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MICHIGAN WILDLIFE CONTAMINANT TREND MONITORING

YEAR 2008 ANNUAL REPORT
NESTLING BALD EAGLES

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SECTION 1.0

Executive Summary

- The bald eagle monitoring project is one component of Michigan's water quality monitoring program that was summarized by the Michigan Department of Environmental Quality (MDEQ) in the January 1997 report entitled, "A Strategic Environmental Quality Monitoring Program for Michigan's Surface Waters (Strategy)." This document serves as the tenth annual report for the bald eagle element of the Strategy. The following are the goals of the bald eagle monitoring project:

    1. Assess the current status and condition of individual waters of the state and determine whether water quality standards are being met.

    2. Determine temporal and spatial trends in the quality of Michigan's surface waters.

- In 2008, 92 nestling bald eagle blood plasma samples were analyzed for organochlorine contaminants, dichlorodiphenyltrichloroethane (DDT) and its metabolites, hexachlorobenzene (HCB), *alpha*-hexachlorocyclohexane (*alpha*-HCH), *gamma*-hexachlorocyclohexane (*gamma*-HCH), heptachlor, heptachlor epoxide, *alpha*-chlordane, *gamma*-chlordane, dieldrin, toxaphene, and 20 polychlorinated biphenyl (PCB) congeners.

- Significant differences were found among Great Lakes, anadromous, and inland breeding areas and between Great Lakes and anadromous pooled and inland breeding areas for both 4,4'-dichlorodiphenyldichloroethylene (4,4'-DDE) ($P \leq 0.0001$) and total DDT ($P \leq 0.0001$). Significant differences were found among Lake Michigan, Lake Superior, Lake Huron, Lake Erie, inland upper peninsula, and inland lower peninsula for 4,4'-DDE ($P \leq 0.0001$) and total DDT ($P \leq 0.0001$). Geometric mean 4,4'-DDE and total DDT concentrations were ranked in the following order by Great Lakes watershed from highest to lowest: Lake Huron (n=30) > Lake Michigan (n=43) > Lake Superior (n=17) breeding areas.

- Twenty PCB congeners were quantified and summed to determine total PCBs in nestling bald eagle blood plasma samples. Six congeners (110, 118, 138, 153, 180, and 187) contributed significantly (i.e., consisting of ≥ 89% of the total PCBs) to the total PCB concentrations. At least 1 of the targeted PCB congeners was detected in 49 of the 92 nestlings sampled. Total PCB concentrations for Great Lakes and anadromous breeding areas were greater than Great Lakes and inland breeding areas ($P=0.0001$): Lake Huron and Lake Michigan breeding areas were significantly greater than inland lower peninsula, Lake Superior, and inland upper peninsula breeding areas ($P<0.0001$). Geometric mean PCB concentrations were ranked in the following order by location from highest to lowest: Lake Huron (n=8) > Lake Michigan (n=12) > inland lower peninsula (n=28) > Lake Superior (n=7) > inland upper peninsula (n=34) breeding areas.

- *alpha*-HCH was quantified in 2 samples ranging from 5.9 to 6.1 nanograms per gram (ng/g); both of the samples were from Lake Huron Great Lakes breeding areas. Because *alpha*-HCH was only quantified in 2% of the samples, statistical analysis was not possible.

- HCB was quantified in 2 samples ranging from 6.0 to 6.1 ng/g; both samples were from inland lower peninsula breeding areas. Because HCB was quantified in only 2% of the samples, statistical analysis was not possible.

- Dieldrin was quantified in 18 samples ranging from 2.1 to 5.6 ng/g; 14 samples were from Great Lakes breeding areas and 4 were from inland breeding areas. These samples were collected from Lake Huron (n=4) and inland lower peninsula (n=14) breeding areas. Because dieldrin was only quantified in 20% of the samples, statistical analysis was not possible.

- Mercury data will be provided in another report.

SECTION 2.0

INTRODUCTION

In April 1999, the MDEQ, Water Resources Division, began monitoring environmentally persistent and toxic contaminants in bald eagles. This study is part of the wildlife contaminant monitoring project component of the MDEQ's Strategy (MDEQ, 1997).

The November 1998 passage of the Clean Michigan Initiative-Clean Water Fund (CMI-CWF) bond proposal resulted in a substantial increase in annual funding for statewide surface water quality monitoring beginning in 2000. The CMI-CWF offers reliable funding for the monitoring of surface water quality over a period of approximately 15 years. This is important since one of the goals of the Strategy is to measure temporal and spatial trends in contaminant levels in Michigan's surface waters.

The bald eagle (*Haliaeetus leucocephalus*) was selected as a biosentinel species for monitoring contaminants in Michigan for the following reasons:

1. As a top-level predator, the bald eagle has a significant reliance on the aquatic food web and feeds primarily on fish and waterbirds. Specific dietary preferences of bald eagles include species of northern pike, suckers, bullheads, carp, catfish, bowfin, ducks, gulls, and deer (winter carrion and road-killed deer).

2. Past monitoring has shown that eagles accumulate organic and inorganic environmental contaminants and those contaminants may be quantified in blood, feather, and egg samples.

3. There is a viable population of bald eagles that provides sufficient sampling opportunities for a long-term monitoring program.

4. The large body size of nestling eagles allows monitoring to be conducted by blood sampling techniques and sufficient sample volumes are available to attain low quantification levels (QL).

5. Mature bald eagles display great fidelity to their chosen nesting territory and often return to the same nest tree year after year. Although some eagles may move away from their nesting territories in the winter months, bald eagles generally reside within the state's waters throughout the year. Therefore, contaminants found in nestling bald eagles will represent the uptake of available contaminants within a particular territory.

The primary objectives of this project were to gather the tenth year of data on eaglets, evaluate temporal trends between these data and historical data available in the scientific literature, and evaluate spatial trends of contaminant concentrations among watersheds and the Great Lakes basins. Because the methods for sample collection required nest visits and handling nestling eagles, other biological measures were obtained. Therefore, the secondary objectives of the project included determining reproductive success and collecting nestling morphological data. Both spatial and temporal trends of reproductive success were also assessed in this project.

In accordance with one of the key principles of the CMI-CWF, the bald eagle monitoring protocol was planned and conducted in partnership with outside organizations. In 1999, this partnership included Lake Superior State University and Clemson University, and since 2000, this partnership included Michigan State University and Clemson University.

This document serves as the tenth annual report for the bald eagle element of the Strategy. The first (MDEQ, 2002), second (MDEQ, 2003), third (MDEQ, 2004a), fourth (MDEQ, 2004b), fifth (MDEQ, 2008a), sixth (MDEQ, 2008b), seventh (MDNRE, 2010a), eighth (MDNRE, 2010b), and ninth (MDNRE, 2010c) reports contain results of the samples collected in 1999, 2000, 2001, 2002, 2003, 2004, 2005, 2006, and 2007, respectively. This report contains the analytical results for organic contaminants that were measured in nestling bald eagle blood samples, and statistical, temporal, and spatial trend analyses of the data. The results of the analyses of feathers for mercury will be provided in a separate report.

Section 3.0

STUDY DESIGN AND METHODS

3.1 SITE SELECTION

The bald eagle monitoring project is designed to provide monitoring coverage of both the coastal Great Lakes and inland waters. Nesting eagles are found along the shorelines and on islands of each of the four Great Lakes surrounding Michigan. Further, the distribution of breeding eagles across much of Michigan provides monitoring coverage for many of the major river systems. Currently, active bald eagle breeding areas are well distributed across the upper peninsula and northern lower peninsula of Michigan.

The establishment of breeding areas in southern Michigan is relatively recent, and the number of active breeding areas continues to increase as eagles either establish new breeding areas or reoccupy historical territories. For example, the breeding areas in Arenac, Barry, Ottawa, and Wayne Counties were established in 1998 or 1999. One breeding area in Monroe County was established in 1988 and the other three breeding areas were first occupied in 1998 or 1999. The first breeding areas in Allegan and Saginaw Counties were established in 1993. At the time of writing this report there were 790 breeding areas in the state of Michigan.

To facilitate the MDEQ's National Pollutant Discharge Elimination System permitting process, Michigan's watersheds, as delineated by eight-digit hydrologic unit codes (HUC), are divided into five basin years for monitoring (Figure 1). Therefore, approximately 20% of Michigan's surface waters are assessed each year. The bald eagle sample collection schedule is consistent with the basin year delineation and complements the other monitoring activities conducted during each basin year. In addition to the basin year sampling, nests associated with the Great Lakes, the connecting channels, and 12 inland territories are sampled annually. Great Lakes and connecting channel nests are sampled annually because nesting success is highly uncertain for these sites.

The following basin year watersheds were the focus of sampling in 2008: Bad-Montreal, Black-Presque Isle, Ontonagon, Rouge-Flat, Thornapple-Rabbit, Betsie-Platte, Boardman-Charlevoix, Pigeon, Birch-Willow, Flint, Lake St. Clair, and Raisin (Figure 2). In addition to the basin year watersheds for 2008, nests associated with the Great Lakes and connecting channels were sampled. Great Lakes-associated nests are defined as those nests within 8.0 kilometers of the shorelines of the Great Lakes and along tributaries where anadromous fish are accessible.

3.2 FIELD METHODS

The methods used to collect blood and breast feather samples from nestling bald eagles are designed to avoid injury and undue stress to the birds. Sample collection and morphometric methods are adapted from Bortolotti (1984a, 1984b, and 1984c), Henny and Meeker (1981), Henny *et al*. (1981), and Morizot *et al*. (1985). The methods are summarized below, but details of the procedures are published in a Standard Operating Procedure (SOP) (Bowerman and Roe, 2002).

Blood and feather samples were collected from five- to nine-week old nestling bald eagles from May 6 through June 25, 2008. The approximate age of nestling eagles is visually estimated from two aerial survey flights that are piloted by a Michigan Department of Natural Resource (MDNR) pilot or contracted private pilot. An observer on each flight makes notes of the nest tree and location, determines an aerial latitude and longitude for the nest, and notes the reproductive status of each nest (e.g., eggs, chicks, or adult brooding behavior). From the observer's notes, field crews are directed to the nests at the appropriate time for sampling. Field staff ground truth the latitude/longitude coordinates using Global Positioning System units.

Once at the nest, a trained crewmember climbs the nest tree and secures a nestling. The nestling is placed in a restraining bag, lowered to the ground, weighed by spring scale, and prepared for sampling. Morphological measurements of the culmen, hallux claw, and bill depth are derived by using calipers. The eighth primary feather and the footpad are measured using a ruler. Procedures developed by Bortolotti (1984b) are used to determine the age and sex of the nestlings. Sex is determined by the relationship of hallux claw length, footpad length, and bill depth. Once sex is determined, the length of the eighth primary feather is used to make a sex-specific estimation of age.

