FINAL REPORT

TEMPORAL TRENDS IN CONTAMINANTS IN PUGET SOUND HARBOR SEALS

Prepared by

John Calambokidis
Cascadia Research
218½ W Fourth Ave.
Olympia, WA 98501

Steve Jeffries
Marine Mammal Investigations
Washington Department of Fish and Wildlife
7801 Phillips County Rd. SW
Tacoma, WA 98498

Peter S. Ross and Michael Ikonomou
Institute of Ocean Sciences
Department of Fisheries and Oceans
P.O. Box 6000
Sidney, BC V8L 4B2

Prepared for
U.S. Environmental Protection Agency
and
Puget Sound Water Quality Action Team

December 1999

TABLE OF CONTENTS

INTRODUCTION

Harbor seals (*Phoca vitulina*) are the most abundant marine mammal species in Washington State and occur throughout the marine waters including Puget Sound (Osborne *et al.* 1988). Extremely high concentrations of some chlorinated hydrocarbon contaminants, especially PCBs, were found in Puget Sound harbor seals in the 1970s and 1980s (Arndt 1973, Calambokidis *et al.* 1978, 1984). There has been increasing evidence of contaminant-associated adverse effects including reproductive impairment and immunotoxicity and endocrine disruption caused by some chlorinated hydrocarbons in controlled captive feeding studies with PCBs being implicated in the observed effects (Reijnders 1986, Brower *et al.* 1986, Addison 1989, Ross *et al.* 1995, 1996, De Swart *et al.* 1994).

One of the longest-term datasets on trends in contaminants in the Puget Sound region comes from harbor seals. Harbor seal pups from Puget Sound have been collected and tested for concentrations of PCBs and DDT compounds at 4-5 year intervals from 1972 to 1990 at several Puget Sound sites (Arndt 1973, Calambokidis *et al.* 1978, 1984, 1991). Analyses were last completed for 14 pups collected in 1990 from Gertrude Island in southern Puget Sound and Smith Island in the Strait of Juan de Fuca. Clear temporal and spatial trends in chlorinated hydrocarbons have been documented in harbor seal neonates in Puget Sound (Calambokidis 1995). Samples from harbor seals are ideally suited for trend analyses because they are highly contaminated, represent an integration of concentrations in a broad selection of prey in a region, and, with the utilization of non-emaciated pups, provide limited inter-sample variability allowing sensitive detection of changes over time.

Additional blubber samples from dead harbor seal neonates at Gertrude Island were obtained in 1996 and 1997, and biopsy samples of blubber were obtained from weaned harbor seal pups in 1993 and 1996. Biopsy samples from weaned pups have not been used in the past trend analysis but may be a valuable alternate source of samples. For these samples to be suitable for use in the trend analysis, information is needed on the degree of inter-sample variability, factors responsible for variability, and the comparability of these samples to the past analyses on dead harbor seal neonates.

Primary objectives of the study were:

1. Determine current levels of a broad range of chlorinated hydrocarbon contaminants in Puget Sound harbor seals including congener-specific concentrations of PCBs, DDTs and other pesticides, and the first analyses of polychlorinated dibenzo dioxins and furans (PCDDs and PCDFs).

2. Determine trends in concentrations of some of these contaminants including long-term trends in PCBs and DDT compounds in blubber of harbor seal pups in southern Puget Sound .

3. Determine how concentrations in blubber vary between biopsies of weaned seal pups and those from dead neonates.

4. Identify the degree of inter-sample variability and potential factors responsible for variation (date, length, weight, etc.) in samples from pups and evaluate use of weaned pups in future

trend analyses.

This report summarizes the results of the analyses conducted on Puget Sound harbor seals to address the above objectives. These results and those of related studies in British Columbia will be the focus of several planned manuscripts for publication in scientific journals.

METHODS

Sample Collection

A total of 57 blubber samples from harbor seals were collected and analyzed for contaminants at the Institute for Ocean Sciences (IOS). Samples analyzed were obtained in two different ways and five different years from 1984 to 1997 (Tables 1-2).

Biopsy sampling

Blubber samples for contaminant analysis were collected from live weaned pups at Gertrude Island, southern Puget Sound in 1993 (n=11) and 1996 (n=17) (Tables 1-2). Seals were captured using an entanglement net deployed from a boat off the haul-out area (Jeffries *et al.* 1993). Seals were physically restrained then weighed and measured prior to sampling. Newly weaned pups were selected for biopsy sampling for contaminant analyses.

Samples were taken by 6 mm diameter sterile biopsy punch from an area over the left pelvis, 10 cm down from the midline. The biopsy site was shaved, cleaned with Betadine solution, and rinsed twice with 70% isopropyl alcohol. A local anesthetic (2.0 cc of Lidocaine:Epinephrine solution) was administered subdurally into the biopsy site. Four biopsy punch samples were taken from each animal. Blubber samples were placed in aluminum foil, then into a whirlpak bag, labeled with identification number, date and collection location. Samples were frozen and stored at -20^{O} C prior to shipping to IOS for analysis.

Sampling of dead neonates

Dead harbor seal neonates were collected for contaminant analysis from the Gertrude Island area and other regions around southern Puget Sound in 1984 (n=10), 1990 (n=10), 1996 (n=4), and 1997 (n=5)(Tables 1-2). Collections in 1984 and 1990 were part of past studies to examine mortality, causes of death, and contaminants in harbor seals (Calambokidis *et al.* 1985, 1991, Steiger *et al.* 1989) and some of these samples have been analyzed for contaminants previously (Calambokidis *et al.* 1991, Hong *et al.* 1996).

Beach searches were conducted regularly to look for dead pups and birth sites. One or more persons walked the haul-out and surrounding areas. Additional areas were checked by skiff cruises near shore, using binoculars to scan for carcasses. Searches generally began prior to the pupping season and continued though the end of the pupping season. The Northwest Stranding Network provided additional reports of marine mammal strandings in the study region.

Samples chosen for analysis from those collected were based on: 1) post-mortem condition of the animal, 2) collection of blubber, liver, and histopathology samples, 3) presence of an adequate blubber layer (indicating the animal was not emaciated) and 4) the age of the animal (neonate judged to be no more than one week old). Carcasses determined to be in good condition were either necropsied at the site or placed on ice and brought back for necropsy in the lab.

Animals were weighed, standard length and axillary girth were measured, and the sex was determined (Table 2). For information on the age of the pup, the presence of an umbilical cord was

noted, and described and measured if present, tooth development was described, and the presence of lanugo coat was noted. Blubber thickness was measured over the posterior end of the sternum (xiphoid cartilage) using a ruler; signs of blubber deterioration (gas bubbles or leaching of oil) were noted. Carcasses were examined for the presence of parasites, injuries, and gross abnormalities. Lungs were examined for signs of aeration.

Tissues were generally sampled with stainless steel instruments that were cleaned by initially rinsed with distilled water, then rinsed with methylene chloride, followed by air drying or utilizing clean scalpels. Blubber was sampled from the mid-ventral region. These samples included the full thickness of the blubber layer. Toxicology samples were stored on ice if collected in the field and then frozen at -20° C. Tissues shipped to the laboratory for analyses were placed in a cooler with ice and delivered directly or were shipped on dry ice.

Analytical Methods

Sample extraction, cleanup and fractionation

Approximately 0.1 to 0.2 g of blubber was submitted to the analytical laboratory. Blubber samples were homogenized unfrozen and spiked with a mixture of $^{13}C_{12}$-labeled PCDFs, PCDDs and PCBs as supplied by Cambridge Isotope Laboratories (Andover, MA). The PCBs mixture contained representative diortho (DO), mono-ortho (MO) and non-ortho (NO) PCB congeners. The samples were dried with sodium sulphate and extracted with 250 ml of dichloromethane (DCM) from a glass column by gravity flow.

Cleanup took place in three stages. In the first step aliquots were passed through a multi-layer silica column packed with successive layers of silica gel (basic, neutral, acidic, neutral) and eluted with DCM/hexane (1:1). The second cleanup step was via a neutral alumina activated column capped with anhydrous sodium sulphate. The column was washed with hexane followed with 1:1 DCM/hexane elution to recover the analytes of interest. Fractionation of the later mixture was accomplished with an automated high performance liquid chromatography (HPLC) system utilizing a carbon fiber packed column with a 1:12 mixture of activated carbon/filter paper homogenate. Four fractions were collected from the carbon fiber column: Fraction I was eluted with 20 ml of 5% DCM/hexane and contained the DO-PCBs; Fraction-II eluted with 44ml of 50% DCM/hexane contained the MO-PCBs; Fraction-III, eluted with 50 ml of 50% ethyl acetate/benzene contained the NO-PCBs and Fraction-IV, with 60 ml of toluene in a reverse flow direction to collect all the PCDDs/PCDFs. All four fractions collected from the carbon fiber system were concentrated to less than 10 uL and spiked with the corresponding ^{13}C-labeled method performance standards prior to HRGC/HRMS analysis. Details on the extraction and cleanup methodology utilized, preparation of the silica gel, alumina and carbon fiber columns are described elsewhere (Rantalainen *et al.* 1998, MacDonald *et al.* 1997)

Instrumental analysis and quantitation

Analyses of cleaned up samples for PCDDs, PCDFs, NO- and MO- and DO-PCBs were conducted by high-resolution gas chromatography/high-resolution mass spectrometry (HRGC/HRMS). For all analyses the MS was operated at 10000 resolution under positive EI

conditions and data were acquired in the Single Ion Resolving Mode (SIR). Details on the GC and MS conditions for the PCDDs/PCDFs, MO- and NO-PCBs analyses have been previously reported for the DO-PCBs analysis (Rantalainen *et al.* 1998, MacDonald *et al.* 1997, Ikonomou *et al.* 1998, In press). The concentrations of identified compounds and their minimum detection limits (MDLs) were calculated by the internal standard method using mean relative response factors determined from calibration standard runs, made before and after each batch of samples was run. The criteria for identification and quantification and the quality control measures undertaken for the HRGC/HRMS analysis of all the analytes of interest were based on procedures established in the Environment Canada "River Road" protocol (Environment Canada 1992a, 1992b) for PCDD/PCDF analysis. The same criteria and quality assurance quality control procedures were also applied to the NO- MO- and DO-PCB analyses.

Pesticide Analysis

The following materials were used for the pesticide analysis:

- sodium sulfate: anhydrous sodium sulfate baked at 450 degrees C at least overnight and cooled to room temperature in a desiccating chamber
- 1:1 dichloromethane:hexane, pesticide grade
- hexane, pesticide grade
- Florisil: anhydrous 60 –100 mesh Florisil baked at 450 degrees C overnight and cooled to room temperature in a desiccating chamber. Deactivated with 1.2% toluene-washed water, by weight, and stored under nitrogen until use.

Extraction procedures consisted of the following steps:

1. Weigh 0.1 – 0.2 grams of blubber into a tared weigh boat; record sample weight.
2. Grind sample in 500-ml porcelain mortar & pestle with 200 grams sodium sulfate until a free-flowing mixture is attained.
3. Transfer sample mixture to an extraction column quantitatively with rinses of 1:1 dichloromethane:hexane and elute with 250 - 350 ml 1:1 dichloromethane:hexane into a pre-weighed 500 ml round bottom flask. Calculate total weight of solution.
4. Transfer 25% by weight of the extract solution into a 250-ml round bottom flask. Rotary evaporate to 5 – 10 ml and transfer to a screw cap vial. Store in freezer until pesticide work up required.

Work up of samples for the pesticide analysis consisted of the following:

1. Spike each pesticide sample with 40 microliters of pesticide internal standard (see below). Evaporate to < 1 ml under nitrogen.
2. Prepare Florisil column: 8 grams of 1.2% water deactivated Florisil slurry packed

with hexane into fritted column. Transfer sample quantitatively with hexane to top of column with hexane. Elute column with 60 ml 1:1 dichloromethane:hexane into a 125 ml round bottom flask.

3. Rotary evaporate sample to a volume of 1 – 5 ml. Transfer to a 15-ml glass centrifuge tube with 1:1 dichloromethane:hexane. Evaporate under nitrogen to 0.2 ml. Transfer into an amber microvial. Evaporate under nitrogen to approximately 100 microliters. Add 2017 pg of ^{13}C-PCB-111 as external standard. Cap. Submit for GC/HRMS analysis.

The 40 microliters of the pesticide internal standard contained the following:

Compound	Picograms
$^{13}C_6$-chlorobenzene	2972
$^{13}C_6$-1,4-dichlorobenzene	2972
$^{13}C_6$-1,2,3-trichlorobenzene	2972
$^{13}C_6$-1,2,3,4-tetrachlorobenzene	2972
$^{13}C_6$-pentachlorobenzene	2972
$^{13}C_6$-hexachlorobenzene	2972
$^{13}C_8$-Mirex	2304
$^{13}C_6$-Lindane	3140
$^{13}C_{12}$-p,p'-DDE	3004
$^{13}C_{12}$-p,p'-DDT	3248
d_4-alpha-endosulfan	19760
$^{13}C_{12}$-PCB-101	2936

Data analysis

No adjustments were made to sample values based on recovery factors. Values for the four duplicate samples analyzed were averaged for the data summaries and statistical analyses. Values below detection limits were treated as 0 values. Total PCBs were determined by summing the values of all PCB congeners quantified. Toxic equivalency quotients (TEQ) were calculated by multiplying concentrations of specific compounds by their newly published toxic equivalency factors (TEF) for mammals (Van den Berg *et al*. 1998). Statistical analysis were conducting using the software package SYSTAT.

RESULTS AND DISCUSSION

Duplicate samples

Four sets of samples were analyzed in duplicate (Table 3). These were not true duplicates because the samples were not homogenized prior to splitting. Additionally, one of these was not a true duplicate because the samples were taken from two separate jars that were collected in the field. Overall there was good agreement among the duplicate samples. For total PCBs and DDTs, differences averaged 12% and 5%, respectively. For total PCBs, all differences were less than 10% except for the duplicates taken from different jars. Total PCDDs and PCDFs differed by slightly larger amounts (25-26%) with greatest differences again from the duplicate samples from different jars. Total TEQ (PCBs, PCDDs, and PCDFs) averaged only a 10% difference among samples.

Analysis results

Results of analyses for all samples are shown in Tables 4-10 and summarized by group in Tables 11-14. For PCB congeners, 173 congeners or groups were tested for and detectable levels were found for 146. Total PCBs (sum of all detectable congeners) ranged from 2.8 to 44.7 ppm (ug/g, wet weight). Di-ortho PCB congeners accounted for 92-98% of the total PCBs detected, mono-ortho PCBs 2-8% and coplanar PCBs 0.005-0.06% (Table 8). Higher chlorinated congeners accounted for the highest concentrations with hexa-chlorinated biphenyls responsible for 34-67%% of the total PCBs (Table 8).

Among the dioxins, concentrations of TCDD ranged from not detected (8 samples) to 45 ppt (ng/kg, wet weight). Total PCDD concentrations ranged from 28 to 2,435 ppt (ng/kg, wet weight). The higher values stemmed from elevated levels of OCDD in one run of samples and may be an artifact. For dibenzofurans, concentrations of TCDF ranged from not detected (3 samples) to 37 ppt with total PCDFs ranging from not detected (2 samples) to 192 ppt.

A number of pesticides were detected in all samples (Table 9 and 13). Highest concentrations were found of different DDT products, particularly p,p'-DDE and p,p'-DDT. Other pesticides with detectable concentrations included chlorobenzenes (tri, tetra, penta, and hexa), HCH (alpha, beta, and gamma), aldrin (detected in only one sample), dieldrin, alpha-endosulfan, methoxychlor, mirex, chlordane (oxy, trans, and cis), nonachlor (cis and trans), heptachlor, and helptachlor epoxide.

Total TEQs for the samples ranged from 41 to 434 (ng/kg, wet weight) (Table 10). On average, 68% of the TEQ came from mono-ortho PCBs, 23% from coplanar (non-ortho) PCBs, 8% from PCDDs, and 2% from PCDFs. PCBs therefore accounted for over 90% of the TEQ. This is similar to the proportion of TEQs from PCBs occurring in harbor seals showing immune dysfunction in response to feeding on herring from the Baltic Sea (Ross *et al.* 1995).

Based on the total TEQs found in southern Puget Sound harbor seals they appear to be at risk to immunotoxicity. Mean TEQs (converted to lipid weights) in blubber for southern Puget Sound harbor seal pups were 168 ng/kg. This is close to the mean TEQs in captive Baltic harbor seals showing immune dysfunction; initially estimated as 209 ng/kg (Ross *et al.* 1995, 1996) but recently adjusted to 255ng/kg to account for updated TEF values and the contribution of congeners

not analyzed in the older studies (Ross *et al.* In Press). Eight of the pups sampled in Puget Sound had levels at or above the 255 ng/kg mean TEQ of the immune impaired captive seals (Figure 1). These comparison are complicated slightly by changes in the TEFs used to calculate the TEQ, but these differences should be small. Because even higher concentrations of contaminants would be expected in older animals, the potential for immune system impairment in portions of the seal population are high.

Comparison of PCBs and DDTs with past analyses of duplicate samples

Some of the samples analyzed for the current study were samples that had been analyzed for PCBs and DDT compounds previously by other laboratories using different methods (see Calambokidis *et al.* 1978, 1984, 1991). We evaluated: 1) the comparability of the current results with those reported previously and 2) the appropriateness of pooling the current results with those from the previous studies.

Of the analyses conducted for the current study at the IOS, seven had also been analyzed for PCBs and DDT compounds at The Evergreen State College (TESC) by Cascadia Research personnel (Calambokidis *et al.* 1984, 1991) and six had also been analyzed by an EPA contract lab (Calambokidis *et al.* 1991). Despite the differences in analytical methods, instrumentation, and quantification methods, there was surprisingly good agreement among the varied analyses (Tables 15a-15b). Between the IOS results and those from TESC, means for both PCBs and DDT compounds (p,p'DDE and p,p'DDT) varied by less than 10% between the two labs and differences were not significant (paired t-test, Tables 15b). Differences were slightly higher between the common samples analyzed by both IOS and the EPA contact lab for PCBs and DDT compounds (Tables). Differences in means were about 20% for both PCBs and DDT compounds, but these were still not significantly different (paired t-test, Table 15b).

The similarity in the total PCBs is particularly surprising given the differences in quantification methods for this complex mixture of compounds. For the current analyses, we used the total PCBs computed as a sum of the concentrations for all detected PCB congeners in the IOS analyses. The EPA contract lab was based on matching the sample profiles to a commercial mixture of PCBs and then utilized selected peaks to extrapolate a total concentration. The TESC analyses quantified the concentration of total PCBs as a sum of the concentrations represented by up to 21 peaks that could be eluded from a packed column. The above results indicate that it would be reasonable to compare the results of the current analyses with some of the historical values. This would also allow the pooling of results from these multiple analysis methods to allow an evaluation of longer time series changes.

Some of the results agree and others disagree with those reported by Hong *et al.* (1996) on concentrations and TEQs for PCB congeners from samples of four southern Puget Sound harbor seals also analyzed in the current study. They report mean values of the four samples that we compared to the means of the same four samples in the IOS analyses. Mean values for total PCBs (13.1 vs. 17.4 ug/g) and p,p'-DDE (2.9 vs. 2.3 ug/g) agreed reasonably well as did values for most of the principal PCB congeners. Calculated TEQs from PCBs, however, different greatly primarily as a result of differences in the concentration of one congener (PCB 126). This coplanar non-ortho PCB has a high TEF (0.1) and contributed over 75% of the total TEQ calculated in Hong *et al.* (1996). The mean concentration of this congener reported by Hong *et al.* (1996) was more than an

order of magnitude higher than those found in the current analyses of the same samples (7.7 vs. 0.54 ng/g). We suspect the higher value reported in Hong *et al*. (1996) may have been biased high by inclusion of some potential co-eluding congeners.

Relationships with year, type of sample, and animal condition

Total PCBs and DDTs showed a decreasing trend but Analysis of Covariance (ANCOVA) revealed no significant differences between biopsied weaned pups and dead neonates or significant decline with year for the 1984-97 samples analyzed at IOS (Table 16, $p>0.05$ in both cases). Total TEQ showed a near significant decline by year ($p=0.07$). Other pesticides also showed general declining trends but only for HCB, total chlorobenzenes, and chlordanes was the decline statistically significant.

Examination for trends and differences in condition was also conducted with the inclusion of a number of other factors that appeared to be influencing concentrations of contaminants (Table 17). Multiple regression analyses incorporating weight and length of the pup generally revealed significant trends in contaminants and some or all of these factors including sometimes improving the significance of the trend by year (Table 17). For total PCBs, there were significant differences between weaned and dead pups, an inverse relationship with weight and direct relationship with length Table 17, $p<0.05$ in all three cases), while the trend by year fell just short of significant ($p=0.08$).

Because of the large difference in size between biopsied and dead neonate pups, we also examined patterns just among biopsied seals. Even within this group, concentrations of contaminants varied significantly by size and condition of the animal. Among biopsied pups, concentrations of total PCBs and total TEQ varied significantly directly with length and inversely with weight (multiple regression, $p<0.01$, Table 18). For total DDTs the pattern was similar, although the relationship with length fell slightly short of significance ($p=0.08$). The relationships with length and weight were not as easily discerned with some of the other pesticides and with PCDDs and PCDFs, possibly due to the greater variations in these measurements and the slightly smaller sample size of biopsied animals examined for pesticides.

Inclusion of previous samples from past analyses of total PCBs and DDTs would allow evaluation of a longer time series (back to the 1970s). Earlier samples were primarily analyzed by Cascadia at The Evergreen State College (TESC) and the results with duplicate samples showed good agreement with the total PCB and DDT values determine by IOS. This close agreement among labs suggests pooling these results would not strongly bias the trend analysis. There were no duplicate samples available to test the agreement with a few analyses conducted in the early 1970s at the University of Washington (Arndt 1973). Both total PCBs and DDTs showed highly significant declines by year when the results of previous analyses from the 1970s and 1980s are included (Figure 2).

These results indicate there was clear decline in PCB and DDT concentrations in harbor seals between the 1970s and 1980s but that this decline has slowed and become less pronounced in the 1990s. Although initial efforts to restrict use of these compounds have resulted in a drop in concentrations, these long-lived contaminants persist in the marine environment and high concentrations in some areas such as Puget Sound will likely remain for years to come. Given these

concentrations are in the range of those shown to cause immune response in other studies, harbor seals in this region may be at risk for some time to come.

Conclusions

Primary conclusions from this study include:

1. Dead neonates and biopsied live weaned pups yielded similar blubber concentrations,
2. Total PCBs and DDTs showed good agreement with analyses done in the past
3. Although PCBs DDTs have declined since 1970s, levels have stabilized in recent years
4. Primary risk (measured by TEQs) comes from PCBs and not PCDDs or PCDFs
5. PCBs and TEQs remain high and similar to those known to cause immune dysfunction

RESEARCH RECOMMENDATIONS

We make the following recommendations for future research:

Continue temporal trends in S. Puget Sound. Harbor seals have proven to be a good indicator of trends in contaminants in Puget Sound and have provided one of the longest periodic records of contaminant levels in the marine ecosystem. We recommend that monitoring of contaminant concentrations in southern Puget Sound harbor seal pups be continued at approximately 5-year intervals (next sampling in 2001-2002).

Examine spatial patterns of contaminant concentrations in seals and extend temporal comparison to second area (Smith Island). Historical contaminant data exist for Smith Island going back to 1972, even though this site was not included in the most recent round of analyses. Including Smith Island in sampling would allow evaluation of contaminant trends at two sites, southern Puget Sound and northern Puget Sound. The addition of Smith Island and possibly a third site at Neah Bay would allow a better evaluation of spatial patterns in contaminants. Concentrations of contaminants were significantly higher in southern Puget Sound than in the Strait of Georgia but there was little information to evaluate where these levels change.

Evaluation of concentrations of contaminants in age/sex groups that are likely at higher risk. The current study sampled seal pups because they provide the most reliable group for examining long-term trends in contaminants. This age group probably has lower concentrations than juveniles or adult animals. Levels found in pups were nonetheless in the range that has been demonstrated to cause immune impairment. Examination of adult males and females from southern Puget Sound will provide a better indication of the proportion of animals at risk to contaminant-related problems.

Examination of food web dynamics of seal exposure to contaminants. It is important to understand the mechanism by which southern Puget Sound seals are exposed to these potentially damaging concentrations of contaminants. Fecal samples from seals in southern Puget Sound have been collected and need to be examined to determine their prey in this region. A "market basket" type approach could then be used to examine the contaminant concentrations in a typical seal's diet and evaluate how they are accumulating these concentrations of contaminants.

Evaluation of the impacts of contaminants on seals under controlled conditions. Ultimately controlled experiments using seals in semi-captivity will be needed to evaluate the potential impacts of contaminant concentrations on Puget Sound harbor seals. These types of experiments involving feeding groups of seals diets of fish from contaminated areas have proven critical to our understanding of how these contaminants effect reproduction and immune response (Reijnders 1986, Brower *et al.* 1986, Addison 1989, Ross *et al.* 1995, 1996, De Swart *et al.* 1994).

ACKNOWLEDGMENTS

Support for different aspects of this research was received from the U.S. Environmental Protection Agency, the Puget Sound Water Quality Action Team, Institute of Ocean Sciences' Regional Contaminant Laboratory (Canadian Department of Fisheries and Oceans) and the Washington Department of Fish and Wildlife. Scott Redman, John Armstrong, and John Pierce were all helpful in providing this support. We thank the many people that aided in collection of samples, especially Dyanna Lambourn. The expert analytical and technical support by the Regional Contaminants Laboratory staff, including Norman Crewe, Tamara Fraser and Reet Dhillon, is also acknowledged.

REFERENCES

Addison, R.F. 1989. Organochlorines and marine mammal reproduction. Canadian Journal of Fisheries and Aquatic Sciences 46:360-368.

Anas, R.E. 1974. DDT plus PCB's in blubber of harbor seals. Pesticides Monitoring Journal 8: 12-14.

Arndt, D.P. 1973. DDT and PCB levels in three Washington State harbor seal (*Phoca vitulina richardii*) populations. M.S. Thesis, University of Washington, Seattle. 65pp.

Brouwer, A., P.J.H. Reijnders, and J.H. Koeman. 1989. Polychlorinated biphenyl (PCB)-contaminated fish induces vitamin A and thyroid hormone deficiency in the common seal (*Phoca vitulina*). Aquatic Toxicology 15:99-106.

Calambokidis, J. 1995. Contaminants in Puget Sound marine mammals: temporal, spatial, and species-related patterns. Presentation at Puget Sound Research '95, 12-14 January 1995, Bellevue, WA. Pages 901-908 in Proceedings, Vol. 2. Puget Sound Water Quality Authority, Olympia, WA.

Calambokidis, J., and J. Barlow. 1991. Chlorinated hydrocarbon concentrations and their use for describing population discreetness in harbor porpoises from Washington, Oregon, and California. In J.E. Reynolds III and D.K. Odell (eds.). Marine mammal strandings in the United States: proceedings of the Second Marine Mammal Stranding Workshop; 3-5 December 1987, Miami, Florida. NOAA Technical Report NMFS 98:101-110.

Calambokidis, J., K. Bowman, S. Carter, J. Cubbage, P. Dawson, T. Fleischner, J. Shuett-Hames, J. Skidmore, B. Taylor, and S.G. Herman. 1978. Chlorinated hydrocarbon concentrations and the ecology and behavior of harbor seals in Washington State waters. Final report to the National Science Foundation, Washington, D.C. 121pp.

Calambokidis, J., J. Peard, G.H. Steiger, J.C. Cubbage, and R.L. DeLong. 1984. Chemical contaminants in marine mammals from Washington State. NOAA Technical Memorandum NOS OMS 6, National Technical Information Service, Springfield, Virginia. 167pp.

Calambokidis, J., S.M. Speich, J. Peard, G.H. Steiger, J.C. Cubbage, D.M. Fry, and L.J. Lowenstine. 1985. Biology of Puget Sound marine mammals and marine birds: Population health and evidence of pollution effects. NOAA Technical Memorandum NOS OMA 18, National Technical Information Service, Springfield, Virginia. 159pp.

Calambokidis, J., J.B. Buchanan, G.H. Steiger, and J.R. Evenson. 1991. Toxic contaminants in Puget Sound wildlife. Report EPA910/9-91-023 to the U.S. EPA, Region 10, Seattle, Washington. 96pp.

Calambokidis, J., G.H. Steiger, L.J. Lowenstine, and D.S. Becker. 1991. Chemical contamination of harbor seal pups in Puget Sound. Report EPA 910/9-91-032 to U.S. EPA, Region 10, Seattle, Washington.

