

MI/DEQ/WB-05/024

**MICHIGAN FISH CONTAMINANT MONITORING PROGRAM
2004 ANNUAL REPORT**

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SECTION 1.0

INTRODUCTION

The Michigan Department of Environmental Quality-Water Bureau (MDEQ-WB) has analyzed over 17,000 fish tissue samples collected since 1980. The MDEQ-WB conducts fish contaminant monitoring to address four goals. The first goal is to support the development of the Michigan Department of Community Health's (MDCH's) *Michigan Fish Advisory*. Edible-portion sample results are used by the MDCH to issue general and specific advisories against eating certain sport fish from Michigan's surface waters. The second goal is to support the regulation of commercial fisheries in the waters of the state. The Michigan Department of Agriculture (MDA) uses edible-portion monitoring results to regulate sales of the commercial catch. The third goal of the fish contaminant monitoring is to identify spatial differences and temporal trends in the quality of Michigan's surface waters. Temporal trends and spatial differences are examined by collecting whole-fish and caged-fish samples in addition to the edible-portion samples. Finally, the fourth goal is to evaluate whether existing pollution prevention, regulatory, and remedial programs are effectively reducing chemical contamination in the aquatic environment. To achieve this goal, fish tissue samples are used to identify waters that are attaining or not attaining the designated uses described in Michigan's Water Quality Standards (MWQS), identify sources of pollutants, and track the effectiveness of remedial actions. Fish contaminant analyses are limited to chemicals with high bioaccumulation potential in fish tissue. The presence of even extremely low concentrations of some bioaccumulative pollutants in surface water can result in fish tissue concentrations that pose a human or wildlife health risk.

Several state and federal agencies and tribal organizations assist with the MDEQ-WB's fish contaminant monitoring efforts by collecting or analyzing samples and data. These include the Michigan Department of Natural Resources (MDNR), the MDCH, the MDA, the United States Environmental Protection Agency (USEPA), the United States Fish and Wildlife Service, the Grand Traverse Bay Band of Chippewa and Ottawa Indians, and the Great Lakes Indian Fish and Wildlife Commission. In addition, sample collection plans and analytical results are reviewed by Michigan's Fish and Wildlife Contaminant Advisory Committee (FAWCAC). The FAWCAC members include representatives from all Michigan agencies involved in fish and wildlife contaminant monitoring (MDEQ-WB, MDCH, MDA, and MDNR). The primary role of the FAWCAC is to coordinate fish and wildlife monitoring conducted by state agencies. Also, the FAWCAC reviews fish and wildlife consumption advisories proposed by state agencies in Michigan.

Fish contaminant data are presented annually in staff reports. The objectives of the Michigan Fish Contaminant Monitoring Program 2004 Annual Report (2004 Annual Report) are as follows:

1. Summarize the results of the available edible-portion fish tissue analyses, identify sites where modifications to the MDCH's *Michigan Fish Advisory* should be considered, identify waterbodies monitored in 2002 and 2003 that are not meeting the designated use described in the MWQS, and identify contaminant trends where possible.
2. Summarize the results of whole-fish tissue analyses and identify any spatial or temporal contaminant trends.

3. Identify spatial or temporal trends that can be attributed to specific pollution control activities.

Prior to 1986, Michigan conducted fish contaminant studies on a demand basis primarily to address specific problems. In 1986, a comprehensive program was initiated to assess the degree of chemical contamination in fish from the surface waters of the state. Michigan's fish contaminant data are available online at <http://www.deq.state.mi.us/fcmp/>. Also, contaminant data are available in staff reports (MDNR, 1986a, 1986b, and 1989; Duling, 1988; Duling and Benzie, 1989 and 1990; Waggoner, 1991 and 1992; Wood, 1993 and 1994; Wood et al., 1995; Day and Holden, 1996; Day, 1997, 1998, 1999, and 2002; Day and Walsh, 2000 and 2001; and Day, Bohr, and Ramirez, 2004). In addition, inventories of fish contaminant monitoring locations sampled between 1980 and 2003 are provided in Appendices A, B, and C.

SECTION 2.0

METHODS

The 2004 Annual Report includes the analytical results available by January 15, 2005, for samples collected prior to January 1, 2004, which were not presented in earlier annual reports. A list of waterbodies and species included in this annual report is provided in Appendix D. Raw data from these sites are included in Appendix E (available upon request).

A total of 2,283 fish were collected from inland lakes, rivers, and the Great Lakes and connecting channels during calendar year 2003. Many of these fish were combined into composite samples and a total of 991 samples were analyzed. The samples included 22 species collected from 102 locations. Approximately 73% of the samples were processed as edible portions to support the development and review of fish consumption advisories. The remaining samples were collected to support the other goals of the Fish Contaminant Monitoring Program.

2.1 EDIBLE-PORTION AND WHOLE-FISH COLLECTION AND PROCESSING

The MDNR-Fisheries Division and the MDEQ-WB collected the majority of the fish using standard fish sampling techniques determined appropriate for individual waterbodies. These techniques included electrofishing, trap nets, gill nets, and trawling. In addition, private consultants and tribal organizations collected samples for the program.

The MDEQ-WB processed fish in accordance with Great Lakes and Environmental Assessment Section's (GLEAS) Procedure 31 (available upon request). Each fish was measured (total length) and weighed. Fish were prepared as standard edible portions (Table 1) or whole fish. Each sample was individually wrapped in aluminum foil, placed in a plastic bag, appropriately labeled, and frozen until analyzed.

2.1.1 Edible-Portion Monitoring

In 2003, 799 fish were collected from 55 locations and processed as edible-portion samples. These samples included 20 species of fish. The 2003 edible portion sample locations are illustrated in Figure 1. Edible-portion sampling was often targeted toward sites of known or suspected contamination, sites popular with sport anglers, and sites with public access.

2.1.2 Whole-Fish Trend Monitoring

The MDEQ-WB coordinates the collection and analysis of whole fish from 26 locations as part of an effort to measure spatial and temporal trends in contaminant concentrations (Table 2; Figure 2). Samples are collected from each site every 2 to 5 years. Select species of adult fish are targeted for collection and analyses. Species and locations were selected to complement and avoid duplication with the USEPA's Great Lakes whole-fish trend monitoring program.

A total of 100 fish tissue samples were collected from 8 trend sites in 2003 (Appendix E, available upon request). Largemouth bass were collected from Pontiac Lake; carp were collected from the Grand and Kalamazoo Rivers, as well as Lake Huron at Saginaw Bay, Lake Michigan at Grand Traverse Bay, and Lake Michigan at Little Bay De Noc; redhorse sucker were collected from the Manistique River; and walleye were collected from South Manistique Lake and Lake Huron at Saginaw Bay. All 26 trend sites have been sampled at least 3 times

since 1990, except the Manistee, Manistique, and Menominee Rivers. Trend monitoring sites, collection dates, and species are listed in Appendix B.

Since 1990, lake trout, walleye, or largemouth bass were collected from 8 inland lake trend monitoring sites (Table 2). Gun, Gull, and South Manistique Lakes were sampled 6 times; Pontiac Lake, Lake Gogebic, and Higgins Lake were sampled 5 times; Houghton Lake was sampled 4 times; and Grand Sable Lake was sampled 3 times.

Whole carp or redhorse sucker were collected from 8 river trend monitoring sites since 1990 (Table 2). The Kalamazoo River was monitored 7 times; the Muskegon River was monitored 6 times; the St. Joseph and Grand Rivers were monitored 5 times; the Raisin River was monitored 4 times; the Manistee, Manistique, and Menominee Rivers were each monitored 2 times.

Ten trend monitoring sites were established in the Great Lakes or connecting channels (Table 2). Carp were monitored at 9 locations, walleye were collected from 8 locations, and lake trout were collected from 3 locations since 1990.

2.2 CAGED-FISH BIOCONCENTRATION STUDIES

The MDEQ-WB uses caged fish to identify sources of bioaccumulative contaminants and identify spatial trends in contaminant concentrations. Caged-fish studies are a particularly useful water quality monitoring tool because the test fish are exposed to the water column under relatively controlled conditions. Some contaminants accumulate in the test fish at levels that may be orders of magnitude above the concentrations in the ambient water. The relatively high concentrations in the test fish tissue are easier and cheaper to measure than the relatively low concentrations typically found in the ambient water.

The MDEQ-WB performed all caged-fish studies in accordance with GLEAS Procedure 62 (available upon request). The channel catfish used as test organisms in the experiments were purchased from a commercial fish farm. Control samples were obtained at the beginning of the test period by randomly selecting a subset of channel catfish and combining them into 4 composite samples of whole fish. The remaining channel catfish were held in stainless steel cages at the test sites for 28 days. The fish were removed from the cages and divided into 4 composite samples of whole fish. Each sample had a minimum total weight of 40 grams, and the number of fish per composite was determined by the size of the fish and the number surviving to the end of the 28-day test. Each composite sample was wrapped individually in aluminum foil, placed in a separate plastic bag, labeled, and frozen until analyzed.

Caged-fish studies were conducted in the Boardman, Flat, Flint, Pere Marquette, and St. Joseph River watersheds in 2003. Clean Michigan Initiative funds were used to support analyses of caged fish tissue samples at a contract laboratory. Research Productivity Council (RPC) is conducting the analyses and the results were not available for inclusion in the 2004 Annual Report. These data will either be summarized in separate reports or in the 2005 Annual Report. However, the results of the 2002 caged fish studies conducted in the Black (Van Buren County), Galien, Huron, Manistique, Muskegon, and Saginaw River watersheds are included in this report.

