

MICHIGAN WILDLIFE CONTAMINANT TREND MONITORING

**2014-2017 REPORT**

# **NESTLING BALD EAGLES**

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## Abstract

The bald eagle (*Haliaeetus leucocephalus*) is a widely distributed bird of prey that has been extensively studied due to its susceptibility to the effects of environmental contaminants. As a long-lived apex predator, the species is exposed to the effects of biomagnification, and analysis of tissue samples can produce valuable information about organisms positioned lower in the food chain and water quality. In addition, bald eagles are territorial nesters; therefore, nestlings provide a representation of the contaminant levels of the surrounding environment. Legacy contaminants of concern that include organochlorine (OC) pesticides and polychlorinated biphenyls (PCBs) continue to be monitored in the Great Lakes ecosystem under the Clean Michigan Initiative of 1999. Spatial and temporal trends of OCs and PCBs in nestling bald eagles of Michigan were evaluated annually from 2014 to 2017. Statewide geometric mean concentrations of DDE did not significantly change during this timeframe, from 10 µg/kg in 2014 to 6 µg/kg in 2017. Sum PCBs also remained steady with no significant change from 17 µg/kg in 2014 to 28 µg/kg in 2017. DDE increased significantly in the Lower Peninsula subpopulation between 2014 and 2016 and in the Lake Huron Great Lake watershed between 2015 and 2017 and also between 2015 and 2017. DDE decreased significantly in the Upper Peninsula Lake Michigan watershed between 2014 and 2015, the Lake Superior Great Lake watershed between 2014 and 2017, and in the Lake Huron Great Lake watershed between 2014 and 2015. PCBs increased significantly in the Lower Peninsula subpopulation between 2014 and 2016 and between 2014 and 2017; in the Lower Peninsula Lake Michigan watershed between 2014 and 2015, between 2014 and 2016, and between 2014 and 2017; and in the Lake Huron Great Lake watershed between 2015 and 2016 and 2015 and 2017. Geometric mean concentrations of DDE also increased above the No Observable Adverse Effects Concentrations (NOAEC) of 11.4 µg/kg in the Lake Michigan subpopulation and the Lake Michigan Great Lake and Lake Erie Inland Lower Peninsula watersheds during the 2014-2017 time period. Geometric mean concentration of Sum PCBs were below the NOAEC of 36.4 µg/kg in all spatial scales during the 2014-2017 time period.

## INTRODUCTION

The bald eagle (*Haliaeetus leucocephalus*) is a large bird of prey that is indigenous to North America. This species of sea eagle inhabits areas with large bodies of water with adequate food supply and prefers super-canopy trees for nesting and roosting. Bald eagles are a top predator in aquatic food chains giving preference to fish but will also actively hunt birds, mammals, and reptiles as well as scavenge carrion and steal from other predators (Buehler 2000). During the winter, bald eagles within the Great Lakes region typically do not migrate; however, some birds may fly long distances in order to find food. Bald eagles are considered to be territorial, defending breeding areas consisting of an occupied nest tree and possibly several alternate nests. Eagles reach reproductive age once they are in full adult plumage at 4 to 6 years of age. A breeding pair will attempt to reproduce in one nest per year and clutch sizes vary from 1-3 eggs (Stalmaster 1987).

The survival of the species became a topic of concern in the 1960s after a dramatic decrease in the population due a combination of hunting pressure, and the exposure and effects of anthropogenic pollutants, dichlorodiphenyltrichloroethane (DDT) and polychlorinated biphenyls (PCBs). Eagle numbers reached their lowest in 1961 with only 52 breeding pairs recorded in the state of Michigan. Bald eagles were placed on the federal Endangered Species List as Endangered in 1976 throughout its range with the exception of Alaska. This mandated protection afforded the eagle reprieve from hunting, and once DDT and PCB were officially outlawed in 1972 and 1976, respectively, the population began to rebound. Nationwide monitoring efforts were put into place to evaluate population growth with aerial and ground surveys. As of 2017, there are 835 occupied nests in Michigan and numbers are still increasing. The total number of young produced each year has also increased from 34 in 1961 to 843 in 2017.

Currently, the bald eagle is widely distributed, and has been extensively studied due to its susceptibility to the effects of environmental contaminants such as PCB, DDT, and mercury (Hg) (Bowerman et al 2002). As a long-lived apex predator, the species is exposed to the effects of biomagnification, and analysis of tissue samples can produce valuable information about organisms positioned lower in the food chain. In addition, bald eagles are territorial nesters that seek out prey items within their breeding area; therefore, samples from nestlings provide a representation of the contaminant levels of the surrounding environment (Bowerman et al. 2002).

Blood and blood components are often sampled and analyzed to monitor the environmental exposure of contaminants in birds (Bowerman et al 1998; 2003; Olsson et al 2000; Dykstra et al 2005). The levels of OC pesticides and PCBs in nestling eagle blood is directly related to their dietary exposure from food brought by adult bald eagles hunting within the breeding area. Therefore, measures of contaminants in blood from a nestling eagle are an appropriate way to determine the level of contamination in the surrounding habitat, further validating the bald eagle as a suitable bioindicator of ecosystem quality (Bowerman et al 202). This localized representation of contamination allows for the evaluation of spatial and temporal trends throughout the study area.

Organochlorine pesticides, particularly DDT, are synthetic compounds that were applied in agricultural settings and are highly persistent in the environment. DDT biomagnifies within food chains, and breaks down into metabolites with the majority being in the toxic form of the para, para isomer of DDT, Dichlorodiphenyldichloroethane (p,p'-DDE). The p,p'-DDE metabolite is

likely responsible for eggshell thinning in birds. DDT was banned in 1972; however, there is still a potential for exposure within the environment. Other banned or restricted OCs that are included in this study methoxychlor, dieldrin, aldrin, endrin, chlordane, endosulfan, and lindane which have similar chemical properties with varying negative biological effects.

Polychlorinated biphenyls are synthetic, highly stable organic compounds that biomagnify within food chains. They were almost exclusively used as insulating or cooling agents and were primarily released into the environment via industrial discharge, leaks, improper disposal, and atmospheric deposition of incompletely incinerated waste (Eisler 2007). There are 209 possible congeners, which are numbered based on the condition of chlorination, each with varying degrees of toxicity and biological activity. PCBs were banned in 1979 but still persist. In birds, PCBs can disrupt growth, reproduction, metabolism and behavior in addition to the compounds having teratogenic, mutagenic, carcinogenic properties (Eisler 2007).

In 1999, the Michigan Department of Environmental Quality (MDEQ) implemented the Michigan Bald Eagle Biomonitoring Project under the Clean Michigan Initiative. In addition to population productivity and individual bird biometrics, this long-term monitoring effort provides information about persistent environmental contaminants including PCBs, organochlorine pesticides such as DDT, and heavy metals such as Hg. Blood and feather samples and biometrics are taken from nestling bald eagles throughout the state on an annual basis to evaluate spatial and temporal trends of relevant measures. Long-term monitoring has allowed for the determination that bald eagle productivity is increasing spatially and temporally in congruence with the decline of PCB and DDT concentrations below lowest observed adverse effect levels (LOAELS).

This report includes the analysis of 22 congeners of PCBs, DDT and its metabolites, and 18 additional OC pesticides detected in nestlings from 2014 to 2017. Due to its toxicological effects and data showing that 95% of total DDT in eagle plasma was in the form of p,p'-DDE, a summary of p,p'-DDE data are provided in this report. PCBs are reported as a sum of the analyzed congeners. The other 18 OC pesticides and associated compounds measured are not reported here because they failed to be detected in 50% of the analyzed samples.

## **METHODS**

### **Study Area**

Blood and feather samples were collected annually from nestlings in active bald eagle breeding areas throughout the state of Michigan.

### **Field Methods**

#### *Aerial Surveys*

Michigan Department of Natural Resources (MDNR) pilots and experienced nest observers were contracted to conduct annual aerial surveys. Flights were conducted first in early spring to determine which nests were occupied, and again in late spring to establish which nests were successful. Observers provided the following location information: approximate latitude and

longitude of nest tree, nest tree species, reproductive status (e.g., eggs, chicks, or adult brooding behavior). If the nest was successful, observers provided the number of young, stage of nestling development based on size and color, tree condition, and potential nest access from the ground.

### *Nestling Eagle Capture*

Field crews sampled nestlings that were approximately five to nine weeks post-hatch. Lower Peninsula nests were sampled in May, and Upper Peninsula nests were visited in June. Once at the nest, a certified climber ascended the nest tree using spur-climbing techniques, and secured the nestlings in a restraining bag. The bag was lowered to ground where it was handled by a trained sample collector.

### *Sample Collection*

Standard handling and sampling procedures were conducted under a United States Fish and Wildlife Bird Banding (USFWS) Permit, MDNR Scientific Collecting Permit, and University of Maryland Animal Care and Use Protocol. Nestlings were banded using a size nine (USFWS) bird band. Approximately 10 mL of blood was drawn via the brachial vein. Blood samples were centrifuged for 10 minutes at 2000 rpm. The plasma was removed and stored frozen until time of analysis. Nestlings were placed back into the restraining bag, raised, and released back into the nest. All samples were transferred to Clemson University for analysis via the chain-of-custody system.

### *Sample Selection*

Samples were selected for analysis by ensuring that only one sample from each breeding area (defined below in 'Spatial Analysis') was sampled, since the breeding area is considered the sampling unit for this project. It was also ensured that all breeding areas were sampled in the analysis.

## **Lab Methods**

### *Solid-Phase Extraction*

An extraction and cleanup of nestling plasma was performed using the solid-phase micro extraction procedure for organochlorine compounds as described in Sundberg et al. (2006). Briefly, nestling plasma samples (0.1-ml) were fortified with surrogate compounds, to assess consistency in the extraction and cleanup process, and an approximately 8M solid urea solution. Two 0.1-mL volumes of sterile chicken plasma were also fortified with surrogate compounds and solid urea solution, for use as control samples in every batch of eagle samples. Additionally, two 0.1-mL volumes of chicken plasma were fortified with surrogate compounds, solid urea solution, and known amounts of all analytes of interest, known as spikes, to examine recovery from the extraction and cleanup process for quality assurance purposes. The plasma samples were diluted with 0.9 mL of Nanopure water and stirred for 25 minutes. Each sample was

passed through a 30 mg Oasis HLB solid-phase micro-extraction cartridge and both sample vials and cartridges were rinsed with Nanopure water. Analytes were eluted from the cartridges using 2-1 ml volumes of dichloromethane (DCM). The sample elutions were concentrated under a gentle stream of nitrogen gas until dry. Finally, internal standard compound was added to monitor Gas Chromatograph (GC) performance, and a final volume of 0.1 mL was achieved using hexane.

### *OC and PCB Analysis*

Individual analytes were quantified using an Agilent 7890 GC with an Electron Capture Device (ECD). GC settings were consistent with the quantitation methods described in EPA method 8081 and 8082. The GC was configured with a split injection with dual columns and ECD detectors to confirm the detection of each analyte. Individual analyte calibration curves were used for individual analyte quantification. Two blanks and a calibration solution were also analyzed with every set of extracted eagle samples to monitor for calibration performance and possible GC contaminations. Method detection limits (MDLs) and quantification limits were calculated for each analyte. For quality control purposes, reported values were first detected on both GC columns, and detections of an analyte was above the detection and quantification limits. Only analytes that were detected in a minimum of 50% of all nestling plasma samples are reported. Geometric means were calculated for spatial and temporal analyses (see sections below for definitions). Values that fell below the MDL were set at half the detection limit for that compound (Leith et al., 2010), which ranged from 0.54 to 1.95 ng/mL, depending on the compound. For simplicity and thoroughness, the MDL was set at 2ng/mL (Wierda et al., 2016). DDT is reported as p,p'-DDE and the PCBs are reported as Sum PCBs. The sum concentration of PCBs is a subset of 22 non-coplanar congeners of PCBs which act as a surrogate for coplanar PCB since they are often difficult to detect and quantify (Bergen et al. 1996).

Quality assurance protocols required spike recoveries for each batch of extracted eagle samples to average between 70 to 130% of the nominal amount of analytes. If the spikes of a batch did not meet these criteria, they proceeded through the extraction and cleanup method again.

### **Temporal Analysis**

Temporal analyses were conducted on an annual basis for 2014, 2015, 2016, and 2017 at Statewide, Category, Subpopulation, and Great Lakes Watershed spatial scales (Roe 2001; Bowerman et al 1995). Spatial scales are defined below. This temporal analysis is different from previous analyses performed in this study since the entire state of Michigan is sampled every year, using 60 instead of 90 samples annually (Leith et al., 2010). This allows for a more fine-tuned analysis of PCB and DDE trends with a decreased sampling effort.

### **Spatial Analysis**

Organochlorine pesticide and PCB concentrations in nestling bald eagle plasma were compared at three spatial scales: Category; Subpopulation; and Great Lakes Watershed (Roe 2001).

Breeding area, which included all nests within a breeding pair of bald eagles' defended territory, was the sampling unit used for all analyses. The breeding areas were then grouped at each spatial scale for comparison.

The Category spatial scale was defined by whether the breeding area was considered to be inland (IN) or along the Great Lakes (GL) shoreline. The GL variable was defined as those breeding areas that were within 8.0 km of the Great Lakes shoreline and/or along tributaries open to anadromous Great Lakes fish. The IN variable included all breeding areas that were located beyond 8 km of the Great Lakes shorelines and not along anadromous tributaries.

The Subpopulation spatial scale subdivided the Category spatial scale into breeding areas that were located within four GL and two IN groups. The GL subpopulations were those within 8 km of Lake Superior (LS), Lake Michigan (LM), Lake Huron (LH), and Lake Erie (LE). The IN subpopulations consisted of those breeding areas beyond 8 km and located in either the Upper Peninsula (INUP) and Lower Peninsula (INLP).

At the Great Lakes Watershed spatial scale, breeding areas were sorted into ten groups which assigned a peninsula affiliation based on Great Lakes Basin drainages. This scale included four GL and six IN groupings. The GL groups included breeding areas within Lake Superior Great Lakes (LSGL), Lake Michigan Great Lakes (LMGL), Lake Huron Great Lakes (LHGL), and Lake Erie Great Lakes (LEGL) drainages. The IN groups were Lake Huron Inland Lower Peninsula (LHINLP), Lake Huron Inland Upper Peninsula (LHINUP), Lake Michigan Inland Lower Peninsula (LMINLP), Lake Michigan Inland Upper Peninsula (LMINUP), Lake Superior Inland (LSIN), and Lake Erie Inland (LEIN).

## **Statistical Methods**

As is often the case in contaminants research, distributions of contaminant concentrations were right-skewed and bound by zero on the left (Leith et al 2010). A generalized linear model (GLM) was used with the response modeled as a Gamma distribution to account for the distribution of the data. The model formula consisted of the contaminant concentration of interest as the response variable on the left side of the formula, and an intercept term and predictor variable of interest on the right. Difference of least squares means was then used to test for differences between different levels of the predictor variable of interest (package = lsmeans). All analyses were performed using the R statistical language (R 2014). Statistical significance was determined at  $\alpha < 0.05$ .

## **RESULTS**

From 2014-2017, 284 nestling bald eagle plasma samples from 74 breeding areas were analyzed for OCs and PCBs (Appendix 1). Concentrations of 4,4'-DDE were detected in 215 out of 284 samples (75.7%) and total PCBs were detected in 271 out of 284 samples (95.4%). Concentrations of 4,4'-DDE ranged from non-detectable limits (ND) to 244  $\mu\text{g}/\text{kg}$  and total PCBs ranged from ND to 248  $\mu\text{g}/\text{kg}$ . Appendix 1 highlights the values for the two compounds for each

individual that are above the no observable adverse effect concentration (NOAEC) for productivity. The productivity NOAEC for total PCBs is 36.4 µg/kg (shaded in yellow), and the productivity NOAEC for 4,4'-DDE is 11.4 µg/kg (shaded in red). These values have previously been reported by Bowerman et al. (2003).