De Swart, R.L., P.S. Ross, L.J. Vedder, H.H. Timmerman, S. Heisterkamp, H. van Loveren, J.G. Vos, P.J.H. Reijnders, and A.D.M.E. Osterhaus. 1994. Impairment of immune function in harbour seals (*Phoca vitulina*) feeding on fish from polluted waters. Ambio 23:155-159.

Environment Canada. 1992a. Reference method for the determination of PCDD's and PCDF's in pulp and paper mill effluents. Report EPS 1/RM/19, ISBN 0-662-19450-0.

Environment Canada. 1992b. Internal quality assurance requirements for the analysis of dioxins in environmental samples. Environmental Protection Series. Report EPS 1/RM/23, ISBN 0-662-59298-0.

Hong, S.-W., J. Calambokidis, B. Bush, G.H. Steiger and S. Shaw. 1996. Polychlorinated biphenyls and organochlorine pesticides in harbor seal pups from the inland waters of Washington State. Environmental Science and Technology 30:837-844.

Ikonomou, M.G., P. Sather, T. Fraser, N. Crewe and T. He. In press. Analytical considerations when carbon fibre fractionation is used in conjunction with HRGC/HRMS for the full congener PCBs determinations in environmental samples. Chemosphere.

Ikonomou, M.G., P. Sather, T. He, N. Crewe, T. Fraser and T. Full. 1998. Congener PCBs analysis by HRGC/HRMS: QA/QC considerations. Organohalogen Compounds 35:33-38.

Jeffries, S.J., R.F. Brown and J.T. Harvey. 1993. Techniques for capturing, handling, and marking harbour seals. Aquatic Mammals 19:211-225.

MacDonald, D.D., M.G. Ikonomou, A.-L. Rantalainen, H.I. Rogers, D, Sutherland and J. van-Oostdam. 1997. Contaminants in white sturgeon (Acipenser transontanus) from the Upper Fraser River, British Columbia. Environmental Toxicology and Chemistry 19: 479-490.

Osborne, R., J. Calambokidis and E.M. Dorsey. 1988. A guide to marine mammals of Greater Puget Sound. Island Publishers, Anacortes, Washington. 191pp.

Rantalainen, A-L., M.G. Ikonomou, H.I. Rogers. 1998. Lipid-filled semipermeable membrane devices (SPMDs) as traps for toxic chemicals in the Lower Fraser River, Vancouver, British Columbia. Chemosphere 37:1119-1138

Reijnders, P.J.H. 1986. Reproductive failure in common seals feeding on fish from polluted coastal waters. Nature, London 324:456-457.

Ross, P.S. R.L. De Swart, P.J.H. Reijnders, H. van Loveren, J.G. Vos and A.D.M.E. Osterhaus. 1995. Contaminant-related suppression of delayed-type hypersensitivity and antibody responses in harbor seals fed herring from the Baltic Sea. Environmental Health Perspectives 103:162-167.

Ross, P.S. R.L. De Swart, R. Addison, H. van Loveren, J.G. Vos and A.D.M.E. Osterhaus. 1996. Contaminant-induced immunotoxicity in harbour seals: wildlife at risk? Toxicology

112:157-169.

Ross, P.S., G.M. Ellis, M.G. Ikonomou, L.G. Barrett-Lennard, and R.F. Addison. In Press. High PCB concentrations in free-ranging Pacific killer whales, *Orcinus orca*: effects of age, sex, and dietary preference. Marine Pollution Bulletin.

Steiger, G.H., J. Calambokidis, J.C. Cubbage, D.E. Skilling, A.W. Smith and D.E. Gribble. 1989. Mortality of harbor seal pups at different sites in the inland waters of Washington. Journal of Wildlife Diseases 25:319-328.

Van den Berg, M., L. Birnbaum, A.T.C. Bosveld, B. Brunstrom, P. Cook, M. Feeley, J.P. Giesy, A. Hanberg, R. Hasegawa, S.W. Kennedy, T. Kubiak, J.C. Larsen, F.X. Rolaaf van Leeuwen, A.K. Djien Liem, C. Nolt, R.E. Peterson, L. Poellinger, S. Safe, K. Schrenk, K. Tillitt, M. Tysklind, M. Younes, F. Waern and T. Zacharewski. 1998. Toxic equivalency factors (TEFs) for PCBs, PCDDs, PCDFs for humans and wildlife. Environmental Health Perspectives 106: 775-792.

TABLES AND FIGURES

Table 1.Summary of number of samples analyzed by type. Does not include duplicates.

Type	PCBs, PCDFs & PCDDs	Pesticides
Biopsy samples from captured weaned pups		
1993	11	11
1996	17	12
Total weaned pups	28	23
Samples from fresh dead neonates		
1984	10	10
1990	10	10
1996	4	4
1997	5	5
Total neonates	29	29
Total different samples	57	52

Table 2. List of samples analyzed with summarized biological information.

Field #	Lab. sample #	Site	Collected	Type	Sex	Age	Wt-kg	Len-cm	Grth-cm	Bl-cm	Umb-cm
Y675	1443F 20/11/96 frIII+IV	Gertrude Is.	24-Oct-96	Biopsy	F	Wean	18.5	87	69		0
Y674	1444F 20/1196 frIII+IV	Gertrude Is.	24-Oct-96	Biopsy	F	Wean	16.0	82	68		0
B986	1445-6F 20/11/96 frIII+IV (dupes)	Gertrude Is.	24-Oct-96	Biopsy	M	Wean	26.0	89	81		0
Y673	1447F 11/12/96 frIII+IV	Gertrude Is.	24-Oct-96	Biopsy	F	Wean	23.0	103	70		0
B984	1448F 11/12/96 frIII+IV	Gertrude Is.	23-Oct-96	Biopsy	M	Wean	20.0	90	70		0
B985	1449F 11/12/96 frIII+IV	Gertrude Is.	23-Oct-96	Biopsy	M	Wean	17.0	77	64		0
B1065	1450F 11/12/96 frIII+IV	Gertrude Is.	24-Oct-96	Biopsy	M	Wean	23.5	100	69		0
Y709	1451F 11/12/96 frIII+IV	Gertrude Is.	15-Oct-96	Biopsy	F	Wean	21.0	86	84		0
B1059	1452F 11/12/96 frIII+IV	Gertrude Is.	17-Oct-96	Biopsy	M	Wean	16.0	91	65		0
B808	1526F 10/2/97 frIII+IV	Gertrude Is.	27-Sep-93	Biopsy	M	Wean	32.5				0
Y560	1527F 10/2/97 frIII+IV	Gertrude Is.	27-Sep-93	Biopsy	F	Wean	20.5				0
Y575	1528F 10/2/97 frIII+IV	Gertrude Is.	27-Sep-93	Biopsy	F	Wean	24.7	96	80		0
B858	1529F 10/2/97 frIII+IV	Gertrude Is.	4-Oct-93	Biopsy	M	Wean	20.5	97	72		0
B855	1530F 10/2/97 frIII+IV	Gertrude Is.	4-Oct-93	Biopsy	M	Wean	28.5	93	89		0
B859	1531F 10/2/97 frIII+IV	Gertrude Is.	4-Oct-93	Biopsy	M	Wean	25.0	89	75		0
Y613	1748F 29/4/97 frIII+IV	Gertrude Is.	28-Sep-93	Biopsy	F	Wean	20.0	83	73		0
Y582	1750F 29/4/97 frIII+IV	Gertrude Is.	28-Sep-93	Biopsy	F	Wean	26.0	88	85		0
B888	1751F 29/4/97 frIII+IV	Gertrude Is.	28-Sep-93	Biopsy	M	Wean	20.0	84	69		0
B861	1752F 29/4/97 frIII+IV	Gertrude Is.	4-Oct-93	Biopsy	M	Wean	27.5	100	76		0
B1007	1753F 29/4/97 frIII+IV	Gertrude Is.	9-Oct-96	Biopsy	M	Wean	21.0	82	71		0
Y694	1754F 29/4/97 frIII+IV	Gertrude Is.	9-Oct-96	Biopsy	F	Wean	21.5	93	68		0
B1004	1755F 29/4/97 frIII+IV	Gertrude Is.	9-Oct-96	Biopsy	M	Wean	21.0	86	62		0
B1011	1756F 29/4/97 frIII+IV	Gertrude Is.	9-Oct-96	Biopsy	M	Wean	20.5	91	70		0
Y614	1749,57F 29/4/97 frIII+IV (dupes)	Gertrude Is.	28-Sep-93	Biopsy	F	Wean	24.5	93	71		0
Y701	1762F 2/5/97 frIII+IV	Gertrude Is.	10-Oct-96	Biopsy	F	Wean	21.5	97	71		0
Y702	1763F 2/5/97 frIII+IV	Gertrude Is.	10-Oct-96	Biopsy	F	Wean	23.0	97	81		0
Y672	1764F 2/5/97 frIII+IV	Gertrude Is.	24-Oct-96	Biopsy	F	Wean	27.5	108	78		0
B1041	1765F 2/5/97 frIII+IV	Gertrude Is.	11-Oct-96	Biopsy	M	Wean	20.0	92	75		0
CRC 393	1766F 2/5/97 frIII+IV	Gertrude Is.	13-Sep-90	Dead	F	Neonate	9.5	84	45	0.8	1
CRC 367	1767F 2/5/97 frIII+IV	Gertrude Is.	15-Aug-90	Dead	M	Neonate	8.9	82	46	1.3	
CRC 392	1768F 2/5/97 frIII+IV	Gertrude Is.	13-Sep-90	Dead	M	Neonate	12.6	87	51	1.2	1
CRC 375	1769F-rex 29/5/97 frIII+IV	Nisqually	21-Aug-90	Dead	F	Neonate	13.3	86	54	1.9	1.5
CRC 381	1770-1F 2/5/97 frIII+IV (dupes)	Steamboat Is.	1-Sep-90	Dead	F	Wean	19.0	93	65	2.5	0
CRC 157	1781F 22/5/97 frIII+IV	Gertrude Is.	21-Aug-84	Dead	M	Neonate	9.5	83	54	1.2	0
CRC 167	1783F 22/5/97 frIII+IV	Gertrude Is.	31-Aug-84	Dead	M	Neonate	15.9	93	55	1.7	1
CRC 186	1784F 22/5/97 frIII+IV	Gertrude Is.	18-Sep-84	Dead	F	Neonate	12.0	92	52	1.6	0
CRC 338	1785F 22/5/97 frIII+IV	Gertrude Is.	9-Sep-90	Dead	F	Neonate	11.1	85	54	1.4	0.5
CRC 182	1782,6F 22/5/97 frIII+IV (dupes)	Gertrude Is.	16-Sep-84	Dead	M	Neonate	11.8	88	49	1.2	1
CRC 183	1787F 22/5/97 frIII+IV	Gertrude Is.	20-Sep-84	Dead	F	Fetus	13.6	85	52	1.5	20
CRC 387	1788F 22/5/97 frIII+IV	Gertrude Is.	4-Sep-90	Dead	M	Neonate	9.2	86	40	1.0	
CRC 389	1789F 22/5/97 frIII+IV	Gertrude Is.	12-Sep-90	Dead	F	Neonate	8.5	85	44	1.2	0
CRC 170	1790F 22/5/97 frIII+IV	Gertrude Is.	2-Sep-84	Dead	F	Neonate	10.9	77	52	1.5	6
CRC 379	1807F 29/5/97 frIII+IV	Gertrude Is.	31-Aug-90	Dead	F	Neonate		86	46	1.4	
CRC 111	1808F 29/5/97 frIII+IV	Henderson	14-Jul-84	Dead	F	Neonate	14.1	89	57	1.6	20
CRC 125	1809F 29/5/97 frIII+IV	Henderson	31-Jul-84	Dead	M	Neonate	9.3	88	71	2.5	0
CRC 126	1810F 29/5/97 frIII+IV	Budd Inlet	31-Jul-84	Dead	M	Neonate	11.4	89	64	1.5	5
CRC 385	1811F 29/5/97 frIII+IV	Gertrude Is.	4-Sep-90	Dead	M	Neonate	9.6	86	42	0.9	
CRC 158	1812F 29/5/97 frIII+IV	Gertrude Is.	21-Aug-84	Dead	F	Neonate	10.0	88	48	1.4	0
MMP97-20	1969F 9/1/98	Gertrude Is.	8/9/1997	Dead	F	Neonate	9.0	76	54	2.0	0
MMP97-21	1970F 9/1/98	Gertrude Is.	8/9/1997	Dead	F	Neonate	13.0	88	52	1.5	0
MMP97-22	1971F 9/1/98	Gertrude Is.	8/13/1997	Dead	M	Neonate	12.0	87	53	1.6	0
MMP97-19	1972F 9/1/98	Gertrude Is.	8/9/1997	Dead	F	Neonate	7.0	72	42	1.0	0
MMP97-30	1973F 9/1/98	Gertrude Is.	8/29/1997	Dead	M	Neonate	11.0	79	52	1.8	0
MMP 96-26	2247F 9/9/98 frIV+III	Gertrude Is.	8/15/1996	Dead	M	Neonate	10.0	77	55	1.2	0
MMP 96-27	2248F 9/9/98 frIV+III	Gertrude Is.	8/15/1996	Dead	F	Neonate	8.2	70	45	1.2	0
MMP 96-23	2249F 9/9/98 frIV+III	Gertrude Is.	7/31/1996	Dead	F	Neonate	13.0	99	55	1.2	0
MMP 96-31	2250F 9/9/98 frIV+III	Gertrude Is.	8/27/1996	Dead	F	Neonate	8.0	71	39	0.8	0

Table 3. Summary of results from duplicate analyses of samples.

			Concentration ug/g, wet weight				Conc. ng/kg, wet wt.		
Field #	**Lab #**	**Lipid%**	**total PCB**	**p,p-DDE**	**p,p-DDT**	**total DDTs**	**total PCDD**	**total PCDF**	**total TEQ**
B986	1445F 20/11/96 frIII+IV (rep1446 del)		5.7	0.58	0.13	0.73	124	6	72
B986	1446F 20/11/96 frIII+IV (rep of 1445F)		5.5	0.57	0.13	0.72	96	7	68
Y614	1749F 29/4/97 frIII+IV	102	15.0	1.33	0.11	1.47	80	10	
Y614	1757F 29/4/97 frIII+IV (rep 1749F del)	102	15.9	1.26	0.10	1.39	89	16	144
CRC 381	1770F 2/5/97 frIII+IV	90	13.9	1.62	0.17	1.82	136	15	174
CRC 381	1771F 2/5/97 frIII+IV (rep of 1770F)	91	15.1	1.54	0.15	1.73	111	12	176
CRC 182 (masking tape)	1782F 22/5/97 frIII+IV (rep of 1786F)	111	15.8	2.01	0.28	2.34	108	ND	162
CRC 182 (GREEN TAPE)	1786F 22/5/97 frIII+IV (rep 1782F del)	85	21.3	1.88	0.27	2.20	170	8	205
Mean % difference between duplicate samples			12%	5%	4%	5%	25%	26%	10%

Table 4. Concentrations of PCDDs and PCDFs in harbor seal blubber (ng/kg, wet weight). Duplicates are averaged and listed once.

Field #	Lab. sample #	a2,3,7,8-TCDD	TCDD TOTAL	TCDD NP	a1,2,3,7,8-PeCDD	PeCDD TOTAL	PeCDD NP	a1,2,3,4,7,8-HxCDD	a1,2,3,6,7,8-HxCDD	a1,2,3,7,8,9-HxCDD	HxCDD TOTAL	HxCDD NP
Y675	1443F 20/11/96 frIV	ND	9.37	3	5.55	5.55	1	2.09	32.83	2.88	40.02	4
Y674	1444F 20/11/96 frIV	NDR(1.83)	12.98	4	7.21	11.54	2	ND	39.83	4.17	47.48	3
B986	1445-6F 20/11/96 frIV (mean of 2)	1.10	10.55	3.5	3.57	8.36	2.5	0.94	21.31	2.56	27.29	2.5
Y673	1447F 11/12/96 frIV	1.72	44.99	9	7.02	63.34	5	ND	51.71	5.91	114.90	5
B984	1448F 11/12/96 frIV	2.47	14.06	4	10.00	12.07	2	3.77	49.58	3.22	59.07	4
B985	1449F 11/12/96 frIV	NDR(1.27)	23.38	5	6.05	18.69	4	ND	29.10	3.51	43.78	4
B1065	1450F 11/12/96 frIV	1.82	20.23	5	6.88	14.98	3	ND	43.95	NDR(3.64)	51.63	3
Y709	1451F 11/12/96 frIV	0.93	17.79	5	4.18	13.09	3	2.79	22.41	5.19	33.03	4
B1059	1452F 11/12/96 frIV	1.88	31.62	5	8.94	22.71	3	ND	79.19	5.38	96.78	4
B808	1526F 10/2/97 frIV	1.53	7.00	3	NDR(6.08)	ND	0	ND	19.11	2.37	21.48	2
Y560	1527F 10/2/97 frIV	ND	7.64	1	8.28	8.28	1	4.93	28.02	8.87	41.82	3
Y575	1528F 10/2/97 frIV	ND	11.14	2	4.61	4.61	1	ND	29.65	8.89	42.03	3
B858	1529F 10/2/97 frIV	1.89	1.89	1	7.56	7.56	1	4.38	37.39	NDR(5.43)	43.90	3
B855	1530F 10/2/97 frIV	ND	ND	0	6.68	6.68	1	5.89	29.77	ND	40.27	3
B859	1531F 10/2/97 frIV	1.38	5.43	2	NDR(8.00)	ND	0	ND	42.94	5.54	50.78	3
Y613	1748F 29/4/97 frIV	2.01	5.78	2	5.92	5.92	1	1.83	22.31	3.34	28.60	4
Y582	1750F 29/4/97 frIV	0.99	11.62	3	3.45	3.45	1	ND	22.08	5.11	27.19	2
B888	1751F 29/4/97 frIV	1.99	13.45	3	5.59	5.59	1	ND	31.09	5.81	36.90	2
B861	1752F 29/4/97 frIV	ND	7.02	1	5.53	5.53	1	ND	20.14	2.59	25.69	3
B1007	1753F 29/4/97 frIV	ND	ND	0	4.69	4.69	1	ND	18.54	NDR(3.90)	18.54	1
Y694	1754F 29/4/97 frIV	ND	3.56	1	6.99	6.99	1	1.77	27.35	4.53	33.65	3
B1004	1755F 29/4/97 frIV	ND	10.57	2	5.41	5.41	1	ND	27.99	ND	27.99	1
B1011	1756F 29/4/97 frIV	ND	4.92	1	3.01	3.01	1	ND	23.97	ND	23.97	1
Y614	1749-57F 29/4/97 frIV (mean of 2)	2.62	10.95	2.5	4.96	4.96	1	0.80	22.68	4.93	29.07	3
Y701	1762F 2/5/97 frIV	ND	ND	0	NDR(4.41)	ND	0	ND	30.64	ND	30.64	1
Y702	1763F 2/5/97 frIV	1.57	1.57	1	4.05	4.05	1	1.63	21.66	ND	23.29	2
Y672	1764F 2/5/97 frIV	ND	ND	0	5.37	5.37	1	ND	35.65	5.38	42.26	3
B1041	1765F 2/5/97 frIV	NDR(1.71)	8.77	2	4.89	4.89	1	ND	18.33	3.77	22.10	2
CRC 393	1766F 2/5/97 frIV	10.97	10.97	1	28.37	28.37	1	4.03	75.21	7.10	86.34	3
CRC 367	1767F 2/5/97 frIV	2.44	9.10	3	3.34	3.34	1	ND	16.11	3.84	22.12	3
CRC 392	1768F 2/5/97 frIV	11.48	19.88	2	16.43	16.43	1	1.72	58.65	6.93	67.30	3
CRC 375	1769F-rex 29/5/97 frIV	2.81	10.91	3	6.31	6.31	1	ND	23.08	3.45	26.54	2
CRC 381	1770-1F 2/5/97 frIV (mean of 2)	4.78	7.00	1.5	15.26	15.26	1	1.17	51.42	4.47	58.18	3
CRC 157	1781F 22/5/97 frIV	ND	5.80	1	33.77	33.77	1	ND	143.02	ND	143.07	1
CRC 167	1783F 22/5/97 frIV	1.69	5.17	2	7.10	7.10	1	ND	25.56	3.59	29.15	2
CRC 186	1784F 22/5/97 frIV	3.48	3.48	1	20.67	20.67	1	ND	75.09	ND	75.09	1
CRC 338	1785F 22/5/97 frIV	6.92	14.64	3	12.93	12.93	1	3.47	27.29	5.83	36.60	3
CRC 182	1782,6F 22/5/97 frIV (mean of 2)	4.81	2.73	0.5	18.26	18.26	1	ND	68.53	4.65	73.18	2
CRC 183	1787F 22/5/97 frIV	ND	ND	0	7.81	7.81	1	ND	26.04	2.91	33.34	3
CRC 387	1788F 22/5/97 frIV	6.50	12.12	2	6.68	6.68	1	ND	26.60	2.54	29.14	2
CRC 389	1789F 22/5/97 frIV	5.48	9.88	2	12.61	12.61	1	1.64	36.36	3.33	41.33	3
CRC 170	1790F 22/5/97 frIV	ND	3.26	1	4.79	4.79	1	ND	23.15	ND	23.15	1
CRC 379	1807F 29/5/97 frIV	4.34	14.48	3	7.03	7.03	1	ND	37.33	4.10	41.43	2
CRC 111	1808F 29/5/97 frIV	1.51	1.51	1	3.60	5.71	2	ND	24.12	ND	26.86	2
CRC 125	1809F 29/5/97 frIV	2.81	10.11	3	13.78	13.78	1	NDR(2.16)	54.27	NDR(3.35)	54.27	1
CRC 126	1810F 29/5/97 frIV	0.88	9.44	3	7.64	7.64	1	1.89	31.25	NDR(3.05)	35.68	3
CRC 385	1811F 29/5/97 frIV	4.81	11.38	2	5.32	5.32	1	ND	22.63	ND	23.59	2
CRC 158	1812F 29/5/97 frIV	1.99	7.80	3	16.37	16.37	1	ND	46.62	ND	46.62	1
MMP97-20	1969F 9/1/98 frIV	ND	ND	0	NDR(1.72)	ND	0	ND	9.97	ND	9.97	1
MMP97-21	1970F 9/1/98 frIV	ND	ND	0	ND	ND	0	ND	8.43	ND	8.43	1
MMP97-22	1971F 9/1/98 frIV	ND	1.87	1	NDR(7.46)	ND	0	ND	21.94	ND	21.94	1
MMP97-19	1972F 9/1/98 frIV	ND	ND	0	ND	ND	0	ND	30.73	ND	30.73	1
MMP97-30	1973F 9/1/98 frIV	ND	5.14	1	2.54	2.54	1	ND	31.07	ND	31.07	1
MMP 96-26	2247F 9/9/98 frIV	NDR(2.37)	13.83	3	5.22	5.22	1	2.05	33.23	4.26	50.75	7
MMP 96-27	2248F 9/9/98 frIV	2.86	9.60	2	9.93	9.93	1	2.49	49.76	7.46	96.08	5
MMP 96-23	2249F 9/9/98 frIV	ND	14.92	3	2.63	2.63	1	1.32	19.61	3.82	32.73	5
MMP 96-31	2250F 9/9/98 frIV	ND	14.94	3	2.85	2.85	1	1.70	27.14	4.81	67.37	6

NP=number of peaks (analytes) detected, ND=not detected, NDR=not detected due to incorrect isotopic ratio

Table 4.

Field #	a1,2,3,4,6,7,8-HpCDD	HpCDD TOTAL	HpCDD NP	OCDD	OCDD TOTAL	TOTAL PCDD	a2,3,7,8-TCDF	TCDF TOTAL	TCDF NP	a1,2,3,7,8-PeCDF	a2,3,4,7,8-PeCDF	PeCDF TOTAL	PeCDF NP	a1,2,3,4,7,8-HxCDF
Y675	9.33	13.33	2	79.53	79.53	147.79	6.64	8.05	2	NDR(0.89)	1.87	1.87	1	ND
Y674	10.17	10.17	1	75.70	75.70	157.87	4.71	6.11	2	0.89	2.06	2.95	2	ND
B986	4.09	6.76	2	57.18	57.18	110.14	3.22	4.85	2	0.00	0.38	0.38	0.5	1.25
Y673	12.04	24.18	2	50.49	50.49	297.89	7.45	7.45	1	ND	3.04	3.04	1	0.95
B984	5.99	5.99	1	46.36	46.36	137.54	3.95	4.92	2	0.83	2.31	3.82	3	1.37
B985	8.38	8.38	1	58.86	58.86	153.09	11.70	13.09	2	ND	3.17	3.17	1	1.83
B1065	5.00	5.00	1	46.10	46.10	137.94	5.25	6.39	2	0.73	1.94	4.90	4	1.33
Y709	5.52	5.52	1	48.17	48.17	117.60	3.92	5.44	2	ND	1.63	1.63	1	ND
B1059	10.47	19.04	2	50.79	50.79	220.94	6.66	7.85	2	ND	3.31	3.31	1	1.38
B808	10.16	20.06	2	591.72	591.72	640.26	9.12	9.12	1	ND	2.36	2.36	1	ND
Y560	42.08	65.19	2	1957.20	1957.20	2080.13	11.83	11.83	1	ND	27.15	27.15	1	17.23
Y575	40.12	67.75	2	2256.28	2256.28	2381.81	10.34	10.34	1	ND	30.89	30.89	1	21.28
B858	31.44	55.46	2	1615.96	1615.96	1724.77	8.11	8.11	1	ND	1.88	1.88	1	ND
B855	41.33	65.29	2	2321.22	2321.22	2433.46	7.15	9.18	2	ND	2.16	2.16	1	ND
B859	32.43	52.18	2	1595.53	1595.53	1703.92	5.48	7.30	2	ND	1.55	1.55	1	ND
Y613	3.66	5.91	2	37.99	37.99	84.19	6.29	7.64	3	ND	NDR(1.35)	ND	0	ND
Y582	3.70	3.70	1	56.64	56.64	102.59	7.95	7.95	1	ND	ND	ND	0	ND
B888	6.40	6.40	1	62.19	62.19	124.53	6.09	6.09	1	ND	ND	ND	0	ND
B861	6.07	6.07	1	67.44	67.44	111.75	8.45	8.45	1	ND	1.69	1.69	1	NDR(1.30)
B1007	4.78	7.35	2	27.41	27.41	57.99	6.32	6.32	1	ND	2.31	2.31	1	NDR(1.02)
Y694	3.28	3.28	1	22.08	22.08	69.56	7.66	7.66	1	ND	NDR(2.46)	ND	0	1.02
B1004	4.70	4.70	1	19.02	19.02	67.69	4.79	4.79	1	ND	NDR(1.48)	ND	0	ND
B1011	3.39	3.39	1	24.23	24.23	59.52	4.65	4.65	1	ND	ND	ND	0	ND
Y614	3.93	7.13	2	32.35	32.35	84.46	7.59	7.59	1	NDR(.8)	1.83	1.83	1	1.06
Y701	NDR(4.00)	4.39	1	52.69	52.69	87.72	3.41	3.41	1	ND	ND	ND	0	1.62
Y702	2.94	3.94	2	14.07	14.07	46.92	2.48	2.48	1	ND	ND	ND	0	ND
Y672	4.98	4.98	1	28.24	28.24	80.85	9.64	9.64	1	ND	1.74	1.74	1	1.39
B1041	NDR(3.39)	2.48	1	39.80	39.80	78.04	8.30	8.30	1	ND	ND	ND	0	NDR(0.94)
CRC 393	8.08	12.64	2	43.89	43.89	182.21	36.88	36.88	1	ND	5.78	5.78	1	ND
CRC 367	2.76	2.76	1	20.35	20.35	57.67	9.64	9.64	1	ND	1.21	1.21	1	ND
CRC 392	7.51	11.07	2	52.33	52.33	167.00	24.90	24.90	1	ND	3.23	3.23	1	ND
CRC 375	11.19	17.29	2	48.67	48.67	109.71	12.85	12.85	1	ND	ND	ND	0	ND
CRC 381	8.34	9.91	1.5	33.41	33.41	123.75	8.28	8.28	1	ND	3.22	3.22	1	0.38
CRC 157	NDR(7.87)	ND	0	13.72	13.72	196.36	NDR(3.28)	ND	0	ND	ND	ND	0	ND
CRC 167	5.23	5.23	1	47.91	47.91	94.56	ND	2.39	1	ND	ND	ND	0	ND
CRC 186	5.85	5.85	1	27.74	27.74	132.83	ND	ND	0	ND	ND	ND	0	ND
CRC 338	8.23	11.15	2	24.07	24.07	99.39	18.29	18.29	1	ND	ND	ND	0	2.24
CRC 182	8.95	12.37	2	32.44	32.44	138.98	1.68	1.68	1	ND	ND	ND	0	ND
CRC 183	8.30	11.43	2	38.88	38.88	91.47	12.13	12.13	1	ND	ND	ND	0	ND
CRC 387	4.94	9.63	2	20.02	20.02	77.58	11.67	12.73	2	ND	ND	ND	0	NDR(1.52)
CRC 389	5.34	7.30	2	17.71	17.71	88.83	21.54	21.54	1	ND	4.07	4.07	1	ND
CRC 170	NDR(2.67)	2.62	1	11.73	11.73	45.55	ND	0.57	1	ND	ND	ND	0	ND
CRC 379	10.17	16.23	2	64.11	64.11	143.28	9.36	9.36	1	ND	1.66	1.66	0	ND
CRC 111	4.26	8.62	2	37.47	37.47	80.17	2.81	2.81	1	ND	NDR(1.90)	ND	0	1.36
CRC 125	4.59	7.39	2	25.13	25.13	110.68	3.31	3.31	1	ND	1.13	1.13	1	ND
CRC 126	3.53	3.53	1	24.31	24.31	80.60	3.14	3.14	1	ND	ND	ND	0	ND
CRC 385	3.73	6.57	2	27.00	27.00	73.86	13.06	13.06	1	ND	2.23	2.23	1	0.76
CRC 158	7.74	12.05	2	39.11	39.11	121.95	6.39	6.39	1	ND	2.75	2.75	1	ND
MMP97-20	NDR(3.69)	2.86	1	15.09	15.09	27.92	4.54	6.39	2	ND	ND	ND	0	ND
MMP97-21	3.01	3.01	1	21.29	21.29	32.73	NDR(3.23)	ND	0	ND	ND	ND	0	ND
MMP97-22	NDR(4.19)	3.66	1	29.35	29.35	56.82	11.20	15.62	4	ND	ND	ND	0	ND
MMP97-19	NDR(5.12)	ND	0	38.41	38.41	69.14	4.11	10.49	3	ND	ND	ND	0	ND
MMP97-30	3.93	3.93	1	67.54	67.54	110.22	4.05	4.05	1	ND	ND	ND	0	ND
MMP 96-26	4.44	7.41	2	20.02	20.02	97.23	7.47	7.47	1	ND	1.60	1.60	1	1.03
MMP 96-27	9.21	15.09	2	30.15	30.15	160.84	21.03	24.21	2	ND	2.67	3.58	3	NDR(1.04)
MMP 96-23	5.47	9.43	2	26.20	26.20	85.91	6.33	6.33	1	ND	1.24	1.24	1	1.05
MMP 96-31	9.91	18.29	2	30.51	30.51	133.95	5.95	5.95	1	ND	ND	ND	0	ND

Table 4.

