The 1999 Mussel Bioaccumulation study involved deployment of caged mussels at two offshore locations (OS and CCB) and two near-shore locations (BIH and DI). One of these locations, ECCB, was added in 1998. Contaminant levels measured in 1998 were among the lowest observed since 1991, especially at OS. Among the stations previously studied, concentrations were routinely highest at BIH and lowest at

OS for organics. Lead and mercury concentrations were more variable. All mussel chemical concentrations were below both FDA and MWRA Caution and Warning limits.

4.4 Recalculation of the Baseline Threshold Incorporating 1999 Data and Evaluation of the Monitoring Threshold

A major component of the MWRA fish and shellfish monitoring program is evaluating whether consumption of fish and shellfish in and around the outfall could pose a threat to human health. MWRA has set Caution and Warning Levels to ensure the protection of human health. Caution Levels are set at two times the baseline arithmetic averages of annual means (of composite samples) for organisms collected or deployed at OS during the period 1992 through 1999 (the actual baseline years used for each animal type are footnoted in Table 4-1). To establish when significant increases above the baseline would be detected, a statistical value has been established. The significant increase value is set as the 95th percentile upper confidence limit (based on the "t" distribution) of the mean of the annual means. An example of a "t" distribution of the cumulative frequency has been created for mercury in flounder fillets and is presented in Figure 4-1. Warning Levels have been set at 80% of the FDA Action Limit.

Current tissue concentrations are generally an order of magnitude or more below Warning Levels and FDA Action Limits (Table 4-1). Moreover, the caution levels are greater than values that are detected (two times the OS baseline mean); thus changes in levels can be detected before thresholds are exceeded. Similarly, the monitoring hypothesis regarding future increases of the prevalence of flounder liver CHV at OS relative to baseline levels measured in outer Boston Harbor also appears to be sufficiently sensitive to detect trends based on current data.

In the past, lipid normalized organic contaminant values have been used to define monitoring thresholds. Recent evaluations of lipid normalized data (Mitchell 1998) concluded that no appreciable reduction in variability was evident when comparing temporal trends on a lipid normalized basis relative to data expressed on a dry weight basis. Lipid concentrations will continue to be monitored but threshold testing will be based on wet-weight concentrations only.

Table 4-1. Comparison of Baseline Mean Concentrations, Significantly Increased Levels and Recalculated Threshold (Incorporating 1999 Data) at the Outfall Site.

Parameter	Baseline Mean[1]	Baseline Standard Error	N	Significant Increase[2]	Caution Level[3]	Warning Level[4]
Mercury (ppm wet)						
Flounder	0.078	0.008	8	0.093	0.157	0.8
Lobster	0.151	0.004	8	0.159	0.301	0.8
Mussels	0.019	0.002	6	0.024	0.039	0.8
Lead (ppm wet)						
Mussels	0.46	0.09	6	0.65	0.92	3
PCBs (ppb wet)						
Flounder	35.99	2.66	8	41.04	71.99	1600
Lobster	17.57	3.83	8	24.82	35.13	1600
Mussels	12.00	1.95	7	16.21	24.00	1600
PAH[5] (ppb wet)						
Mussels	14.53	4.02	7	22.23	28.76	----
Chlordane (ppm wet)						
Flounder	1.39	0.26	8	1.88	2.78	240
Lobster	0.38	0.06	8	0.49	0.76	240
Mussels	1.27	0.13	7	1.55	2.54	240
Dieldrin (ppm wet)						
Flounder	0.34	0.07	8	0.47	0.67	240
Lobster	0.87	0.11	8	1.09	1.75	240
Mussels	0.30	0.03	7	0.35	0.60	240
DDT (ppb wet)						
Flounder	3.86	0.22	8	4.28	7.72	4000
Lobster	2.12	0.40	8	2.88	4.24	4000
Mussels	3.24	0.46	7	4.23	6.48	4000
CHV Prevalence						
Flounder	23.25	0.02	9	23.28	> harbor prevalence (1991-1999)	----

[1] Mean Concentration of Annual Means, 1992-1999 (Flounder and Lobster). Mean Concentration 1992-1994, 1996-1999 (Mussels; no 1992 metals data, 1993 metals data suspect, 1995 array was lost).

[2] The significant increase is the concentration at which an increase from the baseline mean is considered statistically significant at the 0.05 level (i.e., 95th percent UCL = mean + $t_{0.1, n-1}$ * S.E.).

[3] Based on "appreciable change from baseline"; see text for discussion. (2 x OS baseline mean from 1992-1999).

[4] Massachusetts Water Resources Authority (MWRA) 1997a. Contingency Plan. Warning Level is 80% of the FDA Level.

[5] Representing NOAA PAHs only.

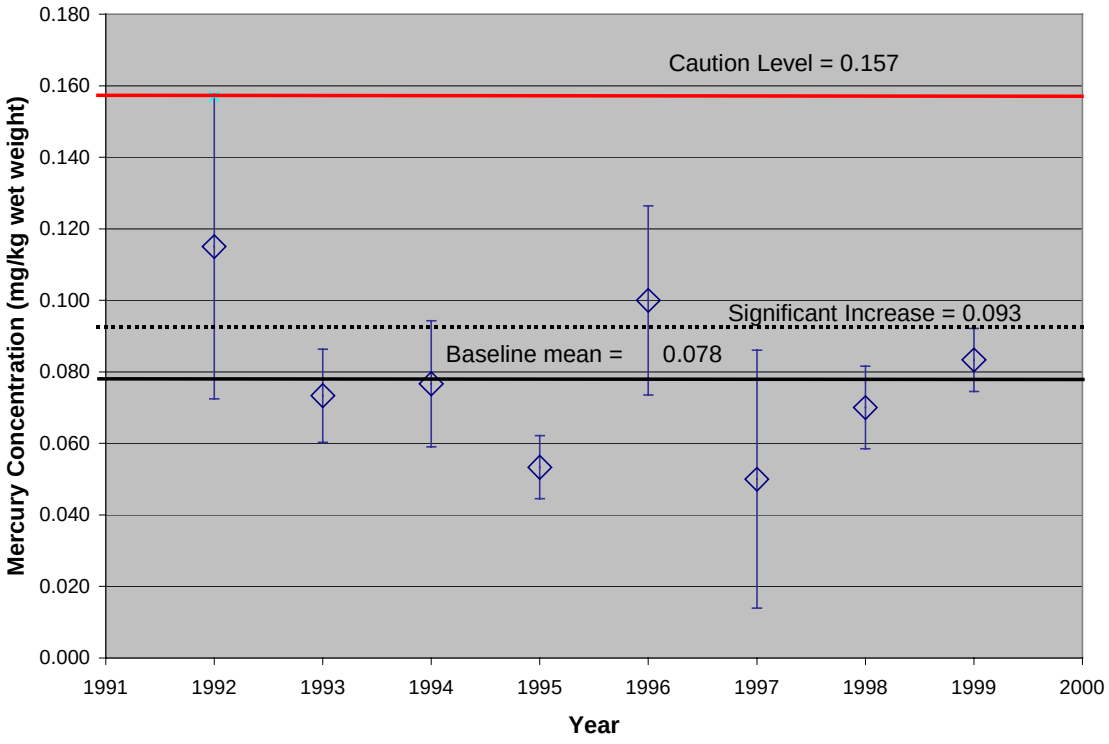


Figure 4-1. Baseline mean (lower solid line), yearly means with standard error (bars), significant increase (dashed line), and caution level (upper solid line), for mercury concentration in flounder fillet.

5.0 RECOMMENDATIONS

An evaluation of the 1999 Fish and Shellfish tasks indicates that the program is achieving its monitoring goals. However, refinements to the program may be warranted. Based on the 1999 results, several recommendations for future effort are suggested:

- As recommended in the 1998 Fish and Shellfish Annual Report, flounder collection at DIF was conducted in early May, after an initial visit in April showed that fish were essentially absent from the area. The catch per unit effort at DIF for 1999 was the highest since the Monitoring Program began in 1991. Collection of flounder at all stations should be conducted in April. Where fish are not available in April, a second collection should be attempted in May;

- Lobster collection should be coordinated with commercial lobstermen both temporally and spatially to maximize collection efficiency. Attempts to collect lobsters in a relatively shorter time period must continue;

- Once the diffuser at the Outfall Site is on line, temporal baseline trends should be evaluated statistically, including all baseline years within the Monitoring Program;

- Due to the apparent upward trend of contaminants (especially total PCB) in lobster hepatopancreas samples from DIF, analytical methods should be examined and temporal and spatial trends analyzed to answer the following questions:

    1. Is the apparent trend of contaminant concentrations in lobster hepatopancreas from Boston Harbor and the Outfall Site “real”?
    2. Are there analytical artifacts associated with quantification of PCBs and chlorinated pesticides that affect observed trends in hepatopancreas concentrations and data interpretation in general?

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APPENDICES

APPENDIX A

Summary of Measurement Program from 1992-1999

There have been a number of changes in fish and shellfish monitoring over the past 8 years of monitoring. The following table summarizes those changes.

Table A-1. Summary of Changes in Fish and Shellfish Monitoring 1992-1999.

Organism	Laboratory		Chemistry Composites per Station	Organisms per Composite
Flounder	**Chemistry**	**Histology/Physiology[a]**		
1992	Battelle	M. Moore	4	1
1993	Battelle	M. Moore	9-10	1
1994	Battelle	M. Moore	3	1
1995	ADL/ENVITEC	M. Moore	3	5
1996	ADL/ENVITEC	M. Moore	3	5
1997	ADL/ENVITEC	M. Moore	3	5
1998	Battelle	M. Moore	3	5
1999	Battelle	M. Moore	3	5
Lobster	**Chemistry**	**Physiology**		
1992	Battelle	Battelle	3	1
1993	Battelle	Battelle	2–10	1
1994	Battelle	Battelle	2–3	5
1995	ADL/ENVITEC	ENSR	3	5
1996	ADL/ENVITEC	ENSR	3	5
1997	ADL/ENVITEC	ENSR	3	5
1998	Battelle	Battelle	3	5
1999	Battelle	Battelle	3	5
Mussel	**Chemistry**	**Biological Condition**		
1992	Aquatec	Aquatec	5-8	10
1993	Aquatec	Aquatec	3-8	10
1994	Aquatec	Aquatec	3-8	10
1995	ADL/ENVITEC	Aquatec	5	At least 200 g
1996	ADL/ENVITEC	Aquatec	5	At least 200 g
1997	ADL/ENVITEC	Aquatec	5	At least 200 g
1998	Battelle	Battelle	5	5-8
1999	Battelle	Battelle	5	5-8

[a]Individual livers/fish

kEY	TITLE	TEAM	OLD DCN	NEW DCN	APPROVE
Ammonia	Ammonia, Aqueous, Autoanalyzer	Red	10-RED-SKA-04		5/5/95
Nitrogen	Total Kjeldahl Nitrogen	Red	10-RED-SKA-06		5/5/95
Phosphorus	Phosphorus (Semi Automated, Colorimetric)	Red	10-RED-SKA-03		5/5/95
Nitrogen	Nitrogen, Nitrate-Nitrite, Semi-Auto Colorimetry (Skalar)	Red	10-RED-SKA-02		5/5/95
Phenolics	Determination of Total Recoverable Phenolics by Semi-Automated Colorimetry	Red	10-RED-SKA-07.2		
Solids	Percent Total, Volatile, and Fixed Solids in Sludge	Red	10-RED-GRV-01		1/30/96
Nitrogen	Total Kjeldahl Nitrogen (TKN)	Red	10-RED-TCO-01.1		2/27/97
Solids	Total and Volatile Solids in Wastewater	Red	10-RED-GRV-02		3/13/96
Phosphorus	Total Phosphorus Block Digestion	Red	10RED-DIG-01		5/15/95
Nitrogen	Total Kjeldahl Nitrogen Block Digestion	Red	10-RED-DIG-02		5/15/95
Cyanide	Total Cyanide by Midi Distillation and Semi-Automated Colorimetry	Red	10-RED-CN-01	1034.0	
Phosphorus	Phosphorus (Manual, Colorimetric, Ascorbic Acid, two Reagent)	Red	10-RED-UVV-01		5/15/95
Nitrate	Nitrate & Nitrite Nitrogen by Automated Colorimetry	Red		1007 0	8/18/98
Phosphorus	Orthophosphate Phosphorus by Automated Colorimetry	Red		1006 0	8/18/98
Ammonia	Ammonia Nitrogen by Semi-Automated Colorimetry	Red		1005 0	8/18/98
Anions	Determination of Inorganic Anions by Ion Chromatography	Red		1002 0	8/6/98
Carbon	Particulate Carbon and Nitrogen Determination	Red	10-RED-CHN-01.0		3/6/98
Sulfide	Sulfide, Titrimetric, Iodometric Method	Red	10-RED-TCO-02.1		1/6/98
Phonolics	Determination of Total Recoverable Phenolics by Semi-Automated Colorimetry	Red	10-RED-SKA-07.3		10/6/97
Sulfide	Sulfide, Colorimetric, Methylene Blue Method	Red	10-RED-UVV-04.0		8/29/97
Cyanide	Total Cyanide by Midi Distillation and Semi-Automated Colorimetry	Red	10-RED-CN-01.1		5/24/99
Phosphorus	Particulate Phosphorus	Red	10-RED-DIG-04.0		6/20/97
Anions	Determination of Inorganic Anions by Ion Chromatography	Red	10-RED-IC-01.1		6/27/97
Phosphorus	Total Phosphorus (Autoclave Disgestion)	Red	10-RED-PHO-01.1		10/3/97
Ammonia	Ammonia, Nitrogen	Red	10-RED-TCO-03.0		3/27/97
Nitrogen	Determination of Total Nitrogen/Phosphorus and Total Dissolved Nitrogen/Phosphorus by Combined Persulfate	Red	10-RED-DIG-03.0		3/7/97
Hardness	Hardness (as mg CaCo3/L)EDTA Titration	Orange	10-ORAN-TCO-08		5/5/95
Ammonia	Ammonia in Sea Water/Phenolhypochlorite Method	Red	10-RED-UVV-03		5/5/95
Nitrogen	Nitrogen, Nitrite, Automated Colorimetric	Red	10-RED-ALP-02		5/15/95
Ammonia	Ammonia, Semi-Automated Colorimetry on Alpkem Auto-Analyzer	Red	10-RED-ALP-01		5/15/95
Nitrogen	Nitrogen, Nitrate-Nitrite, Auto Colorimetric, Cadmium Reduction (Alpkem)	Red	10-RED-ALP-03		5/15/97
Metals	Metals Analysis by Inductively Coupled Plasma Atomic Emission Spectroscopy	Orange		1008.0	3/22/99
Chromium	Hexavalent Chromium (Colorimetric Analysis)	Orange	10-ORAN-UW-01	1003.1FSP	3/12/99
Conductivity	Specific Conductivity at 25 degreesC	Orange	10-ORNG-YSI-01.1		1/26/98
Fluoride	Fluoride, Ion Selective Electrode Method	Orange	10-ORNG-ISE-01.0		1/26/98
Alkalinity	Alkalinity Potentiometric Titration to pH4.3	Orange	10-ORNG-TPO-04.1	1039.0	03/12/99
Chloride	Chloride (Titrimetric-Analysis-Potentiometric Endpoint)	Orange	10-ORNG-TAR-01.1		8/4/97
Metals	Graphite Furnace Atomic Absorption Spectroscopy (Thermo Jarrell Ash FA188)	Orange	10-ORNG-TJA-01		5/5/95
Metals	Preparation for Analysis of Total Elements by Microwave Digestion	Orange	10-ORNG-DIG-03		5/5/95
Hypochlorite	Sodium Hypochlorite (Titrimetric Analysis	Orange	10-ORNG-TCO-01.0		5/5/95
Solids	Settleable Solids	Orange	10-Oran-IHC-01		4/22/98
Alkalinity	Alkalinity (mg CaC03/L to pH 4.3) Manual Titration to pH 4.3	Orange	10-Orng-TPO-04		
Mercury	Mercury Analysis by Cold Vapor Absorption (Leeman PS200)	Orange	10-Oran-CVA-02		5/5/95
Coliforms	Fecal Coliforms by Multiple Tube Fermentation (A-1 Medium) Method	Indigo	10-IND-AIM-01.0		1/19/98
Salinity	Salinity by YSI Model 30S-C-T Meter	Indigo	10-IND-SAL-01.0		9/8/97
Turbidity	Turbidity, Nephelometric Method	Indigo	10-IND-NPH-01.0	1021.0	2/2/99
Coliforms	Total Coliforms & Fecal Coliforms/E.coli using the Presence/Absence Method	Indigo	10-IND-PAI-01		7/18/96
Coliform	Fecal Coliform in Sludge Pellets by Multiple-Tube Fermentation Technique	Indigo	10-IND-MTF-01	1033.FSP	
Toxicity	Microtox Toxicity Analysis - Basic Test by M500 Toxicity Analyzer	Indigo	10-IND-TOX-01		4/1/96
Heterotrophic	Heterotrophic Plate Count by Pour Plate Method	Indigo	10-IND-PPM-01		4/1/96
MBAS	Anionic Surfactants as MBAS (Methylene Blue Active Substances)	Indigo	10-IND-UVV-01		3/6/96
Chlorine	Total Chlorine (Cl2)Residual, DPD-Colorimetric Method	Indigo	10-INDG-TCR-01.0		6/22/95
Coliform	Total Coliform	Indigo	10-IND-MFL-01		11/14/95

Coliform	Fecal Coliform	Indigo	0-IND-MFL-02		11/14/95
Heterotrophic	Heterotrophic Plate Count	Indigo	0-IND-MFL-03		12/5/95
pH	pH (Hydrogen Ion) by Potentiometer	Violet		1001.0	8/10/98
pH	pH by Potehtiometer	Violet	10-VIOl-ph-01		5/15/95
Sampling	DITP Sampling: Standard Operating Procedures	Violet	40-VIOL-SAMP-01.1		3/4/98
Sampling	Processing Standard Operating Procedures	Violet	20-VIO-CKIN-01.0		1/9/98
Spills	Chemical Spills Treatment	Safety	20-SAFT-SPL-01.0		7/9/97
Control Charts	Generating, Evaluating and Utilizing Control Charts	Charts		5001.0	12/18/98
Safety	Personal Protective Equipment	Safety	20-SAFT-PPE-01.0		3/30/98
Safety	Local Safety Plan	Safety	50-safety-01.0		1/13/97
Waste Disposal	Waste Disposal Practices	Lab	60-LABG-WDIS-01.1	2003.0	
Reagent Water	Laboratory Reagent Water System	Lab	20-LABG-RWS-01.0		5/12/95
Glassware	Container/Glassware Cleaning Procedures	Lab	20-LABG-GLSC-01.0		5/9/95
Chain of Custody	Internal Chain of Custody Procedures	Violet	20-VIOL-CUST-01.0		4/12/96
Neutralizer System	Laboratory Acid/Base Neutralizer System	Violet	20-VIO-NEU-01.0		10/9/97
DAIR	Procedures for the Response to Discoveries of Anomalies in the Central Laboratory LIMS Data Records	Yellow	50-YELL-DTQL-01.1		5/1/96
SOPS	Guidance for Writing, Revising and Approving Standard Operating Procedures	Lab	50-LABG-SOP-01.0		11/16/95
Nitrite	Nitrate & Nitrite Nitrogen by Automated Colorimetry	Red		1007.0	
Solids	Percent Total and Volatile Suspended Solids in Sludge	Green	01-GRN-GRV-03.0		
Solids	Percent Total and Volatile Suspended Solids in Sludge	Green	10-GRN-GRV-03.0		4/9/97
TOC	Total Organic Carbon by Combustion and Infrared Detection	Blue		1011.0	11/23/98
PHC	Extractabel Petroleum Hydrocarbons	Blue	10-BLUE-FID-01		04/27/98
FOG	Fats, Oils and Grease (manual solvent extraction) (Manual Solvent Extraction)	Blue	10-BLUE-GRV-01		03/03/98
HEM	Hexane Extractable Material (1664 Solid Phase Extraction)	Blue	10-BLU-GRV-02.0	1028.1	1/20/99
BOD	Manual & Robotic Biochemical Oxygen Demand (Total, Carbonaceous, and Soluble)	Blue	10-BLUE-DOX-01.2	1029.0	03/05/99
COD	Chemical Oxygen Demand (COD) by Closed Reflux, Colorimetric Method	Blue	10-BLUE-UVV-01	1037.0	05/12/95
TOC	Total Organic Carbon Combustion-Infrared method	Blue	10-BLUE-IR-01.0		8/22/96
TPH	Total Petroleum Hydrocarbons (TPH) by FT-IR	Blue	10-BLUE-IR-02	1018.0	1/25/99
Coliform	Fecal Coliform - Receiving Water Samples for Harbor Studies	Indigo	10-IND-MFL-05		3/4/96
Enterococcus	Enterococcus Receiving Water Samples for Harbor Studies	Indigo	10-IND-MFL-04		3/1/96
TSS	Total Suspended Solids in Surface Water by Gravimetric Method	Indigo	10-IND-GRV-01		12/9/96
Chloyophylla	Measurement of Chlorophylla and Phaeophytin in Surface Water by Fluorescence	Indigo	10-IND-FLU-01.0		9/19/97
Mercury	Digestion of Aqueous Samples for Mercury Analysis	Orange	10-Orng-DIG-04	1026.0	3/11/99
Metals	Flame Atomic Absorption Spectroscopy (Thermo Jarrell Ash Video 12E)	Orange	10-Orng-FAA-01		5/5/95
Metals	Graphite Furnace Atomic Absorption Spectroscopy (Perkin Elmer 5100 ZL)	Orange	10-ORNG-PE-01.1	1038.0	3/15/99
Metals	Inductively Coupled Plasma, Perkin-Elmer Optima 3000	Orange	10-Orng-ICP-01		5/5/95
Metals	Preparation of Aqueous Samples for Elemental Analysis	Orange	10-Orng-Dig-01		5/5/95
Acidity	Acidity by Potentiometric Titration in Wastewater and Sludge	Orange	10-ORNG-TPO-02		2/22/96
Metals	Digestion of Sludge and Soilid Samples for Elemental Analysis	Orange	10-ORNG-DIG-05		4/16/96
Metals	Preparation for Analysis of Elements in Solids and Sludges by Microwave Digestion	Orange	10-ORNG-DIG-07.0		6/8/97
Formaldehyde	Formaldehyde Analysis by High Performance Liquid Chromatography	Green		1004.0	8/18/98
HPLC	High Performance Liquid Chromatography/Gel Permeation Cleanup HPLC/GPC for Semivolative Extracts	Green	10-GRN-GPC-01.0		9/19/97
ABN	Standard Operating Procedure for Base Neutral Acid (ABN) Analysis by GC/MS	Green	10-GRN-MS-02.0	1013.0	5/29/97
Solids	Total Volative, and Fixed Suspended Solids	Green	10-GRN-GRV-02	1012.0	3/16/99
Solids	Total Volatile, and Fixed Dissolved Solids	Green	10-GRN-GRV-01		5/12/95
VOCS	SOP for the Analysis of Volatile Organic Compounds by Purge & Trap Gasomatography/Mass Spectrometry (CC	Green	10-GRN-MS-01		8/18/97
Pesticides	Separatory Funnel Extraction of Aqueous Pesticides and Aroclors	Green	10-GRN-EXT-02.1	1036.0	
Pesticides	Pesticides and Aroclors by EPA Method 608	Green	10-GRN-ECD-01	1035.0	
ABN	Standard Operating Procedure for Separatory Funnel Extraction of Aqueous ABNs	Green	10-GRN-EXT-01.1		7/15/97
Nitrogen	Particulate Carbon and Nitrogen Determination	Red	10-RED-CHN-01.0		
Phosphorus	Determinationof Total Nitrogen/Phosphorus and Total Dissolved Nitrogen/Phosphorus by Combined Persulfate	Red	10-RED-DIG-03.0		
Nitrate	Nitrogen, Nitrate-Nitrite, Auto Colorimetric, Cadmium Reduction (Alpkem)	Red	10-RED-ALP-03		
Nitrite	Nitrogen, Nitrate-Nitrite, Auto Colorimetric, Cadmium Reduction (Alpkem)	Red	10-RED-ALP-03		
Aroclors	Separatory Funnel Extraction of Aqueous Pesticides and Aroclors	Green	10-GRN-EXT-02.1		9/11/97

Aroclors	Pesticides and Aroclors by EPA Method 608	Green	10-GRN-ECD-01	5/16/95
Sampling	Sample Management Procedure	Violet	40-VIOL-SAMP-02.0	5/11/95
Solids	Density, gravimetric	Red	10-RED-GRV-03.0	
Skalar	Operation of Skalar San Plus Autoanalyzer	Red	10-Red-SKA-01	05/05/95
Metals	Preparation of Aqueous Samples for Analysis of Acid Soluble Elements	Orange	10-ORNG-DIG-02	05/05/95
Metals	Digestion of Solid Samples for Mercury Analysis	Orange	10-ORNG-DIG-06.0	1027.0 3/11/99
Sulfite	Sulfite (Titrimetric Analysis)	Orange	10-ORNG-TCO-05.0	10/14/96
Volatile Acid	Volatile Acid Alkalinity	Orange	10-ORNG-TPO-03	05/05/95
Formaldehyde	Spectrophotometric Analysis of Formaldehyde in Wastewater	Blue	10-BLUE-UVV-02	01/09/97
Safety	Laboratory Safety Committee Responsibilities and Procedures	Safety		2001.0 07/16/98
Safety	Emergency Evacuation Procedures	Safety		2002.0 01/20/99

APPENDIX A

Summary of Measurement Program from 1991-1998

Table A-1. Summary of Changes in Fish and Shellfish Monitoring 1992-1998

There have been a number of changes in fish and shellfish monitoring over the past 6 years of monitoring. The following table summarizes those changes.

Organism	Laboratory		Composites per Station	Organisms per Composite
Flounder	**Chemistry**	**Histology/Physiology**		
1992	Battelle	M. Moore	4	1
1993	Battelle	M. Moore	9-10	1
1994	Battelle	M. Moore	3	1
1995	ADL/ENVITEC	M. Moore	3	5
1996	ADL/ENVITEC	M. Moore	3	5
1997	ADL/ENVITEC	M. Moore	3	5
1998	Battelle	M. Moore	3	5
Lobster	**Chemistry**	**Physiology**		
1992	Battelle	Battelle	3	1
1993	Battelle	Battelle	3	1
1994	Battelle	Battelle	3	1
1995	ADL/ENVITEC	ENSR	3	5
1996	ADL/ENVITEC	ENSR	3	5
1997	ADL/ENVITEC	ENSR	3	5
1998	Battelle	Battelle	3	5
Mussel	**Chemistry**	**Biological Condition**		
1992	Aquatec	Aquatec	5-8	10
1993	Aquatec	Aquatec	3-8	10
1994	Aquatec	Aquatec	3-8	10
1995	ADL/ENVITEC	Aquatec	5	At least 200 g
1996	ADL/ENVITEC	Aquatec	5	At least 200 g
1997	ADL/ENVITEC	Aquatec	5	At least 200 g
1998	Battelle	Battelle	5	5-8

APPENDIX B

Summary Tables of Lipid (% dry wt.), PCB/Pesticide, PAH and Metals Results for Individual Composites of Flounder, Lobster and Mussels

Table B-1. 1999 Lipid Data - Individual Replicates.

Matrix	Station	Sample	Bottle	Rep	Value	Val Qual	Unit Code
Flounder Fillet	DI	FF99110C1	WQ73COMP	1	4.7		PCTDRYWT
Flounder Fillet	DI	FF99110C2	WQ74COMP	1	3.9		PCTDRYWT
Flounder Fillet	DI	FF99110C3	WQ75COMP	1	3.9		PCTDRYWT
Flounder Fillet	OS	FF99140C1	WM70COMP	1	4.8		PCTDRYWT
Flounder Fillet	OS	FF99140C2	WM71COMP	1	5.3		PCTDRYWT
Flounder Fillet	OS	FF99140C3	WM72COMP	1	4.2		PCTDRYWT
Flounder Fillet	ECCB	FF99150C1	WM90COMP	1	3.2		PCTDRYWT
Flounder Fillet	ECCB	FF99150C2	WM91COMP	1	3.1		PCTDRYWT
Flounder Fillet	ECCB	FF99150C3	WM92COMP	1	3.0		PCTDRYWT
Flounder Liver	DI	FF99110C1	WQ76COMP	1	50.2		PCTDRYWT
Flounder Liver	DI	FF99110C2	WQ77COMP	1	38.8		PCTDRYWT
Flounder Liver	DI	FF99110C3	WQ78COMP	1	43.5		PCTDRYWT
Flounder Liver	OS	FF99140C1	WM73COMP	1	30.5		PCTDRYWT
Flounder Liver	OS	FF99140C2	WM74COMP	1	24.7		PCTDRYWT
Flounder Liver	OS	FF99140C3	WM75COMP	1	27.8		PCTDRYWT
Flounder Liver	ECCB	FF99150C1	WM93COMP	1	87.3		PCTDRYWT
Flounder Liver	ECCB	FF99150C2	WM94COMP	1	27.2		PCTDRYWT
Flounder Liver	ECCB	FF99150C3	WM95COMP	1	35.1		PCTDRYWT
lobster meat	DI	FL9911C1	XJ42	1	2.2		PCTDRYWT
lobster meat	DI	FL9911C2	XJ43	1	1.6		PCTDRYWT
lobster meat	DI	FL9911C3	XJ44	1	1.9		PCTDRYWT
lobster meat	OS	FL9914C1	XJ45	1	1.7		PCTDRYWT
lobster meat	OS	FL9914C2	XJ46	1	1.3		PCTDRYWT
lobster meat	OS	FL9914C3	XJ47	1	1.5		PCTDRYWT
lobster meat	ECCB	FL9915C1	XJ48	1	2.6		PCTDRYWT
lobster meat	ECCB	FL9915C2	XJ49	1	1.7		PCTDRYWT
lobster meat	ECCB	FL9915C3	XJ50	1	1.8		PCTDRYWT
lobster hepatopancreas	DI	FL9911C1	XJ51	1	32.3		PCTDRYWT
lobster hepatopancreas	DI	FL9911C2	XJ52	1	30.0		PCTDRYWT
lobster hepatopancreas	DI	FL9911C3	XJ53	1	31.8		PCTDRYWT
lobster hepatopancreas	OS	FL9914C1	XJ54	1	30.2		PCTDRYWT
lobster hepatopancreas	OS	FL9914C2	XJ55	1	58.7		PCTDRYWT
lobster hepatopancreas	OS	FL9914C3	XJ56	1	40.8		PCTDRYWT
lobster hepatopancreas	ECCB	FL9915C1	XJ57	1	35.2		PCTDRYWT
lobster hepatopancreas	ECCB	FL9915C2	XJ58	1	37.3		PCTDRYWT
lobster hepatopancreas	ECCB	FL9915C3	XJ59	1	43.4		PCTDRYWT
mussels	OS	FM9932G	XD84	1	8.7		PCTDRYWT
mussels	OS	FM9932G	XD85	1	8.0		PCTDRYWT
mussels	OS	FM9932G	XD86	1	6.9		PCTDRYWT
mussels	OS	FM9932G	XD87	1	7.9		PCTDRYWT
mussels	OS	FM9932G	XD88	1	9.0		PCTDRYWT
mussels	OS	FM9932G	XD89	1	8.4		PCTDRYWT
mussels	OS	FM9932G	XD90	1	8.3		PCTDRYWT

Table B-1. 1999 Lipid Data - Individual Replicates.
(Continued)

Matrix	Station	Sample	Bottle	Rep	Value	Val Qual	Unit Code
mussels	OS	FM9932G	XD91	1	8.0		PCTDRYWT
mussels	BIH	FM9931G	XD79	1	5.6		PCTDRYWT
mussels	BIH	FM9931G	XD80	1	6.2		PCTDRYWT
mussels	BIH	FM9931G	XD81	1	6.0		PCTDRYWT
mussels	BIH	FM9931G	XD82	1	6.4		PCTDRYWT
mussels	BIH	FM9931G	XD83	1	6.5		PCTDRYWT
mussels	CCCB	FM9933G	XD92	1	11.3		PCTDRYWT
mussels	CCCB	FM9933G	XD93	1	13.8		PCTDRYWT
mussels	CCCB	FM9933G	XD94	1	12.1		PCTDRYWT
mussels	CCCB	FM9933G	XD95	1	10.5		PCTDRYWT
mussels	CCCB	FM9933G	XD96	1	9.9		PCTDRYWT
mussels	CCCB	FM9933G	XD97	1	11.5		PCTDRYWT
mussels	CCCB	FM9933G	XD98	1	11.9		PCTDRYWT
mussels	CCCB	FM9933G	XD99	1	14.2		PCTDRYWT
mussels	GLOUCESTER	FM9912G	XD74	1	7.8		PCTDRYWT
mussels	GLOUCESTER	FM9912G	XD75	1	5.6		PCTDRYWT
mussels	GLOUCESTER	FM9912G	XD76	1	7.5		PCTDRYWT
mussels	GLOUCESTER	FM9912G	XD77	1	6.4		PCTDRYWT
mussels	GLOUCESTER	FM9912G	XD78	1	5.6		PCTDRYWT

Table B-2. 1999 Percent Dry Weight Data - Individual Replicates.

Matrix	Station	Sample	Bottle	Rep	Value	Val Qual	Unit Code
Flounder Fillet	DI	FF99110C1	WQ73COMP	1	17.9		PCTDRYWT
Flounder Fillet	DI	FF99110C2	WQ74COMP	1	17.3		PCTDRYWT
Flounder Fillet	DI	FF99110C3	WQ75COMP	1	17.6		PCTDRYWT
Flounder Fillet	OS	FF99140C1	WM70COMP	1	15.8		PCTDRYWT
Flounder Fillet	OS	FF99140C2	WM71COMP	1	16.8		PCTDRYWT
Flounder Fillet	OS	FF99140C3	WM72COMP	1	14.8		PCTDRYWT
Flounder Fillet	ECCB	FF99150C1	WM90COMP	1	16.5		PCTDRYWT
Flounder Fillet	ECCB	FF99150C2	WM91COMP	1	17.0		PCTDRYWT
Flounder Fillet	ECCB	FF99150C3	WM92COMP	1	16.6		PCTDRYWT
Flounder Liver	DI	FF99110C1	WQ76COMP	1	28.0		PCTDRYWT
Flounder Liver	DI	FF99110C2	WQ77COMP	1	26.5		PCTDRYWT
Flounder Liver	DI	FF99110C3	WQ78COMP	1	30.5		PCTDRYWT
Flounder Liver	OS	FF99140C1	WM73COMP	1	22.4		PCTDRYWT
Flounder Liver	OS	FF99140C2	WM74COMP	1	22.1		PCTDRYWT
Flounder Liver	OS	FF99140C3	WM75COMP	1	21.6		PCTDRYWT
Flounder Liver	ECCB	FF99150C1	WM93COMP	1	13.7		PCTDRYWT
Flounder Liver	ECCB	FF99150C2	WM94COMP	1	22.3		PCTDRYWT
Flounder Liver	ECCB	FF99150C3	WM95COMP	1	21.0		PCTDRYWT
lobster meat	DI	FL9911C1	XJ42	1	13.0		PCTDRYWT
lobster meat	DI	FL9911C2	XJ43	1	15.4		PCTDRYWT
lobster meat	DI	FL9911C3	XJ44	1	18.1		PCTDRYWT
lobster meat	OS	FL9914C1	XJ45	1	14.1		PCTDRYWT
lobster meat	OS	FL9914C2	XJ46	1	13.0		PCTDRYWT
lobster meat	OS	FL9914C3	XJ47	1	13.6		PCTDRYWT
lobster meat	ECCB	FL9915C1	XJ48	1	13.5		PCTDRYWT
lobster meat	ECCB	FL9915C2	XJ49	1	12.7		PCTDRYWT
lobster meat	ECCB	FL9915C3	XJ50	1	12.7		PCTDRYWT
lobster hepatopancreas	DI	FL9911C1	XJ51	1	45.8		PCTDRYWT
lobster hepatopancreas	DI	FL9911C2	XJ52	1	32.7		PCTDRYWT
lobster hepatopancreas	DI	FL9911C3	XJ53	1	36.2		PCTDRYWT
lobster hepatopancreas	OS	FL9914C1	XJ54	1	29.1		PCTDRYWT
lobster hepatopancreas	OS	FL9914C2	XJ55	1	31.2		PCTDRYWT
lobster hepatopancreas	OS	FL9914C3	XJ56	1	28.6		PCTDRYWT
lobster hepatopancreas	ECCB	FL9915C1	XJ57	1	26.0		PCTDRYWT
lobster hepatopancreas	ECCB	FL9915C2	XJ58	1	26.0		PCTDRYWT
lobster hepatopancreas	ECCB	FL9915C3	XJ59	1	24.1		PCTDRYWT
Mussels	OS	FM9932G	XD84	1	16.8		PCTDRYWT
Mussels	OS	FM9932G	XD85	1	18.5		PCTDRYWT
Mussels	OS	FM9932G	XD86	1	18.2		PCTDRYWT
Mussels	OS	FM9932G	XD87	1	18.5		PCTDRYWT
Mussels	OS	FM9932G	XD88	1	19.0		PCTDRYWT
Mussels	OS	FM9932G	XD89	1	18.7		PCTDRYWT
Mussels	OS	FM9932G	XD90	1	19.9		PCTDRYWT
Mussels	OS	FM9932G	XD91	1	18.9		PCTDRYWT

Table B-2. 1999 Percent Dry Weight Data - Individual Replicates. (Continued)

Matrix	Station	Sample	Bottle	Rep	Value	Val Qual	Unit Code
Mussels	OS	FM9932S	XE11	1	19.8		PCTDRYWT
Mussels	OS	FM9932S	XE12	1	21.6		PCTDRYWT
Mussels	OS	FM9932S	XE13	1	20.6		PCTDRYWT
Mussels	OS	FM9932S	XE14	1	20.8		PCTDRYWT
Mussels	OS	FM9932S	XE15	1	20.7		PCTDRYWT
Mussels	OS	FM9932S	XE16	1	19.4		PCTDRYWT
Mussels	OS	FM9932S	XE17	1	21.6		PCTDRYWT
Mussels	OS	FM9932S	XE18	1	20.8		PCTDRYWT
Mussels	BIH	FM9931G	XD79	1	9.4		PCTDRYWT
Mussels	BIH	FM9931G	XD80	1	10.7		PCTDRYWT
Mussels	BIH	FM9931G	XD81	1	11.9		PCTDRYWT
Mussels	BIH	FM9931G	XD82	1	13.6		PCTDRYWT
Mussels	BIH	FM9931G	XD83	1	12.9		PCTDRYWT
Mussels	BIH	FM9931S	XE06	1	18.8		PCTDRYWT
Mussels	BIH	FM9931S	XE07	1	18.1		PCTDRYWT
Mussels	BIH	FM9931S	XE08	1	20.0		PCTDRYWT
Mussels	BIH	FM9931S	XE09	1	19.6		PCTDRYWT
Mussels	BIH	FM9931S	XE10	1	19.2		PCTDRYWT
Mussels	CCCB	FM9933G	XD92	1	21.6		PCTDRYWT
Mussels	CCCB	FM9933G	XD93	1	18.8		PCTDRYWT
Mussels	CCCB	FM9933G	XD94	1	20.3		PCTDRYWT
Mussels	CCCB	FM9933G	XD95	1	21.7		PCTDRYWT
Mussels	CCCB	FM9933G	XD96	1	17.1		PCTDRYWT
Mussels	CCCB	FM9933G	XD97	1	20.7		PCTDRYWT
Mussels	CCCB	FM9933G	XD98	1	20.6		PCTDRYWT
Mussels	CCCB	FM9933G	XD99	1	20.0		PCTDRYWT
Mussels	CCCB	FM9933S	XE19	1	23.1		PCTDRYWT
Mussels	CCCB	FM9933S	XE20	1	23.2		PCTDRYWT
Mussels	CCCB	FM9933S	XE21	1	21.3		PCTDRYWT
Mussels	CCCB	FM9933S	XE22	1	23.9		PCTDRYWT
Mussels	CCCB	FM9933S	XE23	1	22.1		PCTDRYWT
Mussels	CCCB	FM9933S	XE24	1	23.2		PCTDRYWT
Mussels	CCCB	FM9933S	XE25	1	23.6		PCTDRYWT
Mussels	CCCB	FM9933S	XE26	1	25.4		PCTDRYWT
Mussels	GLOUCESTER	FM9912G	XD74	1	14.0		PCTDRYWT
Mussels	GLOUCESTER	FM9912G	XD75	1	12.6		PCTDRYWT
Mussels	GLOUCESTER	FM9912G	XD76	1	12.8		PCTDRYWT
Mussels	GLOUCESTER	FM9912G	XD77	1	12.5		PCTDRYWT
Mussels	GLOUCESTER	FM9912G	XD78	1	12.4		PCTDRYWT
Mussels	SANDWICH	FM9911S	XE01	1	11.4		PCTDRYWT
Mussels	SANDWICH	FM9911S	XE02	1	23.8		PCTDRYWT
Mussels	SANDWICH	FM9911S	XE03	1	20.8		PCTDRYWT
Mussels	SANDWICH	FM9911S	XE04	1	22.8		PCTDRYWT
Mussels	SANDWICH	FM9911S	XE05	1	20.5		PCTDRYWT

Table B-3. 1999 Flounder Fillet Data - Individual Replicates.

Parameter	DI(1)	NB(2)	BS(3)	FOS(4)	ECCB(5)
Mercury	0.356	0.647	0.433	0.455	0.216
Mercury	0.334	0.417	0.427	0.600	0.209
Mercury	0.366	0.511	0.392	0.566	0.247
Total DDT	20.20	22.98	20.96	20.52	13.68
Total DDT	24.06	20.66	12.43	30.76	9.56
Total DDT	19.96	26.24	17.83	15.64	11.98
Total PCB	139.36	153.79	118.35	123.70	57.15
Total PCB	150.04	115.34	95.97	248.46	40.11
Total PCB	135.16	130.62	119.90	126.40	57.84
Total CHLOR	9.90	8.19	7.41	5.74	3.28
Total CHLOR	10.22	9.92	10.49	12.48	1.64
Total CHLOR	9.08	12.19	8.63	3.13	2.10
Aldrin	0.00	0.00	0.00	0.00	0.00
Aldrin	0.00	0.00	0.00	0.00	0.00
Aldrin	0.00	0.00	0.00	0.00	0.00
Dieldrin	1.55	2.64	3.52	5.62	0.63
Dieldrin	5.12	3.05	2.34	7.25	0.50
Dieldrin	4.50	3.22	2.15	1.49	1.10
Endrin	0.00	0.00	0.00	0.00	0.00
Endrin	0.00	0.00	0.00	0.00	0.00
Endrin	0.00	0.00	0.00	0.00	0.00
Hexachlorobenzene	0.47	0.73	0.52	0.63	0.62
Hexachlorobenzene	0.51	0.00	0.58	0.57	0.46
Hexachlorobenzene	0.48	0.57	0.55	0.60	0.50
Mirex	0.00	0.00	0.00	0.00	0.00
Mirex	0.00	0.00	0.00	0.00	0.00
Mirex	0.00	0.00	0.00	0.00	0.00
Lindane	0.00	0.00	0.00	0.00	0.00
Lindane	0.00	0.00	0.00	0.00	0.00
Lindane	0.00	0.11	0.00	0.00	0.00

Table B-4. 1999 Flounder Liver Data - Individual Replicates.

Parameter	DI(1)	NB(2)	BS(3)	FOS(4)	ECCB(5)
Mercury	0.218	0.696	0.515	0.431	0.331
Mercury	0.223	0.657	0.501	0.664	0.225
Mercury	0.229	0.877	0.466	0.841	0.368
Cadmium	0.48	4.00	1.22	2.33	1.35
Cadmium	0.45	1.18	1.66	1.93	1.02
Cadmium	0.84	1.44	1.54	5.27	2.56
Copper	37.68	94.88	92.08	96.08	63.88
Copper	28.28	39.98	63.38	133.88	46.88
Copper	34.58	136.88	48.48	159.88	101.88
Nickel	0.18	1.41	0.65	0.41	0.40
Nickel	0.26	0.35	0.63	0.47	0.16
Nickel	0.08	0.60	1.68	0.85	0.58
Silver	2.58	10.80	7.63	7.80	4.42
Silver	1.97	3.13	4.68	13.40	3.67
Silver	2.56	28.60	4.83	13.50	5.51
Zinc	102.21	131.21	113.21	99.21	104.21
Zinc	93.21	116.21	95.21	103.21	113.21
Zinc	109.21	121.21	112.21	123.21	119.21
Total DDT	441.15	91.33	155.75	165.81	132.82
Total DDT	485.85	144.98	153.84	112.18	45.90
Total DDT	526.40	112.70	251.41	265.07	62.97
Total PCB	2699.58	706.05	1011.31	1139.77	578.12
Total PCB	2774.19	1020.43	1279.97	782.44	211.39
Total PCB	2809.43	749.57	1349.97	1890.54	291.43
Total PAH	123.20	134.44	54.66	104.62	234.22
Total PAH	80.61	42.09	133.23	42.16	32.18
Total PAH	110.13	116.10	67.67	118.99	113.75
Total CHLOR	212.84	25.43	27.98	47.54	27.62
Total CHLOR	218.02	62.29	35.83	21.45	8.03
Total CHLOR	246.67	37.32	141.32	74.41	10.61
Chromium	0.10	0.86	0.45	0.11	0.14
Chromium	0.55	0.13	0.50	0.16	0.13
Chromium	0.13	0.64	0.74	0.22	0.13
Lead	3.04	7.80	3.85	3.48	1.28
Lead	1.97	2.56	8.00	3.56	2.54
Lead	2.27	2.93	3.02	13.27	2.32
Aldrin	0.00	0.00	0.00	0.00	0.00
Aldrin	0.00	0.00	0.00	0.00	0.00
Aldrin	0.00	0.00	0.00	0.00	0.00
Dieldrin	21.64	13.47	14.47	26.98	13.44
Dieldrin	68.40	11.26	25.65	12.39	4.01
Dieldrin	26.56	7.39	35.95	16.11	2.82
Endrin	0.00	0.00	0.00	0.00	0.00
Endrin	0.00	0.00	0.00	0.00	0.00

Table B-4. 1999 Flounder Liver Data - Individual Replicates. (Continued)

Parameter	DI(1)	NB(2)	BS(3)	FOS(4)	ECCB(5)
Endrin	0.00	0.00	0.00	0.00	0.00
Hexachlorobenzene	6.50	3.44	3.33	4.24	5.84
Hexachlorobenzene	6.11	2.62	5.00	3.95	1.95
Hexachlorobenzene	6.99	2.86	4.95	3.34	2.68
Mirex	0.00	0.00	0.00	0.00	0.00
Mirex	0.00	0.00	0.00	0.00	0.00
Mirex	0.00	0.00	0.00	0.00	0.00
Lindane	0.00	0.00	0.00	0.00	0.00
Lindane	0.00	0.00	0.00	0.00	0.00
Lindane	0.00	0.00	0.00	0.00	0.00

Table B-5. 1999 Lobster Meat Data - Individual Composites.

Parameter	DIF (1)	FOS(4)	ECCB(5)
Mercury	0.927	1.368	0.777
Mercury	0.778	0.865	0.788
Mercury	1.294	0.881	0.572
Total DDT	16.36	7.50	8.87
Total DDT	17.60	7.17	8.15
Total DDT	13.97	7.41	10.93
Total PCB	148.18	79.73	53.21
Total PCB	179.10	68.91	44.97
Total PCB	135.39	72.55	60.56
Total CHLOR	5.31	1.91	1.49
Total CHLOR	5.64	2.27	1.42
Total CHLOR	5.47	2.71	1.57
Aldrin	0.00	0.00	0.00
Aldrin	0.00	0.00	0.00
Aldrin	0.00	0.00	0.00
Dieldrin	6.83	4.88	4.29
Dieldrin	6.87	5.17	3.96
Dieldrin	6.68	5.40	4.54
Endrin	0.00	0.00	0.00
Endrin	0.00	0.00	0.00
Endrin	0.00	0.00	0.00
Hexachlorobenzene	0.49	0.47	0.34
Hexachlorobenzene	0.50	0.46	0.27
Hexachlorobenzene	0.43	0.44	0.37
Mirex	0.49	0.32	0.21
Mirex	0.76	0.23	0.20
Mirex	0.42	0.37	0.27
Lindane	0.00	0.00	0.00
Lindane	0.00	0.00	0.00
Lindane	0.00	0.00	0.00

Table B-6. 1999 Lobster Hepatopancreas Data - Individual Composites.

Parameter	DIF (1)	FOS(4)	ECCB(5)
Lead	0.49	0.44	0.31
Lead	0.58	0.27	0.23
Lead	0.50	0.55	0.21
Mercury	0.332	0.682	0.291
Mercury	0.298	0.416	0.353
Mercury	0.276	0.487	0.307
Cadmium	5.11	21.12	15.42
Cadmium	3.93	8.15	10.57
Cadmium	4.71	17.32	11.28
Chromium	0.15	0.29	0.38
Chromium	0.20	0.13	0.14
Chromium	0.21	0.11	0.14
Copper	891.90	951.20	336.10
Copper	867.70	915.00	561.50
Copper	926.00	625.20	536.30
Nickel	0.53	0.73	1.01
Nickel	0.76	0.63	1.49
Nickel	0.66	0.69	1.48
Silver	48.34	65.85	28.32
Silver	39.05	37.35	36.51
Silver	53.70	40.32	31.88
Zinc	93.60	53.00	74.60
Zinc	73.40	36.60	81.50
Zinc	97.20	52.50	71.10
Total DDT	1246.05	705.53	493.46
Total DDT	1301.59	876.13	580.78
Total DDT	1345.84	656.00	603.12
Total PCB	10380.13	6980.08	2847.05
Total PCB	10003.97	6604.63	2937.54
Total PCB	10382.12	5475.81	3611.92
Total PAH	6498.21	1265.97	1259.04
Total PAH	7115.04	1836.25	1463.00
Total PAH	9178.51	1586.69	1207.04
Total CHLOR	123.82	45.07	27.84
Total CHLOR	123.26	67.91	38.22
Total CHLOR	167.06	60.83	29.50
Aldrin	0.00	0.00	0.00
Aldrin	0.00	0.00	0.00
Aldrin	0.00	0.00	0.00
Dieldrin	53.98	44.86	25.27
Dieldrin	66.57	64.27	27.30
Dieldrin	58.35	45.84	31.82
Endrin	0.00	0.00	0.00
Endrin	0.00	0.00	0.00

Table B-6. 1999 Lobster Hepatopancreas Data - Individual Composites. (Continued)

Parameter	DIF (1)	FOS(4)	ECCB(5)
Endrin	0.00	0.00	0.00
Hexachlorobenzene	6.82	8.02	6.28
Hexachlorobenzene	7.62	10.14	7.47
Hexachlorobenzene	6.46	8.26	7.37
Mirex	7.22	10.83	6.18
Mirex	18.58	9.05	7.25
Mirex	8.51	9.40	7.33
Lindane	0.00	0.00	2.44
Lindane	0.00	2.67	2.56
Lindane	0.00	2.72	2.57

Table B-7. 1999 Mussel data - Individual Replicates.