Three sites were monitored in the Black River and South Branch Black River in VanBuren County (Figure 4). One site was monitored in the Galien River (Figure 5). Four sites were monitored in the Huron River from upstream of Dexter to the mouth (Figure 6). Two sites were monitored in the Manistique River near Manistique (Figure 7). Three sites were monitored in

the Muskegon River from above Rogers Dam to the western Newaygo County line (Figure 8). A total of 19 sites were monitored in the Saginaw River watershed, including 5 sites in the Pine River, 1 site in the Chippewa River, 6 sites in the Tittabawassee River, 2 sites in the Shiawassee River, 1 site each in the Flint and Cass Rivers, and 3 sites in the Saginaw River (Figure 9).

An inventory of all caged-fish bioconcentration studies conducted since 1987 is presented in Appendix C.

2.3 CHEMICAL ANALYSES

Fish tissue samples collected in 2003 were analyzed by several laboratories, including the MDCH-Health Risk Assessment Laboratory (HRAL), Eno River Laboratories (formerly Triangle Laboratories), the University of Minnesota, and RPC. Each of these analytical laboratories has quality assurance programs and use peer-reviewed methods of digestion, extraction, and quantification.

The MDCH-HRAL analyzed the majority of the fish tissue samples collected in 2003. A total of 800 samples were submitted for analyses. A total of 223 edible-portion samples were analyzed for mercury only. The remaining fish tissue samples were analyzed for mercury, percent lipids, 25 organic chemicals (Table 3), and polychlorinated biphenyl (PCB) congeners (Table 4). In addition, analyses of 256 samples collected in 2002 were completed. The results are summarized in Section 3.1.

Analyses of chlorinated dioxin and dibenzofuran congeners (Table 5) were performed on a subset of edible portion fish tissue samples. Eno River Laboratories analyzed dioxin and dibenzofuran congeners in 60 samples and the results are summarized in Section 3.1.

The RPC is analyzing mercury and organic contaminants in 158 caged-fish tissue samples collected in 2003. The 2003 analytical results were not available for inclusion in the 2004 Annual Report. These caged-fish tissue samples will either be summarized in separate reports or in the 2005 Annual Report. However, the results of the 2002 caged-fish analyses conducted by RPC are summarized in Section 3.2. The 2002 samples were analyzed for the contaminants listed in Table 6. In addition, RPC analyzed the 12 samples from the Chippewa, Saginaw, Shiawassee, and Tittabawassee River caged-fish sites for chlorinated dioxin and dibenzofuran congeners (Table 5).

A total of 90 chinook salmon were collected from 6 Lake Huron and Lake Michigan tributaries as part of a Great Lakes trend monitoring program implemented by state and federal agencies. The chinook salmon were combined into 18 edible-portion composite samples. These samples were sent to the University of Minnesota for analyses. The results were not available for inclusion in this report.

Total mercury is referred to as "mercury" throughout the report. In addition, the MDCH trigger levels for mercury (Section 2.5) are based on total mercury concentrations.

Toxaphene is referred to as "apparent toxaphene" throughout the report. The MDCH-HRAL analytical method can identify a residue with chromatographic characteristics similar to toxaphene. However, the method cannot specifically identify the residue as the pesticide toxaphene.

Finally, the MDCH-HRAL does not report concentrations below the quantification level but above the detection level for mercury and the organic parameters listed in Table 3. As a result, concentrations of these parameters that are below the quantification level are coded with a “K” in Appendix E (available upon request). In these cases, the “K” coded concentrations represent the MDCH-HRAL’s quantification levels. However, “K” codes assigned to dioxin, furan, and PCB congeners indicate that concentrations were below the detection level while “J” or “NQ” codes indicate that concentrations were above the detection level but did not meet all of the quantification requirements. In these cases, the “K” coded concentrations represent the laboratory detection level.

2.4 SUMMARY STATISTICS

The average and median contaminant concentrations were calculated for each species from each site (Appendix E, available upon request). In some cases, one or more samples from a particular site had contaminant concentrations that were less than the quantification level. In these cases, calculating the true average contaminant concentration was not possible. Therefore, average contaminant concentrations were calculated using half of the quantification level in place of the sample concentrations that were below the quantification level. The calculated average was then marked with a footnote to indicate that estimated values were used when quantitative concentrations were not available. If all of the concentrations were below the quantification level, then the mean was reported as half of the quantification level and the median was reported as less than the quantification level.

Total PCB concentration was estimated by summing the concentrations of PCB congeners. Individual congeners below the detection level were assigned a concentration equal to 0 for the purpose of calculating a total PCB concentration. Also, congener analyses that did not meet retention time criteria or were subject to analytical interference were assigned a concentration equal to 0 for the purpose of calculating a total PCB concentration. If the results of an individual congener analysis did not meet all of the quantification requirements, then the congener was assigned a concentration equal to the estimated concentration for the purpose of calculating a total PCB concentration. If all of the congeners were below the detection level, then the total PCB concentration was reported as less than the detection level of the individual congeners.

Total chlordane concentration was estimated by summing the concentrations of 5 isomers: *alpha*-chlordane, *gamma*-chlordane, *cis*-nonachlor, *trans*-nonachlor, and oxychlordane. In some cases, individual isomers were below the quantification level. Individual isomers below the quantification level were assigned a concentration equal to 0 for the purpose of calculating a total chlordane concentration. If all 5 isomers were below the quantification level, then the total chlordane concentration was reported as less than the quantification level of the individual isomers.

Total dichlorodiphenyl trichloroethane (DDT) concentrations were calculated by summing concentrations of the para, para’ and ortho, para’ forms of the following chemicals: DDT dihydrochloride, and 1,1-bis(4-chlorophenyl)-2,2-dichloroethane. Individual chemicals below the quantification level were assigned a concentration equal to 0 for the purpose of calculating a total DDT concentration. If all 6 components were below the quantification level, then the total DDT concentration was reported as less than the lowest quantification level of the metabolites.

Total 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) toxic equivalents were calculated pursuant to the 1989 update of the "Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and Dibenzofurans" (USEPA, 1989). The

concentrations of individual dioxin and dibenzofuran congeners in a fish sample were multiplied by toxic equivalency factors and the resulting products summed to calculate a 2,3,7,8-TCDD toxic equivalent (TEQ) concentration. Individual congener concentrations less than the detection level were assigned a value of 0 for the purpose of calculating the dioxin TEQ.

Calculated values presented in Appendix E (available upon request) were not rounded to significant figures. All calculated values are identified in Appendix E and additional information about the precision of the calculated values will be provided upon request.

2.5 FISH CONSUMPTION ADVISORY TRIGGER LEVELS

The MDCH is responsible for establishing, modifying, or removing sport fish consumption advisories in Michigan. The MDCH uses fish consumption advisory “trigger levels” to assess the need for advisories (Table 7). These trigger levels have a variety of origins. The United States Food and Drug Administration (USFDA) developed most of the trigger levels for chlorinated organic chemicals. Dioxin TEQ and mercury trigger levels were developed by the MDCH. Finally, the Great Lakes states and the USEPA developed the total PCB trigger levels used to establish advisories for women of childbearing age and children less than 15 years of age. The underlying risk assumptions used to develop each of these trigger levels are different and the criteria used to determine consumption advisories vary with the contaminant and segment of population covered by the advisory.

The fish consumption advisories are developed based on an evaluation of the relationship between contaminant concentrations and trigger levels across all size ranges of fish of a given species taken from specific locations. Where possible, linear regression analyses are used to predict lengths at which the concentrations in fish species are likely to exceed trigger levels. However, contaminant concentrations and fish total length data either do not often conform to the underlying assumptions of this statistical method or the method does not produce a statistically significant line. In those cases, the appropriate advisory is determined using either median concentrations or the percentage of samples exceeding the trigger level, depending on the contaminant being considered.

The MDCH prefers a data set with a minimum of 10 samples before establishing or modifying fish consumption advisories. However, best professional judgment is applied when evaluating smaller data sets.

The MDCH trigger levels and procedures are described in further detail below.

2.5.1 Fish Consumption Advisory Trigger Levels for Most Chlorinated Organic Contaminants and Dioxin TEQ

The MDCH issues fish consumption advisories based on either linear regression analyses or the percentage of samples that exceed the trigger levels presented in Table 7. The general population is advised to eat no more than 1 meal per week when concentrations in more than 10% of the samples from a particular species of fish of a given length range exceed the trigger level. A “no consumption” advisory is issued if concentrations in 50% or more of the fish sampled exceed the trigger level. In addition, the MDCH advises women and children against eating any fish when concentrations in more than 10% of a particular species of fish of a given length exceed the trigger level.

Either linear regression analyses or percentages were used to make recommendations to the MDCH regarding specific changes to the *Michigan Fish Advisory*. When linear regression analysis was not appropriate, the percentages of samples exceeding trigger levels were calculated. The results are presented in Section 3.1.

2.5.2 Fish Consumption Advisory Trigger Levels for Total PCB

The MDCH uses the USFDA's 2.0 parts per million (ppm) trigger level for total PCB concentrations when developing advisories for the general population. The MDCH advises the general population to eat no more than 1 meal per week when concentrations in more than 10% of the samples from a particular species of fish of a given length range exceed the trigger level. In addition, the MDCH advises the general population against eating any fish when concentrations in 50% or more of the samples exceed the trigger level.

Again, either linear regression analyses or percentages were used to make recommendations to the MDCH regarding specific changes to the *Michigan Fish Advisory*. When linear regression analysis was not appropriate, the percentages of samples exceeding trigger levels were calculated. The results are presented in Section 3.1.

In 1998, the MDCH adopted a new advisory protocol for women of child bearing age and children less than 15 years old. The protocol includes 5 consumption advisory categories based on concentrations of total PCB. Fish species and size classes are placed into the consumption advisory categories based on linear regression analyses or median total PCB concentrations. The results are presented in Section 3.1.