Field #	a1,2,3,6,7,8-HxCDF	a2,3,4,6,7,8-HxCDF	a1,2,3,7,8,9-HxCDF	HxCDF TOTAL	HxCDF NP	a1,2,3,4,6,7,8-HpCDF	a1,2,3,4,7,8,9-HpCDF	HpCDF TOTAL	HpCDF NP	OCDF	OCDF TOTAL	TOTAL PCDF
Y675	ND	ND	ND	ND	0	ND	ND	ND	0	ND	ND	9.92
Y674	ND	1.43	ND	2.45	2	2.19	ND	2.19	1	ND	ND	13.70
B986	ND	ND	ND	1.58	1.5	ND	ND	ND	0	ND	ND	6.80
Y673	ND	ND	ND	0.95	1	ND	ND	ND	0	ND	ND	11.44
B984	0.98	0.92	1.11	5.40	5	1.33	ND	1.33	1	ND	ND	15.47
B985	ND	ND	ND	3.19	2	2.78	ND	2.78	1	ND	ND	22.23
B1065	ND	ND	ND	1.33	1	ND	ND	ND	0	ND	ND	12.62
Y709	ND	ND	ND	ND	0	ND	ND	ND	0	ND	ND	7.06
B1059	0.97	ND	ND	4.68	4	2.12	ND	2.12	1	ND	ND	17.96
B808	ND	ND	ND	ND	0	ND	ND	ND	0	ND	ND	11.48
Y560	4.39	5.71	ND	28.58	3	14.74	6.27	21.01	2	58.56	58.56	147.13
Y575	2.43	16.08	ND	39.79	3	28.49	7.19	35.68	2	75.02	75.02	191.72
B858	ND	ND	ND	ND	0	ND	ND	ND	0	14.03	14.03	24.02
B855	ND	ND	ND	ND	0	ND	ND	ND	0	11.24	11.24	22.58
B859	ND	ND	ND	ND	0	ND	ND	ND	0	ND	ND	8.85
Y613	ND	0.93	ND	0.93	1	ND	ND	ND	0	2.70	2.70	11.27
Y582	ND	ND	ND	ND	0	1.22	ND	2.98	2	3.90	3.90	14.83
B888	ND	1.30	ND	2.02	2	1.44	ND	3.53	2	3.60	3.60	15.24
B861	ND	ND	ND	ND	0	2.07	ND	2.07	1	3.85	3.85	16.06
B1007	ND	ND	ND	ND	0	NDR(1.30)	ND	ND	0	1.48	1.48	10.11
Y694	ND	ND	0.70	1.72	2	ND	ND	ND	0	ND	ND	9.38
B1004	ND	ND	ND	ND	0	ND	ND	ND	0	ND	ND	4.79
B1011	ND	ND	ND	ND	0	0.63	ND	0.63	1	ND	ND	5.28
Y614	0.79	NDR(.750	ND	2.43	1.5	1.39	ND	1.39	0.5	NDR(2.96)	ND	13.23
Y701	ND	ND	ND	1.62	1	NDR(1.25)	ND	ND	0	NDR(4.03)	ND	5.03
Y702	0.48	NDR(0.41)	ND	0.48	1	ND	ND	ND	0	ND	ND	2.96
Y672	ND	ND	ND	1.39	1	ND	ND	ND	0	ND	ND	12.77
B1041	ND	ND	ND	ND	0	ND	ND	ND	0	ND	ND	8.30
CRC 393	ND	ND	ND	ND	0	2.13	ND	2.13	1	NDR(3.06)	ND	44.79
CRC 367	ND	ND	ND	ND	0	ND	ND	ND	0	ND	ND	10.85
CRC 392	ND	ND	ND	ND	0	1.66	ND	1.66	1	NDR(3.79)	ND	29.79
CRC 375	ND	ND	ND	ND	0	ND	ND	ND	0	1.55	1.55	14.39
CRC 381	0.00	ND	ND	1.14	1.5	0.66	ND	0.66	0.5	ND	ND	13.29
CRC 157	ND	ND	ND	ND	0	2.07	ND	2.07	1	ND	ND	2.07
CRC 167	ND	ND	ND	ND	0	1.66	ND	1.66	1	6.44	6.44	10.49
CRC 186	ND	ND	ND	ND	0	NDR(1.26)	ND	ND	0	ND	ND	ND
CRC 338	2.52	3.45	3.58	11.79	4	6.12	3.57	9.69	2	9.35	9.35	49.12
CRC 182	ND	ND	ND	ND	0	NDR(1.45)	ND	ND	0	2.48	2.52	4.20
CRC 183	ND	ND	ND	ND	0	ND	ND	ND	0	2.43	2.43	14.56
CRC 387	ND	ND	ND	ND	0	1.89	ND	1.89	1	ND	ND	14.62
CRC 389	ND	ND	ND	ND	0	ND	ND	ND	0	3.91	3.91	29.52
CRC 170	ND	ND	ND	ND	0	1.14	ND	1.14	1	NDR(1.62)	ND	1.71
CRC 379	ND	ND	ND	ND	0	ND	ND	ND	0	ND	ND	11.02
CRC 111	ND	NDR(1.62)	ND	1.36	1	ND	ND	ND	0	ND	ND	4.17
CRC 125	ND	NDR(1.10)	ND	ND	0	ND	ND	ND	0	ND	ND	4.44
CRC 126	ND	ND	ND	ND	0	ND	ND	ND	0	ND	ND	3.14
CRC 385	0.48	ND	ND	1.14	2	ND	ND	ND	0	ND	ND	16.43
CRC 158	ND	NDR(0.87)	ND	ND	0	1.51	ND	1.51	1	ND	ND	10.65
MMP97-20	ND	ND	ND	0.76	1	ND	ND	ND	0	1.61	1.61	8.76
MMP97-21	ND	ND	ND	ND	0	NDR(2.26)	ND	ND	0	ND	ND	ND
MMP97-22	ND	ND	ND	ND	0	ND	ND	ND	0	ND	ND	15.62
MMP97-19	ND	ND	ND	ND	0	ND	ND	ND	0	ND	ND	10.49
MMP97-30	ND	ND	ND	ND	0	ND	ND	ND	0	ND	ND	4.05
MMP 96-26	ND	ND	ND	1.03	1	1.61	ND	1.61	1	1.60	1.60	13.31
MMP 96-27	ND	1.11	ND	2.26	2	2.04	ND	2.04	1	3.56	3.56	35.65
MMP 96-23	ND	ND	ND	1.05	1	1.34	ND	2.16	2	2.02	2.02	12.80
MMP 96-31	ND	ND	ND	3.81	2	ND	ND	2.15	1	3.39	3.39	15.30

Table 5. Concentrations of coplanar PCB congeners (ng/kg wet weight) in harbor seal blubber samples.

Field #	Lab. sample #	Lipd %	PCB11	PCB13	PCB15	PCB14	PCB12	TOTDI	PCB39	PCB38	PCB35	PCB37	PCB36	TOTTRI	PCB80	PCB79	PCB78	PCB81	PCB77	TOTTETRA	PCB127	PCB126	TOTPENTA	PCB169	TOTHEX
Y675	1443F 20/11/96 frIII+IV	N/A	309	79	362	ND	ND	751	ND	ND	6.2	89	ND	96	53	ND	ND	11.7	29.2	94	1271	367	1638	8.7	8.7
Y674	1444F 20/1196 frIII+IV	N/A	322	78	344	ND	ND	743	ND	ND	7.2	92	ND	99	63	ND	ND	4.2	17.5	85	865	318	1183	9.3	9.3
B986	1445-6F 20/11/96 frIII+IV (mean of 2)	N/A	231	63	372	ND	ND	667	2.5	ND	8.8	193	ND	205	52	0.4	ND	5.6	17.4	75	800	207	1007	10.0	10.0
Y673	1447F 11/12/96 frIII+IV	N/A	166	50	378	ND	ND	594	ND	ND	10.0	157	ND	167	62	1.1	ND	7.1	39.8	110	2218	378	2596	14.4	14.4
B984	1448F 11/12/96 frIII+IV	N/A	171	34	254	ND	ND	459	ND	ND	6.9	367	ND	374	66	ND	ND	15.2	58.3	140	1637	464	2101	14.7	14.7
B985	1449F 11/12/96 frIII+IV	N/A	214	50	332	ND	ND	596	ND	ND	12.4	391	ND	404	68	1.1	ND	7.2	66.8	144	1753	259	2012	9.6	9.6
B1065	1450F 11/12/96 frIII+IV	N/A	217	46	257	ND	ND	520	ND	ND	12.1	310	ND	322	56	ND	ND	7.5	70.9	134	1285	403	1688	14.1	14.1
Y709	1451F 11/12/96 frIII+IV	N/A	199	48	193	ND	ND	440	ND	ND	8.4	127	ND	135	41	ND	ND	5.4	15.1	62	884	219	1103	5.4	5.4
B1059	1452F 11/12/96 frIII+IV	N/A	216	52	179	ND	ND	447	ND	ND	7.3	135	ND	143	62	1.9	ND	8.4	27.8	100	2667	629	3296	17.8	17.8
B808	1526F 10/2/97 frIII+IV	96	82	29	145	ND	ND	256	ND	ND	8.0	184	ND	192	54	1.6	ND	11.0	57.7	124	329	209	537	6.3	6.3
Y560	1527F 10/2/97 frIII+IV	90	476	228	1679	ND	ND	2383	ND	ND	22.8	308	ND	331	48	2.2	2.3	23.5	34.4	110	ND	383	383	40.6	40.6
Y575	1528F 10/2/97 frIII+IV	92	331	97	641	ND	ND	1069	ND	ND	16.8	273	ND	290	79	2.1	NDR(2.1)	20.8	81.8	184	100	369	469	39.1	39.1
B858	1529F 10/2/97 frIII+IV	88	125	44	286	ND	ND	455	ND	ND	5.2	82	ND	87	63	ND	ND	11.8	20.1	95	257	378	635	9.7	9.7
B855	1530F 10/2/97 frIII+IV	98	163	57	304	ND	ND	523	ND	ND	8.6	115	ND	124	58	2.1	ND	12.0	28.3	101	610	301	911	ND	ND
B859	1531F 10/2/97 frIII+IV	88	129	29	152	ND	ND	310	ND	ND	8.8	152	ND	161	42	0.9	ND	10.8	28.2	82	249	353	602	9.8	9.8
Y613	1748F 29/4/97 frIII+IV	59	457	74	416	ND	ND	947	ND	ND	14.6	208	ND	223	69	ND	ND	17.0	39.3	125	2453	332	2785	ND	ND
Y582	1750F 29/4/97 frIII+IV	92	387	86	359	ND	ND	832	ND	ND	16.7	206	ND	222	65	ND	ND	7.3	40.3	112	1780	212	1992	ND	ND
B888	1751F 29/4/97 frIII+IV	77	424	35	292	ND	ND	752	ND	ND	ND	200	ND	200	65	ND	ND	9.2	33.2	107	1621	277	1898	ND	ND
B861	1752F 29/4/97 frIII+IV	88	438	63	340	ND	ND	841	ND	ND	11.3	205	ND	216	67	ND	ND	9.3	46.9	123	825	192	1017	11.2	11.2
B1007	1753F 29/4/97 frIII+IV	81	350	60	345	ND	ND	756	ND	ND	16.6	266	ND	283	73	ND	ND	5.7	40.0	119	1988	151	2139	15.0	15.0
Y694	1754F 29/4/97 frIII+IV	90	371	50	419	ND	ND	840	ND	ND	12.6	156	ND	169	91	ND	ND	7.4	29.4	128	3270	209	3479	10.1	10.1
B1004	1755F 29/4/97 frIII+IV	87	301	41	243	ND	ND	585	ND	ND	11.4	137	ND	148	84	ND	ND	7.2	25.7	117	2182	250	2432	ND	ND
B1011	1756F 29/4/97 frIII+IV	84	194	20	145	ND	ND	359	ND	ND	6.0	111	ND	117	58	ND	ND	6.3	32.9	97	993	193	1186	ND	ND
Y614	1749,57F 29/4/97 frIII+IV (mean of 2)	102	536	70	502	ND	ND	1108	ND	ND	13.6	236	ND	250	73	ND	ND	8.1	40.1	121	2710	351	3061	5.6	5.6
Y701	1762F 2/5/97 frIII+IV	55	176	33	223	ND	ND	431	ND	ND	13.8	107	ND	120	61	ND	2.3	9.7	25.6	99	566	207	773	12.5	12.5
Y702	1763F 2/5/97 frIII+IV	76	54	15	59	ND	ND	128	ND	ND	2.8	24	ND	27	37	ND	ND	4.7	9.2	50	1548	247	1794	9.0	9.0
Y672	1764F 2/5/97 frIII+IV	78	143	36	126	ND	ND	305	ND	ND	8.1	52	ND	60	111	1.8	ND	6.6	51.2	171	3805	241	4046	ND	ND
B1041	1765F 2/5/97 frIII+IV	83	111	32	138	ND	ND	282	ND	ND	5.2	52	ND	57	64	ND	ND	NDR(5.27)	22.5	87	1497	171	1668	ND	ND
CRC 393	1766F 2/5/97 frIII+IV	77	135	35	127	ND	ND	297	ND	ND	NDR(9.24)	46	ND	46	101	2.8	ND	52.6	33.4	190	1050	907	1957	23.9	23.9
CRC 367	1767F 2/5/97 frIII+IV	90	192	61	401	ND	ND	654	ND	ND	8.3	75	ND	83	78	ND	ND	5.6	24.4	108	1732	173	1905	8.2	8.2
CRC 392	1768F 2/5/97 frIII+IV	87	258	74	409	ND	ND	741	ND	ND	6.7	85	ND	92	201	ND	ND	14.1	23.2	238	5005	532	5536	ND	ND
CRC 375	1769F-rex 29/5/97 frIII+IV	86	68	74	124	ND	ND	266	ND	ND	3.5	41	ND	45	78	ND	ND	13.6	30.5	122	3041	284	3325	7.3	7.3
CRC 381	1770-1F 2/5/97 frIII+IV (mean of 2)	91	124	31	200	ND	ND	356	ND	ND	2.8	60	ND	63	81	ND	ND	15.1	20.7	117	2152	449	2601	12.0	12.0
CRC 157	1781F 22/5/97 frIII+IV	75	47	ND	68	ND	ND	116	ND	ND	ND	28	ND	28	121	ND	ND	8.0	14.5	143	5885	679	6564	15.1	15.1
CRC 167	1783F 22/5/97 frIII+IV	108	331	154	1095	ND	ND	1580	ND	ND	15.4	204	ND	220	45	ND	ND	5.8	16.2	67	2072	232	2304	10.4	10.4
CRC 186	1784F 22/5/97 frIII+IV	113	394	193	1503	ND	ND	2091	ND	ND	17.6	277	ND	295	148	ND	ND	7.2	16.5	171	6822	438	7260	8.4	8.4
CRC 338	1785F 22/5/97 frIII+IV	120	142	55	307	ND	ND	505	ND	ND	ND	57	ND	57	83	ND	ND	8.0	26.6	117	2899	301	3200	ND	ND
CRC 182	1782,6F 22/5/97 frIII+IV (mean of 2)	98	220	100	761	ND	ND	1082	ND	ND	13.2	210	ND	224	90	ND	ND	9.2	24.3	124	1893	403	2296	ND	ND
CRC 183	1787F 22/5/97 frIII+IV	102	223	100	733	ND	ND	1056	ND	ND	10.5	136	ND	147	56	ND	ND	7.2	25.5	89	1726	127	1853	ND	ND
CRC 387	1788F 22/5/97 frIII+IV	111	140	55	376	ND	ND	571	ND	ND	6.2	87	ND	93	85	ND	ND	10.6	22.6	118	3096	348	3444	ND	ND
CRC 389	1789F 22/5/97 frIII+IV	109	116	25	212	ND	ND	353	ND	ND	ND	53	ND	53	103	ND	ND	5.7	23.3	132	3067	352	3419	10.8	10.8
CRC 170	1790F 22/5/97 frIII+IV	76	129	66	504	ND	ND	698	ND	ND	6.5	99	ND	106	38	ND	ND	4.4	12.6	55	605	172	777	5.9	5.9
CRC 379	1807F 29/5/97 frIII+IV	82	61	65	108	ND	ND	233	ND	ND	NDR(2.21)	46	ND	46	69	ND	ND	12.5	22.6	104	2682	371	3053	5.1	5.1
CRC 111	1808F 29/5/97 frIII+IV	99	183	123	749	ND	ND	1055	ND	ND	12.4	153	ND	166	35	ND	ND	9.6	32.6	77	655	223	877	NDR(5.73)	ND
CRC 125	1809F 29/5/97 frIII+IV	63	45	49	91	ND	ND	185	ND	ND	NDR(2.77)	35	ND	35	69	ND	ND	5.0	25.8	99	3652	315	3967	10.0	10.0
CRC 126	1810F 29/5/97 frIII+IV	57	71	89	178	ND	ND	338	ND	ND	3.5	51	ND	55	49	ND	ND	2.7	24.8	76	1821	184	2005	4.8	4.8
CRC 385	1811F 29/5/97 frIII+IV	109	83	89	166	ND	ND	339	ND	ND	2.5	44	ND	46	69	ND	ND	6.7	30.8	106	2172	288	2461	7.0	7.0
CRC 158	1812F 29/5/97 frIII+IV	99	160	304	444	ND	ND	908	ND	ND	7.5	72	ND	80	73	ND	ND	7.5	35.2	116	1003	261	1264	ND	ND
MMP97-20	1969F 9/1/98 frIII+IV	42	60	122	138	ND	ND	320	ND	ND	ND	50	ND	50	24	ND	ND	5.1	17.9	47	127	145	272	ND	ND
MMP97-21	1970F 9/1/98 frIII+IV	77	82	ND	227	ND	ND	308	ND	ND	ND	80	ND	80	30	ND	ND	5.9	36.4	73	721	110	831	ND	ND
MMP97-22	1971F 9/1/98 frIII+IV	85	104	ND	110	ND	ND	214	ND	ND	ND	50	ND	50	70	ND	ND	9.3	24.4	104	1479	272	1751	10.4	10.4
MMP97-19	1972F 9/1/98 frIII+IV	20	96	ND	272	ND	ND	368	ND	ND	ND	86	ND	86	24	ND	ND	7.0	23.6	55	810	211	1022	ND	ND
MMP97-30	1973F 9/1/98 frIII+IV	86	56	27	195	ND	ND	277	ND	ND	ND	56	ND	56	32	ND	ND	4.4	10.8	47	210	284	494	ND	ND
MMP 96-26	2247F 9/9/98 frIV	62	140	59	215	ND	ND	414	ND	4.3	7.1	115	ND	127	172	ND	ND	7.1	37.7	216	370	335	705	8.6	8.6
MMP 96-27	2248F 9/9/98 frIV	84	148	94	267	ND	ND	510	ND	ND	7.5	119	ND	127	160	ND	ND	11.9	39.2	211	112	451	562	9.1	9.1
MMP 96-23	2249F 9/9/98 frIV	75	156	48	200	ND	ND	404	ND	ND	5.0	101	ND	106	121	ND	ND	4.6	30.5	156	19	118	136	6.2	6.2
MMP 96-31	2250F 9/9/98 frIV	76	207	52	233	ND	ND	492	ND	ND	8.7	131	ND	140	135	ND	ND	9.0	32.9	177	ND	175	175	5.9	5.9

Table 6. Concentrations of mono-ortho PCB congeners (ng/kg wet weight) in harbor seal blubber samples.

Field #	Lab. sample #	PCB7	PCB9	PCB6	PCB8	PCB5	TOTDICB	PCB23	PCB34	PCB29	PCB26	PCB25	PCB31	PCB28	PCB21	PCB33	PCB20	PCB22	TOTTRICB	PCB72
Y675	1443F 20/11/96 frIII+IV	261	ND	148	1042	ND	1451	ND	ND	ND	178	NDR(29.4)	6350	11447	ND	ND	216	112	18303	161
Y674	1444F 20/1196 frIII+IV	304	ND	212	1416	ND	1933	ND	ND	ND	155	35	4288	8115	ND	ND	219	118	12930	182
B986	1445-6F 20/11/96 frIII+IV (mean of 2)	352	ND	254	1415	ND	2021	ND	ND	ND	178	ND	3858	7011	ND	ND	279	175	11500	130
Y673	1447F 11/12/96 frIII+IV	193	ND	132	915	ND	1240	ND	ND	ND	249	48	7381	11975	ND	ND	273	171	20097	104
B984	1448F 11/12/96 frIII+IV	200	ND	131	786	ND	1117	ND	ND	ND	264	33	7201	12981	ND	ND	155	79	20713	161
B985	1449F 11/12/96 frIII+IV	187	ND	121	846	ND	1155	ND	ND	ND	284	46	6695	11696	ND	ND	265	147	19133	117
B1065	1450F 11/12/96 frIII+IV	316	ND	194	1131	ND	1640	ND	ND	ND	309	66	4480	7267	ND	ND	304	149	12575	179
Y709	1451F 11/12/96 frIII+IV	126	ND	92	551	ND	769	ND	ND	ND	96	25	3262	8228	ND	ND	202	98	11911	ND
B1059	1452F 11/12/96 frIII+IV	393	ND	250	1591	ND	2233	ND	ND	ND	513	83	11212	14146	ND	ND	379	202	26535	375
B808	1526F 10/2/97 frIII+IV	388	ND	ND	ND	1926	2314	ND	ND	ND	134	36	5180	13368	ND	322	ND	185	19225	251
Y560	1527F 10/2/97 frIII+IV	1119	ND	1774	ND	9515	12408	ND	ND	ND	233	147	4008	11605	ND	1294	ND	783	18070	45
Y575	1528F 10/2/97 frIII+IV	715	ND	765	ND	5007	6487	ND	ND	ND	116	76	5442	13010	ND	603	ND	383	19629	127
B858	1529F 10/2/97 frIII+IV	ND	ND	333	ND	2873	3206	ND	ND	ND	74	43	4374	11797	ND	316	ND	186	16789	87
B855	1530F 10/2/97 frIII+IV	ND	ND	995	ND	5296	6290	ND	ND	ND	100	54	2765	9956	ND	436	ND	256	13567	110
B859	1531F 10/2/97 frIII+IV	ND	ND	245	ND	1409	1653	ND	ND	ND	72	34	2782	7666	ND	307	ND	164	11024	62
Y613	1748F 29/4/97 frIII+IV	784	ND	1211	ND	6582	8577	ND	ND	ND	115	ND	3003	13181	ND	692	ND	325	17317	247
Y582	1750F 29/4/97 frIII+IV	ND	ND	1967	ND	12408	14375	ND	ND	ND	ND	ND	4156	10697	ND	578	ND	288	15719	217
B888	1751F 29/4/97 frIII+IV	ND	ND	ND	ND	4062	4062	ND	ND	ND	94	ND	4577	11669	ND	528	ND	270	17138	279
B861	1752F 29/4/97 frIII+IV	432	ND	ND	ND	2985	3417	ND	ND	ND	73	ND	4705	10797	ND	459	ND	264	16298	232
B1007	1753F 29/4/97 frIII+IV	ND	ND	ND	ND	4046	4046	ND	ND	ND	98	47	5055	12558	ND	641	ND	321	18719	264
Y694	1754F 29/4/97 frIII+IV	ND	ND	ND	ND	8243	8243	ND	ND	ND	161	67	5014	14187	ND	447	ND	270	20147	485
B1004	1755F 29/4/97 frIII+IV	ND	ND	ND	ND	6178	6178	ND	ND	ND	ND	ND	4457	11952	ND	284	ND	193	16886	277
B1011	1756F 29/4/97 frIII+IV	N/A	N/A	N/A	N/A	N/A	0	ND	ND	ND	ND	ND	3939	9984	ND	390	ND	166	14478	238
Y614	1757F 29/4/97 frI (Rep of 1749F)	N/A	N/A	N/A	N/A	N/A	0	ND	ND	ND	130	ND	4614	9638	ND	496	ND	216	15093	464
Y701	1762F 2/5/97 frIII+IV	ND	ND	ND	ND	2588	2588	ND	ND	ND	ND	ND	3765	9330	ND	299	ND	133	13526	160
Y702	1763F 2/5/97 frIII+IV	ND	ND	ND	ND	1315	1315	ND	ND	ND	ND	ND	1456	6715	ND	101	ND	63	8335	181
Y672	1764F 2/5/97 frIII+IV	ND	ND	ND	ND	4821	4821	ND	ND	ND	191	ND	4738	12858	ND	417	ND	133	18337	397
B1041	1765F 2/5/97 frIII+IV	ND	ND	ND	ND	1157	1157	ND	ND	ND	ND	ND	4878	15345	ND	398	ND	168	20788	297
CRC 393	1766F 2/5/97 frIII+IV	ND	ND	ND	ND	1617	1617	ND	ND	ND	ND	ND	3064	14996	ND	356	ND	253	18669	394
CRC 367	1767F 2/5/97 frIII+IV	N/A	N/A	N/A	N/A	N/A	ND	ND	ND	ND	81	48	2237	8939	ND	420	ND	254	11979	ND
CRC 392	1768F 2/5/97 frIII+IV	ND	ND	2002	ND	10292	12294	ND	ND	ND	151	ND	6780	30378	ND	559	ND	258	38126	680
CRC 375	1769F-rex 29/5/97 frIII+IV	523	ND	ND	ND	2802	3325	ND	ND	ND	32	ND	3203	11017	ND	140	ND	79	14472	268
CRC 381	1770-1F 2/5/97 frIII+IV (mean of 2)	ND	ND	ND	ND	ND	2345	ND	ND	ND	28	ND	4669	11698	ND	370	ND	208	16972	335
CRC 157	1781F 22/5/97 frIII+IV	86	ND	100	ND	535	721	ND	ND	ND	155	ND	7226	25027	ND	73	ND	52	32533	354
CRC 167	1783F 22/5/97 frIII+IV	10115	ND	14498	ND	78037	102650	ND	ND	ND	192	107	3566	10567	ND	987	ND	527	15946	235
CRC 186	1784F 22/5/97 frIII+IV	5461	ND	8147	ND	43381	56988	ND	ND	ND	ND	ND	7059	20395	ND	1199	ND	563	29216	536
CRC 338	1785F 22/5/97 frIII+IV	431	ND	625	ND	3322	4377	ND	ND	ND	218	ND	5103	13878	ND	293	ND	152	19644	203
CRC 182	1782,6F 22/5/97 frIII+IV (mean of 2)	1462	ND	2088	ND	11568	15118	ND	ND	ND	144	72	5063	20430	ND	756	ND	395	26861	425
CRC 183	1787F 22/5/97 frIII+IV	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND	ND	150	83	2966	8316	ND	657	ND	342	12514	165
CRC 387	1788F 22/5/97 frIII+IV	N/A	N/A	N/A	N/A	N/A	N/A	ND	ND	ND	96	39	3850	12224	ND	376	ND	214	16799	204
CRC 389	1789F 22/5/97 frIII+IV	297	ND	428	ND	2318	3043	ND	ND	ND	234	58	6230	17919	ND	313	ND	175	24929	230
CRC 170	1790F 22/5/97 frIII+IV	294	ND	407	ND	2533	3234	ND	ND	ND	244	71	2248	6898	ND	511	ND	237	10208	105
CRC 379	1807F 29/5/97 frIII+IV	98	ND	102	ND	663	863	ND	ND	ND	117	ND	4036	14160	ND	194	ND	63	18570	134
CRC 111	1808F 29/5/97 frIII+IV	1215	ND	1794	ND	9606	12615	ND	ND	ND	145	58	2639	8599	ND	707	ND	378	12526	186
CRC 125	1809F 29/5/97 frIII+IV	N/A	N/A	N/A	N/A	N/A	ND	ND	ND	ND	59	ND	3606	11746	ND	91	ND	49	15551	433
CRC 126	1810F 29/5/97 frIII+IV	276	ND	367	ND	1995	2638	ND	ND	ND	52	17	2269	9279	ND	153	ND	92	11861	167
CRC 385	1811F 29/5/97 frIII+IV	167	ND	206	ND	1187	1560	ND	ND	ND	230	27	5146	13932	ND	259	ND	134	19727	175
CRC 158	1812F 29/5/97 frIII+IV	509	ND	679	ND	3748	4936	ND	ND	ND	135	ND	4555	13555	ND	415	ND	225	18885	244
MMP97-20	1969F 9/1/98 frIII+IV	ND		ND	1318		1318	ND	ND	ND	68	ND	1656	7104	ND	193		119	9140	125
MMP97-21	1970F 9/1/98 frIII+IV	N/A		N/A	N/A		N/A	ND	ND	ND	105	52	1566	4450	ND	249		154	6577	128
MMP97-22	1971F 9/1/98 frIII+IV	N/A		N/A	N/A		N/A	ND	ND	ND	140	ND	6829	19841	ND	229		154	27192	470
MMP97-19	1972F 9/1/98 frIII+IV	N/A		N/A	N/A		N/A	ND	ND	ND	ND	ND	978	6049	ND	280		159	7465	123
MMP97-30	1973F 9/1/98 frIII+IV	ND		ND	2038		2038	ND	ND	ND	ND	ND	2958	12605	ND	222		ND	15784	196
MMP 96-26	2247F 9/9/98 frIV	N/A		N/A	N/A		N/A	ND	ND	ND	ND	ND	2783	7483	ND	ND		ND	10266	231
MMP 96-27	2248F 9/9/98 frIV	ND		ND	ND		ND	ND	ND	ND	ND	ND	3334	12239	ND	ND		ND	15573	165
MMP 96-23	2249F 9/9/98 frIV	ND		ND	ND		ND	ND	ND	ND	ND	ND	2510	6104	ND	ND		ND	8614	73
MMP 96-31	2250F 9/9/98 frIV	ND		ND	ND		ND	ND	ND	ND	ND	ND	2841	5674	ND	ND		ND	8515	ND

Table 6.