Parameter	DI(1)	FOS(4)	BIH(6)	CCB(9)	Gloucester(7)	Sandwich(8)
Lead	deployments lost	0.79	4.12	1.49	NA	1.36
Lead	deployments lost	1.07	5.36	1.07	NA	1.08
Lead	deployments lost	1.24	5.20	1.29	NA	1.70
Lead	deployments lost	1.21	3.58	1.15	NA	1.71
Lead	deployments lost	0.96	5.21	1.75	NA	1.95
Lead	deployments lost	1.22		1.19	NA	
Lead	deployments lost	0.79		1.21	NA	
Lead	deployments lost	1.43		0.94	NA	
Mercury	deployments lost	0.052	0.103	0.056	NA	0.070
Mercury	deployments lost	0.056	0.102	0.049	NA	0.070
Mercury	deployments lost	0.065	0.101	0.054	NA	0.083
Mercury	deployments lost	0.066	0.084	0.059	NA	0.077
Mercury	deployments lost	0.057	0.107	0.058	NA	0.075
Mercury	deployments lost	0.080		0.048	NA	
Mercury	deployments lost	0.061		0.051	NA	
Mercury	deployments lost	0.063		0.046	NA	
Total DDT	deployments lost	12.34	73.73	16.55	43.04	NA
Total DDT	deployments lost	11.16	91.19	21.96	27.35	NA
Total DDT	deployments lost	12.37	90.01	18.04	42.58	NA
Total DDT	deployments lost	10.46	87.89	15.93	32.93	NA
Total DDT	deployments lost	13.88	86.70	17.71	25.81	NA
Total DDT	deployments lost	11.51		17.25		NA
Total DDT	deployments lost	14.25		15.93		NA
Total DDT	deployments lost	11.53		18.41		NA
Total PCB	deployments lost	35.29	426.51	43.45	68.36	NA
Total PCB	deployments lost	33.57	514.87	58.40	45.59	NA
Total PCB	deployments lost	34.64	525.80	48.84	59.76	NA
Total PCB	deployments lost	41.58	458.58	41.25	51.38	NA
Total PCB	deployments lost	40.30	533.23	52.01	43.54	NA
Total PCB	deployments lost	34.50		44.49		NA
Total PCB	deployments lost	39.25		45.51		NA
Total PCB	deployments lost	35.85		47.37		NA
Total CHLOR	deployments lost	7.69	18.40	7.35	10.22	NA
Total CHLOR	deployments lost	6.85	23.58	8.92	5.74	NA
Total CHLOR	deployments lost	7.45	23.95	7.64	9.74	NA
Total CHLOR	deployments lost	8.89	22.73	6.83	6.70	NA
Total CHLOR	deployments lost	8.35	23.82	7.02	5.76	NA
Total CHLOR	deployments lost	7.29		7.46		NA
Total CHLOR	deployments lost	8.25		7.02		NA
Total CHLOR	deployments lost	7.02		7.93		NA
Total LMW-PAH	deployments lost	50.24	1856.78	39.36	254.70	NA
Total LMW-PAH	deployments lost	38.61	2329.57	50.37	293.66	NA
Total LMW-PAH	deployments lost	29.81	2523.75	50.25	307.71	NA

Table B-7. 1999 Mussel data - Individual Replicates.
(Continued)

Parameter	DI(1)	FOS(4)	BIH(6)	CCB(9)	Gloucester(7)	Sandwich(8)
Total LMW-PAH	deployments lost	34.94	2606.97	43.00	489.84	NA
Total LMW-PAH	deployments lost	36.46	2546.30	33.02	394.36	NA
Total LMW-PAH	deployments lost	33.24		45.83		NA
Total LMW-PAH	deployments lost	33.22		52.69		NA
Total LMW-PAH	deployments lost	34.99		51.34		NA
Total HMW-PAH	deployments lost	33.89	3145.38	14.77	289.21	NA
Total HMW-PAH	deployments lost	32.07	3609.09	16.19	477.97	NA
Total HMW-PAH	deployments lost	26.46	3804.99	21.77	421.41	NA
Total HMW-PAH	deployments lost	28.65	3909.74	13.98	987.84	NA
Total HMW-PAH	deployments lost	32.85	3929.31	19.82	877.79	NA
Total HMW-PAH	deployments lost	28.00		17.37		NA
Total HMW-PAH	deployments lost	27.85		17.76		NA
Total HMW-PAH	deployments lost	29.26		21.12		NA
Aldrin	deployments lost	0.00	0.00	0.00	0.00	NA
Aldrin	deployments lost	0.00	0.00	0.00	0.00	NA
Aldrin	deployments lost	0.00	0.00	0.00	0.00	NA
Aldrin	deployments lost	0.00	0.00	0.00	0.00	NA
Aldrin	deployments lost	0.00	0.00	0.00	0.00	NA
Aldrin	deployments lost	0.00		0.00		NA
Aldrin	deployments lost	0.00		0.00		NA
Aldrin	deployments lost	0.00		0.00		NA
Dieldrin	deployments lost	1.54	7.09	1.15	1.74	NA
Dieldrin	deployments lost	1.41	9.61	1.34	1.16	NA
Dieldrin	deployments lost	1.30	9.19	1.62	1.68	NA
Dieldrin	deployments lost	1.61	10.01	1.66	1.31	NA
Dieldrin	deployments lost	1.53	9.39	1.68	1.29	NA
Dieldrin	deployments lost	1.54		1.62		NA
Dieldrin	deployments lost	1.48		1.74		NA
Dieldrin	deployments lost	1.37		1.77		NA
Endrin	deployments lost	0.00	0.00	0.00	0.00	NA
Endrin	deployments lost	0.00	0.00	0.00	0.00	NA
Endrin	deployments lost	0.00	0.00	0.00	0.00	NA
Endrin	deployments lost	0.00	0.00	0.00	0.00	NA
Endrin	deployments lost	0.00	0.00	0.00	0.00	NA
Endrin	deployments lost	0.00		0.00		NA
Endrin	deployments lost	0.00		0.00		NA
Endrin	deployments lost	0.00		0.00		NA
Hexachlorobenzene	deployments lost	0.17	0.36	0.37	0.42	NA
Hexachlorobenzene	deployments lost	0.20	0.53	0.31	0.23	NA
Hexachlorobenzene	deployments lost	0.14	0.41	0.46	0.36	NA
Hexachlorobenzene	deployments lost	0.42	0.51	0.32	0.24	NA
Hexachlorobenzene	deployments lost	0.24	0.43	0.29	0.65	NA
Hexachlorobenzene	deployments lost	0.22		0.34		NA

Table B-7. 1999 Mussel data - Individual Replicates.
(Continued)

Parameter	DI(1)	FOS(4)	BIH(6)	CCB(9)	Gloucester(7)	Sandwich(8)
Hexachlorobenzene	deployments lost	0.17		0.48		NA
Hexachlorobenzene	deployments lost	0.21		0.32		NA
Mirex	deployments lost	0.08	0.42	0.04	0.16	NA
Mirex	deployments lost	0.05	0.42	0.04	0.14	NA
Mirex	deployments lost	0.05	0.44	0.06	0.11	NA
Mirex	deployments lost	0.04	0.36	0.06	0.21	NA
Mirex	deployments lost	0.08	0.41	0.06	0.12	NA
Mirex	deployments lost	0.03		0.04		NA
Mirex	deployments lost	0.06		0.08		NA
Mirex	deployments lost	0.05		0.05		NA
Lindane	deployments lost	0.32	0.21	0.60	0.34	NA
Lindane	deployments lost	0.35	0.33	0.75	0.27	NA
Lindane	deployments lost	0.32	0.26	0.67	0.34	NA
Lindane	deployments lost	0.39	0.31	0.71	0.29	NA
Lindane	deployments lost	0.38	0.30	0.44	0.23	NA
Lindane	deployments lost	0.41		0.72		NA
Lindane	deployments lost	0.38		0.62		NA
Lindane	deployments lost	0.37		0.72		NA

APPENDIX B

Summary Tables of Lipids (% dry wt), PCB, Pest, PAH and Metals for Individual Composites of Flounder, Lobster and Mussels

Table B-1a. Summary of Mean Flounder Fillet Contamination Levels (ng/g dry wt)
1998 MWRA Flounder Survey – PCB

Deer Island PCBs						
Parameter		**1**	**2**	**3**	**Mean**	**s.e.**
CL9(206)	2,2',3,3',4,4',5,5',6-NONACHLOROBIPHENYL	2.33	1.66	1.29	1.76	0.30
CL8(195)	2,2',3,3',4,4',5,6-OCTACHLOROBIPHENYL	2.04	1.44	1.29	1.59	0.23
CL7(170)	2,2',3,3',4,4',5-HEPTACHLOROBIPHENYL	10.39	7.45	8.35	8.73	0.87
CL6(128)	2,2',3,3',4,4'-HEXACHLOROBIPHENYL	6.15	4.50	4.90	5.19	0.50
CL7(180)	2,2',3,4,4',5,5'-HEPTACHLOROBIPHENYL	14.44	10.59	10.37	11.80	1.32
CL6(138)	2,2',3,4,4',5-HEXACHLOROBIPHENYL	64.12	47.99	55.52	55.87	4.66
CL7(187)	2,2',3,4,5,5',6-HEPTACHLOROBIPHENYL	15.44	11.87	11.12	12.81	1.33
CL4(44)	2,2',3,5'-TETRACHLOROBIPHENYL	0.80	0.65	0.64	0.70	0.05
CL6(153)	2,2',4,4',5,5'-HEXACHLOROBIPHENYL	75.20	56.37	61.43	64.33	5.63
CL5(101)	2,2',4,5,5'-PENTACHLOROBIPHENYL	12.50	14.57	12.87	13.31	0.64
CL4(52)	2,2',5,5'-TETRACHLOROBIPHENYL	2.41	2.84	2.32	2.52	0.16
CL3(18)	2,2',5-TRICHLOROBIPHENYL	0.31	0.28	0.33	0.31	0.02
CL5(118)	2,3',4,4',5-PENTACHLOROBIPHENYL	40.07	30.33	38.44	36.28	3.01
CL4(66)	2,3',4,4'-TETRACHLOROBIPHENYL	8.57	6.89	8.25	7.90	0.51
CL5(105)	2,3,3',4,4'-PENTACHLOROBIPHENYL	13.09	10.08	12.44	11.87	0.91
CL2(8)	2,4'-DICHLOROBIPHENYL	0.00	0.00	0.00	0.00	0.00
CL3(28)	2,4,4'-TRICHLOROBIPHENYL	3.01	2.32	3.00	2.78	0.23
CL5(126)	3,3',4,4',5-PENTACHLOROBIPHENYL	0.00	0.00	0.00	0.00	0.00
CL4(77)	3,3',4,4'-TETRACHLOROBIPHENYL	0.00	0.00	0.00	0.00	0.00
CL10(209)	DECACHLOROBIPHENYL	0.83	0.73	0.48	0.68	0.10
TOTAL PCB		**271.69**	**210.55**	**233.06**	**238.43**	**17.85**

Outfall PCBs						
Parameter		**1**	**2**	**3**	**Mean**	**s.e.**
CL9(206)	2,2',3,3',4,4',5,5',6-NONACHLOROBIPHENYL	1.04	2.60	1.20	1.61	0.50
CL8(195)	2,2',3,3',4,4',5,6-OCTACHLOROBIPHENYL	0.79	1.95	0.93	1.22	0.37
CL7(170)	2,2',3,3',4,4',5-HEPTACHLOROBIPHENYL	2.68	7.04	4.00	4.57	1.29
CL6(128)	2,2',3,3',4,4'-HEXACHLOROBIPHENYL	1.49	4.20	1.79	2.49	0.86
CL7(180)	2,2',3,4,4',5,5'-HEPTACHLOROBIPHENYL	3.39	9.50	4.85	5.92	1.84
CL6(138)	2,2',3,4,4',5-HEXACHLOROBIPHENYL	11.83	40.35	20.75	24.31	8.42
CL7(187)	2,2',3,4,5,5',6-HEPTACHLOROBIPHENYL	4.37	10.70	5.60	6.89	1.94
CL4(44)	2,2',3,5'-TETRACHLOROBIPHENYL	0.09	0.28	0.14	0.17	0.06
CL6(153)	2,2',4,4',5,5'-HEXACHLOROBIPHENYL	13.30	48.79	24.51	28.87	10.47
CL5(101)	2,2',4,5,5'-PENTACHLOROBIPHENYL	2.51	7.37	4.51	4.80	1.41
CL4(52)	2,2',5,5'-TETRACHLOROBIPHENYL	0.45	1.28	0.67	0.80	0.25
CL3(18)	2,2',5-TRICHLOROBIPHENYL	0.00	0.17	0.09	0.09	0.05
CL5(118)	2,3',4,4',5-PENTACHLOROBIPHENYL	7.07	22.56	13.65	14.43	4.49
CL4(66)	2,3',4,4'-TETRACHLOROBIPHENYL	1.42	4.35	2.76	2.84	0.85
CL5(105)	2,3,3',4,4'-PENTACHLOROBIPHENYL	2.54	7.67	4.19	4.80	1.51
CL2(8)	2,4'-DICHLOROBIPHENYL	0.00	0.00	0.00	0.00	0.00
CL3(28)	2,4,4'-TRICHLOROBIPHENYL	0.44	1.31	0.85	0.86	0.25
CL5(126)	3,3',4,4',5-PENTACHLOROBIPHENYL	0.00	0.00	0.00	0.00	0.00
CL4(77)	3,3',4,4'-TETRACHLOROBIPHENYL	0.00	0.28	0.19	0.16	0.08
CL10(209)	DECACHLOROBIPHENYL	0.52	1.22	0.58	0.77	0.23
TOTAL PCB		**53.92**	**171.62**	**91.28**	**105.61**	**34.73**

Cape Cod PCBs						
Parameter		**1**	**2**	**3**	**Mean**	**s.e.**
CL9(206)	2,2',3,3',4,4',5,5',6-NONACHLOROBIPHENYL	0.39	0.40	0.67	0.49	0.09
CL8(195)	2,2',3,3',4,4',5,6-OCTACHLOROBIPHENYL	0.33	0.32	0.53	0.39	0.07
CL7(170)	2,2',3,3',4,4',5-HEPTACHLOROBIPHENYL	1.26	1.24	1.71	1.40	0.15
CL6(128)	2,2',3,3',4,4'-HEXACHLOROBIPHENYL	0.67	0.80	0.64	0.70	0.05
CL7(180)	2,2',3,4,4',5,5'-HEPTACHLOROBIPHENYL	5.41	4.26	6.32	5.33	0.60
CL6(138)	2,2',3,4,4',5-HEXACHLOROBIPHENYL	8.59	7.50	8.41	8.16	0.34
CL7(187)	2,2',3,4,5,5',6-HEPTACHLOROBIPHENYL	2.80	2.46	3.58	2.95	0.33
CL4(44)	2,2',3,5'-TETRACHLOROBIPHENYL	0.00	0.00	0.08	0.03	0.03
CL6(153)	2,2',4,4',5,5'-HEXACHLOROBIPHENYL	10.20	8.58	10.13	9.64	0.53
CL5(101)	2,2',4,5,5'-PENTACHLOROBIPHENYL	2.06	1.42	1.78	1.76	0.19
CL4(52)	2,2',5,5'-TETRACHLOROBIPHENYL	0.40	0.20	0.32	0.31	0.06
CL3(18)	2,2',5-TRICHLOROBIPHENYL	0.11	0.07	0.10	0.09	0.01
CL5(118)	2,3',4,4',5-PENTACHLOROBIPHENYL	6.08	5.29	4.80	5.39	0.37
CL4(66)	2,3',4,4'-TETRACHLOROBIPHENYL	0.98	0.69	0.66	0.78	0.10
CL5(105)	2,3,3',4,4'-PENTACHLOROBIPHENYL	1.53	1.49	1.28	1.43	0.08
CL2(8)	2,4'-DICHLOROBIPHENYL	0.00	0.00	0.00	0.00	0.00
CL3(28)	2,4,4'-TRICHLOROBIPHENYL	0.37	0.24	0.22	0.28	0.05
CL5(126)	3,3',4,4',5-PENTACHLOROBIPHENYL	0.00	0.00	0.00	0.00	0.00
CL4(77)	3,3',4,4'-TETRACHLOROBIPHENYL	0.00	0.00	0.00	0.00	0.00
CL10(209)	DECACHLOROBIPHENYL	0.24	0.27	0.36	0.29	0.04
TOTAL PCB		**41.42**	**35.23**	**41.59**	**39.42**	**2.09**

Table B-1b. Summary of Mean Flounder Fillet Contamination Levels (ng/g dry wt)
1998 MWRA Flounder Survey - DDT

Deer Island DDTs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
O,P-DDD	1.81	1.36	1.44	1.53	0.14
O,P-DDE	0.00	0.00	0.00	0.00	0.00
O,P-DDT	0.83	0.56	0.82	0.74	0.09
P,P-DDD	3.70	2.37	3.65	3.24	0.44
P,P-DDE	22.02	18.99	25.02	22.01	1.74
P,P-DDT	2.46	2.05	3.11	2.54	0.31
DDMU*	0.00	0.39	0.30	0.23	0.12
TOTAL DDT	**30.82**	**25.32**	**34.04**	**30.06**	**2.54**

* DDMU not used in total DDT calculation.

Outfall DDTs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
O,P-DDD	0.29	1.10	0.64	0.68	0.23
O,P-DDE	0.00	0.00	0.00	0.00	0.00
O,P-DDT	0.00	0.56	0.37	0.31	0.16
P,P-DDD	0.50	1.83	1.03	1.12	0.38
P,P-DDE	4.18	14.72	8.50	9.13	3.06
P,P-DDT	0.36	1.58	1.26	1.07	0.37
DDMU*	0.23	0.09	0.21	0.18	0.04
TOTAL DDT	**5.33**	**19.79**	**11.79**	**12.30**	**4.18**

Cape Cod DDTs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
O,P-DDD	0.20	0.15	0.32	0.22	0.05
O,P-DDE	0.00	0.00	0.00	0.00	0.00
O,P-DDT	0.00	0.00	0.00	0.00	0.00
P,P-DDD	0.34	0.25	0.34	0.31	0.03
P,P-DDE	6.08	4.99	5.63	5.57	0.32
P,P-DDT	0.33	0.18	0.29	0.27	0.04
DDMU*	0.00	0.00	0.28	0.09	0.09
TOTAL DDT	**6.95**	**5.57**	**6.59**	**6.37**	**0.41**

Table B-1c. Summary of Mean Flounder Fillet Contamination Levels (ng/g dry wt)
1998 MWRA Flounder Survey - Chlordane

Deer Island Chlordanes					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CIS-CHLORDANE	6.33	4.67	6.72	5.91	0.63
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	0.35	0.26	0.42	0.34	0.05
TRANS_NONACHLOR	8.30	6.63	7.89	7.61	0.50
TOTAL CHLORDANE	**14.98**	**11.56**	**15.03**	**13.86**	**1.15**

Outfall Chlordanes					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CIS-CHLORDANE	1.01	3.19	1.76	1.99	0.64
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	0.06	0.22	0.19	0.16	0.05
TRANS_NONACHLOR	1.76	5.88	2.56	3.40	1.26
TOTAL CHLORDANE	**2.83**	**9.28**	**4.52**	**5.54**	**1.93**

Cape Cod Chlordanes					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CIS-CHLORDANE	0.47	0.38	0.37	0.41	0.03
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	0.11	0.08	0.07	0.09	0.01
TRANS_NONACHLOR	0.86	0.84	0.70	0.80	0.05
TOTAL CHLORDANE	**1.44**	**1.30**	**1.14**	**1.29**	**0.09**

Table B-1d. Summary of Mean Flounder Fillet Contamination Levels (ng/g dry wt)
1998 MWRA Flounder Survey - Pesticides

Deer Island PEST					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00
DIELDRIN	2.66	2.21	2.59	2.49	0.14
ENDRIN	0.35	0.33	0.45	0.38	0.04
HEXACHLOROBENZENE	0.69	0.62	0.67	0.66	0.02
LINDANE	0.16	0.13	0.16	0.15	0.01
MIREX	0.40	0.25	0.23	0.29	0.05

Outfall PEST					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00
DIELDRIN	0.61	1.71	1.17	1.16	0.32
ENDRIN	0.00	0.17	0.17	0.11	0.06
HEXACHLOROBENZENE	0.22	0.61	0.48	0.44	0.11
LINDANE	0.00	0.14	0.10	0.08	0.04
MIREX	0.15	0.35	0.14	0.21	0.07

Cape Cod PEST					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00
DIELDRIN	0.74	0.63	0.66	0.68	0.03
ENDRIN	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	0.48	0.33	0.34	0.38	0.05
LINDANE	0.09	0.09	0.00	0.06	0.03
MIREX	0.00	0.00	0.06	0.02	0.02

Table B-1e. Summary of Mean Flounder Fillet Contamination Levels (ug/g dry wt)
1998 MWRA Flounder Survey – Mercury (Hg)

Deer Island Hg					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
MERCURY	0.257	0.219	0.225	0.234	0.012

Outfall Hg					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
MERCURY	0.253	0.380	0.351	0.328	0.038

Cape Cod Hg					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
MERCURY	0.144	0.093	0.170	0.136	0.023

Table B-1f. Summary of Mean Flounder Fillet Contamination Levels (percent dry wt)
1998 MWRA Flounder Survey – Lipids and Percent Dry Weight

Deer island			
	1	**2**	**3**
Lipid (% Dry Wt)	6.00	14.00	3.00
Percent Dry Wt	16.85	18.10	20.82

Outfall			
	1	**2**	**3**
Lipids (% Dry Wt)	2.00	3.00	11.00
Percent Dry Wt	18.53	23.04	21.16

Cape Cod			
	1	**2**	**3**
Lipids (% Dry Wt)	9.00	5.00	6.00
Percent Dry Wt	22.66	22.80	20.38

Table B-1g. Summary of Mean Flounder Liver Contamination Levels (ng/g dry wt)
1998 MWRA Flounder Survey - PCB

Deer Island PCBs						
Parameter		**1**	**2**	**3**	**Mean**	**s.e.**
CL9(206)	2,2',3,3',4,4',5,5',6-NONACHLOROBIPHENYL	24.25	20.30	13.08	19.21	3.27
CL8(195)	2,2',3,3',4,4',5,6-OCTACHLOROBIPHENYL	23.99	17.39	13.02	18.13	3.19
CL7(170)	2,2',3,3',4,4',5-HEPTACHLOROBIPHENYL	158.29	87.10	81.18	108.86	24.77
CL6(128)	2,2',3,3',4,4'-HEXACHLOROBIPHENYL	102.62	54.24	46.22	67.69	17.61
CL7(180)	2,2',3,4,4',5,5'-HEPTACHLOROBIPHENYL	222.27	120.22	103.26	148.59	37.17
CL6(138)	2,2',3,4,4',5-HEXACHLOROBIPHENYL	1002.14	583.73	533.97	706.61	148.46
CL7(187)	2,2',3,4,5,5',6-HEPTACHLOROBIPHENYL	240.36	158.62	110.32	169.77	37.95
CL4(44)	2,2',3,5'-TETRACHLOROBIPHENYL	13.19	7.10	5.37	8.55	2.37
CL6(153)	2,2',4,4',5,5'-HEXACHLOROBIPHENYL	1173.39	697.64	619.38	830.14	173.11
CL5(101)	2,2',4,5,5'-PENTACHLOROBIPHENYL	246.84	164.74	104.47	172.02	41.26
CL4(52)	2,2',5,5'-TETRACHLOROBIPHENYL	35.62	25.03	17.59	26.08	5.23
CL3(18)	2,2',5-TRICHLOROBIPHENYL	5.97	3.06	5.09	4.71	0.86
CL5(118)	2,3',4,4',5-PENTACHLOROBIPHENYL	694.46	394.07	362.42	483.65	105.80
CL4(66)	2,3',4,4'-TETRACHLOROBIPHENYL	140.63	73.51	70.40	94.85	22.91
CL5(105)	2,3,3',4,4'-PENTACHLOROBIPHENYL	212.89	123.60	114.10	150.20	31.47
CL2(8)	2,4'-DICHLOROBIPHENYL	5.28	3.03	5.32	4.54	0.76
CL3(28)	2,4,4'-TRICHLOROBIPHENYL	46.90	22.79	28.04	32.58	7.32
CL5(126)	3,3',4,4',5-PENTACHLOROBIPHENYL	2.89	3.36	3.10	3.12	0.14
CL4(77)	3,3',4,4'-TETRACHLOROBIPHENYL	7.48	6.18	3.19	5.62	1.27
CL10(209)	DECACHLOROBIPHENYL	6.59	5.27	5.02	5.63	0.49
TOTAL PCB		**4366.0**	**2571.0**	**2244.6**	**3060.5**	**659.5**

Outfall PCBs						
Parameter		**1**	**2**	**3**	**Mean**	**s.e.**
CL9(206)	2,2',3,3',4,4',5,5',6-NONACHLOROBIPHENYL	30.30	13.70	12.43	18.81	5.76
CL8(195)	2,2',3,3',4,4',5,6-OCTACHLOROBIPHENYL	23.82	10.72	9.23	14.59	4.64
CL7(170)	2,2',3,3',4,4',5-HEPTACHLOROBIPHENYL	81.37	41.13	39.35	53.95	13.72
CL6(128)	2,2',3,3',4,4'-HEXACHLOROBIPHENYL	32.64	19.40	17.41	23.15	4.78
CL7(180)	2,2',3,4,4',5,5'-HEPTACHLOROBIPHENYL	110.84	53.29	47.02	70.38	20.31
CL6(138)	2,2',3,4,4',5-HEXACHLOROBIPHENYL	404.49	227.75	240.31	290.85	56.94
CL7(187)	2,2',3,4,5,5',6-HEPTACHLOROBIPHENYL	128.10	63.00	54.60	81.90	23.23
CL4(44)	2,2',3,5'-TETRACHLOROBIPHENYL	1.80	1.65	0.99	1.48	0.25
CL6(153)	2,2',4,4',5,5'-HEXACHLOROBIPHENYL	536.12	292.40	305.10	377.87	79.21
CL5(101)	2,2',4,5,5'-PENTACHLOROBIPHENYL	57.39	41.77	41.32	46.83	5.28
CL4(52)	2,2',5,5'-TETRACHLOROBIPHENYL	9.46	7.38	6.14	7.66	0.97
CL3(18)	2,2',5-TRICHLOROBIPHENYL	1.26	2.48	2.17	1.97	0.37
CL5(118)	2,3',4,4',5-PENTACHLOROBIPHENYL	211.70	130.55	162.41	168.22	23.60
CL4(66)	2,3',4,4'-TETRACHLOROBIPHENYL	33.85	25.98	27.24	29.02	2.44
CL5(105)	2,3,3',4,4'-PENTACHLOROBIPHENYL	62.23	41.00	46.28	49.84	6.38
CL2(8)	2,4'-DICHLOROBIPHENYL	0.00	0.00	0.00	0.00	0.00
CL3(28)	2,4,4'-TRICHLOROBIPHENYL	9.20	9.07	9.80	9.36	0.22
CL5(126)	3,3',4,4',5-PENTACHLOROBIPHENYL	2.19	2.04	0.00	1.41	0.71
CL4(77)	3,3',4,4'-TETRACHLOROBIPHENYL	2.50	1.60	2.00	2.03	0.26
CL10(209)	DECACHLOROBIPHENYL	9.76	5.00	5.37	6.71	1.53
TOTAL PCB		**1749.0**	**989.9**	**1029.2**	**1256.0**	**246.8**

Cape Cod PCBs						
Parameter		**1**	**2**	**3**	**Mean**	**s.e.**
CL9(206)	2,2',3,3',4,4',5,5',6-NONACHLOROBIPHENYL	4.30	4.09	4.61	4.33	0.15
CL8(195)	2,2',3,3',4,4',5,6-OCTACHLOROBIPHENYL	3.73	3.47	3.46	3.55	0.09
CL7(170)	2,2',3,3',4,4',5-HEPTACHLOROBIPHENYL	11.87	11.14	6.19	9.74	1.78
CL6(128)	2,2',3,3',4,4'-HEXACHLOROBIPHENYL	9.08	9.42	2.69	7.07	2.19
CL7(180)	2,2',3,4,4',5,5'-HEPTACHLOROBIPHENYL	80.55	50.56	38.03	56.38	12.61
CL6(138)	2,2',3,4,4',5-HEXACHLOROBIPHENYL	140.87	95.92	43.42	93.40	28.16
CL7(187)	2,2',3,4,5,5',6-HEPTACHLOROBIPHENYL	34.20	26.89	18.47	26.52	4.55
CL4(44)	2,2',3,5'-TETRACHLOROBIPHENYL	0.97	0.42	0.36	0.58	0.20
CL6(153)	2,2',4,4',5,5'-HEXACHLOROBIPHENYL	175.74	112.33	65.77	117.95	31.87
CL5(101)	2,2',4,5,5'-PENTACHLOROBIPHENYL	28.68	14.84	9.33	17.62	5.75
CL4(52)	2,2',5,5'-TETRACHLOROBIPHENYL	5.29	1.54	1.69	2.84	1.23
CL3(18)	2,2',5-TRICHLOROBIPHENYL	18.04	2.28	5.37	8.56	4.82
CL5(118)	2,3',4,4',5-PENTACHLOROBIPHENYL	114.31	60.79	27.64	67.58	25.25
CL4(66)	2,3',4,4'-TETRACHLOROBIPHENYL	16.93	6.82	3.81	9.19	3.97
CL5(105)	2,3,3',4,4'-PENTACHLOROBIPHENYL	27.93	16.56	6.04	16.84	6.32
CL2(8)	2,4'-DICHLOROBIPHENYL	0.00	0.00	0.00	0.00	0.00
CL3(28)	2,4,4'-TRICHLOROBIPHENYL	7.49	2.72	1.97	4.06	1.73
CL5(126)	3,3',4,4',5-PENTACHLOROBIPHENYL	0.00	0.00	0.00	0.00	0.00
CL4(77)	3,3',4,4'-TETRACHLOROBIPHENYL	0.00	0.00	0.00	0.00	0.00
CL10(209)	DECACHLOROBIPHENYL	2.21	1.92	2.32	2.15	0.12
TOTAL PCB		**682.2**	**421.7**	**241.2**	**448.4**	**128.0**

Table B-1h. Summary of Mean Flounder Liver Contamination Levels (ng/g dry wt)
1998 MWRA Flounder Survey - DDT

Deer Island DDTs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
O,P-DDD	23.31	14.98	13.35	17.22	3.09
O,P-DDE	0.00	0.00	0.00	0.00	0.00
O,P-DDT	13.17	4.28	3.59	7.01	3.08
P,P-DDD	60.94	28.81	31.48	40.41	10.29
P,P-DDE	440.24	224.77	203.70	289.57	75.58
P,P-DDT	42.30	18.97	21.49	27.59	7.39
DDMU*	8.71	13.51	3.21	8.48	2.98
TOTAL DDT	**579.97**	**291.82**	**273.61**	**381.80**	**99.23**

Outfall DDTs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
O,P-DDD	10.28	6.80	5.35	7.48	1.46
O,P-DDE	0.00	0.00	0.00	0.00	0.00
O,P-DDT	3.81	1.95	2.92	2.89	0.54
P,P-DDD	12.72	9.80	9.82	10.78	0.97
P,P-DDE	128.81	80.02	96.97	101.93	14.30
P,P-DDT	10.02	9.60	8.41	9.34	0.48
DDMU*	1.83	1.26	0.87	1.32	0.28
TOTAL DDT	**165.65**	**108.17**	**123.47**	**132.43**	**17.18**

Cape Cod DDTs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
O,P-DDD	4.45	2.54	1.58	2.86	0.84
O,P-DDE	0.00	0.00	0.00	0.00	0.00
O,P-DDT	0.99	0.00	0.00	0.33	0.33
P,P-DDD	5.97	3.01	1.72	3.57	1.26
P,P-DDE	90.79	54.25	24.09	56.38	19.28
P,P-DDT	2.40	1.04	1.14	1.53	0.44
DDMU*	0.00	0.91	0.00	0.30	0.30
TOTAL DDT	**104.60**	**60.84**	**28.54**	**64.66**	**22.04**

*DDMU not included in total DDT calculation.

Table B-1i. Summary of Mean Flounder Liver Contamination Levels (ng/g dry wt)
1998 MWRA Flounder Survey - Chlordane

Deer Island Chlordanes					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CIS-CHLORDANE	121.15	48.07	54.59	74.60	23.35
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	4.53	2.44	3.99	3.65	0.63
TRANS_NONACHLOR	160.38	68.86	64.29	97.84	31.30
TOTAL CHLORDANE	**286.07**	**119.37**	**122.86**	**176.10**	**54.99**

Outfall Chlordanes					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CIS-CHLORDANE	23.53	18.27	16.39	19.40	2.14
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	1.56	1.51	1.33	1.47	0.07
TRANS_NONACHLOR	38.35	30.92	22.11	30.46	4.69
TOTAL CHLORDANE	**63.44**	**50.70**	**39.84**	**51.33**	**6.82**

Cape Cod Chlordanes					
Paremeter	**1**	**2**	**3**	**Mean**	**s.e.**
CIS-CHLORDANE	5.93	4.18	1.92	4.01	1.16
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	1.00	0.54	0.44	0.66	0.17
TRANS_NONACHLOR	9.98	8.54	3.07	7.20	2.11
TOTAL CHLORDANE	**16.91**	**13.26**	**5.43**	**11.87**	**3.39**

Table B-1j. Summary of Mean Flounder Liver Contamination Levels (ng/g dry wt)
1998 MWRA Flounder Survey - Pesticides

Deer Island PEST					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00
DIELDRIN	30.98	19.46	21.93	24.12	3.50
ENDRIN	7.06	4.11	5.36	5.51	0.86
HEXACHLOROBENZENE	7.86	5.56	6.18	6.53	0.69
LINDANE	0.83	0.53	0.64	0.67	0.09
MIREX	4.69	2.97	2.80	3.49	0.60

Outfall PEST					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00
DIELDRIN	11.25	9.31	9.20	9.92	0.67
ENDRIN	1.94	1.83	1.49	1.75	0.14
HEXACHLOROBENZENE	6.11	3.40	4.57	4.69	0.78
LINDANE	0.00	0.00	0.00	0.00	0.00
MIREX	5.92	1.38	1.32	2.87	1.52

Cape Cod PEST					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00
DIELDRIN	7.66	4.82	2.19	4.89	1.58
ENDRIN	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	6.97	2.35	1.87	3.73	1.63
LINDANE	0.00	0.22	0.16	0.13	0.07
MIREX	0.00	0.67	0.72	0.46	0.23

Table B-1k. Summary of Mean Flounder Liver Contamination Levels (ng/g dry wt)
1998 MWRA Flounder Survey – Low Molecular Weight PAHs

Deer Island LMW PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
1-METHYLNAPHTHALENE*	5.69	6.66	7.07	6.47	0.41
1-METHYLPHENANTHRENE*	0.00	0.00	0.00	0.00	0.00
2,3,5-TRIMETHYLNAPHTHALENE*	3.04	0.00	0.00	1.01	1.01
2,6-DIMETHYLNAPHTHALENE*	4.51	4.16	0.00	2.89	1.45
2-METHYLNAPHTHALENE*	9.65	9.59	7.17	8.81	0.82
ACENAPHTHENE	5.61	3.93	5.54	5.03	0.55
ACENAPHTHYLENE	0.00	0.00	0.00	0.00	0.00
ANTHRACENE	1.65	0.00	0.00	0.55	0.55
BENZOTHIAZOLE*	5.88	6.80	7.35	6.67	0.43
BIPHENYL	5.25	4.91	4.04	4.73	0.36
C1-DIBENZOTHIOPHENES	0.00	0.00	0.00	0.00	0.00
C1-FLUORENES	0.00	0.00	0.00	0.00	0.00
C1-NAPHTHALENES	12.05	12.56	11.08	11.90	0.43
C1-PHENANTHRENES/ANTHRACENES	0.00	0.00	0.00	0.00	0.00
C2-DIBENZOTHIOPHENES	0.00	0.00	0.00	0.00	0.00
C2-FLUORENES	0.00	0.00	0.00	0.00	0.00
C2-NAPHTHALENES	18.58	9.77	0.00	9.45	5.37
C2-PHENANTHRENES/ANTHRACENES	0.00	0.00	0.00	0.00	0.00
C3-DIBENZOTHIOPHENES	0.00	0.00	0.00	0.00	0.00
C3-FLUORENES	0.00	0.00	0.00	0.00	0.00
C3-NAPHTHALENES	11.57	0.00	0.00	3.86	3.86
C3-PHENANTHRENES/ANTHRACENES	0.00	0.00	0.00	0.00	0.00
C4-NAPHTHALENES	0.00	0.00	0.00	0.00	0.00
C4-PHENANTHRENES/ANTHRACENES	0.00	0.00	0.00	0.00	0.00
DIBENZOFURAN	7.55	5.16	6.92	6.54	0.71
DIBENZOTHIOPHENE	2.20	0.82	0.00	1.01	0.64
FLUORENE	4.73	1.83	2.11	2.89	0.92
NAPHTHALENE	18.00	19.21	18.60	18.60	0.35
PHENANTHRENE	6.11	4.30	5.22	5.21	0.52
Total LMW PAH	**93.31**	**62.49**	**53.50**	**69.77**	**12.05**

Outfall LMW PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
1-METHYLNAPHTHALENE*	5.81	3.88	3.53	4.40	0.71
1-METHYLPHENANTHRENE*	0.00	0.00	0.00	0.00	0.00
2,3,5-TRIMETHYLNAPHTHALENE*	0.00	0.00	0.00	0.00	0.00
2,6-DIMETHYLNAPHTHALENE*	2.59	0.00	2.58	1.72	0.86
2-METHYLNAPHTHALENE*	9.01	5.59	6.25	6.95	1.05
ACENAPHTHENE	0.00	2.09	0.00	0.70	0.70
ACENAPHTHYLENE	1.94	0.00	0.00	0.65	0.65
ANTHRACENE	0.00	0.00	0.00	0.00	0.00
BENZOTHIAZOLE*	6.99	4.13	8.06	6.40	1.17
BIPHENYL	6.06	2.80	2.92	3.93	1.07
C1-DIBENZOTHIOPHENES	0.00	0.00	0.00	0.00	0.00
C1-FLUORENES	0.00	0.00	0.00	0.00	0.00
C1-NAPHTHALENES	10.73	9.14	10.91	10.26	0.56
C1-PHENANTHRENES/ANTHRACENES	0.00	0.00	0.00	0.00	0.00
C2-DIBENZOTHIOPHENES	0.00	0.00	0.00	0.00	0.00
C2-FLUORENES	0.00	0.00	0.00	0.00	0.00
C2-NAPHTHALENES	10.16	0.00	7.64	5.93	3.05
C2-PHENANTHRENES/ANTHRACENES	0.00	0.00	0.00	0.00	0.00
C3-DIBENZOTHIOPHENES	0.00	0.00	0.00	0.00	0.00
C3-FLUORENES	0.00	0.00	0.00	0.00	0.00
C3-NAPHTHALENES	0.00	0.00	0.00	0.00	0.00
C3-PHENANTHRENES/ANTHRACENES	0.00	0.00	0.00	0.00	0.00
C4-NAPHTHALENES	0.00	0.00	0.00	0.00	0.00
C4-PHENANTHRENES/ANTHRACENES	0.00	0.00	0.00	0.00	0.00
DIBENZOFURAN	5.00	3.11	3.77	3.96	0.55
DIBENZOTHIOPHENE	0.00	1.30	0.00	0.43	0.43
FLUORENE	2.05	0.00	1.43	1.16	0.61
NAPHTHALENE	22.46	12.64	9.67	14.92	3.87
PHENANTHRENE	5.01	3.75	2.96	3.91	0.60
Total LMW PAH	**63.42**	**34.84**	**39.30**	**45.85**	**8.88**

*Individual alkylated PAHs and benzothiazole not included in calculations of total PAH.

Table B-1l. Summary of Mean Flounder Liver Contamination Levels (ng/g dry wt) 1998 MWRA Flounder Survey – Low Molecular Weight PAHs (continued)

Cape Cod LMW PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
1-METHYLNAPHTHALENE*	4.30	3.18	1.13	2.87	0.93
1-METHYLPHENANTHRENE*	0.00	0.00	0.00	0.00	0.00
2,3,5-TRIMETHYLNAPHTHALENE*	0.00	0.00	0.00	0.00	0.00
2,6-DIMETHYLNAPHTHALENE*	0.00	2.30	0.00	0.77	0.77
2-METHYLNAPHTHALENE*	5.90	4.47	2.02	4.13	1.13
ACENAPHTHENE	0.00	0.97	0.00	0.32	0.32
ACENAPHTHYLENE	0.00	0.00	0.00	0.00	0.00
ANTHRACENE	0.00	0.00	0.00	0.00	0.00
BENZOTHIAZOLE*	15.60	4.51	4.56	8.22	3.69
BIPHENYL	4.38	2.17	1.44	2.67	0.89
C1-DIBENZOTHIOPHENES	0.00	0.00	0.00	0.00	0.00
C1-FLUORENES	0.00	0.00	0.00	0.00	0.00
C1-NAPHTHALENES	13.15	8.39	4.67	8.74	2.46
C1-PHENANTHRENES/ANTHRACENES	0.00	0.00	0.00	0.00	0.00
C2-DIBENZOTHIOPHENES	0.00	0.00	0.00	0.00	0.00
C2-FLUORENES	0.00	0.00	0.00	0.00	0.00
C2-NAPHTHALENES	0.00	9.40	0.00	3.13	3.13
C2-PHENANTHRENES/ANTHRACENES	0.00	0.00	0.00	0.00	0.00
C3-DIBENZOTHIOPHENES	0.00	0.00	0.00	0.00	0.00
C3-FLUORENES	0.00	0.00	0.00	0.00	0.00
C3-NAPHTHALENES	0.00	0.00	0.00	0.00	0.00
C3-PHENANTHRENES/ANTHRACENES	0.00	0.00	0.00	0.00	0.00
C4-NAPHTHALENES	0.00	0.00	0.00	0.00	0.00
C4-PHENANTHRENES/ANTHRACENES	0.00	0.00	0.00	0.00	0.00
DIBENZOFURAN	4.36	2.40	1.39	2.72	0.87
DIBENZOTHIOPHENE	0.00	0.00	0.00	0.00	0.00
FLUORENE	0.00	0.80	0.45	0.42	0.23
NAPHTHALENE	17.70	11.04	6.93	11.89	3.14
PHENANTHRENE	4.16	2.73	1.33	2.74	0.82
Total LMW PAH	**43.76**	**37.90**	**16.21**	**32.62**	**8.38**

*Individual alkylated PAHs and benzothiazole not included in calculations of total PAH.

Table B-1m. Summary of Mean Flounder Liver Contamination Levels (ng/g dry wt)
1998 MWRA Flounder Survey – HMW PAH

Deer Island HMW PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
BENZ(A)ANTHRACENE	0.00	0.00	0.00	0.00	0.00
BENZO(A)PYRENE	0.00	0.00	0.00	0.00	0.00
BENZO(B)FLUORANTHENE	0.00	0.00	0.00	0.00	0.00
BENZO(E)PYRENE	0.00	0.00	0.00	0.00	0.00
BENZO(G,H,I)PERYLENE	0.00	0.00	0.00	0.00	0.00
BENZO(K)FLUORANTHENE	0.00	0.00	0.00	0.00	0.00
C1-CHRYSENES**	0.00	0.00	0.00	0.00	0.00
C1-FLUORANTHRENES/PYRENES**	0.00	0.00	0.00	0.00	0.00
C2-CHRYSENES**	0.00	0.00	0.00	0.00	0.00
C2-FLUORANTHENES/PYRENES**	0.00	0.00	0.00	0.00	0.00
C3-CHRYSENES**	0.00	0.00	0.00	0.00	0.00
C3-FLUORANTHENES/PYRENES**	0.00	0.00	0.00	0.00	0.00
C4-CHRYSENES**	0.00	0.00	0.00	0.00	0.00
CHRYSENE	3.11	0.00	0.00	1.04	1.04
DIBENZO(A,H)ANTHRACENE	0.00	0.00	0.00	0.00	0.00
FLUORANTHENE	3.86	2.71	3.45	3.34	0.34
INDENO(1,2,3-C,D)PYRENE	0.00	0.00	0.00	0.00	0.00
PERYLENE	0.00	0.00	0.00	0.00	0.00
PYRENE	2.09	1.84	2.60	2.17	0.22
Total HMW PAH	**9.06**	**4.54**	**6.05**	6.55	1.33
Deer Island Total PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
TOTAL PAH	**102.36**	**62.03**	**59.55**	**76.51**	**13.20**

**Not NOAA

Outfall HMW PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
BENZ(A)ANTHRACENE	0.00	0.00	0.00	0.00	0.00
BENZO(A)PYRENE	0.00	0.00	0.00	0.00	0.00
BENZO(B)FLUORANTHENE	0.00	0.00	0.00	0.00	0.00
BENZO(E)PYRENE	0.00	0.00	0.00	0.00	0.00
BENZO(G,H,I)PERYLENE	0.00	0.00	0.00	0.00	0.00
BENZO(K)FLUORANTHENE	0.00	0.00	0.00	0.00	0.00
C1-CHRYSENES	0.00	0.00	0.00	0.00	0.00
C1-FLUORANTHRENES/PYRENES	0.00	0.00	0.00	0.00	0.00
C2-CHRYSENES	0.00	0.00	0.00	0.00	0.00
C2-FLUORANTHENES/PYRENES	0.00	0.00	0.00	0.00	0.00
C3-CHRYSENES	0.00	0.00	0.00	0.00	0.00
C3-FLUORANTHENES/PYRENES	0.00	0.00	0.00	0.00	0.00
C4-CHRYSENES	0.00	0.00	0.00	0.00	0.00
CHRYSENE	0.00	1.58	0.00	0.53	0.53
DIBENZO(A,H)ANTHRACENE	0.00	0.00	0.00	0.00	0.00
FLUORANTHENE	2.56	2.33	1.12	2.01	0.45
INDENO(1,2,3-C,D)PYRENE	0.00	0.00	0.00	0.00	0.00
PERYLENE	0.00	0.00	0.00	0.00	0.00
PYRENE	1.61	1.50	0.00	1.04	0.52
Total HMW PAH	**4.18**	**5.42**	**1.12**	3.57	1.28
Outfall Total PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
TOTAL PAH	**67.59**	**40.26**	**40.42**	**49.42**	**9.08**

Table B-1n. Summary of Mean Flounder Liver Contamination Levels (ng/g dry wt) 1998 MWRA Flounder Survey – HMW PAH (continued)

Cape Cod HMW PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
BENZ(A)ANTHRACENE	0.00	0.00	0.00	0.00	0.00
BENZO(A)PYRENE	0.00	0.00	0.00	0.00	0.00
BENZO(B)FLUORANTHENE	0.00	0.00	0.00	0.00	0.00
BENZO(E)PYRENE	0.00	0.00	0.00	0.00	0.00
BENZO(G,H,I)PERYLENE	0.00	0.00	0.00	0.00	0.00
BENZO(K)FLUORANTHENE	0.00	0.00	0.00	0.00	0.00
C1-CHRYSENES	0.00	0.00	0.00	0.00	0.00
C1-FLUORANTHRENES/PYRENES	0.00	0.00	0.00	0.00	0.00
C2-CHRYSENES	0.00	0.00	0.00	0.00	0.00
C2-FLUORANTHENES/PYRENES	0.00	0.00	0.00	0.00	0.00
C3-CHRYSENES	0.00	0.00	0.00	0.00	0.00
C3-FLUORANTHENES/PYRENES	0.00	0.00	0.00	0.00	0.00
C4-CHRYSENES	0.00	0.00	0.00	0.00	0.00
CHRYSENE	0.00	0.00	0.00	0.00	0.00
DIBENZO(A,H)ANTHRACENE	0.00	0.00	0.00	0.00	0.00
FLUORANTHENE	0.00	2.75	0.00	0.92	0.92
INDENO(1,2,3-C,D)PYRENE	0.00	0.00	0.00	0.00	0.00
PERYLENE	0.00	0.00	0.00	0.00	0.00
PYRENE	0.00	1.31	0.94	0.75	0.39
Total HMW PAH	**0.00**	**4.06**	**0.94**	1.67	1.23
Cape Cod Total PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
TOTAL PAH	**43.76**	**41.96**	**17.15**	**34.29**	**8.59**

Table B-1o. Summary of Mean Flounder Liver Contamination Levels(ug/g dry wt)
1998 MWRA Flounder Survey – Metals

Deer Island Metals					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
SILVER	1.12	2.73	3.79	2.55	0.78
CADMIUM	0.48	0.83	0.66	0.66	0.10
CHROMIUM	0.63	0.25	0.19	0.36	0.14
COPPER	26.30	42.81	58.53	42.55	9.30
MERCURY	0.204	0.288	0.320	0.27	0.03
NICKEL	0.26	1.16	0.33	0.58	0.29
LEAD	2.09	2.58	2.76	2.47	0.20
ZINC	107.80	107.90	103.08	106.26	1.59

Outfall Metals					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
SILVER	4.77	9.38	6.91	7.02	1.33
CADMIUM	0.67	1.64	1.34	1.22	0.29
CHROMIUM	0.26	0.19	0.11	0.19	0.04
COPPER	71.85	130.74	72.22	91.60	19.57
MERCURY	0.313	0.416	0.428	0.39	0.04
NICKEL	0.54	0.76	0.61	0.64	0.07
LEAD	4.47	3.82	3.17	3.82	0.37
ZINC	134.01	104.00	102.89	113.63	10.19

Cape Cod Metals					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
SILVER	7.17	3.43	10.10	6.90	1.93
CADMIUM	1.77	0.72	2.47	1.65	0.51
CHROMIUM	0.10	0.05	0.08	0.08	0.01
COPPER	128.89	92.81	194.83	138.85	29.87
MERCURY	0.305	0.189	0.304	0.27	0.04
NICKEL	0.89	0.38	0.72	0.66	0.15
LEAD	2.70	1.28	2.86	2.28	0.50
ZINC	137.68	146.24	159.32	147.75	6.29

Table B-1p. Summary of Mean Flounder Liver Contamination Levels(percent dry wt)
1998 MWRA Flounder Survey – Lipids and Percent Dry Weight

Deer Island			
	1	**2**	**3**
Lipids (% Dry wt)	51	54	57
Percent Dry Wt	21.43	21.7	18.48

Outfall			
	1	**2**	**3**
Lipids (% Dry Wt)	65	42	29
Percent Dry Wt	20.61	27.72	29.1

Cape Cod			
	1	**2**	**3**
Lipids (% Dry Wt)	42	25	20
Percent Dry Wt	22.88	31.46	48.61

Table B-2a. Summary of Mean Lobster Meat Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Lobster Survey - PCB

Deer Island PCBs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CL9(206)	0.27	0.42	0.38	0.36	0.04
CL8(195)	0.44	0.55	0.42	0.47	0.04
CL7(170)	3.21	0.00	0.00	1.07	1.07
CL6(128)	4.33	5.11	3.59	4.34	0.44
CL7(180)	6.85	7.32	5.66	6.61	0.49
CL6(138)	22.64	26.65	18.95	22.75	2.23
CL7(187)	6.73	7.47	5.65	6.62	0.53
CL4(44)	0.00	0.00	0.00	0.00	0.00
CL6(153)	23.13	26.39	19.72	23.08	1.93
CL5(101)	3.58	2.82	2.23	2.88	0.39
CL4(52)	1.66	2.31	2.06	2.01	0.19
CL3(18)	0.24	0.27	0.20	0.24	0.02
CL5(118)	21.66	28.61	19.81	23.36	2.68
CL4(66)	7.11	9.75	6.09	7.65	1.09
CL5(105)	7.56	9.68	6.93	8.06	0.83
CL2(8)	0.00	0.00	0.00	0.00	0.00
CL3(28)	2.36	4.13	2.08	2.86	0.64
CL5(126)	0.00	0.00	0.00	0.00	0.00
CL4(77)	0.00	0.00	0.00	0.00	0.00
CL10(209)	0.76	0.65	0.45	0.62	0.09
TOTAL PCB	**112.53**	**132.12**	**94.23**	**112.96**	**10.94**

Outfall PCBs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CL9(206)	1.52	1.51	0.77	1.27	0.25
CL8(195)	1.07	0.74	0.55	0.79	0.15
CL7(170)	2.67	0.00	0.00	0.89	0.89
CL6(128)	3.57	1.87	2.64	2.69	0.49
CL7(180)	5.88	4.39	4.41	4.89	0.49
CL6(138)	15.95	9.38	13.14	12.82	1.90
CL7(187)	6.26	4.21	5.01	5.16	0.60
CL4(44)	0.48	0.00	0.00	0.16	0.16
CL6(153)	18.16	12.18	15.69	15.35	1.74
CL5(101)	2.18	1.39	1.53	1.70	0.24
CL4(52)	1.39	0.00	1.43	0.94	0.47
CL3(18)	0.71	0.00	0.00	0.24	0.24
CL5(118)	17.51	11.78	13.55	14.28	1.69
CL4(66)	5.03	3.23	4.89	4.39	0.58
CL5(105)	4.91	2.92	3.94	3.92	0.57
CL2(8)	1.60	0.00	0.00	0.53	0.53
CL3(28)	2.23	0.00	0.00	0.74	0.74
CL5(126)	0.00	0.00	0.00	0.00	0.00
CL4(77)	0.00	0.00	0.00	0.00	0.00
CL10(209)	1.32	1.20	0.67	1.06	0.20
TOTAL PCB	**92.45**	**54.82**	**68.22**	**71.83**	**11.01**

Cape Cod PCBs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CL9(206)	0.34	0.17	0.38	0.30	0.06
CL8(195)	0.56	0.37	0.48	0.47	0.06
CL7(170)	0.00	0.00	0.00	0.00	0.00
CL6(128)	2.56	1.66	2.36	2.19	0.27
CL7(180)	3.87	2.44	3.13	3.15	0.41
CL6(138)	12.77	8.66	12.00	11.14	1.26
CL7(187)	5.53	3.81	5.14	4.82	0.52
CL4(44)	0.00	0.00	0.00	0.00	0.00
CL6(153)	15.36	10.35	14.52	13.41	1.55
CL5(101)	1.17	0.95	1.21	1.11	0.08
CL4(52)	1.12	0.00	0.98	0.70	0.35
CL3(18)	0.00	0.34	0.29	0.21	0.11
CL5(118)	12.14	9.83	10.58	10.85	0.68
CL4(66)	2.08	1.68	2.15	1.97	0.15
CL5(105)	3.04	1.86	2.56	2.49	0.34
CL2(8)	0.00	1.12	1.29	0.80	0.40
CL3(28)	0.63	0.64	0.70	0.66	0.02
CL5(126)	0.00	0.00	0.00	0.00	0.00
CL4(77)	0.00	0.00	0.00	0.00	0.00
CL10(209)	0.64	0.49	0.72	0.62	0.07
TOTAL PCB	**61.80**	**44.37**	**58.53**	**54.90**	**5.35**

Table B-2b. Summary of Mean Lobster Meat Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Lobster Survey - DDT

Deer Island DDTs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
O,P-DDD	0.23	0.00	0.00	0.08	0.08
O,P-DDE	0.00	0.00	0.00	0.00	0.00
O,P-DDT	0.00	0.00	0.00	0.00	0.00
P,P-DDD	1.25	1.99	1.46	1.57	0.22
P,P-DDE	10.02	10.32	8.75	9.70	0.48
P,P-DDT	0.11	0.00	0.00	0.04	0.04
DDMU*	0.67	0.78	0.00	0.48	0.24
TOTAL DDT	**11.61**	**12.31**	**10.21**	**11.37**	**0.62**

* DDMU not included in total DDT calculation.