2.5.3 Fish Consumption Advisory Trigger Levels for Mercury

The MDCH uses 2 trigger levels to assess the need for fish consumption advisories based on mercury (Table 7). Mercury concentrations are plotted with respect to length. A "restrict consumption" advisory is issued for lengths above which the mercury concentrations exceed the 0.5 ppm trigger level. A "no consumption" advisory is issued for lengths above which the mercury concentrations exceed 1.5 ppm. When linear regression analysis was not appropriate, median concentrations were used to place species and size classes into appropriate advisory categories. The results are presented in Section 3.1.

The MDCH advises the general population to eat no more than 1 meal per week of fish covered by a "restrict consumption" advisory. Women of child bearing age and children under age 15 are advised against eating more than 1 meal per month of fish covered by a "restrict consumption" trigger level.

Finally, the MDCH issued a statewide advisory covering certain predator species from all inland lakes and reservoirs. According to the MDCH, no one should eat more than 1 meal per week of fish of the following species and sizes: rock bass, yellow perch, or crappies over 9 inches in length; and largemouth bass, smallmouth bass, walleye, northern pike, or muskellunge of any size. Also, the MDCH advises mothers who are breast feeding, pregnant women, women who intend to have children, and children under age 15 against eating more than 1 meal per month of these fish.

SECTION 3.0

RESULTS AND DISCUSSION

3.1 EDIBLE-PORTION MONITORING

The 2004 Annual Report includes the analytical results available by January 15, 2005, for edible-portion fish samples collected in 2002 and 2003. This includes the results from 275 fish collected from 20 sites in 2002. Most of these 2002 results were not available for inclusion in the 2003 Annual Report as a result of laboratory delays. Therefore, a total of 957 edible-portion fish tissue samples are summarized in this report. This includes samples from 18 species and 64 locations (Figure 3).

3.1.1 General Highlights

- Several chemicals analyzed were not quantified in any of the fish samples, including aldrin, heptachlorostyrene, hexachlorostyrene, pentachlorostyrene, and terphenyl. However, the breakdown product of aldrin (i.e., dieldrin) was quantified in fish tissue samples from 33 of 49 locations in which they were analyzed (Table 8).
- Mercury was quantified in every sample analyzed (Table 8). The highest concentrations were found in top predator species from inland lakes or impoundments.
- Dioxin TEQ concentrations were quantified in every sample at both locations from which samples were analyzed for dioxin and dibenzofuran congeners (Table 8). However, the quantification levels for dioxin and dibenzofuran congeners are 3 to 4 orders of magnitude lower than the quantification levels for other organic contaminants (Tables 3 and 5). Therefore, dioxin and dibenzofuran congeners were quantified more frequently than many of the other organic contaminants.
- The maximum concentrations of most chlorinated organic contaminants were found in fish from the Great Lakes or locations with access to the Great Lakes (Table 8). Lake Superior cisco/wet had the highest concentrations of several organic contaminants. These fish were relatively large, had relatively high percentages of body fat, and thus readily accumulate the bioaccumulative organic chemicals present in the Great Lakes system.
- The maximum concentrations of many chlorinated organic contaminants were found in carp from the Tittabawassee River in the Saginaw River watershed. The Saginaw River watershed has a long history of industrial activity and carp readily accumulate the bioaccumulative organic chemicals present in the watershed.

3.1.2 Comparison to the MDCH Sport Fish Consumption Advisory Trigger Levels

Contaminant concentrations in edible-portion samples were compared to trigger levels to assist the MDCH with their annual review of the sport fish consumption advisories. Species and sites covered by existing advisories were highlighted when new concentration data did not exceed respective trigger levels. In addition, species and sites were identified when new concentration data exceeded trigger levels. Plots of contaminant concentration versus fish total length were

generated to assist with data analysis in cases where either contaminant concentrations exceeded trigger levels or the site and species are covered by an existing advisory.

In a few cases, linear regression analyses were used to determine the need for an advisory. However, the contaminant and length data did not often conform to the underlying assumptions of linear regression. In some cases, median concentrations were calculated and compared to trigger levels to determine the need for consumption advisories, while percentages of samples exceeding trigger levels were calculated in other cases. A more detailed discussion of the trigger levels and criteria used to develop advisory recommendations is presented in Section 2.5.

3.1.2.1 General Highlights of the Trigger Level Comparisons

General highlights of the trigger level comparisons are presented below followed by site-specific evaluations and recommendations.

- Apparent toxaphene, heptachlor+heptachlor epoxide, dieldrin, and mirex trigger levels were not exceeded in any sample analyzed.
- Total PCB concentrations were greater than or equal to the women and children trigger level in 229 of 744 (31%) samples. Concentrations were greater than or equal to the women and children trigger levels in fish from 31 of 49 (63%) locations (Table 9). The 2004 MDCH *Fish Consumption Advisory* includes women and children advisories covering 18 of the 31 locations.
- Total PCB concentrations were greater than or equal to the general population trigger level in 12 of 744 (2%) samples. Concentrations were greater than or equal to the general population trigger level in fish from 4 of 49 (8%) locations (Table 9). The 2004 MDCH *Fish Consumption Advisory* includes general population advisories covering 3 of the 4 locations.
- Mercury concentrations were greater than or equal to the “restrict consumption” trigger level in 186 of 957 (19%) samples from 45 of 67 (67%) locations (Table 10). The 2004 MDCH *Fish Consumption Advisory* includes either statewide or specific advisories caused by mercury at 30 of the 45 locations.
- Mercury concentrations were greater than or equal to the “no consumption” trigger level in 4 of 957 (0.4%) samples from 2 of 67 (3%) locations (Table 10). Both of these locations are covered by the statewide mercury advisory.
- Thirty-six of 49 (73%) inland lakes or reservoirs sampled in 2002 and 2003 had 1 or more fish with mercury concentrations greater than or equal to the “restrict consumption” trigger level and 2 of 49 (4.1%) had mercury concentrations greater than or equal to the “no consumption” trigger level. This compares to 71% and 6.8% of the 266 inland lakes or reservoirs monitored at least once since 1985, respectively.
- Dioxin TEQ concentrations exceeded the trigger level in 27 of 60 (45%) samples. Concentrations exceeded the trigger level in fish from both locations monitored in 2003 (Table 11). The 2004 MDCH *Fish Consumption Advisory* includes an advisory based on dioxin covering both locations.

- Total chlordane concentrations exceeded the trigger level in 3 of 744 (0.4%) samples from 2 of 49 (4.1%) locations (Table 12). The 2004 MDCH *Fish Consumption Advisory* includes an advisory based on chlordane covering 1 of the 2 locations.
- Total DDT concentrations exceeded the trigger level in 2 of 744 (0.3%) samples from 1 of 49 (2%) locations (Table 13). This site is not covered by an advisory due to DDT.

3.1.2.2 Lake Erie Watershed

Chenango Lake, Livingston County (ID 2003017) *Largemouth Bass and Yellow Bullhead*

Existing MDCH Advisory: Chenango Lake largemouth bass are covered by the statewide mercury advisory. Yellow bullhead are not covered by an advisory.

Comparison to Trigger Levels: Eight largemouth bass ranging in length from 11.8 to 18.5 inches were collected from Chenango Lake in 2003. Mercury concentrations equaled or exceeded the MDCH “restrict consumption” trigger level in 3 of 8 fish (Table 10; Figure 10). The median mercury concentration in the 3 legal sized fish was 0.66 ppm.

Nine yellow bullhead ranging in length from 7.8 to 10.4 inches were collected from Chenango Lake. Contaminant concentrations in all 8 fish were below the MDCH trigger level.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Lake St. Clair, Michigan Waters (ID 2003069) *Smallmouth Bass*

Existing MDCH Advisory: Women and children should not eat more than 1 meal per month of Lake St. Clair smallmouth bass due to elevated concentrations of mercury and PCBs. The general population should not eat more than 1 meal per week of smallmouth bass.

Comparison to Trigger Levels: Ten smallmouth bass ranging in length from 14.2 to 20.5 inches were collected from Lake St. Clair in 2003. Total PCB concentrations were below women and children trigger levels in 3 fish, 5 fish were in the women and children “1 meal per week” range, and 2 were in the women and children “1 meal per month” range (Table 9; Figure 11). A total of 37 smallmouth bass were collected since 1987. The median total PCB concentration in the 37 fish was 0.131 ppm. The median concentration in the 21 fish collected since 2001 was 0.084 ppm.

Mercury concentrations exceeded the “restrict consumption” trigger level in 4 of the 10 smallmouth bass collected in 2003 (Table 10). Mercury analysis has been conducted on a total of 37 smallmouth bass from Lake St. Clair since 1987 (Figure 12). Linear regression analysis indicates that mercury concentrations in smallmouth bass greater than 16.6 inches are likely to exceed the MDCH trigger level.

Recommendations: No changes to the advisory are recommended.

Rouge River, Middle Branch, Phoenix Lake, Wayne County (ID 2002086)
Carp, Northern Pike, and White Sucker

Existing MDCH Advisory: Women and children should not eat more than 1 meal per month of Phoenix Lake carp greater than 18 inches and no more than 1 meal per week of carp less than 18 inches due to elevated concentrations of PCBs. Also, women and children should not eat more than 1 meal per month of northern pike greater than 30 inches due to elevated concentrations of PCBs. White sucker are not covered by an advisory.

Comparison to Trigger Levels: Four carp ranging in length from 17.2 to 18.6 inches were collected from Phoenix Lake in 2002. Total PCB concentrations were below women and children trigger levels in 3 carp and at the “1 meal per week” trigger level in one fish (Table 9; Figure 13). A total of 23 carp were collected from Phoenix Lake since 1988. The median concentration of total PCB in carp less than 18 inches was 0.043 ppm; the median concentration in carp greater than 18 inches was 0.314 ppm.