Field #	PCB68	PCB57	PCB67	PCB58	PCB63	PCB6174	PCB70	PCB76	PCB66	PCB55	PCB56	PCB60	TOTTECB	PCB111	PCB120	PCB124	PCB108	PCB107	PCB123	PCB118106	PCB114
Y675	83.7	ND	ND	ND	74	55744	5940	ND	6475	ND	ND	4128	72607	272	425	702	7801	ND	ND	267289	6920
Y674	85.8	ND	ND	ND	71	72709	4507	ND	5290	ND	ND	3039	85884	371	599	551	8436	ND	ND	332291	10194
B986	92.7	ND	6.2	ND	70	30473	3319	ND	4419	ND	ND	2558	41067	225	592	620	5788	ND	ND	158091	4071
Y673	ND	ND	ND	ND	105	77551	8408	ND	9766	ND	ND	5355	101289	1480	4313	10225	9515	ND	ND	426155	14370
B984	ND	ND	ND	ND	116	52702	5996	ND	8777	ND	ND	3879	71631	449	531	861	11518	ND	ND	333553	9956
B985	116.9	ND	38.0	ND	123	56059	6982	ND	8434	ND	ND	4335	76205	951	2757	768	7108	ND	ND	244362	7677
B1065	ND	ND	ND	ND	147	73682	6893	ND	8121	ND	ND	4343	93365	529	1154	892	9627	ND	ND	405431	12088
Y709	ND	ND	ND	ND	ND	23687	1756	ND	2706	ND	ND	1929	30079	324	478	278	2446	ND	ND	203010	4708
B1059	ND	ND	ND	ND	127	146117	10362	ND	11830	ND	ND	7017	175828	1285	2664	765	14437	ND	ND	681339	21809
B808	314.7	22.2	NDR(24.4)	ND	151	34101	7259	ND	7082	9.6	ND	3524	52714	432	5751	878	ND	8073	ND	188209	5466
Y560	ND	2.7	8.7	ND	34	29554	2328	ND	3605	ND	ND	2206	37782	92	305	434	ND	5780	ND	224543	7144
Y575	21.7	ND	21.7	ND	92	42818	6442	ND	7160	5.9	ND	3693	60382	117	376	879	ND	7620	ND	231889	6777
B858	48.0	ND	7.4	ND	43	38375	4235	ND	6231	ND	ND	3254	52282	132	1566	659	ND	6049	ND	268208	7720
B855	67.6	ND	10.4	ND	47	27607	3917	ND	4653	ND	ND	2199	38610	275	2282	831	ND	6084	ND	197028	5505
B859	28.6	ND	7.8	ND	41	28800	2641	ND	3448	ND	ND	1975	37003	157	1044	439	ND	6442	ND	220274	6141
Y613	ND	ND	NDR(34.2)	NDR(20.4)	119	82693	7080	ND	7998	ND	ND	4793	102929	755	3090	672	ND	7685	ND	271899	11113
Y582	ND	ND	ND	ND	188	41178	6806	ND	6344	ND	ND	3391	58123	ND	976	864	ND	6135	ND	166767	4635
B888	126.4	ND	16.3	ND	120	48670	6339	ND	6198	ND	ND	3359	65107	542	2074	776	ND	6262	ND	199486	6190
B861	ND	ND	ND	ND	97	34178	7414	ND	7070	ND	ND	3419	52410	241	367	844	ND	6729	ND	153268	4550
B1007	92.4	ND	53.6	ND	134	41669	7400	ND	7051	ND	ND	3696	60361	379	1041	607	ND	7028	ND	173527	5064
Y694	101.8	ND	26.1	ND	142	48699	8703	ND	8464	ND	ND	4413	71033	916	1308	793	ND	10217	ND	228315	6328
B1004	25.1	ND	ND	ND	154	52813	7988	ND	9024	ND	ND	4544	74824	779	1527	932	ND	9977	ND	212987	5506
B1011	21.7	ND	23.3	ND	140	35242	4969	ND	6547	ND	ND	3249	50430	251	411	700	ND	6349	ND	147874	3694
Y614	58.8	13.9	NDR(30.2)	20.3	205	62312	8877	ND	8030	ND	ND	4063	84043	616	2234	577	ND	7142	ND	257972	7094
Y701	ND	ND	ND	ND	56	32185	3818	ND	5317	ND	ND	2889	44425	321	375	608	ND	6299	ND	169098	5371
Y702	NDR(15.4)	ND	ND	ND	54	38504	3653	ND	3120	ND	ND	1834	47346	406	1006	439	ND	5484	ND	184850	5733
Y672	70.1	ND	31.5	ND	252	51231	8430	ND	9771	ND	ND	4877	75060	686	2718	689	ND	10693	ND	263190	8846
B1041	ND	ND	ND	ND	157	46663	7816	ND	8738	ND	ND	4430	68101	276	1425	786	ND	7775	ND	198130	5243
CRC 393	ND	ND	ND	ND	138	116846	6791	ND	17395	ND	ND	8259	149824	1544	2136	1057	ND	19084	ND	936678	28931
CRC 367	ND	ND	ND	ND	102	36475	5232	ND	6576	ND	ND	3260	51646	152	1071	492	ND	6024	ND	164883	5097
CRC 392	42.1	ND	ND	ND	419	120538	16072	ND	27114	ND	ND	12998	177862	651	2080	1224	ND	22019	ND	563021	17732
CRC 375	54.1	9.3	22.4	7.9	234	61691	6817	ND	9106	10.9	ND	3899	82120	276	2932	540	ND	7636	ND	214695	7643
CRC 381	59.9	ND	0.0	ND	57	63384	6628	ND	7223	ND	ND	4550	82238	391	878	565	ND	10374	ND	324058	9326
CRC 157	65.0	ND	28.2	ND	199	204157	8842	ND	20773	ND	ND	10874	245290	732	1440	909	ND	20433	ND	918373	33827
CRC 167	41.7	ND	18.6	ND	157	58493	4404	ND	6277	ND	ND	2908	72535	664	3829	495	ND	5818	ND	205194	7844
CRC 186	ND	ND	ND	ND	288	144386	12621	ND	18685	ND	ND	9511	186028	1213	9646	626	ND	11048	ND	403414	13880
CRC 338	52.1	5.4	20.9	ND	192	52822	7304	ND	10802	ND	ND	4786	76187	265	1000	977	ND	10003	ND	254612	7450
CRC 182	26.3	ND	18.1	6.1	241	100959	9513	ND	13814	ND	ND	6616	131619	472	1374	1149	ND	11629	ND	378863	12279
CRC 183	54.3	ND	11.0	ND	152	39956	5312	ND	5451	ND	ND	2419	53519	266	4162	411	ND	3760	ND	108225	4752
CRC 387	39.3	ND	NDR(25.0)	ND	233	54707	7195	ND	9486	ND	ND	4144	76008	699	2318	1079	ND	9190	ND	241478	7291
CRC 389	21.2	ND	26.2	5.6	179	87446	10372	ND	13998	ND	ND	7382	119659	431	820	835	ND	12036	ND	386371	12839
CRC 170	19.4	ND	13.5	ND	79	42700	3783	ND	5971	ND	ND	3301	55972	107	716	440	ND	3779	ND	142478	5477
CRC 379	ND	ND	17.7	ND	123	72540	4672	ND	8908	ND	ND	3977	90371	306	996	831	ND	8284	ND	288740	10498
CRC 111	18.1	ND	34.3	7.9	80	31149	4685	ND	4644	ND	ND	1822	42626	181	498	626	ND	3868	ND	143356	3925
CRC 125	38.0	ND	13.2	ND	262	104687	7023	ND	9630	ND	ND	4918	127005	529	8337	457	ND	9781	ND	300104	12456
CRC 126	27.0	ND	10.0	ND	162	46614	3599	ND	5937	ND	ND	3295	59811	183	1300	430	ND	5317	ND	148116	4782
CRC 385	11.6	ND	18.5	NDR(8.9)	141	76963	8017	ND	10583	ND	ND	5601	101510	228	1417	746	ND	8150	ND	301178	11430
CRC 158	19.1	ND	NDR(23.1)	ND	216	69923	8328	ND	12120	9.7	ND	6607	97467	259	1433	585	ND	9043	ND	284959	10939
MMP97-20	ND	ND	ND	ND	101	16613	4556		3931	ND		2569	27895	168	414	587		4704	ND	109999	2900
MMP97-21	ND	ND	NDR(11.1)	ND	87	17191	3177		3018	ND		1644	25245	302	1522	480		3018	ND	98798	2691
MMP97-22	ND	ND	24.1	ND	213	54829	11599		9538	ND		6727	83400	1352	4401	1060		11636	ND	294994	7978
MMP97-19	ND	ND	ND	ND	62	29863	2656		3330	ND		2365	38400	451	6506	365		5174	ND	196401	6468
MMP97-30	ND	ND	ND	ND	66	62489	5755		4983	ND		4311	77799	411	1590	688		8551	ND	334637	10636
MMP 96-26	283.7	ND	ND	ND	158	53038	5775		7930	ND		3541	70956	2150	4653	654		9358	ND	289437	9569
MMP 96-27	ND	ND	ND	ND	ND	58463	7623		9435	ND		4532	80218	404	1176	1022		9944	ND	349692	10801
MMP 96-23	ND	ND	ND	ND	68	12784	3273		3748	ND		2109	22056	143	1678	426		4661	ND	118414	3288
MMP 96-31	ND	ND	ND	ND	ND	9142	2350		2738	ND		1650	15880	ND	327	499		3626	ND	109267	2743

Table 6.

Field #	PCB122	PCB105	TOTPECB	PCB159	PCB162	PCB167	PCB156	PCB157	TOTHX	PCB189	TOTHP
Y675	ND	104015	387425	ND	1049	3945	55276	15963	76232	3248	3248
Y674	ND	132244	484686	ND	1201	4341	96252	27685	129478	4357	4357
B986	ND	61628	231015	ND	662	3065	29557	8144	41427	1988	1988
Y673	ND	188840	654898	105.0	2011	7847	156179	45355	211497	8849	8849
B984	ND	120033	476901	ND	1643	7077	100562	29990	139272	4322	4322
B985	ND	96185	359808	ND	935	4394	64668	18553	88550	2903	2903
B1065	ND	151179	580900	ND	1887	8439	126311	34893	171530	7839	7839
Y709	0.0	79429	290673	ND	389	2878	48004	14472	65743	2380	2380
B1059	ND	255688	977987	ND	3120	14701	264719	77446	359986	12975	12975
B808	73.8	75815	284698	18.7	1383	5714	40095	11280	58490	2224	2224
Y560	ND	86416	324714	19.4	896	7692	78759	18638	106005	8410	8410
Y575	86.1	91110	338854	19.8	968	8362	79785	16407	105542	9495	9495
B858	ND	109063	393396	27.9	1097	6541	75063	20788	103517	2922	2922
B855	32.0	77430	289467	35.9	1009	6777	51779	13418	73019	2449	2449
B859	ND	80809	315307	25.1	859	4605	53909	14728	74125	2824	2824
Y613	ND	115720	410935	ND	1355	9121	100399	27640	138516	3929	3929
Y582	ND	63563	242941	ND	904	3500	28104	8351	40860	1152	1152
B888	ND	79424	294755	NDR(62.4)	1126	6289	50611	13562	71589	2415	2415
B861	ND	58295	224294	ND	810	2946	27742	7387	38885	1276	1276
B1007	ND	72743	260389	ND	971	5135	38082	10594	54783	1638	1638
Y694	ND	96515	344391	ND	1437	5935	45671	12773	65816	1745	1745
B1004	ND	84492	316201	ND	1220	4802	44314	12552	62888	2182	2182
B1011	ND	56457	215737	ND	867	3849	30499	9004	44219	1158	1158
Y614	ND	101088	376723	ND	1369	10943	90559	24238	127110	3578	3578
Y701	ND	73191	255264	ND	923	4493	39068	10889	55373	1800	1800
Y702	ND	69933	267851	39.3	1111	4655	65005	16966	87776	3861	3861
Y672	ND	117513	404335	ND	1696	4343	85428	24828	116295	2687	2687
B1041	ND	80397	294032	ND	1137	4274	37580	10903	53894	1872	1872
CRC 393	ND	360424	1349853	ND	4588	23953	241623	66886	337050	9943	9943
CRC 367	ND	67655	245373	ND	118	2959	34901	9811	47790	1306	1306
CRC 392	ND	251824	858552	ND	2405	11601	103313	28417	145736	3031	3031
CRC 375	ND	98823	332544	ND	1070	6761	61388	17155	86375	1773	1773
CRC 381	ND	131705	477296	ND	1578	7304	92361	25381	126624	3369	3369
CRC 157	ND	387201	1362915	ND	3635	14224	262985	67101	347945	9671	9671
CRC 167	ND	88316	312161	ND	957	5129	84602	20043	110731	2211	2211
CRC 186	ND	160316	600143	ND	2082	8843	144163	39599	194686	4417	4417
CRC 338	ND	107419	381725	20.8	1397	6006	49484	13300	70207	1726	1726
CRC 182	ND	166643	572409	ND	1620	7309	99572	25387	133888	3259	3259
CRC 183	ND	47695	169272	ND	516	2865	50517	13726	67623	1559	1559
CRC 387	ND	101103	363157	ND	1304	6872	52491	13916	74582	1996	1996
CRC 389	ND	167009	580341	ND	1460	6454	90685	23985	122585	2732	2732
CRC 170	ND	57974	210970	ND	587	3184	47663	12045	63478	1456	1456
CRC 379	ND	122350	432005	14.8	1223	4761	85408	23344	114751	2417	2417
CRC 111	ND	52624	205077	ND	606	3277	39443	8990	52316	1363	1363
CRC 125	ND	139483	471148	ND	1307	7009	115641	29849	153806	3059	3059
CRC 126	ND	60588	220716	ND	634	2811	30944	7826	42216	1139	1139
CRC 385	ND	130466	453616	ND	1225	5034	94336	24767	125361	2843	2843
CRC 158	ND	131372	438589	ND	1364	5930	90281	23867	121442	3141	3141
MMP97-20	ND	42447	161218	ND	561	2859	18328	5217	26965	1142	1142
MMP97-21	ND	36408	143219	ND	400	2868	22388	6510	32166	1117	1117
MMP97-22	ND	121698	443119	ND	1208	5830	41733	11689	60460	1938	1938
MMP97-19	ND	79051	294416	ND	788	6628	60327	17004	84747	2766	2766
MMP97-30	ND	134970	491484	ND	1163	6599	95981	26011	129754	4117	4117
MMP 96-26	ND	124164	439986	ND	1168	8213	74199	22271	105850	2853	2853
MMP 96-27	ND	144608	517648	ND	1407	7424	97544	29228	135602	4991	4991
MMP 96-23	ND	47029	175638	ND	454	3209	22466	7027	33156	1428	1428
MMP 96-31	ND	40103	156564	ND	462	2570	17772	5324	26127	1126	1126

Table 7. Concentrations of diortho PCB congeners (ng/kg wet weight) in harbor seal blubber samples.

Field #	Lab. sample #	PCB410	TOTDICB	PCB19	PCB30	PCB18	PCB17	PCB2724	PCB1632	TOTTRICB	PCB54	PCB50	PCB53	PCB51	PCB45	PCB46	PCB69
Y675	1443F 20/11/96 frIII+IV	127	127	36	ND	1404	227	64	566	2298	ND	ND	65	75	ND	ND	ND
Y674	1444F 20/1196 frIII+IV	142	142	45	ND	958	193	62	414	1672	ND	ND	57	48	45	ND	ND
B986	1445-6F 20/11/96 frIII+IV (mean of 2)	138	138	41	ND	1046	182	42	310	1621	ND	ND	102	53	24	ND	ND
Y673	1447F 11/12/96 frIII+IV	157	157	34	ND	1635	215	59	753	2696	ND	ND	157	154	ND	ND	ND
B984	1448F 11/12/96 frIII+IV	98	98	16	ND	859	111	42	250	1277	ND	ND	100	42	387	14	ND
B985	1449F 11/12/96 frIII+IV	148	148	28	ND	1093	170	64	825	2180	ND	ND	90	73	27	ND	ND
B1065	1450F 11/12/96 frIII+IV	136	136	23	ND	902	161	43	376	1505	ND	ND	102	48	44	ND	ND
Y709	1451F 11/12/96 frIII+IV	150	150	26	ND	746	130	41	276	1219	ND	ND	34	23	20	ND	ND
B1059	1452F 11/12/96 frIII+IV	106	106	25	ND	1246	178	59	628	2136	ND	ND	98	57	ND	ND	ND
B808	1526F 10/2/97 frIII+IV	234	234	NDR(42.2)	ND	1301	224	51	804	2379	ND	ND	258	ND	NDR(44.8)	ND	ND
Y560	1527F 10/2/97 frIII+IV	1382	1382	170	ND	2624	1002	305	1551	5652	ND	ND	113	ND	110	ND	ND
Y575	1528F 10/2/97 frIII+IV	816	816	129	ND	2327	527	159	1178	4320	ND	ND	NDR(329.0)	ND	ND	ND	ND
B858	1529F 10/2/97 frIII+IV	455	455	ND	62	1288	331	ND	617	2298	ND	ND	107	ND	45	NDR(33.9)	ND
B855	1530F 10/2/97 frIII+IV	446	446	79	ND	1675	658	210	1052	3675	ND	ND	599	ND	NDR(349.4)	ND	ND
B859	1531F 10/2/97 frIII+IV	249	249	ND	ND	1562	392	ND	546	2501	ND	ND	187	ND	79	ND	ND
Y613	1748F 29/4/97 frIII+IV	469	469	70	ND	910	358	131	580	2048	ND	ND	121	ND	70	ND	ND
Y582	1750F 29/4/97 frIII+IV	401	401	49	ND	970	354	ND	688	2061	ND	ND	111	43	ND	ND	ND
B888	1751F 29/4/97 frIII+IV	ND	ND	ND	ND	1133	330	103	711	2276	ND	ND	87	85	NDR(38.0)	ND	ND
B861	1752F 29/4/97 frIII+IV	243	243	47	ND	1297	319	ND	805	2467	ND	ND	214	131	NDR(76.4)	ND	ND
B1007	1753F 29/4/97 frIII+IV	165	165	NDR(31.9)	ND	1390	280	ND	730	2400	ND	ND	231	211	72	ND	ND
Y694	1754F 29/4/97 frIII+IV	264	264	39	ND	1376	288	ND	796	2498	ND	ND	160	130	ND	ND	ND
B1004	1755F 29/4/97 frIII+IV	ND	ND	ND	ND	2652	411	ND	700	3763	ND	ND	ND	ND	ND	ND	ND
B1011	1756F 29/4/97 frIII+IV	165	165	ND	ND	1288	274	76	627	2266	ND	ND	142	ND	68	ND	ND
Y614	1749,57F 29/4/97 frIII+IV (mean of 2)	490	490	70	ND	2536	486	157	1074	4323	ND	ND	325	140	100	ND	ND
Y701	1762F 2/5/97 frIII+IV	ND	ND	NDR(51.0)	ND	995	201	89	381	1666	ND	ND	79	57	ND	ND	ND
Y702	1763F 2/5/97 frIII+IV	84	84	9	ND	758	138	25	176	1105	ND	ND	119	108	NDR(35.8)	ND	ND
Y672	1764F 2/5/97 frIII+IV	181	181	ND	ND	915	169	105	931	2119	ND	ND	185	116	ND	ND	ND
B1041	1765F 2/5/97 frIII+IV	165	165	ND	ND	2018	222	59	758	3057	ND	ND	305	347	68	ND	ND
CRC 393	1766F 2/5/97 frIII+IV	196	196	28	ND	904	190	ND	291	1412	ND	ND	160	44	ND	ND	ND
CRC 367	1767F 2/5/97 frIII+IV	ND	ND	ND	ND	1247	ND	ND	ND	1247	ND	ND	ND	ND	ND	ND	ND
CRC 392	1768F 2/5/97 frIII+IV	582	582	NDR(69.6)	ND	1242	350	109	985	2686	ND	ND	97	73	ND	ND	ND
CRC 375	1769F-rex 29/5/97 frIII+IV	89	89	24	ND	880	131	ND	362	1396	ND	ND	112	63	33	ND	ND
CRC 381	1770-1F 2/5/97 frIII+IV (mean of 2)	241	241	20	ND	1099	246	34	521	1919	ND	ND	110	ND	ND	ND	ND
CRC 157	1781F 22/5/97 frIII+IV	74	74	10	ND	1768	NDR(75.8)	27	273	2078	ND	ND	158	58	28	ND	ND
CRC 167	1783F 22/5/97 frIII+IV	903	903	102	ND	1695	606	126	937	3466	ND	ND	104	50	54	ND	ND
CRC 186	1784F 22/5/97 frIII+IV	667	667	90	ND	3457	628	148	1249	5572	ND	ND	263	164	83	ND	ND
CRC 338	1785F 22/5/97 frIII+IV	458	458	49	ND	1339	240	71	721	2420	ND	ND	161	83	ND	ND	ND
CRC 182	1782,6F 22/5/97 frIII+IV (mean of 2)	451	451	58	ND	2532	394	87	701	3772	ND	ND	366	127	116	ND	ND
CRC 183	1787F 22/5/97 frIII+IV	575	575	67	ND	1372	463	89	717	2708	ND	ND	123	86	58	ND	ND
CRC 387	1788F 22/5/97 frIII+IV	221	221	NDR(33.1)	ND	1243	303	56	524	2125	ND	ND	105	85	42	ND	ND
CRC 389	1789F 22/5/97 frIII+IV	405	405	52	ND	926	183	52	609	1821	ND	ND	91	72	41	ND	ND
CRC 170	1790F 22/5/97 frIII+IV	228	228	36	ND	1379	268	56	435	2174	ND	ND	255	90	91	ND	ND
CRC 379	1807F 29/5/97 frIII+IV	96	96	23	ND	1033	155	ND	432	1643	ND	ND	102	85	ND	ND	ND
CRC 111	1808F 29/5/97 frIII+IV	497	497	74	ND	1197	490	94	817	2673	ND	ND	99	49	54	ND	ND
CRC 125	1809F 29/5/97 frIII+IV	94	94	15	ND	1003	131	24	350	1523	ND	ND	97	63	ND	ND	ND
CRC 126	1810F 29/5/97 frIII+IV	143	143	28	ND	1212	214	53	394	1900	ND	ND	180	87	62	ND	ND
CRC 385	1811F 29/5/97 frIII+IV	215	215	29	ND	1167	196	64	730	2185	ND	ND	150	115	ND	ND	ND
CRC 158	1812F 29/5/97 frIII+IV	396	396	62	ND	1621	299	87	917	2986	ND	ND	251	140	ND	ND	ND
MMP97-20	1969F 9/1/98 frIII+IV	ND	ND	ND	ND	736	157	ND	289	1181	ND	ND	ND	ND	ND	ND	ND
MMP97-21	1970F 9/1/98 frIII+IV	ND	ND	ND	ND	630	ND	ND	608	1237	ND	ND	ND	ND	ND	ND	ND
MMP97-22	1971F 9/1/98 frIII+IV	ND	ND	ND	ND	2351	ND	ND	909	3261	ND	ND	97	58	ND	ND	ND
MMP97-19	1972F 9/1/98 frIII+IV	ND	ND	ND	ND	(1013.1)	ND	ND	NDR(654.2)	ND	ND	ND	ND	ND	ND	ND	ND
MMP97-30	1973F 9/1/98 frIII+IV	ND	ND	ND	ND	1827	471	ND	680	2979	ND	ND	ND	ND	ND	ND	ND
MMP 96-26	2247F 9/9/98 frIV	ND	ND	ND	ND	R(792.2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MMP 96-27	2248F 9/9/98 frIV	ND	ND	ND	ND	2558	ND	ND	837	3395	ND	ND	ND	ND	ND	ND	ND
MMP 96-23	2249F 9/9/98 frIV	ND	ND	ND	ND	1065	ND	ND	690	1754	ND	ND	291	ND	ND	ND	ND
MMP 96-31	2250F 9/9/98 frIV	ND	ND	ND	ND	555	222	NDR(232.6)	623	1400	ND	ND	ND	ND	ND	ND	ND