Outfall DDTs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
O,P-DDD	0.45	0.00	0.26	0.23	0.13
O,P-DDE	0.00	0.00	0.00	0.00	0.00
O,P-DDT	0.00	0.00	0.00	0.00	0.00
P,P-DDD	1.19	0.57	1.13	0.96	0.20
P,P-DDE	9.14	5.72	7.77	7.54	0.99
P,P-DDT	0.39	0.00	0.15	0.18	0.11
DDMU*	0.00	0.00	0.00	0.00	0.00
TOTAL DDT	**11.16**	**6.28**	**9.30**	**8.91**	**1.42**

Cape Cod DDTs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
O,P-DDD	0.26	0.00	0.14	0.13	0.07
O,P-DDE	0.00	0.00	0.00	0.00	0.00
O,P-DDT	0.00	0.00	0.00	0.00	0.00
P,P-DDD	1.15	0.61	1.07	0.94	0.17
P,P-DDE	9.89	6.33	9.34	8.52	1.11
P,P-DDT	0.12	0.00	0.15	0.09	0.05
DDMU*	0.74	0.00	0.52	0.42	0.22
TOTAL DDT	**11.41**	**6.94**	**10.71**	**9.69**	**1.39**

Table B-2c. Summary of Mean Lobster Meat Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Lobster Survey - Chlordanes

Deer Island Chlordanes					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CIS-CHLORDANE	3.53	2.01	2.14	2.56	0.48
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	0.11	0.07	0.00	0.06	0.03
TRANS_NONACHLOR	1.45	1.71	1.45	1.54	0.09
TOTAL CHLORDANE	**5.09**	**3.80**	**3.59**	**4.16**	**0.47**

Outfall Chlordanes					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CIS-CHLORDANE	2.60	0.77	1.56	1.64	0.53
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	0.35	0.22	0.17	0.24	0.05
TRANS_NONACHLOR	1.30	0.87	1.03	1.06	0.13
TOTAL CHLORDANE	**4.24**	**1.85**	**2.75**	**2.95**	**0.70**

Cape Cod Chlordanes					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CIS-CHLORDANE	0.89	0.98	0.93	0.93	0.03
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	0.19	0.20	0.20	0.19	0.00
TRANS_NONACHLOR	0.68	0.45	0.51	0.55	0.07
TOTAL CHLORDANE	**1.76**	**1.63**	**1.64**	**1.68**	**0.04**

Table B-2d. Summary of Mean Lobster Meat Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Lobster Survey - Pesticides

Deer Island PEST					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00
DIELDRIN	3.57	4.23	3.43	3.75	0.25
ENDRIN	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	0.41	0.39	0.46	0.42	0.02
LINDANE	0.00	0.00	0.00	0.00	0.00
MIREX	0.00	0.00	0.00	0.00	0.00

Outfall PEST					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00
DIELDRIN	3.69	3.85	3.89	3.81	0.06
ENDRIN	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	0.96	0.55	0.56	0.69	0.13
LINDANE	2.62	0.00	0.00	0.87	0.87
MIREX	0.25	0.00	0.19	0.15	0.07

Cape Cod PEST					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00
DIELDRIN	2.22	2.54	2.38	2.38	0.09
ENDRIN	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	0.54	0.51	0.54	0.53	0.01
LINDANE	0.00	2.68	0.00	0.89	0.89
MIREX	0.17	0.14	0.00	0.10	0.05

Table B-2e. Summary of Mean Lobster Meat Tissue Contaminants Level (ug/g dry wt)
1998 MWRA Lobster Survey - Mercury

Deer Island Hg					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
MERCURY	0.71	0.78	0.81	0.77	0.03

Outfall Hg					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
MERCURY	0.87	1.03	1.08	0.99	0.06

Cape Cod Hg					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
MERCURY	0.67	0.61	0.51	0.60	0.05

Table B-2f. Summary of Mean Lobster Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Lobster Survey – Hepatopancreas PCBs

Deer Island PCBs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CL9(206)	18.78	17.45	22.47	19.56	1.50
CL8(195)	30.46	28.21	31.04	29.90	0.86
CL7(170)	250.01	212.41	210.62	224.34	12.84
CL6(128)	279.11	271.81	249.09	266.67	9.04
CL7(180)	597.05	560.58	831.67	663.10	84.94
CL6(138)	1899.46	1742.23	1636.69	1759.46	76.34
CL7(187)	479.75	431.47	421.17	444.13	18.06
CL4(44)	9.25	13.53	12.86	11.88	1.33
CL6(153)	1933.17	1725.98	1703.25	1787.47	73.15
CL5(101)	62.58	50.64	99.68	70.97	14.76
CL4(52)	59.60	72.76	76.88	69.75	5.21
CL3(18)	0.00	4.76	7.14	3.97	2.10
CL5(118)	1487.89	1471.80	1300.11	1419.93	60.09
CL4(66)	325.69	357.07	301.21	327.99	16.17
CL5(105)	470.93	462.72	403.85	445.83	21.13
CL2(8)	0.00	0.00	0.00	0.00	0.00
CL3(28)	114.80	145.68	112.72	124.40	10.66
CL5(126)	0.00	0.00	0.00	0.00	0.00
CL4(77)	32.32	44.38	29.69	35.47	4.52
CL10(209)	18.77	11.62	23.29	17.89	3.40
TOTAL PCB	**8069.6**	**7625.1**	**7473.4**	**7722.7**	**178.9**

Outfall PCBs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CL9(206)	62.35	70.65	34.10	55.70	11.06
CL8(195)	49.79	50.47	31.15	43.80	6.33
CL7(170)	195.48	186.01	154.63	178.71	12.34
CL6(128)	206.45	178.12	198.29	194.29	8.42
CL7(180)	466.85	609.87	433.42	503.38	54.11
CL6(138)	1170.84	1376.01	1283.89	1276.91	59.33
CL7(187)	430.30	564.64	438.21	477.72	43.52
CL4(44)	4.08	3.78	7.21	5.02	1.10
CL6(153)	1512.61	1747.23	1629.97	1629.94	67.73
CL5(101)	66.48	41.35	42.23	50.02	8.23
CL4(52)	82.04	34.73	39.85	52.21	14.99
CL3(18)	0.00	0.00	0.00	0.00	0.00
CL5(118)	823.69	1019.85	988.51	944.02	60.84
CL4(66)	230.06	151.98	194.25	192.10	22.57
CL5(105)	226.14	356.96	297.37	293.49	37.81
CL2(8)	0.00	2.82	3.13	1.98	1.00
CL3(28)	111.98	39.56	51.93	67.82	22.37
CL5(126)	6.74	0.00	6.03	4.26	2.14
CL4(77)	0.00	0.00	0.00	0.00	0.00
CL10(209)	35.44	40.34	20.74	32.17	5.89
TOTAL PCB	**5681.3**	**6474.4**	**5854.9**	**6003.5**	**240.7**

Cape Cod PCBs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CL9(206)	29.96	34.07	30.54	31.52	1.28
CL8(195)	27.32	27.48	27.40	27.40	0.05
CL7(170)	116.38	136.12	118.01	123.51	6.33
CL6(128)	135.59	137.88	140.61	138.03	1.45
CL7(180)	199.89	264.81	213.29	226.00	19.79
CL6(138)	730.20	858.41	759.90	782.84	38.75
CL7(187)	347.62	376.49	306.73	343.61	20.24
CL4(44)	0.00	0.00	0.00	0.00	0.00
CL6(153)	878.23	1022.08	913.13	937.81	43.32
CL5(101)	13.12	14.44	26.91	18.16	4.39
CL4(52)	2.80	2.12	2.62	2.51	0.20
CL3(18)	0.00	0.00	0.00	0.00	0.00
CL5(118)	492.74	569.30	506.05	522.70	23.62
CL4(66)	57.18	57.25	81.64	65.36	8.14
CL5(105)	136.24	164.08	122.09	140.80	12.33
CL2(8)	6.73	0.00	0.00	2.24	2.24
CL3(28)	17.04	17.91	23.47	19.47	2.01
CL5(126)	0.00	0.00	6.94	2.31	2.31
CL4(77)	0.00	0.00	0.00	0.00	0.00
CL10(209)	22.15	32.84	21.70	25.56	3.64
TOTAL PCB	**3213.2**	**3715.3**	**3301.0**	**3409.8**	**154.8**

Table B-2g. Summary of Mean Lobster Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Lobster Survey – Hepatopancreas DDTs

Deer Island DDTs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
O,P-DDD	15.22	17.33	17.63	16.73	0.76
O,P-DDE	91.61	91.69	66.44	83.25	8.40
O,P-DDT	0.00	0.00	0.00	0.00	0.00
P,P-DDD	116.38	142.60	131.92	130.30	7.61
P,P-DDE	911.71	802.88	861.11	858.57	31.44
P,P-DDT	21.05	13.52	15.83	16.80	2.23
DDMU*	0.00	0.00	0.00	0.00	0.00
TOTAL DDT	**1156.0**	**1068.0**	**1092.9**	**1105.6**	**26.2**

*DDMU not used in total DDT calculation.

Outfall DDTs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
O,P-DDD	16.10	14.96	12.24	14.43	1.15
O,P-DDE	7.58	5.56	7.48	6.87	0.66
O,P-DDT	0.00	0.00	0.00	0.00	0.00
P,P-DDD	60.27	60.84	76.16	65.76	5.20
P,P-DDE	784.36	1048.25	937.41	923.34	76.50
P,P-DDT	26.99	22.79	19.55	23.11	2.15
DDMU*	22.23	0.00	32.10	18.11	9.49
TOTAL DDT	**895.3**	**1152.4**	**1052.8**	**1033.5**	**74.8**

Cape Cod DDTs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
O,P-DDD	6.69	6.24	11.94	8.29	1.83
O,P-DDE	3.82	2.80	3.68	3.43	0.32
O,P-DDT	0.00	0.00	0.00	0.00	0.00
P,P-DDD	41.37	37.68	60.89	46.65	7.20
P,P-DDE	647.62	731.45	666.45	681.84	25.39
P,P-DDT	17.86	18.91	26.39	21.05	2.69
DDMU*	0.00	0.00	0.00	0.00	0.00
TOTAL DDT	**717.4**	**797.1**	**769.4**	**761.3**	**23.4**

Table B-2h. Summary of Mean Lobster Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Lobster Survey – Hepatopancreas Chlordanes

Deer Island Chlordanes					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CIS-CHLORDANE	116.94	126.84	106.35	116.71	5.91
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	0.00	0.00	0.00	0.00	0.00
TRANS_NONACHLOR	114.00	116.10	121.22	117.11	2.14
TOTAL CHLORDANE	**230.9**	**242.9**	**227.6**	**233.8**	**4.7**

Outfall Chlordanes					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CIS-CHLORDANE	31.60	27.57	28.25	29.14	1.25
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	3.73	4.09	5.17	4.33	0.43
TRANS_NONACHLOR	69.92	53.07	58.21	60.40	4.99
TOTAL CHLORDANE	**105.2**	**84.7**	**91.6**	**93.9**	**6.0**

Cape Cod Chlordanes					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CIS-CHLORDANE	13.96	13.09	18.63	15.23	1.72
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	1.28	1.07	2.10	1.48	0.31
TRANS_NONACHLOR	23.57	25.42	26.95	25.31	0.98
TOTAL CHLORDANE	**38.8**	**39.6**	**47.7**	**42.0**	**2.8**

Table B-2i. Summary of Mean Lobster Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Lobster Survey – Hepatopancreas Pesticides

Deer Island PEST					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00
DIELDRIN	46.62	37.08	49.98	44.56	3.86
ENDRIN	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	6.68	4.68	11.88	7.75	2.15
LINDANE	4.70	3.74	3.82	4.09	0.31
MIREX	0.00	0.00	0.00	0.00	0.00

Outfall PEST					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00
DIELDRIN	38.05	46.68	50.60	45.11	3.71
ENDRIN	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	9.86	9.14	10.37	9.79	0.36
LINDANE	3.19	2.92	2.86	2.99	0.10
MIREX	0.00	0.00	0.00	0.00	0.00

Cape Cod PEST					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00
DIELDRIN	25.51	24.61	27.44	25.85	0.83
ENDRIN	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	6.94	7.02	6.96	6.97	0.02
LINDANE	2.86	3.69	4.28	3.61	0.41
MIREX	0.00	0.00	0.00	0.00	0.00

Table B-2j. Summary of Mean Lobster Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Lobster Survey – Hepatopancreas LMW PAHs

Deer Island LMW PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
1-METHYLNAPHTHALENE*	17.56	14.41	13.60	15.19	1.21
1-METHYLPHENANTHRENE*	46.74	55.57	33.24	45.18	6.49
2,3,5-TRIMETHYLNAPHTHALENE*	23.00	27.08	29.45	26.51	1.88
2,6-DIMETHYLNAPHTHALENE*	14.00	17.53	18.35	16.63	1.33
2-METHYLNAPHTHALENE*	24.24	21.28	20.51	22.01	1.14
ACENAPHTHENE	22.15	26.54	27.82	25.51	1.72
ACENAPHTHYLENE	6.70	8.57	9.10	8.13	0.73
ANTHRACENE	35.85	75.77	39.34	50.32	12.76
BENZOTHIAZOLE*	63.39	54.41	92.10	69.97	11.36
BIPHENYL	4.64	4.49	6.45	5.19	0.63
C1-DIBENZOTHIOPHENES	32.40	44.16	55.51	44.02	6.67
C1-FLUORENES	54.31	62.39	63.55	60.08	2.91
C1-NAPHTHALENES	34.80	21.87	25.75	27.47	3.83
C1-PHENANTHRENES/ANTHRACENES	232.38	306.43	238.65	259.15	23.71
C2-DIBENZOTHIOPHENES	197.76	221.64	250.96	223.45	15.38
C2-FLUORENES	531.96	239.27	272.74	347.99	92.49
C2-NAPHTHALENES	43.47	52.91	50.61	49.00	2.84
C2-PHENANTHRENES/ANTHRACENES	479.96	542.27	547.77	523.34	21.74
C3-DIBENZOTHIOPHENES	160.30	169.32	224.46	184.69	20.05
C3-FLUORENES	283.98	307.24	355.73	315.65	21.13
C3-NAPHTHALENES	76.71	91.59	95.08	87.79	5.63
C3-PHENANTHRENES/ANTHRACENES	358.79	409.81	415.25	394.62	17.98
C4-NAPHTHALENES	81.36	106.30	111.10	99.59	9.22
C4-PHENANTHRENES/ANTHRACENES	212.31	296.88	201.10	236.76	30.23
DIBENZOFURAN	18.82	19.80	19.14	19.25	0.29
DIBENZOTHIOPHENE	11.59	15.26	11.50	12.79	1.24
FLUORENE	25.94	35.07	27.64	29.55	2.80
NAPHTHALENE	26.30	14.79	27.46	22.85	4.05
PHENANTHRENE	130.17	201.00	106.64	145.94	28.36
Total LMW PAH	**3062.7**	**3273.4**	**3183.4**	**3173.1**	**61.0**

* Not included in Total

Outfall LMW PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
1-METHYLNAPHTHALENE*	5.18	5.81	5.97	5.65	0.24
1-METHYLPHENANTHRENE*	20.66	15.95	9.12	15.24	3.35
2,3,5-TRIMETHYLNAPHTHALENE*	8.70	7.42	5.68	7.27	0.88
2,6-DIMETHYLNAPHTHALENE*	5.61	5.26	5.57	5.48	0.11
2-METHYLNAPHTHALENE*	7.61	6.45	7.86	7.31	0.44
ACENAPHTHENE	3.24	4.45	3.38	3.69	0.38
ACENAPHTHYLENE	3.04	4.33	2.91	3.43	0.45
ANTHRACENE	48.43	7.13	4.24	19.93	14.27
BENZOTHIAZOLE*	43.27	25.51	31.44	33.41	5.22
BIPHENYL	4.83	4.03	3.78	4.21	0.32
C1-DIBENZOTHIOPHENES	17.52	17.78	13.51	16.27	1.38
C1-FLUORENES	15.39	16.26	8.94	13.53	2.31
C1-NAPHTHALENES	12.67	7.99	10.42	10.36	1.35
C1-PHENANTHRENES/ANTHRACENES	125.95	89.51	52.54	89.33	21.19
C2-DIBENZOTHIOPHENES	40.22	42.97	42.18	41.79	0.82
C2-FLUORENES	45.74	64.20	44.28	51.41	6.41
C2-NAPHTHALENES	19.07	19.94	19.83	19.61	0.27
C2-PHENANTHRENES/ANTHRACENES	149.01	175.65	137.60	154.09	11.27
C3-DIBENZOTHIOPHENES	27.12	31.86	30.08	29.69	1.38
C3-FLUORENES	63.51	126.63	50.30	80.15	23.55
C3-NAPHTHALENES	23.37	21.74	19.55	21.55	1.11
C3-PHENANTHRENES/ANTHRACENES	239.07	201.70	152.41	197.73	25.10
C4-NAPHTHALENES	0.00	0.00	0.00	0.00	0.00
C4-PHENANTHRENES/ANTHRACENES	85.10	125.00	89.51	99.87	12.63
DIBENZOFURAN	9.75	10.57	7.89	9.40	0.79
DIBENZOTHIOPHENE	11.21	3.69	2.73	5.88	2.68
FLUORENE	10.57	11.01	9.76	10.45	0.36
NAPHTHALENE	20.23	11.89	15.71	15.94	2.41
PHENANTHRENE	166.89	50.24	31.16	82.77	42.42
Total LMW PAH	**1141.9**	**1048.6**	**752.7**	**981.1**	**117.3**

* Not included in Total

Table B-2j. Summary of Mean Lobster Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Lobster Survey – Hepatopancreas LMW PAHs (continued)

Cape Cod LMW PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
1-METHYLNAPHTHALENE*	4.77	4.95	6.13	5.28	0.43
1-METHYLPHENANTHRENE*	7.08	10.40	7.99	8.49	0.99
2,3,5-TRIMETHYLNAPHTHALENE*	3.89	3.87	4.55	4.10	0.22
2,6-DIMETHYLNAPHTHALENE*	2.52	2.65	3.23	2.80	0.22
2-METHYLNAPHTHALENE*	6.13	6.20	7.48	6.61	0.44
ACENAPHTHENE	2.77	3.56	2.95	3.09	0.24
ACENAPHTHYLENE	3.06	2.38	3.29	2.91	0.27
ANTHRACENE	3.41	3.26	4.05	3.58	0.24
BENZOTHIAZOLE*	45.25	40.13	48.67	44.68	2.48
BIPHENYL	2.45	2.81	2.95	2.74	0.15
C1-DIBENZOTHIOPHENES	10.15	10.40	9.08	9.88	0.41
C1-FLUORENES	9.07	9.58	7.88	8.84	0.50
C1-NAPHTHALENES	6.00	8.84	9.95	8.26	1.18
C1-PHENANTHRENES/ANTHRACENES	39.62	39.46	36.23	38.44	1.10
C2-DIBENZOTHIOPHENES	32.16	43.10	29.26	34.84	4.21
C2-FLUORENES	34.97	47.21	29.73	37.30	5.18
C2-NAPHTHALENES	14.01	11.15	13.00	12.72	0.84
C2-PHENANTHRENES/ANTHRACENES	112.23	122.23	116.89	117.12	2.89
C3-DIBENZOTHIOPHENES	22.25	33.10	23.11	26.16	3.48
C3-FLUORENES	112.36	124.82	103.73	113.64	6.12
C3-NAPHTHALENES	12.28	11.46	11.43	11.72	0.28
C3-PHENANTHRENES/ANTHRACENES	100.32	180.42	167.11	149.28	24.78
C4-NAPHTHALENES	0.00	0.00	0.00	0.00	0.00
C4-PHENANTHRENES/ANTHRACENES	34.40	104.10	52.97	63.83	20.84
DIBENZOFURAN	6.43	6.03	8.38	6.95	0.73
DIBENZOTHIOPHENE	2.49	1.96	2.03	2.16	0.17
FLUORENE	5.91	8.82	6.74	7.16	0.87
NAPHTHALENE	12.64	15.26	15.49	14.46	0.91
PHENANTHRENE	27.80	27.04	26.03	26.96	0.51
Total LMW PAH	**606.8**	**817.0**	**682.3**	**702.0**	**61.5**

* Not included in Total

Table B-2k. Summary of Mean Lobster Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Lobster Survey – Hepatopancreas HMW PAHs

Deer Island HMW PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
BENZ(A)ANTHRACENE	154.75	277.21	196.53	209.50	35.94
BENZO(A)PYRENE	78.11	139.63	91.42	103.05	18.69
BENZO(B)FLUORANTHENE	134.93	202.81	177.95	171.89	19.83
BENZO(E)PYRENE	98.33	149.09	132.39	126.60	14.94
BENZO(G,H,I)PERYLENE (1)	9.85	15.68	10.71	12.08	1.82
BENZO(K)FLUORANTHENE	79.89	147.34	103.03	110.09	19.79
C1-CHRYSENES	159.69	205.86	221.59	195.72	18.58
C1-FLUORANTHRENES/PYRENES	399.13	526.75	570.52	498.80	51.41
C2-CHRYSENES	77.52	116.89	117.51	103.97	13.23
C2-FLUORANTHENES/PYRENES	203.47	241.18	284.79	243.15	23.49
C3-CHRYSENES	0.00	0.00	32.45	10.82	10.82
C3-FLUORANTHENES/PYRENES	81.71	114.45	131.56	109.24	14.62
C4-CHRYSENES	0.00	0.00	0.00	0.00	0.00
CHRYSENE	439.70	574.61	571.54	528.62	44.47
DIBENZO(A,H)ANTHRACENE (1)	3.05	4.28	2.92	3.42	0.43
FLUORANTHENE	763.03	977.40	1013.23	917.89	78.11
INDENO(1,2,3-C,D)PYRENE (1)	17.36	22.52	13.45	17.78	2.63
PERYLENE	17.09	30.43	20.59	22.70	3.99
PYRENE	662.71	971.47	1029.74	887.97	113.88
Total HMW PAH	**3380.3**	**4717.6**	**4721.9**	**4273.3**	**446.5**

Deer Island Total PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
TOTAL PAH	**6443.0**	**7991.0**	**7905.3**	**7446.4**	**502.3**

(1) Values are considered estimated due to low QC recoveries.

Outfall HMW PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
BENZ(A)ANTHRACENE	131.40	85.58	67.94	94.97	18.91
BENZO(A)PYRENE	75.41	59.52	48.93	61.28	7.70
BENZO(B)FLUORANTHENE	104.52	78.50	84.97	89.33	7.82
BENZO(E)PYRENE	89.12	90.06	91.69	90.29	0.75
BENZO(G,H,I)PERYLENE (1)	13.90	12.32	16.49	14.24	1.21
BENZO(K)FLUORANTHENE	79.58	58.37	59.91	65.95	6.83
C1-CHRYSENES	73.29	75.51	63.39	70.73	3.73
C1-FLUORANTHRENES/PYRENES	154.08	181.57	112.77	149.47	20.00
C2-CHRYSENES	44.52	44.81	39.22	42.85	1.82
C2-FLUORANTHENES/PYRENES	76.46	88.48	58.01	74.32	8.86
C3-CHRYSENES	0.00	0.00	0.00	0.00	0.00
C3-FLUORANTHENES/PYRENES	35.86	40.92	29.45	35.41	3.32
C4-CHRYSENES	0.00	0.00	0.00	0.00	0.00
CHRYSENE	218.79	197.26	180.67	198.90	11.03
DIBENZO(A,H)ANTHRACENE (1)	2.56	2.63	3.29	2.83	0.23
FLUORANTHENE	343.11	260.91	211.81	271.94	38.30
INDENO(1,2,3-C,D)PYRENE (1)	15.30	14.35	15.29	14.98	0.31
PERYLENE	20.46	34.57	28.69	27.90	4.09
PYRENE	213.14	186.71	125.30	175.05	26.02
Total HMW PAH	**1691.5**	**1512.1**	**1237.8**	**1480.5**	**131.9**

Outfall Total PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
TOTAL PAH	**2833.4**	**2560.6**	**1990.5**	**2461.5**	**248.3**

Table B-2k. Summary of Mean Lobster Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Lobster Survey – Hepatopancreas HMW PAHs (continued)

Cape Cod HMW PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
BENZ(A)ANTHRACENE	31.75	32.49	26.22	30.15	1.98
BENZO(A)PYRENE	19.19	20.45	16.04	18.56	1.31
BENZO(B)FLUORANTHENE	57.00	59.58	42.87	53.15	5.19
BENZO(E)PYRENE	61.57	59.49	49.66	56.91	3.67
BENZO(G,H,I)PERYLENE (1)	9.92	6.10	5.54	7.19	1.38
BENZO(K)FLUORANTHENE	41.04	32.87	29.52	34.48	3.42
C1-CHRYSENES	46.94	44.94	37.28	43.05	2.94
C1-FLUORANTHRENES/PYRENES	76.22	89.35	69.99	78.52	5.71
C2-CHRYSENES	35.00	32.40	28.76	32.05	1.81
C2-FLUORANTHENES/PYRENES	41.32	39.31	33.88	38.17	2.22
C3-CHRYSENES	0.00	0.00	0.00	0.00	0.00
C3-FLUORANTHENES/PYRENES	0.00	20.82	15.97	12.26	6.29
C4-CHRYSENES	0.00	0.00	0.00	0.00	0.00
CHRYSENE	105.79	101.89	102.43	103.37	1.22
DIBENZO(A,H)ANTHRACENE (1)	0.00	0.00	0.00	0.00	0.00
FLUORANTHENE	135.77	141.29	120.22	132.42	6.31
INDENO(1,2,3-C,D)PYRENE (1)	10.45	8.06	4.00	7.50	1.88
PERYLENE	18.05	9.96	9.37	12.46	2.80
PYRENE	133.14	145.27	113.79	130.73	9.17
Total HMW PAH	**823.1**	**844.3**	**705.5**	**791.0**	**43.2**

Cape Cod Total PAHs					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
TOTAL PAH	**1429.9**	**1661.3**	**1387.8**	**1493.0**	**85.0**

(1) Values are considered estimated due to low QC recoveries.

Table B-2l. Summary of Mean Lobster Tissue Contaminants Level (ug/g dry wt)
1998 MWRA Lobster Survey – Hepatopancreas Metals

Deer Island Metals					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CADMIUM	2.57	3.57	5.79	3.98	0.95
CHROMIUM	0.13	0.07	0.07	0.09	0.02
COPPER	602.70	689.70	544.90	612.43	42.08
LEAD	0.15	0.30	0.24	0.23	0.04
MERCURY	0.242	0.269	0.274	0.26	0.01
NICKEL	0.33	0.38	0.36	0.36	0.01
SILVER	28.15	34.59	28.41	30.38	2.10
ZINC	70.09	115.20	63.54	82.94	16.24

Outfall Metals					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CADMIUM	24.38	14.99	12.60	17.32	3.60
CHROMIUM	0.20	0.23	0.26	0.23	0.02
COPPER	790.30	527.80	514.30	610.80	89.83
LEAD	0.56	0.55	0.78	0.63	0.07
MERCURY	0.389	0.344	0.361	0.36	0.01
NICKEL	1.19	1.28	1.16	1.21	0.03
SILVER	38.88	23.24	27.59	29.90	4.66
ZINC	85.29	64.28	189.40	112.99	38.68

Cape Cod Metals					
Parameter	**1**	**2**	**3**	**Mean**	**s.e.**
CADMIUM	6.85	8.02	7.80	7.56	0.36
CHROMIUM	0.17	0.10	0.20	0.15	0.03
COPPER	665.50	573.00	479.50	572.67	53.69
LEAD	0.30	0.30	0.32	0.30	0.01
MERCURY	0.228	0.276	0.224	0.24	0.02
NICKEL	0.66	0.57	0.95	0.73	0.11
SILVER	34.66	33.35	21.23	29.75	4.28
ZINC	78.80	104.70	85.80	89.77	7.74

Table B-2m. Summary of Mean Lobster Tissue Lipid and Dry Wt Units (percent dry wt)
1998 MWRA Lobster Survey – Meat and Hepatopancreas

Lobster Meat Lipids and % Dry Weight									
	Deer Island			**Outfall**			**Cape Cod**		
	1	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Lipid (% Dry Wt)	4.00	3.00	6.00	2.00	5.00	5.00	4.00	4.00	3.00
Percent Dry Wt	14.11	15.52	14.73	13.53	13.65	13.59	15.07	13.42	14.73

Lobster Hepatopancreas Lipids and % Dry Weight									
	Deer Island			**Outfall**			**Cape Cod**		
	1	**2**	**3**	**1**	**2**	**3**	**1**	**2**	**3**
Lipid (% Dry Wt)	104.00	66.00	68.00	68.00	70.00	60.00	59.00	60.00	59.00
Percent Dry Wt	36.88	33.53	33.45	28.96	34.00	34.21	28.67	29.34	31.30

Table B-3a. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Gloucester Pre-Deployment Mussel PCBs

Gloucester PCBs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
CL9(206)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL8(195)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL7(170)	0.00	0.00	0.00	0.55	0.62	0.23	0.14
CL6(128)	1.68	1.21	1.41	1.57	1.28	1.43	0.09
CL7(180)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL6(138)	10.63	9.47	9.90	9.86	10.65	10.10	0.23
CL7(187)	3.83	3.50	4.01	3.92	4.16	3.89	0.11
CL4(44)	3.54	3.91	3.05	2.97	3.43	3.38	0.17
CL6(153)	13.73	11.92	13.08	12.60	13.66	13.00	0.34
CL5(101)	8.36	8.26	7.56	7.29	8.24	7.94	0.22
CL4(52)	5.38	5.57	4.40	4.60	4.69	4.93	0.23
CL3(18)	0.00	1.21	0.94	0.92	1.03	0.82	0.21
CL5(118)	8.91	8.02	7.95	7.88	8.52	8.26	0.20
CL4(66)	4.46	5.57	3.79	4.04	4.51	4.47	0.30
CL5(105)	3.32	3.38	2.96	3.04	3.55	3.25	0.11
CL2(8)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL3(28)	1.47	1.96	1.23	1.32	1.34	1.46	0.13
CL5(126)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL4(77)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL10(209)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL PCB	**65.30**	**63.98**	**60.27**	**60.57**	**65.69**	**63.16**	**1.15**

Table B-3b. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Gloucester Pre-Deployment Mussel Pesticides – DDTs

Gloucester DDTs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
O,P-DDD	6.21	7.04 S	4.69	4.79	4.99	5.54	0.46
O,P-DDE	0.00	25.59 S	0.00	0.00	0.00	5.12	5.12
O,P-DDT	1.04	0.81S	1.04	0.87	1.26	1.00	0.08
P,P-DDD	16.38	22.84S	13.13	13.48	14.04	15.97	1.81
P,P-DDE	10.60	113.38 S	9.56	9.27	9.86	30.54	20.71
P,P-DDT	3.91	14.22 S	3.76	3.40	4.03	5.86	2.09
DDMU*	1.66	16.10 S	1.34	1.41	1.61	4.42	2.92
TOTAL DDT	**38.15**	**183.87S**	**32.18**	**31.81**	**34.18**	**34.05**	**1.45**

*DDMU not included in total DDT calculation
S indicates data suspect, not used in calculations of total DDT

Table B-3c. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Gloucester Pre-Deployment Mussel Pesticides – Chlordanes

Gloucester Chlordanes							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
CIS-CHLORDANE	3.96	3.66	3.53	3.35	3.82	3.66	0.11
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	0.00	0.23	0.23	0.00	0.34	0.16	0.07
TRANS_NONACHLOR	3.22	2.96	2.84	2.75	3.08	2.97	0.08
TOTAL CHLORDANE	**7.18**	**6.85**	**6.60**	**6.10**	**7.24**	**6.79**	**0.21**

Table B-3d. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Gloucester Pre-Deployment Mussel Pesticides

Gloucester PEST							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIELDRIN	3.05	2.47	2.63	2.78	3.21	2.83	0.13
ENDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINDANE	0.40	0.39	0.39	0.45	0.47	0.42	0.01
MIREX	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table B-3e. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Gloucester Pre-Deployment Mussel Low Molecular Weight (PAHs)

Gloucester LMW PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
1-METHYLNAPHTHALENE*	4.06	4.64	3.56	2.99	4.81	4.01	0.34
1-METHYLPHENANTHRENE*	3.42	2.93	2.59	2.69	3.39	3.01	0.17
2,3,5-TRIMETHYLNAPHTHALENE*	2.54	0.63	0.00	0.84	1.33	1.07	0.43
2,6-DIMETHYLNAPHTHALENE*	3.27	2.94	2.38	3.54	4.82	3.39	0.41
2-METHYLNAPHTHALENE*	6.20	7.60	6.37	5.75	7.45	6.67	0.36
ACENAPHTHENE	4.38	7.31	4.24	3.97	3.75	4.73	0.65
ACENAPHTHYLENE	1.85	2.33	1.91	2.29	2.24	2.12	0.10
ANTHRACENE	4.07	2.94	2.78	3.42	2.99	3.24	0.23
BENZOTHIAZOLE*, **	3.90	3.67	4.09	3.40	3.97	3.81	0.12
BIPHENYL	55.52	72.12	92.03	20.14	40.98	56.16	12.39
C1-DIBENZOTHIOPHENES**	1.41	1.87	2.26	1.54	2.92	2.00	0.27
C1-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1-NAPHTHALENES**	9.09	9.25	7.11	6.44	10.60	8.49	0.76
C1-PHENANTHRENES/ANTHRACENES**	18.05	15.93	14.34	15.71	16.61	16.13	0.60
C2-DIBENZOTHIOPHENES**	8.98	9.65	8.59	8.63	10.49	9.27	0.36
C2-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-NAPHTHALENES**	8.17	7.88	6.01	6.50	10.71	7.85	0.82
C2-PHENANTHRENES/ANTHRACENES**	45.08	25.81	25.62	33.64	35.85	33.20	3.61
C3-DIBENZOTHIOPHENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-NAPHTHALENES**	8.33	7.66	6.65	7.29	7.94	7.57	0.29
C3-PHENANTHRENES/ANTHRACENES**	18.28	19.63	15.57	14.57	14.21	16.45	1.07
C4-NAPHTHALENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4-PHENANTHRENES/ANTHRACENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIBENZOFURAN	1.24	1.37	0.92	0.92	1.14	1.12	0.09
DIBENZOTHIOPHENE	1.04	0.87	0.95	0.97	0.99	0.96	0.03
FLUORENE	2.49	1.90	1.98	1.30	2.13	1.96	0.19
NAPHTHALENE	7.48	8.05	7.77	7.40	7.99	7.74	0.13
PHENANTHRENE	12.27	10.12	8.46	8.96	11.04	10.17	0.69
Total LMW PAH	**207.72**	**204.66**	**207.18**	**143.70**	**182.57**	**189.17**	**12.29**
Total NOAA LMW	**107.56**	**123.51**	**134.07**	**63.30**	**92.93**	**104.27**	**12.40**

*Not included in total LMW PAH calculation.
**Not included in total NOAA LMW calculati.on.

Table B-3f Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Gloucester Pre-Deployment Mussel High Molecular Weight and Total PAHs

Gloucester HMW PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
BENZ(A)ANTHRACENE	7.38	8.39	5.37	6.35	5.83	6.66	0.55
BENZO(A)PYRENE	3.41	3.75	0.00	3.60	2.71	2.69	0.70
BENZO(B)FLUORANTHENE	8.04	11.80	7.87	7.45	8.52	8.74	0.78
BENZO(E)PYRENE	13.10	14.70	11.57	11.51	12.47	12.67	0.59
BENZO(G,H,I)PERYLENE	3.55	3.93	2.86	3.46	2.43	3.25	0.27
BENZO(K)FLUORANTHENE	6.63	9.38	6.05	6.68	6.66	7.08	0.59
C1-CHRYSENES*	5.91	8.40	6.44	5.79	5.24	6.36	0.54
C1-FLUORANTHRENES/PYRENES*	25.42	22.77	19.15	19.39	20.13	21.37	1.20
C2-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-FLUORANTHENES/PYRENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-FLUORANTHENES/PYRENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHRYSENE	19.75	19.94	16.48	15.64	16.47	17.66	0.91
DIBENZO(A,H)ANTHRACENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLUORANTHENE	45.81	39.64	36.21	37.13	36.97	39.15	1.76
INDENO(1,2,3-C,D)PYRENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERYLENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PYRENE	46.12	42.27	35.92	38.18	40.86	40.67	1.75
Total HMW PAH	**185.12**	**184.97**	**147.92**	**155.17**	**158.30**	**166.30**	**7.84**
Total NOAA HMW	**153.80**	**153.80**	**122.33**	**130.00**	**132.93**	**138.57**	**6.45**
Gloucester Total PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
TOTAL PAH	**392.84**	**389.63**	**355.10**	**298.88**	**340.88**	**355.46**	**17.29**
TOTAL NOAA PAH	**261.35**	**277.31**	**256.39**	**193.30**	**225.86**	**242.84**	**14.93**

*Not included in NOAA PAH.

Table B-4a. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey –Sandwich Pre-Deployment Mussel - PCBs

Sandwich PCBs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
CL9(206)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL8(195)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL7(170)	0.79	0.00	0.00	0.65	0.60	0.41	0.17
CL6(128)	2.82	2.26	2.50	1.94	2.16	2.34	0.15
CL7(180)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL6(138)	19.46	17.72	16.48	16.27	16.08	17.20	0.63
CL7(187)	7.61	6.81	6.33	6.25	6.10	6.62	0.28
CL4(44)	1.61	1.30	1.31	1.17	1.11	1.30	0.09
CL6(153)	25.81	24.08	21.80	20.76	20.33	22.55	1.04
CL5(101)	9.24	8.38	7.99	7.60	7.43	8.13	0.32
CL4(52)	2.15	1.84	2.13	2.01	1.64	1.95	0.10
CL3(18)	1.84	1.35	1.38	1.33	1.30	1.44	0.10
CL5(118)	12.83	11.68	11.17	10.93	10.37	11.39	0.42
CL4(66)	2.19	2.04	2.43	0.00	2.21	1.77	0.45
CL5(105)	3.41	2.36	2.73	2.49	2.38	2.67	0.19
CL2(8)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL3(28)	0.91	0.58	0.00	0.68	0.71	0.57	0.15
CL5(126)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL4(77)	1.16	0.00	1.06	0.00	1.56	0.75	0.32
CL10(209)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL PCB	**91.81**	**80.39**	**77.30**	**72.06**	**73.98**	**79.11**	**3.48**

Table B-4b. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey –Sandwich Pre-Deployment Mussel Pesticides – DDT

Sandwich DDTs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
O,P-DDD	7.76	6.13	6.32	5.92	5.64	6.36	0.37
O,P-DDE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O,P-DDT	1.15	0.82	1.58	1.34	1.39	1.26	0.13
P,P-DDD	22.70	20.25	19.64	18.71	17.57	19.77	0.86
P,P-DDE	27.57	24.32	22.65	22.26	22.08	23.78	1.03
P,P-DDT	6.01	4.63	4.76	3.96	3.88	4.65	0.38
DDMU*	3.41	2.10	1.59	1.96	1.77	2.17	0.32
TOTAL DDT	**65.21**	**56.14**	**54.95**	**52.20**	**50.56**	**55.81**	**2.55**

* DDMU not used in total DDT calculation.

Table B-4c. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey –Sandwich Pre-Deployment Mussel Pesticides- Chlordanes

Sandwich Chlordanes							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
CIS-CHLORDANE	7.80	7.02	6.69	6.29	6.18	6.80	0.29
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	1.13	1.28	1.40	1.29	0.78	1.18	0.11
TRANS_NONACHLOR	7.27	6.11	6.21	5.78	5.54	6.18	0.30
TOTAL CHLORDANE	**16.20**	**14.40**	**14.30**	**13.36**	**12.50**	**14.15**	**0.62**

Table B-4d. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey –Sandwich Pre-Deployment Mussel Pesticides

Sandwich PEST							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIELDRIN	6.32	5.94	5.46	5.37	5.23	5.67	0.20
ENDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINDANE	0.00	1.02	1.05	0.79	0.87	0.75	0.19
MIREX	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table B-4e. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey –Sandwich Pre-Deployment Mussel Low Molecular Weight (LMW) - PAHs

Sandwich LMW PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
1-METHYLNAPHTHALENE*	5.51	5.05	4.80	3.86	4.11	4.67	0.30
1-METHYLPHENANTHRENE*	3.98	2.30	3.28	2.09	2.56	2.84	0.35
2,3,5-TRIMETHYLNAPHTHALENE*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,6-DIMETHYLNAPHTHALENE*	3.05	3.84	2.77	2.78	3.37	3.16	0.20
2-METHYLNAPHTHALENE*	9.50	9.19	6.84	8.30	7.84	8.33	0.48
ACENAPHTHENE	3.75	2.85	2.41	2.92	2.63	2.91	0.23
ACENAPHTHYLENE	11.50	1.79	1.34	0.73	1.70	3.41	2.03
ANTHRACENE	4.09	2.15	2.27	1.17	1.93	2.32	0.48
BENZOTHIAZOLE*, **	12.56	7.18	4.03	5.25	4.35	6.67	1.57
BIPHENYL	14.03	26.83	1.06	33.69	5.87	16.30	6.16
C1-DIBENZOTHIOPHENES**	2.45	1.94	1.87	2.21	2.07	2.11	0.10
C1-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1-NAPHTHALENES**	12.98	11.45	10.16	9.18	9.55	10.67	0.70
C1-PHENANTHRENES/ANTHRACENES**	20.35	13.06	12.83	12.04	10.39	13.73	1.72
C2-DIBENZOTHIOPHENES**	15.96	8.55	9.59	8.62	8.43	10.23	1.45
C2-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-NAPHTHALENES**	8.39	12.06	7.80	8.02	8.01	8.85	0.81
C2-PHENANTHRENES/ANTHRACENES**	55.72	44.68	44.29	38.35	18.20	40.25	6.19
C3-DIBENZOTHIOPHENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-NAPHTHALENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-PHENANTHRENES/ANTHRACENES**	15.55	10.79	9.93	8.47	6.70	10.29	1.49
C4-NAPHTHALENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4-PHENANTHRENES/ANTHRACENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIBENZOFURAN	2.53	1.84	2.30	1.94	1.85	2.09	0.14
DIBENZOTHIOPHENE	1.32	1.05	0.87	1.06	0.77	1.01	0.09
FLUORENE	2.36	2.22	1.74	2.23	2.16	2.14	0.11
NAPHTHALENE	10.50	9.54	7.28	7.97	10.30	9.12	0.64
PHENANTHRENE	11.99	13.96	9.60	8.58	8.66	10.56	1.05
Total LMW PAH	**193.48**	**164.76**	**125.34**	**147.16**	**99.22**	**145.99**	**16.16**
Total NOAA LMW	**80.27**	**79.72**	**43.39**	**74.30**	**51.12**	**65.76**	**7.72**

*Not included in total LMW PAH calculation
**Not included in total NOAA LMW PAH

Table B-4f. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey –Sandwich Pre-Deployment Mussel High Molecular Weight and Total PAHs

Sandwich HMW PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
BENZ(A)ANTHRACENE	s	2.19	2.25	1.02	2.56	2.01	0.34
BENZO(A)PYRENE	s	0.00	0.00	0.00	1.90	0.47	0.47
BENZO(B)FLUORANTHENE	s	3.18	3.63	2.14	3.04	3.00	0.31
BENZO(E)PYRENE	s	3.65	3.96	3.43	3.29	3.58	0.15
BENZO(G,H,I)PERYLENE	s	0.00	0.00	0.00	0.00	0.00	0.00
BENZO(K)FLUORANTHENE	s	2.68	2.79	1.79	1.90	2.29	0.26
C1-CHRYSENES*	s	0.00	0.00	0.00	0.00	0.00	0.00
C1-FLUORANTHRENES/PYRENES*	s	7.56	7.01	6.95	6.40	6.98	0.24
C2-CHRYSENES*	s	0.00	0.00	0.00	0.00	0.00	0.00
C2-FLUORANTHENES/PYRENES*	s	0.00	0.00	0.00	0.00	0.00	0.00
C3-CHRYSENES*	s	0.00	0.00	0.00	0.00	0.00	0.00
C3-FLUORANTHENES/PYRENES*	s	0.00	0.00	0.00	0.00	0.00	0.00
C4-CHRYSENES*	s	0.00	0.00	0.00	0.00	0.00	0.00
CHRYSENE	s	6.70	7.15	4.43	6.82	6.27	0.62
DIBENZO(A,H)ANTHRACENE	s	0.00	0.00	0.00	0.00	0.00	0.00
FLUORANTHENE	s	29.20	26.31	24.00	28.06	26.89	1.13
INDENO(1,2,3-C,D)PYRENE	s	0.00	0.00	0.00	0.00	0.00	0.00
PERYLENE	s	0.00	0.00	0.00	2.19	0.55	0.55
PYRENE	s	11.94	15.52	9.35	15.32	13.03	1.48
Total HMW PAH	**na**	**67.11**	**68.62**	**53.11**	**71.48**	**65.08**	**4.09**
Total NOAA HMW	**na**	**59.55**	**61.61**	**46.16**	**65.08**	**58.10**	**4.14**
Sandwich Total PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
TOTAL PAH	**na**	**231.87**	**193.96**	**200.28**	**170.69**	**199.20**	**12.61**
TOTAL NOAA PAH	**na**	**139.27**	**105.00**	**120.46**	**116.20**	**120.23**	**7.13**

S indicates data suspect, not used in calculations of total PAH.
*Not included in NOAA totals.