### **Temporal Trends**

For the entire State of Michigan, concentrations of DDE have not changed from 2014 to 2017 (Table 1). Concentrations of PCBs increased from 2014 to 2017 (Table 2). Statewide averages have remained below the productivity NOAECs for both compounds.

DDE concentrations have not changed from 2014 to 2017 in nestlings in the Great Lakes and Inland spatial categories and have experienced a mild decrease but not significantly (Table 3). PCB concentrations in the Great Lakes spatial category have not changed from 2014-2017 however have experienced an insignificant increase from 2014 to 2017 (Table 4). PCB concentrations rose above the productivity NOAEC in 2016 however dropped again in 2017.

Only statistically significant changes in concentrations of DDE and PCBs between time periods at the Subpopulation and Great Lakes Watershed spatial scales are reported. At the Subpopulation spatial scale, DDE increased significantly between 2014 and 2016. At the Watershed spatial scale, DDE decreased on the Upper Peninsula Lake Michigan watershed between 2014 and 2015, on the Lake Superior Great Lake watershed between 2014 and 2017, and on the Lake Huron Great Lake watershed between 2014 and 2015; however it increased on the Lake Huron Great Lake watershed between 2015 and 2016 as well as between 2015 and 2017 (Table 5).

PCB concentrations changed in the Lower Peninsula in the Subpopulation spatial scale, with a decrease between 2014 and 2015, and an increase between 2014 to 2016 and between 2014 and 2016. At the Watershed spatial scale, PCB concentrations increased in the Lower Peninsula Lake Michigan watershed between 2014 and 2015, 2014 and 2016, and 2014 and 2017 (Table 6).

### **Spatial Trends**

During the entire time period, 2014-2017, concentrations of DDE were not significantly different between the GL and IN categories, and PCBs were higher in GL breeding areas compared to IN nestlings (Tables 7 and 8). Geometric means of DDE concentrations were 6 and 3 µg/kg for GL and IN respectively. PCB geometric means were 26 and 10 µg/kg for PCBs for GL and IN sites, respectively.

At the Subpopulation spatial scale, concentrations of DDE did not significantly differ between sites. Geometric means of DDE ranged from 2-12 µg/kg at the Subpopulation spatial scale. The Lake Michigan subpopulation rose above the productivity NOAEC (Table 7). For PCB concentrations, Lake Erie, Lake Huron, and Lake Michigan sites were significantly higher than



both inland sites (INLP and INUP) as well as Lake Superior (LS) (Tables 7 and 8). PCB geometric means ranged from 8 to 33 µg/kg, which fall below the productivity NOAEC. At the Great Lakes Watershed spatial scale, DDE concentrations in the LEILP watershed were significantly higher than all other watersheds except the LMSUP site, which had too few samples for statistical significance to be meaningful. LMGL were higher than sites located at LHGL, LHINLP, LMINLP, LMINUP, and LSINUP (Table 7). Geometric means of DDE ranged from 5 to 23 µg/kg. Both the LEILP and LMGL sites were above the productivity NOAEC. PCB concentrations in all GL sites were higher than those in LHINLP, LMINLP, LMINUP, and LSINUP at the Great Lakes Watershed spatial scale. Geometric means of PCBs ranged from 2 to 69 µg/kg (Table 8). PCB concentrations at all sites remained below the productivity NOAEC.

## **2014**

### *Category*

Concentrations of DDE did not differ significantly between GL and IN sites, and ranged from 2-30 and 2-244 µg/kg, respectively. Geometric means were 10 µg/kg for GL and 6 µg/kg for IN (Table 9), which remain below the productivity NOAEC. PCB concentrations were greater in GL versus IN sites and ranged from <MDL-89 for GL and <MDL-77 µg/kg for IN. Geometric means were 17 and 3 µg/kg, respectively (Table 10).

### *Subpopulation*

Concentrations of DDE did not differ between sites (Table 9). Geometric means for DDE ranged from 6-15 µg/kg, those in LM rising above the productivity NOAEC. PCB concentrations did not differ between sites (Table 10). Geometric means for PCBs ranged from 2 to 25 µg/kg, which all remain below the productivity NOAEC.

### *Great Lakes Watershed*

At the Great Lakes Watershed spatial scale, concentrations of DDE were effectively not significantly different (Table 9). The LEILP site tested statistically different from the LHGL, LMGL, LSGL, LHILP, and LMILP sites, however this is not a meaningful comparison because the LEILP site had only one sample. Geometric means ranged from 4 to 15 µg/kg, those in LMGL rising above the productivity NOAEC. Concentrations of PCBs at the Watershed spatial scale were not significantly different, and ranged from 4 to 25 µg/kg, remaining below the productivity NOAEC.

## **2015**

### *Category*

Concentrations of DDE did not differ significantly between GL and IN sites, and ranged from <MDL to 80 and <MDL to 244 µg/kg, respectively (Table 11). Geometric means were 4 for GL and 4 µg/kg for IN, remaining below the productivity NOAEC. PCB concentrations were greater

in GL versus IN sites, and ranged from 3 to 197 for GL and <MDL to 79 µg/kg for IN. Geometric means were 22 and 5 µg/kg, respectively (Table 12). All geometric means remained below productivity NOAECs.

### *Subpopulation*

DDE concentrations did not vary significantly at the Subpopulation spatial scale. Geometric means ranged from 2 to 11 µg/kg, the highest of which was from the LMGL site (Table 11). PCB concentration did not vary significantly at the Subpopulation spatial scale. PCB geometric means ranged from 9 to 43 µg/kg, the highest of which was from the LMGL site (Table 12), and was the only geometric mean that rose above the productivity NOAEC.

### *Great Lakes Watershed*

Concentrations of DDE and PCBs did not vary at the Great Lakes Watershed spatial scale (Tables 11 and 12). DDE concentrations tested as being different between the LEILP and the LHGL sites, however this is not a meaningful comparison because the LEILP site has only one sample. Geometric means for DDE ranged from <MDL to 11 µg/kg, and geometric means for PCBs ranged from 8 to 43 µg/kg. Again, the highest levels for both compounds were found at the LMGL site, for which the PCB geometric mean was the only geometric mean to rise above the productivity NOAEC.

## **2016**

### *Category*

Concentrations of DDE were significantly different between GL and IN sites, and ranged from <MDL to 47 and <MDL to 15, respectively. Geometric means were 8 for GL and 2 µg/kg for IN (Table 13). PCB concentrations were greater in GL versus IN sites, and ranged from 5 to 230 and 4 to 155 µg/kg, respectively. Geometric means were 37 for GL and 15 µg/kg for IN (Table 14). The PCB geometric mean for the GL category rose above the productivity NOAEC.

### *Subpopulation*

DDE concentrations at the Subpopulation spatial scale were not significantly different from each other. (Table 13). Geometric means ranged from 2 to 14, the highest of which was found at the LMGL site, however the sample with the highest DDE concentration, 47 µg/kg, was found at LHGL. PCB concentrations did not differ significantly from each other (Table 14). Geometric means for PCBs in the Subpopulation spatial scale ranged from 6 to 47, the highest of which was found at the LHGL site. LHGL and LMGL, with a geometric mean of 35, were the only two sites for which PCB geometric means rose above the productivity NOAEC.

### *Great Lakes Watershed*

At the Great Lakes Watershed spatial scale, DDE concentrations and PCB concentrations did not differ statistically between sites (Tables 13 and 14). DDE geometric means ranged from <MDL to 14 µg/kg, and PCB geometric means ranged from 6 to 47 µg/kg. The highest PCB concentration was found at LHGL, which was the only geometric mean to rise above the productivity NOAEC.

### **2017**

#### *Category*

DDE concentrations differed significantly between the GL and IN sites at the Category spatial scale (Tables 15 and 16). The GL geometric mean was 6 µg/kg while the IN geometric mean was 3 µg/kg. PCB concentrations did not differ significantly between GL and IN sites. Geometric means for PCBs were 28 and 20 µg/kg for GL and IN respectively, which were below the productivity NOAEC.

#### *Subpopulation*

DDE concentrations were not significantly different between sites at the Subpopulation spatial scale (Table 15). Geometric means ranged between <MDL and 10 µg/kg, which fall below the productivity NOAEC. PCB concentrations were statistically lower at the LSGL site than at the other Great Lake sites as well as the LP site. The UP and LP sites were statistically lower than the LEGL and LHGL sites. The highest PCB concentration of 249 µg/kg was found at the LP. The LEGL and LHGL geometric means were above the productivity NOAEC.

### *Great Lakes Watershed*

The geometric mean of DDE concentrations range from <MDL to 10 µg/kg (Table 15). The highest value, 10 µg/kg, was found at the LHGL and LMGL sites, which are statistically higher than the LSGL and LHILP sites. The highest concentration reported was 39 µg/kg at the LHGL. All geometric means for PCBs are well below the productivity NOAEC. PCB concentration geometric means range from 6 to 77 µg/kg (Table 16). The LEGL and LHGL sites are statistically higher than the other two Great Lakes sites, as well as the LHILP site, but remain statistically similar to the other inland sites. PCB concentration geometric means rise above the productivity NOAEC at the LEGL, LHGL, and LMILP sites.

## **DISCUSSION**

The observable fluctuations in concentrations of contaminants over the four years may be due to changes in the environment which alter the bioavailability of the compounds. These factors include bioremediation, water level fluctuations, and temperature (Pittman 2014; Fuentes 2013).

In the 1970s new environmental regulations almost eliminated direct sources of PCBs and OCs (Anthony et al 2007). However, in recent decades long-range transport and atmospheric deposition have emerged as new sources of contaminants along with relic sources and persistent contaminations (Anthony et al 2007). The combination of new emerging global sources of contaminants and relic regional sources make the continued monitoring of these contaminants in the environment essential to ensure the health of aquatic ecosystems.

This report outlines the observable fluctuations in DDE and PCB concentrations through temporal analysis between 2014 and 2017, and through spatial analysis across the state of Michigan. While previous reports have shown that GL sites are often more contaminated than IN sites, this report continues to demonstrate that phenomenon with a few specific exceptions. Specifically, DDE concentrations in 2014 and 2015 were not statistically different between GL and IN sites, perhaps indicating that DDE concentrations at the GL sites are decreasing.

Furthermore, levels of DDE and PCBs have generally been observed in this report as being below the previously reported productivity NOAEC. The watersheds LEGL, LHGL, and LMGL in particular often have higher levels than other watersheds.

Temporally, there is not a clear pattern of increase or decrease for either compound, however the combination of decrease at some sites with increase observed at other sites (Tables 5 and 6) suggests long-range transport, atmospheric deposition, relic sources, temperature, bioremediation, and water level fluctuations as possible explanations (Pittman 2014; Fuentes 2013; Anthony et al., 2007).

It is important to note that the sampling regime/analysis changed from 5-year collections/analysis ending in 2013 to annual collections/analysis in 2014, allowing for the entire state to be sampled in one year. This means that smaller changes can be monitored and that state-wide monitoring can happen on an annual basis rather than on a 5-year cycle.

Observed increases in concentrations of DDE and Sum PCBs at a small number territories is likely a direct result of either the increased input of contaminants into the environment or the increased bioavailability of relic contaminants. Since contaminants increased in localized areas across most watersheds, global use of contaminants and long-range transport could be a possible explanation. Many countries in Asia and Africa still have minimal regulations on the use of OCs and PCBs, resulting in higher levels and continued deposition of these compounds (Hoff et al 1992; Anthony et al 2007; Odabasi et al 2008; Kim et al 2009) and these countries could be a source for atmospheric concentrations (Jaward et al 2004; Pozo et al 2006, 2009; Lee et al 2007). In addition, significant increases in DDE in the Great Lakes watersheds could be a result of the distribution and concentration of contamination from relic sources in these watersheds. In either event, any increase is cause for concern and increases in a majority of watersheds throughout Michigan poses potential hazards to ecosystem health. These concerns have also be echoed at other trophic levels in the Great Lakes aquatic ecosystems as increases in contaminant concentration have been observed in fish over similar study periods (Monson 2009; Bhavsar et al 2010).

## Recommendations

Overall, remediation has positively affected the Great Lakes region. However, with the current rise in contaminant concentrations at a number of territories within most watersheds, and the emerging threats of a changing climate, land-use practices, and human population, management strategies should be planned cautiously to incorporate these dynamic conditions—particularly along Michigan’s Great Lakes coast lines and related watersheds. Possible mechanisms causing increased DDE and Sum PCBs in these areas and across the state are localized relic sources of contaminations and new emerging inputs from atmospheric sources at both the regional and global scales. Also, the effects of changing climate on environmental factors that have been found to influence contaminant concentrations like lake pH, water level fluctuations, precipitation, and temperature will be important to take into account along with ecosystem health monitoring data similar to those presented in this report. All of these factors contribute to the environmental concentrations of these contaminants and are all potentially influenced directly by human actions and climate change.

Based on the results stated in this report, we recommend:

- Continue monitoring bald eagle productivity and the collection of nestling plasma samples statewide, with priority given to nestlings in areas known to have elevated contamination, to determine if the observed increases are related to cyclic variations in environmental conditions or due to new input sources in the environment.
- Another year of data will allow for a fourth five-year period to be added to the data set spanning from 1999 to 2013 and therefore overall changes across 20 years can be reported.
- Examine these data and future data and compare to other sources of contaminant monitoring data such as passive air sampling, other avian indicators, and lower trophic level indicators of contaminant concentration.
- Evaluate these data and future data in relation to land use change, anthropogenic disturbance, and climate patterns.

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Table 1: Sample sizes, medians, ranges, and geometric means ( $\mu\text{g}/\text{kg}$ ) of DDE in plasma samples of nestling bald eagles for the state of Michigan from 2014-2017, year by year. Significant differences are indicated by different letters.

<b>Whole State</b>	<b>N</b>	<b>Median</b>	<b>Range</b>	<b>Geo. Mean</b>	<b>Sig. Diff.</b>
<b>2014</b>	59	7	<MDL-244	8	A
<b>2015</b>	70	3	<MDL-81	3	A
<b>2016</b>	68	5	<MDL-47	5	A
<b>2017</b>	87	5	<MDL-39	4	A

Table 2: Sample sizes, medians, ranges, and geometric means ( $\mu\text{g}/\text{kg}$ ) of  $\Sigma\text{PCBs}$  in plasma samples of nestling bald eagles for the state of Michigan from 2014-2017, year by year. Significant differences are indicated by different letters.

<b>Whole State</b>	<b>N</b>	<b>Median</b>	<b>Range</b>	<b>Geo. Mean</b>	<b>Sig. Diff.</b>
<b>2014</b>	59	6	<MDL-89	7	A
<b>2015</b>	70	12	4-198	16	AB
<b>2016</b>	68	27	5-229	25	B
<b>2017</b>	87	28	3-249	24	B

Table 3. Sample sizes, medians, ranges, and geometric means ( $\mu\text{g}/\text{kg}$ ) of DDE in plasma samples of nestling bald eagles for the Category designation. Significant differences are indicated by different letters.

Category	Year	N	Median	Range	Geo. Mean	Sig. Diff.
	2014	30	10	2-30	10	
	2015	45	4	<MDL-80	4	A
	2017	51	7	<MDL-39	6	A
<b>Inland</b>	2014	29	5	<MDL-244	6	A
			3	<MDL-55	2	A
	2016	29	3	<MDL-29	3	A
		36	2	<MDL-24	3	A

Table 4: Sample sizes, medians, ranges, and geometric means ( $\mu\text{g}/\text{kg}$ ) of  $\Sigma\text{PCBs}$  in plasma samples of nestling bald eagles for the Category designation. Significant difference are indicated by different letters.