Table 7. (

Field #	PCB7352	PCB43	PCB49	PCB477548	PCB65	PCB62	PCB44	PCB5942	PCB714164	PCB40	TOTTECB	PCB104	PCB96	PCB103	PCB100	PCB94	PCB98	PCB10293	PCB95
Y675	238951	ND	77775	75672	ND	ND	10757	4584	8919	474	417272	ND	ND	1482	1212	ND	ND	645	139514
Y674	327134	ND	80689	81626	ND	ND	5995	2333	4859	209	502994	ND	ND	1539	1187	ND	ND	433	98895
B986	115104	ND	43279	36834	ND	ND	6514	1498	4050	257	207714	ND	ND	1394	888	ND	ND	478	68150
Y673	502991	ND	94396	124571	ND	ND	11636	5373	12880	497	752656	ND	ND	920	1510	ND	ND	591	169007
B984	277316	ND	72213	65171	ND	ND	10017	2724	6441	370	434797	ND	19	1442	894	20	ND	400	90575
B985	260745	ND	60930	96688	ND	ND	10821	3982	10550	612	444518	ND	18	1183	910	22	ND	584	103921
B1065	301085	ND	75018	99570	ND	ND	8760	3232	7133	353	495343	ND	ND	1310	1151	16	ND	449	116988
Y709	180142	ND	55158	56229	ND	ND	6260	1522	4216	237	303840	ND	ND	944	727	ND	ND	330	59399
B1059	620715	ND	146224	251020	ND	ND	15107	5911	13174	655	1052960	ND	ND	2130	1849	20	ND	557	207345
B808	177340	ND	51802	49003	ND	ND	13588	4612	12283	742	309628	ND	ND	1033	853	ND	ND	784	106039
Y560	186944	ND	45829	50544	ND	ND	7799	1760	5054	365	298517	ND	ND	1111	683	ND	ND	629	83812
Y575	240944	ND	57029	69598	ND	ND	13758	4650	13564	743	400287	ND	ND	1305	1236	ND	ND	909	131425
B858	152886	ND	48358	73902	ND	ND	9187	3479	10153	398	298514	ND	ND	1175	1095	ND	ND	503	70439
B855	176983	ND	53464	59224	ND	ND	7212	3193	6508	378	307561	ND	72	1408	982	118	ND	2976	87117
B859	205102	ND	63968	53053	ND	ND	8287	2594	5612	381	339262	ND	ND	1400	1045	60	ND	1057	98007
Y613	162045	ND	33431	83271	ND	ND	6007	390	4663	162	290162	ND	ND	1653	934	ND	ND	1886	86522
Y582	119551	ND	38571	33136	ND	ND	8235	2297	7202	354	209501	ND	ND	978	620	ND	ND	928	61212
B888	180586	ND	64560	59784	ND	ND	9642	3699	7638	494	326576	ND	ND	1028	724	ND	ND	2957	81111
B861	133285	ND	39314	38190	ND	ND	11102	2851	10946	527	236561	ND	ND	798	752	ND	ND	2580	80462
B1007	205140	ND	58305	62826	ND	ND	11355	3460	11491	661	353754	ND	ND	1241	1409	39	ND	6364	121259
Y694	218805	ND	55929	64383	ND	ND	13325	4453	12944	755	370883	ND	ND	1417	1310	ND	ND	1168	128549
B1004	206526	ND	70622	68340	ND	ND	13055	4748	10571	975	374838	ND	ND	1917	1567	ND	ND	1048	130427
B1011	127601	ND	47438	41771	ND	ND	8928	3434	7422	464	237268	ND	ND	1056	809	ND	ND	597	53537
Y614	279133	ND	69294	75192	ND	ND	12814	4617	12286	667	454567	ND	ND	1606	1737	42	ND	2222	155045
Y701	136719	ND	51976	44477	ND	ND	7155	2307	5428	296	248494	ND	ND	1212	937	ND	ND	1354	58294
Y702	204034	ND	53612	51703	ND	ND	4928	1499	3982	183	320167	ND	ND	1163	966	NDR(38.2)	ND	808	86399
Y672	276838	ND	68976	97247	ND	ND	13247	5097	12491	690	474888	ND	ND	791	637	ND	ND	117	88929
B1041	217081	ND	60047	66903	ND	ND	13494	6431	12821	841	378339	ND	ND	1227	1615	66	ND	1714	147943
CRC 393	337843	ND	62904	127846	ND	ND	8220	1924	5968	396	545306	ND	ND	1975	1947	112	ND	2133	125462
CRC 367	162628	ND	40433	50479	ND	ND	10689	3319	8850	705	277102	ND	ND	ND	1359	ND	ND	ND	171304
CRC 392	402993	ND	113434	118347	ND	ND	32575	7815	25463	1172	701970	ND	ND	1335	1075	ND	ND	ND	184109
CRC 375	246621	ND	55569	82074	ND	ND	11311	2805	7786	444	406817	ND	ND	905	623	ND	ND	384	86375
CRC 381	303552	ND	74513	78671	ND	ND	13107	4055	10225	475	484708	ND	ND	1358	1073	ND	ND	528	138695
CRC 157	1190893	ND	236995	331736	ND	ND	40660	10733	26177	1401	1838839	ND	ND	2982	2687	57	ND	3872	491194
CRC 167	339068	ND	68490	131550	ND	ND	7942	2244	5838	335	555675	ND	ND	936	666	22	ND	377	84811
CRC 186	993138	ND	166601	354489	ND	ND	27661	7400	19748	1276	1570823	ND	ND	1911	1969	48	ND	2859	348983
CRC 338	229118	ND	57373	64233	ND	ND	18184	6850	15355	977	392334	ND	ND	907	814	34	ND	1281	117383
CRC 182	548036	ND	136745	158980	ND	ND	24372	4653	15820	908	890122	ND	ND	1883	1642	64	ND	3037	268513
CRC 183	177524	ND	33140	105571	ND	ND	6450	1464	5073	351	329840	ND	ND	402	319	18	ND	423	45973
CRC 387	184362	ND	59212	59636	ND	ND	9921	3883	8925	417	326588	ND	ND	1143	1014	ND	ND	375	67805
CRC 389	398942	ND	80934	115838	ND	ND	21584	5261	18333	1029	642125	ND	ND	1193	1249	ND	ND	713	194492
CRC 170	303192	ND	54709	110228	ND	ND	8360	1763	5786	426	484899	ND	18	696	664	37	ND	208	91340
CRC 379	323645	ND	79559	118989	ND	ND	12608	3358	9483	524	548354	ND	ND	1155	922	ND	ND	410	96256
CRC 111	126944	ND	26587	31020	ND	ND	2812	913	3644	147	192268	ND	ND	466	385	ND	ND	188	24141
CRC 125	671820	ND	91788	225523	ND	ND	14703	5036	10066	816	1019913	ND	ND	1281	1063	21	ND	632	200186
CRC 126	159288	ND	39200	41528	ND	ND	10074	2483	5503	552	258958	ND	ND	569	470	NDR(25.0)	ND	388	68266
CRC 385	502846	ND	89257	162757	ND	ND	17511	5934	17382	983	796934	ND	NDR(25.5)	1299	1230	23	ND	975	178705
CRC 158	515202	ND	67975	144363	ND	ND	17920	8195	15985	1133	771163	ND	ND	1018	1400	39	ND	1162	218319
MMP97-20	58432	ND	20003	19750	ND	ND	4474	1269	4929	231	109088	ND	ND	832	602	ND	ND	354	46329
MMP97-21	55029	ND	16931	23295	ND	ND	2518	894	2687	178	101533	ND	ND	576	336	ND	ND	ND	17417
MMP97-22	213295	ND	53992	65300	ND	ND	13191	4904	13668	NDR(613.9)	364505	ND	ND	1878	1477	ND	ND	835	157216
MMP97-19	130416	ND	35759	55491	ND	ND	3042	1321	2909	ND	228937	ND	ND	1016	810	ND	ND	ND	40837
MMP97-30	356620	ND	85416	134016	ND	ND	9435	3806	7810	346	597448	ND	ND	2031	1490	ND	ND	758	165966
MMP 96-26	294421	ND	82201	120137	ND	ND	12635	4775	9560	ND	523730	ND	ND	1409	1140	ND	ND	ND	96378
MMP 96-27	468766	ND	124441	190554	ND	ND	18730	8929	17276	ND	828696	ND	ND	2274	2234	ND	ND	ND	180112
MMP 96-23	102811	ND	26118	35107	ND	ND	7576	2743	8875	383	183904	ND	ND	1151	1210	ND	ND	ND	85805
MMP 96-31	55791	ND	22062	17754	ND	ND	4107	1576	4672	ND	105962	ND	ND	)R(423.3)	ND	ND	ND	ND	22031

Table 7. (

Field #	PCB88	PCB121	PCB91	PCB9284	PCB89	PCB10190	PCB113	PCB99	PCB119	PCB112	PCB10983	PCB9786	PCB116125117	PCB11587	PCB85	PCB110	PCB82	TOTPECB
Y675	398	ND	34902	86904	1230	678215	ND	694036	27914	ND	4137	30182	ND	93086	168192	112562	3450	2078061
Y674	883	ND	37554	88030	ND	878730	ND	1176878	32135	ND	2161	20068	ND	87878	197972	75043	1734	2701120
B986	349	ND	19991	46695	1215	362158	ND	312786	15158	ND	1936	13620	ND	53404	76331	56010	1068	1031631
Y673	918	ND	53116	131512	3046	1390257	ND	1710764	49874	ND	3337	22274	ND	104581	42586	120995	2406	3807693
B984	376	ND	27721	75853	1569	798463	ND	1189987	25296	ND	2615	19757	ND	79735	163965	85617	1496	2565801
B985	612	ND	30348	72330	1886	661162	ND	913650	25853	ND	3345	23021	ND	70197	206196	86416	3480	2205135
B1065	793	ND	38507	106232	1984	956215	ND	1214171	36485	ND	2836	21810	ND	105808	275435	104405	1988	2986582
Y709	371	ND	18904	51370	801	437642	ND	557522	19605	ND	2086	15080	ND	54028	101588	53308	1465	1375170
B1059	2124	ND	73080	191784	1816	1829463	ND	3197508	68365	ND	5295	40732	ND	172672	660472	163653	3512	6622375
B808	373	ND	24176	59873	2475	440478	ND	361898	16888	ND	3887	23281	ND	66319	92796	72044	3520	1276718
Y560	NDR(336.0)	ND	20165	51512	1410	440718	ND	495213	16643	ND	2078	17018	ND	53331	108384	49930	1292	1343929
Y575	671	ND	31514	68438	2737	528781	ND	567887	22875	ND	4453	24617	ND	74159	134498	96497	3248	1695250
B858	204	ND	20898	53081	1725	401378	ND	723257	23408	ND	3012	21732	ND	64991	172555	89755	3050	1652260
B855	424	ND	20252	63774	10232	387035	ND	490016	19150	ND	2241	15599	ND	58569	125123	50150	2433	1337671
B859	281	ND	21781	58979	2262	456344	ND	442850	17255	ND	2476	19326	ND	63671	95896	54206	1779	1338676
Y613	1329	ND	20631	88732	13929	705747	ND	1180650	29260	ND	3060	17640	ND	86363	274604	71898	1674	2586513
Y582	316	ND	15942	44575	4527	339452	ND	274570	13504	ND	2253	15422	ND	53580	65600	56220	2043	951742
B888	631	ND	22235	57446	16940	458963	ND	459545	18584	ND	2552	21671	ND	69883	114569	64470	2582	1395891
B861	392	ND	18567	46738	7081	331966	ND	265349	13039	ND	2868	17104	ND	54407	72260	72063	2569	988996
B1007	ND	ND	31289	62392	15357	459586	ND	447152	19623	ND	3498	21927	ND	64663	123625	78025	3367	1460816
Y694	667	ND	31787	82930	ND	552125	ND	438958	22364	ND	4491	26375	ND	75193	106868	99590	3398	1577191
B1004	398	ND	34227	71386	3692	515143	ND	499669	25000	ND	4597	32802	ND	76928	120367	95310	4422	1618899
B1011	432	ND	15863	41600	1023	331156	ND	333656	15277	ND	2047	16438	ND	49281	77923	53142	2542	996379
Y614	666	ND	40927	81986	4930	662689	ND	914265	25927	ND	4166	29681	ND	88348	186841	94165	4134	2299376
Y701	ND	ND	18451	46983	5249	354332	ND	334674	16658	ND	2121	17070	ND	51608	81757	57279	1823	1049803
Y702	575	ND	25032	57034	ND	494674	ND	541611	16869	ND	1811	13805	ND	50406	105831	39122	1446	1437553
Y672	498	ND	25555	83592	ND	753819	ND	946687	27006	ND	3233	18490	ND	83474	218462	102372	2126	2355790
B1041	505	ND	35946	66088	3366	464725	ND	419328	21587	ND	4425	25606	ND	68129	119934	93633	4071	1479909
CRC 393	952	ND	36408	90971	ND	963160	ND	1363472	42161	ND	5338	32947	ND	109442	370541	105648	2654	3255323
CRC 367	ND	ND	40739	35751	4155	368944	ND	604711	25440	ND	6349	40396	ND	105809	199817	115927	8969	1729671
CRC 392	ND	ND	43924	142810	ND	1106680	ND	893560	41796	ND	7222	51638	ND	179193	249468	217957	5718	3126486
CRC 375	357	ND	23402	60174	1135	524497	ND	812112	18890	ND	2793	18307	ND	73591	189288	64752	2028	1879613
CRC 381	288	ND	35911	97844	1533	788387	ND	963076	28100	ND	4638	33463	ND	111966	196272	112277	3865	2519274
CRC 157	1549	ND	129956	302571	8156	2278512	ND	2333613	79515	ND	13020	85220	ND	320132	647201	323865	10682	7034785
CRC 167	410	ND	28495	66484	2125	592382	ND	1105356	17566	ND	2154	17874	ND	75614	282836	55530	1929	2335566
CRC 186	707	ND	106312	151766	10059	1274025	ND	2149601	39428	ND	7579	50876	ND	180400	724185	150915	7269	5208889
CRC 338	246	ND	27629	71204	3824	537249	ND	435333	19290	ND	4748	30198	ND	90651	122342	119065	4518	1586715
CRC 182	618	ND	65640	127903	9916	1013945	ND	1150267	32432	ND	6179	40665	ND	163721	333831	157906	4893	3383055
CRC 183	357	ND	13877	32112	1040	321853	ND	1124051	9495	ND	1519	9744	ND	36573	274298	33844	1643	1907541
CRC 387	381	ND	22763	59724	1158	477711	ND	485632	19105	ND	2319	21242	ND	80330	139292	69262	2093	1451348
CRC 389	739	ND	48489	115209	2442	904850	ND	943893	33036	ND	6976	44131	ND	125837	247269	155372	7081	2832970
CRC 170	333	ND	28808	48002	1802	409644	ND	696046	11382	ND	1901	12739	ND	54193	222279	53046	1331	1634470
CRC 379	383	ND	33144	79471	1096	697675	ND	1056467	27380	ND	3168	26099	ND	90227	285619	81627	3183	2484281
CRC 111	114	ND	6837	27682	569	207774	ND	314739	7736	ND	609	5521	ND	26730	68673	2813	ND	694976
CRC 125	553	ND	57933	109762	2756	984134	ND	1764007	29765	ND	5592	37728	ND	108256	454162	91444	6418	3855694
CRC 126	171	ND	16003	41983	1466	310744	ND	265067	10334	ND	2201	14392	ND	50799	77221	42824	1737	904636
CRC 385	660	ND	51862	103536	2229	901443	ND	1284791	28643	ND	5117	34622	ND	102194	333733	116565	6313	3153941
CRC 158	448	ND	57252	105848	3569	794558	ND	959233	25369	ND	6337	37548	ND	111049	301351	131725	7085	2763309
MMP97-20	231	ND	11216	28040	1373	215617	ND	206078	8823	ND	2027	12603	ND	34189	47949	41873	2537	660671
MMP97-21	323	ND	7577	18216	604	195265	ND	292625	9055	ND	825	6486	ND	22494	62906	19390	R(596.2)	654095
MMP97-22	718	ND	40163	98206	1973	665885	ND	551610	28221	ND	5014	30309	ND	94719	139121	110677	3863	1931885
MMP97-19	560	ND	15880	44268	766	435950	ND	789130	18861	ND	1010	10757	ND	43300	150186	30651	1091	1585073
MMP97-30	1447	ND	51197	115702	1311	1073004	ND	1457928	36453	ND	3902	27141	ND	112813	356535	99289	2614	3509582
MMP 96-26	ND	ND	30034	76096	ND	717161	ND	1154328	41431	ND	6841	26134	ND	80805	217712	64075	ND	2513542
MMP 96-27	ND	ND	58716	108799	ND	950805	ND	1469700	39151	ND	4342	36451	ND	109566	370706	125201	4431	3462487
MMP 96-23	ND	ND	21452	36329	2124	255721	ND	232238	11327	ND	3112	14676	ND	35864	59576	51976	2606	815168
MMP 96-31	ND	ND	6962	20204	ND	163991	ND	145986	10408	ND	618	7351	ND	25882	26471	30091	1025	461018

Table 7. (

Field #	PCB155	PCB150	PCB152	PCB145	PCB148	PCB136	PCB154	PCB151	PCB135144	PCB147	PCB149	PCB139140	PCB143134	PCB142131	PCB133	PCB165	PCB146161
Y675	67	254	ND	ND	539	12893	14015	90369	48874	20006	418369	2254	ND	ND	ND	ND	351484
Y674	415	238	ND	ND	730	8893	23291	107260	42961	32215	368393	2601	ND	ND	ND	ND	626254
B986	162	179	ND	ND	416	6262	10009	51166	23497	9190	186269	1242	ND	ND	ND	977	160381
Y673	320	612	ND	ND	1507	11530	26801	174183	78468	42933	750723	6219	ND	ND	ND	8146	985530
B984	82	227	ND	ND	668	9447	16529	89231	33426	22716	324710	1636	733	ND	ND	6065	630968
B985	102	157	ND	ND	437	7946	13433	62476	31188	16732	335229	1241	966	ND	ND	6012	437185
B1065	237	187	ND	ND	634	7831	23318	110547	43570	30799	441032	2191	583	ND	ND	7348	760737
Y709	125	83	ND	ND	260	4336	7644	37973	18769	11737	155994	780	309	ND	ND	1819	19547
B1059	901	247	ND	ND	1120	16775	53549	239174	101046	68089	1134075	4044	ND	1184	ND	19528	2069694
B808	ND	261	ND	ND	444	12929	11837	97471	50817	16755	399145	1416	1501	ND	ND	ND	234339
Y560	ND	NDR(236.5)	ND	ND	229	8704	7840	65413	36598	14395	287135	1093	848	ND	ND	ND	311536
Y575	ND	380	ND	ND	179	10202	6036	87981	49603	17185	330085	1352	1145	ND	ND	ND	271625
B858	ND	153	ND	ND	256	8180	10217	69359	33450	15039	262804	1184	1148	ND	ND	ND	314113
B855	144	399	ND	ND	736	20000	16950	119100	53920	17286	360569	ND	4306	ND	ND	5000	313604
B859	ND	325	ND	ND	426	9440	8219	65839	39251	13341	233237	1751	695	ND	ND	ND	278485
Y613	1013	253	ND	ND	1053	9224	24817	121487	63581	41576	430727	4657	703	ND	ND	23291	704645
Y582	119	103	ND	ND	348	7079	9141	55130	26575	10427	210922	1165	NDR(503.1)	ND	ND	ND	158983
B888	243	139	ND	ND	553	9638	12982	75404	36310	16941	303629	1639	816	ND	ND	7238	282899
B861	NDR(162.6)	279	ND	ND	447	7344	8561	63070	34478	11682	226789	1950	637	ND	ND	ND	161416
B1007	337	447	ND	ND	1021	10670	14334	86306	53381	20950	355878	3480	977	ND	ND	11028	259219
Y694	332	378	ND	ND	911	12085	18538	112865	61808	20757	460978	2691	1047	ND	ND	ND	299658
B1004	388	442	ND	ND	1002	15128	15039	96240	48541	15239	332588	2426	2143	ND	ND	3703	263827
B1011	148	126	ND	ND	351	4861	8318	44926	20723	8936	153453	853	470	ND	ND	1362	190320
Y614	354	593	ND	ND	1200	13057	20169	114364	65527	30555	406179	4790	1099	ND	ND	2245	535356
Y701	86	207	ND	ND	531	7047	11855	60137	26842	11475	201198	2053	524	ND	ND	ND	199114
Y702	346	502	ND	ND	976	10813	18366	103589	52137	23902	341085	4008	347	ND	ND	ND	498197
Y672	118	234	ND	ND	500	7352	16069	109883	43597	25973	378565	1968	661	ND	ND	3782	617599
B1041	110	645	ND	ND	689	13101	11001	83961	54717	16267	321677	3821	848	ND	ND	2070	209446
CRC 393	175	249	ND	ND	1556	10928	30754	96663	76542	30855	666645	5229	1082	ND	ND	ND	873898
CRC 367	ND	ND	ND	ND	ND	8385	ND	32066	28327	12194	246689	2204	840	ND	ND	ND	8747
CRC 392	ND	NDR(134.3)	ND	ND	77	13969	3649	168913	75065	28974	652071	2704	1494	ND	ND	ND	475368
CRC 375	76	145	ND	ND	369	7539	12130	86206	40522	22717	328766	1491	312	ND	ND	ND	418482
CRC 381	ND	190	ND	ND	244	9712	8132	95355	47805	24038	380430	1465	987	ND	ND	3213	448514
CRC 157	261	366	ND	ND	830	34921	38170	327632	168078	68117	1525263	4241	3482	ND	ND	10446	1268741
CRC 167	106	122	ND	ND	283	9718	10835	83516	33854	20703	315685	1442	893	ND	ND	ND	557480
CRC 186	101	554	ND	ND	780	26481	21277	216434	130895	57325	972660	6230	2224	ND	ND	ND	1033660
CRC 338	ND	168	ND	ND	253	9817	7468	84392	43487	14224	306929	1730	1956	ND	ND	ND	229448
CRC 182	53	415	ND	ND	609	21447	14092	161635	88171	32583	638372	4082	2050	ND	ND	7119	592748
CRC 183	58	74	ND	ND	195	4072	5133	36900	17960	16260	160053	792	396	ND	ND	6567	655820
CRC 387	135	193	ND	ND	629	6924	13200	83050	36942	14778	254098	2609	315	ND	ND	2057	271794
CRC 389	210	215	ND	ND	5753	14314	17077	132477	75542	29001	647346	2215	1430	ND	ND	3856	461445
CRC 170	92	173	ND	ND	276	7061	6143	52638	33230	15503	250106	1723	410	ND	ND	1832	279440
CRC 379	54	121	ND	ND	444	6998	13995	86615	40569	25346	342695	2399	500	ND	ND	4329	507615
CRC 111	ND	54	ND	ND	162	3467	5516	32018	11167	6845	86751	906	NDR(307.7)	ND	ND	1034	157834
CRC 125	76	183	ND	ND	462	21345	21099	146792	86330	40729	1030706	1756	1139	ND	ND	ND	866580
CRC 126	ND	161	ND	ND	233	6925	4998	56345	31453	10607	207551	1067	576	ND	ND	1049	155944
CRC 385	117	180	ND	ND	590	13206	18632	121307	67560	30203	611497	2671	974	ND	ND	4963	631251
CRC 158	ND	301	ND	ND	512	17356	15565	153398	94207	28747	770152	2756	1524	ND	ND	3593	465197
MMP97-20	NDR(115.9)	NDR(111.6)	ND	ND	243	4395	5094	33614	16409	5580	138953	802	941	ND	ND	1230	94468
MMP97-21	ND	NDR(159.4)	ND	ND	155	1075	5193	15740	6333	5184	63120	NDR(609.7)	ND	ND	ND	R(1802.7)	138634
MMP97-22	240	225	ND	ND	573	9616	15239	116503	49056	16471	439699	1791	1007	ND	ND	2518	230557
MMP97-19	302	ND	ND	ND	457	3808	13396	64525	22587	18960	217924	1775	ND	ND	ND	6776	459359
MMP97-30	667	328	ND	ND	655	12076	24110	153453	61331	34065	607155	3328	610	ND	ND	6180	644636
MMP 96-26	461	ND	ND	ND	449	10866	22103	115386	46227	28174	475619	11270	ND	ND	ND	ND	656746
MMP 96-27	492	429	ND	ND	886	15189	25839	153197	77116	41940	617349	13294	ND	ND	ND	ND	692464
MMP 96-23	NDR(450.3)	551	ND	ND	DR(637.8)	9707	10715	72022	41575	12591	281185	6295	ND	ND	ND	ND	144807
MMP 96-31	155	120	ND	ND	175	2830	5132	25822	10306	5090	82177	927	ND	ND	ND	ND	80654

Table 7. (

Field #	PCB132153	PCB168	PCB141	PCB137	PCB130	PCB160163164138	PCB158	PCB129	PCB166	PCB128	TOTHX	PCB188	PCB184	PCB179	PCB176	PCB186	PCB178
Y675	2604703	114365	44753	49701	141887	1937698	80635	4125	3068	206974	6147035	99	599	6703	3847	ND	102115
Y674	5084766	93925	49210	91559	246104	3649980	138517	6788	5575	341061	10920735	185	1514	5707	2369	ND	160604
B986	1120404	49114	22616	22473	58847	810636	40004	2163	1683	90314	2668002	97	458	3677	1469	ND	44447
Y673	5120646	207976	88428	110043	346359	4868200	218441	11991	7695	560975	13627724	758	2582	22995	8012	ND	251407
B984	5003844	73927	46818	82758	221358	3814235	118945	4828	4672	313055	10820878	140	992	5856	2709	ND	130194
B985	3310480	93101	38097	58575	172042	2440820	96496	5529	3622	222521	7354386	75	570	2997	1993	ND	82272
B1065	6047993	149084	71710	109605	290313	4473871	174940	11697	6989	413913	13179127	123	1637	5267	2398	ND	193010
Y709	1489551	45266	20789	35692	109107	1206125	52752	2088	2405	139903	3363052	40	394	1898	1116	ND	44580
B1059	8002103	194115	143674	259057	654443	7601922	372981	22188	12580	921498	21893989	127	3638	8579	5616	258	513461
B808	1492874	94424	39078	32290	94864	1083190	47068	937	1905	118166	3831710	86	280	6626	3452	ND	60246
Y560	2238387	96478	24207	43038	108789	1701815	70956	1808	3135	189430	5211834	NDR(54.1)	136	5224	2215	ND	74742
Y575	1912847	84101	33559	39403	118419	1562932	70145	1927	2830	190794	4792730	ND	ND	8359	3160	ND	62006
B858	2804734	60457	32797	59275	99982	2142000	94949	1583	3783	270377	6285840	ND	141	4979	2291	ND	81639
B855	2470146	169016	39352	66573	119200	1808282	96501	1730	3768	215552	5902132	530	551	19979	8120	ND	91890
B859	1996124	90394	28482	35572	107083	1416081	63204	1958	2740	170159	4562803	232	262	11585	3779	ND	72529
Y613	4802422	207570	55239	107565	304242	3612774	152336	3726	5237	416062	11094200	305	1484	11441	3504	ND	161324
Y582	1077496	53548	29693	23667	68688	776759	36494	942	1274	87788	2636341	58	302	3149	1950	ND	39012
B888	1938839	75613	39213	42158	109954	1387341	60515	683	2472	157405	4562626	69	471	3741	2285	ND	74627
B861	1089623	61199	30524	22893	75354	822198	39720	964	1679	92496	2753301	106	371	6078	2339	ND	39392
B1007	1617548	97333	36885	35491	120286	1218104	53538	1852	2011	153239	4154315	278	662	12091	4182	ND	68687
Y694	1938110	114334	49343	34273	136906	1356316	57045	2410	2102	145421	4828310	NDR(128.5)	624	7790	3623	ND	76281
B1004	1685305	112775	41461	38611	108035	1320323	62231	2511	2790	168737	4339486	369	815	16575	6322	ND	68855
B1011	1265730	47706	24962	27040	69846	931916	40377	1247	1684	109612	2954967	NDR(103.3)	450	3208	1316	ND	48268
Y614	3718119	141316	54780	81139	215789	2782092	106030	2679	4123	335367	8636922	668	1213	21270	6504	ND	143164
Y701	1366001	65772	29064	28854	62625	994818	46195	1402	1821	122172	3239794	98	406	4810	1812	ND	52088
Y702	3647202	100403	42668	50317	185972	2372990	89417	1943	2636	213837	7761652	522	1147	15277	4228	ND	134513
Y672	4246054	107781	65839	89114	226411	3077029	112291	2196	3496	302657	9439168	106	680	5860	2871	ND	150341
B1041	1298412	102637	35707	27365	105704	1045180	52907	1042	1865	138513	3527686	432	403	19157	5926	ND	54065
CRC 393	7107041	346885	67123	162136	316207	5320100	240398	5526	9201	596723	15965915	328	1262	11586	4713	ND	195978
CRC 367	79185	55305	29985	34612	82955	1059152	65083	ND	1815	121598	1869143	ND	ND	30973	13128	ND	11500
CRC 392	3529562	157769	106458	93678	240340	2879796	139962	2314	5420	314147	8891728	ND	ND	5195	4071	ND	111052
CRC 375	3015525	90117	41287	74734	185269	2387990	84064	2261	3128	251789	7054921	46	350	2999	1478	ND	73911
CRC 381	3379819	131623	57134	85623	227671	2674221	101782	3014	4275	304279	7989526	41	310	5935	2716	ND	104407
CRC 157	6151421	373495	222129	231226	597826	6017856	343252	10666	14877	848979	18262272	250	1696	16583	11964	271	287486
CRC 167	3821847	93316	53246	100178	211443	3047371	99698	3926	4196	337682	8807539	67	515	5053	2411	ND	108251
CRC 186	6641196	362296	122938	197880	500486	5888820	216288	7422	8188	824672	17238805	187	931	22884	8346	ND	192379
CRC 338	1517409	96158	51396	40989	115778	1250875	68026	2127	2777	153213	3998620	47	145	7082	3364	ND	51730
CRC 182	3972298	211812	98321	107441	271336	3324992	140557	4171	5593	419401	10119299	155	550	17137	6191	ND	119003
CRC 183	5216304	46552	20873	109481	179967	3453211	71871	3366	2372	319296	10327571	34	405	2055	915	ND	106683
CRC 387	3208012	78689	49008	46080	97040	1443545	56411	1919	2779	179460	5849666	129	585	5043	1857	ND	59178
CRC 389	3208012	157309	66579	77906	227345	2642749	116536	3037	4612	321424	8216387	85	767	6508	4148	ND	107924
CRC 170	2016713	77664	32947	48083	119841	1740379	68409	1461	2124	233197	4989442	71	338	5797	1983	ND	50594
CRC 379	3646491	91903	45711	87032	208962	2869694	132289	2706	4787	358313	8479567	41	462	2804	1359	ND	104514
CRC 111	1387692	24165	18777	36514	51723	995942	45394	794	1988	115902	2984646	54	194	1856	635	ND	32654
CRC 125	6333526	196918	81975	141290	381799	5109207	164861	6088	6438	482251	15121549	46	543	4220	4154	ND	142537
CRC 126	1140340	55934	30283	27865	73517	864950	38217	1057	1615	96006	2806696	37	135	3591	1497	ND	32320
CRC 385	4677438	153557	64362	87407	272648	3715123	136708	2848	4720	412961	11030920	69	626	4873	2841	ND	117366
CRC 158	3451488	177859	97885	84447	230217	2917671	130607	3710	4717	333498	8985409	85	333	12213	5933	ND	94245
MMP97-20	697380	31109	17224	13059	40708	461452	20954	978	1160	57612	1643364	NDR(60.1)	267	3482	2041	ND	31228
MMP97-21	1175717	19302	11358	22343	54820	688022	24158	1573	1150	69733	2303609	ND	NDR(270.0)	834	389	ND	45799
MMP97-22	1440174	73948	44378	29239	107286	1048891	41608	1651	2331	119730	3792732	ND	546	6177	3360	ND	65741
MMP97-19	3491702	61088	24141	61246	155337	2129400	62864	4039	3142	211519	7014347	ND	NDR(680.8)	3499	1224	ND	112775
MMP97-30	4726424	126817	56881	85939	241601	3276889	123431	5380	5277	397684	10594917	195	1426	7833	3700	ND	155981
MMP 96-26	5116525	296355	53149	88638	240189	3292543	144550	ND	ND	301025	10900272	ND	586	2992	1265	ND	92684
MMP 96-27	5482976	255084	56826	90193	291658	3835733	184663	4412	ND	478129	12317868	415	1207	13780	4753	ND	147195
MMP 96-23	1011449	76326	26204	17825	65142	687745	4127	2913	1457	81477	2554113	269	576	12596	4041	ND	30549
MMP 96-31	665629	25750	13459	12592	31763	423259	29987	1109	1109	47277	1465323	ND	ND	1054	712	ND	21195