Table B-4g. Summary of Mean Mussel Tissue Contaminants Level (ug/g dry wt)
1998 MWRA Mussel Survey – Sandwich Pre-Deployment Mussel – Metals

Sandwich Metals							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
LEAD	2.22	3.35	3.90	2.73	2.06	2.85	0.35
MERCURY	0.090	0.120	0.100	0.090	0.090	0.10	0.01

Table B-5a. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Boston Inner Harbor Mussel - PCBs

Boston Inner Harbor PCBs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
CL9(206)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL8(195)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL7(170)	1.90	1.74	1.50	1.39	0.00	1.31	0.34
CL6(128)	10.25	8.17	10.37	11.46	9.94	10.04	0.53
CL7(180)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL6(138)	74.16	61.22	69.37	82.08	69.87	71.34	3.40
CL7(187)	18.73	16.86	18.55	19.77	15.99	17.98	0.68
CL4(44)	18.37	14.28	16.41	21.61	15.41	17.22	1.29
CL6(153)	106.64	78.72	97.69	117.79	106.23	101.42	6.51
CL5(101)	91.31	63.72	74.96	105.57	85.93	84.30	7.12
CL4(52)	36.21	27.92	30.46	42.00	32.62	33.84	2.45
CL3(18)	6.03	4.40	5.19	7.05	5.01	5.54	0.46
CL5(118)	67.11	53.13	60.04	77.90	64.38	64.51	4.10
CL4(66)	22.35	16.85	19.04	26.58	20.60	21.08	1.65
CL5(105)	21.77	18.79	19.74	25.27	19.72	21.06	1.16
CL2(8)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL3(28)	10.58	8.91	9.77	13.24	9.46	10.39	0.76
CL5(126)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL4(77)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL10(209)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TOTAL PCB	**485.42**	**374.72**	**433.09**	**551.71**	**455.16**	**460.02**	**29.22**

Table B-5b. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey –Boston Inner Harbor Mussel Pesticides – DDTs

Boston Inner Harbor DDTs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
O,P-DDD	15.40	12.82	14.23	17.73	14.05	14.85	0.83
O,P-DDE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O,P-DDT	2.64	0.00	1.96	3.19	2.12	1.98	0.54
P,P-DDD	38.62	29.93	33.69	46.53	36.04	36.96	2.79
P,P-DDE	24.61	23.82	24.55	28.59	24.16	25.14	0.87
P,P-DDT	2.96	2.34	2.50	3.76	3.54	3.02	0.28
DDMU*	3.65	3.18	3.73	5.32	3.54	3.89	0.37
TOTAL DDT	**84.22**	**68.91**	**76.92**	**99.80**	**79.92**	**81.95**	**5.12**

Table B-5c. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey –Boston Inner Harbor Mussel Pesticides – Chlordanes

Boston Inner Harbor Chlordanes							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
CIS-CHLORDANE	15.17	10.66	12.59	17.05	13.26	13.75	1.10
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	0.60	0.55	0.00	0.54	0.46	0.43	0.11
TRANS_NONACHLOR	12.37	9.92	10.84	13.63	11.18	11.59	0.64
TOTAL CHLORDANE	**28.14**	**21.14**	**23.43**	**31.22**	**24.90**	**25.76**	**1.77**

Table B-5d. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey –Boston Inner Harbor Mussel Pesticides

Boston Inner Harbor PEST							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIELDRIN	7.51	6.44	7.73	8.95	7.42	7.61	0.40
ENDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINDANE	0.63	0.59	0.64	0.77	0.44	0.61	0.05
MIREX	0.00	0.00	0.00	0.46	0.00	0.09	0.09

Table B-5e. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Mussel Survey –Boston Inner Harbor Mussel Low Molecular Weight PAHs

Boston Inner Harbor LMW PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
1-METHYLNAPHTHALENE*	3.15	2.62	3.55	3.77	2.79	3.17	0.22
1-METHYLPHENANTHRENE*	10.99	7.83	10.78	12.18	10.26	10.41	0.72
2,3,5-TRIMETHYLNAPHTHALENE*	5.87	4.17	5.79	16.50	6.90	7.85	2.21
2,6-DIMETHYLNAPHTHALENE*	4.35	3.42	4.29	5.19	3.60	4.17	0.31
2-METHYLNAPHTHALENE*	5.43	4.92	5.82	5.45	5.21	5.37	0.15
ACENAPHTHENE	27.09	20.66	26.20	31.56	24.64	26.03	1.77
ACENAPHTHYLENE	10.50	9.91	10.91	12.46	10.21	10.80	0.45
ANTHRACENE	26.22	21.57	23.18	30.36	24.96	25.26	1.50
BENZOTHIAZOLE*, **	3.82	2.87	4.09	4.32	3.26	3.67	0.27
BIPHENYL	0.00	3.58	11.55	66.62	12.09	18.77	12.19
C1-DIBENZOTHIOPHENES**	10.44	9.58	9.09	14.48	13.13	11.34	1.05
C1-FLUORENES**	34.11	21.50	33.67	44.45	29.51	32.65	3.72
C1-NAPHTHALENES**	8.18	6.37	9.15	9.08	7.62	8.08	0.51
C1-PHENANTHRENES/ANTHRACENES**	85.98	56.71	69.65	99.97	76.22	77.70	7.32
C2-DIBENZOTHIOPHENES**	152.97	127.12	131.32	160.65	130.81	140.57	6.78
C2-FLUORENES**	138.75	92.92	104.89	137.47	89.29	112.66	10.71
C2-NAPHTHALENES**	14.94	12.94	13.90	13.52	9.29	12.92	0.96
C2-PHENANTHRENES/ANTHRACENES**	279.37	229.52	252.66	310.88	251.07	264.70	13.99
C3-DIBENZOTHIOPHENES**	231.33	208.78	213.41	258.74	235.27	229.51	8.89
C3-FLUORENES**	301.60	234.11	243.17	296.06	244.11	263.81	14.43
C3-NAPHTHALENES**	23.36	17.91	20.99	34.20	25.35	24.36	2.76
C3-PHENANTHRENES/ANTHRACENES**	332.27	254.94	331.54	367.57	291.01	315.47	19.39
C4-NAPHTHALENES**	69.36	39.04	47.94	103.61	66.92	65.37	11.13
C4-PHENANTHRENES/ANTHRACENES**	300.34	265.45	275.25	350.14	304.39	299.11	14.72
DIBENZOFURAN**	18.51	13.91	15.98	19.55	15.65	16.72	1.02
DIBENZOTHIOPHENE**	4.92	4.55	4.91	6.67	5.36	5.28	0.37
FLUORENE	22.96	17.22	21.36	25.91	18.50	21.19	1.56
NAPHTHALENE	8.42	10.45	10.80	10.71	9.09	9.90	0.48
PHENANTHRENE	41.80	35.03	37.79	44.69	35.00	38.86	1.91
Total LMW PAH	**2143.43**	**1713.76**	**1919.32**	**2449.33**	**1929.48**	**2031.07**	**124.71**
Total NOAA LMW	**166.79**	**141.37**	**172.02**	**265.41**	**163.24**	**181.76**	**21.55**

*Not included in total LMW PAH calculation.
**Not included in total NOAA LMW PAH calculation.

Table B-5f. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Mussel Survey –Boston Inner Harbor Mussel High Molecular Weight and Total PAHs

Boston Inner Harbor HMW PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
BENZ(A)ANTHRACENE	129.85	102.67	110.56	140.39	126.38	121.97	6.80
BENZO(A)PYRENE	43.56	35.74	38.60	51.27	46.56	43.15	2.77
BENZO(B)FLUORANTHENE	106.88	94.73	91.99	119.97	106.82	104.08	5.01
BENZO(E)PYRENE	162.25	142.43	140.19	183.22	153.99	156.42	7.80
BENZO(G,H,I)PERYLENE	16.31	20.21	16.44	17.95	16.08	17.40	0.78
BENZO(K)FLUORANTHENE	83.98	64.31	64.74	84.11	80.24	75.48	4.52
C1-CHRYSENES*	116.13	94.76	106.46	124.14	111.32	110.56	4.91
C1-FLUORANTHRENES/PYRENES*	335.11	243.15	274.33	333.33	302.20	297.62	17.62
C2-CHRYSENES*	45.40	41.62	40.12	62.75	53.09	48.60	4.19
C2-FLUORANTHENES/PYRENES*	203.67	140.93	148.88	208.27	174.34	175.22	13.73
C3-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-FLUORANTHENES/PYRENES*	97.31	72.42	74.63	106.90	88.89	88.03	6.58
C4-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHRYSENE	251.94	200.20	207.93	249.83	239.24	229.83	10.80
DIBENZO(A,H)ANTHRACENE	3.32	4.10	3.64	4.06	3.43	3.71	0.16
FLUORANTHENE	550.13	432.74	503.21	668.39	509.19	532.73	38.81
INDENO(1,2,3-C,D)PYRENE	8.67	12.89	8.10	8.62	8.26	9.31	0.90
PERYLENE	10.45	11.89	49.53	13.73	14.08	19.94	7.43
PYRENE	564.91	450.20	524.27	681.77	534.99	551.23	37.70
Total HMW PAH	**2729.89**	**2164.99**	**2403.63**	**3058.69**	**2569.10**	**2585.26**	**150.82**
Total NOAA HMW	**1932.27**	**1572.11**	**1759.21**	**2223.30**	**1839.26**	**1865.23**	**107.36**
Boston Inner Harbor Total PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
TOTAL PAH	**4873.32**	**3878.75**	**4322.95**	**5508.02**	**4498.58**	**4616.33**	**274.33**
TOTAL NOAA PAH	**2099.06**	**1713.48**	**1931.23**	**2488.71**	**2002.51**	**2047.00**	**127.36**

*Not included in total NOAA calculation.

Table B-5g. Summary of Mean Mussel Tissue Contaminants Level (ug/g dry wt)
1998 MWRA Mussel Survey – Boston Inner Harbor Mussel – Metals

Boston Inner Harbor Metals							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
LEAD	3.26	4.19	4.43	4.12	4.46	4.09	0.22
MERCURY	0.110	0.110	0.110	0.100	0.120	0.11	0.00

Table B-6a. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey –Deer Island Mussel - PCBs

Deer Island PCBs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
CL9(206)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL8(195)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL7(170)	1.00	0.96	1.39	0.95	1.08	1.08	0.08
CL6(128)	4.12	3.84	3.86	3.96	3.70	3.90	0.07
CL7(180)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL6(138)	25.39	23.30	23.98	25.03	25.23	24.59	0.41
CL7(187)	7.82	7.19	7.55	7.69	7.70	7.59	0.11
CL4(44)	5.78	6.07	5.73	6.18	6.41	6.03	0.13
CL6(153)	32.89	30.25	31.29	33.32	33.47	32.24	0.63
CL5(101)	21.32	20.01	19.47	21.34	21.67	20.76	0.43
CL4(52)	11.12	10.54	10.06	11.17	10.89	10.76	0.21
CL3(18)	2.08	1.50	1.76	1.87	2.00	1.84	0.10
CL5(118)	20.31	19.30	19.33	21.02	20.75	20.14	0.36
CL4(66)	7.26	7.46	7.80	7.60	7.78	7.58	0.10
CL5(105)	6.74	6.74	6.45	6.68	6.61	6.64	0.05
CL2(8)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL3(28)	4.37	4.40	4.13	4.60	4.57	4.42	0.08
CL5(126)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL4(77)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL10(209)	1.75	1.40	1.71	1.61	1.58	1.61	0.06
TOTAL PCB	**151.96**	**142.98**	**144.52**	**153.02**	**153.44**	**149.18**	**2.24**

Table B-6b. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey –Deer Island Mussel Pesticides – DDTs

Deer Island DDTs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
O,P-DDD	5.56	5.44	5.51	5.79	5.97	5.65	0.10
O,P-DDE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O,P-DDT	1.53	1.32	1.91	1.04	1.89	1.54	0.17
P,P-DDD	13.69	14.15	13.99	14.89	15.01	14.34	0.26
P,P-DDE	12.71	11.50	11.55	12.80	12.57	12.22	0.29
P,P-DDT	4.31	4.03	4.24	4.16	4.64	4.28	0.10
DDMU*	1.90	1.89	1.66	1.97	1.88	1.86	0.05
TOTAL DDT	**37.80**	**36.44**	**37.20**	**38.68**	**40.08**	**38.04**	**0.63**

Table B-6c. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey –Deer Island Mussel Pesticides – Chlordanes

Deer Island Chlordanes							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
CIS-CHLORDANE	12.48	12.15	11.56	12.67	13.24	12.42	0.28
HEPTACHLOR	0.97	1.03	1.10	1.08	1.22	1.08	0.04
HEPTACHLOREPOXIDE	0.57	0.63	0.50	0.59	0.65	0.59	0.03
TRANS_NONACHLOR	11.13	10.42	10.17	11.10	11.57	10.88	0.25
TOTAL CHLORDANE	**25.15**	**24.24**	**23.34**	**25.43**	**26.68**	**24.97**	**0.56**

Table B-6d. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey –Deer Island Mussel Pesticides

Deer Island PEST							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIELDRIN	4.16	3.91	3.90	4.22	4.29	4.10	0.08
ENDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINDANE	0.66	0.78	0.73	0.83	0.78	0.75	0.03
MIREX	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table B-6e. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Mussel Survey – Deer Island Mussel Low Molecular Weight PAHs

Deer Island LMW PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
1-METHYLNAPHTHALENE*	3.39	4.36	5.50	4.65	5.20	4.62	0.37
1-METHYLPHENANTHRENE*	4.51	4.35	4.78	4.08	4.54	4.45	0.12
2,3,5-TRIMETHYLNAPHTHALENE*	2.07	2.53	3.58	3.59	2.67	2.89	0.30
2,6-DIMETHYLNAPHTHALENE*	3.90	5.06	5.19	4.96	5.84	4.99	0.31
2-METHYLNAPHTHALENE*	6.77	8.85	10.03	8.72	9.26	8.73	0.54
ACENAPHTHENE	3.97	3.75	4.26	4.59	3.81	4.08	0.15
ACENAPHTHYLENE	2.97	2.30	4.46	2.79	3.58	3.22	0.37
ANTHRACENE	3.53	4.05	5.37	4.16	4.87	4.40	0.32
BENZOTHIAZOLE*, **	9.59	6.29	6.78	6.00	5.79	6.89	0.70
BIPHENYL	0.00	0.00	2.82	2.59	9.08	2.90	1.66
C1-DIBENZOTHIOPHENES**	6.24	5.14	5.35	6.49	5.78	5.80	0.26
C1-FLUORENES**	10.28	14.54	14.83	13.71	15.26	13.72	0.90
C1-NAPHTHALENES**	8.87	12.39	13.53	11.56	12.21	11.71	0.78
C1-PHENANTHRENES/ANTHRACENES**	23.24	21.83	24.60	23.96	25.31	23.79	0.60
C2-DIBENZOTHIOPHENES**	30.98	33.83	26.81	29.95	32.34	30.78	1.19
C2-FLUORENES**	36.41	46.45	33.54	45.60	41.61	40.72	2.53
C2-NAPHTHALENES**	8.95	10.96	11.36	10.76	13.15	11.03	0.67
C2-PHENANTHRENES/ANTHRACENES**	70.93	69.06	64.52	73.19	72.13	69.97	1.52
C3-DIBENZOTHIOPHENES**	40.91	35.97	30.54	37.94	35.33	36.14	1.70
C3-FLUORENES**	82.61	70.38	70.70	76.04	67.40	73.43	2.69
C3-NAPHTHALENES**	16.10	22.07	17.42	18.91	20.27	18.95	1.05
C3-PHENANTHRENES/ANTHRACENES**	71.61	56.79	53.08	63.92	61.80	61.44	3.17
C4-NAPHTHALENES**	35.08	39.16	38.73	35.17	39.22	37.47	0.96
C4-PHENANTHRENES/ANTHRACENES**	43.00	40.90	36.95	36.85	38.87	39.31	1.18
DIBENZOFURAN**	2.78	3.32	3.34	3.22	3.09	3.15	0.10
DIBENZOTHIOPHENE**	1.36	1.48	2.39	2.20	1.76	1.84	0.20
FLUORENE	4.11	3.82	4.87	3.97	4.14	4.18	0.18
NAPHTHALENE	5.50	7.67	10.53	7.08	7.52	7.66	0.82
PHENANTHRENE	8.79	11.28	14.57	10.48	11.36	11.29	0.94
Total LMW PAH	**518.22**	**517.15**	**494.55**	**525.10**	**529.91**	**516.99**	**6.07**
Total NOAA LMW	**49.51**	**58.03**	**75.95**	**61.64**	**71.88**	**63.40**	**4.77**

*Not included in total LMW PAH calculation**.**

****** Not included in total NOAA LMW PAH calculation.

Table B-6f. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Mussel Survey – Deer Island Mussel High Molecular Weight and Total PAHs

Deer Island HMW PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
BENZ(A)ANTHRACENE	11.47	9.42	8.63	9.38	8.50	9.48	0.53
BENZO(A)PYRENE	4.75	5.40	4.67	4.26	4.05	4.63	0.23
BENZO(B)FLUORANTHENE	9.62	10.11	8.82	8.91	8.65	9.22	0.28
BENZO(E)PYRENE	15.91	18.91	15.89	17.38	16.19	16.85	0.58
BENZO(G,H,I)PERYLENE	1.98	4.39	1.84	1.82	1.94	2.39	0.50
BENZO(K)FLUORANTHENE	8.66	8.72	8.02	7.19	7.02	7.92	0.36
C1-CHRYSENES*	15.71	11.70	11.28	11.71	11.50	12.38	0.84
C1-FLUORANTHRENES/PYRENES*	27.62	25.14	24.73	26.62	26.40	26.10	0.52
C2-CHRYSENES*	6.79	7.76	5.21	5.79	5.32	6.17	0.48
C2-FLUORANTHENES/PYRENES*	21.79	19.66	15.92	22.03	19.05	19.69	1.11
C3-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-FLUORANTHENES/PYRENES*	12.36	10.91	9.29	12.52	11.66	11.35	0.59
C4-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHRYSENE	25.45	23.70	22.93	25.62	25.04	24.55	0.53
DIBENZO(A,H)ANTHRACENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLUORANTHENE	36.79	40.30	40.44	39.55	41.24	39.66	0.77
INDENO(1,2,3-C,D)PYRENE	1.00	2.26	1.37	1.12	1.04	1.36	0.23
PERYLENE	6.41	1.83	1.78	1.61	1.58	2.64	0.94
PYRENE	31.55	33.49	33.86	45.36	33.84	35.62	2.47
Total HMW PAH	**237.84**	**233.70**	**214.67**	**240.86**	**223.00**	**230.01**	**4.88**
Total NOAA HMW	**153.58**	**158.53**	**148.25**	**162.18**	**149.07**	**154.32**	**2.69**
Deer Island Total PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
TOTAL PAH	**756.06**	**750.85**	**709.23**	**765.96**	**752.91**	**747.00**	**9.79**
TOTAL NOAA PAH	**203.09**	**216.55**	**224.20**	**223.83**	**220.95**	**217.73**	**3.91**

Table B-6g. Summary of Mean Mussel Tissue Contaminants Level (ug/g dry wt)
1998 MWRA Mussel Survey – Deer Island Mussel – Metals

Deer Island Metals							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
LEAD	2.65	3.15	3.83	1.70	6.02	3.47	0.73
MERCURY	0.090	0.100	0.110	0.080	0.110	0.098	0.006

Table B-7a. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Quincy Harbor Mussel – PCBs

Quincy PCBs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
CL9(206)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL8(195)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL7(170)	0.00	0.51	1.03	1.22	1.60	0.87	0.28
CL6(128)	8.15	7.71	8.26	8.53	8.93	8.31	0.20
CL7(180)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL6(138)	50.95	45.31	51.16	55.54	56.55	51.90	2.00
CL7(187)	13.45	12.13	14.23	15.46	16.03	14.26	0.70
CL4(44)	7.46	7.50	6.82	8.07	9.32	7.83	0.42
CL6(153)	64.35	57.00	67.10	73.73	69.70	66.37	2.81
CL5(101)	33.04	30.81	32.63	36.42	37.45	34.07	1.24
CL4(52)	13.07	12.43	12.41	12.93	15.59	13.29	0.59
CL3(18)	3.36	3.16	2.82	3.37	4.28	3.40	0.24
CL5(118)	38.23	35.18	37.61	40.76	43.39	39.03	1.40
CL4(66)	13.80	13.93	13.04	15.30	16.53	14.52	0.62
CL5(105)	11.58	10.95	12.47	12.23	13.58	12.16	0.44
CL2(8)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL3(28)	5.17	5.34	4.57	5.75	6.73	5.51	0.36
CL5(126)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL4(77)	0.00	0.00	0.00	1.30	0.00	0.26	0.26
CL10(209)	0.00	0.00	0.55	0.00	0.00	0.11	0.11
TOTAL PCB	**262.60**	**241.95**	**264.72**	**290.61**	**299.68**	**271.91**	**10.38**

Table B-7b. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Quincy Harbor Mussel Pesticides - DDTs

Quincy DDTs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
O,P-DDD	7.28	7.09	6.60	7.72	8.34	7.41	0.30
O,P-DDE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O,P-DDT	1.44	0.00	0.00	2.21	0.00	0.73	0.46
P,P-DDD	18.42	16.63	15.86	19.34	20.87	18.22	0.90
P,P-DDE	20.92	20.74	21.91	22.99	25.77	22.47	0.92
P,P-DDT	2.16	1.76	1.51	2.21	2.28	1.98	0.15
DDMU*	3.52	3.19	3.85	3.45	4.26	3.65	0.18
TOTAL DDT	**50.23**	**46.22**	**45.89**	**54.47**	**57.25**	**50.81**	**2.24**

Table B-7c. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Quincy Harbor Mussel Pesticides - Chlordanes

Quincy Chlordanes							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
CIS-CHLORDANE	11.23	11.09	10.26	11.91	13.36	11.57	0.52
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	0.36	0.25	0.30	0.35	0.43	0.34	0.03
TRANS_NONACHLOR	10.47	10.12	10.25	11.91	12.10	10.97	0.43
TOTAL CHLORDANE	**22.06**	**21.46**	**20.81**	**24.18**	**25.89**	**22.88**	**0.94**

Table B-7d. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Quincy Harbor Mussel Pesticides

Quincy PEST							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIELDRIN	5.48	5.25	4.96	6.08	6.07	5.57	0.22
ENDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINDANE	0.78	0.72	0.00	0.72	0.78	0.60	0.15
MIREX	0.55	0.00	0.00	0.00	0.00	0.11	0.11

Table B-7e. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Mussel Survey – Quincy Harbor Mussel Low Molecular Weight PAHs

Quincy LMW PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
1-METHYLNAPHTHALENE*	4.46	5.07	4.23	4.58	5.65	4.80	0.25
1-METHYLPHENANTHRENE*	1.98	2.06	1.85	2.19	2.15	2.05	0.06
2,3,5-TRIMETHYLNAPHTHALENE*	2.50	2.27	2.41	1.98	2.78	2.39	0.13
2,6-DIMETHYLNAPHTHALENE*	3.11	3.38	3.69	3.51	4.07	3.55	0.16
2-METHYLNAPHTHALENE*	8.55	9.31	9.06	9.04	10.31	9.25	0.29
ACENAPHTHENE	3.09	2.04	3.36	3.03	3.59	3.02	0.26
ACENAPHTHYLENE	0.00	0.00	2.88	2.30	2.79	1.59	0.66
ANTHRACENE	2.79	2.75	2.87	3.08	3.21	2.94	0.09
BENZOTHIAZOLE*, **	5.22	6.68	3.29	3.08	2.50	4.15	0.78
BIPHENYL	3.47	0.00	3.33	4.26	6.19	3.45	1.00
C1-DIBENZOTHIOPHENES**	0.99	0.00	0.00	0.00	0.00	0.20	0.20
C1-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1-NAPHTHALENES**	11.25	15.07	10.53	10.92	16.69	12.89	1.25
C1-PHENANTHRENES/ANTHRACENES**	12.42	15.78	13.79	18.10	20.28	16.07	1.42
C2-DIBENZOTHIOPHENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-NAPHTHALENES**	8.09	10.37	9.50	8.27	8.60	8.97	0.43
C2-PHENANTHRENES/ANTHRACENES**	38.52	40.66	31.56	42.18	41.27	38.84	1.92
C3-DIBENZOTHIOPHENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-NAPHTHALENES**	8.14	8.77	9.18	8.83	10.77	9.14	0.44
C3-PHENANTHRENES/ANTHRACENES**	31.11	32.08	28.30	36.10	27.97	31.11	1.48
C4-NAPHTHALENES**	12.10	11.14	13.52	12.03	14.01	12.56	0.53
C4-PHENANTHRENES/ANTHRACENES**	20.27	24.45	18.47	18.83	22.48	20.90	1.13
DIBENZOFURAN**	1.37	1.66	1.89	1.66	2.03	1.72	0.11
DIBENZOTHIOPHENE**	0.56	0.00	0.00	0.00	0.00	0.11	0.11
FLUORENE	2.12	1.64	2.03	2.19	2.15	2.02	0.10
NAPHTHALENE	6.74	6.75	6.85	6.93	10.48	7.55	0.73
PHENANTHRENE	4.43	4.97	4.78	5.26	5.44	4.97	0.18
Total LMW PAH	**167.46**	**178.11**	**162.84**	**183.99**	**197.96**	**178.07**	**6.23**
Total NOAA LMW	**43.24**	**40.64**	**47.34**	**48.35**	**58.82**	**47.60**	**3.16**

*Not included in total LMW PAH calculation.
** Not included in NOAA total.

Table B-7f. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Mussel Survey – Quincy Harbor Mussel High Molecular Weight and TotalPAHs

Quincy HMW PAHs							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
BENZ(A)ANTHRACENE	4.54	4.48	4.12	4.69	4.11	4.39	0.12
BENZO(A)PYRENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BENZO(B)FLUORANTHENE	6.80	8.47	7.12	9.46	6.31	7.63	0.58
BENZO(E)PYRENE	16.04	17.80	13.64	14.25	15.90	15.53	0.73
BENZO(G,H,I)PERYLENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BENZO(K)FLUORANTHENE	4.36	5.28	4.68	6.11	4.53	4.99	0.32
C1-CHRYSENES&	6.12	6.09	6.58	6.02	5.65	6.09	0.15
C1-FLUORANTHRENES/PYRENES*	19.72	26.76	20.51	20.44	28.41	23.17	1.83
C2-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-FLUORANTHENES/PYRENES*	11.33	12.05	9.88	12.09	11.84	11.44	0.41
C3-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-FLUORANTHENES/PYRENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHRYSENE	16.03	15.07	14.12	13.05	15.98	14.85	0.57
DIBENZO(A,H)ANTHRACENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLUORANTHENE	58.44	56.76	50.12	54.30	70.97	58.12	3.50
INDENO(1,2,3-C,D)PYRENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERYLENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PYRENE	27.27	41.16	35.15	39.45	48.36	38.28	3.48
Total HMW PAH	**170.66**	**193.93**	**165.91**	**179.87**	**212.06**	**184.49**	**8.39**
Total NOAA HMW	**133.49**	**149.03**	**128.95**	**141.32**	**166.15**	**143.79**	**6.56**
Quncy Total PAH							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
TOTAL PAH	**338.12**	**372.03**	**328.75**	**363.86**	**410.02**	**362.56**	**14.29**
TOTAL NOAA PAH	**176.73**	**189.26**	**176.29**	**189.17**	**224.97**	**191.39**	**8.88**

*Not included in total LMW PAH calculation.

Table B-7g. Summary of Mean Mussel Tissue Contaminants Level (ug/g dry wt)
1998 MWRA Mussel Survey – Quincy Harbor Mussel – Metals

Quincy Metals							
Parameter	**1**	**2**	**3**	**4**	**5**	**Mean**	**s.e.**
LEAD	3.22	3.24	4.11	3.21	2.66	3.29	0.23
MERCURY	0.090	0.100	0.120	0.110	0.100	0.10	0.01

Table B-8a. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Outfall Mussel – PCBs

Outfall PCBs										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
CL9(206)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL8(195)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL7(170)	0.00	0.29	0.32	0.40	0.00	0.39	0.52	0.34	0.28	0.07
CL6(128)	1.91	1.67	1.85	2.92	1.83	2.25	2.26	1.92	2.08	0.14
CL7(180)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL6(138)	11.48	11.56	12.50	13.98	9.11	12.01	11.43	10.32	11.55	0.51
CL7(187)	4.73	4.92	5.41	6.33	3.81	5.10	4.61	4.59	4.94	0.26
CL4(44)	0.86	0.87	1.09	1.27	0.74	1.05	1.02	0.87	0.97	0.06
CL6(153)	15.20	15.11	16.26	19.10	12.13	16.22	15.12	14.03	15.39	0.70
CL5(101)	7.09	6.51	7.26	8.64	5.62	7.59	7.03	6.10	6.98	0.33
CL4(52)	2.02	1.72	2.23	2.49	1.66	2.37	2.11	1.81	2.05	0.11
CL3(18)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL5(118)	7.95	7.51	8.33	9.46	6.05	8.10	7.90	7.06	7.80	0.35
CL4(66)	2.28	1.80	2.60	3.30	1.87	2.78	2.55	2.21	2.42	0.17
CL5(105)	2.50	2.50	2.86	3.04	2.07	2.67	2.41	2.24	2.54	0.11
CL2(8)	1.96	1.69	1.89	0.00	0.79	0.00	1.54	0.00	0.98	0.31
CL3(28)	0.28	0.24	0.48	0.42	0.24	0.45	0.34	0.00	0.31	0.06
CL5(126)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL4(77)	0.43	0.57	0.00	0.70	0.53	0.47	0.00	0.00	0.34	0.10
CL10(209)	0.41	0.34	0.29	0.40	0.00	0.00	0.00	0.00	0.18	0.07
TOTAL PCB	**59.10**	**57.30**	**63.39**	**72.44**	**46.46**	**61.44**	**58.84**	**51.48**	**58.81**	**2.75**

Table B-8b. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Outfall Mussel Pesticides - DDTs

Outfall DDTs										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
O,P-DDD	2.42	2.37	2.71	2.61	1.56	2.10	2.20	1.84	2.23	0.14
O,P-DDE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O,P-DDT	0.97	1.05	1.05	0.93	0.95	1.00	1.09	0.75	0.97	0.04
P,P-DDD	6.74	6.00	7.16	6.52	4.52	6.05	6.11	4.72	5.98	0.33
P,P-DDE	8.24	7.77	9.08	9.56	6.07	8.63	8.24	7.27	8.11	0.39
P,P-DDT	3.14	3.05	3.47	2.87	1.72	2.44	2.30	2.04	2.63	0.21
DDMU*	1.25	0.99	1.02	1.35	0.88	1.28	1.15	1.01	1.12	0.06
TOTAL DDT	**21.51**	**20.25**	**23.47**	**22.49**	**14.81**	**20.22**	**19.94**	**16.62**	**19.91**	**1.03**

Table B-8c. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Outfall Mussel Pesticides – Chlordanes

Outfall Chlordanes										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
CIS-CHLORDANE	6.94	7.00	8.47	8.28	4.75	5.75	9.78	5.66	7.08	0.60
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	0.43	0.40	0.41	0.44	0.19	0.37	0.36	0.29	0.36	0.03
TRANS_NONACHLOR	3.47	3.19	3.66	3.47	2.19	2.96	2.82	2.48	3.03	0.18
TOTAL CHLORDANE	**10.83**	**10.58**	**12.54**	**12.19**	**7.13**	**9.08**	**12.96**	**8.43**	**10.47**	**0.74**

*DDMU not included in total DDT calculation.

Table B-8d. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey – Outfall Mussel Pesticides -

Outfall PEST										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIELDRIN	2.39	2.39	2.47	2.55	1.87	2.07	2.31	1.92	2.25	0.09
ENDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINDANE	0.68	0.55	0.68	0.58	0.34	0.38	0.45	0.00	0.46	0.08
MIREX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Table B-8e. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Mussel Survey – Outfall Mussel Low Molecular Weight PAHs

Outfall LMW PAHs										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
1-METHYLNAPHTHALENE*	1.02	1.16	1.73	0.95	1.14	0.90	1.22	1.67	1.22	0.11
1-METHYLPHENANTHRENE*	0.68	0.69	0.76	0.57	0.47	0.83	0.69	0.78	0.68	0.04
2,3,5-TRIMETHYLNAPHTHALENE*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,6-DIMETHYLNAPHTHALENE*	0.76	0.94	1.23	0.95	0.00	0.81	1.11	0.93	0.84	0.13
2-METHYLNAPHTHALENE*	1.80	1.93	2.84	1.73	2.16	1.62	1.65	2.53	2.03	0.16
ACENAPHTHENE	1.36	1.72	2.43	1.96	0.00	2.83	2.27	2.05	1.83	0.30
ACENAPHTHYLENE	1.01	1.02	1.29	1.27	0.76	1.27	1.01	1.21	1.11	0.07
ANTHRACENE	0.96	1.13	1.08	0.86	0.75	0.96	0.87	0.83	0.93	0.05
BENZOTHIAZOLE*, **	11.36	8.56	8.03	6.87	5.21	5.80	7.12	6.06	7.37	0.69
BIPHENYL	2.19	0.93	0.64	2.17	0.00	1.51	1.05	0.79	1.16	0.27
C1-DIBENZOTHIOPHENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1-FLUORENES**	0.00	0.00	0.00	1.99	0.00	0.00	0.00	0.00	0.25	0.25
C1-NAPHTHALENES**	3.54	3.35	4.75	3.81	3.03	3.16	3.20	4.27	3.64	0.21
C1-PHENANTHRENES/ANTHRACENES**	3.85	3.26	4.20	3.49	2.86	3.83	3.66	3.93	3.64	0.15
C2-DIBENZOTHIOPHENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-NAPHTHALENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-PHENANTHRENES/ANTHRACENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-DIBENZOTHIOPHENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-NAPHTHALENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-PHENANTHRENES/ANTHRACENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4-NAPHTHALENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4-PHENANTHRENES/ANTHRACENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIBENZOFURAN**	1.25	1.36	1.32	1.44	1.01	1.05	1.26	1.21	1.24	0.05
DIBENZOTHIOPHENE**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLUORENE	1.73	1.54	1.77	2.92	0.00	2.06	1.39	1.12	1.57	0.29
NAPHTHALENE	3.35	3.75	4.84	3.22	3.83	3.73	3.36	3.93	3.75	0.18
PHENANTHRENE	3.95	3.61	4.31	3.53	2.65	3.29	4.39	3.34	3.63	0.20
Total LMW PAH	**23.18**	**21.66**	**26.62**	**26.65**	**14.89**	**23.69**	**22.45**	**22.68**	**22.73**	**1.30**
Total NOAA LMW	**18.18**	**18.43**	**22.90**	**20.14**	**11.76**	**19.81**	**19.00**	**19.18**	**18.75**	**1.11**

*Not included in total LMW PAH calculation.
**Not included in NOAA total.

Table B-8f. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Mussel Survey – Outfall Mussel High Molecular Weight and Total PAHs

Outfall HMW PAHs										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
BENZ(A)ANTHRACENE	1.23	1.50	1.69	0.97	0.97	1.05	1.20	1.21	1.23	0.09
BENZO(A)PYRENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BENZO(B)FLUORANTHENE	1.83	1.32	1.56	1.23	1.62	1.70	1.37	1.21	1.48	0.08
BENZO(E)PYRENE	2.82	1.99	1.97	1.99	1.99	2.43	2.65	2.57	2.30	0.13
BENZO(G,H,I)PERYLENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BENZO(K)FLUORANTHENE	1.08	1.24	1.56	0.94	1.23	1.41	1.37	1.12	1.24	0.07
C1-CHRYSENES*	1.56	1.70	2.22	1.54	1.66	1.46	1.39	2.01	1.69	0.10
C1-FLUORANTHRENES/PYRENES*	3.49	2.54	3.77	3.20	2.85	3.40	2.60	2.67	3.06	0.16
C2-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-FLUORANTHENES/PYRENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-FLUORANTHENES/PYRENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHRYSENE	3.36	3.56	4.33	3.75	3.04	3.52	3.23	3.61	3.55	0.14
DIBENZO(A,H)ANTHRACENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLUORANTHENE	6.63	5.16	6.71	7.11	4.60	6.48	6.44	6.15	6.16	0.30
INDENO(1,2,3-C,D)PYRENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERYLENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PYRENE	4.05	3.07	3.51	4.99	2.63	3.82	3.30	4.89	3.78	0.30
Total HMW PAH	**26.06**	**22.09**	**27.30**	**25.71**	**20.60**	**25.27**	**23.55**	**25.44**	**24.50**	**0.79**
Total NOAA HMW	**21.02**	**17.85**	**21.31**	**20.98**	**16.08**	**20.41**	**19.56**	**20.76**	**19.75**	**0.66**
Outfall Total PAHs										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
TOTAL PAH	**49.24**	**43.75**	**53.92**	**52.37**	**35.49**	**48.96**	**46.00**	**48.13**	**47.23**	**2.03**
TOTAL NOAA PAH	**39.82**	**36.28**	**44.21**	**41.12**	**27.84**	**40.22**	**38.57**	**39.95**	**38.50**	**1.72**

Table B-8g. Summary of Mean Mussel Tissue Contaminants Level (ug/g dry wt)
1998 MWRA Mussel Survey – Outfall Pre-Deployment Mussel – Metals

Outfall Metals										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
LEAD	2.77	2.01	1.52	2.08	2.06	2.90	2.07	1.67	2.14	0.17
MERCURY	0.100	0.090	0.080	0.080	0.080	0.100	0.090	0.090	0.09	0.00

B-9a. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey - Cape Cod Mussel - PCBs

Cape Cod PCBs										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
CL9(206)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL8(195)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL7(170)	0.00	0.00	0.00	0.00	0.00	0.24	0.22	0.61	0.13	0.08
CL6(128)	1.19	1.39	1.14	1.29	1.43	1.61	1.18	1.83	1.38	0.08
CL7(180)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL6(138)	9.83	10.60	9.54	10.22	10.00	11.43	8.42	11.15	10.15	0.34
CL7(187)	3.65	3.19	2.80	3.07	2.99	3.67	2.43	3.17	3.12	0.15
CL4(44)	0.90	1.02	0.80	0.98	1.53	1.01	1.07	1.03	1.04	0.08
CL6(153)	12.90	13.95	13.47	13.08	12.03	13.73	10.79	16.97	13.37	0.63
CL5(101)	5.83	6.90	5.51	7.39	6.11	8.79	5.50	8.77	6.85	0.48
CL4(52)	1.88	2.04	1.65	2.01	2.00	2.04	1.60	1.99	1.90	0.06
CL3(18)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL5(118)	6.43	8.11	6.80	8.43	7.59	7.37	5.40	7.66	7.22	0.35
CL4(66)	1.94	1.70	0.00	1.70	1.65	2.24	1.78	1.76	1.60	0.24
CL5(105)	2.05	2.03	1.70	2.00	2.16	2.17	1.64	2.32	2.01	0.08
CL2(8)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL3(28)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL5(126)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CL4(77)	0.00	0.00	0.00	0.41	0.00	0.00	0.00	0.00	0.05	0.05
CL10(209)	0.00	0.00	0.00	0.60	0.00	0.00	0.00	0.00	0.08	0.08
TOTAL PCB	**46.61**	**50.93**	**43.41**	**51.17**	**47.50**	**54.30**	**40.03**	**57.26**	**48.90**	**2.00**

B-9b. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Mussel Survey - Cape Cod Mussel Pesticides - DDT

Cape Cod DDTs										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
O,P-DDD	2.47	3.70	2.82	1.65	2.21	3.63	3.48	4.55	3.06	0.33
O,P-DDE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
O,P-DDT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
P,P-DDD	4.60	4.53	3.20	4.02	4.20	5.31	3.89	5.03	4.35	0.24
P,P-DDE	7.12	7.75	6.49	7.57	7.26	8.33	6.18	8.53	7.40	0.29
P,P-DDT	1.16	1.22	0.00	1.07	0.94	1.27	0.92	1.47	1.00	0.16
DDMU*	0.56	0.70	0.00	0.54	0.70	0.00	0.00	0.00	0.31	0.12
TOTAL DDT	**15.35**	**17.19**	**12.50**	**14.31**	**14.61**	**18.54**	**14.48**	**19.58**	**15.82**	**0.85**

B-9c. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt) 1998 MWRA Mussel Survey - Cape Cod Mussel Pesticides - Chlordanes

Cape Cod Chlordanes										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
CIS-CHLORDANE	3.92	5.90	4.82	6.15	5.25	8.17	5.87	7.80	5.98	0.50
HEPTACHLOR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEPTACHLOREPOXIDE	0.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.05	0.05
TRANS_NONACHLOR	2.14	2.35	1.93	2.46	2.30	2.51	1.96	2.51	2.27	0.08
TOTAL CHLORDANE	**6.42**	**8.25**	**6.75**	**8.61**	**7.55**	**10.68**	**7.83**	**10.31**	**8.30**	**0.54**

B-9d. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey - Cape Cod Mussel Pesticides

Cape Cod PEST										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
ALDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIELDRIN	2.85	2.85	2.29	2.56	2.64	3.44	2.72	3.25	2.82	0.13
ENDRIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
HEXACHLOROBENZENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LINDANE	0.44	0.00	0.00	0.56	0.38	0.00	0.00	0.00	0.17	0.09
MIREX	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

B-9e. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey - Cape Cod Mussel Low Molecular Weight (LMW) PAHs

Cape Cod LMW PAHs										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
1-METHYLNAPHTHALENE*	1.24	1.28	0.81	0.94	0.96	0.91	0.97	0.74	0.98	0.07
1-METHYLPHENANTHRENE*	0.72	0.72	0.67	0.69	0.59	0.51	0.46	0.48	0.60	0.04
2,3,5-TRIMETHYLNAPHTHALENE*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,6-DIMETHYLNAPHTHALENE*	0.00	0.95	0.90	1.20	0.72	1.10	0.85	1.08	0.85	0.13
2-METHYLNAPHTHALENE*	2.20	1.73	1.56	1.35	1.39	1.57	1.52	1.20	1.56	0.11
ACENAPHTHENE	0.00	7.38	4.86	5.05	2.57	4.76	1.60	3.60	3.73	0.81
ACENAPHTHYLENE	0.00	0.66	0.56	0.89	0.66	1.01	0.48	0.74	0.63	0.11
ANTHRACENE	0.75	0.88	0.74	0.96	0.79	1.08	0.57	0.90	0.83	0.05
BENZOTHIAZOLE*, **	4.74	5.21	3.73	5.03	3.05	4.50	4.12	4.53	4.36	0.25
BIPHENYL	0.00	0.48	0.00	0.95	0.60	1.35	0.00	0.46	0.48	0.17
C1-DIBENZOTHIOPHENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C1-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	1.62	0.00	0.20	0.20
C1-NAPHTHALENES**	3.31	2.80	1.99	1.82	1.71	1.88	2.19	1.60	2.16	0.21
C1-PHENANTHRENES/ANTHRACENES**	3.09	3.07	3.15	3.45	2.56	3.06	2.63	2.86	2.98	0.10
C2-DIBENZOTHIOPHENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-NAPHTHALENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-PHENANTHRENES/ANTHRACENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-DIBENZOTHIOPHENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-FLUORENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-NAPHTHALENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-PHENANTHRENES/ANTHRACENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4-NAPHTHALENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4-PHENANTHRENES/ANTHRACENES**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DIBENZOFURAN**	1.45	1.58	1.42	1.30	1.25	1.33	1.35	1.34	1.38	0.04
DIBENZOTHIOPHENE**	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLUORENE	0.00	3.17	1.96	2.55	2.26	3.02	1.75	2.29	2.13	0.35
NAPHTHALENE	5.19	4.63	3.44	3.46	3.41	3.43	3.30	3.22	3.76	0.26
PHENANTHRENE	3.85	3.81	3.34	3.53	3.31	3.16	3.32	3.29	3.45	0.09
Total LMW PAH	**17.65**	**28.47**	**21.46**	**23.95**	**19.13**	**24.08**	**18.81**	**20.29**	**21.73**	**1.27**
Total NOAA LMW	**13.95**	**25.69**	**18.83**	**21.56**	**17.27**	**21.89**	**14.82**	**18.00**	**19.00**	**1.38**

*Not included in total LMW PAH calculation.
**Not included in total NOAA LMW calculati.on.

B-9f. Summary of Mean Mussel Tissue Contaminants Level (ng/g dry wt)
1998 MWRA Mussel Survey - Cape Cod High Molecular Weight and Total PAHs

Cape Cod HMW PAHs										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
BENZ(A)ANTHRACENE	0.91	0.97	1.18	1.24	0.68	1.25	0.77	0.87	0.98	0.08
BENZO(A)PYRENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BENZO(B)FLUORANTHENE	1.38	0.58	1.12	1.07	0.61	0.94	0.70	0.75	0.89	0.10
BENZO(E)PYRENE	2.45	1.23	1.24	1.52	1.01	0.98	1.02	0.91	1.30	0.18
BENZO(G,H,I)PERYLENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BENZO(K)FLUORANTHENE	1.32	0.64	0.63	1.01	0.65	0.99	0.57	0.62	0.80	0.10
C1-CHRYSENES*	1.50	1.45	1.58	2.07	1.16	2.01	1.10	1.34	1.53	0.13
C1-FLUORANTHRENES/PYRENES*	2.96	3.35	3.53	4.03	2.31	3.22	2.35	2.95	3.09	0.21
C2-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2-FLUORANTHENES/PYRENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3-FLUORANTHENES/PYRENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C4-CHRYSENES*	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CHRYSENE	2.84	3.20	3.76	3.72	2.73	3.11	2.22	2.83	3.05	0.18
DIBENZO(A,H)ANTHRACENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FLUORANTHENE	8.73	7.43	7.55	9.02	6.73	6.56	6.23	7.11	7.42	0.35
INDENO(1,2,3-C,D)PYRENE	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PERYLENE	0.00	5.15	5.79	4.01	1.35	1.64	0.00	0.00	2.24	0.85
PYRENE	5.26	3.82	3.65	5.46	2.89	3.96	2.63	3.35	3.88	0.36
Total HMW PAH	**27.33**	**27.80**	**30.03**	**33.15**	**20.13**	**24.66**	**17.59**	**20.73**	**25.18**	**1.90**
Total NOAA HMW	**22.88**	**23.00**	**24.92**	**27.05**	**16.66**	**19.43**	**14.13**	**16.44**	**20.56**	**1.62**
Cape Cod Total PAHs										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
TOTAL PAH	**44.99**	**56.27**	**51.48**	**57.10**	**39.27**	**48.74**	**36.40**	**41.02**	**46.91**	**2.75**
TOTAL NOAA PAH	**36.83**	**48.69**	**43.75**	**48.61**	**33.93**	**41.32**	**28.96**	**34.44**	**39.57**	**2.55**

*Not included in NOAA total PAH.

B-9g. Summary of Mean Mussel Tissue Contaminants Level (ug/g dry wt)
1998 MWRA Mussel Survey - Cape Cod Metals

Cape Cod Metals										
Parameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Mean**	**s.e.**
LEAD	1.34	2.73	1.65	1.99	1.69	1.77	2.17	2.24	1.95	0.15
MERCURY	0.050	0.080	0.070	0.080	0.050	0.070	0.090	0.070	0.07	0.01

B-10a. Summary of Mussel Tissue Contaminants Level (percent dry wt)
1998 MWRA Mussel Survey

Gloucester					
	1	2	3	4	5
Lipids (% Dry Wt)	6.00	6.00	5.00	6.00	6.00
Percent Dry Wt	12.26	10.62	11.11	10.43	11.31

* Note that 1998 lipids don't have decimals.

Sandwich					
	1	2	3	4	5
Lipids (% Dry Wt)	9.00	9.00	7.00	7.00	11.00
Percent Dry Wt	13.29	13.29	13.29	13.29	13.29

Deer Island					
	1	2	3	4	5
Lipids (% Dry Wt)	7.00	8.00	6.00	7.00	7.00
Percent Dry Wt	14.88	13.90	15.16	14.09	15.72

Outfall								
	1	2	3	4	5	6	7	8
Lipids (% Dry Wt)	7.00	7.00	8.00	9.00	6.00	7.00	8.00	7.00
Percent Dry Wt	14.26	14.54	15.15	16.20	18.20	16.79	14.91	16.11

Aquarium					
	1	2	3	4	5
Lipids (% Dry Wt)	6.00	6.00	6.00	8.00	6.00
Percent Dry Wt	11.69	10.46	9.95	14.05	13.45

Cape Cod								
	1	2	3	4	5	6	7	8
Lipids (% Dry Wt)	8.00	9.00	8.00	8.00	8.00	9.00	8.00	8.00
Percent Dry Wt	16.96	17.65	17.49	18.11	18.13	19.35	19.89	19.00

Quincy					
	1	2	3	4	5
Lipids (% Dry Wt)	7.00	7.00	7.00	7.00	8.00
Percent Dry Wt	15.57	15.08	15.90	15.62	14.60

APPENDIX C

Historical Data Tables

Table C-1. Lipid Data - Flounder Fillet 1992 – 1999.