Sterile techniques are used to collect blood from the brachial vein of nestling bald eagles. Syringes fitted with 22 or 25 gauge x 1" needles are used for the veinipuncture. Up to 12 cc of blood are drawn from the brachial vein and are then transferred to heparinized vacuum tubes and placed on ice in coolers for transfer out of the field. Samples of whole blood are centrifuged within 48 hours of collection and the plasma is decanted and transferred to another vacuum tube and frozen at approximately -20^{o} C for storage. Three to four feather samples also are collected from the nestling eagles. Feathers are plucked from the breast and stored in small sealed envelopes. After sampling is completed, the nestlings are banded with a size 9 United States Fish and Wildlife Service (USFWS) rivet band. The nestling is then placed back in the restraining bag, raised, and released to the nest.

From the field, samples are transferred to prearranged collection points at various MDNR, United States Forest Service, or USFWS field stations. At the end of the sampling effort, all samples are collected and transferred to the USFWS's East Lansing Field Office, entered into sample storage through a chain-of-custody tracking system, and stored frozen at approximately -20^{o} C. Upon request to the USFWS chain-of-custody officer, samples are transferred to the Clemson Institute of Environmental Toxicology (CIET) for analysis. Upon receipt at the CIET, SOPs direct that samples be logged in, checked for sample integrity and again stored frozen at approximately -20^{o} C until prepared for instrumental analysis (CIET and Department of Environmental Toxicology, 1996; CIET, 1999).

3.3 LABORATORY METHODS

All plasma samples were received at the CIET laboratory under chain-of-custody by August 29, 2008. All extractions and analyses were conducted according to procedures detailed in CIET SOPs. Plasma samples were extracted in six batches. Chicken plasma was used for laboratory control samples in all analytical batches. In addition to the eagle plasma samples, each analytical batch contained a reagent blank, a chicken plasma matrix blank, a chicken plasma matrix spike, and a chicken plasma matrix spike duplicate.

Organochlorine pesticide and PCB concentrations were quantified by capillary gas chromatography with an electron capture detector using United States Environmental Protection Agency approved methods. All reported results were confirmed by dual column analysis. The QL for the organic compounds was 2 ng/g (parts per billion) with the exception of toxaphene, which had a QL of 125 ng/g. Method validation studies were conducted on chicken plasma as a surrogate matrix to ensure that the data quality objectives of the Quality Assurance Project Plan (CIET and Department of Environmental Toxicology, 1996; CIET, 1999) were met. Average recoveries of 70% to 130% for matrix spikes were required under the Quality Assurance Project Plan (CIET and Department of Environmental Toxicology, 1996; CIET, 1999). Correlation coefficients (r^2) for calibration curves consisting of 5 concentrations of standards were at least > 0.99 for all target analytes in all batches. The average detector response for the instrumental calibration checks was within 20% of the initial calibration for each batch. The average Relative Percent Difference for the spiked analytes in the chicken plasma matrix spike and chicken plasma matrix spike duplicate were less than 30% for all batches.

3.4 STATISTICAL DESIGN

For the purposes of reporting and statistical analysis of the 2008 data, and in keeping with reporting conventions in the scientific literature, the data were broadly grouped by breeding area location. At the broadest level, Great Lakes and inland breeding areas were compared. The breeding areas located on anadromous rivers were examined separately from other Great Lakes breeding areas for organic contaminants to better assess the concentrations that may be affecting bald eagle productivity along the Great Lakes. The Great Lakes-associated nests were evaluated further by lake basin (Superior, Michigan, Huron, and Erie). Inland breeding areas were also evaluated further by peninsula (inland lower and upper peninsula). Lastly, breeding areas were also grouped by watershed (HUC).

Contaminates were analyzed independently or grouped as follows. Total DDTs were analyzed as the sum of all DDT and DDT metabolites found. 4,4'-DDE was analyzed independently because of its pervasiveness in samples and history as an ecological factor. Total PCBs were examined as the sum of the 16 PCB congeners found. Heptachlor epoxide, *alpha*-Chlordane, and Dieldrin were all analyzed independently.

Statistical analyses were performed using nonparametric rank converted ANOVA tests. Nonparametric pair-wise comparisons, least significant difference, were used to determine where significant differences occurred within regions. Nonparametric statistics were employed as neither the assumptions of normality nor of linear regressions were met. All analyses were performed using the SAS Institute, Inc. (1999) statistical package. A probability level = 95% ($\alpha = 0.05$) was used to determine statistical significance. Differences in order (i.e., highest concentration to lowest concentration) between rank converted ANOVA and geometric mean results were observed and are the result of a combination of factors. The two factors are the assignment of the value of 0.0001 ng/g (see section 4.2) to all nondetects, and sample size, with the former having the greatest effect on the results. These two factors have also resulted is very large standard errors for some analyses; in these cases, the latter is suspected to have had the greatest effect.

SECTION 4.0

RESULTS AND DISCUSSION

4.2 ORGANIC CONTAMINANTS IN NESTLING BALD EAGLE BLOOD SAMPLES

In 2008, 92 nestling bald eagle blood samples were analyzed for organochlorine contaminants. The target list of analytes included historical organochlorine pesticides such as chlordane, dieldrin, and DDT and its metabolic products, and 20 PCB congeners. The complete list of analytes and the parameter-specific Method Detection Levels and QLs are shown in Table 1. For statistical analysis, concentrations less than the QL were reported as one-half the QL (1.00 ng/g) and nondetects were set at 0.0001 ng/g.

Of the 92 samples analyzed, 14 were from breeding areas in the 2008 basin year watersheds. Regionally, the analyzed samples were from 34 inland upper peninsula, 31 inland lower peninsula, 7 Lake Superior, 12 Lake Michigan, and 8 Lake Huron breeding areas. The no-observable-adverse-effect levels (NOAEL) in blood of bald eagle nestlings for DDE and PCBs that are associated with a healthy bald eagle population (i.e., an average of young per occupied nest) were determined using data from Bowerman et al. (2003). The NOAELs for DDE and PCBs in nestling blood are 11.4 and 36.4 ng/g, respectively.

4.21 DDT and Metabolites

Concentrations of 2,4'- and 4,4'-DDE, 2,4'- and 4,4'- DDT, and 2,4'- and 4,4'-dichlorodiphenyldichloroethane (4,4'-DDD) were measured in nestling bald eagle blood samples (Table 2). The most ubiquitous compound, 4,4'-DDE, was detected in 65 (71%) samples and on average made up 96% of the total DDT quantified. Statewide, concentrations of 4,4'-DDE ranged from < 1.0 to 44.8 ng/g. Total DDT concentrations were calculated as the sum of 2,4'- and 4,4'-DDE, 2,4'- and 4,4'-DDD, and 2,4'- and 4,4'-DDT.

Concentrations of 4,4'-DDE and total DDT in anadromous (n=3) breeding areas were greater than inland (n=65) breeding areas. Great Lakes (n=24) breeding areas were not significantly different from anadromous or inland breeding areas. Concentrations of 4,4'-DDE and total DDT for Great Lakes and anadromous (n=27) breeding areas combined were greater than inland breeding areas. Geometric mean 4,4'-DDE and total DDT concentrations were ranked in the following order by location from highest to lowest: anadromous, Great Lakes, and inland (Figure 3).

Concentrations of 4,4'-DDE and total DDT varied among Lake Michigan, Lake Superior, Lake Huron, inland upper peninsula, and inland lower peninsula. Concentrations of 4,4'-DDE and total DDT for Lake Huron and Lake Michigan were greater than inland lower peninsula, Lake Superior, and inland upper peninsula. Concentrations of 4,4'-DDE and total DDT for inland lower peninsula were greater than inland upper peninsula. Geometric mean 4,4'-DDE and total DDT concentrations were ranked in the following order by location from highest to lowest: Lake Huron (n=8), Lake Michigan (n=12), inland lower peninsula (n=31), Lake Superior (n=7), and inland upper peninsula (n=34) breeding areas (Figure 3).

Concentrations of 4,4'-DDE and total DDT varied among Lakes Huron, Michigan, and Superior watersheds. Geometric mean 4,4'-DDE and total DDT concentrations were ranked in the following order by Great Lakes watershed from highest to lowest: Lake Huron (n=30), Lake Michigan (n=43), and Lake Superior (n=17; Figure 4).

The greatest total DDT concentration (46.3 ng/g) in an individual breeding area occurred in a nestling from the Wingleton Lake Baldwin breeding area, which is located in Lake County near Baldwin in the midwest of Michigan (Table 2). 4,4'-DDE made up 97% of the total DDT found in that eaglet. In past reports, a total DDT concentration of ≥ 100 ng/g was arbitrarily considered to be high. No eaglet sampled attained this threshold.

The NOAEL for 4,4'-DDE in the blood of nestling bald eagles was determined to be 11.4 ng/g based on data presented in Bowerman et al. (2003). Of the 92 nestling plasma samples analyzed in 2008, 12 (13%) exceeded the NOAEL. Of these eaglets exceeding the NOAEL, 8 (67%) were from Great Lakes breeding areas. It is possible that once some of these nestlings reach breeding age, they may not be able to reproduce at a level considered to support a healthy population due to elevated concentrations of 4,4'-DDE. The finding that some nestlings have concentrations of 4,4'-DDE in their blood above the NOAEL further stresses the importance of the long-term monitoring program to track fluctuations in annual bald eagle productivity within the state of Michigan.

4.22 PCBs

Twenty PCB congeners were quantified and summed to determine total PCBs in nestling bald eagle plasma samples (Table 3). Six PCB congeners (110, 118, 138, 153, 180, and 187) made up 89% of all PCBs detected in samples. PCB congeners 18, 28, 44, and 107 were not found in any eaglets.

Statewide total PCB concentrations ranged from nondetect to 94.0 ng/g (Table 3). No PCBs were found in 43 (47%) of the nestlings sampled. Thirty-nine of the nestlings in which no PCB congeners were detected were from inland breeding areas. PCB congeners were detected in nestlings from inland, Great Lakes, and anadromous breeding areas (Table 3).

Total PCB concentrations were calculated as the sum of all PCB congeners (Table 3). Total PCB concentrations for anadromous (n=3) breeding areas were greater than Great Lakes (n=24) and inland (n=65) breeding areas (Figure 5). Total PCB concentrations for Great Lakes and anadromous breeding areas combined (n=27) were greater than inland breeding areas.

Total PCB concentrations for Lake Huron and Lake Michigan breeding areas were significantly greater than inland lower peninsula, Lake Superior, and inland upper peninsula breeding areas (Figure 5). The greatest total concentration of PCBs (94.0 ng/g) was found in a Lake Huron eaglet in Arenac County at the Pt AuGres N breeding area near Saginaw Bay (Table 3). Geometric mean PCB concentrations were ranked in the following order by location from highest to lowest: Lake Huron (n=8), Lake Michigan (n=12), inland lower peninsula (n=28), Lake Superior (n=7), and inland upper peninsula (n=34) breeding areas.

The total PCB concentration for the Lake Huron watershed was greater than the Lakes Michigan and Superior watersheds (Figure 6). Geometric mean total PCB concentrations were ranked in the following order by Great Lakes watershed from highest to lowest: Huron (n=27), Michigan (n=43), and Superior (n=17).