Table 7. (

Field #	PCB175	CB187182	PCB183	PCB185	CB174181	PCB177	PCB171	PCB173	CB192172	PCB180	PCB193	PCB191	CB170190	TOTHP	PCB202	PCB200	PCB204	PCB197
Y675	7467	623665	213096	5119	61660	138641	55127	ND	44160	708923	45013	9892	249236	2275359	59161	1477	ND	3254
Y674	11730	998881	375666	5160	41463	205243	89409	ND	70970	1275184	73940	15870	412042	3745938	93357	2229	ND	5766
B986	3602	279886	104291	2690	22333	49105	24449	ND	20568	399204	20295	4444	114842	1095855	30330	961	58	2009
Y673	20750	1866189	556434	9030	87713	360021	122576	ND	104051	1847272	106790	22836	700243	6089659	166414	9353	400	9330
B984	7702	837179	277399	4787	36721	143101	70383	ND	52759	964820	56016	11759	310240	2912756	81162	1648	216	3668
B985	4498	464205	172136	2967	36650	89459	40625	ND	32767	535116	38582	7227	181972	1694112	54829	1033	81	2356
B1065	11965	1174803	430595	6668	55513	232769	99994	ND	85645	1376872	95702	17873	464151	4254985	162362	2168	337	8540
Y709	2979	284033	109782	1861	18920	61066	26645	ND	21582	407770	24476	5541	145712	1158393	29140	440	NDR(76.2)	1468
B1059	24005	3079654	1150522	15389	143656	496672	257698	ND	230367	3747213	284939	44080	1202665	11208540	384350	3032	876	18247
B808	4914	358524	167252	4124	44463	86979	28372	ND	23391	283973	20762	3794	91679	1188918	35118	1590	ND	2254
Y560	6676	478521	169940	2362	28805	95943	37533	ND	31899	492852	35499	8064	201103	1671514	34748	1201	ND	1930
Y575	5484	397641	135797	3401	32819	89379	33587	ND	29570	405885	29191	6691	166915	1409885	28947	1284	ND	1507
B858	4964	443837	196893	3068	31329	80018	46655	ND	31973	552676	39048	8867	225016	1753394	38319	1233	ND	2202
B855	10830	522520	229810	8304	56185	108792	52695	ND	41924	654526	41312	8379	220142	2076489	57469	12291	ND	4733
B859	7915	422422	162517	2924	27465	90224	39343	ND	30224	454400	32647	6896	165676	1531041	38358	4168	ND	3044
Y613	27049	974902	353863	5092	52811	243192	90303	ND	77126	943565	67807	13341	368895	3396004	65650	3266	231	5324
Y582	4388	263312	88833	2941	25491	48747	20394	ND	18156	216268	15567	2809	76528	827903	19075	739	ND	1490
B888	12014	442841	157004	3963	40447	89971	37506	ND	33904	415455	28278	5468	153306	1501349	36032	762	ND	2439
B861	6505	266243	81406	2801	26165	60437	20207	ND	17307	213027	15309	3125	78644	839462	18958	1334	ND	1508
B1007	15947	445953	133270	4139	46376	111749	36600	ND	28275	327806	23533	4550	119847	1383944	32757	2843	ND	2806
Y694	7109	509306	156692	4805	52382	109341	34276	ND	29780	356263	25640	4825	118862	1497598	41232	1765	ND	2686
B1004	7853	411627	144972	5097	52515	84663	40306	ND	31390	365048	24108	5554	135144	1401212	34046	4236	ND	42809
B1011	4058	300393	110634	2638	20927	55626	27150	ND	23567	308906	19101	4261	110970	1041474	24809	978	ND	1929
Y614	18163	942697	327919	5173	53942	211874	99264	ND	68377	843953	58602	10742	337114	3150640	69077	7851	85	5944
Y701	5990	305055	112160	2842	24632	46756	27524	ND	23132	295678	21292	4416	110509	1039202	25662	1482	ND	2283
Y702	15876	819918	297479	3920	36384	201389	91081	ND	65077	809830	57999	10262	285888	2850791	65907	6235	ND	5863
Y672	9846	883532	309840	6624	50794	163507	73804	ND	65459	811391	58315	10478	280287	2883734	69335	1605	ND	4124
B1041	6854	340596	103294	3849	42779	95282	34429	ND	23141	268275	19324	4060	97684	1119550	24003	4773	ND	2228
CRC 393	20099	1302473	486965	4471	81348	269746	123863	ND	103826	1469256	98939	20424	555085	4750362	76839	4896	ND	6844
CRC 367	ND	64745	23315	12000	147755	273226	114864	ND	11131	254353	18707	3673	357530	1336898	971	ND	ND	ND
CRC 392	13021	739399	249070	9530	80244	170025	65707	ND	61969	760394	52871	10343	272805	2605695	22206	329	ND	826
CRC 375	4712	467672	164663	3107	27617	100557	42611	ND	36624	452856	27754	5777	163849	1576582	42680	1058	ND	2334
CRC 381	6967	642608	223243	4933	51877	162191	60731	ND	54621	724576	44163	9864	275435	2374620	33500	851	ND	1787
CRC 157	26408	1809206	666272	20759	226431	439290	159552	ND	166323	2129791	127327	32689	837955	6960250	134915	3166	559	9504
CRC 167	7278	577631	229857	4653	39274	117370	59500	ND	53052	650828	40008	7733	228099	2131579	50919	1636	ND	3111
CRC 186	19102	1172542	404449	10246	114656	336094	121575	ND	94986	1145282	75532	14559	420482	4154234	77872	4490	ND	6283
CRC 338	5138	334646	117802	4439	42805	85557	29831	ND	24461	311486	20766	5035	118267	1162602	25283	1407	ND	1679
CRC 182	13116	792992	263451	8089	79925	194050	73680	ND	64657	818406	49627	10908	296514	2808451	53293	3723	131	4361
CRC 183	4579	779734	281631	1594	16212	110771	70569	ND	72132	1042676	55509	9085	330149	2884733	69820	612	61	3234
CRC 387	6127	417922	154508	3680	26529	74144	40377	ND	31701	391726	24547	5004	131736	1374794	40569	2605	200	3796
CRC 389	9074	708716	227193	5773	75201	165130	54416	ND	48901	608352	44121	9768	270844	2346922	56351	1445	114	3389
CRC 170	4682	355700	110591	2356	25467	75246	31579	ND	27991	368330	23936	5366	150087	1240116	26242	1635	ND	2113
CRC 379	6613	634378	226546	3473	32674	131662	58768	ND	54547	705814	45922	10703	294260	2314540	56374	1008	75	3320
CRC 111	2643	177872	81693	1443	8566	27329	19251	ND	17144	269996	13235	3554	86233	744353	25244	977	ND	1754
CRC 125	7775	811322	295268	5013	91276	187621	76702	ND	68958	890221	52395	10014	299341	2947406	73135	1056	ND	3619
CRC 126	2994	217193	75405	2152	21443	54699	19697	ND	18469	235036	13178	3144	72797	773785	23297	1014	57	1615
CRC 385	8084	675243	235323	4252	58042	159903	52598	ND	53985	709641	52299	10740	307017	2452904	51745	1229	ND	3050
CRC 158	9139	584444	207630	7144	82672	154262	54640	ND	48920	653669	37564	9278	236738	2198910	53080	3725	370	3786
MMP97-20	2481	196061	64800	2398	25571	48974	17440	ND	14898	178824	10735	2442	71388	673029	15639	923	ND	1528
MMP97-21	2510	221039	100722	1097	7073	36402	21983	ND	18997	255066	15948	3331	94258	825448	25821	ND	ND	2071
MMP97-22	6228	422187	125528	5295	48997	97392	28389	ND	22861	248675	18380	3510	93816	1197081	29994	1710	ND	2911
MMP97-19	6670	647792	236676	3420	24088	124913	56796	ND	46317	608864	40387	7718	228006	2149145	68459	1920	ND	4646
MMP97-30	13199	935625	340208	6911	60531	196957	77681	ND	62867	841361	54543	12834	358030	3129881	71239	2520	NDR(228.7)	6872
MMP 96-26	6221	556979	194985	3362	34296	96351	49333	ND	36008	439635	32594	9253	165919	1722463	41460	ND	ND	2465
MMP 96-27	14041	980300	297571	5605	56075	201525	80277	ND	55276	733235	52483	14457	344368	3002562	56877	3686	ND	5179
MMP 96-23	3648	200674	60956	2639	26569	48922	18879	ND	12453	133249	9930	3112	53623	622685	14768	3643	ND	1848
MMP 96-31	1444	128662	48846	1090	8507	21826	12006	ND	9972	122808	9078	2634	50942	440775	11008	ND	ND	1104

Table 7. (

Field #	PCB199	PCB198	PCB201	PCB203196	PCB195	PCB194	PCB205	TOTOC	PCB208	PCB207	PCB206	TOTNO	PCB209	TOTDC
Y675	1307	2906	81042	115295	20429	91422	3642	379934	9158	3207	26507	38872	7363	7363
Y674	777	4653	127947	215500	36653	158901	4497	650280	13210	5629	47099	65938	9188	9188
B986	507	1749	40314	70134	11707	56381	2262	216412	6243	2584	19494	28321	6665	6665
Y673	1691	6949	213351	358295	57024	304831	9277	1136914	30956	11847	86750	129553	32621	32621
B984	676	3012	81162	176022	25945	101191	3058	477761	10621	4035	34935	49591	7740	7740
B985	722	2265	90093	87891	16737	60849	2364	319220	7306	2431	21392	31129	5618	5618
B1065	1189	7923	248381	286097	52545	210987	6919	987447	25680	9249	89770	124699	22285	22285
Y709	350	1393	49478	51066	9381	42652	2035	187404	4475	1655	14778	20908	4039	4039
B1059	2425	18528	579330	590720	106181	387863	11962	2103515	50526	16525	150663	217714	46936	46936
B808	1067	1778	52846	69046	12345	33400	928	210373	4853	1777	14443	21074	4177	4177
Y560	505	1881	48768	77268	15055	57074	2654	241083	5477	1850	20790	28117	3546	3546
Y575	471	2173	46131	72771	13815	55864	2336	225300	5670	ND	28000	33670	3895	3895
B858	491	1561	47037	91018	17425	54922	2005	256213	4728	1794	19527	26049	3394	3394
B855	2552	3106	92568	160131	26729	107821	1920	469318	11216	4971	35323	51511	9472	9472
B859	662	2386	55716	94398	14594	58251	1777	273355	6210	2671	22020	30901	4806	4806
Y613	754	4468	105998	162339	29429	93741	2484	473684	10323	4609	29505	44437	5706	5706
Y582	545	1273	33146	50050	8869	26189	594	141971	3387	1477	10642	15505	2727	2727
B888	803	1672	45581	95198	16848	53293	1177	253806	6119	2577	20433	29130	4637	4637
B861	510	1344	32851	48869	8362	27099	785	141620	3602	1656	11042	16300	2543	2543
B1007	1024	2509	56426	67567	12162	35971	934	214998	5859	2488	14717	23064	4488	4488
Y694	1018	2214	57206	81875	14014	40815	956	243781	5852	2302	15456	23610	4047	4047
B1004	1403	2150	86752	92757	16295	52021	1688	334157	8916	4056	24452	37424	7820	7820
B1011	367	1880	61034	64049	11579	38969	836	206429	5055	2218	14978	22251	3922	3922
Y614	852	3820	128083	184335	31195	97391	1949	530582	10444	5292	37469	53205	8029	8029
Y701	520	1379	39933	63486	11119	35976	993	182834	4791	2069	15917	22777	3995	3995
Y702	673	3480	113455	157651	31879	89523	1876	476542	8064	4064	26153	38282	5099	5099
Y672	1042	3904	127748	173699	31895	90941	1683	505976	10816	4024	34115	48955	7492	7492
B1041	840	1360	46651	53462	9605	30563	829	174315	5312	2304	14865	22481	4383	4383
CRC 393	1356	4911	158527	229616	44126	137314	3698	668128	11612	5698	45820	63129	7153	7153
CRC 367	976	ND	5428	6801	11708	26434	NDR(479.2)	52318	N/A	N/A	N/A	N/A	N/A	N/A
CRC 392	1086	3478	82806	134803	26025	74146	1630	347334	9178	2707	104140	116025	7391	7391
CRC 375	511	2449	89024	65423	13101	34704	820	252104	3244	1212	11421	15877	2217	2217
CRC 381	680	2670	114276	115438	20158	67576	1567	358504	7197	2533	61424	71153	4414	4414
CRC 157	3428	10637	312383	315358	59934	223766	7091	1080740	25039	9343	72455	106837	18117	18117
CRC 167	844	3236	76093	106000	22236	55245	1026	320345	4598	1833	16101	22532	2776	2776
CRC 186	2123	5779	108125	166005	35315	90823	1759	498575	9164	3721	25827	38712	6745	6745
CRC 338	826	1702	34868	56451	10472	32583	989	166260	3694	1368	13742	18803	2895	2895
CRC 182	1680	3995	106195	119975	23999	77455	1848	396656	9005	3637	27701	40343	7959	7959
CRC 183	243	4112	159338	135826	22599	87499	1236	484580	5189	1992	20025	27206	2816	2816
CRC 387	682	2815	95101	80697	14611	43031	896	285003	4723	2422	17374	24520	4341	4341
CRC 389	1428	3409	121819	86150	16291	53190	1847	345433	6166	2277	17405	25848	4173	4173
CRC 170	618	1832	64202	46336	9246	30340	1008	183570	3444	1513	10498	15455	2951	2951
CRC 379	514	3547	128498	95371	18076	62374	1902	371058	6372	2404	22092	30869	4390	4390
CRC 111	362	1608	53560	52517	7801	33554	752	178128	3092	1492	17456	22040	2837	2837
CRC 125	1500	4145	157683	111731	23069	65073	1005	442016	6016	1954	20338	28308	4035	4035
CRC 126	559	1605	56380	42055	7518	24858	641	159599	2766	1123	10174	14064	2559	2559
CRC 385	826	3175	110353	80460	15895	53899	1817	322447	5116	1942	16884	23943	3341	3341
CRC 158	1892	3742	134130	102070	17653	62995	1854	385296	6699	2579	25434	34712	4995	4995
MMP97-20	776	1027	16748	33074	6276	19430	562	95985	5201	2028	12914	20144	4399	4399
MMP97-21	ND	1819	28181	61356	12101	32869	666	164886	4271	1842	14699	20812	2991	2991
MMP97-22	1159	1719	47599	53429	10692	25783	580	175573	5428	1889	11873	19190	3937	3937
MMP97-19	1082	4286	126934	135533	28435	68619	1421	441336	9948	3419	28526	41893	7236	7236
MMP97-30	1580	4482	97956	144961	29215	79332	2144	440303	15562	6073	37796	59431	7426	7426
MMP 96-26	788	1902	75772	89250	17992	39443	951	270024	4962	1463	11891	18317	2627	2627
MMP 96-27	1139	2886	113754	129514	26749	68386	2811	410982	10986	5233	26272	42490	6576	6576
MMP 96-23	923	729	29536	33114	6260	15599	467	106887	4063	1552	6198	11814	2603	2603
MMP 96-31	ND	ND	23420	34274	6704	18475	781	95766	2949	1073	8350	12372	2620	2620

Table 8. Concentrations of PCBs (ng/kg wet weight) by number of chlorines and type in harbor seal blubber samples.

			Coplanar (non-ortho) PCBs by number of chlorines					Mono-ortho PCBs by number of chlorines					
Field #	Lab. sample #	Lipid%	DICB	TRICB	TETRACB	PENTACB	HEXCB	DICB	TRICB	TETRACB	PENTACB	HEXCB	HEPCB
Y675	1443F 20/11/96 frIII+IV	N/A	751	96	94	1638	9	1451	18303	72607	387425	76232	3248
Y674	1444F 20/1196 frIII+IV	N/A	743	99	85	1183	9	1933	12930	85884	484686	129478	4357
B986	1445-6F 20/11/96 frIII+IV (mean of 2)	N/A	667	205	75	1007	10	2021	11500	41067	231015	41427	1988
Y673	1447F 11/12/96 frIII+IV	N/A	594	167	110	2596	14	1240	20097	101289	654898	211497	8849
B984	1448F 11/12/96 frIII+IV	N/A	459	374	140	2101	15	1117	20713	71631	476901	139272	4322
B985	1449F 11/12/96 frIII+IV	N/A	596	404	144	2012	10	1155	19133	76205	359808	88550	2903
B1065	1450F 11/12/96 frIII+IV	N/A	520	322	134	1688	14	1640	12575	93365	580900	171530	7839
Y709	1451F 11/12/96 frIII+IV	N/A	440	135	62	1103	5	769	11911	30079	290673	65743	2380
B1059	1452F 11/12/96 frIII+IV	N/A	447	143	100	3296	18	2233	26535	175828	977987	359986	12975
B808	1526F 10/2/97 frIII+IV	96	256	192	124	537	6	2314	19225	52714	284698	58490	2224
Y560	1527F 10/2/97 frIII+IV	90	2383	331	110	383	41	12408	18070	37782	324714	106005	8410
Y575	1528F 10/2/97 frIII+IV	92	1069	290	184	469	39	6487	19629	60382	338854	105542	9495
B858	1529F 10/2/97 frIII+IV	88	455	87	95	635	10	3206	16789	52282	393396	103517	2922
B855	1530F 10/2/97 frIII+IV	98	523	124	101	911	ND	6290	13567	38610	289467	73019	2449
B859	1531F 10/2/97 frIII+IV	88	310	161	82	602	10	1653	11024	37003	315307	74125	2824
Y613	1748F 29/4/97 frIII+IV	59	947	223	125	2785	ND	8577	17317	102929	410935	138516	3929
Y582	1750F 29/4/97 frIII+IV	92	832	222	112	1992	ND	14375	15719	58123	242941	40860	1152
B888	1751F 29/4/97 frIII+IV	77	752	200	107	1898	ND	4062	17138	65107	294755	71589	2415
B861	1752F 29/4/97 frIII+IV	88	841	216	123	1017	11	3417	16298	52410	224294	38885	1276
B1007	1753F 29/4/97 frIII+IV	81	756	283	119	2139	15	4046	18719	60361	260389	54783	1638
Y694	1754F 29/4/97 frIII+IV	90	840	169	128	3479	10	8243	20147	71033	344391	65816	1745
B1004	1755F 29/4/97 frIII+IV	87	585	148	117	2432	ND	6178	16886	74824	316201	62888	2182
B1011	1756F 29/4/97 frIII+IV	84	359	117	97	1186	ND	0	14478	50430	215737	44219	1158
Y614	1749,57F 29/4/97 frIII+IV (mean of 2)	102	1108	250	121	3061	6	0	15093	84043	376723	127110	3578
Y701	1762F 2/5/97 frIII+IV	55	431	120	99	773	12	2588	13526	44425	255264	55373	1800
Y702	1763F 2/5/97 frIII+IV	76	128	27	50	1794	9	1315	8335	47346	267851	87776	3861
Y672	1764F 2/5/97 frIII+IV	78	305	60	171	4046	ND	4821	18337	75060	404335	116295	2687
B1041	1765F 2/5/97 frIII+IV	83	282	57	87	1668	ND	1157	20788	68101	294032	53894	1872
CRC 393	1766F 2/5/97 frIII+IV	77	297	46	190	1957	24	1617	18669	149824	1349853	337050	9943
CRC 367	1767F 2/5/97 frIII+IV	90	654	83	108	1905	8	ND	11979	51646	245373	47790	1306
CRC 392	1768F 2/5/97 frIII+IV	87	741	92	238	5536	ND	12294	38126	177862	858552	145736	3031
CRC 375	1769F-rex 29/5/97 frIII+IV	86	266	45	122	3325	7	3325	14472	82120	332544	86375	1773
CRC 381	1770-1F 2/5/97 frIII+IV (mean of 2)	91	356	63	117	2601	12	2345	16972	82238	477296	126624	3369
CRC 157	1781F 22/5/97 frIII+IV	75	116	28	143	6564	15	721	32533	245290	1362915	347945	9671
CRC 167	1783F 22/5/97 frIII+IV	108	1580	220	67	2304	10	102650	15946	72535	312161	110731	2211
CRC 186	1784F 22/5/97 frIII+IV	113	2091	295	171	7260	8	56988	29216	186028	600143	194686	4417
CRC 388	1785F 22/5/97 frIII+IV	120	505	57	117	3200	ND	4377	19644	76187	381725	70207	1726
CRC 182	1782,6F 22/5/97 frIII+IV mean of 2)	98	1082	224	124	2296	ND	15118	26861	131619	572409	133888	3259
CRC 183	1787F 22/5/97 frIII+IV	102	1056	147	89	1853	ND	N/A	12514	53519	169272	67623	1559
CRC 387	1788F 22/5/97 frIII+IV	111	571	93	118	3444	ND	N/A	16799	76008	363157	74582	1996
CRC 389	1789F 22/5/97 frIII+IV	109	353	53	132	3419	11	3043	24929	119659	580341	122585	2732
CRC 170	1790F 22/5/97 frIII+IV	76	698	106	55	777	6	3234	10208	55972	210970	63478	1456
CRC 379	1807F 29/5/97 frIII+IV	82	233	46	104	3053	5	863	18570	90371	432005	114751	2417
CRC 111	1808F 29/5/97 frIII+IV	99	1055	166	77	877	ND	12615	12526	42626	205077	52316	1363
CRC 125	1809F 29/5/97 frIII+IV	63	185	35	99	3967	10	ND	15551	127005	471148	153806	3059
CRC 126	1810F 29/5/97 frIII+IV	57	338	55	76	2005	5	2638	11861	59811	220716	42216	1139
CRC 385	1811F 29/5/97 frIII+IV	109	339	46	106	2461	7	1560	19727	101510	453616	125361	2843
CRC 158	1812F 29/5/97 frIII+IV	99	908	80	116	1264	ND	4936	18885	97467	438589	121442	3141
MMP97-20	1969F 9/1/98 frIV	42	320	50	47	272	ND	1318	9140	27895	161218	26965	1142
MMP97-21	1970F 9/1/98 frIV	77	308	80	73	831	ND	N/A	6577	25245	143219	32166	1117
MMP97-22	1971F 9/1/98 frIV	85	214	50	104	1751	10	N/A	27192	83400	443119	60460	1938
MMP97-19	1972F 9/1/98 frIV	20	368	86	55	1022	ND	N/A	7465	38400	294416	84747	2766
MMP97-30	1973F 9/1/98 frIV	86	277	56	47	494	ND	2038	15784	77799	491484	129754	4117
MMP 96-26	2247F 9/9/98 frIV	62	414	127	216	705	9	N/A	10266	70956	439986	105850	2853
MMP 96-27	2248F 9/9/98 frIV	84	510	127	211	562	9	ND	15573	80218	517648	135602	4991
MMP 96-23	2249F 9/9/98 frIV	75	404	106	156	136	6	ND	8614	22056	175638	33156	1428
MMP 96-31	2250F 9/9/98 frIV	76	492	140	177	175	6	ND	8515	15880	156564	26127	1126

NP=number of peaks (analytes) detected, ND=not detected, NDR=not detected due to incorrect isotopic ratio

Table 8.