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1992	DI	92-353	92-353M	5.4		PCTDRYWT
1992	DI	92-354	92-354M	4.3		PCTDRYWT
1992	DI	92-359	92-359M	9.1		PCTDRYWT
1992	DI	92-35C	92-35CM	5.7		PCTDRYWT
1992	NB	92-300	92-300M	5.0		PCTDRYWT
1992	NB	92-307	92-307M	5.6		PCTDRYWT
1992	NB	92-308	92-308M	1.3		PCTDRYWT
1992	NB	92-30C	92-30CM	8.0		PCTDRYWT
1992	BS	92-253	92-253M	8.9		PCTDRYWT
1992	BS	92-257	92-257M	9.1		PCTDRYWT
1992	BS	92-258	92-258M	6.8		PCTDRYWT
1992	BS	92-25C	92-25CM	12.9		PCTDRYWT
1992	OS	92-400	92-400M	9.1		PCTDRYWT
1992	OS	92-401	92-401M	16.5		PCTDRYWT
1992	OS	92-409	92-409M	4.6		PCTDRYWT
1992	OS	92-40C	92-40CM	12.9		PCTDRYWT
1992	ECCB	92-451	92-451M	2.3		PCTDRYWT
1992	ECCB	92-452	92-452M	4.7		PCTDRYWT
1992	ECCB	92-456	92-456M	1.8		PCTDRYWT
1992	ECCB	92-45C	92-45CM	5.7		PCTDRYWT
1993	DI	F93010465	465SF	2.3		PCTDRYWT
1993	DI	F93010466	466SF	5.8		PCTDRYWT
1993	DI	F93010467	467SF	1.8		PCTDRYWT
1993	DI	F93010468	468SF	2.4		PCTDRYWT
1993	DI	F93010469	469SF	1.6		PCTDRYWT
1993	DI	F93010470	470SF	2.6		PCTDRYWT
1993	DI	F93010471	471SF	3.4		PCTDRYWT
1993	DI	F93010472	472SF	1.9		PCTDRYWT
1993	DI	F93010473	473SF	4.8		PCTDRYWT
1993	DI	F93010474	474SF	5.4		PCTDRYWT
1993	OS	F93010565	565SF	3.6		PCTDRYWT
1993	OS	F93010566	566SF	1.6		PCTDRYWT
1993	OS	F93010567	567SF	2.6		PCTDRYWT
1993	OS	F93010569	569SF	3.1		PCTDRYWT
1993	OS	F93010570	570SF	4.0		PCTDRYWT
1993	OS	F93010571	571SF	1.5		PCTDRYWT
1993	OS	F93010572	572SF	1.6		PCTDRYWT
1993	OS	F93010573	573SF	5.1		PCTDRYWT
1993	OS	F93010574	574SF	1.6		PCTDRYWT
1993	ECCB	F93010625	625SF	1.6		PCTDRYWT
1993	ECCB	F93010626	626SF	3.2		PCTDRYWT
1993	ECCB	F93010627	627SF	3.4		PCTDRYWT
1993	ECCB	F93010628	628SF	2.8		PCTDRYWT
1993	ECCB	F93010629	629SF	4.5		PCTDRYWT
1993	ECCB	F93010630	630SF	2.3		PCTDRYWT

Table C-1. Lipid Data - Flounder Fillet 1992 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1993	ECCB	F93010631	631SF	3.8		PCTDRYWT
1993	ECCB	F93010632	632SF	4.8		PCTDRYWT
1993	ECCB	F93010633	633SF	1.6		PCTDRYWT
1993	ECCB	F93010634	634SF	1.5		PCTDRYWT
1994	DI	FI101FLNDR	OU28	4.4		PCTDRYWT
1994	DI	FI102FLNDR	OU29	4.7		PCTDRYWT
1994	DI	FI103FLNDR	OU30	5.5		PCTDRYWT
1994	NB	FI201FLNDR	OU31	5.3		PCTDRYWT
1994	NB	FI202FLNDR	OU32	3.4		PCTDRYWT
1994	NB	FI203FLNDR	OU33	6.2		PCTDRYWT
1994	BS	FI301FLNDR	OU34	6.1		PCTDRYWT
1994	BS	FI302FLNDR	OU35	3.8		PCTDRYWT
1994	BS	FI303FLNDR	OU36	5.2		PCTDRYWT
1994	OS	FI401FLNDR	OU37	6.5		PCTDRYWT
1994	OS	FI402FLNDR	OU38	3.6		PCTDRYWT
1994	OS	FI403FLNDR	OU39	6.3		PCTDRYWT
1994	ECCB	FI501FLNDR	OU40	6.3		PCTDRYWT
1994	ECCB	FI502FLNDR	OU41	6.5		PCTDRYWT
1994	ECCB	FI503FLNDR	OU42	3.5		PCTDRYWT
1995	DI	P95111000C1	P95111000TC1	2.3		PCTDRYWT
1995	DI	P95111000C2	P95111000TC2	0.9		PCTDRYWT
1995	DI	P95111000C3	P95111000TC3	2.5		PCTDRYWT
1995	OS	P95114000C1	P95114000TC1	2.9		PCTDRYWT
1995	OS	P95114000C2	P95114000TC2	1.9		PCTDRYWT
1995	OS	P95114000C3	P95114000TC3	1.8		PCTDRYWT
1995	ECCB	P95115000C1	P95115000TC1	2.2		PCTDRYWT
1995	ECCB	P95115000C2	P95115000TC2	2.5		PCTDRYWT
1995	ECCB	P95115000C3	P95115000TC3	2.8		PCTDRYWT
1996	DI	P96111000C1	P96111000TC1	2.6		PCTDRYWT
1996	DI	P96111000C2	P96111000TC2	2.0		PCTDRYWT
1996	DI	P96111000C3	P96111000TC3	1.8		PCTDRYWT
1996	NB	P96112000C1	P96112000TC1	1.7		PCTDRYWT
1996	NB	P96112000C2	P96112000TC2	3.3		PCTDRYWT
1996	NB	P96112000C3	P96112000TC3	1.9		PCTDRYWT
1996	BS	P96113000C1	P96113000TC1	2.4		PCTDRYWT
1996	BS	P96113000C2	P96113000TC2	1.4		PCTDRYWT
1996	BS	P96113000C3	P96113000TC3	1.9		PCTDRYWT
1996	OS	P96114000C1	P96114000TC1	1.5		PCTDRYWT
1996	OS	P96114000C2	P96114000TC2	2.3		PCTDRYWT
1996	OS	P96114000C3	P96114000TC3	1.9		PCTDRYWT
1996	ECCB	P96115000C1	P96115000TC1	2.2		PCTDRYWT
1996	ECCB	P96115000C2	P96115000TC2	2.0		PCTDRYWT
1996	ECCB	P96115000C3	P96115000TC3	2.6		PCTDRYWT
1997	DI	P97111000C1	P97111000TC1	1.4		PCTDRYWT

Table C-1. Lipid Data - Flounder Fillet 1992 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1997	DI	P97111000C2	P97111000TC2	1.5		PCTDRYWT
1997	DI	P97111000C3	P97111000TC3	1.3		PCTDRYWT
1997	OS	P97114000C1	P97114000TC1	1.5		PCTDRYWT
1997	OS	P97114000C2	P97114000TC2	1.7		PCTDRYWT
1997	OS	P97114000C3	P97114000TC3	1.7		PCTDRYWT
1997	ECCB	P97115000C1	P97115000TC1	2.3		PCTDRYWT
1997	ECCB	P97115000C2	P97115000TC2	1.3		PCTDRYWT
1997	ECCB	P97115000C3	P97115000TC3	1.0		PCTDRYWT
1998	DI	VQST11	VQ79	6.0		PCTDRYWT
1998	DI	VQST12	VQ80	14.0		PCTDRYWT
1998	DI	VQST13	VQ81	3.0		PCTDRYWT
1998	OS	VQST41	VQ85	2.0		PCTDRYWT
1998	OS	VQST42	VQ86	3.0		PCTDRYWT
1998	OS	VQST43	VQ87	11.0		PCTDRYWT
1998	ECCB	VQST51	VR06	9.0		PCTDRYWT
1998	ECCB	VQST52	VR07	5.0		PCTDRYWT
1998	ECCB	VQST53	VR08	6.0		PCTDRYWT
1999	DI	FF99110C1	WQ73COMP	4.7		PCTDRYWT
1999	DI	FF99110C2	WQ74COMP	3.9		PCTDRYWT
1999	DI	FF99110C3	WQ75COMP	3.9		PCTDRYWT
1999	NB	FF99120C1	WM20COMP	5.7		PCTDRYWT
1999	NB	FF99120C2	WM21COMP	4.1		PCTDRYWT
1999	NB	FF99120C3	WM22COMP	3.8		PCTDRYWT
1999	BS	FF99130C1	WM17COMP	5.4		PCTDRYWT
1999	BS	FF99130C2	WM18COMP	6.2		PCTDRYWT
1999	BS	FF99130C3	WM19COMP	4.1		PCTDRYWT
1999	OS	FF99140C1	WM70COMP	4.8		PCTDRYWT
1999	OS	FF99140C2	WM71COMP	5.3		PCTDRYWT
1999	OS	FF99140C3	WM72COMP	4.2		PCTDRYWT
1999	ECCB	FF99150C1	WM90COMP	3.2		PCTDRYWT
1999	ECCB	FF99150C2	WM91COMP	3.1		PCTDRYWT
1999	ECCB	FF99150C3	WM92COMP	3.0		PCTDRYWT

Table C-2. Lipid Data - Flounder Liver 1992 – 1999.

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1992	DI	92-353	92-353L	21.1		PCTDRYWT
1992	DI	92-354	92-354L	13.0		PCTDRYWT
1992	DI	92-359	92-359L	74.0		PCTDRYWT
1992	DI	92-35C	92-35CL	22.7		PCTDRYWT
1992	NB	92-300	92-300L	46.2		PCTDRYWT
1992	NB	92-307	92-307L	20.3		PCTDRYWT
1992	NB	92-308	92-308L	26.2		PCTDRYWT
1992	NB	92-30C	92-30CL	28.4		PCTDRYWT
1992	BS	92-253	92-253L	37.5		PCTDRYWT
1992	BS	92-257	92-257L	49.3		PCTDRYWT
1992	BS	92-258	92-258L	25.0		PCTDRYWT
1992	BS	92-25C	92-25CL	19.5		PCTDRYWT
1992	OS	92-400	92-400L	25.5		PCTDRYWT
1992	OS	92-401	92-401L	52.4		PCTDRYWT
1992	OS	92-409	92-409L	20.2		PCTDRYWT
1992	OS	92-40C	92-40CL	22.5		PCTDRYWT
1992	ECCB	92-451	92-451L	15.9		PCTDRYWT
1992	ECCB	92-452	92-452L	18.5		PCTDRYWT
1992	ECCB	92-456	92-456L	29.9		PCTDRYWT
1992	ECCB	92-45C	92-45CL	22.1		PCTDRYWT
1994	DI	FI101FLNDR	OV83	98.5		PCTDRYWT
1994	DI	FI102FLNDR	OV84	75.1		PCTDRYWT
1994	DI	FI103FLNDR	OV85	84.3		PCTDRYWT
1994	NB	FI201FLNDR	OV89	38.9		PCTDRYWT
1994	NB	FI202FLNDR	OV90	34.2		PCTDRYWT
1994	NB	FI203FLNDR	OV91	41.8		PCTDRYWT
1994	BS	FI301FLNDR	OV86	104.1		PCTDRYWT
1994	BS	FI302FLNDR	OV87	33.9		PCTDRYWT
1994	BS	FI303FLNDR	OV88	54.1		PCTDRYWT
1994	OS	FI401FLNDR	OV92	37.4		PCTDRYWT
1994	OS	FI402FLNDR	OV93	35.6		PCTDRYWT
1994	OS	FI403FLNDR	OV94	31.4		PCTDRYWT
1994	ECCB	FI501FLNDR	OV95	34.2		PCTDRYWT
1994	ECCB	FI502FLNDR	OV96	14.7		PCTDRYWT
1994	ECCB	FI503FLNDR	OV97	50.0		PCTDRYWT
1995	DI	P95111000C1	P95111000LC1	28.5		PCTDRYWT
1995	DI	P95111000C2	P95111000LC2	44.9		PCTDRYWT
1995	DI	P95111000C3	P95111000LC3	25.7		PCTDRYWT
1995	OS	P95114000C1	P95114000LC1	24.0		PCTDRYWT
1995	OS	P95114000C2	P95114000LC2	20.6		PCTDRYWT
1995	OS	P95114000C3	P95114000LC3	25.0		PCTDRYWT
1995	ECCB	P95115000C1	P95115000LC1	11.2		PCTDRYWT
1995	ECCB	P95115000C2	P95115000LC2	15.2		PCTDRYWT
1995	ECCB	P95115000C3	P95115000LC3	16.4		PCTDRYWT
1996	DI	P96111000C1	P96111000LC1	28.3		PCTDRYWT

Table C-2. Lipid Data - Flounder Liver 1992 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1996	DI	P96111000C2	P96111000LC2	22.6		PCTDRYWT
1996	DI	P96111000C3	P96111000LC3	20.2		PCTDRYWT
1996	NB	P96112000C1	P96112000LC1	19.3		PCTDRYWT
1996	NB	P96112000C2	P96112000LC2	24.3		PCTDRYWT
1996	NB	P96112000C3	P96112000LC3	15.2		PCTDRYWT
1996	BS	P96113000C1	P96113000LC1	19.6		PCTDRYWT
1996	BS	P96113000C2	P96113000LC2	24.7		PCTDRYWT
1996	BS	P96113000C3	P96113000LC3	20.4		PCTDRYWT
1996	OS	P96114000C1	P96114000LC1	24.1		PCTDRYWT
1996	OS	P96114000C2	P96114000LC2	27.2		PCTDRYWT
1996	OS	P96114000C3	P96114000LC3	21.4		PCTDRYWT
1996	ECCB	P96115000C1	P96115000LC1	28.9		PCTDRYWT
1996	ECCB	P96115000C2	P96115000LC2	26.3		PCTDRYWT
1996	ECCB	P96115000C3	P96115000LC3	20.2		PCTDRYWT
1997	DI	P97111000C1	P97111000LC1	13.3		PCTDRYWT
1997	DI	P97111000C2	P97111000LC2	15.0		PCTDRYWT
1997	DI	P97111000C3	P97111000LC3	11.2		PCTDRYWT
1997	OS	P97114000C1	P97114000LC1	16.3		PCTDRYWT
1997	OS	P97114000C2	P97114000LC2	14.0		PCTDRYWT
1997	OS	P97114000C3	P97114000LC3	14.1		PCTDRYWT
1997	ECCB	P97115000C1	P97115000LC1	15.4		PCTDRYWT
1997	ECCB	P97115000C2	P97115000LC2	17.7		PCTDRYWT
1997	ECCB	P97115000C3	P97115000LC3	23.2		PCTDRYWT
1998	DI	VQST11	VQ82	51.0		PCTDRYWT
1998	DI	VQST12	VQ83	54.0		PCTDRYWT
1998	DI	VQST13	VQ84	57.0		PCTDRYWT
1998	OS	VQST41	VQ88	65.0		PCTDRYWT
1998	OS	VQST42	VQ89	42.0		PCTDRYWT
1998	OS	VQST43	VQ90	29.0		PCTDRYWT
1998	ECCB	VQST51	VR09	42.0		PCTDRYWT
1998	ECCB	VQST52	VR10	25.0		PCTDRYWT
1998	ECCB	VQST53	VR11	20.0		PCTDRYWT
1999	DI	FF99110C1	WQ76COMP	50.2		PCTDRYWT
1999	DI	FF99110C2	WQ77COMP	38.8		PCTDRYWT
1999	DI	FF99110C3	WQ78COMP	43.5		PCTDRYWT
1999	NB	FF99120C1	WM23COMP	28.1		PCTDRYWT
1999	NB	FF99120C2	WM24COMP	29.0		PCTDRYWT
1999	NB	FF99120C3	WM25COMP	24.5		PCTDRYWT
1999	BS	FF99130C1	WM14COMP	40.7		PCTDRYWT
1999	BS	FF99130C2	WM15COMP	31.8		PCTDRYWT
1999	BS	FF99130C3	WM16COMP	37.4		PCTDRYWT
1999	OS	FF99140C1	WM73COMP	30.5		PCTDRYWT
1999	OS	FF99140C2	WM74COMP	24.7		PCTDRYWT
1999	OS	FF99140C3	WM75COMP	27.8		PCTDRYWT

Table C-2. Lipid Data - Flounder Liver 1992 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1999	ECCB	FF99150C1	WM93COMP	87.3		PCTDRYWT
1999	ECCB	FF99150C2	WM94COMP	27.2		PCTDRYWT
1999	ECCB	FF99150C3	WM95COMP	35.1		PCTDRYWT

Table C-3. Lipid Data - Lobster Meat 1992-1999.

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1992	DI	92-467	92-467M	16.2		PCTDRYWT
1992	DI	92-469	92-469M	19.6		PCTDRYWT
1992	DI	92-482	92-482M	21.8		PCTDRYWT
1992	OS	92-460	92-460M	14.8		PCTDRYWT
1992	OS	92-463	92-463M	13.2		PCTDRYWT
1992	OS	92-464	92-464M	12.6		PCTDRYWT
1992	ECCB	92-465	92-465M	13.6		PCTDRYWT
1992	ECCB	92-466	92-466M	26.9		PCTDRYWT
1992	ECCB	92-477	92-477M	8.3		PCTDRYWT
1993	DI	F93010KG34	KG34SM	3.2		PCTDRYWT
1993	DI	S93030KI06	KI06SM	1.6		PCTDRYWT
1993	DI	S93030KI07	KI07SM	2.7		PCTDRYWT
1993	OS	S93030KH97	KH97SM	3.5		PCTDRYWT
1993	OS	S93030KH98	KH98SM	3.8		PCTDRYWT
1993	ECCB	LOB-F0KH99	KH99SM	6.8		PCTDRYWT
1993	ECCB	LOB-F0KI01	KI01SM	4.8		PCTDRYWT
1993	ECCB	LOB-F0KI02	KI02SM	4.5		PCTDRYWT
1993	ECCB	LOB-F0KI03	KI03SM	2.8		PCTDRYWT
1993	ECCB	LOB-F0KI04	KI04SM	7.6		PCTDRYWT
1993	ECCB	LOB-F0KI05	KI05SM	2.1		PCTDRYWT
1993	ECCB	LOB-F0KI21	KI21SM	0.4		PCTDRYWT
1993	ECCB	LOB-F0KI22	KI22SM	7.1		PCTDRYWT
1993	ECCB	LOB-F0KI23	KI23SM	4.1		PCTDRYWT
1993	ECCB	LOB-F0KI24	KI24SM	1.6		PCTDRYWT
1994	DI	FI101LOBST	OV31	10.9		PCTDRYWT
1994	DI	FI102LOBST	OV32	9.7		PCTDRYWT
1994	DI	FI103LOBST	OV33	6.2		PCTDRYWT
1994	OS	FI401LOBST	OV34	13.4		PCTDRYWT
1994	OS	FI402LOBST	OV35	9.4		PCTDRYWT
1994	ECCB	FI501LOBST	OV36	5.0		PCTDRYWT
1994	ECCB	FI502LOBST	OV37	4.8		PCTDRYWT
1994	ECCB	FI503LOBST	OV38	4.9		PCTDRYWT
1995	DI	L95111000C1	L95111000TC1	4.4		PCTDRYWT
1995	DI	L95111000C2	L95111000TC2	5.5		PCTDRYWT
1995	DI	L95111000C3	L95111000TC3	4.9		PCTDRYWT
1995	OS	L95114000C1	L95114000TC1	5.2		PCTDRYWT
1995	OS	L95114000C2	L95114000TC2	4.3		PCTDRYWT
1995	OS	L95114000C3	L95114000TC3	3.3		PCTDRYWT
1995	ECCB	L95115000C1	L95115000TC1	5.1		PCTDRYWT
1995	ECCB	L95115000C2	L95115000TC2	4.4		PCTDRYWT
1995	ECCB	L95115000C3	L95115000TC3	4.5		PCTDRYWT
1996	DI	L96111000C1	L96111000TC1	3.8		PCTDRYWT
1996	DI	L96111000C2	L96111000TC2	3.4		PCTDRYWT
1996	DI	L96111000C3	L96111000TC3	4.2		PCTDRYWT
1996	OS	L96114000C1	L96114000TC1	3.3		PCTDRYWT
1996	OS	L96114000C2	L96114000TC2	3.3		PCTDRYWT

Table C-3. Lipid Data - Lobster Meat 1992-1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1996	OS	L96114000C3	L96114000TC3	3.4		PCTDRYWT
1996	ECCB	L96115000C1	L96115000TC1	3.3		PCTDRYWT
1996	ECCB	L96115000C2	L96115000TC2	3.2		PCTDRYWT
1996	ECCB	L96115000C3	L96115000TC3	3.0		PCTDRYWT
1997	DI	L97111000C1	L97111000TC1	4.0		PCTDRYWT
1997	DI	L97111000C2	L97111000TC2	3.1		PCTDRYWT
1997	DI	L97111000C3	L97111000TC3	3.1		PCTDRYWT
1997	OS	L97114000C1	L97114000TC1	3.2		PCTDRYWT
1997	OS	L97114000C2	L97114000TC2	3.6		PCTDRYWT
1997	OS	L97114000C3	L97114000TC3	3.3		PCTDRYWT
1997	ECCB	L97115000C1	L97115000TC1	3.4		PCTDRYWT
1997	ECCB	L97115000C2	L97115000TC2	3.0		PCTDRYWT
1997	ECCB	L97115000C3	L97115000TC3	3.5		PCTDRYWT
1998	DI	VZST11	VZ35COMP	4.0		PCTDRYWT
1998	DI	VZST12	VZ36COMP	3.0		PCTDRYWT
1998	DI	VZST13	VZ37COMP	6.0		PCTDRYWT
1998	OS	VZST41	VZ23COMP	2.0		PCTDRYWT
1998	OS	VZST42	VZ24COMP	5.0		PCTDRYWT
1998	OS	VZST43	VZ25COMP	5.0		PCTDRYWT
1998	ECCB	VZST91	VZ29COMP	4.0		PCTDRYWT
1998	ECCB	VZST92	VZ30COMP	4.0		PCTDRYWT
1998	ECCB	VZST93	VZ31COMP	3.0		PCTDRYWT
1999	DI	FL9915C1	XJ48	2.6		PCTDRYWT
1999	DI	FL9915C2	XJ49	1.7		PCTDRYWT
1999	DI	FL9915C3	XJ50	1.8		PCTDRYWT
1999	OS	FL9914C1	XJ45	1.7		PCTDRYWT
1999	OS	FL9914C2	XJ46	1.3		PCTDRYWT
1999	OS	FL9914C3	XJ47	1.5		PCTDRYWT
1999	ECCB	FL9911C1	XJ42	2.2		PCTDRYWT
1999	ECCB	FL9911C2	XJ43	1.6		PCTDRYWT
1999	ECCB	FL9911C3	XJ44	1.9		PCTDRYWT

Table C-4. Lipid Data - Lobster Hepatopancreas 1992 – 1999.

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1992	DI	92-467	92-467L	65.8		PCTDRYWT
1992	DI	92-469	92-469L	73.7		PCTDRYWT
1992	DI	92-482	92-482L	66.3		PCTDRYWT
1992	OS	92-460	92-460L	57.0		PCTDRYWT
1992	OS	92-463	92-463L	47.1		PCTDRYWT
1992	OS	92-464	92-464L	79.2		PCTDRYWT
1992	ECCB	92-465	92-465L	18.8		PCTDRYWT
1992	ECCB	92-466	92-466L	82.5		PCTDRYWT
1992	ECCB	92-476	92-476L	30.1		PCTDRYWT
1993	DI	F93010KG34	KG34SH	34.3		PCTDRYWT
1993	DI	S93030KI06	KI06SH	35.2		PCTDRYWT
1993	DI	S93030KI07	KI07SH	55.8		PCTDRYWT
1993	OS	S93030KH97	KH97SH	56.2		PCTDRYWT
1993	OS	S93030KH98	KH98SH	45.3		PCTDRYWT
1993	ECCB	LOB-F0KH99	KH99SH	72.9		PCTDRYWT
1993	ECCB	LOB-F0KI01	KI01SH	33.6		PCTDRYWT
1993	ECCB	LOB-F0KI02	KI02SH	57.9		PCTDRYWT
1993	ECCB	LOB-F0KI03	KI03SH	43.5		PCTDRYWT
1993	ECCB	LOB-F0KI04	KI04SH	65.5		PCTDRYWT
1993	ECCB	LOB-F0KI05	KI05SH	33.7		PCTDRYWT
1993	ECCB	LOB-F0KI21	KI21SH	39.4		PCTDRYWT
1993	ECCB	LOB-F0KI22	KI22SH	40.3		PCTDRYWT
1993	ECCB	LOB-F0KI23	KI23SH	56.4		PCTDRYWT
1993	ECCB	LOB-F0KI24	KI24SH	67.2		PCTDRYWT
1994	DI	FI101LOBST	OV42	72.4		PCTDRYWT
1994	DI	FI102LOBST	OV43	71.5		PCTDRYWT
1994	DI	FI103LOBST	OV44	67.5		PCTDRYWT
1994	OS	FI401LOBST	OV45	59.2		PCTDRYWT
1994	OS	FI402LOBST	OV46	56.5		PCTDRYWT
1994	ECCB	FI501LOBST	OV47	79.0		PCTDRYWT
1994	ECCB	FI502LOBST	OV48	67.3		PCTDRYWT
1994	ECCB	FI503LOBST	OV49	61.7		PCTDRYWT
1995	DI	L95111000C1	L95111000HC1	70.8		PCTDRYWT
1995	DI	L95111000C2	L95111000HC2	64.3		PCTDRYWT
1995	DI	L95111000C3	L95111000HC3	55.9		PCTDRYWT
1995	OS	L95114000C1	L95114000HC1	70.9		PCTDRYWT
1995	OS	L95114000C2	L95114000HC2	60.4		PCTDRYWT
1995	OS	L95114000C3	L95114000HC3	61.8		PCTDRYWT
1995	ECCB	L95115000C1	L95115000HC1	57.7		PCTDRYWT
1995	ECCB	L95115000C2	L95115000HC2	64.7		PCTDRYWT
1995	ECCB	L95115000C3	L95115000HC3	79.6		PCTDRYWT
1996	DI	L96111000C1	L96111000HC1	49.5		PCTDRYWT
1996	DI	L96111000C2	L96111000HC2	60.1		PCTDRYWT
1996	DI	L96111000C3	L96111000HC3	59.4		PCTDRYWT
1996	OS	L96114000C1	L96114000HC1	47.4		PCTDRYWT
1996	OS	L96114000C2	L96114000HC2	54.1		PCTDRYWT

Table C-4. Lipid Data - Lobster Hepatopancreas 1992 – 1999. (Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1996	OS	L96114000C3	L96114000HC3	52.4		PCTDRYWT
1996	ECCB	L96115000C1	L96115000HC1	59.1		PCTDRYWT
1996	ECCB	L96115000C2	L96115000HC2	65.1		PCTDRYWT
1996	ECCB	L96115000C3	L96115000HC3	60.6		PCTDRYWT
1997	DI	L97111000C1	L97111000HC1	46.3		PCTDRYWT
1997	DI	L97111000C2	L97111000HC2	56.5		PCTDRYWT
1997	DI	L97111000C3	L97111000HC3	44.5		PCTDRYWT
1997	OS	L97114000C1	L97114000HC1	64.2		PCTDRYWT
1997	OS	L97114000C2	L97114000HC2	62.8		PCTDRYWT
1997	OS	L97114000C3	L97114000HC3	44.7		PCTDRYWT
1997	ECCB	L97115000C1	L97115000HC1	58.6		PCTDRYWT
1997	ECCB	L97115000C2	L97115000HC2	61.0		PCTDRYWT
1997	ECCB	L97115000C3	L97115000HC3	57.7		PCTDRYWT
1998	DI	VZST11	VZ38COMP	104.0		PCTDRYWT
1998	DI	VZST12	VZ39COMP	66.0		PCTDRYWT
1998	DI	VZST13	VZ40COMP	68.0		PCTDRYWT
1998	OS	VZST41	VZ26COMP	68.0		PCTDRYWT
1998	OS	VZST42	VZ27COMP	70.0		PCTDRYWT
1998	OS	VZST43	VZ28COMP	60.0		PCTDRYWT
1998	ECCB	VZST91	VZ32COMP	59.0		PCTDRYWT
1998	ECCB	VZST92	VZ33COMP	60.0		PCTDRYWT
1998	ECCB	VZST93	VZ34COMP	59.0		PCTDRYWT
1999	DI	FL9915C1	XJ57	35.2		PCTDRYWT
1999	DI	FL9915C2	XJ58	37.3		PCTDRYWT
1999	DI	FL9915C3	XJ59	43.4		PCTDRYWT
1999	OS	FL9914C1	XJ54	30.2		PCTDRYWT
1999	OS	FL9914C2	XJ55	58.7		PCTDRYWT
1999	OS	FL9914C3	XJ56	40.8		PCTDRYWT
1999	ECCB	FL9911C1	XJ51	32.3		PCTDRYWT
1999	ECCB	FL9911C2	XJ52	30.0		PCTDRYWT
1999	ECCB	FL9911C3	XJ53	31.8		PCTDRYWT

Table C-5. Lipid Data - Mussels 1991-1999.

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1991	DI	M91143957	M91143957	2.1		PCTDRYWT
1991	DI	M91143958	M91143958	4.5		PCTDRYWT
1991	DI	M91143959	M91143959	4.0		PCTDRYWT
1991	DI	M91143960	M91143960	3.2		PCTDRYWT
1991	DI	M91143961	M91143961	2.8		PCTDRYWT
1991	DI	M91143962	M91143962	3.4		PCTDRYWT
1991	DI	M91143963	M91143963	3.1		PCTDRYWT
1991	DI	M91143964	M91143964	3.0		PCTDRYWT
1991	BIH	M91143739	M91143739	7.9		PCTDRYWT
1991	BIH	M91143740	M91143740	4.2		PCTDRYWT
1991	BIH	M91143741	M91143741	6.8		PCTDRYWT
1991	BIH	M91143742	M91143742	5.2		PCTDRYWT
1991	BIH	M91143743	M91143743	4.7		PCTDRYWT
1991	GLOU	M91143626	M91143626	4.4		PCTDRYWT
1991	GLOU	M91143627	M91143627	8.1		PCTDRYWT
1991	GLOU	M91143628	M91143628	4.7		PCTDRYWT
1991	GLOU	M91143629	M91143629	1.8		PCTDRYWT
1991	GLOU	M91143630	M91143630	3.9		PCTDRYWT
1991	GLOU	M91143631	M91143631	1.8		PCTDRYWT
1991	GLOU	M91143632	M91143632	2.4		PCTDRYWT
1991	GLOU	M91143633	M91143633	3.9		PCTDRYWT
1991	GLOU	M91143634	M91143634	8.4		PCTDRYWT
1991	GLOU	M91143635	M91143635	4.8		PCTDRYWT
1992	DI	M92164479	M92164479	4.4		PCTDRYWT
1992	DI	M92164480	M92164480	5.5		PCTDRYWT
1992	DI	M92164481	M92164481	4.8		PCTDRYWT
1992	DI	M92164482	M92164482	5.8		PCTDRYWT
1992	DI	M92164483	M92164483	4.8		PCTDRYWT
1992	DI	M92164484	M92164484	3.6		PCTDRYWT
1992	DI	M92164485	M92164485	4.6		PCTDRYWT
1992	DI	M92164486	M92164486	7.5		PCTDRYWT
1992	OS	M92164492	M92164492	5.4		PCTDRYWT
1992	OS	M92164493	M92164493	3.8		PCTDRYWT
1992	OS	M92164494	M92164494	4.7		PCTDRYWT
1992	OS	M92164495	M92164495	3.3		PCTDRYWT
1992	OS	M92164496	M92164496	5.0		PCTDRYWT
1992	OS	M92164497	M92164497	3.5		PCTDRYWT
1992	OS	M92164498	M92164498	3.1		PCTDRYWT
1992	OS	M92164499	M92164499	5.0		PCTDRYWT
1992	BIH	M92164487	M92164487	5.7		PCTDRYWT
1992	BIH	M92164488	M92164488	5.2		PCTDRYWT
1992	BIH	M92164489	M92164489	4.1		PCTDRYWT
1992	BIH	M92164490	M92164490	5.8		PCTDRYWT
1992	BIH	M92164491	M92164491	4.6		PCTDRYWT
1992	GLOU	M92162679	M92162679	4.5		PCTDRYWT
1992	GLOU	M92162680	M92162680	3.6		PCTDRYWT

Table C-5. Lipid Data - Mussels 1991-1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1992	GLOU	M92162681	M92162681	4.0		PCTDRYWT
1992	GLOU	M92162682	M92162682	4.4		PCTDRYWT
1992	GLOU	M92162683	M92162683	7.5		PCTDRYWT
1993	DI	M93196384	M93196384	6.5	j	PCTDRYWT
1993	DI	M93196385	M93196385	6.5	j	PCTDRYWT
1993	DI	M93196386	M93196386	6.5	j	PCTDRYWT
1993	DI	M93196387	M93196387	6.5	j	PCTDRYWT
1993	DI	M93196388	M93196388	6.5	j	PCTDRYWT
1993	OS	M93196376	M93196376	7.1	j	PCTDRYWT
1993	OS	M93196377	M93196377	7.1	j	PCTDRYWT
1993	OS	M93196378	M93196378	7.1	j	PCTDRYWT
1993	OS	M93196379	M93196379	7.1	j	PCTDRYWT
1993	OS	M93196380	M93196380	7.1	j	PCTDRYWT
1993	OS	M93196381	M93196381	7.1	j	PCTDRYWT
1993	OS	M93196382	M93196382	7.1	j	PCTDRYWT
1993	OS	M93196383	M93196383	7.1	j	PCTDRYWT
1993	BIH	M93196389	M93196389	5.3	j	PCTDRYWT
1993	BIH	M93196390	M93196390	5.3	j	PCTDRYWT
1993	BIH	M93196391	M93196391	5.3	j	PCTDRYWT
1993	BIH	M93196392	M93196392	5.3	j	PCTDRYWT
1993	GLOU	M93188933	M93188933	8.0	j	PCTDRYWT
1993	GLOU	M93188934	M93188934	8.0	j	PCTDRYWT
1993	GLOU	M93188936	M93188936	8.0	j	PCTDRYWT
1993	GLOU	M93188937	M93188937	8.0	j	PCTDRYWT
1993	GLOU	M93188941	M93188941	8.0	j	PCTDRYWT
1994	DI	M94233366	M94233366	4.4		PCTDRYWT
1994	DI	M94233367	M94233367	5.2		PCTDRYWT
1994	DI	M94233368	M94233368	5.2		PCTDRYWT
1994	DI	M94233369	M94233369	5.2		PCTDRYWT
1994	OS	M94233376	M94233376	3.6		PCTDRYWT
1994	OS	M94233377	M94233377	4.7		PCTDRYWT
1994	OS	M94233378	M94233378	5.2		PCTDRYWT
1994	OS	M94233379	M94233379	4.1		PCTDRYWT
1994	OS	M94233381	M94233381	6.5		PCTDRYWT
1994	OS	M94233382	M94233382	6.4		PCTDRYWT
1994	OS	M94233383	M94233383	8.1		PCTDRYWT
1994	OS	M94233384	M94233384	5.7		PCTDRYWT
1994	BIH	M94233371	M94233371	4.8		PCTDRYWT
1994	BIH	M94233372	M94233372	6.6		PCTDRYWT
1994	BIH	M94233373	M94233373	5.1		PCTDRYWT
1994	GLOU	M94225475	M94225475	3.3		PCTDRYWT
1994	GLOU	M94225476	M94225476	4.6		PCTDRYWT
1994	GLOU	M94225477	M94225477	5.0		PCTDRYWT
1994	GLOU	M94225478	M94225478	4.0		PCTDRYWT
1995	DI	M9511D1H7	M9511D1H7TC1	10.2		PCTDRYWT

Table C-5. Lipid Data - Mussels 1991-1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1995	DI	M9511D1H7	M9511D1H7TC2	11.9		PCTDRYWT
1995	DI	M9511D1H7	M9511D1H7TC3	11.6		PCTDRYWT
1995	DI	M9511D1H7	M9511D1H7TC4	11.0		PCTDRYWT
1995	DI	M9511D1H7	M9511D1H7TC5	11.5		PCTDRYWT
1995	BIH	M9511D6H7	M9511D6H7TC1	10.0		PCTDRYWT
1995	BIH	M9511D6H7	M9511D6H7TC2	10.1		PCTDRYWT
1995	BIH	M9511D6H7	M9511D6H7TC3	10.4		PCTDRYWT
1995	BIH	M9511D6H7	M9511D6H7TC4	10.2		PCTDRYWT
1995	BIH	M9511D6H7	M9511D6H7TC5	8.5		PCTDRYWT
1995	GLOU	M9511H7	M9511H7TC1	9.2		PCTDRYWT
1995	GLOU	M9511H7	M9511H7TC2	8.1		PCTDRYWT
1995	GLOU	M9511H7	M9511H7TC3	8.6		PCTDRYWT
1995	GLOU	M9511H7	M9511H7TC4	8.2		PCTDRYWT
1995	GLOU	M9511H7	M9511H7TC5	9.6		PCTDRYWT
1996	DI	M9611D1H7	M9611D1H7TC1	9.0		PCTDRYWT
1996	DI	M9611D1H7	M9611D1H7TC2	15.0		PCTDRYWT
1996	DI	M9611D1H7	M9611D1H7TC3	13.4		PCTDRYWT
1996	DI	M9611D1H7	M9611D1H7TC4	14.9		PCTDRYWT
1996	DI	M9611D1H7	M9611D1H7TC5	16.7		PCTDRYWT
1996	OS	M9611D4H7	M9611D4H7TC1	8.8		PCTDRYWT
1996	OS	M9611D4H7	M9611D4H7TC2	10.5		PCTDRYWT
1996	OS	M9611D4H7	M9611D4H7TC3	12.2		PCTDRYWT
1996	OS	M9611D4H7	M9611D4H7TC4	10.4		PCTDRYWT
1996	OS	M9611D4H7	M9611D4H7TC5	10.9		PCTDRYWT
1996	BIH	M9611D6H7	M9611D6H7TC1	8.7		PCTDRYWT
1996	BIH	M9611D6H7	M9611D6H7TC2	10.3		PCTDRYWT
1996	BIH	M9611D6H7	M9611D6H7TC3	10.9		PCTDRYWT
1996	BIH	M9611D6H7	M9611D6H7TC4	8.9		PCTDRYWT
1996	BIH	M9611D6H7	M9611D6H7TC5	11.4		PCTDRYWT
1996	GLOU	M9611H7	M9611H7TC1	7.1		PCTDRYWT
1996	GLOU	M9611H7	M9611H7TC2	11.6		PCTDRYWT
1996	GLOU	M9611H7	M9611H7TC3	6.0		PCTDRYWT
1997	DI	M9711D1H7	M9711D1H7TC1	9.3		PCTDRYWT
1997	DI	M9711D1H7	M9711D1H7TC2	9.7		PCTDRYWT
1997	DI	M9711D1H7	M9711D1H7TC3	7.8		PCTDRYWT
1997	DI	M9711D1H7	M9711D1H7TC4	8.6		PCTDRYWT
1997	DI	M9711D1H7	M9711D1H7TC5	9.1		PCTDRYWT
1997	OS	M9711D4H7	M9711D4H7TC1	7.2		PCTDRYWT
1997	OS	M9711D4H7	M9711D4H7TC2	8.9		PCTDRYWT
1997	OS	M9711D4H7	M9711D4H7TC3	9.6		PCTDRYWT
1997	OS	M9711D4H7	M9711D4H7TC4	8.0		PCTDRYWT
1997	OS	M9711D4H7	M9711D4H7TC5	9.0		PCTDRYWT
1997	BIH	M9711D6H7	M9711D6H7TC1	8.8		PCTDRYWT
1997	BIH	M9711D6H7	M9711D6H7TC2	7.7		PCTDRYWT
1997	BIH	M9711D6H7	M9711D6H7TC3	7.5		PCTDRYWT

Table C-5. Lipid Data - Mussels 1991-1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1997	BIH	M9711D6H7	M9711D6H7TC4	7.8		PCTDRYWT
1997	BIH	M9711D6H7	M9711D6H7TC5	7.5		PCTDRYWT
1997	GLOU	M9711H7	M9711H7TC1	8.2		PCTDRYWT
1997	GLOU	M9711H7	M9711H7TC2	8.1		PCTDRYWT
1997	GLOU	M9711H7	M9711H7TC3	8.6		PCTDRYWT
1997	GLOU	M9711H7	M9711H7TC4	8.6		PCTDRYWT
1997	GLOU	M9711H7	M9711H7TC5	9.1		PCTDRYWT
1998	GLOU	FM9812G	VX01	6.0		PCTDRYWT
1998	GLOU	FM9812G	VX02	6.0		PCTDRYWT
1998	GLOU	FM9812G	VX03	5.0		PCTDRYWT
1998	GLOU	FM9812G	VX04	6.0		PCTDRYWT
1998	GLOU	FM9812G	VX05	6.0		PCTDRYWT
1998	SAND	FM9811S	VX06	8.6		PCTDRYWT
1998	DI	FM9821G	VX17	7.0		PCTDRYWT
1998	DI	FM9821G	VX18	8.0		PCTDRYWT
1998	DI	FM9821G	VX19	6.0		PCTDRYWT
1998	DI	FM9821G	VX20	7.0		PCTDRYWT
1998	DI	FM9821G	VX21	7.0		PCTDRYWT
1998	OS	FM9822G	VX22	7.0		PCTDRYWT
1998	OS	FM9822G	VX23	7.0		PCTDRYWT
1998	OS	FM9822G	VX24	8.0		PCTDRYWT
1998	OS	FM9822G	VX25	9.0		PCTDRYWT
1998	OS	FM9822G	VX26	6.0		PCTDRYWT
1998	OS	FM9822G	VX27	7.0		PCTDRYWT
1998	OS	FM9822G	VX28	8.0		PCTDRYWT
1998	OS	FM9822G	VX29	7.0		PCTDRYWT
1998	BIH	FM9832G	VX12	6.0		PCTDRYWT
1998	BIH	FM9832G	VX13	6.0		PCTDRYWT
1998	BIH	FM9832G	VX14	6.0		PCTDRYWT
1998	BIH	FM9832G	VX15	8.0		PCTDRYWT
1998	BIH	FM9832G	VX16	6.0		PCTDRYWT
1998	QUINCY	FM9831S	VX07	7.0		PCTDRYWT
1998	QUINCY	FM9831S	VX08	7.0		PCTDRYWT
1998	QUINCY	FM9831S	VX09	7.0		PCTDRYWT
1998	QUINCY	FM9831S	VX10	7.0		PCTDRYWT
1998	QUINCY	FM9831S	VX11	8.0		PCTDRYWT
1998	CCCB	FM9833G	VX30	8.0		PCTDRYWT
1998	CCCB	FM9833G	VX31	9.0		PCTDRYWT
1998	CCCB	FM9833G	VX32	8.0		PCTDRYWT
1998	CCCB	FM9833G	VX33	8.0		PCTDRYWT
1998	CCCB	FM9833G	VX34	8.0		PCTDRYWT
1998	CCCB	FM9833G	VX35	9.0		PCTDRYWT
1998	CCCB	FM9833G	VX36	8.0		PCTDRYWT
1998	CCCB	FM9833G	VX37	8.0		PCTDRYWT
1999	GLOU	FM9912G	XD74	7.8		PCTDRYWT

Table C-5. Lipid Data - Mussels 1991-1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1999	GLOU	FM9912G	XD75	5.6		PCTDRYWT
1999	GLOU	FM9912G	XD76	7.5		PCTDRYWT
1999	GLOU	FM9912G	XD77	6.4		PCTDRYWT
1999	GLOU	FM9912G	XD78	5.6		PCTDRYWT
1999	OS	FM9932G	XD84	8.7		PCTDRYWT
1999	OS	FM9932G	XD85	8.0		PCTDRYWT
1999	OS	FM9932G	XD86	6.9		PCTDRYWT
1999	OS	FM9932G	XD87	7.9		PCTDRYWT
1999	OS	FM9932G	XD88	9.0		PCTDRYWT
1999	OS	FM9932G	XD89	8.4		PCTDRYWT
1999	OS	FM9932G	XD90	8.3		PCTDRYWT
1999	OS	FM9932G	XD91	8.0		PCTDRYWT
1999	BIH	FM9931G	XD79	5.6		PCTDRYWT
1999	BIH	FM9931G	XD80	6.2		PCTDRYWT
1999	BIH	FM9931G	XD81	6.0		PCTDRYWT
1999	BIH	FM9931G	XD82	6.4		PCTDRYWT
1999	BIH	FM9931G	XD83	6.5		PCTDRYWT
1999	CCCB	FM9933G	XD92	11.3		PCTDRYWT
1999	CCCB	FM9933G	XD93	13.8		PCTDRYWT
1999	CCCB	FM9933G	XD94	12.1		PCTDRYWT
1999	CCCB	FM9933G	XD95	10.5		PCTDRYWT
1999	CCCB	FM9933G	XD96	9.9		PCTDRYWT
1999	CCCB	FM9933G	XD97	11.5		PCTDRYWT
1999	CCCB	FM9933G	XD98	11.9		PCTDRYWT
1999	CCCB	FM9933G	XD99	14.2		PCTDRYWT

Table C-6. Percent Dry Weight - Flounder Fillet 1992 – 1999.

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1992	DI	92-353	92-353M	18.1		PCTDRYWT
1992	DI	92-354	92-354M	18.5		PCTDRYWT
1992	DI	92-359	92-359M	21.3		PCTDRYWT
1992	DI	92-35C	92-35CM	20.6		PCTDRYWT
1992	NB	92-300	92-300M	21.1		PCTDRYWT
1992	NB	92-307	92-307M	17.0		PCTDRYWT
1992	NB	92-308	92-308M	19.5		PCTDRYWT
1992	NB	92-30C	92-30CM	20.5		PCTDRYWT
1992	BS	92-253	92-253M	20.0		PCTDRYWT
1992	BS	92-257	92-257M	19.3		PCTDRYWT
1992	BS	92-258	92-258M	22.5		PCTDRYWT
1992	BS	92-25C	92-25CM	19.2		PCTDRYWT
1992	OS	92-400	92-400M	17.3		PCTDRYWT
1992	OS	92-401	92-401M	21.0		PCTDRYWT
1992	OS	92-409	92-409M	18.9		PCTDRYWT
1992	OS	92-40C	92-40CM	20.3		PCTDRYWT
1992	ECCB	92-451	92-451M	18.4		PCTDRYWT
1992	ECCB	92-452	92-452M	22.2		PCTDRYWT
1992	ECCB	92-456	92-456M	19.8		PCTDRYWT
1992	ECCB	92-45C	92-45CM	20.3		PCTDRYWT
1993	DI	F93010465	465SF	20.5		PCTDRYWT
1993	DI	F93010466	466SF	21.3		PCTDRYWT
1993	DI	F93010467	467SF	15.3		PCTDRYWT
1993	DI	F93010468	468SF	17.5		PCTDRYWT
1993	DI	F93010469	469SF	18.8		PCTDRYWT
1993	DI	F93010470	470SF	20.4		PCTDRYWT
1993	DI	F93010471	471SF	12.6		PCTDRYWT
1993	DI	F93010472	472SF	16.1		PCTDRYWT
1993	DI	F93010473	473SF	17.9		PCTDRYWT
1993	DI	F93010474	474SF	21.1		PCTDRYWT
1993	OS	F93010565	565SF	19.4		PCTDRYWT
1993	OS	F93010566	566SF	16.7		PCTDRYWT
1993	OS	F93010567	567SF	21.2		PCTDRYWT
1993	OS	F93010569	569SF	18.7		PCTDRYWT
1993	OS	F93010570	570SF	18.3		PCTDRYWT
1993	OS	F93010571	571SF	16.4		PCTDRYWT
1993	OS	F93010572	572SF	17.2		PCTDRYWT
1993	OS	F93010573	573SF	16.0		PCTDRYWT
1993	OS	F93010574	574SF	17.6		PCTDRYWT
1993	ECCB	F93010625	625SF	14.7		PCTDRYWT
1993	ECCB	F93010626	626SF	16.0		PCTDRYWT
1993	ECCB	F93010627	627SF	19.2		PCTDRYWT
1993	ECCB	F93010628	628SF	17.8		PCTDRYWT
1993	ECCB	F93010629	629SF	17.4		PCTDRYWT

Table C-6. Percent Dry Weight - Flounder Fillet 1992 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1993	ECCB	F93010630	630SF	16.9		PCTDRYWT
1993	ECCB	F93010631	631SF	19.5		PCTDRYWT
1993	ECCB	F93010632	632SF	19.7		PCTDRYWT
1993	ECCB	F93010633	633SF	16.3		PCTDRYWT
1993	ECCB	F93010634	634SF	20.2		PCTDRYWT
1994	DI	FI101FLNDR	OU28	17.4		PCTDRYWT
1994	DI	FI102FLNDR	OU29	17.4		PCTDRYWT
1994	DI	FI103FLNDR	OU30	17.1		PCTDRYWT
1994	NB	FI201FLNDR	OU31	17.5		PCTDRYWT
1994	NB	FI202FLNDR	OU32	17.3		PCTDRYWT
1994	NB	FI203FLNDR	OU33	18.0		PCTDRYWT
1994	BS	FI301FLNDR	OU34	17.4		PCTDRYWT
1994	BS	FI302FLNDR	OU35	17.6		PCTDRYWT
1994	BS	FI303FLNDR	OU36	18.1		PCTDRYWT
1994	OS	FI401FLNDR	OU37	18.6		PCTDRYWT
1994	OS	FI402FLNDR	OU38	17.7		PCTDRYWT
1994	OS	FI403FLNDR	OU39	17.1		PCTDRYWT
1994	ECCB	FI501FLNDR	OU40	19.0		PCTDRYWT
1994	ECCB	FI502FLNDR	OU41	17.7		PCTDRYWT
1994	ECCB	FI503FLNDR	OU42	17.7		PCTDRYWT
1995	DI	P95111000C1	P95111000TC1	17.1		PCTDRYWT
1995	DI	P95111000C2	P95111000TC2	16.6		PCTDRYWT
1995	DI	P95111000C3	P95111000TC3	17.4		PCTDRYWT
1995	OS	P95114000C1	P95114000TC1	17.9		PCTDRYWT
1995	OS	P95114000C2	P95114000TC2	16.8		PCTDRYWT
1995	OS	P95114000C3	P95114000TC3	17.5		PCTDRYWT
1995	ECCB	P95115000C1	P95115000TC1	17.4		PCTDRYWT
1995	ECCB	P95115000C2	P95115000TC2	18.0		PCTDRYWT
1995	ECCB	P95115000C3	P95115000TC3	18.1		PCTDRYWT
1996	DI	P96111000C1	P96111000TC1	18.4		PCTDRYWT
1996	DI	P96111000C2	P96111000TC2	16.1		PCTDRYWT
1996	DI	P96111000C3	P96111000TC3	20.3		PCTDRYWT
1996	NB	P96112000C1	P96112000TC1	16.9		PCTDRYWT
1996	NB	P96112000C2	P96112000TC2	18.9		PCTDRYWT
1996	NB	P96112000C3	P96112000TC3	18.1		PCTDRYWT
1996	BS	P96113000C1	P96113000TC1	18.5		PCTDRYWT
1996	BS	P96113000C2	P96113000TC2	18.5		PCTDRYWT
1996	BS	P96113000C3	P96113000TC3	17.8		PCTDRYWT
1996	OS	P96114000C1	P96114000TC1	18.4		PCTDRYWT
1996	OS	P96114000C2	P96114000TC2	17.2		PCTDRYWT
1996	OS	P96114000C3	P96114000TC3	21.9		PCTDRYWT
1996	ECCB	P96115000C1	P96115000TC1	16.7		PCTDRYWT
1996	ECCB	P96115000C2	P96115000TC2	20.1		PCTDRYWT

Table C-6. Percent Dry Weight - Flounder Fillet 1992 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1996	ECCB	P96115000C3	P96115000TC3	18.0		PCTDRYWT
1997	DI	P97111000C1	P97111000TC1	17.9		PCTDRYWT
1997	DI	P97111000C2	P97111000TC2	17.7		PCTDRYWT
1997	DI	P97111000C3	P97111000TC3	17.6		PCTDRYWT
1997	OS	P97114000C1	P97114000TC1	18.3		PCTDRYWT
1997	OS	P97114000C2	P97114000TC2	17.6		PCTDRYWT
1997	OS	P97114000C3	P97114000TC3	17.0		PCTDRYWT
1997	ECCB	P97115000C1	P97115000TC1	17.4		PCTDRYWT
1997	ECCB	P97115000C2	P97115000TC2	18.1		PCTDRYWT
1997	ECCB	P97115000C3	P97115000TC3	17.7		PCTDRYWT
1998	DI	VQST11	VQ79	16.9		PCTDRYWT
1998	DI	VQST12	VQ80	18.1		PCTDRYWT
1998	DI	VQST13	VQ81	20.8		PCTDRYWT
1998	OS	VQST41	VQ85	18.5		PCTDRYWT
1998	OS	VQST42	VQ86	23.0		PCTDRYWT
1998	OS	VQST43	VQ87	21.2		PCTDRYWT
1998	ECCB	VQST51	VR06	22.7		PCTDRYWT
1998	ECCB	VQST52	VR07	22.8		PCTDRYWT
1998	ECCB	VQST53	VR08	20.4		PCTDRYWT
1999	DI	FF99110C1	WQ73COMP	17.9		PCTDRYWT
1999	DI	FF99110C2	WQ74COMP	17.3		PCTDRYWT
1999	DI	FF99110C3	WQ75COMP	17.6		PCTDRYWT
1999	NB	FF99120C1	WM20COMP	17.1		PCTDRYWT
1999	NB	FF99120C2	WM21COMP	18.9		PCTDRYWT
1999	NB	FF99120C3	WM22COMP	16.4		PCTDRYWT
1999	BS	FF99130C1	WM17COMP	18.3		PCTDRYWT
1999	BS	FF99130C2	WM18COMP	16.9		PCTDRYWT
1999	BS	FF99130C3	WM19COMP	19.5		PCTDRYWT
1999	OS	FF99140C1	WM70COMP	15.8		PCTDRYWT
1999	OS	FF99140C2	WM71COMP	16.8		PCTDRYWT
1999	OS	FF99140C3	WM72COMP	14.8		PCTDRYWT
1999	ECCB	FF99150C1	WM90COMP	16.5		PCTDRYWT
1999	ECCB	FF99150C2	WM91COMP	17.0		PCTDRYWT
1999	ECCB	FF99150C3	WM92COMP	16.6		PCTDRYWT

Table C-7. Percent Dry Weight - Flounder Liver 1992 – 1999.