Category	Year	N	Median	Range	Geo. Mean	Sig. Diff.
<b>Great Lakes</b>	2014	30	24	<MDL-89	17	A
	2015	45	27	3-197	22	A
	2016	40	48	5-229	37	A
	2017	51	40	2-149	28	A
<b>Inland</b>	2014	29	2	<MDL-77	3	A
	2015	26	6	4-79	9	AB
	2016	29	14	4-156	15	B
	2017	36	21	3-249	20	B

Table 5: Significant differences in nestling plasma concentrations of DDE between all years at the Subpopulation and Great Lakes Watershed spatial scales. Increases are indicated by a + and decreases are indicated by a -. Only p-values below 0.05 are reported.

Comparison	DDE	
	Trend	p-value
<b>Subpopulation</b>		
Lower Peninsula		
2014:2016	+	0.0337
<b>Great Lakes Watershed</b>		
Upper Peninsula Lake Michigan		
2014:2015	-	0.0402
Lake Superior Great Lake		
2014:2017	-	0.0082
Lake Huron Great Lake		
2014:2015	-	0.0067
2015:2016	+	0.0134
2015:2017	+	0.0036

Table 6: Significant differences in nestling plasma concentrations of  $\Sigma$ PCBs between all years at the Subpopulation and Great Lakes watershed spatial scales. Increases are indicated by a + and decreases are indicated by a -. Only p-values below 0.05 are reported.

Comparison	Sum PCBs	
	Trend	p-value
<b>Subpopulation</b>		
Lower Peninsula		
2014:2015	-	0.0492
2014:2016	+	0.0051
2014:2017	+	0.0012
<b>Great Lakes Watershed</b>		
Lower Peninsula Lake Michigan		
2014:2015	+	0.0227
2014:2016	+	0.0141
2014:2017	+	0.0095
Lake Superior Great Lake		
2015:2017	-	0.0425
Lake Huron Great Lake		
2015:2016	+	0.0284
2015:2017	+	0.0280

Table 7. Sample sizes, medians, ranges and geometric means ( $\mu\text{g}/\text{kg}$ ) of DDE in plasma samples of nestling bald eagles collected within Michigan, 2014-2017. Comparisons were made at 3 geographic scales; Category, Subpopulation, and Great Lakes Watersheds.

Comparison	4,4'-DDE				
	N	Median	Range	Geo. Mean	Sig. Diff.
<b>Category</b>					
Great Lakes	165	7	<MDL-230	6	A
Inland	119	3	<MDL-244	3	A
<b>Subpopulation</b>					
Lake Erie	25	4	<MDL-27	4	A
Lake Huron	64	8	<MDL-64	7	A
Lake Michigan	51	12	<MDL-81	12	A
Lake Superior	25	2	<MDL-26	2	A
Lower Peninsula	139	3	ND-244	3	A
Upper Peninsula	34	2	ND-28	2	A
<b>Great Lakes Watershed</b>					
Lake Erie Great Lake	25	4	<MDL-27	4	AB
Lake Huron Great Lake	64	8	<MDL-47	7	A C
Lake Michigan Great Lake	51	12	<MDL-81	12	C
Lake Superior Great Lake	25	2	<MDL-26	2	AB
Lake Erie Inland Lower Peninsula	3	55	9-244	49	D
Lake Huron Inland Lower Peninsula	40	2	ND-21	2	B
Lake Michigan Inland Lower Peninsula	42	4	<MDL-24	4	AB
Lake Huron Inland Upper Peninsula	--	--	--	--	--
Lake Michigan Inland Upper Peninsula	19	3	ND-28	3	ABC
Lakes Michigan/Superior Upper Peninsula	2	2	<MDL-2	1	ABCD
Lake Superior Inland Upper Peninsula	13	3	ND-6	2	ABC

Great Lakes breeding areas are within 8.0 km of a Great Lake or along rivers open to Great Lakes fish runs; Inland breeding areas are greater than 8.0 km from a Great Lake and not along anadromous fish runs. For each analysis, significant differences are indicated by different letters.

Table 8: Sample sizes, medians, ranges and geometric means ( $\mu\text{g}/\text{kg}$ ) of  $\Sigma\text{PCBs}$  in plasma samples of nestling bald eagles collected within Michigan, 2014-2017. Comparisons were made at 3 geographic scales; Category, Subpopulation, and Great Lakes Watersheds.

Comparison	Sum PCBs				
	N	Median	Range	Geo. Mean	Sig. Diff.
<b>Category</b>					
Great Lakes	165	34	ND-81	26	A
Inland	119	9	ND-249	10	B
<b>Subpopulation</b>					
Lake Erie	25	42	5-149	33	A
Lake Huron	64	40	<MDL-230	31	A
Lake Michigan	51	42	5-197	33	A
Lake Superior	25	7	<MDL-56	8	B
Lower Peninsula	139	11	<MDL-249	10	B
Upper Peninsula	34	6	2-77	8	B
<b>Great Lakes Watershed</b>					
Lake Erie Great Lake	25	42	5-149	33	A
Lake Huron Great Lake	64	40	<MDL-230	30	A
Lake Michigan Great Lake	51	42	5-197	33	A
Lake Superior Great Lake	25	7	<MDL-56	8	B
Lake Erie Inland Lower Peninsula	3	4	2-11	5	AB
Lake Huron Inland Lower Peninsula	40	15	<MDL-60	9	B
Lake Michigan Inland Lower Peninsula	42	11	<MDL-249	12	AB
Lake Huron Inland Upper Peninsula	--	--	--	--	--
Lake Michigan Inland Upper Peninsula	19	7	2-77	11	AB
Lakes Michigan/Superior Upper Peninsula	2	18	12-24	17	AB
Lake Superior Inland Upper Peninsula	13	5	2-14	5	AB

Great Lakes breeding areas are within 8.0 km of a Great Lake or along rivers open to Great Lakes fish runs; inland breeding areas are greater than 8.0 km from a Great Lake and not along anadromous fish runs. For each analysis, significant differences are indicated by different letters.

Table 9: Sample sizes and medians, ranges and geometric means ( $\mu\text{g/kg}$ ) of DDE in plasma samples of nestling bald eagles collected within Michigan in 2014. Comparisons were made at 3 geographic scales; Category, Subpopulation, and Great Lakes Watersheds.

Comparison	4,4'-DDE				
	N	Median	Range	Geo. Mean	Sig. Diff.
<b>Category</b>					
Great Lakes	30	10	2-30	10	A
Inland	29	5	2-244	6	A
<b>Subpopulation</b>					
Lake Erie	1	--	--	--	--
Lake Huron	15	10	6-30	11	A
Lake Michigan	8	15	8-28	15	A
Lake Superior	6	6	2-26	6	A
Lower Peninsula	21	5	2-244	6	A
Upper Peninsula	8	5	3-28	6	A
<b>Great Lakes Watershed</b>					
Lake Erie Great Lake	1	--	--	--	AB
Lake Huron Great Lake	15	10	7-30	11	B
Lake Michigan Great Lake	8	15	8-28	15	B
Lake Superior Great Lake	6	6	2-26	6	B
Lake Erie Inland Lower Peninsula	1	--	--	--	A
Lake Huron Inland Lower Peninsula	11	5	2-21	5	B
Lake Michigan Inland Lower Peninsula	9	4	3-21	5	B
Lake Huron Inland Upper Peninsula	--	--	--	--	--
Lake Michigan Inland Upper Peninsula	3	8	6-28	11	AB
Lakes Michigan/Superior Inland Upper Peninsula	--	--	--	--	--
Lake Superior Inland Upper Peninsula	5	3	3-6	4	AB

Great Lakes breeding areas are within 8.0 km of a Great Lake or along rivers open to Great Lakes fish runs; inland breeding areas are greater than 8.0 km from a Great Lake and not along anadromous fish runs. For each analysis, significant differences are indicated by different letters.

Table 10: Sample sizes and medians, ranges and geometric means ( $\mu\text{g/kg}$ ) of  $\Sigma\text{PCBs}$  in plasma samples of nestling bald eagles collected within Michigan in 2014. Comparisons were made at 3 geographic scales; Category, Subpopulation, and Great Lakes Watersheds.

Comparison	Sum PCBs				
	N	Median	Range	Geo. Mean	Sig. Diff.
<b>Category</b>					
Great Lakes	30	24	<MDL-89	17	A
Inland	29	2	<MDL-77	3	B
<b>Subpopulation</b>					
Lake Erie	1	--	--	--	A
Lake Huron	15	36	<MDL-70	24	A
Lake Michigan	8	24	9-89	25	A
Lake Superior	6	4	<MDL-55	4	A
Lower Peninsula	21	2	<MDL-27	2	A
Upper Peninsula	8	3	2-77	5	A
<b>Great Lakes Watershed</b>					
Lake Erie Great Lake	1	--	--	--	A
Lake Huron Great Lake	15	36	<MDL-70	24	A
Lake Michigan Great Lake	8	24	9-89	25	A
Lake Superior Great Lake	6	4	<MDL-55	4	A
Lake Erie Inland Lower Peninsula	1	--	--	--	--
Lake Huron Inland Lower Peninsula	11	1	<MDL-27	3	A
Lake Michigan Inland Lower Peninsula	9	2	<MDL-55	2	A
Lake Huron Inland Upper Peninsula	--	--	--	--	--
Lake Michigan Inland Upper Peninsula	3	7	3-77	12	A
Lakes Michigan/Superior Upper Peninsula	--	---	--	--	--
Lake Superior Inland Upper Peninsula	5	3	2-6	3	A

Great Lakes breeding areas are within 8.0 km of a Great Lake or along rivers open to Great Lakes fish runs; inland breeding areas are greater than 8.0 km from a Great Lake and not along anadromous fish runs. For each analysis, significant differences are indicated by different letters.

Table 11: Sample sizes and medians, ranges and geometric means ( $\mu\text{g/kg}$ ) of DDE in plasma samples of nestling bald eagles collected within Michigan in 2015. Comparisons were made at 3 geographic scales; Category, Subpopulation, and Great Lakes Watersheds.

Comparison	4,4'-DDE				
	N	Median	Range	Geo. Mean	Sig. Diff.
<b>Category</b>					
Great Lakes	44	4	<MDL-80	4	A
Inland	61	4	<MDL-244	4	A
<b>Subpopulation</b>					
Lake Erie	8	1	<MDL-7	2	A
Lake Huron	16	2	<MDL-16	2	A
Lake Michigan	14	10	3-80	11	A
Lake Superior	6	3	1-10	3	A
Lower Peninsula	16	3	1-55	3	A
Upper Peninsula	13	1	1-9	6	A
<b>Great Lakes Watershed</b>					
Lake Erie Great Lake	8	1	<MDL-7	2	AB
Lake Huron Great Lake	16	2	<MDL-16	2	B
Lake Michigan Great Lake	14	10	4-81	11	AB
Lake Superior Great Lake	6	3	<MDL-10	3	AB
Lake Erie Inland Lower Peninsula	1	--	--	--	A
Lake Huron Inland Lower Peninsula	6	1	<MDL-3	1	AB
Lake Michigan Inland Lower Peninsula	9	3	<MDL-9	3	AB
Lake Huron Inland Upper Peninsula	--	--	--	--	--
Lake Michigan Inland Upper Peninsula	9	1	<MDL-9	2	AB
Lakes Michigan/Superior Inland Upper Peninsula	--	--	--	--	--
Lake Superior Inland Upper Peninsula	1	--	--	--	AB

Great Lakes breeding areas are within 8.0 km of a Great Lake or along rivers open to Great Lakes fish runs; inland breeding areas are greater than 8.0 km from a Great Lake and not along anadromous fish runs. For each analysis, significant differences are indicated by different letters.



Table 12: Sample sizes and medians, ranges and geometric means ( $\mu\text{g/kg}$ ) of  $\Sigma\text{PCBs}$  in plasma samples of nestling bald eagles collected within Michigan in 2015. Comparisons were made at 3 geographic scales; Category, Subpopulation, and Great Lakes Watersheds.

Comparison	Sum PCBs				
	N	Median	Range	Geo. Mean	Sig. Diff.
<b>Category</b>					
Great Lakes	44	27	3-197	22	A
Inland	61	5	<MDL-79	5	B
<b>Subpopulation</b>					
Lake Erie	8	19	5-91	16	A
Lake Huron	16	10	4-69	14	A
Lake Michigan	14	42	13-197	43	A
Lake Superior	6	24	6-56	21	A
Lower Peninsula	16	6	4-79	9	A
Upper Peninsula	13	6	4-61	10	A
<b>Great Lakes Watershed</b>					
Lake Erie Great Lake	8	19	5-91	16	A
Lake Huron Great Lake	16	10	4-69	14	A
Lake Michigan Great Lake	14	42	13-198	43	A
Lake Superior Great Lake	6	24	6-56	21	A
Lake Erie Inland Lower Peninsula	1	--	--	--	A
Lake Huron Inland Lower Peninsula	6	6	5-33	8	A
Lake Michigan Inland Lower Peninsula	9	7	6-79	10	A
Lake Huron Inland Upper Peninsula	--	--	--	--	--
Lake Michigan Inland Upper Peninsula	9	6	4-61	10	A
Lakes Michigan/Superior Inland Upper Peninsula	--	--	--	--	--
Lake Superior Inland Upper Peninsula	1	--	---	--	A

Great Lakes breeding areas are within 8.0 km of a Great Lake or along rivers open to Great Lakes fish runs; inland breeding areas are greater than 8.0 km from a Great Lake and not along anadromous fish runs. For each analysis, significant differences are indicated by different letters.

Table 13: Sample sizes and medians, ranges and geometric means ( $\mu\text{g/kg}$ ) of DDE in plasma samples of nestling bald eagles collected within Michigan in 2016. Comparisons were made at 3 geographic scales; Category, Subpopulation, and Great Lakes Watersheds.

Comparison	4,4'-DDE				
	N	Median	Range	Geo. Mean	Sig. Diff.
<b>Category</b>					
Great Lakes	40	7	<MDL-47	8	A
Inland	28	3	<MDL-15	2	B
<b>Subpopulation</b>					
Lake Erie	9	5	<MDL-11	4	AB
Lake Huron	16	7	2-47	8	AB
Lake Michigan	13	21	2-33	14	AB
Lake Superior	2	4	3-6	4	AB
Lower Peninsula	23	3	1-16	3	B
Upper Peninsula	2	2	1-4	2	AB
<b>Great Lakes Watershed</b>					
Lake Erie Great Lake	9	5	<MDL-12	4	AB
Lake Huron Great Lake	16	7	2-47	8	AB
Lake Michigan Great Lake	13	21	2-33	14	AB
Lake Superior Great Lake	2	4	3-6	4	AB
Lake Erie Inland Lower Peninsula	1	--	--	--	AB
Lake Huron Inland Lower Peninsula	11	1	<MDL-6	2	B
Lake Michigan Inland Lower Peninsula	11	5	<MDL-16	4	AB
Lake Huron Inland Upper Peninsula	--	--	--	--	--
Lake Michigan Inland Upper Peninsula	3	1	<MDL-3	1	AB
Lakes Michigan/Superior Inland Upper Peninsula	--	--	--	--	--
Lake Superior Inland Upper Peninsula	2	2	<MDL-4	2	AB

Great Lakes breeding areas are within 8.0 km of a Great Lake or along rivers open to Great Lakes fish runs; inland breeding areas are greater than 8.0 km from a Great Lake and not along anadromous fish runs. For each analysis, significant differences are indicated by different letters.