Ten northern pike ranging in length from 21.8 to 28.9 inches were collected from Phoenix Lake in 2002. The total PCB concentrations in 8 fish were below women and children trigger levels, and 2 northern pike had concentrations in the women and children “1 meal per week” range (Table 9; Figure 14). The median total PCB concentration was 0.032 ppm. A total of 25 northern pike were collected since 1988, and the overall median total PCB concentration was 0.04 ppm. No fish larger than 30 inches have been collected since 1988.

Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 northern pike collected in 2002 (Figure 15). Mercury concentrations were measured in a total of 18 northern pike collected since 2001. Concentrations in all 18 fish were below the MDCH “restrict consumption” trigger level, and the median mercury concentration was 0.20 ppm.

Ten white sucker ranging in length from 11.4 to 14.1 inches were collected in 2002. Total PCB concentrations in 7 fish were below women and children trigger levels and 3 white suckers had concentrations in the women and children “1 meal per week” range (Table 9; Figure 16). A total of 15 white sucker were collected from Phoenix Lake since 1988. The median total PCB concentration in white sucker less than 14 inches was 0.030 ppm; the median concentration in fish greater than 14 inches was 0.123 ppm.

Recommendations: The MDCH should consider advising women and children to eat no more than 1 meal per week of white sucker from Phoenix Lake greater than 14 inches in length due to elevated levels of PCBs.

The MDCH should consider removing the women and children advisory on Phoenix Lake carp less than 18 inches.

Additional carp greater than 18 inches should be collected from Phoenix Lake to evaluate the need for changes to the advisory based on total PCB concentrations.

Sand Lake, Lenawee County (ID 2003107)
Walleye

Existing MDCH Advisory: Sand Lake walleye are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten walleye ranging in length from 17.6 to 23.6 inches in length were collected from Sand Lake in 2003. The total PCB concentration exceeded the women and children “1 meal per week” trigger level in 1 fish (Table 9; Figure 17). The median concentration of total PCBs was 0.034 ppm.

Mercury concentrations in 6 of 10 fish equaled or exceeded the “restrict consumption” trigger level (Table 10; Figure 18). The median mercury concentration in the 10 walleye was 0.53 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Union Lake, Oakland County (ID 2002100)
Largemouth Bass and Smallmouth Bass

Existing MDCH Advisory: Union Lake largemouth and smallmouth bass are covered by the statewide mercury advisory.

Comparison to Trigger Levels: One largemouth bass and 8 smallmouth bass ranging in length from 13.9 to 16.5 inches were collected from Union Lake in 2002. Total PCB concentrations in 3 fish exceeded the women and children “1 meal per week” trigger level (Table 9; Figure 19), and the median concentration was 0.039 ppm

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 8 of 9 fish (Table 10; Figure 20). The median concentration of mercury in the largemouth and smallmouth bass was 0.73 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

3.1.2.3 Lake Huron Watershed

AuSable River, Alcona Dam Pond, Alcona County (ID 2003002)
Carp, Northern Pike, and Walleye

Existing MDCH Advisory: Alcona Dam Pond carp are not covered by a fish consumption advisory. Northern pike and walleye are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Three carp ranging in length from 20.0 to 28.3 inches were collected from the Alcona Dam Pond in 2003. Contaminant concentrations were below MDCH trigger levels in all 3 fish.

Four northern pike ranging in length from 17.4 to 23.6 inches were collected from the Alcona Dam Pond in 2003. Contaminant concentrations were below MDCH trigger levels in all 4 fish; however, all of the fish were below the 24-inch legal size limit (Figure 21).

Seven walleye ranging in length from 14.7 to 24.1 inches were collected from the Alcona Dam Pond in 2003. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 1 of 7 walleye (Table 10; Figure 22). Linear regression analysis indicates that walleye less than 24 inches are likely to be below the “restrict consumption” trigger level.

Recommendations: Additional walleye and northern pike should be collected to evaluate the possibility of relaxing the advisory based on mercury.

Ess Lake, Montmorency County (ID 2003023)
Northern Pike

Existing MDCH Advisory: Ess Lake northern pike are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten northern pike ranging in length from 19.6 to 25.8 inches were collected from Ess Lake in 2003 and analyzed for mercury levels only. The mercury concentration in 1 fish exceeded the MDCH “restrict consumption” trigger level, and the median mercury concentration was 0.38 ppm (Table 10; Figure 23). Five northern pike were longer than the 24-inch legal size limit, and the median mercury concentration in the 5 legal sized fish was 0.36 ppm.

Recommendations: The MDCH should consider removing the mercury advisory on Ess Lake northern pike less than 26 inches. No additional monitoring is recommended.

Gaylanta Lake, Montmorency County (ID 2003040)
Northern Pike

Existing MDCH Advisory: Gaylanta Lake northern pike are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten northern pike ranging in length from 22.0 to 25.6 inches were collected in 2003 and analyzed for mercury only. Mercury concentrations in 1 northern pike exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 24), and the median concentration of mercury was 0.38 ppm. Three northern pike were longer than the 24-inch legal size limit and had a median mercury concentration of 0.41 ppm.

Recommendations: The MDCH should consider removing the advisory on Gaylanta Lake northern pike less than 26 inches. No additional monitoring is recommended.

Lake Emma, Presque Isle County (ID 2003050)
Northern Pike

Existing MDCH Advisory: Lake Emma northern pike are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Lake Emma northern pike are exempted from the statewide 24-inch legal size limit. Ten northern pike ranging in length from 15.6 to 19.8 inches were collected from Lake Emma in 2003 and analyzed for mercury only. Mercury concentrations in 3 fish exceeded the MDCH “restrict consumption” trigger level, and the median mercury concentration was 0.44 ppm (Table 10; Figure 25). Linear regression analysis indicates that mercury concentrations in northern pike longer than 18 inches are likely to exceed the “restrict consumption” trigger level.

Recommendations: Lake Emma northern pike are exempted from the statewide 24-inch legal size limit and the MDCH should consider removing the advisory on fish less than 18 inches. No additional monitoring is recommended.

Lake Esau, Presque Isle County (ID 2003052)
Smallmouth Bass

Existing MDCH Advisory: Lake Esau smallmouth bass are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten smallmouth bass ranging in length from 14.7 to 17.3 inches were collected from Lake Esau in 2003 and analyzed for mercury only. Mercury concentrations in all 10 fish were less than the MDCH “restrict consumption” trigger level (Figure 26).

Recommendations: The MDCH should consider removing the mercury advisory for smallmouth bass from Lake Esau less than 18 inches in length. No additional monitoring is recommended.

Lobdell Lake, Genesee County (ID 2003072)
Carp and Largemouth Bass

Existing MDCH Advisory: Lobdell Lake largemouth bass are covered by the statewide mercury advisory. Carp are not covered by an advisory.

Comparison to Trigger Levels: Ten carp ranging from 14.8 to 27.2 inches were collected from Lobdell Lake in 2003. Total PCB concentrations in 4 carp were below the women and children “1 meal per week” trigger level and concentrations in 6 fish were in the women and children “1 meal per week” range (Table 9; Figure 27). Linear regression analysis indicates that PCB concentrations in carp longer than 19 inches are likely to exceed the women and children “1 meal per week” trigger level, and carp longer than 30 inches are likely to exceed the women and children “1 meal per month” trigger level.

Eleven largemouth bass ranging in length from 13.3 to 15.2 inches were collected from Lobdell Lake in 2003. Mercury concentrations were above the MDCH “restrict consumption” trigger level in 9 of the largemouth bass (Table 10; Figure 28). The median concentration in the 11 fish was 0.62 ppm.

Recommendations: The MDCH should consider advising women and children against eating more than 1 meal per week of Lobdell Lake carp between 18 and 30 inches, and no more than 1 meal per month of Lobdell Lake carp greater than 30 inches due to elevated levels of PCBs. No additional monitoring is recommended.

Pratt Lake, Gladwin County (ID 2003095)
Largemouth Bass

Existing MDCH Advisory: Pratt Lake largemouth bass are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten largemouth bass ranging in length from 13.5 to 14.9 inches were collected from Pratt Lake in 2003 and analyzed for mercury only. Mercury concentrations in 2 fish were at or above the MDCH “restrict consumption” trigger level (Table 10; Figure 29). The median concentration in the 6 largemouth bass greater than the 14-inch legal size limit was 0.43 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Shiawassee River, Exchange Road, Shiawassee County (ID 2003109)
Carp and Smallmouth Bass

Existing MDCH Advisory: No one should eat carp of any size from the Shiawassee River above Owosso due to elevated concentrations of PCBs. Also, women and children should not eat more than 1 meal per month of smallmouth bass from the Shiawassee River between Byron and Owosso due to elevated concentrations of PCBs.

Comparison to Trigger Levels: Ten carp ranging in length from 19.2 to 26.8 inches were collected from the Shiawassee River between Byron and Owosso in 2003. The total PCB concentration in 1 carp (10%) exceeded the general population trigger level. Total PCB concentrations exceeded women and children trigger levels in all 10 fish. Concentrations in 6 carp were in the women and children “1 meal per month” range (Table 9; Figure 30), 3 were in the women and children “6 meals per year” range, and 1 carp exceeded the “no consumption” trigger level. The median concentration of total PCB in carp between 18 and 22 inches was 0.74 ppm; in carp between 22 and 26 inches the median concentration was 1.41 ppm. The median concentration for the 2 carp greater than 26 inches was 1.96 ppm. A total of 30 carp were collected between Byron and Owosso since 1987. Total PCB concentrations exceeded the general population trigger level in 11 of 30 (37%) of the fish. The median total PCB concentration in the 7 carp less than 22 inches was 0.74 ppm, and in the 23 fish greater than 22 inches the median concentration was 1.57 ppm.