The NOAEL for total PCBs in the blood of nestling bald eagles was determined to be 36.4 ng/g based on data presented in Bowerman et al. (2003). Of the 92 nestling plasma samples analyzed in 2008, 7 (8%) of the samples exceed the NOAEL. It is therefore possible that once some of these nestlings reach breeding age, they may not be able to reproduce at a level considered to support a healthy population due to elevated concentrations of PCBs. The finding that some nestlings have concentrations of PCBs in their blood above the NOAEL further stresses the importance of the long-term monitoring program that is needed to track fluctuations in annual bald eagle productivity within the state of Michigan.

4.23 Other Organics

The other organic contaminants that were detected in 2008 nestlings were *alpha*-HCH, HCB, and dieldrin (Table 4). However, no statistical analysis was conducted for these contaminants because *alpha*-HCH, HCB, and dieldrin were detected in only 2%, 2%, and 20%, respectively, of the samples. Concentrations of *alpha*-chlordane, *gamma*-HCH, heptachlor, heptachlor epoxide, *gamma*-chlordane, and toxaphene were not detected in any of the samples. The following is a summary of the results of these analyses:

- *alpha*-HCH was quantified in 2 samples ranging from 5.9 to 6.1 ng/g. Both of these samples were from Lake Huron Great Lakes breeding areas.

- HCB was quantified in 2 samples ranging from 6.0 to 6.1 ng/g. Both of these samples were from inland lower peninsula breeding areas.

- Dieldrin was quantified in 18 samples ranging from 2.1 to 5.6 ng/g. Fourteen of these samples were from Great Lakes breeding areas and 4 were from inland breeding areas. Regionally, samples were from Lake Huron (n=4) and inland lower peninsula (n=14) breeding areas.

SECTION 5.0

FUTURE STUDIES

Several potential areas of future study were identified during the course of this monitoring study:

- Conduct further investigations to determine the source of PCBs found in hotspots such as Lake Superior in northwest Marquette County.

- Examine contaminant data to assess the partitioning of contaminants between various media and biota.

- Analyze archived eagle samples to enhance our ability to assess trends.

SECTION 6.0

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SECTION 7.0

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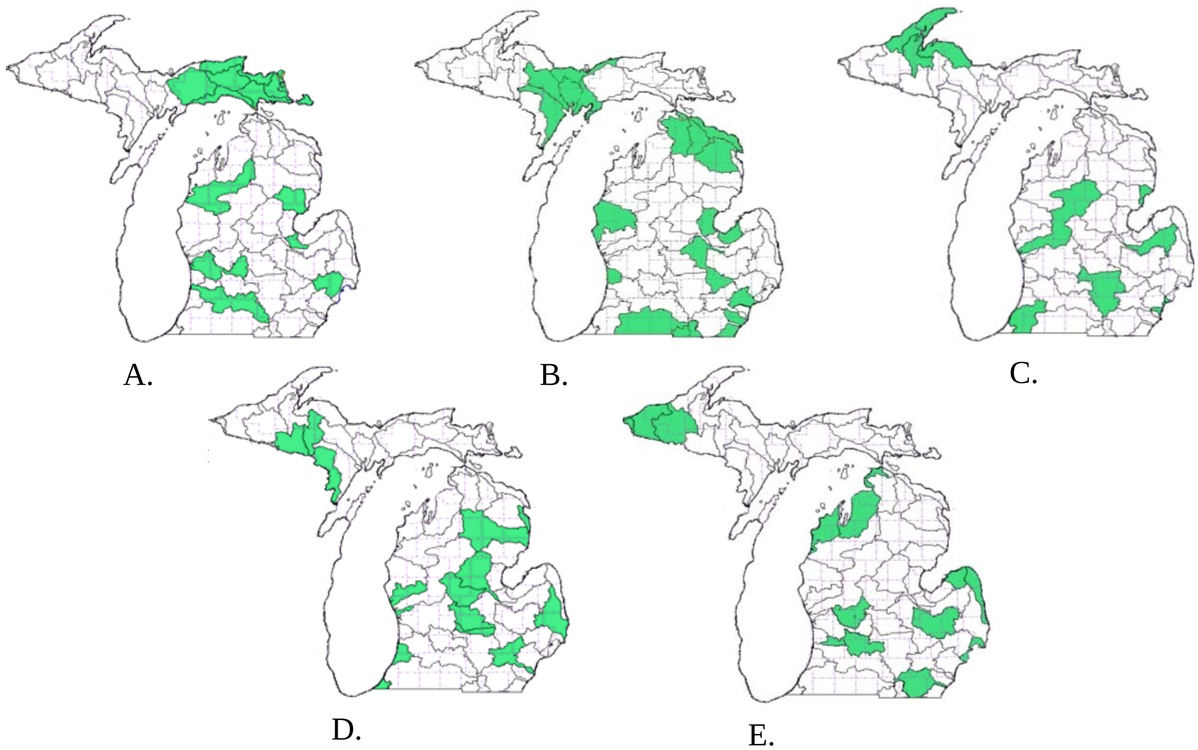
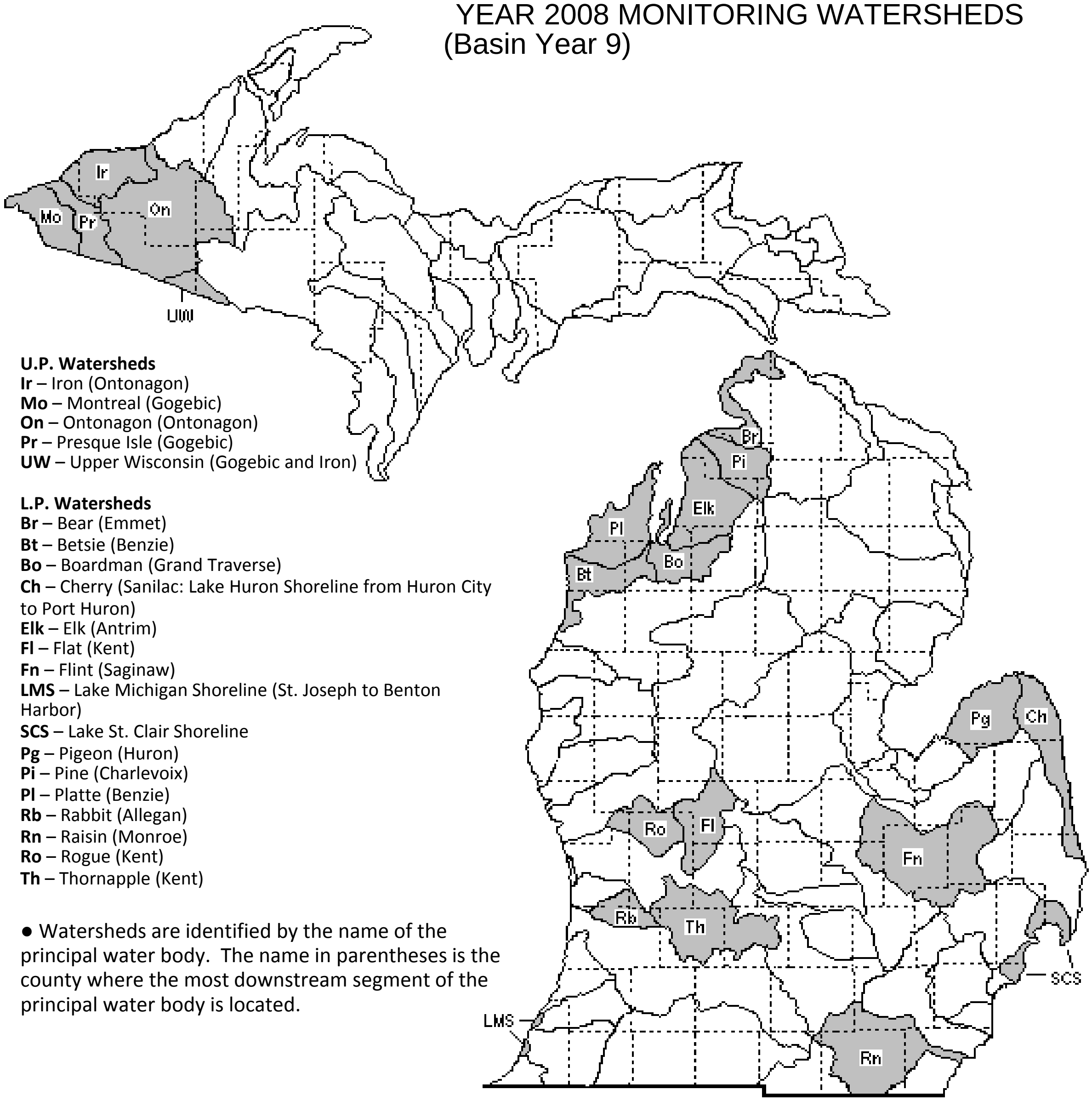


Figure 1. Michigan's watershed delineations and monitoring 'basin years': (A) 1999, 2004 basin year watersheds (shaded); (B) 2000, 2005 basin year watersheds (shaded); (C) 2001, 2006 basin year watersheds (shaded); (D) 2002, 2007 basin year watersheds (shaded); and (E) 2003, 2008 basin year watersheds (shaded).

Figure 2. The 2008 basin year watersheds.

YEAR 2008 MONITORING WATERSHEDS
(Basin Year 9)



U.P. Watersheds
Ir – Iron (Ontonagon)
Mo – Montreal (Gogebic)
On – Ontonagon (Ontonagon)
Pr – Presque Isle (Gogebic)
UW – Upper Wisconsin (Gogebic and Iron)

L.P. Watersheds
Br – Bear (Emmet)
Bt – Betsie (Benzie)
Bo – Boardman (Grand Traverse)
Ch – Cherry (Sanilac: Lake Huron Shoreline from Huron City to Port Huron)
Elk – Elk (Antrim)
Fl – Flat (Kent)
Fn – Flint (Saginaw)
LMS – Lake Michigan Shoreline (St. Joseph to Benton Harbor)
SCS – Lake St. Clair Shoreline
Pg – Pigeon (Huron)
Pi – Pine (Charlevoix)
Pl – Platte (Benzie)
Rb – Rabbit (Allegan)
Rn – Raisin (Monroe)
Ro – Rogue (Kent)
Th – Thornapple (Kent)

● Watersheds are identified by the name of the principal water body. The name in parentheses is the county where the most downstream segment of the principal water body is located.