	Mono-ortho PCBs by number of chlorines									Total	%PCBs by type		
Field #	DICB	TRICB	TETRACB	PENTACB	HEXCB	HEPCB	OCTACB	NONACB	DECACB	PCBs	PCB%CP	PCB%MO	PCB%DO
Y675	127	2298	417272	2078061	6147035	2275359	379934	38872	7363	11.9	0.02%	4.70%	95.28%
Y674	142	1672	502994	2701120	10920735	3745938	650280	65938	9188	19.3	0.01%	3.72%	96.27%
B986	138	1621	207714	1031631	2668002	1095855	216412	28321	6665	5.6	0.04%	5.89%	94.08%
Y673	157	2696	752656	3807693	13627724	6089659	1136914	129553	32621	26.6	0.01%	3.75%	96.23%
B984	98	1277	434797	2565801	10820878	2912756	477761	49591	7740	18.0	0.02%	3.97%	96.01%
B985	148	2180	444518	2205135	7354386	1694112	319220	31129	5618	12.6	0.03%	4.34%	95.63%
B1065	136	1505	495343	2986582	13179127	4254985	987447	124699	22285	22.9	0.01%	3.79%	96.20%
Y709	150	1219	303840	1375170	3363052	1158393	187404	20908	4039	6.8	0.03%	5.89%	94.08%
B1059	106	2136	1052960	6622375	21893989	11208540	2103515	217714	46936	44.7	0.01%	3.48%	96.51%
B808	234	2379	309628	1276718	3831710	1188918	210373	21074	4177	7.3	0.02%	5.78%	94.21%
Y560	1382	5652	298517	1343929	5211834	1671514	241083	28117	3546	9.3	0.03%	5.45%	94.52%
Y575	816	4320	400287	1695250	4792730	1409885	225300	33670	3895	9.1	0.02%	5.93%	94.04%
B858	455	2298	298514	1652260	6285840	1753394	256213	26049	3394	10.9	0.01%	5.27%	94.72%
B855	446	3675	307561	1337671	5902132	2076489	469318	51511	9472	10.6	0.02%	4.00%	95.98%
B859	249	2501	339262	1338676	4562803	1531041	273355	30901	4806	8.5	0.01%	5.18%	94.80%
Y613	469	2048	290162	2586513	11094200	3396004	473684	44437	5706	18.6	0.02%	3.67%	96.31%
Y582	401	2061	209501	951742	2636341	827903	141971	15505	2727	5.2	0.06%	7.23%	92.71%
B888	ND	2276	326576	1395891	4562626	1501349	253806	29130	4637	8.5	0.03%	5.33%	94.63%
B861	243	2467	236561	988996	2753301	839462	141620	16300	2543	5.3	0.04%	6.33%	93.63%
B1007	165	2400	353754	1460816	4154315	1383944	214998	23064	4488	8.0	0.04%	5.00%	94.96%
Y694	264	2498	370883	1577191	4828310	1497598	243781	23610	4047	9.1	0.05%	5.64%	94.31%
B1004	ND	3763	374838	1618899	4339486	1401212	334157	37424	7820	8.6	0.04%	5.57%	94.39%
B1011	165	2266	237268	996379	2954967	1041474	206429	22251	3922	5.8	0.03%	5.63%	94.34%
Y614	490	4323	454567	2299376	8636922	3150640	530582	53205	8029	15.7	0.03%	3.85%	96.12%
Y701	ND	1666	248494	1049803	3239794	1039202	182834	22777	3995	6.2	0.02%	6.05%	93.92%
Y702	84	1105	320167	1437553	7761652	2850791	476542	38282	5099	13.3	0.02%	3.13%	96.86%
Y672	181	2119	474888	2355790	9439168	2883734	505976	48955	7492	16.3	0.03%	3.80%	96.17%
B1041	165	3057	378339	1479909	3527686	1119550	174315	22481	4383	7.2	0.03%	6.15%	93.82%
CRC 393	196	1412	545306	3255323	15965915	4750362	668128	63129	7153	27.1	0.01%	6.88%	93.11%
CRC 367	ND	1247	277102	1729671	1869143	1336898	52318	N/A	N/A	5.6	0.05%	6.36%	93.59%
CRC 392	582	2686	701970	3126486	8891728	2605695	347334	116025	7391	17.0	0.04%	7.25%	92.71%
CRC 375	89	1396	406817	1879613	7054921	1576582	252104	15877	2217	11.7	0.03%	4.44%	95.52%
CRC 381	241	1919	484708	2519274	7989526	2374620	358504	71153	4414	14.5	0.02%	4.88%	95.10%
CRC 157	74	2078	1838839	7034785	18262272	6960250	1080740	106837	18117	37.3	0.02%	5.36%	94.62%
CRC 167	903	3466	555675	2335566	8807539	2131579	320345	22532	2776	14.8	0.03%	4.16%	95.81%
CRC 186	667	5572	1570823	5208889	17238805	4154234	498575	38712	6745	29.8	0.03%	3.60%	96.37%
CRC 388	458	2420	392334	1586715	3998620	1162602	166260	18803	2895	7.9	0.05%	7.02%	92.93%
CRC 182	451	3772	890122	3383055	10119299	2808451	396656	40343	7959	18.5	0.02%	4.76%	95.22%
CRC 183	575	2708	329840	1907541	10327571	2884733	484580	27206	2816	16.3	0.02%	1.87%	98.11%
CRC 387	221	2125	326588	1451348	5849666	1374794	285003	24520	4341	9.9	0.04%	5.40%	94.55%
CRC 389	405	1821	642125	2832970	8216387	2346922	345433	25848	4173	15.3	0.03%	5.59%	94.39%
CRC 170	228	2174	484899	1634470	4989442	1240116	183570	15455	2951	8.9	0.02%	3.88%	96.10%
CRC 379	96	1643	548354	2484281	8479567	2314540	371058	30869	4390	14.9	0.02%	4.42%	95.55%
CRC 111	497	2673	192268	694976	2984646	744353	178128	22040	2837	5.2	0.04%	6.34%	93.62%
CRC 125	94	1523	1019913	3855694	15121549	2947406	442016	28308	4035	24.2	0.02%	3.18%	96.80%
CRC 126	143	1900	258958	904636	2806696	773785	159599	14064	2559	5.3	0.05%	6.43%	93.52%
CRC 385	215	2185	796934	3153941	11030920	2452904	322447	23943	3341	18.5	0.02%	3.81%	96.17%
CRC 158	396	2986	771163	2763309	8985409	2198910	385296	34712	4995	15.8	0.01%	4.32%	95.66%
MMP97-20	ND	1181	109088	660671	1643364	673029	95985	20144	4399	3.4	0.02%	6.63%	93.35%
MMP97-21	ND	1237	101533	654095	2303609	825448	164886	20812	2991	4.3	0.03%	4.86%	95.11%
MMP97-22	ND	3261	364505	1931885	3792732	1197081	175573	19190	3937	8.1	0.03%	7.60%	92.37%
MMP97-19	ND	ND	228937	1585073	7014347	2149145	441336	41893	7236	11.9	0.01%	3.60%	96.39%
MMP97-30	ND	2979	597448	3509582	10594917	3129881	440303	59431	7426	19.1	0.00%	3.78%	96.21%
MMP 96-26	ND	ND	523730	2513542	10900272	1722463	270024	18317	2627	16.6	0.01%	3.80%	96.19%
MMP 96-27	ND	3395	828696	3462487	12317868	3002562	410982	42490	6576	20.8	0.01%	3.62%	96.37%
MMP 96-23	ND	1754	183904	815168	2554113	622685	106887	11814	2603	4.5	0.02%	5.31%	94.68%
MMP 96-31	ND	1400	105962	461018	1465323	440775	95766	12372	2620	2.8	0.04%	7.45%	92.51%

Table 9. Concentrations of diortho pesticides (ng/kg wet weight) in harbor seal blubber samples.

Field #	Lab. sample #	135-TriCB	124-TriCB	123-TriCB	1235-TeCB	1234-TeCB	PeCB	total tri, te, pe CB	HCB	alpha-HCH	beta-HCH	gamma-HCH	totHCH	HCB	Aldrin	Dieldrin	o,p-DDE	p,p-DDE	o,p-DDD	p,p-DDD
Y675	1443F 20/11/96 frIII+IV	11.7	4521	226	2539	144	667	8110	9855	39466	20167	4769	64402	9855	ND	13094	ND	1286693	ND	26973
Y674	1444F 20/1196 frIII+IV	9.4	4214	230	2405	173	598	7629	6901	29016	15513	4940	49468	6901	ND	13349	ND	2261865	165	21112
B986	1445-6F 20/11/96 frIII+IV (mean of 2)	5.2	4959	284	970	112	558	6887	4795	19622	10452	2935	33009	4795	ND	11314	217	578084	250	14593
Y673	1447F 11/12/96 frIII+IV	ND	4047	237	1702	191	678	6855	4075	36996	15805	4955	57757	4075	ND	9596	491	3728270	194	27924
B984	1448F 11/12/96 frIII+IV	ND	4412	285	1697	232	712	7338	3514	22591	12370	2991	37952	3514	ND	8991	346	1751508	422	21356
B985	1449F 11/12/96 frIII+IV	13.8	5597	336	2394	329	1262	9932	6006	37247	23735	6860	67842	6006	ND	20616	ND	1918454	137	27625
B1065	1450F 11/12/96 frIII+IV	ND	4970	282	1490	179	675	7597	4197	20451	10615	2740	33805	4197	ND	6286	267	2206431	405	18176
Y709	1451F 11/12/96 frIII+IV	ND	9430	589	1205	122	446	11793	3144	20116	12702	3255	36072	3144	ND	9188	ND	719786	ND	11736
B1059	1452F 11/12/96 frIII+IV	15.0	5663	230	3943	228	775	10853	4875	48225	21868	6467	76559	4875	ND	12893	127	6581075	206	44587
B808	1526F 10/2/97 frIII+IV	6.6	5190	330	1153	229	971	7880	5943	34806	21091	6507	62404	5943	ND	14716	ND	718714	170	17508
Y560	1527F 10/2/97 frIII+IV	ND	10015	651	940	258	1291	13155	4352	21378	15167	4457	41002	4352	ND	10950	ND	970140	118	16807
Y575	1528F 10/2/97 frIII+IV	15.2	9607	732	955	318	1399	13027	6929	36089	22788	8317	67193	6929	ND	15921	116	1140475	181	25989
B858	1529F 10/2/97 frIII+IV	ND	14244	824	1479	156	849	17552	6568	35586	19816	7137	62540	6568	ND	11574	ND	1107126	ND	17562
B855	1530F 10/2/97 frIII+IV	ND	6430	536	1200	158	970	9294	4462	21329	11438	3513	36281	4462	ND	7779	ND	723412	ND	11922
B859	1531F 10/2/97 frIII+IV	NDR(13.55)	4895	357	1053	150	769	7224	4264	25272	13438	4324	43034	4264	ND	8149	647	680089	ND	11969
Y613	1748F 29/4/97 frIII+IV	ND	6930	436	1865	102	761	10095	9139	28216	33310	2205	63731	9139	ND	25459	1063	6026337	357	57477
Y582	1750F 29/4/97 frIII+IV	ND	12009	820	1201	202	1118	15351	9939	29238	21245	5381	55863	9939	ND	16860	ND	561692	169	14616
B888	1751F 29/4/97 frIII+IV	ND	13646	955	1416	96	1178	17291	14860	28604	16203	5407	50214	14860	ND	11506	ND	912284	143	18058
B861	1752F 29/4/97 frIII+IV	33.2	7939	486	1078	169	1243	10948	11204	33501	21542	6480	61523	11204	ND	14261	ND	556122	128	14099
B1007	1753F 29/4/97 frIII+IV	ND	10448	608	1436	166	795	13454	5200	35327	26314	6395	68037	5200	ND	22303	223	933685	205	22308
Y694	1754F 29/4/97 frIII+IV	ND	8164	425	1941	213	787	11530	6234	36798	30175	7321	74294	6234	ND	22807	134	884125	141	21800
B1004	1755F 29/4/97 frIII+IV	NDR(19.98)	7267	417	1313	105	747	9849	4976	26027	19658	5393	51077	4976	ND	15419	641	912940	328	28253
Y614	1749,57F 29/4/97 frIII+IV (mean of 2)	17.2	10140	716	1358	140	899	13271	9881	45950	27981	9274	83204	9881	ND	17717	524	1296124	210	24888
CRC 393	1766F 2/5/97 frIII+IV	ND	6325	404	1680	199	909	9517	7284	39219	27041	6314	72573	7284	ND	22609	454	3452288	278	70482
CRC 367	1767F 2/5/97 frIII+IV	ND	10341	2298	1059	122	770	14591	6475	23141	11969	3724	38834	6475	ND	11241	ND	771207	168	26027
CRC 392	1768F 2/5/97 frIII+IV	ND	8328	486	3576	371	1525	14285	6599	50738	20680	6873	78291	6599	ND	15010	ND	2291122	139	47541
CRC 375	1769F-rex 29/5/97 frIII+IV	ND	5130	266	2464	200	803	8863	8814	33381	14953	4587	52921	8814	ND	14597	163	1956956	384	35051
CRC 381	1770-1F 2/5/97 frIII+IV (mean of 2)	8.0	7208	410	2154	208	650	10638	5770	27526	12065	4513	44104	5770	ND	11161	ND	1581786	237	30689
CRC 157	1781F 22/5/97 frIII+IV	10.5	7977	272	6621	355	1017	16252	8589	103306	22204	4836	130346	8589	ND	26300	424	5342518	2747	878774
CRC 167	1783F 22/5/97 frIII+IV	13.3	7131	290	2307	222	665	10629	6142	38868	7408	4113	50389	6142	ND	8017	ND	1693217	254	25195
CRC 186	1784F 22/5/97 frIII+IV	ND	26124	1588	4144	409	1837	34102	10555	78942	33946	9910	122798	10555	ND	57312	623	3378881	429	72267
CRC 338	1785F 22/5/97 frIII+IV	NDR(7.45)	5577	325	1907	276	1028	9114	7020	32561	15849	5329	53739	7020	ND	11455	ND	1104601	274	26789
CRC 182	1782,6F 22/5/97 frIII+IV (mean of 2)	4.0	6719	293	3422	261	938	11637	7802	80049	15722	7150	102921	7802	ND	17055	795	1942470	792	49304
CRC 183	1787F 22/5/97 frIII+IV	7.3	5689	465	1711	236	544	8653	9207	33975	7788	3292	45055	9207	ND	7511	418	2504865	313	29228
CRC 387	1788F 22/5/97 frIII+IV	12.2	5216	286	1341	207	691	7753	4294	27628	11972	4285	43885	4294	742	8519	189	1005559	170	18556
CRC 389	1789F 22/5/97 frIII+IV	14.2	7105	383	3939	326	1008	12775	7765	55792	26859	7338	89988	7765	ND	14694	ND	2324601	135	48092
CRC 170	1790F 22/5/97 frIII+IV	10.1	6558	537	1622	247	494	9467	6099	30964	5287	2998	39250	6099	ND	6235	496	1009119	518	31312
CRC 379	1807F 29/5/97 frIII+IV	12.2	4480	205	2997	156	905	8754	4046	39559	14387	5274	59219	4046	ND	11607	ND	1908660	210	31440
CRC 111	1808F 29/5/97 frIII+IV	12.3	3584	217	1226	136	422	5598	3743	25078	5246	2891	33215	3743	ND	9075	159	491515	184	15958
CRC 125	1809F 29/5/97 frIII+IV	ND	11126	649	3367	114	647	15902	7911	54794	12943	5619	73356	7911	ND	20508	113	3306567	579	360671
CRC 126	1810F 29/5/97 frIII+IV	ND	10528	625	1231	125	565	13075	5703	19688	4219	1513	25421	5703	ND	8674	621	938049	466	151085
CRC 385	1811F 29/5/97 frIII+IV	14.8	5429	322	2989	277	992	10023	8725	57279	24701	8355	90335	8725	ND	23262	ND	2454103	224	56534
CRC 158	1812F 29/5/97 frIII+IV	20.5	4901	243	2071	194	740	8170	9879	54876	13361	6195	74432	9879	ND	20769	ND	1871418	382	66766
MMP97-20	1969F 9/1/98 frIII+IV	ND	1946	111	597	94	371	3120	4358	13689	11218	2888	27795	4358	ND	12450	ND	492398	149	24799
MMP97-21	1970F 9/1/98 frIII+IV	ND	3574	209	492	105	387	4767	3651	7944	5379	1715	15039	3651	ND	6235	ND	480844	140	6119
MMP97-22	1971F 9/1/98 frIII+IV	ND	4126	161	2171	187	705	7350	7727	34974	27384	7972	70330	7727	ND	20925	ND	1231367	130	28248
MMP97-19	1972F 9/1/98 frIII+IV	ND	96704	5304	302	ND	454	102764	2909	7791	7421	1932	17144	2909	ND	5946	ND	1205516	213	42667
MMP97-30	1973F 9/1/98 frIII+IV	ND	210534	10721	1131	ND	551	222937	3324	28520	28510	6271	63301	3324	ND	24411	176	2403017	146	58425
MMP 96-26	2247F 9/9/98 frIV	ND	7044	444	1678	123	866	10155	4231	23507	17370	4702	45580	4231	ND	15726	ND	1855127	184	25781
MMP 96-27	2248F 9/9/98 frIV	8.7	5077	321	2426	173	1133	9138	5441	44856	25815	7009	77679	5441	ND	25931	410	2450106	340	40788
MMP 96-23	2249F 9/9/98 frIV	ND	7115	433	499	153	807	9008	4955	16059	12803	3196	32058	4955	ND	16316	ND	443081	318	18256
MMP 96-31	2250F 9/9/98 frIV	14.7	8165	544	463	82	801	10070	6340	8029	5360	ND	13389	6340	ND	7651	ND	198417	88	7340

Table 9.

Field #	o,p-DDT	p,p-DDT	totDDTs	alpha-endosulfan	Methoxychlor	Mirex	Oxychlordane	trans-chlordane	cis-chlordane	trans-nonachlor	cis-nonachlor	tot chlor/nona.	Heptachlor	Heptachlor epoxide	Endrin
Y675	1564	206961	1522192	NDR(6309.84)	ND	6935	93330	423	3791	235745	6881	340170	ND	37383	ND
Y674	1410	348660	2633212	NDR(7386.46)	ND	12989	181316	385	3725	414753	7541	607720	ND	47595	ND
B986	1552	132227	726923	NDR(7201)	ND	4140	49070	312	3724	132686	5250	191042	ND	17184	ND
Y673	2888	621788	4381554	NDR(5876.64)	ND	22209	250884	512	6785	783887	8517	1050583	ND	57390	ND
B984	3180	331732	2108544	NDR(7068.72)	ND	9383	140045	530	4978	302183	7178	454914	189	30809	ND
B985	1369	290511	2238096	NDR(8746.85)	ND	6401	142274	519	4897	253531	6742	407963	ND	42318	ND
B1065	1991	402465	2629734	NDR(7594.74)	ND	21282	118688	699	4168	351210	6630	481394	ND	28119	ND
Y709	868	112813	845203	NDR(7737.97)	ND	5405	54141	221	2334	147709	4460	208865	232	18756	ND
B1059	1852	674341	7302189	NDR(8072.56)	ND	45815	414886	898	5653	818204	11324	1250964	176	80274	ND
B808	594	59410	796397	NDR(6086.79)	ND	4416	51878	258	5273	193792	8291	259492	ND	20966	ND
Y560	NDR(807.84)	86792	1073857	NDR(10704.87)	ND	6696	75317	385	5856	299360	7892	388810	ND	22848	ND
Y575	1460	159799	1328019	NDR(12025.27)	ND	5746	84922	436	6926	279427	8052	379763	284	27438	ND
B858	ND	18645	1143334	NDR(6047.11)	ND	7316	79525	228	4035	225700	9490	318978	ND	24563	ND
B855	870	87727	823931	NDR(9621.49)	ND	7472	50631	233	2012	142582	4755	200213	ND	14217	ND
B859	1277	81417	775399	NDR(8928.44)	ND	6750	56682	291	5437	214008	6000	282417	211	18171	ND
Y613	2422	282347	6370002	NDR(5504.64)	ND	17034	264385	638	13762	993020	20337	1292142	331	63245	ND
Y582	353	45995	622824	NDR(9241.92)	ND	3517	55534	268	4889	178587	9018	248295	ND	21512	ND
B888	688	54968	986141	NDR(10465.66)	ND	6069	83371	348	4545	278505	8496	375265	NDR(195.17)	27456	ND
B861	458	37577	608384	NDR(8430.75)	ND	3203	38890	230	5481	157854	7620	210074	ND	18049	ND
B1007	933	71826	1029182	NDR(8812.16)	ND	4407	78754	413	8865	308752	13831	410614	ND	34002	ND
Y694	476	78818	985494	NDR(10119.25)	ND	4905	59651	244	5198	210116	11483	286692	ND	27153	ND
B1004	2143	94266	1038570	NDR(8393.08)	ND	5945	61800	318	7128	220599	8440	298285	ND	22434	ND
Y614	1237	107124	1430108	NDR(7451)	ND	16223	97271	248	9851	422389	13777	543536	141	32038	ND
CRC 393	3919	465283	3992704	NDR(8778.44)	ND	17818	182683	1478	20643	800296	31093	1036192	ND	38637	ND
CRC 367	1208	87895	886505	NDR(7858.56)	ND	3955	63777	373	7922	246823	9484	328379	ND	19677	ND
CRC 392	1688	246801	2587291	NDR(9576.18)	ND	11069	137239	395	4918	395954	10897	549403	ND	35885	ND
CRC 375	1851	190482	2184888	NDR(5965.83)	ND	6681	145944	413	8053	346160	10132	510702	ND	34793	ND
CRC 381	1156	160007	1773874	NDR(6823)	ND	10427	121981	368	5413	407127	10354	545243	ND	29306	ND
CRC 157	768	ND	6225231	NDR(5884.20)	ND	34208	383129	3550	18302	1412526	39454	1856962	ND	84147	ND
CRC 167	1232	161565	1881464	NDR(4990.90)	ND	7257	212135	764	6401	440871	9099	669270	ND	37393	ND
CRC 186	3190	429187	3884577	NDR(5162.00)	ND	12655	970984	4650	56848	4009171	79285	5120938	1040	207646	ND
CRC 338	721	88635	1221019	NDR(5061.87)	ND	6340	75905	400	7485	260171	12340	356301	ND	25811	ND
CRC 182	3749	276867	2273978	NDR(5431)	ND	10550	217256	1834	23481	827849	24124	1094543	325	47337	ND
CRC 183	1613	150743	2687180	NDR(5189.43)	ND	10781	180132	759	8274	486398	8438	684001	ND	26874	ND
CRC 387	864	92664	1118001	NDR(5438.68)	ND	7494	70859	326	5942	255589	8784	341500	ND	20149	ND
CRC 389	838	186036	2559703	NDR(4514.94)	ND	8657	175224	657	8887	579126	20099	783993	ND	47518	ND
CRC 170	4265	293172	1338882	NDR(5320.35)	ND	3801	125842	939	9706	411447	8074	556009	242	23980	ND
CRC 379	1239	170261	2111810	NDR(7309.71)	ND	9598	161702	512	5250	413596	8911	589971	118	36036	ND
CRC 111	ND	71230	579045	NDR(6766.44)	ND	6897	73955	425	7015	259944	8192	349531	140	14657	ND
CRC 125	5246	106861	3780037	NDR(3574.65)	ND	12181	314956	749	7479	628566	16260	968010	ND	62930	ND
CRC 126	NDR(669.79)	ND	1090222	NDR(4158.21)	ND	5049	43821	393	7189	207223	6763	265388	ND	11553	ND
CRC 385	1538	202046	2714445	NDR(7451.56)	ND	8502	247642	727	8744	584346	16816	858275	155	61627	ND
CRC 158	2167	232889	2173621	NDR(7164.38)	ND	11779	185322	826	13232	632479	23280	855140	NDR(331.84)	44405	ND
MMP97-20	1274	102782	621401	NDR(3318.94)	ND	2741	25592	212	2944	77939	4225	110913	169	10873	ND
MMP97-21	501	62989	550593	NDR(4769.52)	ND	3849	38775	305	2188	92108	2169	135546	ND	10440	ND
MMP97-22	813	131358	1391915	NDR(4013.69)	ND	3642	68629	233	4950	222143	10258	306213	ND	31242	ND
MMP97-19	ND	17681	1266077	NDR(7750.26)	ND	8449	84084	242	2063	222400	5402	314191	ND	20657	ND
MMP97-30	1472	133907	2597143	NDR(5966.09)	ND	11707	263288	512	6250	671917	13974	955941	432	81484	ND
MMP 96-26	951	88006	1970049	NDR(13677.80)	ND	6817	167176	394	3814	283715	8386	463485	214	39150	ND
MMP 96-27	2068	143471	2637183	NDR(10079.25)	ND	9761	213400	470	7390	495713	13545	730518	ND	60112	ND
MMP 96-23	1063	27965	490684	NDR(14205.76)	ND	2780	33641	230	7844	146419	9425	197559	ND	13990	ND
MMP 96-31	ND	15099	220945	NDR(14777.31)	ND	2351	15989	99	1881	56691	3472	78132	ND	6333	ND

Table 10. TEQs relative to TCDD (ng/kg) calculated based on recently published TEFs (Van den Berg *et al.* 1998).