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1992	DI	92-353	92-353L	20.4		PCTDRYWT
1992	DI	92-354	92-354L	21.5		PCTDRYWT
1992	DI	92-359	92-359L	24.5		PCTDRYWT
1992	DI	92-35C	92-35CL	23.1		PCTDRYWT
1992	NB	92-300	92-300L	22.2		PCTDRYWT
1992	NB	92-307	92-307L	18.0		PCTDRYWT
1992	NB	92-308	92-308L	20.7		PCTDRYWT
1992	NB	92-30C	92-30CL	25.7		PCTDRYWT
1992	BS	92-253	92-253L	21.8		PCTDRYWT
1992	BS	92-257	92-257L	26.4		PCTDRYWT
1992	BS	92-258	92-258L	24.1		PCTDRYWT
1992	BS	92-25C	92-25CL	23.0		PCTDRYWT
1992	OS	92-400	92-400L	24.1		PCTDRYWT
1992	OS	92-401	92-401L	25.7		PCTDRYWT
1992	OS	92-409	92-409L	22.1		PCTDRYWT
1992	OS	92-40C	92-40CL	24.7		PCTDRYWT
1992	ECCB	92-451	92-451L	20.7		PCTDRYWT
1992	ECCB	92-452	92-452L	22.2		PCTDRYWT
1992	ECCB	92-456	92-456L	25.7		PCTDRYWT
1992	ECCB	92-45C	92-45CL	23.3		PCTDRYWT
1993	DI	FI1-04	FI1-04CL	20.2		PCTDRYWT
1993	OS	FI4-05	FI4-05CL	20.5		PCTDRYWT
1993	ECCB	FI5-06	FI5-06CL	20.3		PCTDRYWT
1994	DI	FI101FLNDR	OV83	15.9		PCTDRYWT
1994	DI	FI102FLNDR	OV84	23.7		PCTDRYWT
1994	DI	FI103FLNDR	OV85	22.7		PCTDRYWT
1994	NB	FI201FLNDR	OV89	25.0		PCTDRYWT
1994	NB	FI202FLNDR	OV90	20.0		PCTDRYWT
1994	NB	FI203FLNDR	OV91	22.3		PCTDRYWT
1994	BS	FI301FLNDR	OV86	10.4		PCTDRYWT
1994	BS	FI302FLNDR	OV87	23.6		PCTDRYWT
1994	BS	FI303FLNDR	OV88	18.2		PCTDRYWT
1994	OS	FI401FLNDR	OV92	18.4		PCTDRYWT
1994	OS	FI402FLNDR	OV93	26.9		PCTDRYWT
1994	OS	FI403FLNDR	OV94	19.8		PCTDRYWT
1994	ECCB	FI501FLNDR	OV95	22.0		PCTDRYWT
1994	ECCB	FI502FLNDR	OV96	17.8		PCTDRYWT
1994	ECCB	FI503FLNDR	OV97	20.6		PCTDRYWT
1995	DI	P95111000C1	P95111000LC1	20.3		PCTDRYWT
1995	DI	P95111000C2	P95111000LC2	19.4		PCTDRYWT
1995	DI	P95111000C3	P95111000LC3	18.7		PCTDRYWT
1995	OS	P95114000C1	P95114000LC1	20.5		PCTDRYWT
1995	OS	P95114000C2	P95114000LC2	21.1		PCTDRYWT
1995	OS	P95114000C3	P95114000LC3	19.4		PCTDRYWT
1995	ECCB	P95115000C1	P95115000LC1	20.3		PCTDRYWT

Table C-7. Percent Dry Weight - Flounder Liver 1992 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1995	ECCB	P95115000C2	P95115000LC2	18.6		PCTDRYWT
1995	ECCB	P95115000C3	P95115000LC3	19.6		PCTDRYWT
1996	DI	P96111000C1	P96111000LC1	20.7		PCTDRYWT
1996	DI	P96111000C2	P96111000LC2	21.4		PCTDRYWT
1996	DI	P96111000C3	P96111000LC3	22.7		PCTDRYWT
1996	NB	P96112000C1	P96112000LC1	20.7		PCTDRYWT
1996	NB	P96112000C2	P96112000LC2	19.6		PCTDRYWT
1996	NB	P96112000C3	P96112000LC3	21.8		PCTDRYWT
1996	BS	P96113000C1	P96113000LC1	21.6		PCTDRYWT
1996	BS	P96113000C2	P96113000LC2	23.1		PCTDRYWT
1996	BS	P96113000C3	P96113000LC3	20.0		PCTDRYWT
1996	OS	P96114000C1	P96114000LC1	18.2		PCTDRYWT
1996	OS	P96114000C2	P96114000LC2	23.1		PCTDRYWT
1996	OS	P96114000C3	P96114000LC3	19.0		PCTDRYWT
1996	ECCB	P96115000C1	P96115000LC1	19.7		PCTDRYWT
1996	ECCB	P96115000C2	P96115000LC2	22.0		PCTDRYWT
1996	ECCB	P96115000C3	P96115000LC3	21.4		PCTDRYWT
1997	DI	P97111000C1	P97111000LC1	21.5		PCTDRYWT
1997	DI	P97111000C2	P97111000LC2	21.2		PCTDRYWT
1997	DI	P97111000C3	P97111000LC3	23.3		PCTDRYWT
1997	OS	P97114000C1	P97114000LC1	21.4		PCTDRYWT
1997	OS	P97114000C2	P97114000LC2	22.3		PCTDRYWT
1997	OS	P97114000C3	P97114000LC3	21.3		PCTDRYWT
1997	ECCB	P97115000C1	P97115000LC1	24.1		PCTDRYWT
1997	ECCB	P97115000C2	P97115000LC2	23.5		PCTDRYWT
1997	ECCB	P97115000C3	P97115000LC3	25.4		PCTDRYWT
1998	DI	VQST11	VQ82	21.4		PCTDRYWT
1998	DI	VQST12	VQ83	21.7		PCTDRYWT
1998	DI	VQST13	VQ84	18.5		PCTDRYWT
1998	OS	VQST41	VQ88	20.6		PCTDRYWT
1998	OS	VQST42	VQ89	27.7		PCTDRYWT
1998	OS	VQST43	VQ90	29.1		PCTDRYWT
1998	ECCB	VQST51	VR09	22.9		PCTDRYWT
1998	ECCB	VQST52	VR10	31.5		PCTDRYWT
1998	ECCB	VQST53	VR11	48.6		PCTDRYWT
1999	DI	FF99110C1	WQ76COMP	28.0		PCTDRYWT
1999	DI	FF99110C2	WQ77COMP	26.5		PCTDRYWT
1999	DI	FF99110C3	WQ78COMP	30.5		PCTDRYWT
1999	NB	FF99120C1	WM23COMP	19.6		PCTDRYWT
1999	NB	FF99120C2	WM24COMP	24.3		PCTDRYWT
1999	NB	FF99120C3	WM25COMP	22.5		PCTDRYWT
1999	BS	FF99130C1	WM14COMP	23.8		PCTDRYWT
1999	BS	FF99130C2	WM15COMP	17.1		PCTDRYWT
1999	BS	FF99130C3	WM16COMP	21.8		PCTDRYWT

Table C-7. Percent Dry Weight - Flounder Liver 1992 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1999	OS	FF99140C1	WM73COMP	22.4		PCTDRYWT
1999	OS	FF99140C2	WM74COMP	22.1		PCTDRYWT
1999	OS	FF99140C3	WM75COMP	21.6		PCTDRYWT
1999	ECCB	FF99150C1	WM93COMP	13.7		PCTDRYWT
1999	ECCB	FF99150C2	WM94COMP	22.3		PCTDRYWT
1999	ECCB	FF99150C3	WM95COMP	21.0		PCTDRYWT

Table C-8. Dry Weight Data - Lobster Meat 1992 – 1999.

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1992	DI	92-467	92-467M	22.1		PCTDRYWT
1992	DI	92-469	92-469M	23.1		PCTDRYWT
1992	DI	92-482	92-482M	20.0		PCTDRYWT
1992	OS	92-460	92-460M	17.3		PCTDRYWT
1992	OS	92-463	92-463M	16.6		PCTDRYWT
1992	OS	92-464	92-464M	21.3		PCTDRYWT
1992	ECCB	92-465	92-465M	16.3		PCTDRYWT
1992	ECCB	92-466	92-466M	21.7		PCTDRYWT
1992	ECCB	92-476	92-476M	17.2		PCTDRYWT
1993	DI	F93010KG34	KG34SM	14.3		PCTDRYWT
1993	DI	S93030KI06	KI06SM	12.5		PCTDRYWT
1993	DI	S93030KI07	KI07SM	13.5		PCTDRYWT
1993	OS	S93030KH97	KH97SM	12.9		PCTDRYWT
1993	OS	S93030KH98	KH98SM	18.9		PCTDRYWT
1993	ECCB	LOB-F0KH99	KH99SM	12.2		PCTDRYWT
1993	ECCB	LOB-F0KI01	KI01SM	18.8		PCTDRYWT
1993	ECCB	LOB-F0KI02	KI02SM	14.4		PCTDRYWT
1993	ECCB	LOB-F0KI03	KI03SM	12.8		PCTDRYWT
1993	ECCB	LOB-F0KI04	KI04SM	19.6		PCTDRYWT
1993	ECCB	LOB-F0KI05	KI05SM	13.7		PCTDRYWT
1993	ECCB	LOB-F0KI21	KI21SM	12.5		PCTDRYWT
1993	ECCB	LOB-F0KI22	KI22SM	14.7		PCTDRYWT
1993	ECCB	LOB-F0KI23	KI23SM	20.2		PCTDRYWT
1993	ECCB	LOB-F0KI24	KI24SM	15.3		PCTDRYWT
1994	DI	FI101LOBST	OV31	10.7		PCTDRYWT
1994	DI	FI102LOBST	OV32	12.5		PCTDRYWT
1994	DI	FI103LOBST	OV33	11.5		PCTDRYWT
1994	OS	FI401LOBST	OV34	16.9		PCTDRYWT
1994	OS	FI402LOBST	OV35-MEAN	13.3		PCTDRYWT
1994	ECCB	FI501LOBST	OV36	16.9		PCTDRYWT
1994	ECCB	FI502LOBST	OV37	16.2		PCTDRYWT
1994	ECCB	FI503LOBST	OV38	15.5		PCTDRYWT
1995	DI	L95111000C1	L95111000TC1	11.4		PCTDRYWT
1995	DI	L95111000C2	L95111000TC2	12.3		PCTDRYWT
1995	DI	L95111000C3	L95111000TC3	12.5		PCTDRYWT
1995	OS	L95114000C1	L95114000TC1	13.6		PCTDRYWT
1995	OS	L95114000C2	L95114000TC2	12.6		PCTDRYWT
1995	OS	L95114000C3	L95114000TC3	11.4		PCTDRYWT
1995	ECCB	L95115000C1	L95115000TC1	14.0		PCTDRYWT
1995	ECCB	L95115000C2	L95115000TC2	14.6		PCTDRYWT
1995	ECCB	L95115000C3	L95115000TC3	15.0		PCTDRYWT
1996	DI	L96111000C1	L96111000TC1	15.6		PCTDRYWT
1996	DI	L96111000C2	L96111000TC2	15.0		PCTDRYWT
1996	DI	L96111000C3	L96111000TC3	15.3		PCTDRYWT
1996	OS	L96114000C1	L96114000TC1	14.4		PCTDRYWT
1996	OS	L96114000C2	L96114000TC2	15.2		PCTDRYWT

Table C-8. Dry Weight Data - Lobster Meat 1992 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1996	OS	L96114000C3	L96114000TC3	15.5		PCTDRYWT
1996	ECCB	L96115000C1	L96115000TC1	17.6		PCTDRYWT
1996	ECCB	L96115000C2	L96115000TC2	21.0		PCTDRYWT
1996	ECCB	L96115000C3	L96115000TC3	19.6		PCTDRYWT
1997	DI	L97111000C1	L97111000TC1	15.3		PCTDRYWT
1997	DI	L97111000C2	L97111000TC2	13.2		PCTDRYWT
1997	DI	L97111000C3	L97111000TC3	12.4		PCTDRYWT
1997	OS	L97114000C1	L97114000TC1	18.4		PCTDRYWT
1997	OS	L97114000C2	L97114000TC2	10.7		PCTDRYWT
1997	OS	L97114000C3	L97114000TC3	12.4		PCTDRYWT
1997	ECCB	L97115000C1	L97115000TC1	14.2		PCTDRYWT
1997	ECCB	L97115000C2	L97115000TC2	17.1		PCTDRYWT
1997	ECCB	L97115000C3	L97115000TC3	16.2		PCTDRYWT
1998	DI	VZST11	VZ35COMP	14.1		PCTDRYWT
1998	DI	VZST12	VZ36COMP	15.5		PCTDRYWT
1998	DI	VZST13	VZ37COMP	14.7		PCTDRYWT
1998	OS	VZST41	VZ23COMP	13.5		PCTDRYWT
1998	OS	VZST42	VZ24COMP	13.7		PCTDRYWT
1998	OS	VZST43	VZ25COMP	13.6		PCTDRYWT
1998	ECCB	VZST91	VZ29COMP	15.1		PCTDRYWT
1998	ECCB	VZST92	VZ30COMP	13.4		PCTDRYWT
1998	ECCB	VZST93	VZ31COMP	14.7		PCTDRYWT
1999	DI	FL9915C1	XJ48	13.5		PCTDRYWT
1999	DI	FL9915C2	XJ49	12.7		PCTDRYWT
1999	DI	FL9915C3	XJ50	12.7		PCTDRYWT
1999	OS	FL9914C1	XJ45	14.1		PCTDRYWT
1999	OS	FL9914C2	XJ46	13.0		PCTDRYWT
1999	OS	FL9914C3	XJ47	13.6		PCTDRYWT
1999	ECCB	FL9911C1	XJ42	13.0		PCTDRYWT
1999	ECCB	FL9911C2	XJ43	15.4		PCTDRYWT
1999	ECCB	FL9911C3	XJ44	18.1		PCTDRYWT

Table C-9. Dry Weight Data - Lobster hepatopancreas 1992 – 1999.

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1992	DI	92-467	92-467L	38.5		PCTDRYWT
1992	DI	92-469	92-469L	50.8		PCTDRYWT
1992	DI	92-482	92-482L	40.5		PCTDRYWT
1992	OS	92-460	92-460L	35.4		PCTDRYWT
1992	OS	92-463	92-463L	31.9		PCTDRYWT
1992	OS	92-464	92-464L	51.9		PCTDRYWT
1992	ECCB	92-465	92-465L	18.9		PCTDRYWT
1992	ECCB	92-466	92-466L	54.5		PCTDRYWT
1992	ECCB	92-476	92-476L	22.7		PCTDRYWT
1993	DI	F93010KG34	KG34SH	18.1		PCTDRYWT
1993	DI	S93030KI06	KI06SH	25.6		PCTDRYWT
1993	DI	S93030KI07	KI07SH	18.8		PCTDRYWT
1993	OS	S93030KH97	KH97SH	20.0		PCTDRYWT
1993	OS	S93030KH98	KH98SH	30.1		PCTDRYWT
1993	ECCB	LOB-F0KH99	KH99SH	28.5		PCTDRYWT
1993	ECCB	LOB-F0KI01	KI01SH	35.9		PCTDRYWT
1993	ECCB	LOB-F0KI02	KI02SH	32.2		PCTDRYWT
1993	ECCB	LOB-F0KI03	KI03SH	13.4		PCTDRYWT
1993	ECCB	LOB-F0KI04	KI04SH	40.4		PCTDRYWT
1993	ECCB	LOB-F0KI05	KI05SH	20.8		PCTDRYWT
1993	ECCB	LOB-F0KI21	KI21SH	14.0		PCTDRYWT
1993	ECCB	LOB-F0KI22	KI22SH	17.8		PCTDRYWT
1993	ECCB	LOB-F0KI23	KI23SH	34.6		PCTDRYWT
1993	ECCB	LOB-F0KI24	KI24SH	20.7		PCTDRYWT
1994	DI	FI101LOBST	OV42	29.9		PCTDRYWT
1994	DI	FI102LOBST	OV43	28.6		PCTDRYWT
1994	DI	FI103LOBST	OV44	24.3		PCTDRYWT
1994	OS	FI401LOBST	OV45	27.6		PCTDRYWT
1994	OS	FI402LOBST	OV46	30.3		PCTDRYWT
1994	ECCB	FI501LOBST	OV47	29.0		PCTDRYWT
1994	ECCB	FI502LOBST	OV48	30.6		PCTDRYWT
1994	ECCB	FI503LOBST	OV49	25.0		PCTDRYWT
1995	DI	L95111000C1	L95111000HC1	37.4		PCTDRYWT
1995	DI	L95111000C2	L95111000HC2	38.2		PCTDRYWT
1995	DI	L95111000C3	L95111000HC3	31.0		PCTDRYWT
1995	OS	L95114000C1	L95114000HC1	37.6		PCTDRYWT
1995	OS	L95114000C2	L95114000HC2	28.9		PCTDRYWT
1995	OS	L95114000C3	L95114000HC3	28.5		PCTDRYWT
1995	ECCB	L95115000C1	L95115000HC1	29.3		PCTDRYWT
1995	ECCB	L95115000C2	L95115000HC2	35.3		PCTDRYWT
1995	ECCB	L95115000C3	L95115000HC3	35.8		PCTDRYWT
1996	DI	L96111000C1	L96111000HC1	29.7		PCTDRYWT
1996	DI	L96111000C2	L96111000HC2	35.4		PCTDRYWT
1996	DI	L96111000C3	L96111000HC3	38.6		PCTDRYWT
1996	OS	L96114000C1	L96114000HC1	35.2		PCTDRYWT
1996	OS	L96114000C2	L96114000HC2	31.2		PCTDRYWT

Table C-9. Dry Weight Data - Lobster hepatopancreas 1992 – 1999.

(CONTINUED)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1996	OS	L96114000C3	L96114000HC3	34.3		PCTDRYWT
1996	ECCB	L96115000C1	L96115000HC1	38.3		PCTDRYWT
1996	ECCB	L96115000C2	L96115000HC2	43.4		PCTDRYWT
1996	ECCB	L96115000C3	L96115000HC3	42.8		PCTDRYWT
1997	DI	L97111000C1	L97111000HC1	30.0		PCTDRYWT
1997	DI	L97111000C2	L97111000HC2	31.3		PCTDRYWT
1997	DI	L97111000C3	L97111000HC3	27.1		PCTDRYWT
1997	OS	L97114000C1	L97114000HC1	41.3		PCTDRYWT
1997	OS	L97114000C2	L97114000HC2	25.8		PCTDRYWT
1997	OS	L97114000C3	L97114000HC3	25.8		PCTDRYWT
1997	ECCB	L97115000C1	L97115000HC1	33.8		PCTDRYWT
1997	ECCB	L97115000C2	L97115000HC2	33.9		PCTDRYWT
1997	ECCB	L97115000C3	L97115000HC3	35.7		PCTDRYWT
1998	DI	VZST11	VZ38COMP	36.9		PCTDRYWT
1998	DI	VZST12	VZ39COMP	33.5		PCTDRYWT
1998	DI	VZST13	VZ40COMP	33.5		PCTDRYWT
1998	OS	VZST41	VZ26COMP	29.0		PCTDRYWT
1998	OS	VZST42	VZ27COMP	34.0		PCTDRYWT
1998	OS	VZST43	VZ28COMP	34.2		PCTDRYWT
1998	ECCB	VZST91	VZ32COMP	28.7		PCTDRYWT
1998	ECCB	VZST92	VZ33COMP	29.3		PCTDRYWT
1998	ECCB	VZST93	VZ34COMP	31.3		PCTDRYWT
1999	DI	FL9915C1	XJ57	26.0		PCTDRYWT
1999	DI	FL9915C2	XJ58	26.0		PCTDRYWT
1999	DI	FL9915C3	XJ59	24.1		PCTDRYWT
1999	OS	FL9914C1	XJ54	29.1		PCTDRYWT
1999	OS	FL9914C2	XJ55	31.2		PCTDRYWT
1999	OS	FL9914C3	XJ56	28.6		PCTDRYWT
1999	ECCB	FL9911C1	XJ51	45.8		PCTDRYWT
1999	ECCB	FL9911C2	XJ52	32.7		PCTDRYWT
1999	ECCB	FL9911C3	XJ53	36.2		PCTDRYWT

Table C-10. Percent Dry weight - Mussels 1991 – 1999.

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1991	DI	M91143957	M91143957	13.6		PCTDRYWT
1991	DI	M91143958	M91143958	14.1		PCTDRYWT
1991	DI	M91143959	M91143959	10.8		PCTDRYWT
1991	DI	M91143960	M91143960	12.0		PCTDRYWT
1991	DI	M91143961	M91143961	12.9		PCTDRYWT
1991	DI	M91143962	M91143962	12.4		PCTDRYWT
1991	DI	M91143963	M91143963	13.8		PCTDRYWT
1991	DI	M91143964	M91143964	14.0		PCTDRYWT
1991	BIH	M91143739	M91143739	14.7		PCTDRYWT
1991	BIH	M91143740	M91143740	8.0		PCTDRYWT
1991	BIH	M91143741	M91143741	12.2		PCTDRYWT
1991	BIH	M91143742	M91143742	11.1		PCTDRYWT
1991	BIH	M91143743	M91143743	9.8		PCTDRYWT
1991	GLOU	M91143626	M91143626	13.5		PCTDRYWT
1991	GLOU	M91143627	M91143627	14.1		PCTDRYWT
1991	GLOU	M91143628	M91143628	12.7		PCTDRYWT
1991	GLOU	M91143629	M91143629	13.4		PCTDRYWT
1991	GLOU	M91143630	M91143630	13.1		PCTDRYWT
1991	GLOU	M91143631	M91143631	9.7		PCTDRYWT
1991	GLOU	M91143632	M91143632	8.4		PCTDRYWT
1991	GLOU	M91143633	M91143633	9.0		PCTDRYWT
1991	GLOU	M91143634	M91143634	8.1		PCTDRYWT
1991	GLOU	M91143635	M91143635	8.0		PCTDRYWT
1992	DI	M92164479	M92164479	12.4		PCTDRYWT
1992	DI	M92164480	M92164480	16.8		PCTDRYWT
1992	DI	M92164481	M92164481	11.7		PCTDRYWT
1992	DI	M92164482	M92164482	10.5		PCTDRYWT
1992	DI	M92164483	M92164483	10.8		PCTDRYWT
1992	DI	M92164484	M92164484	11.9		PCTDRYWT
1992	DI	M92164485	M92164485	11.6		PCTDRYWT
1992	DI	M92164486	M92164486	11.7		PCTDRYWT
1992	OS	M92164492	M92164492	14.5		PCTDRYWT
1992	OS	M92164493	M92164493	16.6		PCTDRYWT
1992	OS	M92164494	M92164494	15.3		PCTDRYWT
1992	OS	M92164495	M92164495	15.5		PCTDRYWT
1992	OS	M92164496	M92164496	15.2		PCTDRYWT
1992	OS	M92164497	M92164497	16.9		PCTDRYWT
1992	OS	M92164498	M92164498	16.1		PCTDRYWT
1992	OS	M92164499	M92164499	16.0		PCTDRYWT
1992	BIH	M92164487	M92164487	5.7		PCTDRYWT
1992	BIH	M92164488	M92164488	9.6		PCTDRYWT
1992	BIH	M92164489	M92164489	11.0		PCTDRYWT
1992	BIH	M92164490	M92164490	10.0		PCTDRYWT
1992	BIH	M92164491	M92164491	10.6		PCTDRYWT
1992	GLOU	M92162679	M92162679	14.7		PCTDRYWT
1992	GLOU	M92162680	M92162680	12.8		PCTDRYWT

Table C-10. Percent Dry weight - Mussels 1991 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1992	GLOU	M92162681	M92162681	15.9		PCTDRYWT
1992	GLOU	M92162682	M92162682	13.5		PCTDRYWT
1992	GLOU	M92162683	M92162683	14.4		PCTDRYWT
1993	DI	M93196384	M93196384	14.5		PCTDRYWT
1993	DI	M93196385	M93196385	13.5		PCTDRYWT
1993	DI	M93196386	M93196386	14.4		PCTDRYWT
1993	DI	M93196387	M93196387	14.9		PCTDRYWT
1993	DI	M93196388	M93196388	14.5		PCTDRYWT
1993	OS	M93196376	M93196376	19.1		PCTDRYWT
1993	OS	M93196377	M93196377	17.5		PCTDRYWT
1993	OS	M93196378	M93196378	18.4		PCTDRYWT
1993	OS	M93196379	M93196379	18.4		PCTDRYWT
1993	OS	M93196380	M93196380	18.3		PCTDRYWT
1993	OS	M93196381	M93196381	17.9		PCTDRYWT
1993	OS	M93196382	M93196382	18.9		PCTDRYWT
1993	OS	M93196383	M93196383	19.7		PCTDRYWT
1993	BIH	M93196389	M93196389	10.3		PCTDRYWT
1993	BIH	M93196390	M93196390	11.0		PCTDRYWT
1993	BIH	M93196391	M93196391	10.5		PCTDRYWT
1993	BIH	M93196392	M93196392	11.1		PCTDRYWT
1993	GLOU	M93188933	M93188933	10.6		PCTDRYWT
1993	GLOU	M93188934	M93188934	9.8		PCTDRYWT
1993	GLOU	M93188936	M93188936	11.8		PCTDRYWT
1993	GLOU	M93188937	M93188937	14.7		PCTDRYWT
1993	GLOU	M93188941	M93188941	12.5		PCTDRYWT
1994	DI	M94233366	M94233366	13.3		PCTDRYWT
1994	DI	M94233367	M94233367	12.8		PCTDRYWT
1994	DI	M94233368	M94233368	13.1		PCTDRYWT
1994	DI	M94233369	M94233369	12.7		PCTDRYWT
1994	OS	M94233376	M94233376	16.0		PCTDRYWT
1994	OS	M94233377	M94233377	16.5		PCTDRYWT
1994	OS	M94233378	M94233378	16.8		PCTDRYWT
1994	OS	M94233379	M94233379	17.0		PCTDRYWT
1994	OS	M94233381	M94233381	16.4		PCTDRYWT
1994	OS	M94233382	M94233382	16.3		PCTDRYWT
1994	OS	M94233383	M94233383	17.2		PCTDRYWT
1994	OS	M94233384	M94233384	17.6		PCTDRYWT
1994	BIH	M94233371	M94233371	14.3		PCTDRYWT
1994	BIH	M94233372	M94233372	11.7		PCTDRYWT
1994	BIH	M94233373	M94233373	14.8		PCTDRYWT
1994	GLOU	M94225475	M94225475	13.5		PCTDRYWT
1994	GLOU	M94225476	M94225476	13.1		PCTDRYWT
1994	GLOU	M94225477	M94225477	13.7		PCTDRYWT
1994	GLOU	M94225478	M94225478	14.8		PCTDRYWT
1995	DI	M9511D1H7	M9511D1H7TC1	11.6		PCTDRYWT

Table C-10. Percent Dry weight - Mussels 1991 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1995	DI	M9511D1H7	M9511D1H7TC2	12.4		PCTDRYWT
1995	DI	M9511D1H7	M9511D1H7TC3	13.6		PCTDRYWT
1995	DI	M9511D1H7	M9511D1H7TC4	11.2		PCTDRYWT
1995	DI	M9511D1H7	M9511D1H7TC5	10.7		PCTDRYWT
1995	DI	M9511D1H8	M9511D1H8TC1	0.0	e	PCTDRYWT
1995	DI	M9511D1H8	M9511D1H8TC2	0.0	e	PCTDRYWT
1995	DI	M9511D1H8	M9511D1H8TC3	0.0	e	PCTDRYWT
1995	DI	M9511D1H8	M9511D1H8TC4	0.0	e	PCTDRYWT
1995	DI	M9511D1H8	M9511D1H8TC5	0.0	e	PCTDRYWT
1995	BIH	M9511D6H7	M9511D6H7TC1	12.3		PCTDRYWT
1995	BIH	M9511D6H7	M9511D6H7TC2	14.7		PCTDRYWT
1995	BIH	M9511D6H7	M9511D6H7TC3	13.7		PCTDRYWT
1995	BIH	M9511D6H7	M9511D6H7TC4	12.9		PCTDRYWT
1995	BIH	M9511D6H7	M9511D6H7TC5	11.9		PCTDRYWT
1995	BIH	M9511D6H8	M9511D6H8TC1	0.0	e	PCTDRYWT
1995	BIH	M9511D6H8	M9511D6H8TC2	0.0	e	PCTDRYWT
1995	BIH	M9511D6H8	M9511D6H8TC3	0.0	e	PCTDRYWT
1995	BIH	M9511D6H8	M9511D6H8TC4	0.0	e	PCTDRYWT
1995	BIH	M9511D6H8	M9511D6H8TC5	0.0	e	PCTDRYWT
1995	GLOU	M9511H7	M9511H7TC1	12.4		PCTDRYWT
1995	GLOU	M9511H7	M9511H7TC2	10.8		PCTDRYWT
1995	GLOU	M9511H7	M9511H7TC3	11.3		PCTDRYWT
1995	GLOU	M9511H7	M9511H7TC4	11.6		PCTDRYWT
1995	GLOU	M9511H7	M9511H7TC5	11.8		PCTDRYWT
1995	SAND	M9511H8	M9511H8TC1	0.0	e	PCTDRYWT
1995	SAND	M9511H8	M9511H8TC2	0.0	e	PCTDRYWT
1995	SAND	M9511H8	M9511H8TC3	0.0	e	PCTDRYWT
1995	SAND	M9511H8	M9511H8TC4	0.0	e	PCTDRYWT
1995	SAND	M9511H8	M9511H8TC5	0.0	e	PCTDRYWT
1996	DI	M9611D1H7	M9611D1H7TC1	9.7		PCTDRYWT
1996	DI	M9611D1H7	M9611D1H7TC2	11.4		PCTDRYWT
1996	DI	M9611D1H7	M9611D1H7TC3	13.2		PCTDRYWT
1996	DI	M9611D1H7	M9611D1H7TC4	13.3		PCTDRYWT
1996	DI	M9611D1H7	M9611D1H7TC5	12.0		PCTDRYWT
1996	DI	M9611D1H8	M9611D1H8TC1	14.2	j	PCTDRYWT
1996	DI	M9611D1H8	M9611D1H8TC2	14.2	j	PCTDRYWT
1996	DI	M9611D1H8	M9611D1H8TC3	14.2	j	PCTDRYWT
1996	DI	M9611D1H8	M9611D1H8TC4	14.2	j	PCTDRYWT
1996	DI	M9611D1H8	M9611D1H8TC5	14.2	j	PCTDRYWT
1996	OS	M9611D4H7	M9611D4H7TC1	13.9		PCTDRYWT
1996	OS	M9611D4H7	M9611D4H7TC2	17.4		PCTDRYWT
1996	OS	M9611D4H7	M9611D4H7TC3	16.8		PCTDRYWT
1996	OS	M9611D4H7	M9611D4H7TC4	16.5		PCTDRYWT
1996	OS	M9611D4H7	M9611D4H7TC5	17.7		PCTDRYWT
1996	OS	M9611D4H8	M9611D4H8TC1	19.1	j	PCTDRYWT

Table C-10. Percent Dry weight - Mussels 1991 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1996	OS	M9611D4H8	M9611D4H8TC2	19.1	j	PCTDRYWT
1996	OS	M9611D4H8	M9611D4H8TC3	19.1	j	PCTDRYWT
1996	OS	M9611D4H8	M9611D4H8TC4	19.1	j	PCTDRYWT
1996	OS	M9611D4H8	M9611D4H8TC5	19.1	j	PCTDRYWT
1996	BIH	M9611D6H7	M9611D6H7TC1	9.6		PCTDRYWT
1996	BIH	M9611D6H7	M9611D6H7TC2	16.9		PCTDRYWT
1996	BIH	M9611D6H7	M9611D6H7TC3	14.7		PCTDRYWT
1996	BIH	M9611D6H7	M9611D6H7TC4	16.4		PCTDRYWT
1996	BIH	M9611D6H7	M9611D6H7TC5	13.2		PCTDRYWT
1996	BIH	M9611D6H8	M9611D6H8TC1	16.3	j	PCTDRYWT
1996	BIH	M9611D6H8	M9611D6H8TC2	16.3	j	PCTDRYWT
1996	BIH	M9611D6H8	M9611D6H8TC3	16.3	j	PCTDRYWT
1996	GLOU	M9611H7	M9611H7TC1	8.8		PCTDRYWT
1996	GLOU	M9611H7	M9611H7TC2	14.1		PCTDRYWT
1996	GLOU	M9611H7	M9611H7TC3	14.6		PCTDRYWT
1996	SAND	M9611H8	M9611H8TC1	17.8	j	PCTDRYWT
1996	SAND	M9611H8	M9611H8TC2	17.8	j	PCTDRYWT
1996	SAND	M9611H8	M9611H8TC3	17.8	j	PCTDRYWT
1996	SAND	M9611H8	M9611H8TC4	17.8	j	PCTDRYWT
1996	SAND	M9611H8	M9611H8TC5	17.8	j	PCTDRYWT
1997	DI	M9711D1H7	M9711D1H7TC1	13.0		PCTDRYWT
1997	DI	M9711D1H7	M9711D1H7TC2	11.9		PCTDRYWT
1997	DI	M9711D1H7	M9711D1H7TC3	11.1		PCTDRYWT
1997	DI	M9711D1H7	M9711D1H7TC4	11.9		PCTDRYWT
1997	DI	M9711D1H7	M9711D1H7TC5	13.0		PCTDRYWT
1997	DI	M9711D1H8	M9711D1H8TC1	16.6	j	PCTDRYWT
1997	DI	M9711D1H8	M9711D1H8TC2	16.6	j	PCTDRYWT
1997	DI	M9711D1H8	M9711D1H8TC3	16.6	j	PCTDRYWT
1997	DI	M9711D1H8	M9711D1H8TC4	16.6	j	PCTDRYWT
1997	DI	M9711D1H8	M9711D1H8TC5	16.6	j	PCTDRYWT
1997	OS	M9711D4H7	M9711D4H7TC1	15.5		PCTDRYWT
1997	OS	M9711D4H7	M9711D4H7TC2	15.7		PCTDRYWT
1997	OS	M9711D4H7	M9711D4H7TC3	15.7		PCTDRYWT
1997	OS	M9711D4H7	M9711D4H7TC4	15.0		PCTDRYWT
1997	OS	M9711D4H7	M9711D4H7TC5	16.8		PCTDRYWT
1997	OS	M9711D4H8	M9711D4H8TC1	19.6	j	PCTDRYWT
1997	OS	M9711D4H8	M9711D4H8TC2	19.6	j	PCTDRYWT
1997	OS	M9711D4H8	M9711D4H8TC3	19.6	j	PCTDRYWT
1997	OS	M9711D4H8	M9711D4H8TC4	19.6	j	PCTDRYWT
1997	OS	M9711D4H8	M9711D4H8TC5	19.6	j	PCTDRYWT
1997	BIH	M9711D6H7	M9711D6H7TC1	16.1		PCTDRYWT
1997	BIH	M9711D6H7	M9711D6H7TC2	13.6		PCTDRYWT
1997	BIH	M9711D6H7	M9711D6H7TC3	12.4		PCTDRYWT
1997	BIH	M9711D6H7	M9711D6H7TC4	13.2		PCTDRYWT
1997	BIH	M9711D6H7	M9711D6H7TC5	12.9		PCTDRYWT

Table C-10. Percent Dry weight - Mussels 1991 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1997	BIH	M9711D6H8	M9711D6H8TC1	17.4	j	PCTDRYWT
1997	BIH	M9711D6H8	M9711D6H8TC2	17.4	j	PCTDRYWT
1997	BIH	M9711D6H8	M9711D6H8TC3	17.4	j	PCTDRYWT
1997	BIH	M9711D6H8	M9711D6H8TC4	17.4	j	PCTDRYWT
1997	BIH	M9711D6H8	M9711D6H8TC5	17.4	j	PCTDRYWT
1997	GLOU	M9711H7	M9711H7TC1	16.0		PCTDRYWT
1997	GLOU	M9711H7	M9711H7TC2	16.9		PCTDRYWT
1997	GLOU	M9711H7	M9711H7TC3	17.9		PCTDRYWT
1997	GLOU	M9711H7	M9711H7TC4	17.1		PCTDRYWT
1997	GLOU	M9711H7	M9711H7TC5	17.7		PCTDRYWT
1997	SAND	M9711H8	M9711H8TC1	22.1	j	PCTDRYWT
1997	SAND	M9711H8	M9711H8TC2	22.1	j	PCTDRYWT
1997	SAND	M9711H8	M9711H8TC3	22.1	j	PCTDRYWT
1997	SAND	M9711H8	M9711H8TC4	22.1	j	PCTDRYWT
1997	SAND	M9711H8	M9711H8TC5	22.1	j	PCTDRYWT
1998	GLOU	FM9812G	VX01	12.3		PCTDRYWT
1998	GLOU	FM9812G	VX02	10.6		PCTDRYWT
1998	GLOU	FM9812G	VX03	11.1		PCTDRYWT
1998	GLOU	FM9812G	VX04	10.4		PCTDRYWT
1998	GLOU	FM9812G	VX05	11.3		PCTDRYWT
1998	SAND	FM9811S	VW64	18.4		PCTDRYWT
1998	SAND	FM9811S	VW65	14.3		PCTDRYWT
1998	SAND	FM9811S	VW66	15.9		PCTDRYWT
1998	SAND	FM9811S	VW67	15.5		PCTDRYWT
1998	SAND	FM9811S	VW68	14.2		PCTDRYWT
1998	SAND	FM9811S	VX06	13.3		PCTDRYWT
1998	DI	FM9821G	VX17	14.9		PCTDRYWT
1998	DI	FM9821G	VX18	13.9		PCTDRYWT
1998	DI	FM9821G	VX19	15.2		PCTDRYWT
1998	DI	FM9821G	VX20	14.1		PCTDRYWT
1998	DI	FM9821G	VX21	15.7		PCTDRYWT
1998	DI	FM9821S	VW79	18.0		PCTDRYWT
1998	DI	FM9821S	VW80	16.7		PCTDRYWT
1998	DI	FM9821S	VW81	14.6		PCTDRYWT
1998	DI	FM9821S	VW82	15.8		PCTDRYWT
1998	DI	FM9821S	VW83	17.3		PCTDRYWT
1998	OS	FM9822G	VX22	14.3		PCTDRYWT
1998	OS	FM9822G	VX23	14.5		PCTDRYWT
1998	OS	FM9822G	VX24	15.2		PCTDRYWT
1998	OS	FM9822G	VX25	16.2		PCTDRYWT
1998	OS	FM9822G	VX26	18.2		PCTDRYWT
1998	OS	FM9822G	VX27	16.8		PCTDRYWT
1998	OS	FM9822G	VX28	14.9		PCTDRYWT
1998	OS	FM9822G	VX29	16.1		PCTDRYWT
1998	OS	FM9822S	VW84	14.8		PCTDRYWT

Table C-10. Percent Dry weight - Mussels 1991 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1998	OS	FM9822S	VW85	17.1		PCTDRYWT
1998	OS	FM9822S	VW86	14.8		PCTDRYWT
1998	OS	FM9822S	VW87	16.6		PCTDRYWT
1998	OS	FM9822S	VW88	20.0		PCTDRYWT
1998	OS	FM9822S	VW89	16.9		PCTDRYWT
1998	OS	FM9822S	VW90	17.1		PCTDRYWT
1998	OS	FM9822S	VW91	18.0		PCTDRYWT
1998	BIH	FM9832G	VX12	11.7		PCTDRYWT
1998	BIH	FM9832G	VX13	10.5		PCTDRYWT
1998	BIH	FM9832G	VX14	10.0		PCTDRYWT
1998	BIH	FM9832G	VX15	14.1		PCTDRYWT
1998	BIH	FM9832G	VX16	13.5		PCTDRYWT
1998	BIH	FM9832S	VW74	13.2		PCTDRYWT
1998	BIH	FM9832S	VW75	15.7		PCTDRYWT
1998	BIH	FM9832S	VW76	12.1		PCTDRYWT
1998	BIH	FM9832S	VW77	16.1		PCTDRYWT
1998	BIH	FM9832S	VW78	14.1		PCTDRYWT
1998	QUINCY	FM9831S	VW69	15.9		PCTDRYWT
1998	QUINCY	FM9831S	VW70	16.8		PCTDRYWT
1998	QUINCY	FM9831S	VW71	15.4		PCTDRYWT
1998	QUINCY	FM9831S	VW72	15.4		PCTDRYWT
1998	QUINCY	FM9831S	VW73	15.8		PCTDRYWT
1998	QUINCY	FM9831S	VX07	15.6		PCTDRYWT
1998	QUINCY	FM9831S	VX08	15.1		PCTDRYWT
1998	QUINCY	FM9831S	VX09	15.9		PCTDRYWT
1998	QUINCY	FM9831S	VX10	15.6		PCTDRYWT
1998	QUINCY	FM9831S	VX11	14.6		PCTDRYWT
1998	CCCB	FM9833G	VX30	17.0		PCTDRYWT
1998	CCCB	FM9833G	VX31	17.7		PCTDRYWT
1998	CCCB	FM9833G	VX32	17.5		PCTDRYWT
1998	CCCB	FM9833G	VX33	18.1		PCTDRYWT
1998	CCCB	FM9833G	VX34	18.1		PCTDRYWT
1998	CCCB	FM9833G	VX35	19.4		PCTDRYWT
1998	CCCB	FM9833G	VX36	19.9		PCTDRYWT
1998	CCCB	FM9833G	VX37	19.0		PCTDRYWT
1998	CCCB	FM9833S	VW92	18.8		PCTDRYWT
1998	CCCB	FM9833S	VW93	18.2		PCTDRYWT
1998	CCCB	FM9833S	VW94	21.4		PCTDRYWT
1998	CCCB	FM9833S	VW95	18.0		PCTDRYWT
1998	CCCB	FM9833S	VW96	25.6		PCTDRYWT
1998	CCCB	FM9833S	VW97	17.4		PCTDRYWT
1998	CCCB	FM9833S	VW98	22.0		PCTDRYWT
1998	CCCB	FM9833S	VW99	21.8		PCTDRYWT
1999	GLOU	FM9912G	XD74	14.0		PCTDRYWT
1999	GLOU	FM9912G	XD75	12.6		PCTDRYWT

Table C-10. Percent Dry weight - Mussels 1991 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1999	GLOU	FM9912G	XD76	12.8		PCTDRYWT
1999	GLOU	FM9912G	XD77	12.5		PCTDRYWT
1999	GLOU	FM9912G	XD78	12.4		PCTDRYWT
1999	SAND	FM9911S	XE01	11.4		PCTDRYWT
1999	SAND	FM9911S	XE02	23.8		PCTDRYWT
1999	SAND	FM9911S	XE03	20.8		PCTDRYWT
1999	SAND	FM9911S	XE04	22.8		PCTDRYWT
1999	SAND	FM9911S	XE05	20.5		PCTDRYWT
1999	OS	FM9932G	XD84	16.8		PCTDRYWT
1999	OS	FM9932G	XD85	18.5		PCTDRYWT
1999	OS	FM9932G	XD86	18.2		PCTDRYWT
1999	OS	FM9932G	XD87	18.5		PCTDRYWT
1999	OS	FM9932G	XD88	19.0		PCTDRYWT
1999	OS	FM9932G	XD89	18.7		PCTDRYWT
1999	OS	FM9932G	XD90	19.9		PCTDRYWT
1999	OS	FM9932G	XD91	18.9		PCTDRYWT
1999	OS	FM9932S	XE11	19.8		PCTDRYWT
1999	OS	FM9932S	XE12	21.6		PCTDRYWT
1999	OS	FM9932S	XE13	20.6		PCTDRYWT
1999	OS	FM9932S	XE14	20.8		PCTDRYWT
1999	OS	FM9932S	XE15	20.7		PCTDRYWT
1999	OS	FM9932S	XE16	19.4		PCTDRYWT
1999	OS	FM9932S	XE17	21.6		PCTDRYWT
1999	OS	FM9932S	XE18	20.8		PCTDRYWT
1999	BIH	FM9931G	XD79	9.4		PCTDRYWT
1999	BIH	FM9931G	XD80	10.7		PCTDRYWT
1999	BIH	FM9931G	XD81	11.9		PCTDRYWT
1999	BIH	FM9931G	XD82	13.6		PCTDRYWT
1999	BIH	FM9931G	XD83	12.9		PCTDRYWT
1999	BIH	FM9931S	XE06	18.8		PCTDRYWT
1999	BIH	FM9931S	XE07	18.1		PCTDRYWT
1999	BIH	FM9931S	XE08	20.0		PCTDRYWT
1999	BIH	FM9931S	XE09	19.6		PCTDRYWT
1999	BIH	FM9931S	XE10	19.2		PCTDRYWT
1999	CCCB	FM9933G	XD92	21.6		PCTDRYWT
1999	CCCB	FM9933G	XD93	18.8		PCTDRYWT
1999	CCCB	FM9933G	XD94	20.3		PCTDRYWT
1999	CCCB	FM9933G	XD95	21.7		PCTDRYWT
1999	CCCB	FM9933G	XD96	17.1		PCTDRYWT
1999	CCCB	FM9933G	XD97	20.7		PCTDRYWT
1999	CCCB	FM9933G	XD98	20.6		PCTDRYWT
1999	CCCB	FM9933G	XD99	20.0		PCTDRYWT
1999	CCCB	FM9933S	XE19	23.1		PCTDRYWT
1999	CCCB	FM9933S	XE20	23.2		PCTDRYWT
1999	CCCB	FM9933S	XE21	21.3		PCTDRYWT

Table C-10. Percent Dry weight - Mussels 1991 – 1999.
(Continued)

Year	Station	Sample	Bottle	Value	Val Qual	Unit Code
1999	CCCB	FM9933S	XE22	23.9		PCTDRYWT
1999	CCCB	FM9933S	XE23	22.1		PCTDRYWT
1999	CCCB	FM9933S	XE24	23.2		PCTDRYWT
1999	CCCB	FM9933S	XE25	23.6		PCTDRYWT
1999	CCCB	FM9933S	XE26	25.4		PCTDRYWT

Table C-11. Flounder Fillet Chemistry Data, 1991 – 1999.