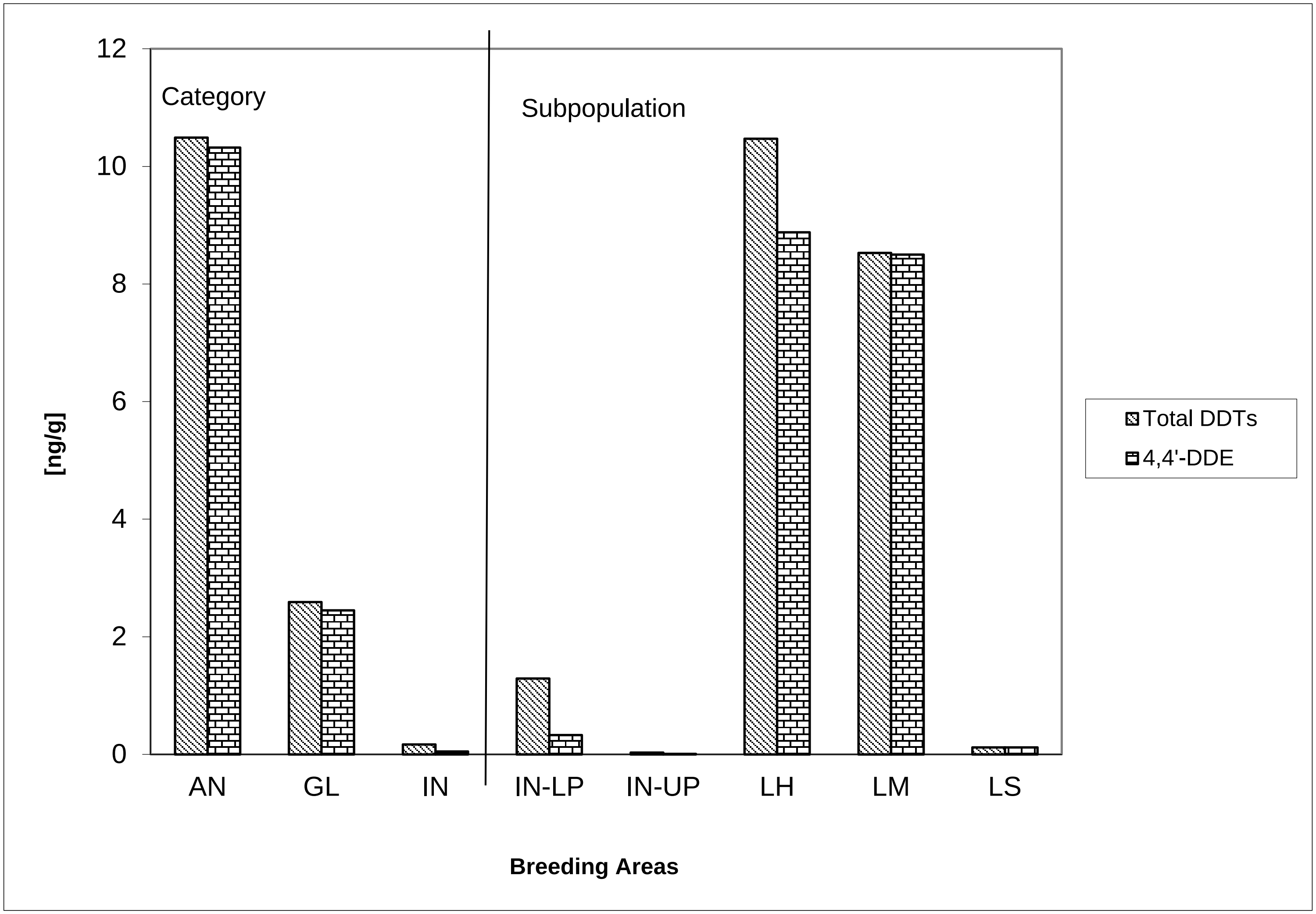


Figure 3. Geometric mean Total DDT and 4,4'-DDE concentrations (ng/g) in nestling bald eagles in 2008 by categories and subpopulations. Error bars have not been included because the number of nondetects makes them too large to display.

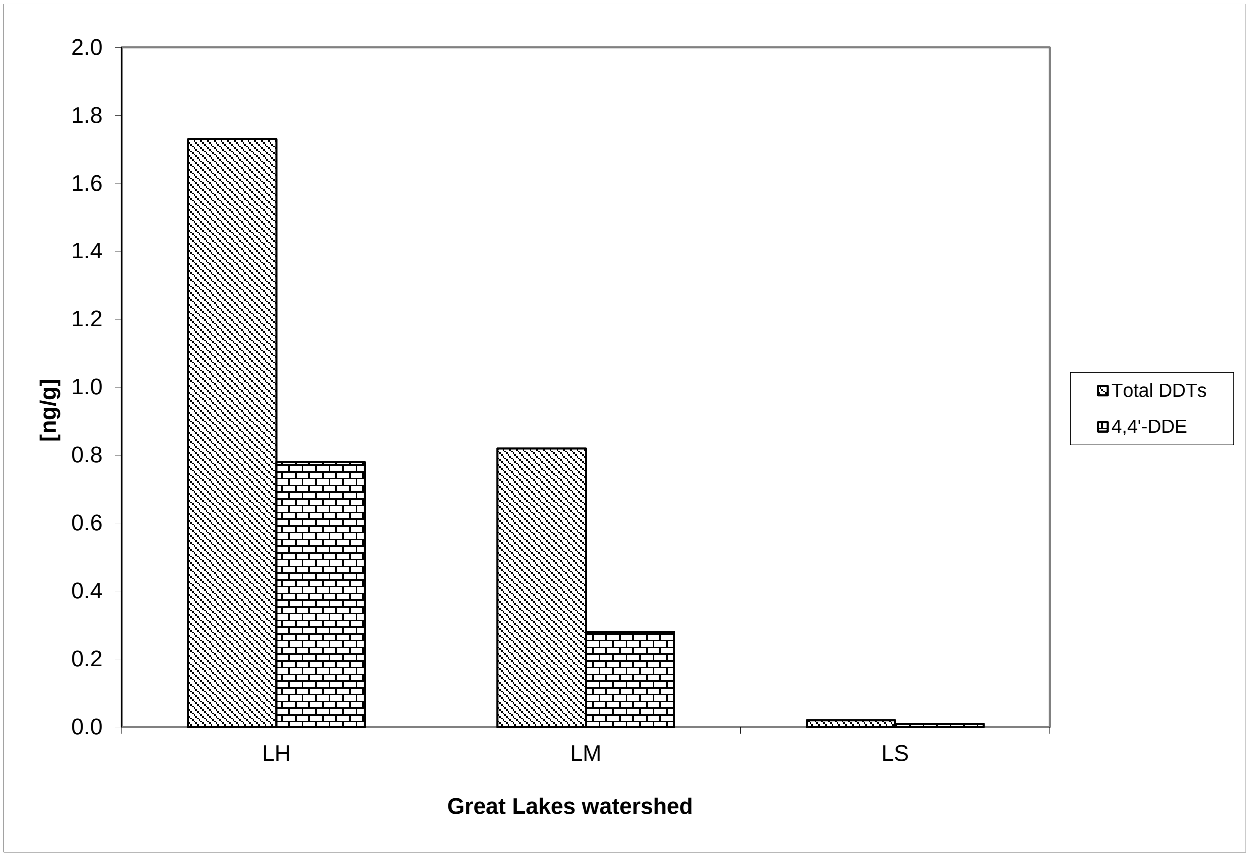


Figure 4. Geometric mean Total DDT and 4,4'-DDE concentrations (ng/g) in nestling bald eagles in 2008 by Great Lakes watersheds. Error bars have not been included because the number of nondetects makes them too large to display.

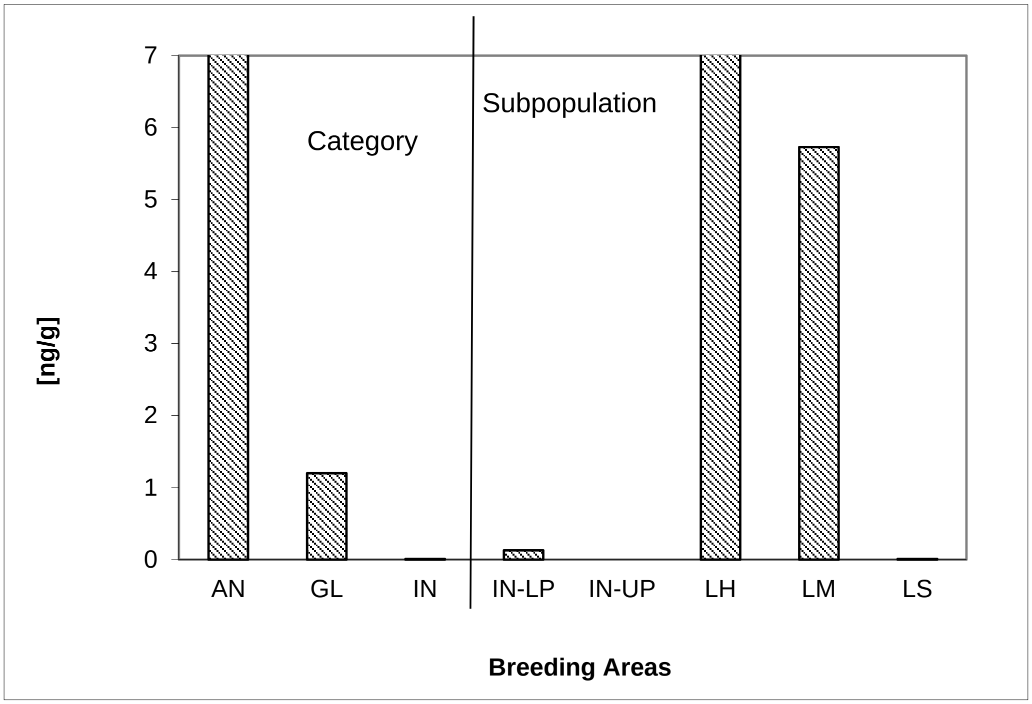


Figure 5. Geometric mean Total PCB concentrations (ng/g) in nestling bald eagles in 2008 by categories and subpopulations. The geometric mean for AN and LH were 11. 6 and 21.1 ng/g, respectively, because they were so much greater than the other results they have been truncated to better show other data points. Error bars have not been included because the number of nondetects makes them too large to display.