Field #	Lab. sample #	Coplanar PCBs					Mono-ortho PCBs								PCDDs							
		PCB77	PCB81	PCB126	PCB169	Total	PCB118	PCB114	PCB105	PCB167	PCB156	PCB157	PCB189	Total	a2,3,7,8-TCDD	a1,2,3,7,8-PeCDD	a1,2,3,4,7,8-HxCDD	a1,2,3,6,7,8-HxCDD	a1,2,3,7,8,9-HxCDD	a1,2,3,4,6,7,8-HpCDD	OCDD	Total
Y675	1443F 20/11/96 frIII+IV	0.003	0.001	36.70	0.087	36.79	26.73	3.46	10.40	0.04	27.64	7.98	0.32	76.57	ND	5.55	0.21	3.28	0.29	0.09	0.01	9.43
Y674	1444F 20/1196 frIII+IV	0.002	0.000	31.80	0.093	31.90	33.23	5.10	13.22	0.04	48.13	13.84	0.44	114.00	NDR(1.83)	7.21	0.00	3.98	0.42	0.10	0.01	11.72
B986	1445-6F 20/11/96 frIII+IV (mean of 2	0.002	0.001	20.72	0.100	20.83	15.81	2.04	6.16	0.03	14.78	4.07	0.20	43.09	1.10	3.57	0.09	2.13	0.26	0.04	0.01	6.10
Y673	1447F 11/12/96 frIII+IV	0.004	0.001	37.79	0.144	37.94	42.62	7.19	18.88	0.08	78.09	22.68	0.88	170.42	1.72	7.02	0.00	5.17	0.59	0.12	0.01	12.91
B984	1448F 11/12/96 frIII+IV	0.006	0.002	46.42	0.147	46.58	33.36	4.98	12.00	0.07	50.28	15.00	0.43	116.12	2.47	10.00	0.38	4.96	0.32	0.06	0.00	15.72
B985	1449F 11/12/96 frIII+IV	0.007	0.001	25.88	0.096	25.98	24.44	3.84	9.62	0.04	32.33	9.28	0.29	79.84	NDR(1.27)	6.05	0.00	2.91	0.35	0.08	0.01	9.40
B1065	1450F 11/12/96 frIII+IV	0.007	0.001	40.34	0.141	40.48	40.54	6.04	15.12	0.08	63.16	17.45	0.78	143.18	1.82	6.88	0.00	4.39	0.00	0.05	0.00	11.33
Y709	1451F 11/12/96 frIII+IV	0.002	0.001	21.90	0.054	21.96	20.30	2.35	7.94	0.03	24.00	7.24	0.24	62.10	0.93	4.18	0.28	2.24	0.52	0.06	0.00	7.28
B1059	1452F 11/12/96 frIII+IV	0.003	0.001	62.92	0.178	63.10	68.13	10.90	25.57	0.15	132.36	38.72	1.30	277.13	1.88	8.94	0.00	7.92	0.54	0.10	0.01	17.51
B808	1526F 10/2/97 frIII+IV	0.006	0.001	20.89	0.063	20.96	18.82	2.73	7.58	0.06	20.05	5.64	0.22	55.10	1.53	NDR(6.08)	0.00	1.91	0.24	0.10	0.06	2.31
Y560	1527F 10/2/97 frIII+IV	0.003	0.002	38.34	0.406	38.75	22.45	3.57	8.64	0.08	39.38	9.32	0.84	84.28	ND	8.28	0.49	2.80	0.89	0.42	0.20	13.08
Y575	1528F 10/2/97 frIII+IV	0.008	0.002	36.94	0.391	37.34	23.19	3.39	9.11	0.08	39.89	8.20	0.95	84.82	ND	4.61	0.00	2.97	0.89	0.40	0.23	9.09
B858	1529F 10/2/97 frIII+IV	0.002	0.001	37.82	0.097	37.92	26.82	3.86	10.91	0.07	37.53	10.39	0.29	89.87	1.89	7.56	0.44	3.74	0.00	0.31	0.16	12.21
B855	1530F 10/2/97 frIII+IV	0.003	0.001	30.08	0.000	30.08	19.70	2.75	7.74	0.07	25.89	6.71	0.24	63.11	ND	6.68	0.59	2.98	0.00	0.41	0.23	10.89
B859	1531F 10/2/97 frIII+IV	0.003	0.001	35.32	0.098	35.42	22.03	3.07	8.08	0.05	26.95	7.36	0.28	67.83	1.38	NDR(8.00)	0.00	4.29	0.55	0.32	0.16	5.33
Y613	1748F 29/4/97 frIII+IV	0.004	0.002	33.16	0.000	33.17	27.19	5.56	11.57	0.09	50.20	13.82	0.39	108.82	2.01	5.92	0.18	2.23	0.33	0.04	0.00	8.71
Y582	1750F 29/4/97 frIII+IV	0.004	0.001	21.23	0.000	21.23	16.68	2.32	6.36	0.04	14.05	4.18	0.12	43.73	0.99	3.45	0.00	2.21	0.51	0.04	0.01	6.21
B888	1751F 29/4/97 frIII+IV	0.003	0.001	27.72	0.000	27.72	19.95	3.10	7.94	0.06	25.31	6.78	0.24	63.38	1.99	5.59	0.00	3.11	0.58	0.06	0.01	9.35
B861	1752F 29/4/97 frIII+IV	0.005	0.001	19.15	0.112	19.27	15.33	2.28	5.83	0.03	13.87	3.69	0.13	41.15	ND	5.53	0.00	2.01	0.26	0.06	0.01	7.87
B1007	1753F 29/4/97 frIII+IV	0.004	0.001	15.08	0.150	15.23	17.35	2.53	7.27	0.05	19.04	5.30	0.16	51.71	ND	4.69	0.00	1.85	0.00	0.05	0.00	6.59
Y694	1754F 29/4/97 frIII+IV	0.003	0.001	20.88	0.101	20.99	22.83	3.16	9.65	0.06	22.84	6.39	0.17	65.10	ND	6.99	0.18	2.74	0.45	0.03	0.00	10.39
B1004	1755F 29/4/97 frIII+IV	0.003	0.001	24.98	0.000	24.98	21.30	2.75	8.45	0.05	22.16	6.28	0.22	61.20	ND	5.41	0.00	2.80	0.00	0.05	0.00	8.26
B1011	1756F 29/4/97 frIII+IV	0.003	0.001	19.32	0.000	19.32	14.79	1.85	5.65	0.04	15.25	4.50	0.12	42.19	ND	3.01	0.00	2.40	0.00	0.03	0.00	5.44
Y614	1749,57F 29/4/97 frIII+IV (mean of 2	0.004	0.001	35.13	0.056	35.20	25.80	3.55	10.11	0.11	45.28	12.12	0.36	97.32	2.62	4.96	0.08	2.27	0.49	0.04	0.00	7.84
Y701	1762F 2/5/97 frIII+IV	0.003	0.001	20.74	0.125	20.87	16.91	2.69	7.32	0.04	19.53	5.44	0.18	52.12	ND	NDR(4.41)	0.00	3.06	0.00	0.00	0.01	3.07
Y702	1763F 2/5/97 frIII+IV	0.001	0.000	24.69	0.090	24.78	18.48	2.87	6.99	0.05	32.50	8.48	0.39	69.76	1.57	4.05	0.16	2.17	0.00	0.03	0.00	6.41
Y672	1764F 2/5/97 frIII+IV	0.005	0.001	24.09	0.000	24.10	26.32	4.42	11.75	0.04	42.71	12.41	0.27	97.93	ND	5.37	0.00	3.57	0.54	0.05	0.00	9.53
B1041	1765F 2/5/97 frIII+IV	0.002	0.000	17.06	0.000	17.06	19.81	2.62	8.04	0.04	18.79	5.45	0.19	54.95	NDR(1.71)	4.89	0.00	1.83	0.38	0.00	0.00	7.10
CRC 393	1766F 2/5/97 frIII+IV	0.003	0.005	90.66	0.239	90.91	93.67	14.47	36.04	0.24	120.81	33.44	0.99	299.66	10.97	28.37	0.40	7.52	0.71	0.08	0.00	37.09
CRC 367	1767F 2/5/97 frIII+IV	0.002	0.001	17.30	0.082	17.38	16.49	2.55	6.77	0.03	17.45	4.91	0.13	48.32	2.44	3.34	0.00	1.61	0.38	0.03	0.00	5.36
CRC 392	1768F 2/5/97 frIII+IV	0.002	0.001	53.16	0.000	53.17	56.30	8.87	25.18	0.12	51.66	14.21	0.30	156.63	11.48	16.43	0.17	5.87	0.69	0.08	0.01	23.24
CRC 375	1769F-rex 29/5/97 frIII+IV	0.003	0.001	28.41	0.073	28.49	21.47	3.82	9.88	0.07	30.69	8.58	0.18	74.69	2.81	6.31	0.00	2.31	0.35	0.11	0.00	9.08
CRC 381	1770-1F 2/5/97 frIII+IV (mean of 2)	0.002	0.002	44.87	0.120	45.00	32.41	4.66	13.17	0.07	46.18	12.69	0.34	109.52	4.78	15.26	0.12	5.14	0.45	0.08	0.00	21.05
CRC 157	1781F 22/5/97 frIII+IV	0.001	0.001	67.90	0.151	68.05	91.84	16.91	38.72	0.14	131.49	33.55	0.97	313.62	ND	33.77	0.00	14.30	0.00	0.00	0.00	48.07
CRC 167	1783F 22/5/97 frIII+IV	0.002	0.001	23.23	0.104	23.34	20.52	3.92	8.83	0.05	42.30	10.02	0.22	85.87	1.69	7.10	0.00	2.56	0.36	0.05	0.00	10.07
CRC 186	1784F 22/5/97 frIII+IV	0.002	0.001	43.84	0.084	43.93	40.34	6.94	16.03	0.09	72.08	19.80	0.44	155.72	3.48	20.67	0.00	7.51	0.00	0.06	0.00	28.24
CRC 338	1785F 22/5/97 frIII+IV	0.003	0.001	30.10	0.000	30.10	25.46	3.72	10.74	0.06	24.74	6.65	0.17	71.55	6.92	12.93	0.35	2.73	0.58	0.08	0.00	16.67
CRC 182	1782,6F 22/5/97 frIII+IV (mean of 2)	0.002	0.001	40.26	0.000	40.27	37.89	6.14	16.66	0.07	49.79	12.69	0.33	123.57	4.81	18.26	0.00	6.85	0.47	0.09	0.00	25.68
CRC 183	1787F 22/5/97 frIII+IV	0.003	0.001	12.70	0.000	12.70	10.82	2.38	4.77	0.03	25.26	6.86	0.16	50.27	ND	7.81	0.00	2.60	0.29	0.08	0.00	10.79
CRC 387	1788F 22/5/97 frIII+IV	0.002	0.001	34.83	0.000	34.83	24.15	3.65	10.11	0.07	26.25	6.96	0.20	71.38	6.50	6.68	0.00	2.66	0.25	0.05	0.00	9.64
CRC 389	1789F 22/5/97 frIII+IV	0.002	0.001	35.21	0.108	35.32	38.64	6.42	16.70	0.06	45.34	11.99	0.27	119.43	5.48	12.61	0.16	3.64	0.33	0.05	0.00	16.79
CRC 170	1790F 22/5/97 frIII+IV	0.001	0.000	17.19	0.059	17.25	14.25	2.74	5.80	0.03	23.83	6.02	0.15	52.82	ND	4.79	0.00	2.32	0.00	0.00	0.00	7.11
CRC 379	1807F 29/5/97 frIII+IV	0.002	0.001	37.14	0.051	37.20	28.87	5.25	12.24	0.05	42.70	11.67	0.24	101.02	4.34	7.03	0.00	3.73	0.41	0.10	0.01	11.28
CRC 111	1808F 29/5/97 frIII+IV	0.003	0.001	22.26	0.000	22.27	14.34	1.96	5.26	0.03	19.72	4.49	0.14	45.95	1.51	3.60	0.00	2.41	0.00	0.04	0.00	6.06
CRC 125	1809F 29/5/97 frIII+IV	0.003	0.001	31.45	0.100	31.56	30.01	6.23	13.95	0.07	57.82	14.92	0.31	123.31	2.81	13.78	0.00	5.43	0.00	0.05	0.00	19.26
CRC 126	1810F 29/5/97 frIII+IV	0.002	0.000	18.37	0.048	18.42	14.81	2.39	6.06	0.03	15.47	3.91	0.11	42.79	0.88	7.64	0.19	3.13	0.00	0.04	0.00	10.99
CRC 385	1811F 29/5/97 frIII+IV	0.003	0.001	28.82	0.070	28.90	30.12	5.72	13.05	0.05	47.17	12.38	0.28	108.77	4.81	5.32	0.00	2.26	0.00	0.04	0.00	7.62
CRC 158	1812F 29/5/97 frIII+IV	0.004	0.001	26.05	0.000	26.06	28.50	5.47	13.14	0.06	45.14	11.93	0.31	104.55	1.99	16.37	0.00	4.66	0.00	0.08	0.00	21.11
MMP97-20	1969F 9/1/98 frIII+IV	0.002	0.001	14.50	0.000	14.51	11.00	1.45	4.24	0.03	9.16	2.61	0.11	28.61	ND	NDR(1.72)	0.00	1.00	0.00	0.00	0.00	1.00
MMP97-21	1970F 9/1/98 frIII+IV	0.004	0.001	11.04	0.000	11.06	9.88	1.35	3.64	0.03	11.19	3.25	0.11	29.46	ND	ND	0.00	0.84	0.00	0.03	0.00	0.88
MMP97-22	1971F 9/1/98 frIII+IV	0.002	0.001	27.15	0.104	27.27	29.50	3.99	12.17	0.06	20.87	5.84	0.19	72.62	ND	NDR(7.46)	0.00	2.19	0.00	0.00	0.00	2.20
MMP97-19	1972F 9/1/98 frIII+IV	0.002	0.001	21.13	0.000	21.14	19.64	3.23	7.91	0.07	30.16	8.50	0.28	69.79	ND	ND	0.00	3.07	0.00	0.00	0.00	3.08
MMP97-30	1973F 9/1/98 frIII+IV	0.001	0.000	28.42	0.000	28.43	33.46	5.32	13.50	0.07	47.99	13.01	0.41	113.75	ND	2.54	0.00	3.11	0.00	0.04	0.01	5.69
MMP 96-26	2247F 9/9/98 frIV	0.004	0.001	33.47	0.086	33.57	28.94	4.78	12.42	0.08	37.10	11.14	0.29	94.75	NDR(2.37)	5.22	0.21	3.32	0.43	0.04	0.00	9.22
MMP 96-27	2248F 9/9/98 frIV	0.004	0.001	45.09	0.091	45.20	34.97	5.40	14.46	0.07	48.77	14.61	0.50	118.79	2.86	9.93	0.25	4.98	0.75	0.09	0.00	15.99
MMP 96-23	2249F 9/9/98 frIV	0.003	0.000	11.78	0.062	11.85	11.84	1.64	4.70	0.03	11.23	3.51	0.14	33.11	ND	2.63	0.13	1.96	0.38	0.05	0.00	5.16
MMP 96-31	2250F 9/9/98 frIV	0.003	0.001	17.50	0.059	17.58	10.93	1.37	4.01	0.03	8.89	2.66	0.11	27.99	ND	2.85	0.17	2.71	0.48	0.10	0.00	6.32

Table 10.

Field #	PCDFs											Total TEQ
	a2,3,7,8-TCDF	a1,2,3,7,8-PeCDF	a2,3,4,7,8-PeCDF	,2,3,4,7,8-HxCDF HxCDF	a1,2,3,6,7,8-HxCDF	a2,3,4,6,7,8-HxCDF	a1,2,3,7,8,9-HxCDF	a1,2,3,4,6,7,8-HpCDF	a1,2,3,4,7,8,9-HpCDF	OCDF	Total	wet wt
Y675	0.66	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.60	124.4
Y674	0.47	0.04	1.03	0.00	0.00	0.14	0.00	0.02	0.00	0.00	1.71	159.3
B986	0.32	0.00	0.19	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.63	70.6
Y673	0.75	0.00	1.52	0.10	0.00	0.00	0.00	0.00	0.00	0.00	2.36	223.6
B984	0.40	0.04	1.16	0.14	0.10	0.09	0.11	0.01	0.00	0.00	2.04	180.5
B985	1.17	0.00	1.59	0.18	0.00	0.00	0.00	0.03	0.00	0.00	2.97	118.2
B1065	0.53	0.04	0.97	0.13	0.00	0.00	0.00	0.00	0.00	0.00	1.66	196.7
Y709	0.39	0.00	0.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.20	92.5
B1059	0.67	0.00	1.66	0.14	0.10	0.00	0.00	0.02	0.00	0.00	2.58	360.3
B808	0.91	0.00	1.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.09	80.5
Y560	1.18	0.00	13.58	1.72	0.44	0.57	0.00	0.15	0.06	0.01	17.71	153.8
Y575	1.03	0.00	15.44	2.13	0.24	1.61	0.00	0.28	0.07	0.01	20.82	152.1
B858	0.81	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.75	141.8
B855	0.72	0.00	1.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.80	105.9
B859	0.55	0.00	0.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.32	109.9
Y613	0.63	0.00	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.72	151.4
Y582	0.80	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.81	72.0
B888	0.61	0.00	0.00	0.00	0.00	0.13	0.00	0.01	0.00	0.00	0.75	101.2
B861	0.84	0.00	0.85	0.00	0.00	0.00	0.00	0.02	0.00	0.00	1.71	70.0
B1007	0.63	0.00	1.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.79	75.3
Y694	0.77	0.00	0.00	0.10	0.00	0.00	0.07	0.00	0.00	0.00	0.94	97.4
B1004	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48	94.9
B1011	0.46	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.47	67.4
Y614	0.76	0.00	0.92	0.11	0.08	0.00	0.00	0.01	0.00	0.00	1.87	142.2
Y701	0.34	0.00	0.00	0.16	0.00	0.00	0.00	0.00	0.00	0.00	0.50	76.6
Y702	0.25	0.00	0.00	0.00	0.05	0.00	0.00	0.00	0.00	0.00	0.30	101.2
Y672	0.96	0.00	0.87	0.14	0.00	0.00	0.00	0.00	0.00	0.00	1.97	133.5
B1041	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	79.9
CRC 393	3.69	0.00	2.89	0.00	0.00	0.00	0.00	0.02	0.00	0.00	6.60	434.3
CRC 367	0.96	0.00	0.61	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.57	72.6
CRC 392	2.49	0.00	1.61	0.00	0.00	0.00	0.00	0.02	0.00	0.00	4.12	237.2
CRC 375	1.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.28	113.5
CRC 381	0.83	0.00	1.61	0.04	0.00	0.00	0.00	0.01	0.00	0.00	2.48	178.0
CRC 157	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.02	429.8
CRC 167	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	0.02	119.3
CRC 186	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	227.9
CRC 338	1.83	0.00	0.00	0.22	0.25	0.35	0.36	0.06	0.04	0.00	3.11	121.4
CRC 182	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.17	189.7
CRC 183	1.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.21	75.0
CRC 387	1.17	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	1.19	117.0
CRC 389	2.15	0.00	2.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.19	175.7
CRC 170	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.01	77.2
CRC 379	0.94	0.00	0.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.77	151.3
CRC 111	0.28	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.42	74.7
CRC 125	0.33	0.00	0.57	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90	175.0
CRC 126	0.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.31	72.5
CRC 385	1.31	0.00	1.12	0.08	0.05	0.00	0.00	0.00	0.00	0.00	2.55	147.8
CRC 158	0.64	0.00	1.38	0.00	0.00	0.00	0.00	0.02	0.00	0.00	2.03	153.7
MMP97-20	0.45	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.45	44.6
MMP97-21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	41.4
MMP97-22	1.12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.12	103.2
MMP97-19	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	94.4
MMP97-30	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	148.3
MMP 96-26	0.75	0.00	0.80	0.10	0.00	0.00	0.00	0.02	0.00	0.00	1.67	139.2
MMP 96-27	2.10	0.00	1.34	0.00	0.00	0.11	0.00	0.02	0.00	0.00	3.57	183.6
MMP 96-23	0.63	0.00	0.62	0.11	0.00	0.00	0.00	0.01	0.00	0.00	1.37	51.5
MMP 96-31	0.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.59	52.5

Table 11. Summary of concentrations (by wet weight) of total PCBs, PCDDs, PCDFs, and TEQs in blubber of southern Puget Sound harbor seals.

		Total PCBs ug/g		Total PCDDs ng/kg		Total PCDFs ng/kg		Total TEQ ng/kg	
Type/Year	**n**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**
Biopsied live weaned pups									
1993	11	9.9	4.1	1043	1014	43.6	63.2	116	33
1996	17	14.3	10.1	120	65	10.3	5.1	131	75
All biopsies	28	12.6	8.4	483	771	23.4	42.0	125	61
Dead neonate pups									
1984	10	17.6	10.4	112	45	6.6	4.5	156	107
1990	10	14.2	6.1	114	42	23.5	14.1	175	101
1996	4	11.2	8.9	119	34	19.3	11.0	105	66
1997	5	9.4	6.4	59	33	9.7	4.8	66	37
All neonates	29	14.1	8.4	105	44	15.2	12.3	140	96
All samples	57	13.4	8.4	290	569	19.4	31.2	133	81

Table 12. Summary of concentrations (by wet weight) of principal DDT compounds in blubber of southern Puget Sound harbor seals.

		p,p'-DDE ng/kg		p,p'-DDT ng/kg		p,p'-DDD ng/kg		o,p'-DDT ng/kg		Total DDTs ug/g		p,p'-DDT/DDE	
Type/Year	**n**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**
Biopsied live weaned pups													
1993	11	1335683	1574774	92891	73552	20990	12935	1017	614	1.45	1.65	8.3%	3.5%
1996	12	1980243	1702447	280534	206321	23870	8393	1685	793	2.29	1.90	14.7%	4.5%
All biopsies	23	1671975	1638529	190792	181462	22493	10651	1381	779	1.89	1.80	11.6%	5.2%
Dead neonate pups													
1984	10	2247862	1449922	172251	137299	168056	270300	2544	1640	2.59	1.66	10.2%	8.7%
1990	10	1885088	806853	189011	110866	39120	16094	1502	927	2.12	0.93	9.8%	1.7%
1996	4	1236683	1089750	68635	59149	23041	14046	1361	615	1.33	1.16	6.1%	1.2%
1997	5	1162628	784087	89743	49399	32051	19671	1015	440	1.29	0.82	10.3%	7.4%
All neonates	29	1796185	1136720	149513	114227	80144	166985	1772	1257	2.03	1.30	9.5%	5.9%
All samples	52	1741246	1368000	167771	147636	54645	127255	1593	1072	1.97	1.53	10.4%	5.6%

Table 13. Summary of concentrations (ng/kg, by wet weight) of pesticide groups in blubber of southern Puget Sound harbor seals.

		Tri, Te., Pe. chlorobenzen		Hexa chlorobenzene		Total HCH		Dieldrin		Mirex		Tot chlordane & nonachlor		Heptachlor epoxide	
Type/Year	**n**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**
Biopsied live weaned pups															
1993	11	12,281	3,536	7,958	3,363	56,999	13,579	14,081	5,018	7,676	4,657	408,999	309,178	26,515	13,306
1996	17	6,578	4,749	5,314	1,804	38,251	28,779	13,821	5,467	12,485	12,232	352,306	359,570	37,001	18,077
All biopsies	28	8,818	5,103	6,579	2,931	45,617	25,417	13,946	5,139	10,185	9,523	374,578	335,881	31,986	16,509
Dead neonate pups															
1984	10	13,349	8,028	7,563	2,120	69,718	37,766	18,146	15,433	11,516	8,557	1,241,979	1,434,923	56,300	57,952
1990	10	10,631	2,415	6,679	1,630	62,389	19,164	14,416	4,921	9,054	3,726	589,996	236,513	34,971	12,743
1996	4	9,593	603	5,241	885	42,177	27,099	16,406	7,480	5,427	3,520	367,424	290,751	29,949	24,569
1997	5	68,188	96,307	4,394	1,937	38,722	26,216	13,993	8,425	6,077	3,852	364,561	343,678	31,059	29,667
All neonates	29	21,349	42,697	6,392	2,083	58,048	30,189	15,904	10,186	8,889	6,086	745,250	921,269	40,959	38,129
All samples	57	15,193	31,048	6,474	2,469	51,941	28,399	15,038	8,326	9,462	7,738	563,166	716,738	36,990	30,594

Table 14. Summary of TEQs (ng/kg wet weight) by group for PCBs, PCDDs, and PCDFs in blubber of southern Puget Sound harbor seals.

		TEQ Copl. PCBs		TEQ mono-ortho PCBs		TEQ PCDDs		TEQ PCDFs		Total TEQ	
Type/Year	**n**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**	**mean**	**s.d**
Biopsied live weaned pups											
1993	11	30.6	7.3	72.7	22.0	8.4	3.1	4.7	7.3	116.4	33.2
1996	17	29.0	12.5	92.8	59.7	9.3	3.7	1.4	0.8	132.5	75.0
All biopsies	28	29.6	10.6	84.9	48.9	9.0	3.5	2.7	4.8	126.2	61.7
Dead neonate pups											
1984	10	30.4	16.5	109.8	81.6	18.7	12.9	0.5	0.7	159.5	110.2
1990	10	40.1	20.3	116.1	71.5	15.8	9.5	2.9	1.7	174.9	101.6
1996	4	27.1	15.2	68.7	45.1	9.2	4.9	1.8	1.3	106.7	65.7
1997	5	20.5	7.7	62.8	35.4	2.6	2.0	0.5	0.4	86.4	44.6
All neonates	29	31.6	17.5	98.2	68.5	13.6	11.0	1.5	1.6	144.9	95.8
All samples	57	30.6	14.4	91.7	59.5	11.3	8.5	2.1	3.5	135.7	80.7

Table 15a. Summary of PCB and DDT concentrations (mg/kg wet weight) in Puget Sound harbor seal samples analyzed by both IOS and labs used in previous analyses (Calambokidis et al. 1984, 1991).

	PCBs			DDTs		
	IOS	**TESC**	**CLP**	**IOS**	**TESC**	**CLP**
CRC 389	15.3	23.0	21.0	2.6	2.7	2.5
CRC 392	17.0	22.0	15.0	2.6	2.6	2.4
CRC 182	21.3	21.5		2.2	3.1	
CRC 393	27.1	21.0	9.5	4.0	2.8	1.4
CRC 379	14.9	18.0	14.0	2.1	1.9	2.3
CRC 167	14.8	16.4		1.9	2.4	
CRC 111	5.2	5.3		0.6	0.7	
CRC 387	9.9		7.8	1.1		1.1
CRC 385	18.5		16.0	2.7		2.7

IOS -Analysis results from Institute of Ocean Science (results from this report)
TESC - Results of anlayses conducted at The Evergreen State College by Cascadia Research (Calambokidis et al.1984, 1991)
CLP - Analyses conducted by EPA contract lab ARI with adjusted PCB quantification (see Calambokidis et al. 1991)

Table 15b. Summary statistics for Puget Sound harbor seal samples analyzed by both IOS and labs used in previous analyses (Calambokidis et al. 1984, 1991). Results of paired t-Test: and correlations are reported.

	total PCBs					total DDTs				
	IOS	***TESC***		***IOS***	***CLP***	***IOS***	***TESC***		***IOS***	***CLP***
n for common samples		7		6			7		6	
Mean (mg/kg, wet weight)	16.5	18.2	-9.5%	17.1	13.9	2.3	2.3	-2.2%	2.5	2.1
SD	6.7	6.1		5.7	4.7	1.0	0.8		0.9	0.7
Pearson Correlation		0.77		-0.08			0.76		0.14	
t (paried t-test)		-1.00		1.03			-0.20		1.04	
P two-tail		0.36		0.35			0.85		0.35	

Table 16. Results of Analysis of Covariance for trend by year and differences between biopsied weaned pups and dead neonates (type).

Contaminant	n	Type (Biopsied vs. dead)		Year trend	
		F ratio	p	F ratio	p
Total PCBs	57	0.00	0.83	2.30	0.14
Total PCDDs	57	8.70	0.01 *	1.75	0.19
Total PCDFs	57	0.92	0.34	0.09	0.76
Total TEQ	57	0.15	0.70	3.35	0.07
Total DDTs	52	0.19	0.66	2.08	0.16
p,p'-DDT	52	1.25	0.27	0.27	0.61
Total Chlorobenzenes	52	4.33	0.04 *	4.13	0.05 *
HCB	52	3.69	0.06	10.98	0.00 *
Mirex	52	1.22	0.28	1.36	0.25
Total chlordanes	52	0.00	0.99	6.90	0.01 *
Total heptachlor	52	0.02	0.90	2.51	0.12

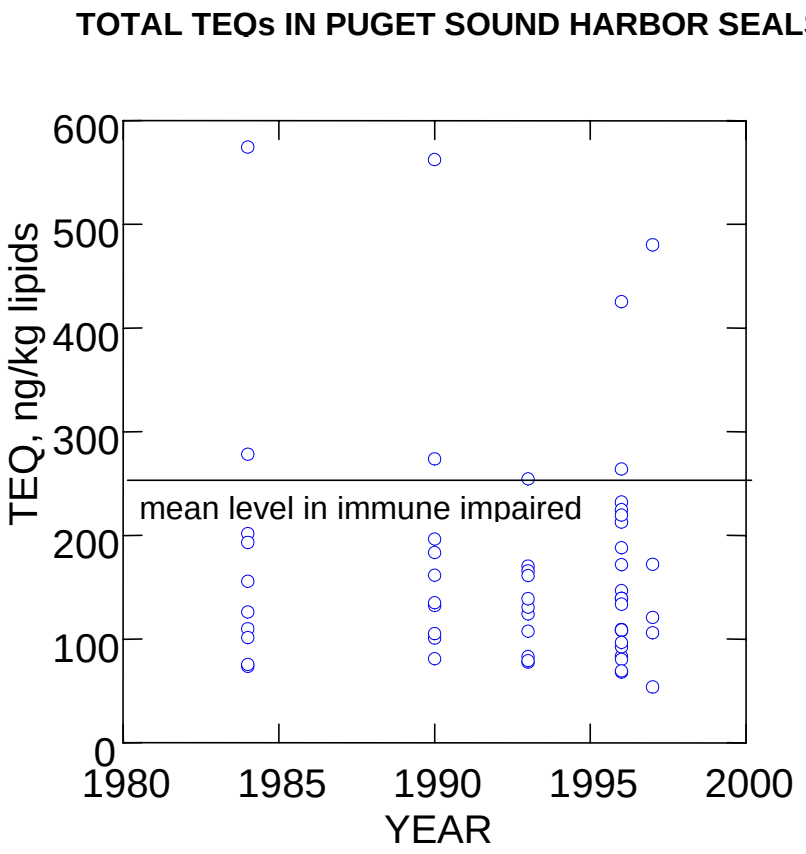

Figure 1. Plot of total TEQ in blubber of Puget Sound pups analyzed in this study for 1984 to 1997. Values were converted to lipid weight basis for comparison to mean value in captive Baltic seals showing immune dysfunction (Ross *et al.* 1995) and adjusted for new TEFs and congeners (Ross *et al.* In press). Where lipid weight was not determined the mean value was used.

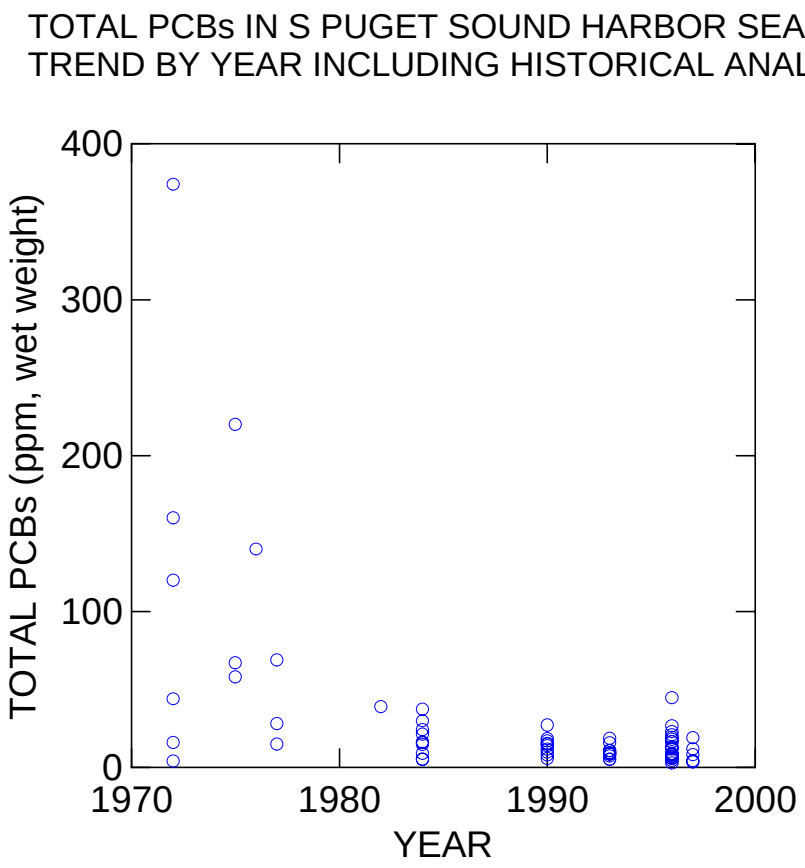

Figure 2. Plot of total PCBs in blubber of Puget Sound pups from 1972 to 1997. Includes both the samples analyzed in the current study and additional data points from past studies (Calambokidis *et al.* 1978, 984, 1991, Arndt 1973).