			Means					SE					N				
Parameter	**Tissue**	**Year**	**DIF(1)**	**OS(4)**	**ECCB(5)**	**NB(2)**	**BS(3)**	**DIF**	**OS**	**ECCB**	**NB**	**BS**	**DIF(1)**	**FOS(4)**	**ECCB(5)**	**NB(2)**	**BS(3)**
Mercury	Fillets	1992	0.443	0.607	0.062	0.511	0.566	0.111	0.229	0.023	0.044	0.089	4	4	4	4	4
Mercury	Fillets	1993	0.460	0.413	0.186			0.105	0.075	0.030			10	9	10		
Mercury	Fillets	1994	0.283	0.434	0.120	0.378	0.477	0.032	0.090	0.006	0.014	0.105	3	3	3	3	3
Mercury	Fillets	1995	0.404	0.312	0.104			0.016	0.043	0.012			3	3	3		
Mercury	Fillets	1996	0.460	0.547	0.400	0.497	0.379	0.069	0.150	0.028	0.066	0.075	3	3	3	3	3
Mercury	Fillets	1997	0.511	0.276	0.195			0.089	0.198	0.020			3	3	3		
Mercury	Fillets	1998	0.234	0.328	0.136			0.012	0.038	0.023			3	3	3		
Mercury	Fillets	1999	0.352	0.540	0.224	0.525	0.417	0.010	0.044	0.012	0.067	0.013	3	3	3	3	3
Total DDT	Fillets	1992	47.31	22.18	10.07	27.29	43.09	8.64	3.35	2.15	11.42	15.60	4	4	4	4	4
Total DDT	Fillets	1993	32.17	27.64	13.05			5.78	4.10	1.62			10	9	10		
Total DDT	Fillets	1994	43.83	22.66	13.82	18.59	24.76	2.38	1.33	0.88	0.93	3.49	3	3	3	3	3
Total DDT	Fillets	1995	43.23	23.13	27.47			16.63	2.66	1.88			3	3	3		
Total DDT	Fillets	1996	32.07	19.28	9.81	19.90	17.39	2.53	4.62	2.01	0.49	2.55	3	3	3	3	3
Total DDT	Fillets	1997	46.27	22.47	13.41			3.75	4.80	1.93			3	3	3		
Total DDT	Fillets	1998	30.06	12.30	6.37			2.54	4.18	0.41			3	3	3		
Total DDT	Fillets	1999	21.40	22.31	11.74	23.29	17.07	1.33	4.45	1.20	1.62	2.49	3	3	3	3	3
Total PCB	Fillets	1992	458.49	220.41	51.14	261.97	380.66	168.05	46.32	11.35	74.60	128.46	4	4	4	4	4
Total PCB	Fillets	1993	200.39	215.05	59.24			29.93	38.81	8.20			10	9	10		
Total PCB	Fillets	1994	520.05	249.88	60.23	150.59	194.17	34.98	32.54	5.75	18.19	33.94	3	3	3	3	3
Total PCB	Fillets	1995	613.88	237.16	107.61			176.48	15.01	5.60			3	3	3		
Total PCB	Fillets	1996	285.76	194.68	65.69	227.83	141.75	29.69	42.59	10.86	15.67	8.90	3	3	3	3	3
Total PCB	Fillets	1997	325.09	206.67	62.78			37.38	30.71	6.70			3	3	3		
Total PCB	Fillets	1998	238.43	105.61	39.42			17.85	34.73	2.09			3	3	3		
Total PCB	Fillets	1999	141.52	166.19	51.70	133.25	111.41	4.43	41.14	5.80	11.18	7.73	3	3	3	3	3
Total CHLOR	Fillets	1992	35.48	8.47	2.67	12.24	25.55	21.30	1.00	0.67	5.24	15.25	4	4	4	4	4
Total CHLOR	Fillets	1993	16.04	17.01	5.54			2.58	3.91	0.87			10	9	10		
Total CHLOR	Fillets	1994	18.78	7.55	2.93	5.57	7.61	1.71	0.74	0.03	1.27	0.95	3	3	3	3	3
Total CHLOR	Fillets	1995	15.47	5.77	4.63			3.32	0.47	0.19			3	3	3		

Table C-11. Flounder Fillet Chemistry Data, 1991 – 1999.
(Continued)

			Means					SE					N				
Parameter	**Tissue**	**Year**	**DIF(1)**	**OS(4)**	**ECCB(5)**	**NB(2)**	**BS(3)**	**DIF**	**OS**	**ECCB**	**NB**	**BS**	**DIF(1)**	**FOS(4)**	**ECCB(5)**	**NB(2)**	**BS(3)**
Total CHLOR	Fillets	1996	11.30	3.67	1.08	6.87	5.40	0.31	0.47	0.55	1.13	0.31	3	3	3	3	3
Total CHLOR	Fillets	1997	13.93	5.66	1.66			1.27	0.68	0.20			3	3	3		
Total CHLOR	Fillets	1998	13.86	5.54	1.29			1.15	1.93	0.09			3	3	3		
Total CHLOR	Fillets	1999	9.73	7.12	2.34	10.10	8.84	0.34	2.79	0.49	1.16	0.90	3	3	3	3	3
Aldrin	Fillets	1992	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4	4	4	4	4
Aldrin	Fillets	1993	0.36	0.34	0.39			0.02	0.03	0.02			10	9	10		
Aldrin	Fillets	1994	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3
Aldrin	Fillets	1995	0.00	0.00	0.00			0.00	0.00	0.00			3	3	3		
Aldrin	Fillets	1996	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3
Aldrin	Fillets	1997	0.00	0.00	0.00			0.00	0.00	0.00			3	3	3		
Aldrin	Fillets	1998	0.00	0.00	0.00			0.00	0.00	0.00			3	3	3		
Aldrin	Fillets	1999	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3
Dieldrin	Fillets	1992	2.67	1.03	1.04	2.92	1.71	0.68	0.13	0.30	1.17	0.71	4	4	4	4	4
Dieldrin	Fillets	1993	3.30	2.96	2.02			0.34	0.64	0.17			10	9	10		
Dieldrin	Fillets	1994	3.56	1.37	1.33	1.15	1.25	0.44	0.14	0.05	0.09	0.17	3	3	3	3	3
Dieldrin	Fillets	1995	3.00	1.10	0.00			1.61	0.55	0.00			3	3	3		
Dieldrin	Fillets	1996	2.00	1.07	1.03	1.23	0.59	0.62	0.29	0.04	0.12	0.30	3	3	3	3	3
Dieldrin	Fillets	1997	2.97	1.73	1.08			0.24	0.09	0.11			3	3	3		
Dieldrin	Fillets	1998	2.49	1.16	0.68			0.14	0.32	0.03			3	3	3		
Dieldrin	Fillets	1999	3.72	4.79	0.74	2.97	2.67	1.10	1.72	0.18	0.17	0.43	3	3	3	3	3
Endrin	Fillets	1992	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4	4	4	4	4
Endrin	Fillets	1993	0.45	0.43	0.50			0.02	0.04	0.02			10	9	10		
Endrin	Fillets	1994	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3
Endrin	Fillets	1995	0.00	0.00	0.00			0.00	0.00	0.00			3	3	3		
Endrin	Fillets	1996	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3
Endrin	Fillets	1997	0.00	0.00	0.00			0.00	0.00	0.00			3	3	3		
Endrin	Fillets	1998	0.38	0.11	0.00			0.04	0.06	0.00			3	3	3		
Endrin	Fillets	1999	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3
Hexachlorobenzene	Fillets	1992	0.90	0.49	0.34	0.49	0.60	0.33	0.14	0.08	0.07	0.24	4	4	4	4	4

Table C-11. Flounder Fillet Chemistry Data, 1991 – 1999.
(Continued)

			Means					SE					N				
Parameter	**Tissue**	**Year**	**DIF(1)**	**OS(4)**	**ECCB(5)**	**NB(2)**	**BS(3)**	**DIF**	**OS**	**ECCB**	**NB**	**BS**	**DIF(1)**	**FOS(4)**	**ECCB(5)**	**NB(2)**	**BS(3)**
Hexachlorobenzene	Fillets	1993	0.98	0.71	0.65			0.17	0.05	0.10			10	9	10		
Hexachlorobenzene	Fillets	1994	0.83	0.59	0.60	0.62	0.72	0.05	0.04	0.16	0.08	0.14	3	3	3	3	3
Hexachlorobenzene	Fillets	1995	0.71	0.52	0.55			0.04	0.04	0.01			3	3	3		
Hexachlorobenzene	Fillets	1996	0.70	0.69	0.76	0.72	1.01	0.09	0.16	0.04	0.02	0.19	3	3	3	3	3
Hexachlorobenzene	Fillets	1997	0.68	0.63	0.32			0.03	0.10	0.16			3	3	3		
Hexachlorobenzene	Fillets	1998	0.66	0.44	0.38			0.02	0.11	0.05			3	3	3		
Hexachlorobenzene	Fillets	1999	0.49	0.60	0.53	0.43	0.55	0.01	0.02	0.05	0.22	0.02	3	3	3	3	3
Mirex	Fillets	1992	0.53	0.39	0.06	0.36	0.50	0.36	0.14	0.06	0.07	0.19	4	4	4	4	4
Mirex	Fillets	1993	0.50	0.52	0.31			0.08	0.08	0.03			10	9	10		
Mirex	Fillets	1994	0.72	0.45	0.18	0.36	0.46	0.13	0.03	0.02	0.02	0.07	3	3	3	3	3
Mirex	Fillets	1995	0.36	0.28	0.16			0.05	0.03	0.08			3	3	3		
Mirex	Fillets	1996	0.12	0.11	0.00	0.00	0.00	0.12	0.11	0.00	0.00	0.00	3	3	3	3	3
Mirex	Fillets	1997	0.00	0.00	0.00			0.00	0.00	0.00			3	3	3		
Mirex	Fillets	1998	0.29	0.21	0.02			0.05	0.07	0.02			3	3	3		
Mirex	Fillets	1999	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3
Lindane	Fillets	1992	0.03	0.04	0.03	0.00	0.00	0.03	0.04	0.03	0.00	0.00	4	4	4	4	4
Lindane	Fillets	1993	0.53	0.53	0.61			0.05	0.04	0.03			10	9	10		
Lindane	Fillets	1994	0.12	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.00	0.00	3	3	3	3	3
Lindane	Fillets	1995	0.00	0.00	0.00			0.00	0.00	0.00			3	3	3		
Lindane	Fillets	1996	0.05	0.04	0.00	0.00	0.00	0.05	0.04	0.00	0.00	0.00	3	3	3	3	3
Lindane	Fillets	1997	0.00	0.11	0.23			0.00	0.06	0.16			3	3	3		
Lindane	Fillets	1998	0.15	0.08	0.06			0.01	0.04	0.03			3	3	3		
Lindane	Fillets	1999	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.04	0.00	3	3	3	3	3

Table C-12. Flounder Liver Chemistry Data, 1991 – 1999.

			Means					SE					N				
Parameter	Tissue	Year	DIF(1)	OS(4)	ECCB(5)	NB(2)	BS(3)	DIF	OS	ECCB	NB	BS	DIF(1)	FOS(4)	ECCB(5)	NB(2)	BS(3)
Lead	Liver	1992	2.75	3.29	6.25	3.39	5.55	1.46	0.87	2.53	1.94	3.34	4	4	4	4	4
Lead	Liver	1993	2.02	2.32	1.14			0.00	0.00	0.00			1	1	1		
Lead	Liver	1994	1.42	6.22	4.15	1.65	6.52	0.26	1.04	0.87	0.19	1.52	3	3	3	3	3
Lead	Liver	1995	0.84	5.94	5.22			0.16	1.69	1.17			3	3	3		
Lead	Liver	1996	2.12	4.24	2.58	2.12	3.84	0.19	0.87	1.57	0.31	1.01	3	3	3	3	3
Lead	Liver	1997	3.06	4.39	1.07			0.64	0.64	0.31			3	3	3		
Lead	Liver	1998	2.47	3.82	2.28			0.20	0.37	0.50			3	3	3		
Lead	Liver	1999	2.42	6.77	2.04	4.43	4.95	0.32	3.25	0.39	1.69	1.54	3	3	3	3	3
Mercury	Liver	1992	1.000	0.560	0.278	0.736	1.054	0.276	0.106	0.130	0.150	0.066	4	4	4	4	4
Mercury	Liver	1993	0.694	0.420	0.232			0.000	0.000	0.000			1	1	1		
Mercury	Liver	1994	0.277	0.545	0.226	0.309	0.453	0.033	0.162	0.021	0.027	0.079	3	3	3	3	3
Mercury	Liver	1995	0.250	0.386	0.301			0.049	0.020	0.051			3	3	3		
Mercury	Liver	1996	0.530	0.553	0.436	0.751	0.730	0.086	0.030	0.042	0.012	0.229	3	3	3	3	3
Mercury	Liver	1997	0.343	0.343	0.202			0.054	0.069	0.021			3	3	3		
Mercury	Liver	1998	0.271	0.386	0.266			0.035	0.037	0.039			3	3	3		
Mercury	Liver	1999	0.223	0.645	0.308	0.743	0.494	0.003	0.119	0.043	0.068	0.015	3	3	3	3	3
Cadmium	Liver	1992	2.28	1.82	0.51	1.32	2.17	0.62	0.58	0.29	0.28	0.64	4	4	4	4	4
Cadmium	Liver	1993	0.91	0.85	0.42			0.00	0.00	0.00			1	1	1		
Cadmium	Liver	1994	0.98	2.16	0.97	0.83	1.09	0.44	0.89	0.21	0.11	0.18	3	3	3	3	3
Cadmium	Liver	1995	0.44	1.42	0.66			0.07	0.09	0.01			3	3	3		
Cadmium	Liver	1996	0.90	3.33	1.09	1.65	1.16	0.30	0.79	0.20	0.36	0.20	3	3	3	3	3
Cadmium	Liver	1997	2.25	1.04	1.83			1.50	0.10	0.49			3	3	3		
Cadmium	Liver	1998	0.66	1.22	1.65			0.10	0.29	0.51			3	3	3		
Cadmium	Liver	1999	0.59	3.18	1.64	2.21	1.47	0.13	1.05	0.47	0.90	0.13	3	3	3	3	3
Copper	Liver	1992	66.28	91.73	72.63	60.03	37.25	48.30	19.98	26.27	23.39	9.45	4	4	4	4	4
Copper	Liver	1993	82.70	50.60	26.40			0.00	0.00	0.00			1	1	1		
Copper	Liver	1994	51.81	112.20	121.30	80.47	103.03	6.84	29.95	5.67	10.72	19.49	3	3	3	3	3
Copper	Liver	1995	55.86	121.40	64.52			22.31	12.89	4.16			3	3	3		
Copper	Liver	1996	42.28	125.51	65.55	74.78	68.31	19.58	34.36	7.73	4.45	13.34	3	3	3	3	3

Table C-12. Flounder Liver Chemistry Data, 1991 – 1999. (Continued)

			Means					SE					N				
Parameter	**Tissue**	**Year**	**DIF(1)**	**OS(4)**	**ECCB(5)**	**NB(2)**	**BS(3)**	**DIF**	**OS**	**ECCB**	**NB**	**BS**	**DIF(1)**	**FOS(4)**	**ECCB(5)**	**NB(2)**	**BS(3)**
Copper	Liver	1997	54.92	75.07	87.01			1.71	11.75	17.91			3	3	3		
Copper	Liver	1998	42.55	91.60	138.85			9.30	19.57	29.87			3	3	3		
Copper	Liver	1999	33.51	129.94	70.88	90.58	67.98	2.77	18.52	16.26	28.06	12.79	3	3	3	3	3
Nickel	Liver	1992	0.84	0.80	0.36	0.46	1.21	0.39	0.29	0.07	0.02	0.60	4	4	4	4	4
Nickel	Liver	1993	0.62	0.65	0.40			0.00	0.00	0.00			1	1	1		
Nickel	Liver	1994	0.24	0.60	0.37	0.27	0.61	0.01	0.04	0.05	0.03	0.09	3	3	3	3	3
Nickel	Liver	1995	0.14	0.44	0.46			0.02	0.11	0.05			3	3	3		
Nickel	Liver	1996	0.00	0.17	0.00	0.11	0.00	0.00	0.10	0.00	0.11	0.00	3	3	3	3	3
Nickel	Liver	1997	0.41	0.38	0.42			0.12	0.03	0.07			3	3	3		
Nickel	Liver	1998	0.58	0.64	0.66			0.29	0.07	0.15			3	3	3		
Nickel	Liver	1999	0.17	0.58	0.38	0.78	0.99	0.05	0.14	0.12	0.32	0.34	3	3	3	3	3
Silver	Liver	1992	2.66	4.77	4.47	2.91	3.34	1.74	1.06	1.07	0.86	1.61	4	4	4	4	4
Silver	Liver	1993	5.46	4.78	1.41			0.00	0.00	0.00			1	1	1		
Silver	Liver	1994	3.76	10.11	6.11	5.67	7.77	0.32	4.11	0.81	1.48	1.18	3	3	3	3	3
Silver	Liver	1995	3.42	9.89	4.55			1.88	2.60	0.39			3	3	3		
Silver	Liver	1996	4.47	22.40	4.16	7.21	6.28	1.53	6.42	0.22	0.52	1.48	3	3	3	3	3
Silver	Liver	1997	5.47	9.17	8.02			0.10	1.36	1.22			3	3	3		
Silver	Liver	1998	2.55	7.02	6.90			0.78	1.33	1.93			3	3	3		
Silver	Liver	1999	2.37	11.57	4.53	14.18	5.71	0.20	1.88	0.53	7.54	0.96	3	3	3	3	3
Zinc	Liver	1992	117.75	163.25	158.25	131.00	141.88	4.52	4.44	6.09	11.67	8.44	4	4	4	4	4
Zinc	Liver	1993	86.70	85.30	82.30			0.00	0.00	0.00			1	1	1		
Zinc	Liver	1994	112.27	154.00	176.67	143.33	138.00	0.37	9.02	15.59	4.10	2.65	3	3	3	3	3
Zinc	Liver	1995	105.68	151.65	138.12			1.38	6.49	11.65			3	3	3		
Zinc	Liver	1996	87.07	120.99	126.28	120.15	124.26	24.87	5.77	2.45	0.46	8.61	3	3	3	3	3
Zinc	Liver	1997	127.46	141.24	137.22			2.55	6.67	7.10			3	3	3		
Zinc	Liver	1998	106.26	113.63	147.75			1.59	10.19	6.29			3	3	3		
Zinc	Liver	1999	101.54	108.54	112.21	122.87	106.87	4.63	7.42	4.36	4.41	5.84	3	3	3	3	3
Total DDT	Liver	1992	214.45	207.07	48.76	166.14	436.33	44.37	36.88	5.13	32.84	171.81	4	4	4	4	4

Table C-12. Flounder Liver Chemistry Data, 1991 – 1999. (Continued)

			Means					SE					N				
Parameter	**Tissue**	**Year**	**DIF(1)**	**OS(4)**	**ECCB(5)**	**NB(2)**	**BS(3)**	**DIF**	**OS**	**ECCB**	**NB**	**BS**	**DIF(1)**	**FOS(4)**	**ECCB(5)**	**NB(2)**	**BS(3)**
Total DDT	Liver	1993	260.49	249.57	71.81			0.00	0.00	0.00			1	1	1		
Total DDT	Liver	1994	407.31	264.11	73.53	168.69	297.61	40.82	47.22	9.79	15.02	82.90	3	3	3	3	3
Total DDT	Liver	1995	866.33	455.23	160.30			76.78	100.00	17.05			3	3	3		
Total DDT	Liver	1996	420.00	274.33	104.00	192.67	176.23	88.49	93.20	11.02	29.69	45.70	3	3	3	3	3
Total DDT	Liver	1997	635.20	342.40	237.37			130.23	56.21	84.22			3	3	3		
Total DDT	Liver	1998	381.80	132.43	64.66			99.23	17.19	22.04			3	3	3		
Total DDT	Liver	1999	484.47	181.02	80.56	116.34	187.00	24.62	44.79	26.59	15.59	32.21	3	3	3	3	3
Total PCB	Liver	1992	2660.12	2414.79	372.72	1844.25	3771.97	523.02	471.73	65.10	563.23	1136.91	4	4	4	4	4
Total PCB	Liver	1993	1812.43	1746.52	350.85			0.00	0.00	0.00			1	1	1		
Total PCB	Liver	1994	3614.88	2381.50	343.67	1115.69	2167.67	595.95	561.77	52.94	135.12	823.07	3	3	3	3	3
Total PCB	Liver	1995	9242.98	6090.63	1249.36			839.25	1747.82	520.59			3	3	3		
Total PCB	Liver	1996	3672.27	2600.57	778.10	2123.10	1690.03	687.72	463.19	33.60	78.39	440.70	3	3	3	3	3
Total PCB	Liver	1997	4637.97	2629.27	938.43			992.24	727.44	177.43			3	3	3		
Total PCB	Liver	1998	3060.53	1256.03	448.36			659.52	246.76	128.01			3	3	3		
Total PCB	Liver	1999	2761.07	1270.92	360.31	825.35	1213.75	32.38	326.53	111.33	98.35	103.22	3	3	3	3	3
Total PAH	Liver	1992	12890.11	3634.73	7968.82	11854.97	11369.08	7775.44	1915.22	2341.36	5192.36	5521.64	4	4	4	4	4
Total PAH	Liver	1993	1328.81	871.23	854.87			0.00	0.00	0.00			1	1	1		
Total PAH	Liver	1994	217.68	243.83	148.17	232.37	198.05	27.81	72.81	39.85	83.26	108.99	3	3	3	3	3
Total PAH	Liver	1995	240.23	61.53	48.63			40.11	11.62	7.96			3	3	3		
Total PAH	Liver	1996	268.63	339.23	284.70	334.97	304.73	37.22	81.93	38.27	15.40	41.13	3	3	3	3	3
Total PAH	Liver	1997	233.03	140.80	103.89			20.09	3.29	12.26			3	3	3		
Total PAH	Liver	1998	76.31	49.42	34.29			13.20	9.08	8.59			3	3	3		
Total PAH	Liver	1999	104.65	88.59	126.72	97.54	85.19	12.60	23.58	58.68	28.23	24.31	3	3	3	3	3
Total CHLOR	Liver	1992	206.97	105.02	47.33	89.13	262.94	72.15	22.63	32.73	27.21	117.12	4	4	4	4	4
Total CHLOR	Liver	1993	125.26	94.47	28.73			0.00	0.00	0.00			1	1	1		
Total CHLOR	Liver	1994	207.94	112.99	19.39	58.94	122.64	22.57	34.53	2.83	13.41	59.70	3	3	3	3	3
Total CHLOR	Liver	1995	283.00	96.00	39.73			42.88	16.29	16.74			3	3	3		

Table C-12. Flounder Liver Chemistry Data, 1991 – 1999. (Continued)

			Means					SE					N				
Parameter	Tissue	Year	DIF(1)	OS(4)	ECCB(5)	NB(2)	BS(3)	DIF	OS	ECCB	NB	BS	DIF(1)	FOS(4)	ECCB(5)	NB(2)	BS(3)
Total CHLOR	Liver	1996	169.87	86.33	20.23	69.33	59.90	36.87	10.99	3.40	8.41	18.86	3	3	3	3	3
Total CHLOR	Liver	1997	243.67	78.67	32.70			54.73	15.94	4.64			3	3	3		
Total CHLOR	Liver	1998	176.10	51.33	11.87			54.99	6.82	3.39			3	3	3		
Total CHLOR	Liver	1999	225.85	47.80	15.42	41.68	68.38	10.52	15.29	6.15	10.86	36.54	3	3	3	3	3
Chromium	Liver	1992	0.24	0.06	0.04	0.03	0.14	0.09	0.02	0.03	0.03	0.06	4	4	4	4	4
Chromium	Liver	1993	0.74	0.92	0.02			0.00	0.00	0.00			1	1	1		
Chromium	Liver	1994	0.19	0.14	0.10	0.10	0.17	0.05	0.00	0.01	0.04	0.03	3	3	3	3	3
Chromium	Liver	1995	0.14	0.09	0.09			0.01	0.02	0.02			3	3	3		
Chromium	Liver	1996	0.08	0.12	0.04	0.16	0.05	0.00	0.03	0.01	0.03	0.01	3	3	3	3	3
Chromium	Liver	1997	0.42	0.30	0.33			0.23	0.29	0.32			3	3	3		
Chromium	Liver	1998	0.36	0.19	0.08			0.14	0.04	0.01			3	3	3		
Chromium	Liver	1999	0.26	0.16	0.14	0.54	0.57	0.15	0.03	0.00	0.22	0.09	3	3	3	3	3
Aldrin	Liver	1992	0.00	0.72	0.52	0.68	1.23	0.00	0.72	0.52	0.68	1.23	4	4	4	4	4
Aldrin	Liver	1993	1.57	1.38	1.46			0.00	0.00	0.00			1	1	1		
Aldrin	Liver	1994	8.24	11.20	13.01	10.18	18.59	1.67	1.94	3.65	1.23	7.39	3	3	3	3	3
Aldrin	Liver	1995	0.00	0.00	0.00			0.00	0.00	0.00			3	3	3		
Aldrin	Liver	1996	0.40	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	3	3	3	3	3
Aldrin	Liver	1997	0.00	0.00	0.00			0.00	0.00	0.00			3	3	3		
Aldrin	Liver	1998	0.00	0.00	0.00			0.00	0.00	0.00			3	3	3		
Aldrin	Liver	1999	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3
Dieldrin	Liver	1992	18.07	12.33	7.31	15.19	17.76	2.30	2.08	1.50	4.42	3.71	4	4	4	4	4
Dieldrin	Liver	1993	23.37	20.25	11.20			0.00	0.00	0.00			1	1	1		
Dieldrin	Liver	1994	30.27	13.82	5.64	9.26	13.46	4.73	3.11	1.48	0.41	4.99	3	3	3	3	3
Dieldrin	Liver	1995	52.67	0.00	7.00			4.48	0.00	7.00			3	3	3		
Dieldrin	Liver	1996	30.00	8.33	9.80	9.00	0.00	13.58	4.41	1.72	4.51	0.00	3	3	3	3	3
Dieldrin	Liver	1997	36.67	18.33	14.33			7.22	3.33	1.45			3	3	3		
Dieldrin	Liver	1998	24.12	9.92	4.89			3.50	0.67	1.58			3	3	3		
Dieldrin	Liver	1999	38.87	18.49	6.76	10.71	25.36	14.84	4.38	3.36	1.78	6.20	3	3	3	3	3

Table C-12. Flounder Liver Chemistry Data, 1991 – 1999. (Continued)

			Means					SE					N				
Parameter	Tissue	Year	DIF(1)	OS(4)	ECCB(5)	NB(2)	BS(3)	DIF	OS	ECCB	NB	BS	DIF(1)	FOS(4)	ECCB(5)	NB(2)	BS(3)
Endrin	Liver	1992	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4	4	4	4	4
Endrin	Liver	1993	1.99	1.74	1.85			0.00	0.00	0.00			1	1	1		
Endrin	Liver	1994	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3
Endrin	Liver	1995	0.00	0.00	0.00			0.00	0.00	0.00			3	3	3		
Endrin	Liver	1996	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3
Endrin	Liver	1997	0.00	0.00	0.00			0.00	0.00	0.00			3	3	3		
Endrin	Liver	1998	5.51	1.75	0.00			0.86	0.14	0.00			3	3	3		
Endrin	Liver	1999	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3
Hexachlorobenzene	Liver	1992	5.83	4.51	2.55	3.68	7.25	1.43	0.58	0.32	0.68	1.17	4	4	4	4	4
Hexachlorobenzene	Liver	1993	6.60	4.70	4.78			0.00	0.00	0.00			1	1	1		
Hexachlorobenzene	Liver	1994	9.02	7.03	5.26	6.22	9.14	1.05	0.77	0.63	0.52	2.53	3	3	3	3	3
Hexachlorobenzene	Liver	1995	6.70	3.63	2.27			0.44	1.86	2.27			3	3	3		
Hexachlorobenzene	Liver	1996	5.93	3.13	0.00	0.00	0.00	3.20	3.13	0.00	0.00	0.00	3	3	3	3	3
Hexachlorobenzene	Liver	1997	7.47	6.27	5.20			0.64	1.17	0.35			3	3	3		
Hexachlorobenzene	Liver	1998	6.53	4.69	3.73			0.69	0.78	1.63			3	3	3		
Hexachlorobenzene	Liver	1999	6.53	3.84	3.49	2.97	4.43	0.25	0.27	1.20	0.24	0.55	3	3	3	3	3
Mirex	Liver	1992	1.41	3.62	0.37	5.62	6.07	1.41	1.25	0.37	2.50	0.67	4	4	4	4	4
Mirex	Liver	1993	2.98	4.25	1.47			0.00	0.00	0.00			1	1	1		
Mirex	Liver	1994	5.87	4.44	0.00	3.31	5.18	1.65	0.95	0.00	0.74	1.37	3	3	3	3	3
Mirex	Liver	1995	4.90	3.80	1.39			0.29	0.35	0.89			3	3	3		
Mirex	Liver	1996	1.80	0.00	0.00	0.00	0.00	1.80	0.00	0.00	0.00	0.00	3	3	3	3	3
Mirex	Liver	1997	11.77	6.77	3.40			2.62	0.15	0.21			3	3	3		
Mirex	Liver	1998	3.49	2.87	0.46			0.60	1.52	0.23			3	3	3		
Mirex	Liver	1999	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3

Table C-12. Flounder Liver Chemistry Data, 1991 – 1999. (Continued)

			Means					SE					N				
Parameter	**Tissue**	**Year**	**DIF(1)**	**OS(4)**	**ECCB(5)**	**NB(2)**	**BS(3)**	**DIF**	**OS**	**ECCB**	**NB**	**BS**	**DIF(1)**	**FOS(4)**	**ECCB(5)**	**NB(2)**	**BS(3)**
Lindane	Liver	1992	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4	4	4	4	4
Lindane	Liver	1993	2.42	2.12	2.25			0.00	0.00	0.00			1	1	1		
Lindane	Liver	1994	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3
Lindane	Liver	1995	1.40	0.97	0.00			0.15	0.49	0.00			3	3	3		
Lindane	Liver	1996	0.87	0.00	0.00	0.00	0.00	0.87	0.00	0.00	0.00	0.00	3	3	3	3	3
Lindane	Liver	1997	0.00	0.00	0.00			0.00	0.00	0.00			3	3	3		
Lindane	Liver	1998	0.67	0.00	0.13			0.09	0.00	0.07			3	3	3		
Lindane	Liver	1999	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3	3	3

Table C-13. Lobster Meat Chemistry Data, 1992 – 1999.

			Means			SE			N		
Parameter	**Tissue**	**Year**	**DIF(1)**	**OS(4)**	**ECCB(5)**	**DIF**	**OS**	**ECCB**	**DIF(1)**	**OS(4)**	**ECCB(5)**
Mercury	Meat	1992	1.228	0.854	0.921	0.304	0.164	0.274	3	3	3
Mercury	Meat	1993	0.842	1.013	0.659	0.011	0.308	0.057	3	2	10
Mercury	Meat	1994	0.827	1.043	0.498	0.067	0.313	0.055	3	2	3
Mercury	Meat	1995	0.610	1.089	0.535	0.297	0.260	0.055	3	3	3
Mercury	Meat	1996	0.858	1.067	0.939	0.071	0.216	0.102	3	3	3
Mercury	Meat	1997	1.467	1.120	0.983	0.111	0.083	0.072	3	3	3
Mercury	Meat	1998	0.767	0.990	0.598	0.029	0.064	0.047	3	3	3
Mercury	Meat	1999	0.999	1.038	0.712	0.153	0.165	0.070	3	3	3
Total DDT	Meat	1992	14.00	8.98	17.83	1.27	1.17	6.73	3	3	3
Total DDT	Meat	1993	28.36	9.24	10.65	10.76	1.49	1.26	3	2	10
Total DDT	Meat	1994	23.83	21.93	10.30	1.79	4.36	1.38	3	2	3
Total DDT	Meat	1995	13.62	14.34	13.22	2.36	0.79	2.55	3	3	3
Total DDT	Meat	1996	25.98	18.53	13.01	3.90	2.81	1.21	3	3	3
Total DDT	Meat	1997	46.34	20.90	14.61	23.02	6.43	1.01	3	3	3
Total DDT	Meat	1998	11.37	8.91	9.69	0.62	1.42	1.39	3	3	3
Total DDT	Meat	1999	15.98	7.36	9.32	1.06	0.10	0.83	3	3	3
Total PCB	Meat	1992	99.61	60.60	87.27	8.72	11.86	32.85	3	3	3
Total PCB	Meat	1993	154.21	65.79	66.46	58.62	2.64	15.62	3	2	10
Total PCB	Meat	1994	137.15	177.93	66.80	13.44	66.57	15.81	3	2	3
Total PCB	Meat	1995	122.31	118.76	76.08	22.28	9.56	12.45	3	3	3
Total PCB	Meat	1996	220.41	148.09	68.88	27.17	2.00	5.82	3	3	3
Total PCB	Meat	1997	311.83	157.62	77.55	141.59	21.88	1.47	3	3	3
Total PCB	Meat	1998	112.96	71.83	54.90	10.94	11.01	5.35	3	3	3
Total PCB	Meat	1999	154.22	73.73	52.91	12.97	3.18	4.50	3	3	3
Total CHLOR	Meat	1992	3.73	1.49	1.57	0.40	0.16	0.05	3	3	3
Total CHLOR	Meat	1993	6.73	2.11	2.41	1.13	0.07	0.61	3	2	10
Total CHLOR	Meat	1994	5.19	5.13	1.36	0.67	1.55	0.19	3	2	3
Total CHLOR	Meat	1995	0.39	0.59	0.06	0.20	0.21	0.05	3	3	3

Table C-13. Lobster Meat Chemistry Data, 1992 – 1999. (Continued)

			Means			SE			N		
Parameter	**Tissue**	**Year**	**DIF(1)**	**OS(4)**	**ECCB(5)**	**DIF**	**OS**	**ECCB**	**DIF(1)**	**OS(4)**	**ECCB(5)**
Total CHLOR	Meat	1996	5.63	3.80	1.52	0.70	0.32	0.06	3	3	3
Total CHLOR	Meat	1997	6.41	3.59	1.83	1.32	1.07	0.29	3	3	3
Total CHLOR	Meat	1998	4.16	2.95	1.68	0.47	0.70	0.04	3	3	3
Total CHLOR	Meat	1999	5.47	2.30	1.49	0.09	0.23	0.04	3	3	3
Aldrin	Meat	1992	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Aldrin	Meat	1993	0.40	0.35	0.56	0.01	0.09	0.20	3	2	10
Aldrin	Meat	1994	0.65	0.42	0.50	0.21	0.02	0.02	3	2	3
Aldrin	Meat	1995	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Aldrin	Meat	1996	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Aldrin	Meat	1997	0.00	0.00	0.61	0.00	0.00	0.50	3	3	3
Aldrin	Meat	1998	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Aldrin	Meat	1999	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Dieldrin	Meat	1992	5.51	3.95	3.52	0.33	0.21	0.45	3	3	3
Dieldrin	Meat	1993	9.02	4.66	3.52	1.08	0.44	0.21	3	2	10
Dieldrin	Meat	1994	11.52	6.43	3.73	4.07	1.40	0.32	3	2	3
Dieldrin	Meat	1995	6.50	5.77	3.93	0.15	0.23	0.33	3	3	3
Dieldrin	Meat	1996	8.53	9.50	3.77	0.74	1.83	0.32	3	3	3
Dieldrin	Meat	1997	6.80	6.27	4.23	0.76	1.07	0.34	3	3	3
Dieldrin	Meat	1998	3.75	3.81	2.38	0.25	0.06	0.09	3	3	3
Dieldrin	Meat	1999	6.79	5.15	4.26	0.06	0.15	0.17	3	3	3
Endrin	Meat	1992	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Endrin	Meat	1993	0.51	0.44	0.46	0.02	0.11	0.03	3	2	10
Endrin	Meat	1994	0.00	0.00	0.00	0.00	0.00	0.00	3	2	3
Endrin	Meat	1995	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Endrin	Meat	1996	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Endrin	Meat	1997	0.00	0.40	0.56	0.00	0.40	0.08	3	3	3
Endrin	Meat	1998	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Endrin	Meat	1999	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3

Table C-13. Lobster Meat Chemistry Data, 1992 – 1999. (Continued)

			Means			SE			N		
Parameter	**Tissue**	**Year**	**DIF(1)**	**OS(4)**	**ECCB(5)**	**DIF**	**OS**	**ECCB**	**DIF(1)**	**OS(4)**	**ECCB(5)**
Hexachlorobenzene	Meat	1992	0.36	0.20	0.35	0.04	0.11	0.07	3	3	3
Hexachlorobenzene	Meat	1993	0.47	0.39	0.31	0.04	0.10	0.03	3	2	10
Hexachlorobenzene	Meat	1994	0.79	0.74	0.63	0.08	0.04	0.02	3	2	3
Hexachlorobenzene	Meat	1995	0.00	0.21	0.25	0.00	0.21	0.25	3	3	3
Hexachlorobenzene	Meat	1996	0.59	1.00	0.52	0.05	0.10	0.08	3	3	3
Hexachlorobenzene	Meat	1997	0.42	0.63	0.53	0.06	0.08	0.06	3	3	3
Hexachlorobenzene	Meat	1998	0.42	0.69	0.53	0.02	0.13	0.01	3	3	3
Hexachlorobenzene	Meat	1999	0.47	0.46	0.33	0.02	0.01	0.03	3	3	3
Mirex	Meat	1992	0.27	0.24	0.29	0.06	0.02	0.11	3	3	3
Mirex	Meat	1993	0.39	0.27	0.31	0.06	0.05	0.05	3	2	10
Mirex	Meat	1994	0.26	0.16	0.29	0.05	0.16	0.05	3	2	3
Mirex	Meat	1995	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Mirex	Meat	1996	0.27	0.36	0.23	0.05	0.06	0.03	3	3	3
Mirex	Meat	1997	0.32	0.00	0.35	0.32	0.00	0.06	3	3	3
Mirex	Meat	1998	0.00	0.15	0.10	0.00	0.07	0.05	3	3	3
Mirex	Meat	1999	0.56	0.31	0.23	0.10	0.04	0.02	3	3	3
Lindane	Meat	1992	0.80	0.00	0.00	0.80	0.00	0.00	3	3	3
Lindane	Meat	1993	4.95	4.93	4.70	0.62	0.30	0.97	3	2	10
Lindane	Meat	1994	0.00	0.00	0.00	0.00	0.00	0.00	3	2	3
Lindane	Meat	1995	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Lindane	Meat	1996	2.00	0.73	0.00	2.00	0.73	0.00	3	3	3
Lindane	Meat	1997	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Lindane	Meat	1998	0.00	0.87	0.89	0.00	0.87	0.89	3	3	3
Lindane	Meat	1999	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3

Table C-14. Lobster Hepatopancreas Chemistry Data, 1992 – 1999.

			Means			SE			N		
Parameter	**Tissue**	**Year**	**DIF(1)**	**OS(4)**	**ECCB(5)**	**DIF**	**OS**	**ECCB**	**DIF(1)**	**OS(4)**	**ECCB(5)**
Lead	Hepatopancreas	1992	0.37	0.28	4.49	0.07	0.10	4.21	3	3	3
Lead	Hepatopancreas	1993	0.33	0.38	0.10	0.10	0.12	0.03	3	2	10
Lead	Hepatopancreas	1994	0.43	0.54	0.09	0.03	0.07	0.02	3	2	3
Lead	Hepatopancreas	1995	0.26	0.30	0.04	0.04	0.04	0.01	3	3	3
Lead	Hepatopancreas	1996	0.35	0.41	0.07	0.08	0.12	0.02	3	3	3
Lead	Hepatopancreas	1997	0.39	0.30	0.04	0.05	0.05	0.02	3	3	3
Lead	Hepatopancreas	1998	0.23	0.63	0.30	0.04	0.07	0.01	3	3	3
Lead	Hepatopancreas	1999	0.52	0.42	0.25	0.03	0.08	0.03	3	3	3
Mercury	Hepatopancreas	1992	0.240	0.537	0.423	0.031	0.273	0.146	3	3	3
Mercury	Hepatopancreas	1993	0.296	0.236	0.192	0.056	0.044	0.038	3	2	10
Mercury	Hepatopancreas	1994	0.269	0.399	0.236	0.010	0.059	0.019	3	2	3
Mercury	Hepatopancreas	1995	0.350	0.335	0.271	0.032	0.050	0.068	3	3	3
Mercury	Hepatopancreas	1996	0.202	0.260	0.243	0.033	0.033	0.023	3	3	3
Mercury	Hepatopancreas	1997	0.432	0.437	0.400	0.082	0.045	0.013	3	3	3
Mercury	Hepatopancreas	1998	0.262	0.365	0.243	0.010	0.013	0.017	3	3	3
Mercury	Hepatopancreas	1999	0.302	0.528	0.317	0.016	0.079	0.019	3	3	3
Cadmium	Hepatopancreas	1992	6.15	12.97	27.12	2.65	2.60	11.22	3	3	3
Cadmium	Hepatopancreas	1993	3.33	13.26	10.92	0.68	4.24	1.62	3	2	10
Cadmium	Hepatopancreas	1994	8.31	12.30	16.14	1.63	2.31	3.56	3	2	3
Cadmium	Hepatopancreas	1995	5.29	5.32	7.94	0.25	0.59	0.22	3	3	3
Cadmium	Hepatopancreas	1996	3.32	9.30	14.44	0.33	1.20	0.47	3	3	3
Cadmium	Hepatopancreas	1997	6.98	11.89	13.71	1.06	1.89	0.98	3	3	3
Cadmium	Hepatopancreas	1998	3.98	17.32	7.56	0.95	3.60	0.36	3	3	3
Cadmium	Hepatopancreas	1999	4.58	15.53	12.42	0.35	3.85	1.51	3	3	3
Chromium	Hepatopancreas	1992	2.91	3.36	2.09	0.38	1.06	0.27	3	3	3
Chromium	Hepatopancreas	1993	1.46	1.27	1.09	0.05	0.06	0.11	3	2	10
Chromium	Hepatopancreas	1994	0.25	0.49	0.19	0.03	0.29	0.04	3	2	3
Chromium	Hepatopancreas	1995	0.24	0.18	0.09	0.04	0.03	0.03	3	3	3
Chromium	Hepatopancreas	1996	0.15	0.12	0.08	0.03	0.01	0.01	3	3	3

Table C-14. Lobster Hepatopancreas Chemistry Data, 1992 – 1999. (Continued)

			Means			SE			N		
Parameter	**Tissue**	**Year**	**DIF(1)**	**OS(4)**	**ECCB(5)**	**DIF**	**OS**	**ECCB**	**DIF(1)**	**OS(4)**	**ECCB(5)**
Chromium	Hepatopancreas	1997	0.26	0.30	0.10	0.02	0.07	0.02	3	3	3
Chromium	Hepatopancreas	1998	0.09	0.23	0.15	0.02	0.02	0.03	3	3	3
Chromium	Hepatopancreas	1999	0.19	0.17	0.22	0.02	0.06	0.08	3	3	3
Copper	Hepatopancreas	1992	261.37	440.77	1014.40	193.14	372.74	496.44	3	3	3
Copper	Hepatopancreas	1993	642.00	309.00	463.51	162.25	178.00	126.55	3	2	10
Copper	Hepatopancreas	1994	537.00	557.51	283.67	93.83	63.51	88.99	3	2	3
Copper	Hepatopancreas	1995	324.73	314.35	125.24	60.19	35.15	33.84	3	3	3
Copper	Hepatopancreas	1996	485.11	371.03	166.57	98.85	70.86	43.40	3	3	3
Copper	Hepatopancreas	1997	641.20	513.48	294.48	106.74	202.59	40.56	3	3	3
Copper	Hepatopancreas	1998	612.43	610.80	572.67	42.08	89.83	53.69	3	3	3
Copper	Hepatopancreas	1999	895.20	830.47	477.97	16.91	103.16	71.31	3	3	3
Nickel	Hepatopancreas	1992	0.80	1.60	0.95	0.42	0.99	0.33	3	3	3
Nickel	Hepatopancreas	1993	0.65	0.47	1.31	0.19	0.03	0.21	3	2	10
Nickel	Hepatopancreas	1994	0.44	0.97	1.19	0.05	0.20	0.07	3	2	3
Nickel	Hepatopancreas	1995	0.42	0.43	0.45	0.09	0.04	0.04	3	3	3
Nickel	Hepatopancreas	1996	0.13	0.39	0.68	0.02	0.02	0.04	3	3	3
Nickel	Hepatopancreas	1997	0.57	1.26	0.89	0.07	0.23	0.24	3	3	3
Nickel	Hepatopancreas	1998	0.36	1.21	0.73	0.01	0.03	0.11	3	3	3
Nickel	Hepatopancreas	1999	0.65	0.69	1.33	0.07	0.03	0.16	3	3	3
Silver	Hepatopancreas	1992	5.07	3.52	3.53	2.44	0.20	1.08	3	3	3
Silver	Hepatopancreas	1993	6.53	2.43	6.35	0.47	0.75	2.01	3	2	10
Silver	Hepatopancreas	1994	10.74	7.47	14.63	3.11	2.21	3.00	3	2	3
Silver	Hepatopancreas	1995	27.55	21.99	8.10	1.95	3.37	2.35	3	3	3
Silver	Hepatopancreas	1996	32.89	21.28	15.25	9.31	3.63	4.06	3	3	3
Silver	Hepatopancreas	1997	6.52	13.23	9.42	0.58	2.41	2.33	3	3	3
Silver	Hepatopancreas	1998	30.38	29.90	29.75	2.10	4.66	4.28	3	3	3
Silver	Hepatopancreas	1999	47.03	47.84	32.24	4.28	9.05	2.37	3	3	3
Zinc	Hepatopancreas	1992	76.60	110.77	100.63	15.35	24.93	31.79	3	3	3
Zinc	Hepatopancreas	1993	74.80	83.55	49.73	34.54	33.45	6.90	3	2	10
Zinc	Hepatopancreas	1994	79.67	97.44	82.70	5.57	6.44	2.91	3	2	3
Zinc	Hepatopancreas	1995	43.94	51.60	54.44	2.24	3.18	1.30	3	3	3
Zinc	Hepatopancreas	1996	53.82	73.86	50.33	9.46	11.34	5.12	3	3	3
Zinc	Hepatopancreas	1997	84.09	80.33	57.92	23.69	13.78	3.42	3	3	3
Zinc	Hepatopancreas	1998	82.94	112.99	89.77	16.24	38.68	7.74	3	3	3
Zinc	Hepatopancreas	1999	88.07	47.37	75.73	7.41	5.39	3.06	3	3	3
Total DDT	Hepatopancreas	1992	576.56	475.34	207.87	245.92	165.46	48.12	3	3	3
Total DDT	Hepatopancreas	1993	642.21	290.29	287.68	27.61	70.86	33.33	3	2	10
Total DDT	Hepatopancreas	1994	404.87	308.72	165.56	49.21	118.94	12.76	3	2	3
Total DDT	Hepatopancreas	1995	670.50	929.90	745.93	155.45	29.58	92.05	3	3	3
Total DDT	Hepatopancreas	1996	1251.00	1025.80	702.17	68.59	30.50	117.10	3	3	3
Total DDT	Hepatopancreas	1997	1093.03	1088.70	788.87	644.25	359.71	142.08	3	3	3

Table C-14. Lobster Hepatopancreas Chemistry Data, 1992 – 1999. (Continued)

			Means			SE			N		
Parameter	**Tissue**	**Year**	**DIF(1)**	**OS(4)**	**ECCB(5)**	**DIF**	**OS**	**ECCB**	**DIF(1)**	**OS(4)**	**ECCB(5)**
Total DDT	Hepatopancreas	1998	1105.64	1033.51	761.26	26.17	74.84	23.37	3	3	3
Total DDT	Hepatopancreas	1999	1297.83	745.89	559.12	28.87	66.67	33.46	3	3	3
Total PCB	Hepatopancreas	1992	3253.52	2046.37	1205.90	509.59	356.67	394.22	3	3	3
Total PCB	Hepatopancreas	1993	2857.83	2262.60	2151.32	282.59	726.95	683.77	3	2	10
Total PCB	Hepatopancreas	1994	2482.48	2452.34	657.09	318.88	1527.20	60.81	3	2	3
Total PCB	Hepatopancreas	1995	4524.95	5234.00	2779.17	1354.20	342.50	305.36	3	3	3
Total PCB	Hepatopancreas	1996	7225.17	5582.57	2465.19	677.31	579.67	298.96	3	3	3
Total PCB	Hepatopancreas	1997	7109.33	4935.30	2477.73	2612.85	285.52	225.11	3	3	3
Total PCB	Hepatopancreas	1998	7722.70	6003.53	3409.83	178.89	240.69	154.81	3	3	3
Total PCB	Hepatopancreas	1999	10255.41	6353.51	3132.17	125.72	452.04	241.29	3	3	3
Total PAH	Hepatopancreas	1992	29707.65	4060.10	4055.21	4885.54	272.53	731.12	3	3	3
Total PAH	Hepatopancreas	1993	11727.19	5862.35	2707.32	5567.15	2193.93	892.29	3	2	12
Total PAH	Hepatopancreas	1994	16577.81	4602.39	786.94	2921.49	280.45	75.12	3	2	3
Total PAH	Hepatopancreas	1995	5386.28	6576.33	4321.43	716.50	669.94	836.64	3	3	3
Total PAH	Hepatopancreas	1996	12816.17	6243.43	2372.37	2478.38	1642.45	701.95	3	3	3
Total PAH	Hepatopancreas	1997	8424.20	3059.50	167768.93	5170.05	1153.71	11612.14	3	3	3
Total PAH	Hepatopancreas	1998	7413.13	2429.48	1478.32	500.61	249.53	84.87	3	3	3
Total PAH	Hepatopancreas	1999	7597.25	1562.97	1309.69	810.43	165.05	78.11	3	3	3
Total CHLOR	Hepatopancreas	1992	196.70	50.75	18.63	106.73	22.64	8.93	3	3	3
Total CHLOR	Hepatopancreas	1993	194.42	48.56	76.12	5.15	4.93	25.54	3	2	10
Total CHLOR	Hepatopancreas	1994	116.33	21.42	13.21	19.70	6.91	2.08	3	2	3
Total CHLOR	Hepatopancreas	1995	38.67	73.67	65.00	13.57	37.02	22.72	3	3	3
Total CHLOR	Hepatopancreas	1996	199.00	156.67	81.20	16.26	22.88	19.00	3	3	3
Total CHLOR	Hepatopancreas	1997	137.63	57.87	41.59	24.88	11.20	6.95	3	3	3
Total CHLOR	Hepatopancreas	1998	233.81	93.87	42.02	4.66	6.03	2.84	3	3	3
Total CHLOR	Hepatopancreas	1999	138.04	57.94	31.85	14.51	6.75	3.22	3	3	3
Aldrin	Hepatopancreas	1992	2.53	0.00	0.00	2.53	0.00	0.00	3	3	3
Aldrin	Hepatopancreas	1993	1.52	1.25	1.37	0.19	0.20	0.18	3	2	10
Aldrin	Hepatopancreas	1994	0.00	0.00	0.00	0.00	0.00	0.00	3	2	3
Aldrin	Hepatopancreas	1995	0.00	2.80	0.00	0.00	1.49	0.00	3	3	3
Aldrin	Hepatopancreas	1996	5.53	2.37	1.00	0.90	1.19	0.50	3	3	3
Aldrin	Hepatopancreas	1997	1.50	0.00	0.00	0.76	0.00	0.00	3	3	3
Aldrin	Hepatopancreas	1998	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Aldrin	Hepatopancreas	1999	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Dieldrin	Hepatopancreas	1992	65.73	27.01	13.41	23.60	9.97	4.75	3	3	3
Dieldrin	Hepatopancreas	1993	124.70	56.60	39.79	25.34	10.59	5.41	3	2	10
Dieldrin	Hepatopancreas	1994	40.75	17.08	9.41	13.69	7.30	2.83	3	2	3
Dieldrin	Hepatopancreas	1995	52.67	106.67	30.00	26.84	11.79	15.04	3	3	3
Dieldrin	Hepatopancreas	1996	126.67	143.33	50.33	14.53	43.33	6.01	3	3	3
Dieldrin	Hepatopancreas	1997	46.00	50.67	32.67	4.16	12.13	2.19	3	3	3
Dieldrin	Hepatopancreas	1998	44.56	45.11	25.85	3.86	3.71	0.83	3	3	3

Table C-14. Lobster Hepatopancreas Chemistry Data, 1992 – 1999. (Continued)

			Means			SE			N		
Parameter	**Tissue**	**Year**	**DIF(1)**	**OS(4)**	**ECCB(5)**	**DIF**	**OS**	**ECCB**	**DIF(1)**	**OS(4)**	**ECCB(5)**
Dieldrin	Hepatopancreas	1999	59.63	51.66	28.13	3.69	6.31	1.94	3	3	3
Endrin	Hepatopancreas	1992	0.00	0.00	11.80	0.00	0.00	11.80	3	3	3
Endrin	Hepatopancreas	1993	1.93	1.58	1.74	0.24	0.25	0.23	3	2	10
Endrin	Hepatopancreas	1994	0.00	0.00	6.45	0.00	0.00	3.84	3	2	3
Endrin	Hepatopancreas	1995	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Endrin	Hepatopancreas	1996	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Endrin	Hepatopancreas	1997	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Endrin	Hepatopancreas	1998	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Endrin	Hepatopancreas	1999	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Hexachlorobenzene	Hepatopancreas	1992	11.79	7.64	40.62	4.80	1.50	36.18	3	3	3
Hexachlorobenzene	Hepatopancreas	1993	9.03	8.26	8.83	1.66	1.39	1.66	3	2	10
Hexachlorobenzene	Hepatopancreas	1994	7.03	5.46	26.60	0.77	3.08	13.46	3	2	3
Hexachlorobenzene	Hepatopancreas	1995	10.13	11.67	8.80	0.75	0.33	0.90	3	3	3
Hexachlorobenzene	Hepatopancreas	1996	17.00	17.33	13.67	1.00	0.33	1.20	3	3	3
Hexachlorobenzene	Hepatopancreas	1997	9.13	13.27	11.30	0.93	3.37	0.91	3	3	3
Hexachlorobenzene	Hepatopancreas	1998	7.75	9.79	6.97	2.15	0.36	0.02	3	3	3
Hexachlorobenzene	Hepatopancreas	1999	6.97	8.81	7.04	0.34	0.67	0.38	3	3	3
Mirex	Hepatopancreas	1992	8.39	6.52	2.68	1.25	3.27	1.99	3	3	3
Mirex	Hepatopancreas	1993	6.27	7.63	6.10	0.19	2.12	1.18	3	2	10
Mirex	Hepatopancreas	1994	0.00	0.00	0.00	0.00	0.00	0.00	3	2	3
Mirex	Hepatopancreas	1995	7.05	8.57	6.10	0.73	0.59	0.51	3	3	3
Mirex	Hepatopancreas	1996	7.90	10.37	8.03	0.20	0.63	0.69	3	3	3
Mirex	Hepatopancreas	1997	8.00	10.37	7.83	1.00	2.89	1.06	3	3	3
Mirex	Hepatopancreas	1998	0.00	0.00	0.00	0.00	0.00	0.00	3	3	3
Mirex	Hepatopancreas	1999	11.43	9.76	6.92	3.59	0.54	0.37	3	3	3
Lindane	Hepatopancreas	1992	1.10	0.79	0.00	1.10	0.79	0.00	3	3	3
Lindane	Hepatopancreas	1993	6.86	4.95	10.32	0.48	2.73	1.84	3	2	10
Lindane	Hepatopancreas	1994	0.00	0.00	0.00	0.00	0.00	0.00	3	2	3
Lindane	Hepatopancreas	1995	5.50	5.13	2.67	0.26	0.90	0.32	3	3	3
Lindane	Hepatopancreas	1996	7.10	6.13	0.00	3.63	0.69	0.00	3	3	3
Lindane	Hepatopancreas	1997	3.27	2.33	0.00	0.52	0.12	0.00	3	3	3
Lindane	Hepatopancreas	1998	4.09	2.99	3.61	0.31	0.10	0.41	3	3	3
Lindane	Hepatopancreas	1999	0.00	1.80	2.52	0.00	0.90	0.04	3	3	3

Table C-15. Mussel Chemistry Data, 1991 – 1999.