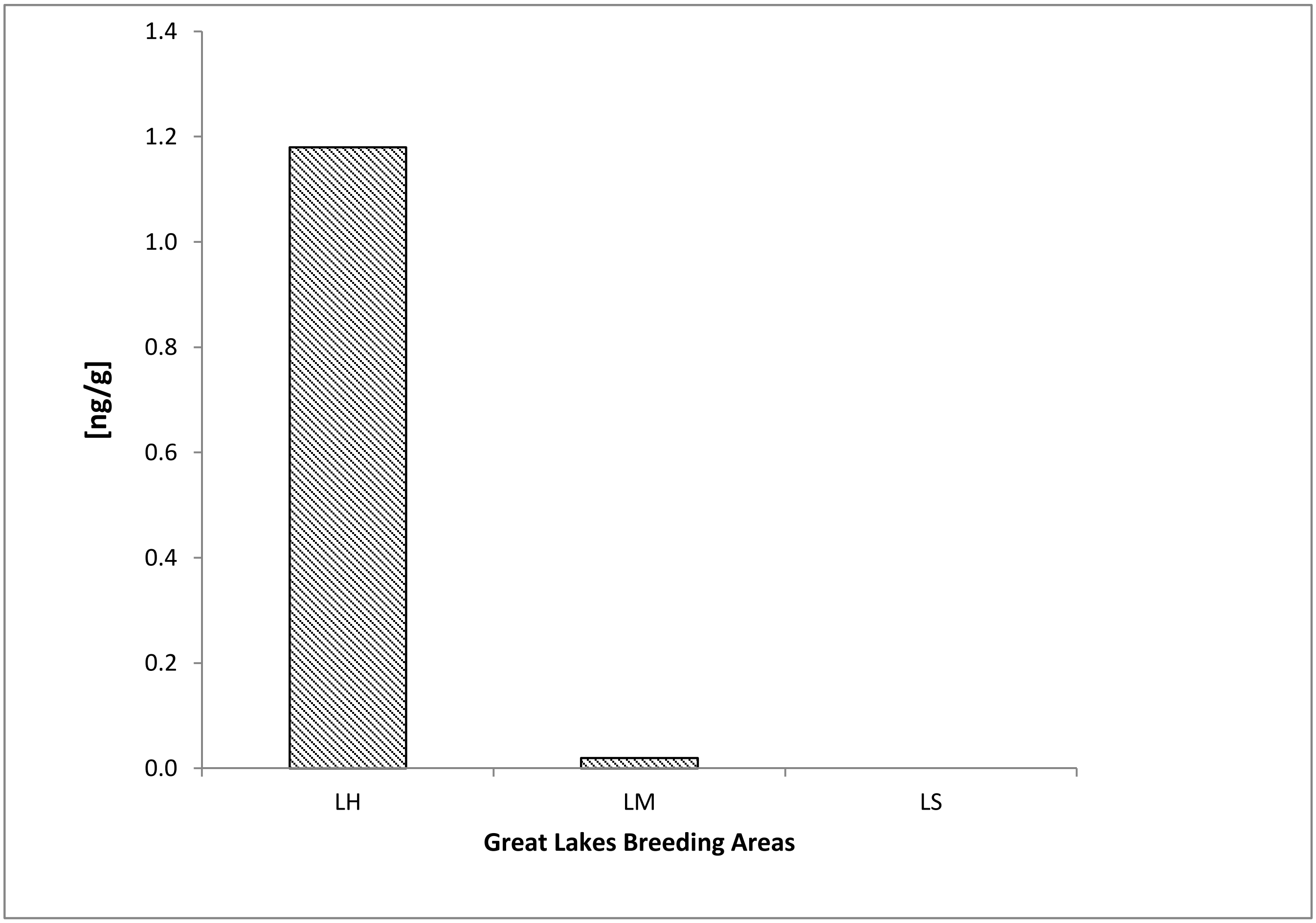


Figure 6. Geometric mean Total PCB concentrations (ng/g) in nestling bald eagles in 2008 by Great Lakes watersheds. Error bars have not been included because the number of nondetects makes them too large to display.

Table 1. Organochlorine contaminant analytes measured in nestling bald eagle blood samples in 2008, with parameter-specific Method Detection Levels (MDLs) and Quantification Levels (QLs).

Organochlorine Contaminant Analyte List	MDL	QL
Hexachlorobenzene	0.54	2.01
alpha -Hexachlorocyclohexane	1.94	2.01
gamma -Hexachlorocyclohexane (Lindane)	1.84	2.01
Heptachlor	1.74	2.00
Heptachlor Epoxide	0.77	2.00
alpha -Chlordane	0.75	2.01
gamma -Chlordane	0.55	2.01
Dieldrin	0.97	2.01
Toxaphene	---	125.0
2,4'-Dichlorodiphenyldichloroethylene (2,4'-DDE)	0.86	2.01
4,4'-DDE	0.61	2.01
2,4'-Dichlorodiphenyldichloroethane (2,4'-DDD)	1.55	2.01
4,4'-DDD	1.18	2.00
2,4'-Dichlorodiphenyltrichloroethane (2,4'-DDT)	1.57	2.01
4,4'-DDT	1.95	2.01
PCB Congener 8	1.94	1.98
PCB Congener 18	1.21	1.98
PCB Congener 28	1.23	1.99
PCB Congener 44	1.52	1.98
PCB Congener 52	0.64	1.98
PCB Congener 66	0.87	2.00
PCB Congener 101	0.38	2.00
PCB Congener 105	1.44	1.98
PCB Congener 110	1.91	2.01
PCB Congener 118	0.58	1.99
PCB Congener 128	0.75	1.99
PCB Congener 138	0.65	2.00
PCB Congener 153	0.57	1.99
PCB Congener 156	1.84	2.01
PCB Congener 170	1.28	1.98
PCB Congener 180	1.62	2.00
PCB Congener 187	1.12	1.98
PCB Congener 195	1.03	2.00
PCB Congener 206	1.19	1.98
PCB Congener 209	1.03	1.99

Table 2. Concentrations of DDE, DDD, and Total DDT compounds (ng/g wet weight (ppb)) in nestling bald eagle plasma samples analyzed in 2008. Breeding areas were located in either inland lower peninsula (LP), inland upper peninsula (UP), Lake Huron (LH), Lake Michigan (LM), or Lake Superior (LS) watersheds. Territories were associated with either inland (IN), Great Lakes (GL), or anadromous (AN) water bodies.

Territory	Breeding Area Location	Territory Location	Blood Sample Number	Breeding Area Name	2,4'-DDD	2,4'-DDE	2,4'-DDT	4,4'-DDD	4,4'-DDE	4,4'-DDT	DDE+DDT +DDD
AG-18a	IN	UP	BAEA-MI-2008-A-002	Forest L. Basin N.	ND	ND	ND	ND	1.2	ND	1.2
AG-20a	IN	UP	BAEA-MI-2008-A-003	Hovey L.	ND	ND	ND	ND	1.2	ND	1.2
AG-23a	GL	LS	BAEA-MI-2008-A-005	Wick Pt	ND	ND	ND	ND	1.3	ND	1.3
AL-04a	IN	LP	BAEA-MI-2008-A-006	McCollum L.	ND	ND	ND	ND	ND	ND	0.0
AL-12a	IN	LP	BAEA-MI-2008-A-010	Hubbard L.	ND	ND	ND	1.5	28.9	ND	30.4
AP-03c	GL	LH	BAEA-MI-2008-A-015	North Point	ND	ND	ND	ND	11.9	ND	11.9
AP-08e	GL	LH	BAEA-MI-2008-A-017	Devils L.	ND	ND	ND	1.5	44.8	ND	46.3
AP-13a	GL	LH	BAEA-MI-2008-A-019	N Pt Grass L	ND	ND	ND	ND	2.8	ND	2.8
AR-06b	AN	LH	BAEA-MI-2008-A-020	Forest L.	ND	ND	ND	ND	3.4	ND	3.4
AR-07b	GL	LH	BAEA-MI-2008-A-021	Omer	ND	ND	ND	ND	2.9	ND	2.9
AR-10C	GL	LH	BAEA-MI-2008-A-022	Pt AuGres N	ND	ND	ND	ND	2.9	ND	2.9
BG-11a	GL	LS	BAEA-MI-2008-A-024	Reed's Pt	ND	ND	ND	ND	21.0	ND	21.0
BG-12a	IN	UP	BAEA-MI-2008-A-027	Pequiming Pt	ND	ND	ND	ND	9.7	ND	9.7
BZ-08b	GL	LM	BAEA-MI-2008-A-029	crystal l	ND	ND	ND	ND	31.3	ND	31.3
CB-15b	IN	LP	BAEA-MI-2008-A-030	Roberts L.	ND	ND	ND	ND	ND	ND	0.0
CB-17a	IN	LP	BAEA-MI-2008-A-033	Stone Ck Fldg	ND	ND	ND	ND	ND	ND	0.0
CL-04b	IN	LP	BAEA-MI-2008-A-036	Doc & Tom L.	ND	ND	ND	ND	6.3	ND	6.3
ET-06b	GL	LM	BAEA-MI-2008-A-038	L. Paradise	ND	ND	ND	ND	ND	ND	0.0
CL-05a	IN	LP	BAEA-MI-2008-A-041	Long L.	ND	ND	ND	ND	6.7	ND	6.7
CR-10c	IN	LP	BAEA-MI-2008-A-042	Shellenbarger Lake	ND	ND	ND	ND	ND	ND	0.0
CX-03b	GL	LM	BAEA-MI-2008-A-045	Garden Isd.	ND	ND	ND	ND	1.2	ND	1.2
CX-09b	GL	LM	BAEA-MI-2008-A-046	Lake Geneserath	ND	ND	ND	ND	2.0	ND	2.0
DE-29a	GL	LM	BAEA-MI-2008-A-047	Masonville	ND	ND	ND	ND	ND	ND	0.0
DE-33a	GL	LH	BAEA-MI-2008-A-048	Days River	ND	ND	ND	ND	ND	ND	0.0
DI-06d	IN	UP	BAEA-MI-2008-A-049	Badwater L.	ND	ND	ND	ND	11.8	ND	11.8
DI-08c	IN	UP	BAEA-MI-2008-A-052	Rock L.- Camey Outlet	ND	ND	ND	ND	ND	ND	0.0
DI-11c	IN	UP	BAEA-MI-2008-A-053	Hardwood Impoundment	ND	ND	ND	ND	ND	ND	0.0
DI-14b	IN	UP	BAEA-MI-2008-A-056	L Antione	ND	ND	ND	ND	ND	ND	0.0
DI-15b	IN	UP	BAEA-MI-2008-A-057	Blomgren March	ND	ND	ND	ND	2.6	ND	2.6
DI-16a	IN	UP	BAEA-MI-2008-A-058	Sturgeion Falls Dam N	ND	ND	ND	ND	2.8	ND	2.8
DI-16a	IN	UP	BAEA-MI-2008-A-059	Sturgeion Falls Dam N	ND	ND	ND	ND	1.0	ND	1.0
ET-01c	GL	LM	BAEA-MI-2008-A-060	Wycamp L.	ND	ND	ND	ND	2.7	ND	2.7
ET-02g	IN	LP	BAEA-MI-2008-A-061	Pickerel Channel	ND	ND	ND	ND	ND	ND	0.0
ET-02g	IN	LP	BAEA-MI-2008-A-063	Pickerel Channel	ND	ND	ND	ND	8.3	ND	8.3
ET-04a	IN	LP	BAEA-MI-2008-A-064	Larks L.	ND	ND	ND	ND	3.5	ND	3.5
ET-13a	IN	LP	BAEA-MI-2008-B-001	Alanson	ND	ND	ND	ND	1.0	ND	1.0
GL-05a	IN	LP	BAEA-MI-2008-B-003	Lake Four	ND	ND	ND	ND	2.9	ND	2.9
GO-02e	IN	UP	BAEA-MI-2008-B-004	Sucker L. S.	ND	ND	ND	ND	3.3	ND	3.3
GO-08b	IN	UP	BAEA-MI-2008-B-007	Bass L.	ND	ND	ND	ND	3.2	ND	3.2
Go-23c	IN	UP	BAEA-MI-2008-B-008	Corey L	ND	ND	ND	ND	4.4	ND	4.4
GO-28f	IN	UP	BAEA-MI-2008-B-010	Lac Vieux Desert	ND	ND	ND	ND	2.7	ND	2.7
GO-36a	IN	UP	BAEA-MI-2008-B-012	West Bay L.	ND	ND	ND	4.8	22.5	ND	27.2
GO-37a	IN	UP	BAEA-MI-2008-B-015	Big Bateau L.	ND	ND	ND	4.3	5.1	ND	9.4
GO-42a	IN	UP	BAEA-MI-2008-B-016	Plymouth Mine	ND	ND	ND	4.4	6.6	ND	11.0
GT-06	GL	LM	BAEA-MI-2008-B-017	Yuba Valley	ND	ND	ND	ND	10.1	ND	10.1
GT-06	GL	LM	BAEA-MI-2008-B-021	Yuba Valley	ND	ND	ND	ND	4.4	ND	4.4
GT-06	GL	LM	BAEA-MI-2008-B-023	Yuba Valley	ND	ND	ND	ND	3.6	ND	3.6
HO-01g	GL	LS	BAEA-MI-2008-B-024	Rockhouse Pt	ND	ND	ND	ND	3.0	ND	3.0
HO-02e	GL	LS	BAEA-MI-2008-B-027	Rabbit Bay	ND	ND	ND	ND	5.9	ND	5.9
HO-04c	GL	LS	BAEA-MI-2008-B-030	La Chance Bay	ND	ND	ND	ND	3.4	ND	3.4
HO-11d	IN	UP	BAEA-MI-2008-B-036	Prickett L S	ND	ND	ND	ND	4.2	ND	4.2
HO-16a	GL	LS	BAEA-MI-2008-B-038	N Portage Canal	ND	ND	ND	ND	2.6	ND	2.6
IO-03e	GL	LH	BAEA-MI-2008-B-040	Tawas Lake N.	ND	ND	ND	ND	3.5	ND	3.5
IO-08b	IN	LP	BAEA-MI-2008-B-042	Loud Dam Pond	ND	ND	ND	ND	20.0	ND	20.0
IO-13b	IN	LP	BAEA-MI-2008-B-043	Wichert Hills	ND	ND	ND	ND	3.3	ND	3.3
IO-14b	IN	LP	BAEA-MI-2008-B-044	Monument E.	ND	ND	ND	ND	ND	ND	0.0
IR-15d	IN	UP	BAEA-MI-2008-B-045	Paint R.- MudL	ND	ND	ND	ND	ND	ND	0.0
IR-21e	IN	UP	BAEA-MI-2008-B-046	Michigamme Resevoir	ND	ND	ND	ND	ND	ND	0.0
IR-24e	IN	UP	BAEA-MI-2008-B-049	Peavy Dam/ Peavy Pond	ND	ND	ND	ND	28.2	ND	28.2
IR-26a	IN	UP	BAEA-MI-2008-B-050	Brule L.	ND	ND	ND	ND	17.0	ND	17.0
IR-46b	IN	UP	BAEA-MI-2008-B-052	Brule R.	ND	ND	ND	ND	6.9	ND	6.9