Table 14: Sample sizes and medians, ranges and geometric means ( $\mu\text{g/kg}$ ) of  $\Sigma\text{PCBs}$  in plasma samples of nestling bald eagles collected within Michigan in 2016. Comparisons were made at 3 geographic scales; Category, Subpopulation, and Great Lakes Watersheds.

<b>Comparison</b>	<b>Sum PCBs</b>				
	<b>N</b>	<b>Median</b>	<b>Range</b>	<b>Geo. Mean</b>	<b>Sig. Diff.</b>
<b>Category</b>					
Great Lakes	40	48	5-230	37	A
Inland	28	14	4-155	15	B
<b>Subpopulation</b>					
Lake Erie	9	52	6-94	34	A
Lake Huron	16	48	5-230	47	A
Lake Michigan	13	51	7-96	35	A
Lake Superior	2	13	8-18	13	A
Lower Peninsula	23	14	5-156	16	A
Upper Peninsula	2	6	6-7	6	A
<b>Great Lakes Watershed</b>					
Lake Erie Great Lake	9	52	6-94	34	A
Lake Huron Great Lake	16	48	5-230	47	A
Lake Michigan Great Lake	13	51	7-96	35	A
Lake Superior Great Lake	2	13	9-18	13	A
Lake Erie Inland Lower Peninsula	1	--	--	--	A
Lake Huron Inland Lower Peninsula	11	17	5-60	15	A
Lake Michigan Inland Lower Peninsula	11	14	5-156	16	A
Lake Huron Inland Upper Peninsula	--	--	--	--	--
Lake Michigan Inland Upper Peninsula	3	22	6-25	15	A
Lakes Michigan/Superior Inland Upper Peninsula	--	--	--	--	--
Lake Superior Inland Upper Peninsula	2	6	6-7	6	A

Great Lakes breeding areas are within 8.0 km of a Great Lake or along rivers open to Great Lakes fish runs; inland breeding areas are greater than 8.0 km from a Great Lake and not along anadromous fish runs. For each analysis, significant differences are indicated by different letters.

Table 15: Sample sizes and medians, ranges and geometric means ( $\mu\text{g/kg}$ ) of DDE in plasma samples of nestling bald eagles collected within Michigan in 2017. Comparisons were made at 3 geographic scales; Category, Subpopulation, and Great Lakes Watersheds.

Comparison	4,4'-DDE				
	N	Median	Range	Geo. Mean	Sig. Diff.
<b>Category</b>					
Great Lakes	51	7	<MDL-39	6	A
Inland	36	2	ND-24	3	B
<b>Subcategory</b>					
Lake Erie	7	5	2-27	6	A
Lake Huron	17	11	<MDL-39	10	A
Lake Michigan	16	12	1-32	10	A
Lake Superior	11	1	1-3	1	A
Lower Peninsula	25	3	1-24	3	A
Upper Peninsula	11	1	ND-19	2	A
<b>Great Lake Watershed</b>					
Lake Erie Great Lake	7	5	3-27	7	AB
Lake Huron Great Lake	17	11	<MDL-39	10	A
Lake Michigan Great Lake	16	12	<MDL-32	10	A
Lake Superior Great Lake	11	1	<MDL-4	1	C
Lake Erie Inland Lower Peninsula	--	--	--	--	--
Lake Huron Inland Lower Peninsula	12	1	ND-6	2	BC
Lake Michigan Inland Lower Peninsula	13	4	<MDL-24	5	AB
Lake Huron Inland Upper Peninsula	--	--	--	--	--
Lake Michigan Inland Upper Peninsula	4	2	ND-19	3	ABC
Lake Michigan/Superior Upper Peninsula	2	2	<MDL-24	1	ABC
Lake Superior Inland Upper Peninsula	5	1	ND-3	1	ABC

Great Lakes breeding areas are within 8.0 km of a Great Lake or along rivers open to Great Lakes fish runs; inland breeding areas are greater than 8.0 km from a Great Lake and not along anadromous fish runs. For each analysis, significant differences are indicated by different letters.

Table 16: Sample sizes and medians, ranges and geometric means ( $\mu\text{g}/\text{kg}$ ) of  $\Sigma\text{PCBs}$  in plasma samples of nestling bald eagles collected within Michigan in 2017. Comparisons were made at 3 geographic scales; Category, Subpopulation, and Great Lakes Watersheds.

Comparison	Sum PCBs				
	N	Median	Range	Geo. Mean	Sig. Diff.
<b>Category</b>					
Great Lakes	51	40	3-149	28	A
Inland	36	21	3-248	20	A
<b>Subcategory</b>					
Lake Erie	7	62	42-149	77	A
Lake Huron	17	70	2-140	50	A
Lake Michigan	16	33	5-67	29	AB
Lake Superior	11	4	4-11	6	C
Lower Peninsula	25	26	4-249	27	AB
Upper Peninsula	11	11	3-46	9	BC
<b>Great Lake Watershed</b>					
Lake Erie Great Lake	7	62	42-149	77	A
Lake Huron Great Lake	17	70	3-140	50	A
Lake Michigan Great Lake	16	33	5-67	29	AB
Lake Superior Great Lake	11	4	4-11	6	C
Lake Erie Inland Lower Peninsula	--	--	--	--	--
Lake Huron Inland Lower Peninsula	12	21	4-45	20	B
Lake Michigan Inland Lower Peninsula	13	47	4-249	37	AB
Lake Huron Inland Upper Peninsula	--	--	--	--	--
Lake Michigan Inland Upper Peninsula	4	11	3-46	11	ABC
Lake Michigan/Superior Upper Peninsula	2	18	12-24	17	ABC
Lake Superior Inland Upper Peninsula	5	5	3-14	6	ABC

Great Lakes breeding areas are within 8.0 km of a Great Lake or along rivers open to Great Lakes fish runs; inland breeding areas are greater than 8.0 km from a Great Lake and not along anadromous fish runs. For each analysis, significant differences are indicated by different letters.

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-1999-A-001	MU-02	c	Muskegon SGA	22.4590	15.9490
BAEA-MI-1999-A-007	MN-08	d	Pine/Timmerman L	2.9760	7.5650
BAEA-MI-1999-A-008	NE-01	i	Anderson Bayou	7.5390	16.2470
BAEA-MI-1999-A-009	MN-05	d	Manistee R SGA	35.1880	23.0050
BAEA-MI-1999-A-013	AP-08	d	Devil's L	29.5440	11.1870
BAEA-MI-1999-A-018	MC-18	d	Millecoquins L	66.1710	43.6480
BAEA-MI-1999-A-020	HO-02	e	Rabbit Bay N	102.5130	41.4060
BAEA-MI-1999-A-021	BG-10	d	Huron Bay	12.3750	5.8030
BAEA-MI-1999-A-022	BG-11	a	Reed's Pt	25.0780	8.0990
BAEA-MI-1999-A-025	MQ-22	a	Harvey	12.9140	8.2300
BAEA-MI-1999-A-029	AG-20	a	Hovey L	34.7030	17.2090
BAEA-MI-1999-A-036	MC-19	c	Marquette Isd	24.5270	12.4610
BAEA-MI-1999-A-038	CP-29	b	Caribou L	12.0010	8.3750
BAEA-MI-1999-B-005	DI-06	d	Badwater L S	26.1740	10.2810
BAEA-MI-1999-B-009	DE-23	a	Escanaba R-Gladstone	178.2300	77.4250
BAEA-MI-1999-B-013	SC-15	c	Mud L Ck	1.0000	1.0000
BAEA-MI-1999-B-019	IR-22	c	Camp 6 Ck-Michigamme R	1.0000	2.7680
BAEA-MI-1999-B-024	MQ-25	a	Ford R-Margarets Rapids	54.3890	25.8140
BAEA-MI-1999-B-028	ON-01	i	Bergland Bay N	1.0000	3.1740
BAEA-MI-1999-B-032	ON-09	g	Victoria	13.5020	8.4990
BAEA-MI-1999-B-034	HO-06	c	Sturgeon R	5.8680	3.4260
BAEA-MI-1999-B-036	HO-16	b	N Portage Canal	40.0510	17.2330
BAEA-MI-1999-B-049	MQ-07	e	Squaw/Chief L	1.0000	2.1840
BAEA-MI-1999-B-062	GO-22	e	Pomeroy L	1.0000	1.0000
BAEA-MI-1999-B-069	SC-19	a	Deer Count Ck	221.5940	96.1930
BAEA-MI-1999-B-071	DE-09	f	Moss L	42.8800	29.7290
BAEA-MI-1999-B-072	ON-20	a	Carp R-Landlooker Ck	3.0920	5.4930
BAEA-MI-1999-B-073	GO-12	j	Presque Isle Park	67.1830	26.8290
BAEA-MI-1999-C-002	OG-01	e	Rifle R Rec Area	10.2800	1.0000
BAEA-MI-1999-C-004	MK-02	c	Moddersville-New Cranberry L	2.1210	4.6830
BAEA-MI-1999-C-005	OG-04	b	No Mans/Augustina L	5.8370	8.8420
BAEA-MI-1999-C-006	RO-01	j	L St Helen E	5.6480	5.1780
BAEA-MI-1999-C-008	IO-02		Cooke Dam	1.0000	5.3940

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-1999-C-011	OT-07	a	O'Rourke L	1.0000	7.1510
BAEA-MI-1999-C-016	MY-05	c	Black R Ranch	1.0000	3.2950
BAEA-MI-1999-C-017	ET-05	a	Walloon L	82.5370	34.8500
BAEA-MI-1999-C-019	ET-05	a	Walloon L	205.4390	96.1900
BAEA-MI-1999-C-022	SC-20	b	D1 Pool (Seney NWR)	1.0000	2.9730
BAEA-MI-1999-C-023	CP-22	g	Duck Bay-Sugar Isd	5.9120	4.8390
BAEA-MI-1999-D-001	AR-03	d	Santiago	25.3650	8.0280
BAEA-MI-1999-D-002	GL-01	b	Molasses R Fldg	1.0000	2.4580
BAEA-MI-1999-D-007	MD-01	a	Sanford L	2.3310	8.1830
BAEA-MI-1999-D-008	RO-11	b	W Twin/Woods L	1.0000	1.0000
BAEA-MI-1999-D-013	PI-03	b	False Presque Isle	80.7610	29.6180
BAEA-MI-1999-D-015	MC-07	c	E L	1.0000	2.2160
BAEA-MI-1999-E-001	SG-02	c	Shiawassee NWR #1	32.2760	8.0250
BAEA-MI-1999-E-002	BY-01	c	Skull/Stoney Isd	85.9580	14.8070
BAEA-MI-1999-E-004	AN-02	b	Swan Ck-Highbanks	60.0480	11.9200
BAEA-MI-1999-E-005	MO-03	d	Raisin R-Monroe	213.0470	8.1220
BAEA-MI-1999-E-006	AR-04	b	Big Charity Isd	31.2220	9.4660
BAEA-MI-1999-G-001	AG-09	e	Grand Isd-Trout Bay	20.7370	9.3330
BAEA-MI-2000-A-001	GO-36	b	W Bay L NE	1.0000	1.0000
BAEA-MI-2000-A-002	DI-06	d	Badwater L S	5.7690	1.9800
BAEA-MI-2000-A-005	DE-16	b	No-see-um Ck-N L	152.1030	60.6670
BAEA-MI-2000-A-007	MM-16	a	Nacomis Ck	65.9580	21.0100
BAEA-MI-2000-A-009	MQ-25	a	Ford R-Margarets Rapids	121.1300	50.5040
BAEA-MI-2000-A-011	HO-06	c	Sturgeon R	1.3480	1.0120
BAEA-MI-2000-A-012	BG-10	d	Huron Bay	10.4540	4.7410
BAEA-MI-2000-A-015	ON-03	g	Interior	1.0000	1.0000
BAEA-MI-2000-A-020	GO-39	a	Copper Peak	24.5640	14.1310
BAEA-MI-2000-A-028	MM-12	b	The Oxbow	42.4520	4.1250
BAEA-MI-2000-A-030	MQ-24	a	Escanaba R-Lindsey Ck	39.1670	23.3020
BAEA-MI-2000-A-032	DE-07	d	Squaw Ck	231.3190	145.4370
BAEA-MI-2000-A-037	CP-25	a	Potagonissing Fldg-First L	20.4050	8.7960
BAEA-MI-2000-A-038	CP-26	c	Gravel Isd/L	104.2910	40.8560
BAEA-MI-2000-A-042	MQ-02	g	Conway L-Salmon Trout R	36.5800	13.2610

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2000-A-043	MQ-10	d	L Independence E-Yellowdog Swp	29.0750	12.5540
BAEA-MI-2000-A-044	MQ-04	c	Partridge Isd	178.9440	256.5090
BAEA-MI-2000-A-051	DE-21	c	Kregg Bay	104.5380	52.9930
BAEA-MI-2000-A-053	LU-12	a	Long L	16.6640	10.0310
BAEA-MI-2000-B-001	MU-02	c	Muskegon SGA	25.8990	23.9510
BAEA-MI-2000-B-003	MN-05	d	Manistee R SGA	28.9820	21.7100
BAEA-MI-2000-B-004	LA-02	a	Syers L	123.1000	95.6290
BAEA-MI-2000-B-005	MS-03	c	Hamlin L	6.4490	8.7330
BAEA-MI-2000-B-007	MN-02	b	Carlson's/Horseshoe Bend	67.7240	39.5120
BAEA-MI-2000-B-012	WX-01	c	Hodenpyle Dam Pd W	8.3150	5.7730
BAEA-MI-2000-C-005	OG-02	f	Stylus L E (N)	13.0110	3.6710
BAEA-MI-2000-C-008	RO-04	b	Backus L	7.4150	7.1750
BAEA-MI-2000-C-023	MY-06	b	Woodmere/W Twin L	5.0020	6.0210
BAEA-MI-2000-C-026	PI-03	b	False Presque Isle	30.7650	20.5600
BAEA-MI-2000-C-027	PI-09	a	L Augusta	20.1490	15.2990
BAEA-MI-2000-C-030	ET-06	a	L Paradise	23.1370	8.0580
BAEA-MI-2000-C-031	ET-05	a	Walloon L	15.2780	12.2490
BAEA-MI-2000-C-033	PI-05	c	Black Mallard L	21.2100	15.8530
BAEA-MI-2000-D-003	MO-04	d	Erie Shooting Club S	69.1350	10.2190
BAEA-MI-2000-D-007	OT-01	a	Caulkins Ck	2.3430	3.8590
BAEA-MI-2000-D-008	OT-03	l	N Br AuSable R	2.7320	1.7950
BAEA-MI-2000-D-009	IO-04	b	Allen L	37.9270	25.3070
BAEA-MI-2000-D-013	AP-04	b	Ossineke-S Pt N	17.1780	9.5240
BAEA-MI-2000-D-016	IO-01	g	Loud Dam Pd E	20.8160	3.3740
BAEA-MI-2000-D-020	BZ-04	b	Upper Herring L	41.6670	27.9910
BAEA-MI-2000-E-001	CB-13	a	Tower S-Onaway	81.9900	80.7640
BAEA-MI-2000-E-005	MY-04	e	Grass L	1.0000	3.0220
BAEA-MI-2000-E-007	AG-20	a	Hovey L	7.2600	7.4050
BAEA-MI-2000-E-008	CP-19	b	Harbor Isd NE	21.3290	9.8490
BAEA-MI-2000-E-010	MQ-15	f	L Superior-Saux Head L	14.0870	6.0330
BAEA-MI-2000-E-012	AG-11	f	Laughing Fish Pt	8.6200	41.7160
BAEA-MI-2000-E-013	AG-08	e	AuTrain L	5.1250	5.6080
BAEA-MI-2000-E-014	AG-02	d	Fish/Baldy L	1.0000	2.1240



Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2000-E-016	AG-09	e	Trout Bay (Grand Isd)	23.3830	12.3010
BAEA-MI-2000-E-018	MC-22	a	Brulee Pt W	37.0020	16.4610
BAEA-MI-2000-E-020	MC-21	c	Big St Martin Isd	25.1210	9.9070
BAEA-MI-2001-A-006	GO-08	b	Bass L	1.0000	3.8740
BAEA-MI-2001-A-019	IR-07	f	Paint L	1.0000	1.0000
BAEA-MI-2001-A-025	GO-35	c	Whitefish L	2.7030	5.4260
BAEA-MI-2001-A-035	HO-03	e	Prickett Dam N	6.7070	5.5130
BAEA-MI-2001-A-036	HO-11	c	Prickett L S	1.0000	1.1610
BAEA-MI-2001-A-044	MQ-09	f	Deer L	9.8880	1.9500
BAEA-MI-2001-A-047	HO-16	b	N Portage Canal	5.5460	5.1040
BAEA-MI-2001-A-048	HO-07	b	Silver Ck-Princess Pt Rd	2.0930	2.6950
BAEA-MI-2001-A-049	BG-11	a	Reed's Pt	24.0530	7.9850
BAEA-MI-2001-A-060	DI-09	c	Gene Pd	4.3130	5.3780
BAEA-MI-2001-A-061	DE-16	b	No-see-um Ck-N L	252.0910	91.5930
BAEA-MI-2001-A-065	MQ-04	d	Partridge Isd	197.1320	109.3860
BAEA-MI-2001-A-069	MQ-15	g	L Superior-Saux Head L	3.1250	3.2480
BAEA-MI-2001-A-076	IR-19	c	Cook's Run-Golden L	1.0000	7.2640
BAEA-MI-2001-A-082	DE-21	c	Kregg Bay	303.6840	99.5120
BAEA-MI-2001-A-083	DE-17	d	Fishdam R Mouth	76.2920	37.6470
BAEA-MI-2001-A-090	IR-28	c	Smoky L	1.0000	2.2500
BAEA-MI-2001-A-097	GO-24	d	Marsh/Deer Isd L	1.0000	3.1920
BAEA-MI-2001-A-107	IR-25	a	Shank L	1.0000	1.0000
BAEA-MI-2001-A-110	AG-17	a	Grand Sable L	51.6380	26.6410
BAEA-MI-2001-A-111	AG-16	c	Beaver Basin	8.0430	11.3230
BAEA-MI-2001-B-001	MU-02	c	Muskegon SGA	24.6590	35.5230
BAEA-MI-2001-B-004	NE-01	i	Anderson Bayou	21.5500	31.5520
BAEA-MI-2001-B-005	MN-02	b	Carlson's/Horseshoe Bend	63.0780	44.2200
BAEA-MI-2001-B-006	MN-05	d	Manistee R SGA	60.2230	33.5000
BAEA-MI-2001-B-010	WX-02	a	L Mitchell	2.6330	10.0520
BAEA-MI-2001-C-004	CL-01	f	Cranberry L	1.0000	6.7110
BAEA-MI-2001-C-005	OL-01	b	Evert	1.0000	2.8450
BAEA-MI-2001-C-008	AL-02	j	Alcona-Bamfield Pd	1.0000	1.9910
BAEA-MI-2001-C-010	MK-01	i	Missaukee L	20.2320	11.6540

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2001-C-014	OS-03	e	McKinley	1.0000	1.1480
BAEA-MI-2001-C-025	PI-01	a	L Ella	7.8000	10.7900
BAEA-MI-2001-C-027	PI-09	a	L Augusta	76.5480	35.5570
BAEA-MI-2001-C-028	CB-01	c	Upper Black R	14.6860	11.0060
BAEA-MI-2001-C-031	AG-11	f	Laughing Fish Pt	43.3280	47.9560
BAEA-MI-2001-C-034	CP-02	e	Sugar Isd S	22.6080	13.4540
BAEA-MI-2001-C-037	CP-10	d	Burnt Isd	42.0020	26.6560
BAEA-MI-2001-D-001	MO-03	a	Raisin R-Monroe	152.7750	9.4390
BAEA-MI-2001-D-005	IO-04	b	Allen L	28.3440	15.5840
BAEA-MI-2001-D-006	AL-05	b	Sprinkler L	1.2060	4.2800
BAEA-MI-2001-D-007	AP-08	d	Devil's L	36.6540	13.9670
BAEA-MI-2001-D-009	IO-05	e	Monument W-Five Channels	12.5330	3.1180
BAEA-MI-2001-D-010	AR-03	d	Santiago	27.8830	7.3540
BAEA-MI-2001-D-012	BY-02	c	Quanicassee	62.2010	10.8430
BAEA-MI-2001-D-015	TU-01	c	Dinsmoore	74.5070	48.0490
BAEA-MI-2001-D-017	AR-04	b	Big Charity Isd	76.9480	19.9970
BAEA-MI-2001-D-018	ET-05	a	Walloon L	44.9630	25.0770
BAEA-MI-2001-D-021	MC-23	b	Duel L-Grants Pt	150.8010	59.5750
BAEA-MI-2001-D-024	AG-08	e	AuTrain L	20.3080	10.5480
BAEA-MI-2001-F-001	SG-02	c	Shiawassee NWR #1	139.4860	38.0710
BAEA-MI-2001-F-006	MO-02	i	Pte Mouille SGA-Laguna Beach N	149.4390	19.2490
BAEA-MI-2002-A-009	DI-06	d	Badwater L S	38.4900	7.4050
BAEA-MI-2002-A-011	DI-16	a	Sturgeon Falls Dam N	57.2860	5.4370
BAEA-MI-2002-A-013	DI-10	a	Sturgeon Falls Dam-Millers	25.7500	2.0590
BAEA-MI-2002-A-014	DI-02	i	Vulcan	46.4410	4.7520
BAEA-MI-2002-A-029	IR-38	a	Mud/Anderson L	1.0000	7.5070
BAEA-MI-2002-A-039	IR-17	f	Michigamme Res S	1.0000	1.7840
BAEA-MI-2002-A-040	IR-22	c	Camp 6 Ck-Michigamme R	1.0000	4.6190
BAEA-MI-2002-A-046	IR-20	b	Iron L	7.2710	9.4140
BAEA-MI-2002-A-063	DI-15	a	Blomgren Marsh	1.3610	1.0000
BAEA-MI-2002-A-076	BG-11	a	Reed's Pt	21.6280	10.2630
BAEA-MI-2002-A-081	IR-40	c	Net R-Widewaters	1.0000	1.0000
BAEA-MI-2002-A-117	HO-02	f	Rabbit Bay N	79.2910	69.9890

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2002-B-008	AR-04	c	Big Charity Isd	182.9450	46.4870
BAEA-MI-2002-B-010	AR-05	a	Pt AuGres S	63.1110	21.1620
BAEA-MI-2002-C-001	OS-08	a	Mio Pd E	4.0350	7.3650
BAEA-MI-2002-C-004	GL-01	c	Molasses R Fldg	26.1980	10.1120
BAEA-MI-2002-C-011	IO-05	d?	Monument W-Five Channels	4.4420	2.0780
BAEA-MI-2002-C-012	IO-04	b	Allen L	67.1130	34.0100
BAEA-MI-2002-C-015	OG-03	c	Hardwood L	18.7130	5.7030
BAEA-MI-2002-C-016	RO-09	g	Marl L	32.2750	18.7760
BAEA-MI-2002-C-018	RO-03	i	Deadstream Fldg S	7.9980	3.6320
BAEA-MI-2002-C-019	RO-13	b	Prudenville	1.0000	4.1970
BAEA-MI-2002-D-002	NE-01	j	Anderson Bayou	63.1780	47.9640
BAEA-MI-2002-D-004	IO-01	g?	Loud Dam Pd E	2.7850	1.3830
BAEA-MI-2002-D-007	OC-01	b	Pentwater	10.0770	8.8930
BAEA-MI-2002-D-008	PI-03	b	False Presque Isle	25.5150	15.1320
BAEA-MI-2002-D-009	PI-10	b	Hoeft SP	39.8230	25.1200
BAEA-MI-2002-D-011	CR-06	a	Mason Tract	1.0000	1.7580
BAEA-MI-2002-D-019	MY-06	b	Woodmere/W Twin L	2.4770	3.9050
BAEA-MI-2002-D-022	MC-23	b	Duel L-Grants Pt	73.5070	46.0720
BAEA-MI-2002-D-023	AG-19	b	Echo L N (Grand Isd)	88.0640	25.7400
BAEA-MI-2002-D-025	DE-09	f	Moss L	97.3900	52.2830
BAEA-MI-2002-D-026	DE-26	a	St Martin Isd	217.2660	81.4100
BAEA-MI-2002-D-027	DE-08	c	Little Summer Isd	217.4800	138.0370
BAEA-MI-2002-D-028	MC-21	c	Big St Martin Isd	79.8410	45.7660
BAEA-MI-2002-D-029	CP-33	a	Sand Isd-Dunbar	55.5690	25.5660
BAEA-MI-2002-D-030	CP-22	i	Duck Bay-Sugar Isd	19.9160	7.9730
BAEA-MI-2002-D-031	CP-10	d	Burnt Isd	68.8890	35.9650
BAEA-MI-2003-A-001	GO-36	_	W Bay L NE	5.9180	5.2650
BAEA-MI-2003-A-004	MM-23	a	Vetorts Pt	112.4650	40.9620
BAEA-MI-2003-A-005	DE-23	b	Escanaba R-Gladstone	10.4480	31.3280
BAEA-MI-2003-A-008	GO-26	c	Mill L	1.0000	1.0000
BAEA-MI-2003-A-012	GO-22	_	Pomeroy L	1.0000	1.6270
BAEA-MI-2003-A-015	IR-33	a	Buck/Armstrong L	1.0000	1.3220
BAEA-MI-2003-A-023	GO-18	_	Montgomery Ck	1.0000	2.6670

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2003-A-027	MQ-04	_	Partridge Isd	261.4820	130.0720
BAEA-MI-2003-A-032	DE-25	a	Hunters Brook	23.0920	50.0570
BAEA-MI-2003-A-033	MM-07	a	Hermansville Pd	78.7510	68.6410
BAEA-MI-2003-A-037	ON-20	a	Carp R-Landlooker Ck	15.8799	6.8000
BAEA-MI-2003-A-039	GO-37	a	Big Bateau L	15.9120	19.8300
BAEA-MI-2003-A-040	GO-08	b	Bass L	1.0000	5.7900
BAEA-MI-2003-A-046	BG-04	_	Von Zellens Camp	51.4980	20.0270
BAEA-MI-2003-A-050	HO-10	_	Bootjack-Dreamland	21.1743	10.5800
BAEA-MI-2003-A-053	GO-15	_	Beatons L	1.0000	9.4800
BAEA-MI-2003-A-056	KW-03	_	Betsy/Burnette Park	33.9621	16.0240
BAEA-MI-2003-A-057	AG-16	c	Beaver Basin	15.3422	8.2240
BAEA-MI-2003-A-059	AG-17	a	Grand Sable L	4.1970	5.5260
BAEA-MI-2003-B-002	MS-05	a	Walhalla E	40.7125	37.9221
BAEA-MI-2003-B-005	MS-06	a	Walhalla W	39.8214	6.0636
BAEA-MI-2003-B-006	ML-01	a	Stanton	2.4108	18.6618
BAEA-MI-2003-B-007	SG-05	a	Bridgeport	16.5295	5.7240
BAEA-MI-2003-B-009	BY-03	d	Nayanquing Pt	7.1367	1.7270
BAEA-MI-2003-B-013	RO-12	e	L St Helen W	1.0000	2.5780
BAEA-MI-2003-C-001	NE-01	j	Anderson Bayou	32.4938	27.4593
BAEA-MI-2003-C-002	AR-03	d	Santiago	52.9536	11.5760
BAEA-MI-2003-C-003	AR-05	a	Pt AuGres S	103.2488	21.2514
BAEA-MI-2003-C-004	AL-08	c	Black R-Negwegon S	71.3994	38.0551
BAEA-MI-2003-C-005	GT-02	b	Brown Bridge Pd	67.4586	40.1640
BAEA-MI-2003-C-006	ET-05	b	Walloon L	27.4708	18.8340
BAEA-MI-2003-C-009	RO-13	b	Prudenville	1.0000	2.3640
BAEA-MI-2003-C-010	OS-08	a	Mio Pd E	1.0000	2.2200
BAEA-MI-2003-C-011	OS-01	g	Reed Ranch	11.5860	6.6000
BAEA-MI-2003-C-012	CR-04	b	Chub L	1.0000	1.5840
BAEA-MI-2003-C-013	LL-09	a	L Leelanau	7.5935	9.7509
BAEA-MI-2003-C-014	LL-07	c	Cat Head Bay	29.8857	20.2934
BAEA-MI-2003-C-015	AP-08	e	Devil's L	161.8004	60.7282
BAEA-MI-2003-C-016	CX-02	b	Beaver Isd-Fox L	41.2576	19.5196
BAEA-MI-2003-C-018	AG-09	e	Trout Bay (Grand Isd)	31.4166	17.1594

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2003-C-019	CX-03	a	Garden Isd Central	54.8604	23.7223
BAEA-MI-2003-C-020	MC-22	a	Brulee Pt W	70.6449	27.2739
BAEA-MI-2003-C-021	MQ-08	_	L Kawbawgam	111.7143	46.7399
BAEA-MI-2003-D-001	WX-02	a	L Mitchell	1.9400	10.7219
BAEA-MI-2003-D-003	AG-08	e	AuTrain L	1.0000	2.3490
BAEA-MI-2003-D-005	CP-02	e	Sugar Isd S	59.8799	20.6933
BAEA-MI-2003-D-008	DE-17	d	Fishdam R Mouth	43.5015	19.8872
BAEA-MI-2003-E-001	SG-02	c	Shiawassee NWR #1	66.4407	15.2257
BAEA-MI-2003-E-003	MO-04	c	Erie Shooting Club S	57.2387	5.0110
BAEA-MI-2003-E-004	HU-04	c	Sand Pt	44.7249	14.4930
BAEA-MI-2003-E-006	ST-02	a	Ford Estate-Ruby	6.5390	1.0000
BAEA-MI-2004-A-003	RO-06	c	Bear Ck Fldg	2.0110	6.3290
BAEA-MI-2004-A-004	OG-02	e	Stylus L E (N)	1.0000	4.0300
BAEA-MI-2004-A-007	OG-01	3	Rifle R Rec Area	9.5240	4.0570
BAEA-MI-2004-A-009	KA-04	e	Big Blue/Bass L	1.0000	1.0000
BAEA-MI-2004-A-010	RO-08	d	Wraco Lodge	1.0000	3.3088
BAEA-MI-2004-A-013	IO-04	b	Allen L	45.3659	8.5918
BAEA-MI-2004-A-017	RO-13	b	Prudenville	1.0000	5.3138
BAEA-MI-2004-A-022	DE-07	d	Squaw Ck	55.3465	16.6320
BAEA-MI-2004-A-023	SC-19	c	Deer Count Ck	64.2148	35.1888
BAEA-MI-2004-A-024	AG-20	a	Hovey L	8.0100	6.5010
BAEA-MI-2004-A-025	AG-18	a	Forest L Basin N	13.5948	10.2467
BAEA-MI-2004-A-026	AG-08	e	AuTrain L	1.0000	3.2200
BAEA-MI-2004-A-027	LU-13	a	Dollarville-Natalie	6.3600	9.0508
BAEA-MI-2004-A-028	MC-07	c	E L	4.4600	7.6020
BAEA-MI-2004-A-029	CP-32	a	Chippewa Co Airport	26.6421	16.7660
BAEA-MI-2004-A-030	CP-30	a	Neebish Isd E	93.0836	32.6208
BAEA-MI-2004-A-032	CP-22	l	Duck Bay-Sugar Isd	24.9991	8.9739
BAEA-MI-2004-A-035	CP-10	d	Burnt Isd	71.1350	33.3640
BAEA-MI-2004-A-036	CP-37	a	Potagannissing Dam	23.0706	20.1537
BAEA-MI-2004-A-037	CP-20	f	Tahquamenon Bay Swamp	14.5608	11.9939
BAEA-MI-2004-A-038	SC-04	c	C2 Pool (Seney NWR )	16.8342	13.2031
BAEA-MI-2004-A-039	LU-12	a?	Long L	1.0000	1.0000