		Means						SE					
Parameter	**Year**	**Gloucester(7)**	**Sandwich(8)**	**DI(1)**	**OS(4)**	**BIH(6)**	**CCB(9)**	**Gloucester***	**Sandwich***	**DI**	**OS**	**BIH**	**CCB**
Lead	1991	5.77	NA	5.85	NA	6.40	NA	0.45	NA	0.30	NA	0.83	NA
Lead	1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	1993	5.20	NA	5.88	3.71	NA	NA	0.34	NA	1.40	0.30	NA	NA
Lead	1994	9.00	NA	8.68	4.73	6.67	NA	1.89	NA	0.99	0.20	1.29	NA
Lead	1995	6.05	NA	8.40	NA	8.53	NA	0.36	NA	0.76	NA	0.51	NA
Lead	1996	NA	2.86	6.27	1.57	9.36	NA	NA	0.73	0.58	0.14	0.98	NA
Lead	1997	NA	2.44	7.83	2.09	9.89	NA	NA	0.34	0.49	0.09	1.61	NA
Lead	1998	NA	2.85	3.47	2.14	4.09	1.95	0.23	0.35	0.73	0.17	0.22	0.15
Lead	1999	NA	1.56	NA	1.09	4.69	1.26	NA	0.15	NA	0.08	0.36	0.09
Mercury	1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	1993	0.393	NA	0.183	0.099	NA	NA	0.060	NA	0.012	0.005	NA	NA
Mercury	1994	0.205	NA	0.208	0.128	0.163	NA	0.071	NA	0.037	0.012	0.004	NA
Mercury	1995	NA	0.063	0.061	NA	0.080	NA	NA	0.011	0.020	NA	0.039	NA
Mercury	1996	NA	0.131	0.154	0.146	0.126	NA	NA	0.056	0.020	0.041	0.014	NA
Mercury	1997	NA	0.173	0.063	0.104	0.320	NA	NA	0.025	0.017	0.043	0.039	NA
Mercury	1998	NA	0.098	0.098	0.089	0.110	0.070	0.005	0.006	0.006	0.003	0.003	0.005
Mercury	1999	NA	0.075	NA	0.063	0.099	0.053	NA	0.002	NA	0.003	0.004	0.002
Total DDT	1991	25.08	NA	45.64	NA	89.18	NA	3.26	NA	4.13	NA	10.77	NA
Total DDT	1992	17.63	NA	21.73	8.91	99.48	NA	1.63	NA	1.78	0.54	18.82	NA
Total DDT	1993	NA	NA	57.50	25.58	127.98	NA	NA	NA	NA	NA	8.6	
Total DDT	1994	24.31	NA	49.17	16.78	77.72	NA	1.49	NA	2.4			
Total DDT	1995	28.56	NA	44.80	NA	91.48	NA	0.55	NA	1.03	NA	5.47	NA
Total DDT	1996	56.77	NA	84.40	29.02	118.50	NA	6.20	NA	7.37	1.16	8.60	NA
Total DDT	1997	51.76	NA	60.04	22.42	134.86	NA	3.05	NA	3.04	1.23	9.61	NA
Total DDT	1998	34.08	55.81	38.04	19.91	81.95	15.82	1.45	0.00	0.63	1.03	5.12	0.85
Total DDT	1999	34.34	NA	NA	12.19	85.90	17.72	3.65	NA	NA	0.47	3.14	0.69
Total PCB	1991	61.25	NA	194.73	NA	462.04	NA	8.28	NA	12.93	NA	34.85	NA
Total PCB	1992	46.72	NA	123.76	34.30	639.43	NA	3.22	NA	8.73	2.72	87.00	NA
Total PCB	1993	NA	NA	264.34	89.05	480.00	NA	NA	NA	36.12	2.68	47.98	NA
Total PCB	1994	104.03	NA	157.46	85.14	484.36	NA	2.73	NA	5.65	6.22	71.34	NA

Table C-15. Mussel Chemistry Data, 1991 – 1999.
(Continued)

		N					
Parameter	**Year**	**Gloucester**	**Sandwich**	**DI**	**FOS**	**BIH**	**CCB**
Lead	1991	10	NA	8	NA	5	NA
Lead	1992	NA	NA	NA	NA	NA	NA
Lead	1993	6	NA	5	8	NA	NA
Lead	1994	4	NA	5	9	3	NA
Lead	1995	5	NA	5	NA	5	NA
Lead	1996	NA	5	5	5	3	NA
Lead	1997	NA	5	5	5	5	NA
Lead	1998	5	5	5	8	5	8
Lead	1999	NA	5	NA	8	5	8
Mercury	1991	NA	NA	NA	NA	NA	NA
Mercury	1992	NA	NA	NA	NA	NA	NA
Mercury	1993	6	NA	5	8	NA	NA
Mercury	1994	4	NA	4	9	3	NA
Mercury	1995	NA	5	5	NA	5	NA
Mercury	1996	NA	5	5	5	3	NA
Mercury	1997	NA	5	5	5	5	NA
Mercury	1998	5	5	5	8	5	8
Mercury	1999	NA	5	NA	8	5	8
Total DDT	1991	10	NA	8	NA	5	NA
Total DDT	1992	5	NA	7	8	5	NA
Total DDT	1993	NA	NA	5	8	4	NA
Total DDT	1994	3	NA	3	7	3	NA
Total DDT	1995	5	NA	5	NA	5	NA
Total DDT	1996	3	NA	5	5	5	NA
Total DDT	1997	5	NA	5	5	5	NA
Total DDT	1998	4	1	5	8	5	8
Total DDT	1999	5	NA	NA	8	5	8
Total PCB	1991	10	NA	8	NA	5	NA
Total PCB	1992	5	NA	7	8	5	NA
Total PCB	1993	NA	NA	5	8	3	NA
Total PCB	1994	3	NA	3	7	3	NA

Table C-15. Mussel Chemistry Data, 1991 – 1999.
(Continued)

		Means						SE					
Parameter	**Year**	**Gloucester(7)**	**Sandwich(8)**	**DI(1)**	**OS(4)**	**BIH(6)**	**CCB(9)**	**Gloucester***	**Sandwich***	**DI**	**OS**	**BIH**	**CCB**
Total PCB	1995	88.65	NA	164.75	NA	436.02	NA	1.01	NA	4.43	NA	14.49	NA
Total PCB	1996	156.59	NA	268.68	98.78	532.56	NA	12.04	NA	16.16	3.62	25.31	NA
Total PCB	1997	131.09	NA	355.57	97.34	752.68	NA	5.18	NA	11.67	2.23	44.53	NA
Total PCB	1998	63.16	79.11	149.18	58.81	460.02	48.90	1.15	0.00	2.24	2.75	29.22	2.00
Total PCB	1999	53.73	NA	NA	36.87	491.80	47.66	4.62	NA	NA	1.07	20.94	1.93
LMW PAH	1991	60.20	NA	528.25	NA	209.00	NA	13.59	NA	88.49	NA	21.43	NA
LMW PAH	1992	70.14	NA	426.01	31.80	194.78	NA	6.43	NA	48.37	4.67	44.15	NA
LMW PAH	1993	16.17	NA	163.67	33.25	92.00	NA	6.50	NA	22.41	4.37	15.13	NA
LMW PAH	1994	71.67	NA	203.67	14.71	53.33	NA	3.18	NA	8.41	1.87	4.37	NA
LMW PAH	1995	51.60	NA	122.85	NA	155.60	NA	1.66	NA	2.70	NA	3.03	NA
LMW PAH	1996	138.70	NA	226.68	41.48	189.62	NA	17.92	NA	41.08	4.14	6.36	NA
LMW PAH	1997	65.70	NA	83.46	40.75	147.50	NA	8.75	NA	2.00	12.20	12.21	NA
LMW PAH	1998	104.27	65.76	63.40	18.75	181.76	19.00	12.40	0.00	4.77	1.11	21.55	1.38
LMW PAH	1999	184.80	NA	NA	21.46	175.70	33.66	24.22	NA	NA	0.47	16.20	1.71
HMW PAH	1991	113.40	NA	699.56	NA	2324.50	NA	20.00	NA	74.42	NA	206.77	NA
HMW PAH	1992	132.42	NA	1504.43	190.13	3343.44	NA	21.20	NA	127.36	145.17	404.89	NA
HMW PAH	1993	105.00	NA	495.17	83.63	1210.33	NA	25.67	NA	54.30	12.45	73.10	NA
HMW PAH	1994	132.33	NA	632.67	18.29	2175.67	NA	59.88	NA	68.81	5.06	230.57	NA
HMW PAH	1995	93.08	NA	415.30	NA	1238.00	NA	6.15	NA	19.52	NA	29.54	NA
HMW PAH	1996	195.13	NA	799.36	37.13	2232.80	NA	19.05	NA	129.11	1.65	127.27	NA
HMW PAH	1997	88.47	NA	260.98	23.67	1345.36	NA	3.82	NA	13.91	1.67	96.48	NA
HMW PAH	1998	138.57	58.10	154.32	19.75	1865.23	20.56	6.45	1.00	2.69	0.66	107.36	1.62
HMW PAH	1999	481.22	NA	NA	25.13	2506.05	17.85	110.08	NA	NA	0.74	107.20	1.01
Total CHLOR	1991	2.71	NA	18.24	NA	20.86	NA	0.68	NA	1.68	NA	2.27	NA
Total CHLOR	1992	2.85	NA	17.97	4.92	45.53	NA	0.57	NA	1.43	0.44	6.16	NA
Total CHLOR	1993	NA	NA	19.38	7.85	22.23	NA	NA	NA	2.20	0.25	2.57	NA
Total CHLOR	1994	9.82	NA	26.69	8.22	25.23	NA	0.70	NA	1.81	0.39	1.92	NA
Total CHLOR	1995	3.18	NA	11.70	NA	20.78	NA	0.18	NA	0.22	NA	1.23	NA
Total CHLOR	1996	9.77	NA	40.96	7.25	31.22	NA	0.94	NA	3.43	0.44	2.30	NA
Total CHLOR	1997	8.80	NA	20.43	6.18	29.04	NA	0.26	NA	1.06	0.28	2.23	NA

Table C-15. Mussel Chemistry Data, 1991 – 1999.
(Continued)

		N					
Parameter	**Year**	**Gloucester**	**Sandwich**	**DI**	**FOS**	**BIH**	**CCB**
Total PCB	1995	5	NA	5	NA	5	NA
Total PCB	1996	3	NA	5	5	5	NA
Total PCB	1997	5	NA	5	5	5	NA
Total PCB	1998	5	1	5	8	5	8
Total PCB	1999	5	NA	NA	8	5	8
LMW PAH	1991	10	NA	8	NA	4	NA
LMW PAH	1992	5	NA	8	8	5	NA
LMW PAH	1993	6	NA	6	8	6	NA
LMW PAH	1994	3	NA	3	7	3	NA
LMW PAH	1995	5	NA	5	NA	5	NA
LMW PAH	1996	3	NA	5	5	5	NA
LMW PAH	1997	5	NA	5	5	5	NA
LMW PAH	1998	5	1	5	8	5	8
LMW PAH	1999	5	NA	NA	8	5	8
HMW PAH	1991	10	NA	8	NA	4	NA
HMW PAH	1992	5	NA	8	8	5	NA
HMW PAH	1993	6	NA	6	8	6	NA
HMW PAH	1994	3	NA	3	7	3	NA
HMW PAH	1995	5	NA	5	NA	5	NA
HMW PAH	1996	3	NA	5	5	5	NA
HMW PAH	1997	5	NA	5	5	5	NA
HMW PAH	1998	5	1	5	8	5	8
HMW PAH	1999	5	NA	NA	8	5	8
Total CHLOR	1991	10	NA	8	NA	5	NA
Total CHLOR	1992	5	NA	7	8	5	NA
Total CHLOR	1993	NA	NA	5	8	4	NA
Total CHLOR	1994	3	NA	3	7	3	NA
Total CHLOR	1995	5	NA	5	NA	5	NA
Total CHLOR	1996	3	NA	5	5	5	NA
Total CHLOR	1997	5	NA	5	5	5	NA

Table C-15. Mussel Chemistry Data, 1991 – 1999.
(Continued)

		Means						SE					
Parameter	**Year**	**Gloucester(7)**	**Sandwich(8)**	**DI(1)**	**OS(4)**	**BIH(6)**	**CCB(9)**	**Gloucester***	**Sandwich***	**DI**	**OS**	**BIH**	**CCB**
Total CHLOR	1998	6.79	14.15	24.97	10.47	25.76	8.30	0.21	0.00	0.56	0.74	1.77	0.54
Total CHLOR	1999	7.63	NA	NA	7.72	22.50	7.52	0.98	NA	NA	0.25	1.05	0.24
Aldrin	1991	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
Aldrin	1992	0.00	NA	0.00	0.00	0.00	NA	0.00	NA	0.00	0.00	0.00	NA
Aldrin	1993	NA	NA	0.00	0.00	0.00	NA	NA	NA	0.00	0.00	0.00	NA
Aldrin	1994	1.22	NA	0.00	0.38	0.00	NA	1.22	NA	0.00	0.38	0.00	NA
Aldrin	1995	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
Aldrin	1996	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
Aldrin	1997	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
Aldrin	1998	0.00	0.00	0.00	NA	0.00	0.00	0.00	0.00	0.00	NA	0.00	0.00
Aldrin	1999	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00
Dieldrin	1991	0.79	NA	2.92	NA	9.00	NA	0.46	NA	0.25	NA	0.84	NA
Dieldrin	1992	0.15	NA	2.66	1.09	6.73	NA	0.15	NA	0.25	0.18	1.03	NA
Dieldrin	1993	NA	NA	3.16	2.24	4.53	NA	NA	NA	0.91	0.07	0.82	NA
Dieldrin	1994	0.73	NA	10.35	1.97	14.57	NA	0.73	NA	0.42	0.13	9.87	NA
Dieldrin	1995	1.54	NA	3.15	NA	6.94	NA	0.06	NA	0.09	NA	0.35	NA
Dieldrin	1996	0.00	NA	5.60	1.36	9.28	NA	0.00	NA	0.60	0.84	0.96	NA
Dieldrin	1997	2.28	NA	3.40	2.02	7.14	NA	0.08	NA	0.25	0.10	0.29	NA
Dieldrin	1998	2.83	5.67	4.10	2.25	7.61	2.82	0.13	0.00	0.08	0.09	0.40	0.13
Dieldrin	1999	1.44	NA	NA	1.47	9.06	1.57	0.12	NA	NA	0.04	0.51	0.08
Endrin	1991	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	1992	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	1993	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	1994	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Endrin	1995	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
Endrin	1996	0.00	NA	0.00	0.00	0.00	NA	0.00	NA	0.00	0.00	0.00	NA
Endrin	1997	0.00	NA	0.00	0.00	0.00	NA	0.00	NA	0.00	0.00	0.00	NA
Endrin	1998	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Endrin	1999	0.00	NA	NA	0.00	0.00	0.00	0.00	NA	NA	0.00	0.00	0.00
Hexachlorobenzene	1991	0.39	NA	0.00	NA	0.00	NA	0.26	NA	0.00	NA	0.00	NA

Table C-15. Mussel Chemistry Data, 1991 – 1999.
(Continued)

		N					
Parameter	**Year**	**Gloucester**	**Sandwich**	**DI**	**FOS**	**BIH**	**CCB**
Total CHLOR	1998	5	1	5	8	5	8
Total CHLOR	1999	5	NA	NA	8	5	8
Aldrin	1991	10	NA	8	NA	5	NA
Aldrin	1992	5	NA	7	8	5	NA
Aldrin	1993	NA	NA	5	8	4	NA
Aldrin	1994	3	NA	3	7	3	NA
Aldrin	1995	5	NA	5	NA	5	NA
Aldrin	1996	3	NA	5	NA	5	NA
Aldrin	1997	5	NA	5	NA	5	NA
Aldrin	1998	5	1	5	NA	5	8
Aldrin	1999	5	NA	NA	8	5	8
Dieldrin	1991	10	NA	8	NA	5	NA
Dieldrin	1992	5	NA	7	8	5	NA
Dieldrin	1993	NA	NA	5	8	4	NA
Dieldrin	1994	3	NA	3	7	3	NA
Dieldrin	1995	5	NA	5	NA	5	NA
Dieldrin	1996	3	NA	5	5	5	NA
Dieldrin	1997	5	NA	5	5	5	NA
Dieldrin	1998	5	1	5	8	5	8
Dieldrin	1999	5	NA	NA	8	5	8
Endrin	1991	NA	NA	NA	NA	NA	NA
Endrin	1992	NA	NA	NA	NA	NA	NA
Endrin	1993	NA	NA	NA	NA	NA	NA
Endrin	1994	NA	NA	NA	NA	NA	NA
Endrin	1995	5	NA	5	NA	5	NA
Endrin	1996	3	NA	5	5	5	NA
Endrin	1997	5	NA	5	5	5	NA
Endrin	1998	5	1	5	8	5	8
Endrin	1999	5	NA	NA	8	5	8
Hexachlorobenzene	1991	10	NA	10	NA	5	NA

Table C-15. Mussel Chemistry Data, 1991 – 1999.
(Continued)

		Means						SE					
Parameter	**Year**	**Gloucester(7)**	**Sandwich(8)**	**DI(1)**	**OS(4)**	**BIH(6)**	**CCB(9)**	**Gloucester***	**Sandwich***	**DI**	**OS**	**BIH**	**CCB**
Hexachlorobenzene	1992	0.00	NA	0.00	0.00	0.00	NA	0.00	NA	0.00	0.00	0.00	NA
Hexachlorobenzene	1993	NA	NA	2.66	0.06	14.20	NA	NA	NA	0.88	0.06	5.93	NA
Hexachlorobenzene	1994	0.91	NA	0.00	0.10	0.00	NA	0.58	NA	0.00	0.10	0.00	NA
Hexachlorobenzene	1995	0.24	NA	0.63	NA	0.74	NA	0.09	NA	0.09	NA	0.09	NA
Hexachlorobenzene	1996	0.98	NA	0.72	0.65	1.48	NA	0.28	NA	0.19	0.05	0.11	NA
Hexachlorobenzene	1997	0.53	NA	0.44	0.23	0.68	NA	0.04	NA	0.05	0.01	0.02	NA
Hexachlorobenzene	1998	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hexachlorobenzene	1999	0.38	NA	NA	0.22	0.45	0.36	0.08	NA	NA	0.03	0.03	0.03
Mirex	1991	0.45	NA	0.00	NA	0.00	NA	0.45	NA	0.00	NA	0.00	NA
Mirex	1992	0.00	NA	0.00	0.00	0.00	NA	0.00	NA	0.00	0.00	0.00	NA
Mirex	1993	NA	NA	0.00	0.00	0.00	NA	NA	NA	0.00	0.00	0.00	NA
Mirex	1994	1.98	NA	0.00	0.00	0.00	NA	0.40	NA	0.00	0.00	0.00	NA
Mirex	1995	0.00	NA	0.07	NA	0.21	NA	0.00	NA	0.03	NA	0.08	NA
Mirex	1996	0.78	NA	0.64	0.70	0.26	NA	0.07	NA	0.06	0.18	0.02	NA
Mirex	1997	0.07	NA	0.50	0.26	0.24	NA	0.07	NA	0.03	0.06	0.15	NA
Mirex	1998	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.09	0.00
Mirex	1999	0.15	NA	NA	0.05	0.41	0.05	0.02	NA	NA	0.01	0.01	0.01
Lindane	1991	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA	0.00	NA
Lindane	1992	0.00	NA	0.16	0.00	0.00	NA	0.00	NA	0.16	0.00	0.00	NA
Lindane	1993	NA	NA	2.22	0.35	2.33	NA	NA	NA	0.57	0.18	0.41	NA
Lindane	1994	0.42	NA	0.19	0.00	0.00	NA	0.42	NA	1.56	0.00	0.00	NA
Lindane	1995	0.65	NA	0.03	NA	0.88	NA	0.06	NA	1.01	NA	0.04	NA
Lindane	1996	0.00	NA	0.00	0.36	0.00	NA	0.00	NA	0.00	0.36	0.00	NA
Lindane	1997	0.00	NA	0.00	0.00	0.00	NA	0.00	NA	0.00	0.00	0.00	NA
Lindane	1998	0.42	0.75	0.75	0.46	0.61	0.17	0.01	0.00	0.03	0.08	0.05	0.09
Lindane	1999	0.30	NA	NA	0.36	0.28	0.65	0.02	NA	NA	0.01	0.02	0.04

Table C-15. Mussel Chemistry Data, 1991 – 1999.
(Continued)

		N					
Parameter	**Year**	**Gloucester**	**Sandwich**	**DI**	**FOS**	**BIH**	**CCB**
Hexachlorobenzene	1992	5	NA	8	8	5	NA
Hexachlorobenzene	1993	NA	NA	5	8	4	NA
Hexachlorobenzene	1994	3	NA	4	7	3	NA
Hexachlorobenzene	1995	5	NA	5	NA	5	NA
Hexachlorobenzene	1996	3	NA	5	5	5	NA
Hexachlorobenzene	1997	5	NA	5	5	5	NA
Hexachlorobenzene	1998	5	1	5	8	5	8
Hexachlorobenzene	1999	5	NA	NA	8	5	8
Mirex	1991	10	NA	10	NA	5	NA
Mirex	1992	5	NA	8	8	5	NA
Mirex	1993	NA	NA	5	8	4	NA
Mirex	1994	3	NA	4	8	3	NA
Mirex	1995	5	NA	5	NA	5	NA
Mirex	1996	3	NA	5	5	5	NA
Mirex	1997	5	NA	5	5	5	NA
Mirex	1998	5	1	5	8	5	8
Mirex	1999	5	NA	NA	8	5	8
Lindane	1991	10	NA	8	NA	5	NA
Lindane	1992	5	NA	7	8	5	NA
Lindane	1993	NA	NA	5	8	4	NA
Lindane	1994	3	NA	3	7	3	NA
Lindane	1995	5	NA	5	NA	5	NA
Lindane	1996	3	NA	5	5	5	NA
Lindane	1997	5	NA	5	5	5	NA
Lindane	1998	5	1	5	8	5	8
Lindane	1999	5	NA	NA	8	5	8

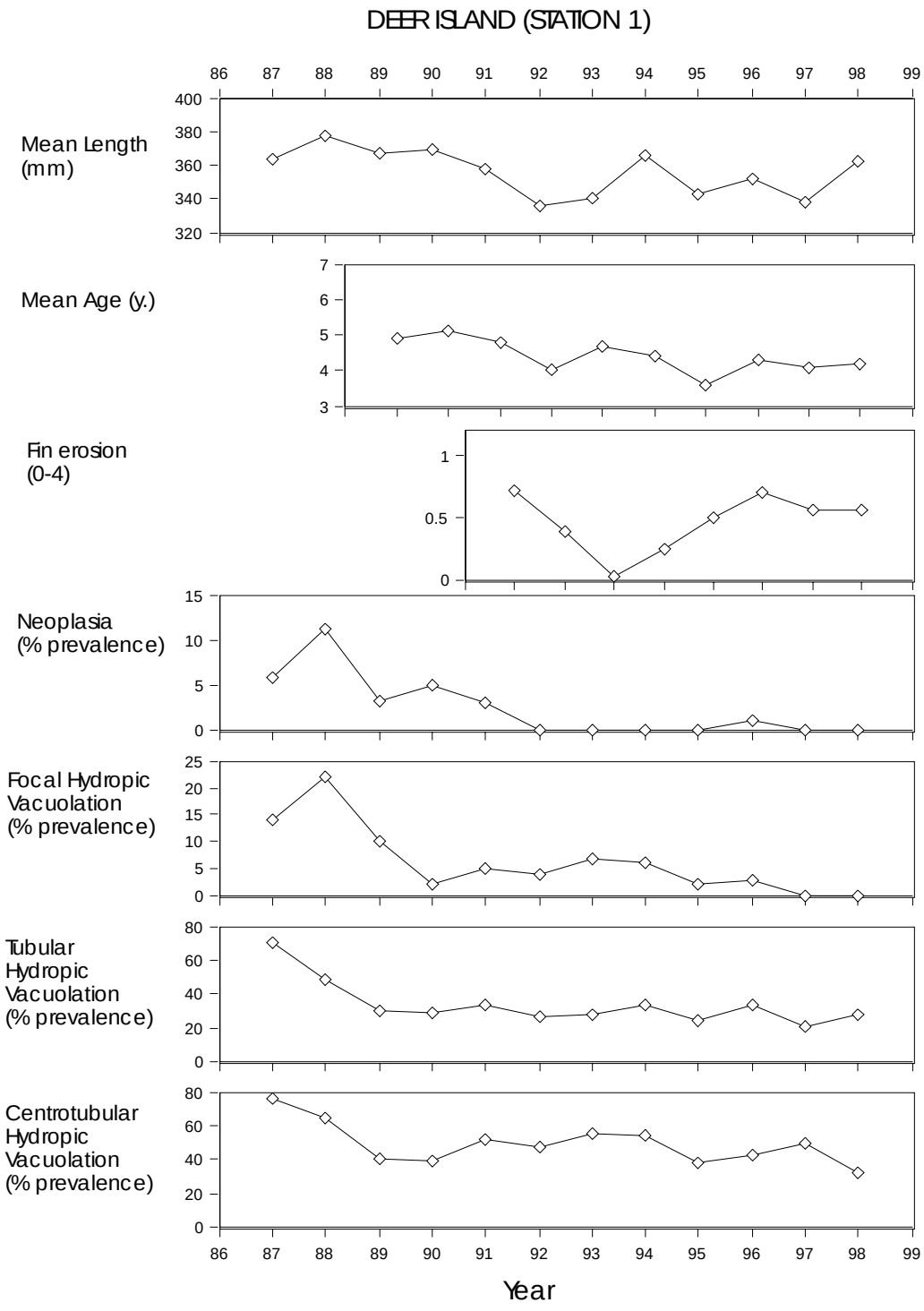
Table C-15. Mussel Chemistry Data, 1991 – 1999.
(Continued)

		Means						SE					
Parameter	**Year**	**Gloucester(7)**	**Sandwich(8)**	**DI(1)**	**FOS(4)**	**BIH(6)**	**CCB(9)**	**Gloucester***	**Sandwich***	**DI**	**FOS**	**BIH**	**CCB**
Total 97/98 LMW PAH	1999	348.06	NA	NA	36.44	2372.67	45.73	42.16	NA	NA	2.17	137.09	2.43
Total 97/98 HMW PAH	1999	610.85	NA	NA	29.88	3679.70	17.85	136.08	NA	NA	0.95	145.16	1.01

		N					
Parameter	**Year**	**Gloucester**	**Sandwich**	**DI**	**FOS**	**BIH**	**CCB**
Total 97/98 LMW PAH	1999	5	NA	NA	8	5	8
Total 97/98 HMW PAH	1999	5	NA	NA	8	5	8

APPENDIX C

Flounder Histology Time Plots



Liver slices examined per fish: 1 for 1987 to 1990, 3 thereafter

Figure C-1. Deer Island Flounder Time Plot

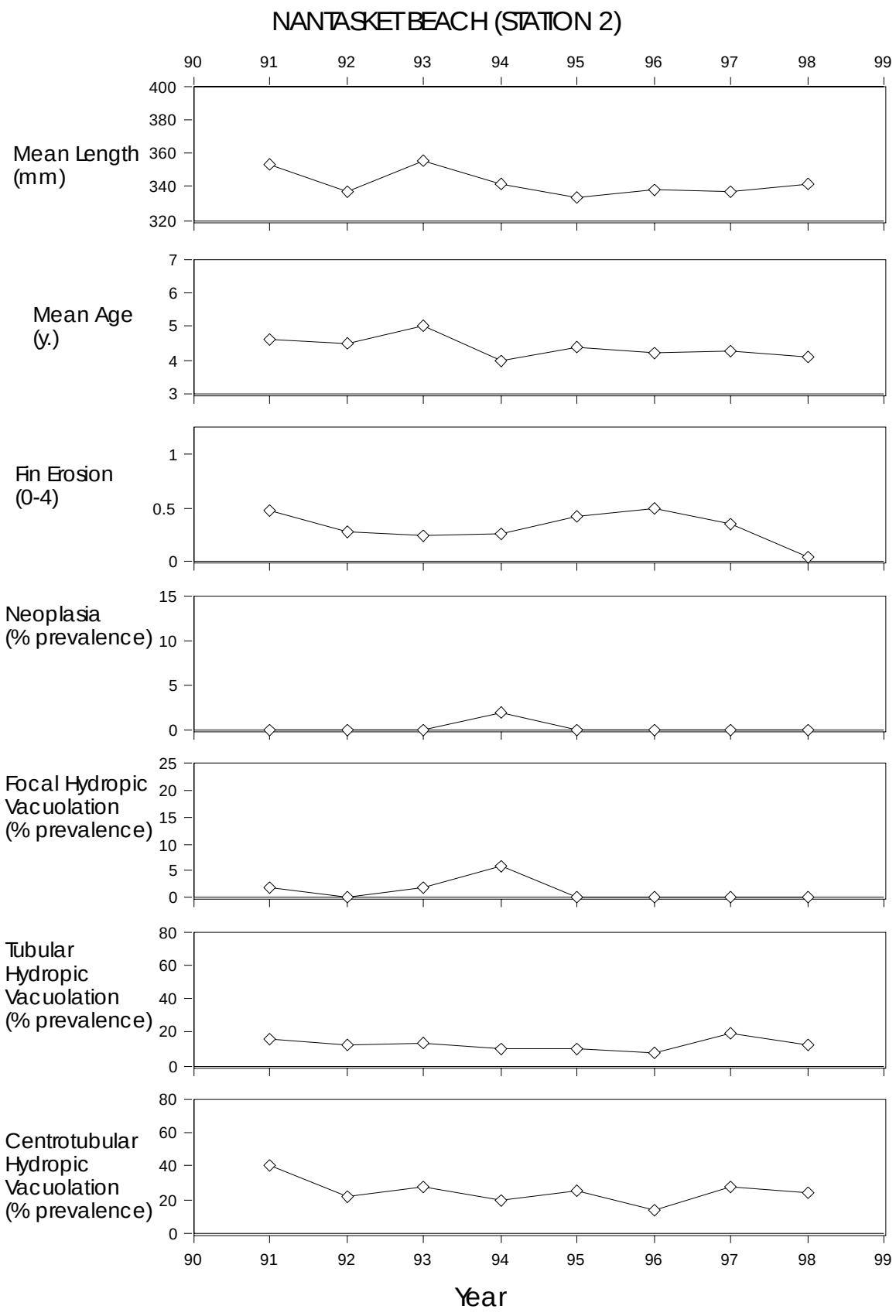


Figure C-2. Nantasket Beach Flounder Time Plot

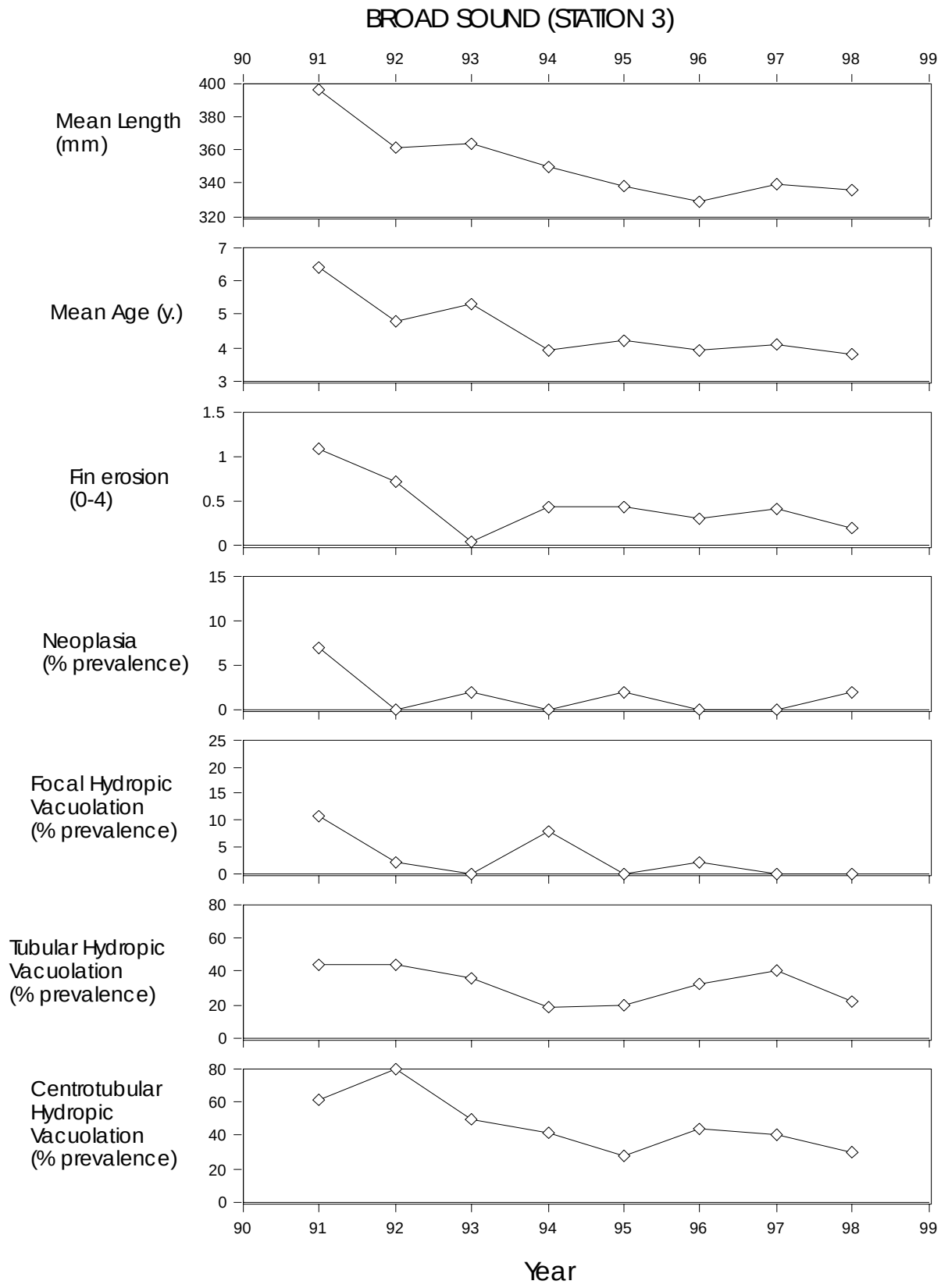


Figure C-3. Broad Sound Flounder Time Plot

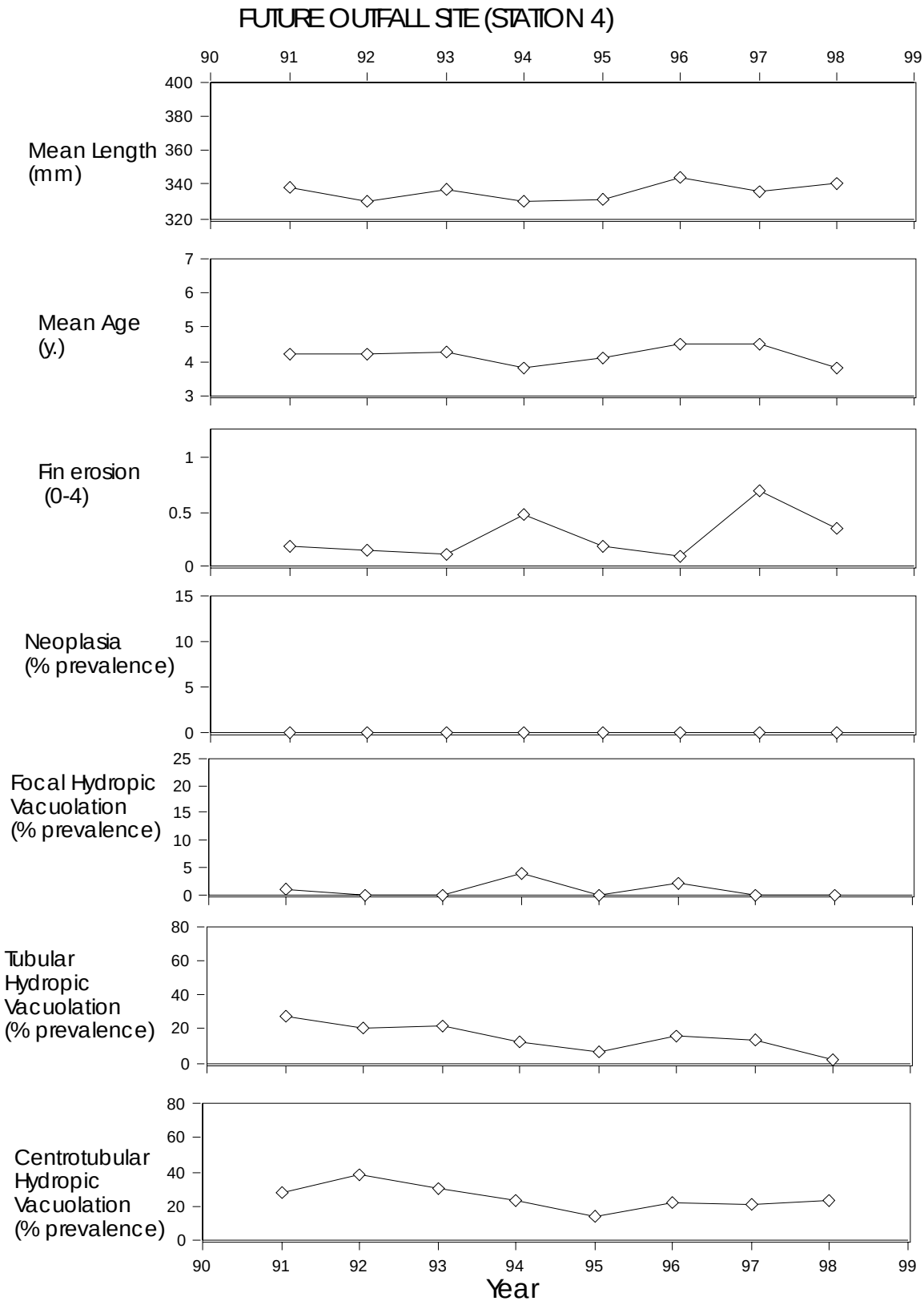


Figure C-4. Future Outfall Site Flounder Time Plot

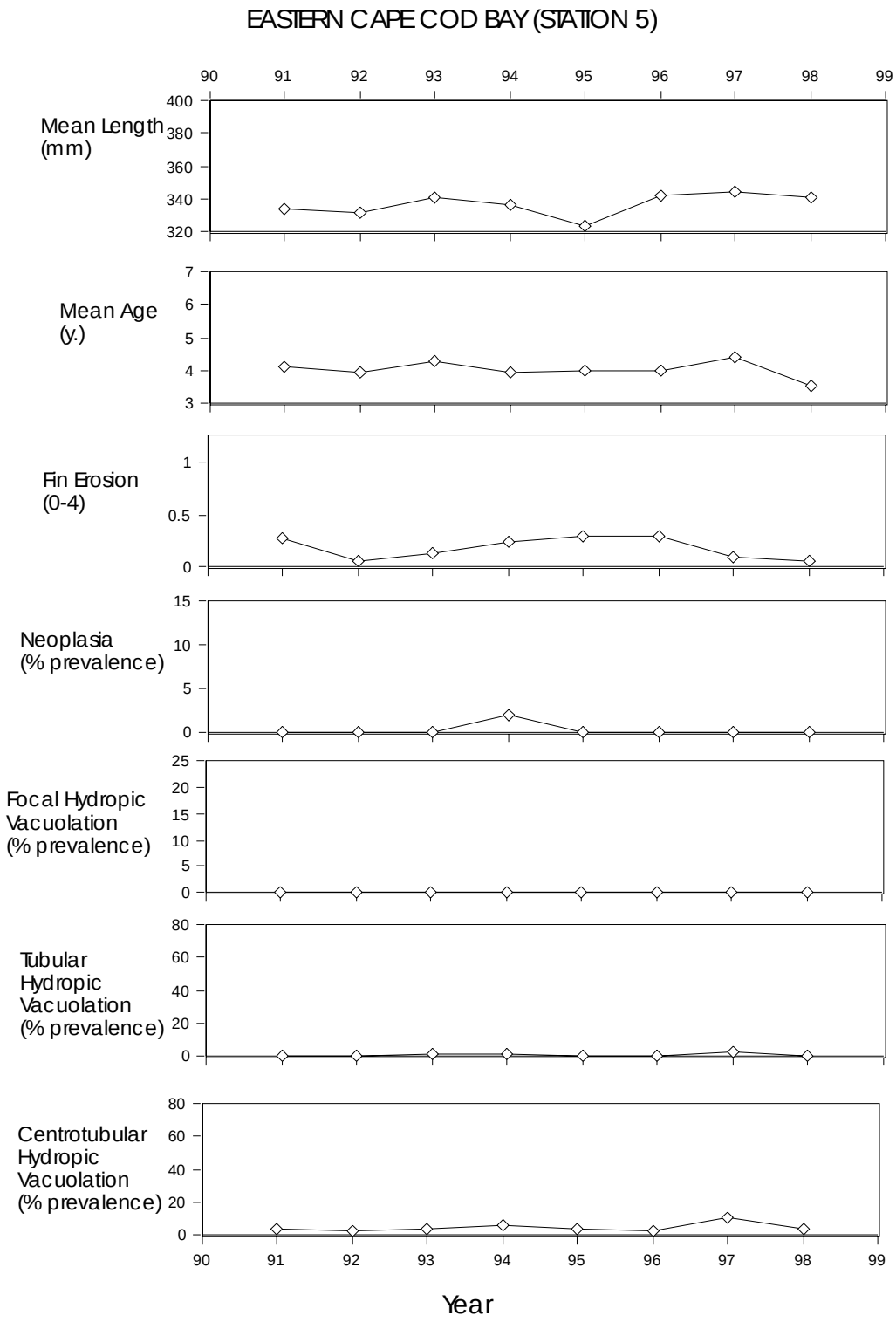


Figure C-5. Eastern Cape Cod Bay Flounder Time Plot

APPENDIX D

Results of Statistical Analyses

Table D-1. ANOVA Results Determining Whether Chemical Concentrations in Flounder Tissues Differ Significantly Between Sampling Stations.

Parameter	Probability	
	Fillet	Liver
Cadmium	NA	0.155
Chromium	NA	0.089
Copper	NA	0.035
Lead	NA	0.38
Mercury	0.0006	0.0009
Nickel	NA	0.17
Silver	NA	0.17
Zinc	NA	0.15
Total PCB	0.019	0.00001
Total PAH	NA	0.91
Total DDT	0.046	0.00002
Total Chlordane	0.019	0.0001
Dieldrin	0.107	0.087
HCB	0.812	0.018

Table D-2. ANOVA Results Determining Whether Chemical Concentrations in Lobster Tissues Differ Significantly between Sampling Stations.

Parameter	Probability	
	Meat	Hepatopancreas
Cadmium	NA	0.04
Chromium	NA	0.86
Copper	NA	0.01
Lead	NA	0.03
Mercury	0.26	0.03
Silver	NA	0.19
Zinc	NA	0.005
Total PCB	0.0003	0.00001
Total PAH	NA	0.0001
Total DDT	0.0006	0.00007
Total Chlordane	0.000003	0.0005
Dieldrin	0.00003	0.005
HCB	0.005	0.06
Mirex	0.027	0.37

Table D-3. ANOVA Results Determining Whether Chemical Concentrations in Mussel Tissue Differ Significantly between Sampling Stations.

Parameter	Probability
Mercury	< 0.001
Silver	< 0.001
Total PCB	< 0.001
Total HMW PAH	< 0.001
Total LMW PAH	< 0.001
Total DDT	< 0.001
Total Chlordane	< 0.001
Dieldrin	< 0.001
HCB	< 0.001
Lindane	< 0.001
Mirex	< 0.001

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