Table 2. Continued.

Territory	Breeding Area Location	Territory Location	Blood Sample Number	Breeding Area Name	2,4'-DDD	2,4'-DDE	2,4'-DDT	4,4'-DDD	4,4'-DDE	4,4'-DDT	DDE+DDT +DDD
IR-48b	IN	UP	BAEA-MI-2008-B-054	Indian L.	ND	ND	ND	ND	5.1	ND	5.1
LA-03f	IN	LP	BAEA-MI-2008-B-056	Wingleton L. Baldwin	ND	ND	ND	ND	21.5	ND	21.5
LA-06a	IN	LP	BAEA-MI-2008-B-058	Big Bass L.	ND	ND	ND	ND	13.5	ND	13.5
LU-02d	IN	UP	BAEA-MI-2008-B-060	Foster Isd	ND	ND	ND	ND	2.8	ND	2.8
LU-08f	IN	UP	BAEA-MI-2008-B-062	Mud L- McMillan	ND	ND	ND	ND	7.2	ND	7.2
MC-06d	IN	UP	BAEA-MI-2008-B-063	S. Manistique L	ND	ND	ND	ND	1.0	ND	1.0
MC-24c	IN	UP	BAEA-MI-2008-B-065	Shoepac L	ND	ND	ND	ND	1.7	ND	1.7
MK-01i	IN	LP	BAEA-MI-2008-B-066	Jennings	ND	ND	ND	ND	9.9	ND	9.9
MK-04b	IN	LP	BAEA-MI-2008-B-068	Reedsburg	ND	ND	ND	ND	7.2	ND	7.2
MK-04b	IN	LP	BAEA-MI-2008-B-070	Reedsburk	ND	ND	ND	ND	3.3	ND	3.3
MM-04e	IN	UP	BAEA-MI-2008-B-072	Shakey R	ND	ND	ND	ND	1.0	ND	1.0
MM-15a	IN	UP	BAEA-MI-2008-B-074	Ten Mile Ck-Whitney	ND	ND	ND	ND	3.1	ND	3.1
MM-22c	GL	LM	BAEA-MI-2008-B-075	Deadmans Pt	ND	ND	ND	ND	ND	ND	ND
MM-25a	IN	UP	BAEA-MI-2008-B-077	Poch de Noch	ND	ND	ND	ND	ND	ND	ND
MS-05c	AN	LM	BAEA-MI-2008-B-078	Walhale E	ND	ND	ND	ND	ND	ND	ND
MY-01i	IN	LP	BAEA-MI-2008-B-079	Valentine L.	ND	ND	ND	ND	ND	ND	ND
NE-01l	AN	LM	BAEA-MI-2008-B-080	Anderson Bayou	ND	ND	ND	ND	1.5	ND	1.5
OG-01F	IN	LP	BAEA-MI-2008-B-083	Rifle R. Rec Area	ND	ND	ND	ND	ND	ND	ND
OG-08b	IN	LP	BAEA-MI-2008-B-085	Devoe Lake	ND	ND	ND	ND	2.4	ND	2.4
OG-11a	IN	LP	BAEA-MI-2008-B-086	Edwards	ND	ND	ND	ND	1.8	ND	1.8
ON-25a	IN	UP	BAEA-MI-2008-B-088	Three Rapids	ND	ND	ND	ND	ND	ND	ND
ON-27a	GL	LS	BAEA-MI-2008-B-090	Carp R Escarpment	ND	ND	ND	ND	ND	ND	ND
OS-04e	IN	LP	BAEA-MI-2008-B-091	S. Br Thunder Bay R.	ND	ND	ND	ND	ND	ND	ND
OS-06b	IN	LP	BAEA-MI-2008-B-094	Shamrock L.	ND	ND	ND	ND	ND	ND	ND
OS-09a	IN	LP	BAEA-MI-2008-B-096	Mack L.	ND	ND	ND	ND	2.7	ND	2.7
OS-11a	IN	LP	BAEA-MI-2008-B-098	Perry L.	ND	ND	ND	ND	1.0	ND	1.0
RO-13b	IN	LP	BAEA-MI-2008-B-099	Prudenville	ND	ND	ND	ND	ND	ND	ND
RO-19a	IN	LP	BAEA-MI-2008-B-101	DNR Airport	ND	ND	ND	ND	ND	ND	ND
SC-12b	IN	UP	BAEA-MI-2008-B-102	Thunder Bay	ND	ND	ND	ND	ND	ND	ND
VI-90a	IN	UP	BAEA-MI-2008-B-103	Tenderfoot L. NE	ND	ND	ND	ND	ND	ND	ND
WX-02a	IN	LP	BAEA-MI-2008-B-104	L. Mitchell	ND	ND	ND	ND	1.2	ND	1.2

Table 3. Concentrations of individual PCB congeners and Total PCBs (ng/g wet weight (ppb)) in nestling bald eagle plasma samples analyzed in 2008. Breeding areas were located in either inland lower peninsula (LP), inland upper peninsula (UP), Lake Huron (LH), Lake Michigan (LM), or Lake Superior (LS) watersheds. Territories were associated with either inland (IN), Great Lakes (GL), or anadromous (AN) water bodies.