Ten smallmouth bass ranging in length from 10.9 to 15.7 inches were collected from the Shiawassee River between Byron and Owosso in 2003. Concentrations in 3 fish were below women and children trigger levels and 7 smallmouth bass had concentrations in the women and children “1 meal per week” range (Table 9; Figure 31). Only 1 fish was longer than the 14-inch legal size limit; the concentration in that fish was 0.068 ppm. A total of 17 smallmouth bass were collected since 1987. Two fish were longer than the 14-inch legal size limit and had a median total PCB concentration of 0.189 ppm

Recommendations: The MDCH should consider relaxing the general population advisory to no more than 1 meal per week of carp less than 22 inches from the Shiawassee River between Byron and Owosso. Also, the MDCH should consider relaxing the women and children advisory to no more than 6 meals per year of carp less than 22 inches.

Additional carp greater than 22 inches and smallmouth bass of legal size should be collected from the Shiawassee River between Byron and Owosso and analyzed for total PCBs to determine whether the advisory could be relaxed.

Stevenson Lake, Isabella County (ID 2002096)
Brown Bullhead, Yellow Bullhead, Largemouth Bass, and Northern Pike

Existing MDCH Advisory: Stevenson Lake largemouth bass and northern pike are covered by the statewide mercury advisory. Brown and yellow bullhead are not covered by an advisory.

Comparison to Trigger Levels: Two brown bullhead and 8 yellow bullhead ranging in length from 10.1 to 13.4 inches were collected from Stevenson Lake in 2002. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 1 fish, and the median concentration was 0.38 ppm (Table 10; Figure 32). Linear regression analysis indicates that yellow bullhead over 12.5 inches are likely to have mercury concentrations greater than 0.5 ppm.

Four largemouth bass ranging in length from 15.7 to 16.9 inches were collected from Stevenson Lake in 2002. Mercury concentrations in all 4 fish exceeded the MDCH “restrict consumption” trigger level, and the median concentration was 0.83 ppm (Table 10; Figure 33).

Ten northern pike ranging in length from 17.8 to 28.0 inches were collected from Stevenson Lake in 2002. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 4 of 10 fish. Of the 5 fish over the 24-inch legal size limit, 4 had mercury concentrations exceeding the MDCH “restrict consumption” trigger level (Table 10; Figure 34). Linear regression analysis indicates that northern pike over 23 inches are likely to have mercury concentrations greater than 0.5 ppm.

Recommendations: The MDCH should consider advising women and children to eat no more than 1 meal per month, and the general population no more than 1 meal per week of Stevenson Lake bullhead greater than 12 inches due to elevated levels of mercury. No additional monitoring is recommended.

Thunder Bay River, Seven Mile Pond, Alpena County (ID 2002097)
Brown Bullhead and Largemouth Bass

Existing MDCH Advisory: Thunder Bay River, Seven Mile Pond, largemouth bass are covered by the statewide mercury advisory. Brown bullhead not covered by an advisory.

Comparison to Trigger Levels: Ten brown bullhead ranging in length from 10.6 to 12.2 inches were collected from Thunder Bay River, Seven Mile Pond, in 2002. Contaminant concentrations in all 10 fish were below MDCH trigger levels.

Ten largemouth bass ranging in length from 12.3 to 15.9 inches were collected from Thunder Bay River, Seven Mile Pond, in 2002. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 of 10 fish (Table 10; Figure 35). Concentrations exceeded the MDCH “restrict consumption” trigger level in 2 of the 6 largemouth bass longer than the 14-inch legal size limit. The median mercury concentration in the legal fish was 0.40 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Tittabawassee River, Smiths Crossing Road, Midland County (ID 2003132)
Carp, Channel Catfish, Smallmouth Bass, Walleye, and White Bass

Existing MDCH Advisory: No one should eat any carp, channel catfish, or white bass of any size from the Tittabawassee River below Midland due to elevated concentrations of PCBs and dioxins. Women and children should not eat any smallmouth bass, and the general population should not eat more than 1 meal per week of smallmouth bass due to elevated concentrations of PCBs and dioxins. Also, women and children should not eat more than 1 meal per month, and the general population no more than 1 meal per week of all other species due to elevated concentrations of PCBs and dioxins.

Comparison to Trigger Levels: Ten carp ranging in length from 16.5 to 27.8 inches were collected from the Tittabawassee River below Midland in 2003. Total PCB concentrations exceeded the general population trigger level in 5 (50%) of the fish. Concentrations in 2 carp were in the women and children “1 meal per month” range, 3 were in the “6 meals per year” range, and 5 had concentrations exceeding the women and children “no consumption” trigger level (Table 9; Figure 36). A total of 20 carp were collected since 1999. The median total PCB

concentration in fish between 18 and 22 inches was 1.05 ppm, for carp 22 to 26 inches the median was 1.86 ppm, and for carp 26 to 30 inches the median was 2.81 ppm. Total PCB concentrations exceeded the general population trigger level in 2 of 7 (29%) fish less than 22 inches, 4 of 10 (40%) fish between 22 and 26 inches, and all 3 (100%) fish greater than 26 inches.

Dioxin TEQ concentrations exceeded the MDCH trigger level in 8 (80%) of the carp collected in 2003 (Table 11; Figure 37). Eighteen of 20 (90%) of the carp collected since 1999 had dioxin TEQ concentrations exceeding the MDCH trigger level.

Total chlordane concentrations exceeded the MDCH trigger level in 1 (10%) of the carp collected in 2003 (Table 12; Figure 38). One of 20 (5%) of the carp collected since 1999 had total chlordane concentrations exceeding the MDCH trigger level.

Total DDT concentrations exceeded the MDCH trigger level in 2 (20%) of the carp collected in 2003 (Table 13; Figure 39). Two of 20 (10%) of the carp collected since 1999 had total DDT concentrations exceeding the MDCH trigger level.

Nine channel catfish ranging in length from 16.9 to 25.0 inches were collected from the Tittabawassee River below Midland in 2003. Total PCB concentrations exceeded women and children trigger levels in all 9 channel catfish. Concentrations were in the “1 meal per week” range in 2 fish, 6 fish were in the “1 meal per month” range, and 1 fish was in the “6 meals per year” range (Table 9; Figure 40). The median concentration was 0.51 ppm.

Dioxin TEQ concentrations exceeded the MDCH trigger level in 5 (56%) of the channel catfish (Table 11; Figure 41).

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 4 of the channel catfish (Table 10; Figure 42), and the median concentration in all 9 channel catfish was 0.37 ppm.

Ten smallmouth bass ranging in length from 13.3 to 18.3 inches were collected from the Tittabawassee River below Midland in 2003. Total PCB concentrations exceeded women and children trigger levels in all 10 fish. Concentrations in 6 fish were in the women and children “1 meal per week” range and 4 fish were in the “1 meal per month” range (Table 9; Figure 43). A total of 25 smallmouth bass were collected from the Tittabawassee River since 1999. Linear regression analysis indicates that smallmouth bass from the Tittabawassee River greater than 16 inches are likely to have total PCB concentrations exceeding the women and children “1 meal per month” trigger level.

Dioxin TEQ concentrations exceeded the trigger level in 3 of 10 (30%) smallmouth bass collected in 2003, and in 8 of 25 (32%) fish collected since 1999 (Table 11; Figure 44).

Ten walleye ranging in length from 16.2 to 20.2 inches were collected from the Tittabawassee River below Midland in 2003. Total PCB concentrations exceeded women and children trigger levels in all 10 fish. Concentrations were in the women and children “1 meal per week” range in 5 of the walleye, and 5 fish were in the women and children “1 meal per month” range (Table 9; Figure 45). A total of 24 walleye were collected from the Tittabawassee River since 1992. The median total PCB concentration in walleye less than 18 inches was 0.17 ppm; for fish between 18 and 22 inches the median concentration was 0.49 ppm. Linear regression analysis indicates

that walleye from the Tittabawassee River greater than 23 inches are likely to have total PCB concentrations exceeding the women and children “6 meals per year” trigger level.

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 1 walleye collected in 2003 (Table 10; Figure 46), and the median concentration for all 10 fish was 0.12 ppm. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 1 of the 24 walleye collected since 1992, and the median mercury concentration was 0.14 ppm.

Dioxin TEQ concentrations were below the trigger level in all 10 walleye collected in 2003 and in all 22 walleye analyzed since 1992 (Figure 47).

Ten white bass ranging in length from 12.9 to 15.1 inches were collected from the Tittabawassee River below Midland in 2003. Total PCB concentrations exceeded the general population trigger level in 1 (10%) white bass collected in 2003 and exceeded women and children trigger levels in all 10 fish. Concentrations were in the women and children “1 meal per month” range in 2 fish, 6 fish were in the “6 meals per year” range and 2 fish exceeded the women and children “no consumption” trigger level (Table 9; Figure 48). A total of 20 white bass were collected from the Tittabawassee River since 1995. The median total PCB concentration for fish less than 14 inches was 1.43 ppm. The median concentration for white bass greater than 14 inches was 2.16 ppm.

Dioxin TEQ concentrations exceeded the trigger level in 8 of 10 (80%) white bass collected in 2003, and in 14 of 20 (70%) white bass collected since 1995 (Table 11; Figure 49).