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2004-A-040	AG-11	f	Laughing Fish Pt	18.7841	9.2692
BAEA-MI-2004-A-041	MC-02	c	Paquin Ck	1.0000	1.0000
BAEA-MI-2004-B-002	OG-07	a	Stylus L W (S)	144.7796	78.9037
BAEA-MI-2004-B-005	MN-06	e	Wellston	10.2837	11.9343
BAEA-MI-2004-B-006	MN-10	a	Little Manistee R	13.1791	12.7587
BAEA-MI-2004-B-007	MN-04	c	Tippy Dam	71.4133	42.1876
BAEA-MI-2004-B-008	MN-11	a	Manistee Airport	76.4895	39.1356
BAEA-MI-2004-B-012	NE-01	i	Anderson Bayou	25.6913	20.6420
BAEA-MI-2004-B-013	MD-01	a	Sanford L	8.3468	10.0587
BAEA-MI-2004-B-014	ET-06	b	L Paradise	52.9415	58.0158
BAEA-MI-2004-B-015	AL-05	c	Sprinkler L	1.0000	1.0000
BAEA-MI-2004-C-001	MO-02	k	Pte Mouille SGA-Laguna Beach N	43.8771	3.9860
BAEA-MI-2004-C-003	IA-02	b	Weber Dam	12.9621	12.0096
BAEA-MI-2004-C-004	AR-05	a	Pt AuGres S	39.3979	12.2560
BAEA-MI-2004-C-005	AR-05	a	Pt AuGres S	37.4676	12.7110
BAEA-MI-2004-C-006	MO-04	e	Erie Shooting Club S	48.4651	8.7600
BAEA-MI-2004-C-007	HU-04	c	Sand Pt	28.8439	14.8768
BAEA-MI-2004-C-008	AN-04	b	New Richmond	107.2994	1.0000
BAEA-MI-2004-C-012	TU-03	b	Caro	1.0000	9.5490
BAEA-MI-2004-C-015	BY-01	d	Skull/Stoney Isd	36.6942	15.3106
BAEA-MI-2005-A-001	AR-05		Pt AuGres	75.5722	21.8003
BAEA-MI-2005-A-003	AR-03		Santiago	44.2592	13.3941
BAEA-MI-2005-A-004	NE-01		Anderson Bayou	33.9677	27.5469
BAEA-MI-2005-A-008	MD-01		Sanford L	17.9808	13.3663
BAEA-MI-2005-A-009	OS-10		Rhoades L	2.2577	3.1836
BAEA-MI-2005-A-011	AL-04		McCollum L	6.4275	6.9947
BAEA-MI-2005-A-017	OT-09		Olund L	1.0000	4.6310
BAEA-MI-2005-A-018	MN-10		Little Manistee R	42.5239	30.4927
BAEA-MI-2005-A-019	OL-01		Evert	8.3755	6.1048
BAEA-MI-2005-A-024	AP-02		Fletcher Pd NE	60.2764	35.5976
BAEA-MI-2005-A-025	GT-08		Cherry City Airport	10.9197	15.4838
BAEA-MI-2005-A-037	CX-02		Beaver Isd-Fox L	23.7131	18.0819
BAEA-MI-2005-A-040	CX-01		East Jordan	24.8534	20.3230

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2005-B-001	MS-06		Walhalla W	40.4987	22.7476
BAEA-MI-2005-B-006	MN-05		Manistee R SGA	53.8507	26.3920
BAEA-MI-2005-B-009	MN-02		Carlsons-Horseshoe Bend	67.6831	70.9344
BAEA-MI-2005-B-011	MN-04		Tippy Dam	82.0145	60.4726
BAEA-MI-2005-B-012	MT-06		Jenson L	3.4473	3.9364
BAEA-MI-2005-B-015	MY-05		Black R Ranch	14.6587	7.1497
BAEA-MI-2005-B-021	PI-03		False Presque Isle	29.7009	19.9187
BAEA-MI-2005-B-023	MY-04		Grass L	5.3734	7.5746
BAEA-MI-2005-B-027	MQ-15		Saux Head L	47.8742	4.2581
BAEA-MI-2005-B-028	DI-09		Genes Pd	14.4997	9.0482
BAEA-MI-2005-B-029	DI-09		Genes Pd	2.3573	6.7360
BAEA-MI-2005-B-030	MQ-02		Conway L-Salmon Trout R	16.4996	1.0000
BAEA-MI-2005-B-033	MQ-04		Partridge Isd	90.6963	85.9263
BAEA-MI-2005-B-036	BG-12		Pequaming Pt	17.8054	10.8743
BAEA-MI-2005-B-037	MQ-25		Ford R-Margarette Rpds	50.7514	41.4957
BAEA-MI-2005-B-038	AG-20		Hovey L	16.3638	7.1260
BAEA-MI-2005-B-040	AG-18		Foerst L Basin N	11.2104	9.6101
BAEA-MI-2005-B-043	AG-13		AuSable Pt	21.0855	1.0000
BAEA-MI-2005-B-049	LU-13		Dollarville	2.8534	5.8772
BAEA-MI-2005-C-001	MO-04		L Erie Shooting Club	58.3765	10.9782
BAEA-MI-2005-C-002	WA-03		Campau Rd	73.5881	24.4707
BAEA-MI-2005-C-003	SG-02		Shiawassee NWR #1	122.5550	29.4934
BAEA-MI-2005-C-005	IA-02		Webber Dam	67.0200	25.7245
BAEA-MI-2005-C-007	SG-01		Shiawassee SGA #1	50.3509	14.1409
BAEA-MI-2005-C-008	NE-03		Croton Prairie	5.2887	12.1906
BAEA-MI-2005-C-009	HU-05		Wildfowl Bay	57.8976	18.9575
BAEA-MI-2005-C-010	BY-01		Skull/Stoney Isd	70.6847	18.7322
BAEA-MI-2005-C-011	HU-04		Sand Pt	27.3344	9.4105
BAEA-MI-2005-C-013	CX-07		Beaver Isd-St James	26.2065	16.4309
BAEA-MI-2006-A-001	OG-03		Hardwood L	10.4358	8.3631
BAEA-MI-2006-A-003	OG-08		Devoe L	66.5098	11.7859
BAEA-MI-2006-A-004	RO-11		Woods/Twin L	134.9446	141.1290
BAEA-MI-2006-A-007	CL-05		Long L	1.0000	10.8168

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2006-A-009	MT-07		Stanwood	13.7915	4.7649
BAEA-MI-2006-A-014	MS-07		Pere Marquette L	53.7440	38.8917
BAEA-MI-2006-A-015	MS-05		Walhalla E	62.7218	43.2762
BAEA-MI-2006-A-017	MU-03		Mona L	26.2552	1.0000
BAEA-MI-2006-A-018	MN-10		Little Manistee R	32.8180	20.3897
BAEA-MI-2006-A-020	GT-09		Old Mission Pt	35.9585	19.5691
BAEA-MI-2006-A-023	GT-08		Cherry City Airport	11.2632	12.3603
BAEA-MI-2006-A-024	MQ-08		Kawbawgam	10.2096	13.3685
BAEA-MI-2006-A-025	HO-11		Prickett L S	29.2135	6.3929
BAEA-MI-2006-A-026	HO-05		Traverse Isd	57.1164	111.7079
BAEA-MI-2006-A-029	MQ-21		Huron Isds NWR W	79.3198	49.1035
BAEA-MI-2006-A-030	MQ-02		Conway L-Salmon Trout R	14.8416	7.1306
BAEA-MI-2006-A-031	BG-04		Von Zellens Camp	35.4498	15.8916
BAEA-MI-2006-A-032	BG-04		Von Zellens Camp	24.2945	14.7710
BAEA-MI-2006-A-035	BG-18		Aura	5.5959	1.0000
BAEA-MI-2006-A-036	SC-12		Thunder L S	1.0000	1.0000
BAEA-MI-2006-A-043	CP-36		Back Bay	2.4272	1.0000
BAEA-MI-2006-A-045	CP-30		Nebish Isd E	29.4839	1.0000
BAEA-MI-2006-A-047	CP-43		Lime Isd South	4.6098	1.0000
BAEA-MI-2006-A-048	CP-46		Rosedale	29.3489	1.0000
BAEA-MI-2006-A-050	BG-02		King L	1.0000	1.0000
BAEA-MI-2006-A-052	BG-14		Vermilac L	1.0000	1.0000
BAEA-MI-2006-A-055	BG-12		Pequaming Pt	7.5506	1.0000
BAEA-MI-2006-A-056	AG-11		Laughing Fish Pt	8.4875	1.0000
BAEA-MI-2006-A-057	SC-06		E1 Pool (Seney NWR)	11.7471	1.0000
BAEA-MI-2006-B-001	CR-07		Bald Hill	6.6815	2.7446
BAEA-MI-2006-B-003	RO-13		Prudenville	13.9647	1.0000
BAEA-MI-2006-B-005	RO-08		Wraco Lodge	1.0000	1.0000
BAEA-MI-2006-B-006	OS-02		Mio Pd W	9.6663	1.0000
BAEA-MI-2006-B-007	OL-01		Evert	12.3095	1.0000
BAEA-MI-2006-B-009	MD-01		Sanford L	26.3628	1.0000
BAEA-MI-2006-B-016	BZ-09		Otter L-Sleeping Bear NL	70.8993	1.0000
BAEA-MI-2006-B-016	BZ-09		Otter L-Sleeping Bear NL	3.0429	6.3691



Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2006-B-017	MN-04		Tippy Dam	57.1098	1.0000
BAEA-MI-2006-B-021	AP-08		Devils L	41.4741	40.2699
BAEA-MI-2006-B-022	AP-13		North Pt-Grass L	140.8778	129.2057
BAEA-MI-2006-C-001	AR-05		Pt AuGres	48.3337	11.5751
BAEA-MI-2006-C-003	BY-03		Nayanquing Pt	36.0693	1.0000
BAEA-MI-2006-C-004	TU-01		Dinsmoore	46.9506	12.1374
BAEA-MI-2006-C-005	SG-06		Shiawassee Rookery	17.2845	11.8201
BAEA-MI-2006-C-006	WA-03		Campeau Road	37.5021	11.3923
BAEA-MI-2006-C-012	MO-08		Strasburg	3.4082	5.0274
BAEA-MI-2007-A-006	MN-10		Little Manistee R	26.9500	21.9208
BAEA-MI-2007-A-011	MN-04		Tippy Dam	37.0770	25.2945
BAEA-MI-2007-A-014	AP-08		Devils L	20.2177	13.7494
BAEA-MI-2007-A-015	MY-10		Tomahawk Ck Fldg	1.0000	6.3673
BAEA-MI-2007-A-017	MM-15		Ten Mile Ck-Whitney	38.6665	22.8501
BAEA-MI-2007-A-021	DI-14		L Antoine	2.7779	4.5058
BAEA-MI-2007-A-023	DI-04		Fumee L	8.3503	8.0342
BAEA-MI-2007-A-025	MM-10		Pemebonwon Falls/R	8.9283	2.6491
BAEA-MI-2007-A-029	IR-33		Iron L	1.0000	4.6747
BAEA-MI-2007-A-032	DE-30		Wells	19.4479	12.3185
BAEA-MI-2007-A-033	AG-13		AuSable Pt	9.6003	7.4361
BAEA-MI-2007-A-035	BG-18		Aura	35.7527	18.7527
BAEA-MI-2007-A-037	BG-11		Reeds Pt	4.8320	6.4925
BAEA-MI-2007-A-042	SC-06		E1 Pool (Seney NWR)	18.7989	24.6216
BAEA-MI-2007-A-046	MQ-02		Conway L-Salmon Trout R	42.1419	22.4408
BAEA-MI-2007-A-053	IR-28		Smokey L	5.6430	5.1769
BAEA-MI-2007-A-054	CP-34		Cedar Isd	18.4532	16.8205
BAEA-MI-2007-A-055	CP-33		Sand Isd-Dunbar	28.5918	19.8674
BAEA-MI-2007-B-004	MN-05		Manistee R SGA	26.5066	22.0120
BAEA-MI-2007-B-013	MS-05		Walhalla E	56.0461	42.6808
BAEA-MI-2007-B-015	OS-05		Garland Golf Course	1.0000	4.6161
BAEA-MI-2007-B-017	AL-02		Alcona-Bamfield Pd	11.4998	9.7909
BAEA-MI-2007-B-025	NE-03		Croton Prairie	3.4500	9.0042
BAEA-MI-2007-B-027	KA-04		Big Blue/Bass L	6.7932	5.5170

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2007-B-028	GT-08		Cherry City Airport	18.7741	17.5724
BAEA-MI-2007-B-031	GT-06		Yuba Valley	39.2580	29.0576
BAEA-MI-2007-B-037	MY-12		Foch Ls Fldg	14.9833	13.2649
BAEA-MI-2007-B-038	DE-29		Masonville	37.4983	21.2172
BAEA-MI-2007-B-039	MM-23		Vetorts Pt	45.1945	18.2154
BAEA-MI-2007-B-043	IR-13		Dog L-L St Kathryn	1.0000	3.8471
BAEA-MI-2007-B-045	IR-09		Paint R-Lower Hemlock Rpd	16.7098	3.6633
BAEA-MI-2007-B-049	CP-27		Pendills L	14.1279	1.0000
BAEA-MI-2007-B-052	CP-44		Sugar Isd NE	9.2328	6.1707
BAEA-MI-2007-B-053	CP-26		Gravel Isd/L	10.1524	10.9128
BAEA-MI-2007-B-054	LU-15		Culhane L	5.4071	5.6116
BAEA-MI-2007-C-001	BY-02		Quanicassee	55.3905	13.8274
BAEA-MI-2007-C-005	TU-03		Caro	5.3328	5.8321
BAEA-MI-2007-C-006	HU-08		Huron City	27.4066	11.3818
BAEA-MI-2007-C-015	CB-17		Stoney Ck Fldg	3.4786	3.3862
BAEA-MI-2007-C-016	CB-10		Tower N-Kleber Pd	3.8319	3.7325
BAEA-MI-2007-C-017	CB-13		Tower S-Onaway	3.5496	5.8795
BAEA-MI-2007-C-019	MM-05		Grand Rpds Dam N	15.9714	3.4725
BAEA-MI-2007-D-003	SG-06		Shiawassee Rookery	27.7805	14.6849
BAEA-MI-2007-D-004	SG-01		Shiawassee SGA #1	26.9602	14.6272
BAEA-MI-2007-D-008	AR-09		Knoll View	103.9466	41.1861
BAEA-MI-2007-D-009	WA-03		Campau Rd	12.7584	9.8428
BAEA-MI-2007-D-010	OW-04		Bass R	33.7146	14.4637
BAEA-MI-2008-A-003	IO-13		Wichert Hills	1.0000	5.0152
BAEA-MI-2008-A-005	GL-05		L 4	3.1227	2.8764
BAEA-MI-2008-A-006	OG-01		Rifle R Rec Area	2.1380	3.9794
BAEA-MI-2008-A-010	NE-01		Anderson Bayou	34.2525	39.1307
BAEA-MI-2008-A-015	MS-05		Walhalla E	29.7136	24.8406
BAEA-MI-2008-A-020	GT-06		Yuba Valley	13.9263	12.0237
BAEA-MI-2008-A-027	AP-08		Devils L	51.5963	24.7402
BAEA-MI-2008-A-029	AP-13		N Pt-Grass L	72.3024	79.6863
BAEA-MI-2008-A-036	AP-03		N Pt	33.8935	24.2241
BAEA-MI-2008-A-038	CB-17		Stoney Ck Fldg	2.4534	4.2475