Territory	Breeding Area Location	Territory Location	Blood Sample Number	Breeding Area Name	#008	#018	#028	#044	#052	#066	#101	#105	#110	#118	#128	#138	#153	#156	#170	#180	#187	#195	#206	#209	SUM PCBs
AG-18a	IN	UP	BAEA-MI-2008-A-002	Forest L. Basin N.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2	1.1	ND	ND	ND	ND	ND	ND	ND	2.2
AG-20a	IN	UP	BAEA-MI-2008-A-003	Hovey L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AG-23a	GL	LS	BAEA-MI-2008-A-005	Wick Pt	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AL-04a	IN	LP	BAEA-MI-2008-A-006	McCollum L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AL-12a	IN	LP	BAEA-MI-2008-A-010	Hubbard L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.4	0.8	9.7	11.6	ND	ND	2.9	2.4	ND	ND	ND	28.8
AP-03c	GL	LH	BAEA-MI-2008-A-015	North Point	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.0	5.3	ND	ND	0.8	0.5	ND	ND	ND	11.7
AP-08e	GL	LH	BAEA-MI-2008-A-017	Devils L.	ND	ND	ND	ND	ND	1.5	4.9	ND	ND	ND	3.3	21.3	26.3	ND	ND	6.6	5.9	ND	ND	ND	69.8
AP-13a	GL	LH	BAEA-MI-2008-A-019	N Pt Grass L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AR-06b	AN	LH	BAEA-MI-2008-A-020	Forest L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6.8	ND	ND	ND	ND	ND	ND	ND	ND	6.8
AR-07b	GL	LH	BAEA-MI-2008-A-021	Omer	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AR-10C	GL	LH	BAEA-MI-2008-A-022	Pt AuGres N	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	ND	ND	ND	ND	ND	ND	ND	ND	1.0
BG-11a	GL	LS	BAEA-MI-2008-A-024	Reed's Pt	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.4	1.4	14.4	19.9	ND	ND	8.8	5.3	ND	ND	ND	54.2
BG-12a	IN	UP	BAEA-MI-2008-A-027	Pequiming Pt	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.2	ND	6.4	7.4	ND	ND	2.3	1.6	ND	ND	ND	18.9
BZ-08b	GL	LM	BAEA-MI-2008-A-029	crystal l	ND	ND	ND	ND	ND	ND	1.6	3.7	ND	6.1	1.0	14.2	21.1	ND	ND	9.9	5.1	ND	ND	ND	62.8
CB-15b	IN	LP	BAEA-MI-2008-A-030	Roberts L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CB-17a	IN	LP	BAEA-MI-2008-A-033	Stone Ck Fldg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CL-04b	IN	LP	BAEA-MI-2008-A-036	Doc & Tom L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.2	ND	4.3	4.9	ND	ND	1.5	6.9	ND	ND	ND	17.8
ET-06b	GL	LM	BAEA-MI-2008-A-038	L. Paradise	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CL-05a	IN	LP	BAEA-MI-2008-A-041	Long L.	ND	ND	ND	ND	ND	ND	2.1	ND	ND	1.6	ND	6.0	6.8	ND	ND	1.6	1.2	ND	ND	ND	19.4
CR-10c	IN	LP	BAEA-MI-2008-A-042	Shellenbarger Lake	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CX-03b	GL	LM	BAEA-MI-2008-A-045	Garden Isd.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CX-09b	GL	LM	BAEA-MI-2008-A-046	Lake Geneserath	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	ND	ND	ND	ND	ND	ND	ND	1.0
DE-29a	GL	LM	BAEA-MI-2008-A-047	Masonville	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DE-33a	GL	LH	BAEA-MI-2008-A-048	Days River	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.9	2.4	ND	ND	0.1	ND	ND	ND	ND	4.3
DI-06d	IN	UP	BAEA-MI-2008-A-049	Badwater L.	ND	ND	ND	ND	ND	1.9	3.4	ND	ND	1.5	ND	5.7	8.1	ND	ND	ND	ND	ND	ND	ND	20.6
DI-08c	IN	UP	BAEA-MI-2008-A-052	Rock L.- Camey Outlet	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DI-11c	IN	UP	BAEA-MI-2008-A-053	Hardwood Impoundment	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DI-14b	IN	UP	BAEA-MI-2008-A-056	L Antione	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DI-15b	IN	UP	BAEA-MI-2008-A-057	Blomgren March	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DI-16a	IN	UP	BAEA-MI-2008-A-058	Sturgeion Falls Dam N	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DI-16a	IN	UP	BAEA-MI-2008-A-059	Sturgeion Falls Dam N	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ET-01c	GL	LM	BAEA-MI-2008-A-060	Wycamp L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1	4.4	ND	ND	ND	ND	ND	ND	ND	6.6
ET-02g	IN	LP	BAEA-MI-2008-A-061	Pickerel Channel	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ET-02g	IN	LP	BAEA-MI-2008-A-063	Pickerel Channel	ND	ND	ND	ND	ND	ND	3.2	ND	ND	1.0	ND	6.5	8.1	ND	ND	1.4	1.1	ND	ND	ND	21.3
ET-04a	IN	LP	BAEA-MI-2008-A-064	Larks L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.0	2.6	ND	ND	ND	ND	ND	ND	ND	4.7
ET-13a	IN	LP	BAEA-MI-2008-B-001	Alanson	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GL-05a	IN	LP	BAEA-MI-2008-B-003	Lake Four	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
GO-02e	IN	UP	BAEA-MI-2008-B-004	Sucker L. S.	ND	ND	ND	ND	ND	ND	ND	ND	2.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.2
GO-08b	IN	UP	BAEA-MI-2008-B-007	Bass L.	ND	ND	ND	ND	ND	ND	ND	ND	3.2	ND	ND	ND	1.1	ND	ND	ND	0.3	ND	ND	ND	4.6
Go-23c	IN	UP	BAEA-MI-2008-B-008	Corey L	ND	ND	ND	ND	ND	ND	ND	ND	3.9	ND	ND	ND	1.6	ND	ND	2.0	ND	ND	ND	ND	7.5
GO-28f	IN	UP	BAEA-MI-2008-B-010	Lac Vieux Desert	ND	ND	ND	ND	ND	ND	ND	ND	2.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.1
GO-36a	IN	UP	BAEA-MI-2008-B-012	West Bay L.	ND	ND	ND	ND	2.9	ND	11.9	4.6	5.6	15.1	4.0	ND	22.3	ND	ND	14.9	9.6	0.9	1.0	1.1	93.9
GO-37a	IN	UP	BAEA-MI-2008-B-015	Big Bateau L.	ND	ND	ND	ND	ND	ND	1.0	ND	3.8	2.5	1.3	ND	4.0	ND	ND	3.4	1.0	ND	ND	ND	17.0
GO-42a	IN	UP	BAEA-MI-2008-B-016	Plymouth Mine	ND	ND	ND	ND	ND	ND	ND	ND	3.4	ND	ND	ND	3.4	ND	ND	2.5	1.0	ND	ND	ND	10.3
GT-06	GL	LM	BAEA-MI-2008-B-017	Yuba Valley	ND	ND	ND	ND	ND	ND	ND	ND	2.4	ND	ND	ND	2.4	ND	ND	2.9	ND	ND	1.0	ND	8.7
GT-06	GL	LM	BAEA-MI-2008-B-021	Yuba Valley	ND	ND	ND	ND	ND	ND	ND	ND	3.0	ND	ND	ND	1.0	ND	ND	1.0	ND	ND	ND	ND	5.1
GT-06	GL	LM	BAEA-MI-2008-B-023	Yuba Valley	ND	ND	ND	ND	ND	ND	ND	ND	2.9	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.9
HO-01g	GL	LS	BAEA-MI-2008-B-024	Rockhouse Pt	6.0	ND	ND	ND	ND	ND	ND	ND	2.7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8.7
HO-02e	GL	LS	BAEA-MI-2008-B-027	Rabbit Bay	6.1	ND	ND	ND	ND	ND	ND	ND	3.6	ND	ND	ND	2.8	ND	ND	2.3	0.6	ND	ND	ND	15.3

Table 3. Continued.

Territory	Breeding Area Location	Territory Location	Blood Sample Number	Breeding Area Name	#008	#018	#028	#044	#052	#066	#101	#105	#110	#118	#128	#138	#153	#156	#170	#180	#187	#195	#206	#209	SUM PCBs
HO-04c	GL	LS	BAEA-MI-2008-B-030	La Chance Bay	ND	ND	ND	ND	ND	ND	ND	ND	3.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.2
HO-11d	IN	UP	BAEA-MI-2008-B-036	Prickett L S	ND	ND	ND	ND	ND	ND	ND	ND	2.8	3.3	1.0	ND	3.7	ND	ND	3.3	ND	ND	ND	ND	14.1
HO-16a	GL	LS	BAEA-MI-2008-B-038	N Portage Canal	ND	ND	ND	ND	ND	ND	ND	ND	2.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2.3
IO-03e	GL	LH	BAEA-MI-2008-B-040	Tawas Lake N.	ND	ND	ND	ND	ND	ND	ND	ND	3.4	ND	ND	ND	1.0	ND	ND	ND	ND	ND	ND	ND	4.3
IO-08b	IN	LP	BAEA-MI-2008-B-042	Loud Dam Pond	ND	ND	ND	ND	ND	ND	ND	ND	2.1	3.0	1.0	3.0	13.2	3.2	ND	9.2	4.6	ND	ND	ND	39.2
IO-13b	IN	LP	BAEA-MI-2008-B-043	Wichert Hills	ND	ND	ND	ND	ND	ND	ND	ND	2.5	ND	ND	ND	ND	ND	ND	0.3	ND	ND	ND	ND	2.8
IO-14b	IN	LP	BAEA-MI-2008-B-044	Monument E.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IR-15d	IN	UP	BAEA-MI-2008-B-045	Paint R.- MudL	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IR-21e	IN	UP	BAEA-MI-2008-B-046	Michigamme Resevoir	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
IR-24e	IN	UP	BAEA-MI-2008-B-049	Peavy Dam/Peavy Pond	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.9	1.0	16.4	25.1	ND	ND	10.1	7.1	ND	ND	ND	65.5
IR-26a	IN	UP	BAEA-MI-2008-B-050	Brule L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	ND	ND	ND	ND	ND	ND	ND	1.0
IR-46b	IN	UP	BAEA-MI-2008-B-052	Brule R.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	ND	ND	ND	ND	ND	ND	ND	1.0
IR-48b	IN	UP	BAEA-MI-2008-B-054	Indian L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	3.1	ND	ND	ND	ND	ND	ND	ND	4.1
LA-03f	IN	LP	BAEA-MI-2008-B-056	Wingleton L. Baldwin	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.4	1.0	15.8	19.4	ND	ND	10.8	6.9	ND	ND	ND	59.4
LA-06a	IN	LP	BAEA-MI-2008-B-058	Big Bass L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.6	8.0	10.6	ND	ND	3.3	2.1	ND	ND	ND	24.7
LU-02d	IN	UP	BAEA-MI-2008-B-060	Foster Isd	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
LU-08f	IN	UP	BAEA-MI-2008-B-062	Mud L- McMillan	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MC-06d	IN	UP	BAEA-MI-2008-B-063	S. Manistique L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MC-24c	IN	UP	BAEA-MI-2008-B-065	Shoepac L	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	ND	ND	ND	ND	ND	ND	ND	1.0
MK-01i	IN	LP	BAEA-MI-2008-B-066	Jennings	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MK-04b	IN	LP	BAEA-MI-2008-B-068	Reedsburg	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.8	5.1	ND	ND	ND	ND	ND	ND	ND	10.9
MK-04b	IN	LP	BAEA-MI-2008-B-070	Reedsburk	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MM-04e	IN	UP	BAEA-MI-2008-B-072	Shakey R	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MM-15a	IN	UP	BAEA-MI-2008-B-074	Ten Mile Ck-Whitney	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MM-22c	GL	LM	BAEA-MI-2008-B-075	Deadmans Pt	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MM-25a	IN	UP	BAEA-MI-2008-B-077	Poch de Noch	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MS-05c	AN	LM	BAEA-MI-2008-B-078	Walhale E	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
MY-01i	IN	LP	BAEA-MI-2008-B-079	Valentine L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NE-01l	AN	LM	BAEA-MI-2008-B-080	Anderson Bayou	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OG-01F	IN	LP	BAEA-MI-2008-B-083	Rifle R. Rec Area	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OG-08b	IN	LP	BAEA-MI-2008-B-085	Devoe Lake	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	2.0	ND	ND	ND	ND	ND	ND	ND	3.0
OG-11a	IN	LP	BAEA-MI-2008-B-086	Edwards	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.0	ND	ND	ND	ND	ND	ND	ND	ND	1.0
ON-25a	IN	UP	BAEA-MI-2008-B-088	Three Rapids	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
ON-27a	GL	LS	BAEA-MI-2008-B-090	Carp R Escarpment	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13.4	ND	ND	ND	ND	ND	ND	ND	13.4
OS-04e	IN	LP	BAEA-MI-2008-B-091	S. Br Thunder Bay R.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-06b	IN	LP	BAEA-MI-2008-B-094	Shamrock L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-09a	IN	LP	BAEA-MI-2008-B-096	Mack L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
OS-11a	IN	LP	BAEA-MI-2008-B-098	Perry L.	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RO-13b	IN	LP	BAEA-MI-2008-B-099	Prudenville	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
RO-19a	IN	LP	BAEA-MI-2008-B-101	DNR Airport	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SC-12b	IN	UP	BAEA-MI-2008-B-102	Thunder Bay	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
VI-90a	IN	UP	BAEA-MI-2008-B-103	Tenderfoot L. NE	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
WX-02a	IN	LP	BAEA-MI-2008-B-104	L. Mitchell	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Table 4. Concentrations of individual organochlorine compounds (ng/g wet weight (ppb)) in nestling bald eagle plasma samples analyzed in 2008. Breeding areas were located in either inland lower peninsula (LP), inland upper peninsula (UP), Lake Huron (LH), Lake Michigan (LM), or Lake Superior (LS) watersheds. Territories were associated with either inland (IN), Great Lakes (GL), or anadromous (AN) water bodies.