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 white bass collected in 2003 and the median mercury concentration was 0.40 ppm (Table 10; Figure 50). Concentrations exceeded the MDCH “restrict consumption” trigger level in 4 of 20 white bass collected since 1995. The median mercury concentration in white bass less than 14 inches was 0.37 ppm and in fish greater than 14 inches the median concentration was 0.48 ppm.

Recommendations: The MDCH should consider advising women and children to eat no more than 1 meal per month of Tittabawassee River walleye less than 22 inches and no more than 6 meals per year of walleye greater than 22 inches due to elevated levels of PCBs. In addition, the MDCH should consider advising the general population to eat no more than 1 meal per week of Tittabawassee River walleye greater than 22 inches.

Wixom Lake, Gladwin County (ID 2002102) *Channel Catfish and Northern Pike*

Existing MDCH Advisory: Wixom Lake northern pike are covered by the statewide mercury advisory. Channel catfish are not covered by an advisory.

Comparison to Trigger Levels: Ten channel catfish ranging in length from 15.6 to 24.8 inches were collected from Wixom Lake in 2002. Total PCB concentrations were below the women and children trigger levels in 9 of the fish. The concentration in 1 channel catfish was in the “1 meal per week” range (Table 9; Figure 51). The median total PCB concentration was 0.021 ppm.

The mercury concentration in 1 channel catfish exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 52). The median mercury concentration was 0.26 ppm.

Ten northern pike ranging in length from 24.0 to 28.8 inches were collected from Wixom Lake in 2002. Mercury concentrations in all 10 northern pike were below the MDCH “restrict consumption” trigger level, and the median concentration was 0.38 ppm (Figure 53).

Recommendations: The MDCH should consider removing the mercury advisory on Wixom Lake northern pike less than 30 inches. No additional monitoring is recommended.

3.1.2.4 Lake Michigan Watershed

Lake Michigan, South of Frankfort (ID 2003160, 2003159, 2003158, 2003155, and 2002112) *Lake Sturgeon*

Existing MDCH Advisory: No one should eat Lake Michigan sturgeon greater than 30 inches due to elevated concentrations of PCBs, chlordane, DDT, and dioxins. In addition, the MDNR forbids possession of southern Lake Michigan lake sturgeon.

Comparison to Trigger Levels: Five lake sturgeon found dead at various points along the Lake Michigan shoreline south of Frankfort were analyzed in 2002 and 2003. The fish ranged in length from 20.9 to 74.0 inches. Total PCB concentrations exceeded women and children trigger levels in 4 of the 5 lake sturgeon analyzed in 2003. Three of the fish were in the women and children “1 meal per month” range and 1 was in the “6 meals per year” range (Table 9; Figure 54). The overall median total PCB concentration was 0.78 ppm. Ten entire and 1 partial lake sturgeon were collected from southern Lake Michigan since 1994. The median total PCB concentration in all 11 fish was 1.06 ppm.

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 of the 5 lake sturgeon analyzed in 2002 and 2003 (Table 10; Figure 55). The median mercury concentration was 0.23 ppm. Four of 11 fish collected since 1994 had mercury concentrations above the MDCH “restrict consumption” trigger level. Linear regression analysis indicates that lake sturgeon greater than 64 inches are likely to have mercury concentrations exceeding the MDCH “restrict consumption” trigger level.

Total chlordane concentrations were below trigger levels in all 5 lake sturgeon analyzed in 2002 and 2003. Total chlordane concentrations exceeded the MDCH trigger level in 5 of 11 (45%) lake sturgeon collected since 1994 (Figure 56).

Total DDT concentrations were below the MDCH trigger level in all 5 lake sturgeon analyzed in 2002 and 2003. Total DDT concentrations exceeded the MDCH trigger level in 3 of 11 (27%) lake sturgeon collected since 1994 (Figure 57).

Recommendations: No changes to the advisory are recommended.

At the request of the MDNR, the MDEQ will continue to analyze samples from lake sturgeon that are found dead.

Austin Lake, Kalamazoo County (ID 2003154) *Carp, Largemouth Bass, and Yellow Bullhead*

Existing MDCH Advisory: Austin Lake largemouth bass are covered by the statewide mercury advisory. Carp and yellow bullhead are not covered by an advisory.

Comparison to Trigger Levels: Ten carp ranging in length from 20.7 to 38.5 inches were collected from Austin Lake in 2003. Total PCB concentrations were below the women and children trigger levels in 8 fish. Concentrations in 2 carp were in the women and children “1 meal per week” range (Table 9; Figure 58). A total of 16 carp were collected since 1993. The median concentration of total PCB in carp greater than 30 inches in length was 0.03 ppm, and the median concentration for fish 22 inches or less was less than 0.025 ppm.

Ten largemouth bass ranging in length from 13.7 to 15.4 inches were collected in 2003. Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 fish. A total of 18 largemouth bass were collected from Austin Lake since 1993 (Figure 59). The median mercury concentration of the 8 largemouth bass greater than the 14-inch legal size limit was 0.35 ppm.

Ten yellow bullhead ranging in length from 7.8 to 13.6 inches were collected from Austin Lake in 2003. Contaminant concentrations were below trigger levels for all 10 fish.

Recommendations: The MDCH should consider removing the advisory on Austin Lake largemouth bass less than 18 inches. No additional monitoring is recommended.

**Black River, South Branch, Downstream of Bangor Dam (ID 2002008)
*Carp, Northern Pike, and White Sucker***

Existing MDCH Advisory: No one should eat carp from the Black River or the South Branch Black River below Bangor due to elevated concentrations of PCBs and chlordane. Women and children should not eat more than 1 meal per month of northern pike and no more than 1 meal per week of white sucker due to elevated concentrations of PCBs.

Comparison to Trigger Levels: Nine carp ranging in length from 21.7 to 27.2 inches were collected from the South Branch Black River downstream of the Bangor Dam in 2002. Total PCB concentrations exceeded the general population trigger level in 2 (22%) fish (Table 9; Figure 60). Concentrations exceeded women and children trigger levels in all 9 carp. Concentrations were in the women and children “1 meal per week” range in 1 carp, 3 were in the “1 meal per month” range, 3 were in the “6 meals per year” range, and 2 exceeded the “no consumption” trigger level. The median total PCB concentration in carp collected in 2002 was 1.12 ppm. Total PCB concentrations exceeded the general population trigger level in 4 of 13 (31%) carp collected from the Black River and the South Branch Black River since 1992. The median total PCB concentration was 1.12 ppm.

Total chlordane concentrations were below the MDCH trigger level in all 9 carp collected in 2002 (Figure 61). Two of 13 (15%) carp collected since 1992 had total chlordane concentrations above the MDCH trigger level.

Five northern pike ranging in length from 18.5 to 26.2 inches were collected from the South Branch Black River below Bangor in 2002. Total PCB concentrations were below women and children trigger levels in all 5 fish (Figure 62), and the median concentration was 0.014 ppm. However, only 1 of the northern pike was above the legal size limit. A total of 9 northern pike were collected from the Black River and the South Branch Black River since 1992. The median total PCB concentration was 0.29 ppm in the 4 legal sized fish collected since 1992.

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 of 5 northern pike collected in 2002 (Table 10; Figure 63), and the median mercury concentration

was 0.42 ppm. The 1 legal sized northern pike collected in 2002 had a mercury concentration of 0.82 ppm. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 of 9 northern pike collected since 1992, and the median concentration was 0.35 ppm. The median mercury concentration in the 4 legal sized fish collected since 1992 was also 0.35 ppm.

Six white sucker ranging in length from 14.0 to 16.1 inches were collected from the South Branch Black River below Bangor in 2002. Total PCB concentrations in 2 fish were in the women and children “1 meal per week” range, and 4 had concentrations below women and children trigger levels (Table 9; Figure 64). The median total PCB concentration was 0.038 ppm. A total of 11 white sucker were collected from the South Branch Black River since 1989, and the median total PCB concentration was 0.079 ppm.

Recommendations: The MDCH should consider removing chlordane from the list of contaminants causing the advisory on Black River carp.

Additional carp should be collected to evaluate the possibility of relaxing the advisory based on PCBs.

Black River, South Branch, Upstream of Bangor Dam (ID 2002106)
Carp and White Sucker

Existing MDCH Advisory: Carp and white sucker are not covered by a fish consumption advisory.

Comparison to Trigger Levels: Ten carp ranging in length from 21.2 to 26.0 inches were collected from the South Branch of the Black River upstream of the Bangor Dam in 2002. Total PCB concentrations exceeded women and children trigger levels in 9 carp (Table 9; Figure 65). Concentrations in 7 fish were in the “1 meal per week” range and 2 were in the “1 meal per month” range. The median concentration in all 10 carp was 0.101 ppm.

Ten white sucker ranging in length from 13.3 to 17.9 inches were collected in 2002. Contaminant concentrations were below MDCH trigger levels in all 10 fish.

Recommendations: The MDCH should consider advising women and children to eat no more than 1 meal per week of carp from the South Branch of the Black River above the Bangor Dam due to elevated levels of PCBs.

No additional monitoring is recommended.

Bristol Lake, Barry County (ID 2002009)
Largemouth Bass and White Sucker

Existing MDCH Advisory: Bristol Lake largemouth bass are covered by the statewide mercury advisory. White sucker are not covered by an advisory.

Comparison to Trigger Levels: Five largemouth bass ranging in length from 10.4 to 15.7 inches were collected from Bristol Lake in 2002. Contaminant concentrations were below MDCH trigger levels in all 5 fish. However, only 2 were above the 14-inch legal size limit (Figure 66).