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2008-A-041	MM-22		Deadmans Pt	99.8840	33.4994
BAEA-MI-2008-A-042	MM-04		Shakey R	13.4559	4.5724
BAEA-MI-2008-A-045	MM-25		Poch de Noch	10.9299	6.7714
BAEA-MI-2008-A-053	GO-42		Plymouth Mine	1.0000	4.7389
BAEA-MI-2008-A-058	HO-04		La Chance Bay	9.1398	18.9959
BAEA-MI-2008-A-059	HO-16		N Portage Canal	7.2089	7.0164
BAEA-MI-2008-A-060	ON-25		Three Rapids	34.4534	12.7726
BAEA-MI-2008-A-061	ON-27		Carp R-Escarpment	14.2843	4.7245
BAEA-MI-2008-A-063	DE-33		Days R	59.6744	27.4490
BAEA-MI-2008-A-064	AG-23		Wick Pt-Grand Isd	12.6242	13.4193
BAEA-MI-2008-B-001	CL-04		Doc & Tom L	28.6036	5.2800
BAEA-MI-2008-B-004	OG-11		Edwards L	17.9376	5.4657
BAEA-MI-2008-B-007	AR-06		Forest L	32.4272	7.7725
BAEA-MI-2008-B-012	AR-10		Pt AuGres N	96.7329	29.8637
BAEA-MI-2008-B-015	AR-07		Hickory Isd	69.1343	17.9283
BAEA-MI-2008-B-016	IO-03		Tawas L N	3.7132	8.5569
BAEA-MI-2008-B-021	RO-19		DNR Airport	1.0000	5.2442
BAEA-MI-2008-B-024	MY-01		Valentine I	2.5083	4.3911
BAEA-MI-2008-B-036	IO-14		Monument E	9.1369	5.0751
BAEA-MI-2008-B-043	OS-09		Mack L	3.0457	3.8339
BAEA-MI-2008-B-050	ET-06		L Paradise	2.3076	18.5383
BAEA-MI-2008-B-057	CX-03		Garden Isd	46.3837	23.4605
BAEA-MI-2008-B-058	CX-09		Beaver Isd-L Geneserath	12.5780	16.9666
BAEA-MI-2008-B-060	ET-01		Wycamp L	11.4350	9.1987
BAEA-MI-2008-B-063	DI-08		Rock L-Carney Outlet	1.0000	3.5373
BAEA-MI-2008-B-068	DE-30		Masonville	21.7235	12.2998
BAEA-MI-2008-B-078	IR-26		Brule L	7.1351	3.3658
BAEA-MI-2008-B-080	BG-12		Pequaming Pt	2.5125	5.8648
BAEA-MI-2008-B-083	BG-11		Reeds Pt	15.0979	11.4030
BAEA-MI-2008-B-085	ON-26		Misery Bay	7.3265	7.2778
BAEA-MI-2008-B-086	HO-02		Rabbit Bay	10.4834	10.3096
BAEA-MI-2008-B-088	IR-21		Michigamme Res NE	1.0000	3.0548
BAEA-MI-2008-B-090	GO-36		W Bay L	33.4620	13.5503

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2008-B-096	AG-18		Forest L Basin N	10.9969	11.8924
BAEA-MI-2008-B-098	AG-20		Hovey L	10.1052	8.8734
BAEA-MI-2008-D-013	MO-08		Strasburg	21.3679	11.1533
BAEA-MI-2009-A-001	OG-08	b	Devoe L	78.0860	18.1000
BAEA-MI-2009-A-003	OG-01	f	Rifle R Rec Area	19.4626	12.7126
BAEA-MI-2009-A-008	RO-07	j	N Bay Houghton L	29.8899	12.0180
BAEA-MI-2009-A-103	CP-14	g	Munuscong Bay NW	26.3263	17.4148
BAEA-MI-2009-A-104	CP-33	a	Sand Isd-Dunbar	34.1503	20.1122
BAEA-MI-2009-A-108	SC-15	e	Mud L Ck	12.9724	20.5114
BAEA-MI-2009-A-112	CP-05	c	Pt Aux Frenes	62.6078	32.5879
BAEA-MI-2009-A-118	SC-06	b	E1 Pool (Seney NWR)	2.1191	10.2793
BAEA-MI-2009-A-126	CP-44	a	Whipple Pt-Sugar Isd NE	70.2820	33.0670
BAEA-MI-2009-A-019	OS-08	f	Mio Pd E	50.9481	7.6787
BAEA-MI-2009-A-021	OS-02	n	Mio Pd W	13.8740	9.9592
BAEA-MI-2009-A-023	AL-09	a	O'Brien L	114.3719	42.1480
BAEA-MI-2009-A-029	AL-11	a	Lincoln-Brownley	44.2357	13.2155
BAEA-MI-2009-A-036	ML-02	a	Whitefish L	33.5992	39.4230
BAEA-MI-2009-A-043	AR-10	a	AuGres-Wigwam-Rifle R	86.6629	17.6691
BAEA-MI-2009-A-050	OS-05	a	Garland Golf Course	4.2284	6.5280
BAEA-MI-2009-A-052	CR-08	c	Lovells	16.1059	9.0038
BAEA-MI-2009-A-054	CR-07	b	Bald Hill	6.4887	5.0650
BAEA-MI-2009-A-055	CR-12	a	Sandhill L	16.3540	11.6843
BAEA-MI-2009-A-059	OT-07	d?	O'Rourke L	11.6652	14.7306
BAEA-MI-2009-A-071	MT-04	b	Chippewa L	7.5091	23.0264
BAEA-MI-2009-A-076	MT-01	c	Martiny L	12.9275	15.3240
BAEA-MI-2009-A-077	GT-06	a	Yuba Valley	23.6311	22.8029
BAEA-MI-2009-A-082	WX-02	a	L Mitchell	6.4855	24.0946
BAEA-MI-2009-A-084	OL-03	a	Eggle L	30.5045	46.8777
BAEA-MI-2009-A-087	GL-04	d	Tittabawassee R	7.7848	12.1043
BAEA-MI-2009-A-089	LU-05	c	Fork L Ck	1.0000	7.6009
BAEA-MI-2009-A-092	MC-06	d	S Manistique L	4.6046	12.4148
BAEA-MI-2009-A-094	MC-24	c	Shoepac L/Sprangs Pt	64.5496	23.0783
BAEA-MI-2009-B-002	RO-11	c	W Twin/Woods L	10.0059	13.9164

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2009-B-006	CL-02	b	McKay Ranch	2.6939	10.5352
BAEA-MI-2009-B-007	MD-01	c	Sanford L	12.4103	1.0000
BAEA-MI-2009-B-010	IO-03	e	Tawas L N	149.8253	33.1784
BAEA-MI-2009-B-011	AR-03	d	Santiago	80.5276	26.5351
BAEA-MI-2009-B-013	AR-06	a	Forest L	75.2090	14.1930
BAEA-MI-2009-B-022	MS-07	a	Pere Marquette L	159.1074	66.0994
BAEA-MI-2009-B-026	MN-10	a	Little Manistee R	87.8554	64.1376
BAEA-MI-2009-B-038	LL-07	d	Cat Head Bay	40.1381	26.4725
BAEA-MI-2009-B-050	MD-02	c	Midland-Gordonville Rd	45.2782	25.4586
BAEA-MI-2009-C-005	MM-01	c	Hayward L #1	43.6183	20.3412
BAEA-MI-2009-C-006	MM-23	a	Vetorts Pt	58.9563	16.7777
BAEA-MI-2009-C-008	DE-29	a	Wells-Escanaba R Dam	70.4441	25.8349
BAEA-MI-2009-C-009	AG-20	a	Hovey L	5.8733	11.6619
BAEA-MI-2009-C-011	AG-20	a	Hovey L	42.3167	23.3660
BAEA-MI-2009-C-012	MQ-12	c	Huron Isds NWR E	332.3818	200.6439
BAEA-MI-2009-C-014	MQ-02	g	Conway L-Salmon Trout R	20.4064	16.4181
BAEA-MI-2009-C-024	HO-03	d	Prickett Dam N	13.9605	14.1516
BAEA-MI-2009-C-025	BG-04	c	Von Zellens Camp	41.1458	24.7704
BAEA-MI-2009-C-031	GO-20	e	Montana Ck	3.8221	7.8026
BAEA-MI-2009-C-032	ON-05	k	Sleeping Bay-Fourteen Mile Pt	48.0544	26.5160
BAEA-MI-2009-C-034	DE-33	a	Days R	86.0425	36.0153
BAEA-MI-2009-D-002	BY-03	d	Nayanquing Pt	83.6345	16.5384
BAEA-MI-2009-D-005	SH-01	c	Michigan Peat	5.6004	13.8766
BAEA-MI-2009-D-014	AN-04	e	New Richmond	498.2512	48.9577
BAEA-MI-2010-A-003	MD-01	c	Sanford L	39.2082	22.1012
BAEA-MI-2010-A-005	AR-10	a	Pt AuGres N	39.3611	14.0543
BAEA-MI-2010-A-007	AR-03	d	Santiago	69.1023	15.6589
BAEA-MI-2010-A-009	AR-06	b?	Forest L	88.6066	18.0367
BAEA-MI-2010-A-100	DE-29	a	Wells-Escanaba R Dam	46.8188	21.7942
BAEA-MI-2010-A-104	DE-33	a	Days R	51.8795	24.9958
BAEA-MI-2010-A-111	GO-03	h	Cisco L E	9.0356	8.9113
BAEA-MI-2010-A-014	IO-03	e	Tawas L N	42.5048	18.7673
BAEA-MI-2010-A-016	OG-08	b	Devoe L	28.2118	12.2783

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2010-A-020	GL-05	a	L 4	8.6457	6.4266
BAEA-MI-2010-A-032	MT-06	a	Jehnonson L	8.3762	10.6872
BAEA-MI-2010-A-035	MT-04	c	Chippewa L	14.7110	23.3406
BAEA-MI-2010-A-039	CR-12	a	Sandhill L	2.8639	4.8971
BAEA-MI-2010-A-040	RO-07	j	N Bay Houghton L	19.3081	14.7188
BAEA-MI-2010-A-046	OT-15	b	Tecon L	10.0551	14.8106
BAEA-MI-2010-A-047	GT-08	b	Cherry City Airport	16.8528	20.8658
BAEA-MI-2010-A-050	MN-10	a	Little Manistee R	37.6166	24.6973
BAEA-MI-2010-A-062	LL-07	d	Cat Head Bay	27.7392	26.6806
BAEA-MI-2010-A-063	LL-10	a	Peshawbestown	5.0831	12.7327
BAEA-MI-2010-A-079	KA-07	a	Devil Ck	2.4330	11.5898
BAEA-MI-2010-A-082	MC-06	d	S Manistique L	1.0000	11.0654
BAEA-MI-2010-A-083	SC-12	b	Thunder Ls	1.0000	9.3114
BAEA-MI-2010-A-086	DE-19	d	Whitefish R-Haymeadow Ck	76.4189	43.3129
BAEA-MI-2010-A-090	DE-13	h	Grandskog L	48.3821	18.9725
BAEA-MI-2010-A-093	AG-18	a	Forest L Basin N	2.8572	8.1792
BAEA-MI-2010-A-098	MM-23	a	Vetorts Pt	47.2266	15.1349
BAEA-MI-2010-B-001	OS-03	e	McKinley	1.0000	6.9578
BAEA-MI-2010-B-002	OS-05	a	Garland Golf Course	5.4588	12.1795
BAEA-MI-2010-B-003	OS-11	b	Perry L	10.9824	15.3043
BAEA-MI-2010-B-007	AL-09	a	O'Brien L	64.1637	76.7175
BAEA-MI-2010-B-009	KA-04	f	Big Blue/Bass L	2.1469	9.6834
BAEA-MI-2010-B-015	OL-03	a	Eggle L	11.4960	21.3265
BAEA-MI-2010-B-017	GT-06	a	Yuba Valley	34.5151	26.4119
BAEA-MI-2010-B-028	ON-25	a	Three Rapids	17.9511	12.9782
BAEA-MI-2010-B-036	GO-27	f	Morrison Ck	5.3266	7.2397
BAEA-MI-2010-B-045	CP-05	c	Pt Aux Frenes	20.1227	15.4895
BAEA-MI-2010-B-046	CP-36	a	Back Bay	8.0379	11.4013
BAEA-MI-2010-B-050	MQ-15	g	L Superior-Saux Head L	232.7814	109.9615
BAEA-MI-2010-B-057	BG-05	b	Pt Abbaye	58.9528	33.4683
BAEA-MI-2010-B-059	BG-04	c	Von Zellens Camp	329.3072	220.0792
BAEA-MI-2010-D-001	SH-01	c	Michigan Peat	27.2394	14.9571
BAEA-MI-2010-D-003	BY-03	d	Nayanquing Pt	36.4257	12.8712

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2010-D-007	WA-03	c	Campau Rd	82.2900	27.1131
BAEA-MI-2010-D-009	SG-11	a	Fergus-Chesaning	36.3744	15.2986
BAEA-MI-2010-D-010	TU-01	c	Dinsmoore	60.8860	19.8270
BAEA-MI-2010-D-013	SG-06	a	Shiawassee Rookery	70.9277	23.3387
BAEA-MI-2010-D-015	SG-01	f	Shiawassee R SGA #1	75.3047	20.3706
BAEA-MI-2010-D-017	CH-01	c	Baker Sanctuary	16.5131	15.0809
BAEA-MI-2010-D-019	BY-05	a	Kawkawlin R	60.7803	18.9977
BAEA-MI-2010-D-021	BY-02	h	Quanicassee	71.8962	24.8366
BAEA-MI-2011-A-001	MK-04	b	Reedsburg	2.3197	11.4854
BAEA-MI-2011-A-004	GL-01	e	Molasses R Fldg	12.2312	14.1247
BAEA-MI-2011-A-005	GL-05	a	L 4	5.0663	3.8550
BAEA-MI-2011-A-008	RO-09	f	Marl L	17.3779	19.2291
BAEA-MI-2011-A-010	MN-10	a	Little Manistee R	65.9455	43.0187
BAEA-MI-2011-A-013	AR-03	d	Santiago	30.6415	12.3662
BAEA-MI-2011-A-014	AR-10	a	Pt AuGres N	48.0919	16.1629
BAEA-MI-2011-A-015	AR-05	c	Pt AuGres S	58.9044	20.3777
BAEA-MI-2011-A-016	MN-04	d	Tippy Dam	39.4016	22.5615
BAEA-MI-2011-A-017	MN-02	d	Carlson's/Horseshoe Bend	34.2830	25.4226
BAEA-MI-2011-A-019	KA-07	a	Devil Ck	4.3308	4.3025
BAEA-MI-2011-A-021	KA-04	e	Big Blue/Bass L	1.0000	6.0064
BAEA-MI-2011-A-022	AL-02	k	Alcona-Bamfield Pd	2.0730	9.5270
BAEA-MI-2011-A-026	OS-12	b	Noodles L	6.4248	4.3979
BAEA-MI-2011-A-032	AL-05	c	Sprinkler L	3.6250	3.3593
BAEA-MI-2011-A-036	OS-11	b	Perry L	1.0000	8.3647
BAEA-MI-2011-A-038	GT-08	b	Cherry City Airport	7.7360	13.5522
BAEA-MI-2011-A-041	MQ-31	a	Thoney Pt	33.1222	21.6961
BAEA-MI-2011-A-043	MQ-09	g	Deer L	13.7000	6.2575
BAEA-MI-2011-A-050	DE-19	d	Whitefish R-Haymeadow Ck	56.6912	35.1605
BAEA-MI-2011-A-054	SC-17	d	Indian L	6.2363	11.1014
BAEA-MI-2011-A-057	BG-05	c	Pt Abbaye	17.8834	17.7739
BAEA-MI-2011-A-062	HO-24	a	Torch L	9.6595	10.5045
BAEA-MI-2011-B-001	IO-19	a	Dease L	2.4378	9.2388
BAEA-MI-2011-B-004	IO-11	a	L Solitude	1.0000	6.0035