Territory	Breeding Area Location	Territory Location	Blood Sample Number	Breeding Area Name	a-HCH	Dieldrin	HCB
AG-18a	IN	UP	BAEA-MI-2008-A-002	Forest L. Basin N.	ND	ND	ND
AG-20a	IN	UP	BAEA-MI-2008-A-003	Hovey L.	ND	ND	ND
AG-23a	GL	LS	BAEA-MI-2008-A-005	Wick Pt	ND	ND	ND
AL-04a	IN	LP	BAEA-MI-2008-A-006	McCollum L.	ND	ND	ND
AL-12a	IN	LP	BAEA-MI-2008-A-010	Hubbard L.	ND	ND	ND
AP-03c	GL	LH	BAEA-MI-2008-A-015	North Point	ND	ND	ND
AP-08e	GL	LH	BAEA-MI-2008-A-017	Devils L.	ND	ND	ND
AP-13a	GL	LH	BAEA-MI-2008-A-019	N Pt Grass L	ND	ND	ND
AR-06b	AN	LH	BAEA-MI-2008-A-020	Forest L.	ND	ND	ND
AR-07b	GL	LH	BAEA-MI-2008-A-021	Omer	ND	ND	ND
AR-10C	GL	LH	BAEA-MI-2008-A-022	Pt AuGres N	ND	ND	ND
BG-11a	GL	LS	BAEA-MI-2008-A-024	Reed's Pt	ND	ND	ND
BG-12a	IN	UP	BAEA-MI-2008-A-027	Pequiming Pt	ND	ND	ND
BZ-08b	GL	LM	BAEA-MI-2008-A-029	crystal l	ND	ND	ND
CB-15b	IN	LP	BAEA-MI-2008-A-030	Roberts L.	ND	ND	ND
CB-17a	IN	LP	BAEA-MI-2008-A-033	Stone Ck Fldg	ND	ND	ND
CL-04b	IN	LP	BAEA-MI-2008-A-036	Doc & Tom L.	ND	ND	ND
ET-06b	GL	LM	BAEA-MI-2008-A-038	L. Paradise	ND	ND	ND
CL-05a	IN	LP	BAEA-MI-2008-A-041	Long L.	ND	ND	ND
CR-10c	IN	LP	BAEA-MI-2008-A-042	Shellenbarger Lake	ND	ND	ND
CX-03b	GL	LM	BAEA-MI-2008-A-045	Garden Isd.	ND	ND	ND
CX-09b	GL	LM	BAEA-MI-2008-A-046	Lake Geneserath	ND	ND	ND
DE-29a	GL	LM	BAEA-MI-2008-A-047	Masonville	ND	ND	ND
DE-33a	GL	LH	BAEA-MI-2008-A-048	Days River	ND	ND	ND
DI-06d	IN	UP	BAEA-MI-2008-A-049	Badwater L.	ND	ND	ND
DI-08c	IN	UP	BAEA-MI-2008-A-052	Rock L.- Camey Outlet	ND	ND	ND
DI-11c	IN	UP	BAEA-MI-2008-A-053	Hardwood Impoundment	ND	ND	ND
DI-14b	IN	UP	BAEA-MI-2008-A-056	L Antione	ND	ND	ND
DI-15b	IN	UP	BAEA-MI-2008-A-057	Blomgren March	ND	ND	ND
DI-16a	IN	UP	BAEA-MI-2008-A-058	Sturgeion Falls Dam N	ND	ND	ND
DI-16a	IN	UP	BAEA-MI-2008-A-059	Sturgeion Falls Dam N	ND	ND	ND
ET-01c	GL	LM	BAEA-MI-2008-A-060	Wycamp L.	ND	ND	ND
ET-02g	IN	LP	BAEA-MI-2008-A-061	Pickerel Channel	ND	ND	ND
ET-02g	IN	LP	BAEA-MI-2008-A-063	Pickerel Channel	ND	ND	ND
ET-04a	IN	LP	BAEA-MI-2008-A-064	Larks L.	ND	ND	ND
ET-13a	IN	LP	BAEA-MI-2008-B-001	Alanson	ND	ND	ND
GL-05a	IN	LP	BAEA-MI-2008-B-003	Lake Four	ND	ND	ND
GO-02e	IN	UP	BAEA-MI-2008-B-004	Sucker L. S.	ND	2.2	ND
GO-08b	IN	UP	BAEA-MI-2008-B-007	Bass L.	ND	3.2	ND
Go-23c	IN	UP	BAEA-MI-2008-B-008	Corey L	ND	3.9	ND
GO-28f	IN	UP	BAEA-MI-2008-B-010	Lac Vieux Desert	ND	2.1	ND
GO-36a	IN	UP	BAEA-MI-2008-B-012	West Bay L.	ND	5.6	ND
GO-37a	IN	UP	BAEA-MI-2008-B-015	Big Bateau L.	ND	3.8	ND
GO-42a	IN	UP	BAEA-MI-2008-B-016	Plymouth Mine	ND	3.4	ND
GT-06	GL	LM	BAEA-MI-2008-B-017	Yuba Valley	ND	2.4	ND
GT-06	GL	LM	BAEA-MI-2008-B-021	Yuba Valley	ND	3.0	ND
GT-06	GL	LM	BAEA-MI-2008-B-023	Yuba Valley	ND	2.9	ND
HO-01g	GL	LS	BAEA-MI-2008-B-024	Rockhouse Pt	6.0	2.7	6.0
HO-02e	GL	LS	BAEA-MI-2008-B-027	Rabbit Bay	6.1	3.6	6.1
HO-04c	GL	LS	BAEA-MI-2008-B-030	La Chance Bay	ND	3.2	ND
HO-11d	IN	UP	BAEA-MI-2008-B-036	Prickett L S	ND	2.8	ND
HO-16a	GL	LS	BAEA-MI-2008-B-038	N Portage Canal	ND	2.3	ND
IO-03e	GL	LH	BAEA-MI-2008-B-040	Tawas Lake N.	ND	3.4	ND
IO-08b	IN	LP	BAEA-MI-2008-B-042	Loud Dam Pond	ND	2.1	ND
IO-13b	IN	LP	BAEA-MI-2008-B-043	Wichert Hills	ND	2.5	ND
IO-14b	IN	LP	BAEA-MI-2008-B-044	Monument E.	ND	ND	ND
IR-15d	IN	UP	BAEA-MI-2008-B-045	Paint R.- MudL	ND	ND	ND
IR-21e	IN	UP	BAEA-MI-2008-B-046	Michigamme Resevoir	ND	ND	ND
IR-24e	IN	UP	BAEA-MI-2008-B-049	Peavy Dam/ Peavy Pond	ND	ND	ND
IR-26a	IN	UP	BAEA-MI-2008-B-050	Brule L.	ND	ND	ND
IR-46b	IN	UP	BAEA-MI-2008-B-052	Brule R.	ND	ND	ND

Table 4. Continued.

Territory	Breeding Area Location	Territory Location	Blood Sample Number	Breeding Area Name	a-HCH	Dieldrin	HCB
IR-48b	IN	UP	BAEA-MI-2008-B-054	Indian L.	ND	ND	ND
LA-03f	IN	LP	BAEA-MI-2008-B-056	Wingleton L. Baldwin	ND	0.7	ND
LA-06a	IN	LP	BAEA-MI-2008-B-058	Big Bass L.	ND	ND	ND
LU-02d	IN	UP	BAEA-MI-2008-B-060	Foster Isd	ND	ND	ND
LU-08f	IN	UP	BAEA-MI-2008-B-062	Mud L- McMillan	ND	ND	ND
MC-06d	IN	UP	BAEA-MI-2008-B-063	S. Manistique L	ND	ND	ND
MC-24c	IN	UP	BAEA-MI-2008-B-065	Shoepac L	ND	ND	ND
MK-01i	IN	LP	BAEA-MI-2008-B-066	Jennings	ND	ND	ND
MK-04b	IN	LP	BAEA-MI-2008-B-068	Reedsburg	ND	ND	ND
MK-04b	IN	LP	BAEA-MI-2008-B-070	Reedsburk	ND	ND	ND
MM-04e	IN	UP	BAEA-MI-2008-B-072	Shakey R	ND	ND	ND
MM-15a	IN	UP	BAEA-MI-2008-B-074	Ten Mile Ck-Whitney	ND	ND	ND
MM-22c	GL	LM	BAEA-MI-2008-B-075	Deadmans Pt	ND	ND	ND
MM-25a	IN	UP	BAEA-MI-2008-B-077	Poch de Noch	ND	ND	ND
MS-05c	AN	LM	BAEA-MI-2008-B-078	Walhale E	ND	ND	ND
MY-01i	IN	LP	BAEA-MI-2008-B-079	Valentine L.	ND	ND	ND
NE-01l	AN	LM	BAEA-MI-2008-B-080	Anderson Bayou	ND	ND	ND
OG-01F	IN	LP	BAEA-MI-2008-B-083	Rifle R. Rec Area	ND	ND	ND
OG-08b	IN	LP	BAEA-MI-2008-B-085	Devoe Lake	ND	ND	ND
OG-11a	IN	LP	BAEA-MI-2008-B-086	Edwards	ND	ND	ND
ON-25a	IN	UP	BAEA-MI-2008-B-088	Three Rapids	ND	ND	ND
ON-27a	GL	LS	BAEA-MI-2008-B-090	Carp R Escarpment	ND	ND	ND
OS-04e	IN	LP	BAEA-MI-2008-B-091	S. Br Thunder Bay R.	ND	ND	ND
OS-06b	IN	LP	BAEA-MI-2008-B-094	Shamrock L.	ND	ND	ND
OS-09a	IN	LP	BAEA-MI-2008-B-096	Mack L.	ND	ND	ND
OS-11a	IN	LP	BAEA-MI-2008-B-098	Perry L.	ND	ND	ND
RO-13b	IN	LP	BAEA-MI-2008-B-099	Prudenville	ND	ND	ND
RO-19a	IN	LP	BAEA-MI-2008-B-101	DNR Airport	ND	ND	ND
SC-12b	IN	UP	BAEA-MI-2008-B-102	Thunder Bay	ND	ND	ND
VI-90a	IN	UP	BAEA-MI-2008-B-103	Tenderfoot L. NE	ND	ND	ND
WX-02a	IN	LP	BAEA-MI-2008-B-104	L. Mitchell	ND	ND	ND