Ten white sucker ranging in length from 13.3 to 19.2 inches were collected from Bristol Lake in 2002. Total PCB concentrations were below women and children trigger levels in 9 fish and 1

fish had a concentration in the women and children “1 meal per week” range (Table 9, Figure 67). The median concentration of total PCB was 0.002 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Camp Lake, Kent County (ID 2003015)
Brown Bullhead, Largemouth Bass, and Northern Pike

Existing MDCH Advisory: Camp Lake largemouth bass and northern pike are covered by the statewide mercury advisory. Brown bullhead are not covered by an advisory.

Comparison to Trigger Levels: Ten brown bullhead ranging in length from 10.8 to 13.6 inches were collected from Camp Lake in 2003. Total PCB concentrations were below women and children trigger levels in 9 fish and 1 fish had a concentration in the women and children “1 meal per week” range (Table 9; Figure 68). The median concentration was 0.010 ppm.

Seven largemouth bass ranging in length from 10.1 to 15.9 inches were collected from Camp Lake in 2003. Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 7 fish, and the median concentration was 0.33 ppm. However, 4 of the 7 largemouth bass were sub-legal size (Figure 69); the median concentration in the 3 largemouth bass greater than the 14-inch legal size limit was 0.36 ppm. Linear regression analysis indicates that largemouth bass longer than 18 inches are likely to have mercury concentrations exceeding the MDCH “restrict consumption” trigger level.

Four northern pike ranging in length from 19.6 to 28.3 inches were collected from Camp Lake in 2003. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 of 4 fish, and the median concentration was 0.47 ppm (Table 10; Figure 70). However, only 1 of the fish was larger than the 24-inch legal size limit.

Recommendations: The MDCH should consider removing the advisory on Camp Lake largemouth bass less than 18 inches.

No additional monitoring is recommended.

Crooked Lake, Barry County (ID 2003020)
Brown Bullhead and Largemouth Bass

Existing MDCH Advisory: Crooked Lake largemouth bass are covered by the statewide mercury advisory. Brown bullhead are not covered by an advisory.

Comparison to Trigger Levels: Ten brown bullhead ranging in length from 9.4 to 12.4 inches were collected from Crooked Lake in 2003. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 1 brown bullhead (Table 10; Figure 71), and the median concentration was 0.05 ppm.

Ten largemouth bass ranging in length from 10.9 to 16.7 inches were collected from Crooked Lake in 2003. The mercury concentrations exceeded MDCH “restrict consumption” trigger level in 1 fish (Table 10; Figure 72), and the median concentration was 0.19 ppm. The median mercury concentration was 0.31 ppm in the 3 largemouth bass longer than the 14-inch legal size limit.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Deer Lake, Charlevoix County (ID 2003021)
Largemouth Bass and Northern Pike

Existing MDCH Advisory: Deer Lake largemouth bass and northern pike are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten largemouth bass ranging in length from 13.0 to 17.8 inches were collected from Deer Lake in 2003 and analyzed for mercury only. The mercury concentration in 1 fish exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 73). Four of the largemouth bass were longer than the 14-inch legal size limit. Mercury concentrations in 1 of the legal size largemouth bass exceeded the MDCH “restrict consumption” trigger level. Linear regression analysis indicates that largemouth bass greater than 16 inches are likely to exceed the MDCH “restrict consumption” trigger level.

Five northern pike ranging in length from 14.7 to 19.7 inches were collected from Deer Lake in 2003. There is no size limit on Deer Lake northern pike. Mercury concentrations in 2 northern pike exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 74), and the median concentration was 0.40 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Flat River, Ingalls Road, Downstream of Belding, Ionia County (ID 2003031)
Rock Bass and White Sucker

Existing MDCH Advisory: Women and children should not eat more than 1 meal per week of Flat River rock bass of any size due to elevated concentrations of PCBs. White sucker are not covered by an advisory.

Comparison to Trigger Levels: Ten rock bass ranging in length from 6.1 to 7.6 inches were collected from the Flat River near Ingalls Road downstream of Belding in 2003. The median total PCB concentration for all 10 fish was 0.007 ppm; the concentrations in all 10 fish were below women and children trigger levels (Figure 75). Twenty rock bass were collected from the Flat River at 2 sites below Greenville in 1998 and analyzed as 4 composite samples. The median total PCB concentration for the samples analyzed since 1998 was 0.052 ppm.

Ten white sucker ranging in length from 9.6 to 15.2 inches were collected from the Flat River near Ingalls Road in 2003. Total PCB concentrations in 8 fish were below women and children trigger levels and 2 of the white sucker had concentrations in the women and children “1 meal per week” range (Table 9; Figure 76). The median total PCB concentration of white sucker less than 14 inches was 0.021 ppm and in fish greater than 14 inches the median was 0.063 ppm.

Recommendations: The MDCH should consider advising women and children to eat no more than 1 meal per week of white sucker greater than 12 inches from the Flat River below Greenville due to elevated levels of PCBs. Additional rock bass and white sucker should be collected from the Flat River below Greenville and analyzed for PCBs to determine whether the advisory could be removed.

Flat River, Miller Road, Upstream of Greenville, Montcalm County (ID 2003032)
Rock Bass and White Sucker

Existing MDCH Advisory: Women and children should not eat more than 1 meal per week of Flat River rock bass of any size due to elevated concentrations of PCBs. White sucker are not covered by an advisory.

Comparison to Trigger Levels: Ten rock bass ranging in length from 5.4 to 8.8 inches were collected from the Flat River upstream of Greenville near Miller Road in 2003. Concentrations of total PCBs were below detection levels and all tested contaminant concentrations were below MDCH trigger levels in all 10 fish.

Ten white sucker ranging in length from 10.4 to 12.7 inches were collected from the Flat River near Miller Road in 2003. Contaminant concentrations were below MDCH trigger levels in all 10 fish.

Recommendations: The MDCH should consider removing the advisory on rock bass from the Flat River upstream of Greenville. No additional monitoring is recommended.

Grand River, Maple Grove Road, Jackson County (ID 2002113)
Northern Pike

Existing MDCH Advisory: Women and children should not eat more than 1 meal per week of northern pike from the Grand River upstream of the Webber Dam due to elevated levels of PCBs.

Comparison to Trigger Levels: Two northern pike ranging in length from 27.9 to 31.7 inches were collected from the Grand River at Maple Grove Road in 2002. The total PCB concentration in 1 fish was in the women and children “1 meal per week” range and 1 fish was in the “1 meal per month” range (Table 9; Figure 77). A total of 4 northern pike were collected from the Grand River upstream of the Webber Dam since 1989. The median concentration in all 4 fish was 0.118 ppm.

The mercury concentration in 1 of 2 northern pike exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 78). The median concentration in all 4 fish collected since 1989 was 0.32 ppm.

Recommendations: No change to the advisory is recommended. Additional northern pike were collected from the Grand River in 2004. These results will be summarized in the 2005 Annual Report.

Green Lake, Grand Traverse County (ID 2003139)
Lake Trout

Existing MDCH Advisory: Green Lake lake trout are not covered by an advisory.

Comparison to Trigger Levels: Ten lake trout ranging in length from 28.2 to 31.8 inches were collected from Green Lake in 2003. Total PCB concentrations exceeded women and children trigger levels in 9 fish (Table 9; Figure 79). Concentrations in 7 fish were in the women and children “1 meal per week” range and 2 fish were in the “1 meal per month” range. The median

total PCB concentration was 0.052 ppm in fish less than 30 inches and 0.133 ppm in fish greater than 30 inches.

Mercury concentrations in all 10 lake trout were above the MDCH “restrict consumption” trigger level (Table 10; Figure 80). The median mercury concentration was 0.55 ppm in fish less than 30 inches and 0.61 ppm in fish greater than 30 inches.

Recommendations: The MDCH should consider advising women and children to eat no more than 1 meal per month of Green Lake lake trout due to elevated levels of PCBs and mercury. Also, the MDCH should consider advising the general population to eat no more than 1 meal per week of Green Lake lake trout.

The Green Lake lake trout are being analyzed for dioxin and furan congeners and the results will be included in the 2005 Annual Report.

No additional monitoring is recommended.

Lake Mitchell, Wexford County (ID 2003141)
Largemouth Bass

Existing MDCH Advisory: Lake Mitchell largemouth bass are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten largemouth bass ranging in length from 13.9 to 16.4 inches were collected from Lake Mitchell in 2003 and analyzed for mercury only. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 1 fish (Table 10; Figure 81). A total of 17 largemouth bass were collected from Lake Mitchell since 1989. Linear regression analysis indicates that Lake Mitchell largemouth bass greater than 17.5 inches are likely to have mercury concentrations greater than the MDCH “restrict consumption” trigger level.

Recommendations: The MDCH should consider removing the advisory covering Lake Mitchell largemouth bass less than 18 inches. No additional monitoring is recommended.

Lake Ovid, Clinton County (ID 2003152)
Largemouth Bass

Existing MDCH Advisory: Lake Ovid largemouth bass are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten largemouth bass ranging in length from 13.6 to 18.5 inches were collected from Lake Ovid in 2003 and analyzed for mercury only. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 fish (Table 10; Figure 82). Linear regression analysis indicates that largemouth bass greater than 17 inches are likely to exceed the MDCH “restrict consumption” trigger level.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Long Lake, Kalamazoo County (ID 2003153 and 2002064)
Black Crappie and Brown Bullhead

Existing MDCH Advisory: Long Lake black crappie greater than 9 inches are covered by the statewide mercury advisory. Brown bullhead are not covered by an advisory.

Comparison to Trigger Levels: Ten black crappie ranging in length from 9.9 to 12.2 inches were collected from Long Lake in 2002. Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 fish (Figure 83), and the median concentration was 0.26 ppm.

Ten brown bullhead ranging in length from 10.6 to 14.0 inches were collected from Long Lake in 2003. Contaminant concentrations were below MDCH trigger levels in all 10 fish.