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2011-B-006	OG-02	i	Stylus L E (N)	6.6751	11.3431
BAEA-MI-2011-B-007	IO-03	e	Tawas L N	72.7773	33.0887
BAEA-MI-2011-B-008	IO-18	a	Spencer L	34.5532	23.3771
BAEA-MI-2011-B-011	IO-06	a	Tawas L SW	18.2269	15.1451
BAEA-MI-2011-B-013	OS-13	c	Meadows	31.4063	15.6124
BAEA-MI-2011-B-014	OS-08	g	Mio Pd E	2.0778	4.3067
BAEA-MI-2011-B-018	CR-08	c	Lovells	4.0216	6.6878
BAEA-MI-2011-B-023	OT-07	d	O'Rourke L	5.3481	10.8946
BAEA-MI-2011-B-028	GT-06	d	Yuba Valley	19.3070	20.1394
BAEA-MI-2011-B-046	CR-07	b	Bald Hill	7.1431	11.6111
BAEA-MI-2011-B-068	DI-16	a	Sturgeon Falls Dam N	15.6994	3.9916
BAEA-MI-2011-B-075	IR-04	l	Hagerman/Ottawa L	11.0937	14.5832
BAEA-MI-2011-B-077	IR-26	a	Brule L	1.0000	9.1333
BAEA-MI-2011-B-079	GO-43	c	Crystal L (VI75, Crystal L)	4.0734	10.8532
BAEA-MI-2011-B-081	GO-49	d	Lac Vieux Desert-Duck Pt (VI103 LVD-DP)	1.0000	8.5783
BAEA-MI-2011-B-085	CP-05	c	Pt Aux Frenes	68.4831	29.5996
BAEA-MI-2011-B-087	CP-36	a	Back Bay	6.5461	6.1758
BAEA-MI-2011-B-096	CP-56	a	Sugar Isd N	33.7114	20.4197
BAEA-MI-2011-B-097	CP-44	a	Whipple Pt-Sugar Isd NE	15.0782	17.4627
BAEA-MI-2011-B-099	CP-57	a	L George-SW	21.4462	17.2155
BAEA-MI-2011-D-001	CH-01	c	Baker Sanctuary	11.0913	12.4422
BAEA-MI-2011-D-003	SH-01	c	Michigan Peat	2.3812	14.2754
BAEA-MI-2011-D-012	BY-05	b	Kawkawlin R	35.7294	13.4720
BAEA-MI-2011-D-015	BY-08	a	Marina	109.1513	22.2081
BAEA-MI-2011-D-017	TU-01	c	Dinsmoore	51.3988	17.8075
BAEA-MI-2011-D-019	WA-07	b	Humbug Marsh	117.8899	20.7797
BAEA-MI-2011-D-020	HU-13	a	Sebewaing	27.8188	13.6894
BAEA-MI-2011-D-022	ST-03	a	Harsens Isd	43.2686	13.5088
BAEA-MI-2011-D-036	MO-03	g	Raisin R-Monroe	141.1771	14.8427
BAEA-MI-2011-D-037	KZ-02	a	Fort Custer	59.6391	26.9298
BAEA-MI-2011-D-040	BY-07	a	Golson Park	76.1950	19.6716
BAEA-MI-2012-A-001	CL-05	c	Long L	2.9159	13.7956
BAEA-MI-2012-A-007	MU-05	a	Muskegon SP	15.1777	18.7132



Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2012-A-014	MN-06	e	Wellston	1.0000	6.2178
BAEA-MI-2012-A-020	CR-02	e	Wakeley L	9.4243	7.4907
BAEA-MI-2012-A-022	CR-07	b	Bald Hill	6.2143	5.2158
BAEA-MI-2012-A-023	CR-08	c	Lovells	2.8016	11.6203
BAEA-MI-2012-A-024	CR-08	c	Lovells	8.1423	11.5105
BAEA-MI-2012-A-025	RO-08	c	Wraco Lodge	2.0673	10.3532
BAEA-MI-2012-A-026	IO-01	?(h or i?)	Loud Dam Pd E	8.4691	4.6208
BAEA-MI-2012-A-027	IO-08	a	Loud Dam Pd W	5.1192	3.4964
BAEA-MI-2012-A-028	OS-08	g	Mio Pd E	5.3565	6.5023
BAEA-MI-2012-A-031	OS-13	c	Meadows	17.4675	23.0319
BAEA-MI-2012-A-033	OG-02	i	Stylus L E (N)	2.3972	6.6586
BAEA-MI-2012-A-034	CR-14	a	Kellogg Bridge	12.9225	3.7916
BAEA-MI-2012-A-053	OT-07	d	O'Rourke L	2.9164	4.7704
BAEA-MI-2012-A-056	MM-01	d	Hayward L #1	2.7990	10.6376
BAEA-MI-2012-A-061	AG-18	a	Forest L Basin N	11.8095	13.2546
BAEA-MI-2012-A-073	GO-13	c	Little Carp R	5.7798	9.2883
BAEA-MI-2012-A-074	GO-39	b	Copper Peak	12.7662	19.9838
BAEA-MI-2012-A-075	DE-41	a	Fayette	105.5763	66.7654
BAEA-MI-2012-A-083	CP-54	a	Cedar Pt	71.2545	48.2256
BAEA-MI-2012-A-092	CP-05	c	Pt Aux Frenes	8.6429	12.3185
BAEA-MI-2012-A-093	MM-05	h	Grand Rpds Dam N (MT08/22, GRD)	12.2809	4.1499
BAEA-MI-2012-A-095	BG-22	a	Reeds Pt N	14.4163	10.5213
BAEA-MI-2012-B-001	MN-04	a	Sadony Bayou	16.8695	15.9440
BAEA-MI-2012-B-004	IS-01	a	L Isabella	6.8509	23.0877
BAEA-MI-2012-B-006	GT-08	b	Cherry City Airport	25.8755	16.8468
BAEA-MI-2012-B-007	MD-01	d	Sanford L	30.3590	20.8358
BAEA-MI-2012-B-015	OS-09	a	Mack L	4.3915	7.0479
BAEA-MI-2012-B-018	AR-10	a	Pt AuGres N	37.7795	15.5470
BAEA-MI-2012-B-021	AR-03	d	Santiago	10.6448	8.9114
BAEA-MI-2012-B-023	MN-06	b	Wellston	17.9768	1.0000
BAEA-MI-2012-B-027	OL-03	L	Eggle L	4.8141	7.6533
BAEA-MI-2012-B-031	LL-07	e	Cat Head Bay	18.8753	16.4692
BAEA-MI-2012-B-032	GT-06	d	Yuba Valley	44.3570	34.1364

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2012-B-042	DE-19	d	Whitefish R-Haymeadow Ck	44.5747	27.1690
BAEA-MI-2012-B-045	GO-11	f	Presque Isle Fldg-Mink L	6.3082	8.2971
BAEA-MI-2012-B-048	GO-38	c	Black R Park	1.0000	4.9593
BAEA-MI-2012-B-050	DE-31	c	Round Isd	26.9347	22.9020
BAEA-MI-2012-B-051	DE-41	a	Fayette	37.2505	32.0622
BAEA-MI-2012-B-052	DE-38	a	Pt Detour	45.5993	71.4598
BAEA-MI-2012-B-056	IR-26	a	Brule L	2.4894	10.4570
BAEA-MI-2012-B-059	GO-28	f	Lac Vieux Desert-Draper Isd	2.0940	8.5137
BAEA-MI-2012-B-061	GO-02	e	Sucker L S	4.0921	5.6908
BAEA-MI-2012-D-002	KZ-02	a	Fort Custer	25.2276	15.5906
BAEA-MI-2012-D-005	SG-10	b	Shiawassee NWR-Eastwood Drain	42.6642	18.6099
BAEA-MI-2012-D-007	BY-09	a	Tobico Marsh	28.6353	10.9590
BAEA-MI-2012-D-008	BY-08	a	Marina	46.8396	1.0000
BAEA-MI-2012-D-012	SG-06	a	Shiawassee Rookery	14.0676	11.5405
BAEA-MI-2012-D-013	SG-01	f	Shiawassee R SGA #1	38.7030	17.3544
BAEA-MI-2012-D-015	WA-07	b	Humbug Marsh	40.3434	12.5786
BAEA-MI-2012-D-035	AN-04	e	New Richmond	104.3975	35.3953
BAEA-MI-2012-D-037	TU-02	g	New Fish Pt SWA	39.3517	1.0000
BAEA-MI-2012-D-040	HU-13	b	Sebewaing	29.2563	14.4093
BAEA-MI-2012-D-042	TU-05	a	Gotham-Old Fish Pt SWA	20.6771	14.9354
BAEA-MI-2012-D-046	BY-07	a	Golson Park	60.9704	21.2992
BAEA-MI-2013-D-019	MO-03	h	Raisin R-Monroe	190.9991	7.7754
BAEA-MI-2013-A-032	KA-06	a	Ingersoll L	1.0000	5.3984
BAEA-MI-2013-B-035	LL-07	e	Cat Head Bay	8.1863	7.9889
BAEA-MI-2013-A-033	KA-03	e	Flowing Well Pd	1.0000	3.6985
BAEA-MI-2013-A-022	CL-08	b	Haskel L	8.9096	12.9342
BAEA-MI-2013-D-008	SG-10	b	Eastwood Drain	11.7232	8.4876
BAEA-MI-2013-B-059	GO-34	a	Sundance L	9.0805	11.2121
BAEA-MI-2013-B-005	RO-09	f	Marl L	2.8319	5.7752
BAEA-MI-2013-A-027	MD-05	b	Coleman	1.0000	5.5590
BAEA-MI-2013-B-013	MT-07	a	Stanwood	24.6817	10.6290
BAEA-MI-2013-B-024	OL-06	a	Rose L	1.0000	7.0988
BAEA-MI-2013-D-015	WA-07	b	Humbug	92.1253	16.3610

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2013-A-007	IO-21	a	Tuttle Marsh	1.0000	14.1553
BAEA-MI-2013-B-002	CR-02	e	Wakeley L	24.1943	22.7477
BAEA-MI-2013-A-006	RO-06	e	Bear Ck Fldg	2.0924	4.7206
BAEA-MI-2013-B-064	IR-13	g	Dog L-L St Kathryn	1.0000	2.1572
BAEA-MI-2013-B-025	GL-05	a	L4	1.0000	2.6601
BAEA-MI-2013-D-013	OA-01	b	Stoney Ck MP	4.7759	54.7822
BAEA-MI-2013-D-022	HU-05	b	Waterfowl Bay	28.8310	8.3989
BAEA-MI-2013-D-003	WA-03	e	Campau Rd	27.6131	8.2854
BAEA-MI-2013-A-002	IO-16	a	Hope Ck	2.6518	3.2775
BAEA-MI-2013-B-047	CP-44	a	Whipple Pt - Sugar Isd NE	37.3412	17.3491
BAEA-MI-2013-B-001	CR-12	a	Sandhill L	1.0000	1.0000
BAEA-MI-2013-B-029	WX-02	a	L Mitchell	2.1762	12.7723
BAEA-MI-2013-A-014	AR-03	d	Santiago	15.1101	5.6733
BAEA-MI-2013-A-064	MQ-10	g	L Independence-Yellowdog Swp	2.2809	5.8217
BAEA-MI-2013-B-060	IR-04	l	Hagerman/Ottawa L	1.0000	6.6614
BAEA-MI-2013-B-058	GO-38	c	Black R Park	2.1335	5.9368
BAEA-MI-2013-B-065	IR-26	b	Misery Bay	2.2633	10.7865
BAEA-MI-2013-B-003	CR-09	b	Pickeral L Fldg	2.5329	4.0023
BAEA-MI-2013-B-045	CP-57	a	L George SW	12.0259	16.7262
BAEA-MI-2013-B-048	CP-56	a	Sugar Isd N	10.5588	8.9189
BAEA-MI-2013-B-067	BG-22	a	Reeds Pt N	2.5639	5.8592
BAEA-MI-2013-B-058	GO-38	c	Black R Park	41.0579	91.9096
BAEA-MI-2013-B-065	IR-26	b	Misery Bay	2.1053	5.1786
BAEA-MI-2013-B-021	MT-04	b	Chippewa L	2.1791	15.4289
BAEA-MI-2013-A-036	MK-05	c	Lake City	1.0000	5.8283
BAEA-MI-2013-A-010	OG-04	b	No Mans/Augustina L	1.0000	4.5116
BAEA-MI-2013-A-028	HU-06	c	Port Austin	19.7393	7.8398
BAEA-MI-2013-A-063	AG-02	e	Baldy L	1.0000	4.3812
BAEA-MI-2013-B-034	KA-01	b	Manistee L	1.0000	13.7056
BAEA-MI-2013-A-004	OG-02	i	Stylus LE	1.0000	3.7368
BAEA-MI-2013-A-050	DE-13	h	Grandskog L	30.1527	13.5359
BAEA-MI-2013-A-015	AR-10	a	Pt Au Gres N	33.1338	13.8753
BAEA-MI-2013-A-059	DI-02	k	Vulcan	6.6917	3.3902
BAEA-MI-2013-B-004	RO-13	b	Prudenville	2.4709	8.2419

Sample ID	Territory #	Nest	Territory Name	Sum PCBs	4,4'-DDE
BAEA-MI-2013-A-060	AG-08	e	AuTrain L	1.0000	7.8417
BAEA-MI-2013-B-056	GO-47	a	Cisco L W	1.0000	3.8024
BAEA-MI-2013-A-008	IO-10	g	Grass L-Oscoda-Dead-Au Sable	8.3101	6.6556
BAEA-MI-2013-D-011	TU-01	c	Dinsmoore	52.3492	12.8242
BAEA-MI-2013-A-019	MK-03	b	Seafuse Marsh	22.5357	26.0878
BAEA-MI-2013-B-019	MU-05	a	Muskegon SP	23.8265	11.3581
BAEA-MI-2013-A-047	SC-17	d	Indian L	2.2018	8.2417
BAEA-MI-2013-B-022	OL-04	b	Sears	2.2102	8.0292
BAEA-MI-2013-A-030	MN-04	d	Tippy Dam	36.5814	18.8794
BAEA-MI-2013-B-055	LU-02	d	Foster Isd	32.0233	10.8343
BAEA-MI-2013-A-062	AG-20	a	Hovey L	1.0000	4.3003

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