Recommendations: The MDCH should consider removing the advisory on Long Lake black crappie less than 14 inches. No additional monitoring is recommended.

Manistique Lake, Mackinac County (ID 2003075)
Walleye

Existing MDCH Advisory: Manistique Lake walleye are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten walleye ranging in length from 18.9 to 22.9 inches were collected from Manistique Lake in 2003. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 3 fish (Table 10; Figure 84). Linear regression analysis indicates that walleye greater than 20.8 inches in length are likely to have mercury concentrations greater than the 0.5 ppm trigger level.

Recommendations: The MDCH should consider removing the advisory on Manistique Lake walleye less than 18 inches. No additional monitoring is recommended.

Manistique River, Below Manistique Papers Dam, Schoolcraft County (ID 2003077)
Redhorse Sucker, Smallmouth Bass, and Walleye

Existing MDCH Advisory: Manistique River redhorse sucker, smallmouth bass, and walleye are not covered by an advisory.

Comparison to Trigger Levels: Ten redhorse sucker ranging in length from 13.4 to 21.7 inches were collected from the Manistique River below the Manistique Papers Dam in 2003. Total PCB concentrations exceeded women and children trigger levels in 8 fish (Table 9; Figure 85). Concentrations in 2 redhorse sucker were in the women and children “1 meal per week” range and 6 were in the women and children “1 meal per month” range. The median total PCB concentration was 0.274 ppm.

The mercury concentration in 1 redhorse sucker exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 86). The median concentration was 0.18 ppm.

Four smallmouth bass ranging in length from 13.5 to 17.6 inches were collected from the Manistique River below the Manistique Papers Dam in 2003. Total PCB concentrations exceeded women and children trigger levels in all 4 fish. The concentration in 1 fish was in the

women and children “1 meal per week” range, and 3 fish were in the women and children “1 meal per month” range (Table 9; Figure 87). The median total PCB concentration was 0.216 ppm.

Ten walleye ranging in length from 13.1 to 26.1 inches were collected from the Manistique River below the Manistique Papers Dam in 2003. Total PCB concentrations exceeded women and children trigger levels in 2 fish (Table 9; Figure 88). The concentration in 1 fish was in the women and children “1 meal per week” range and 1 fish was in the women and children “1 meal per month” range. Linear regression analysis indicates that walleye between 15 and 24.5 inches are likely to have total PCB concentrations in the women and children “1 meal per week” range, and walleye greater than 24.5 inches are likely to have concentrations in the “1 meal per month” range.

Mercury concentrations were below the MDCH “restrict consumption” trigger level in all but 1 walleye collected in 2003 (Table 10; Figure 89). The median mercury concentration was 0.08 ppm. Linear regression analysis indicates that walleye greater than 25.6 inches are likely to have mercury concentrations exceeding the MDCH “restrict consumption” trigger level.

Recommendations: The MDCH should consider advising women and children to eat no more than 1 meal per month of redhorse sucker and smallmouth bass from the Manistique River below the Manistique Papers Dam due to elevated levels of PCBs.

Also, the MDCH should consider advising women and children to eat no more than 1 meal per week of walleye less than 22 inches and no more than 1 meal per month of walleye greater than 22 inches from the Manistique River below the Manistique Papers Dam due to elevated concentrations of PCBs and mercury. In addition, the MDCH should consider advising the general public to eat no more than 1 meal per week of walleye greater than 22 inches due to elevated levels of mercury.

Additional legal sized walleye and smallmouth bass were collected from the Manistique River below the Manistique Papers Dam in 2004. Results will be summarized in the 2005 Annual Report.

Mona Lake, Muskegon County (ID 2002069) ***Carp***

Existing MDCH Advisory: No one should eat Mona Lake carp of any size due to elevated concentrations of PCBs.

Comparison to Trigger Levels: Ten carp ranging in length from 18.1 to 32.1 inches were collected from Mona Lake in 2002. Total PCB concentrations were below the general population trigger level in all 10 fish. Concentrations exceeded women and children trigger levels in 9 carp (Table 9; Figure 90). Total PCB concentrations in 6 fish were in the women and children “1 meal per week” range and 3 were in the “1 meal per month” range. The median concentration was 0.162 ppm. A total of 30 carp were collected from Mona Lake since 1987. Total PCB concentrations have declined since 1987. Linear regression analysis of the data collected since 2000 indicates that carp less than 22 inches are likely to have total PCB concentrations in the women and children “1 meal per week” range, and carp greater than 22 inches are likely to have concentrations in the “1 meal per month” range.

Recommendations: The MDCH should consider removing the general population advisory covering Mona Lake carp. Also, the MDCH should consider relaxing the women and children advisory to no more than 1 meal per month of Mona Lake carp greater than 22 inches and no more than 1 meal per week of carp less than 22 inches.

No additional monitoring is recommended.

Montcalm Lake, Montcalm County (ID 2003065)
Largemouth Bass

Existing MDCH Advisory: Montcalm Lake largemouth bass are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten largemouth bass ranging in length from 11.6 to 16.3 inches were collected from Montcalm Lake in 2003 and analyzed for mercury only. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 1 fish (Table 10; Figure 91). The median mercury concentration was 0.42 ppm in the 4 largemouth bass longer than the 14-inch legal size limit.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Morrison Lake, Ionia County (ID 2003081)
Carp

Existing MDCH Advisory: Women and children should not eat more than 1 meal per month of Morrison Lake carp greater than 30 inches, and no more than 1 meal per week of carp between 26-30 inches due to elevated levels of PCBs.

Comparison to Trigger Levels: Ten carp ranging from 11.1 to 25.6 inches in length were collected from Morrison Lake in 2003. The total PCB concentration was below women and children trigger levels in all 10 fish (Figure 92). A total of 14 carp were collected since 1988. The median total PCB concentration in carp less than 26 inches was 0.004 ppm. Carp between 26 and 30 inches had a median concentration of 0.17 ppm.

Recommendations: No changes to the advisory are recommended. Additional Morrison Lake carp should be collected to evaluate the need for an advisory on carp greater than 26 inches.

North Lake Leelanau, Leelanau County (ID 2003082 and 2002078)
Lake Trout and White Sucker

Existing MDCH Advisory: North Lake Leelanau lake trout and white sucker are not covered by an advisory.

Comparison to Trigger Levels: Twelve lake trout ranging in length from 25.1 to 34.2 inches were collected from North Lake Leelanau in 2003. Total PCB concentrations in 5 fish were in the women and children “1 meal per week” range and 7 fish were in the “1 meal per month” range (Table 9; Figure 93). Linear regression analysis indicates that lake trout less than 26.2 inches will likely have total PCB concentrations in the women and children “1 meal per week” range and lake trout greater than 26.2 inches will likely have total PCB concentrations in the “1 meal per month” range.

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in all 12 lake trout (Table 10; 94).

Ten white sucker ranging in length from 15.3 to 22.5 inches were collected from North Lake Leelanau in 2002. Total PCB concentrations in 5 fish were below women and children trigger levels and concentrations in the remaining 5 white sucker were in the women and children “1 meal per week” range (Table 9; Figure 95). The median total PCB concentration was 0.064 ppm.

Recommendations: The MDCH should consider advising the general population against eating more than 1 meal per week of lake trout from North Lake Leelanau due to elevated levels of mercury. In addition, the MDCH should consider advising women and children against eating more than 1 meal per month of lake trout from North Lake Leelanau due to elevated levels of mercury and PCBs.

The MDCH should consider advising women and children against eating more than 1 meal per week of white sucker from North Lake Leelanau due to elevated concentrations of PCBs.

No additional monitoring is recommended.

North Manistique Lake, Luce County (ID 2003083)
Walleye and Yellow Perch

Existing MDCH Advisory: North Manistique Lake walleye and yellow perch greater than 9 inches are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten walleye ranging in length from 16.3 to 21.8 inches were collected from North Manistique Lake in 2003 and analyzed for mercury only. Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 fish (Figure 96). The median mercury concentration in walleye collected in 2003 was 0.25 ppm. A total of 20 walleye were collected from North Manistique Lake since 1989. The median mercury concentration was 0.21 in walleye less than 18 inches, 0.44 ppm in walleye between 18 and 22 inches, and 0.76 ppm in walleye greater than 22 inches.

Ten yellow perch ranging in length from 7.9 to 11.1 inches were collected from North Manistique Lake in 2003 and analyzed for mercury only. Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 fish (Figure 97). A total of 20 yellow perch were collected since 1989. Mercury concentrations in all 20 fish were less than the “restrict consumption” trigger level. The median mercury concentration in yellow perch greater than 9 inches was 0.20 ppm.

Recommendations: The MDCH should consider removing the advisory on North Manistique Lake walleye less than 22 inches. The MDCH should also consider removing the consumption advisory on North Manistique Lake yellow perch.

No additional monitoring is recommended.

Paint Lake, Iron County (ID 2003144)
Northern Pike

Existing MDCH Advisory: Paint Lake northern pike are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten northern pike ranging in length from 21.6 to 28.9 inches were collected from Paint Lake and analyzed for mercury only. Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 fish (Figure 98), and the median concentration was 0.21 ppm. The median concentration in the 5 fish longer than the 24-inch legal size limit was 0.22 ppm.

Recommendations: The MDCH should consider removing the advisory on Paint Lake northern pike less than 30 inches.

No additional monitoring is recommended.

Pere Marquette Lake, Mason County (ID 2003086)
Northern Pike and White Sucker

Existing MDCH Advisory: Women and children should not eat more than 1 meal per month of Pere Marquette Lake northern pike due to elevated concentrations of mercury and PCBs. The general population should not eat more than 1 meal per week of northern pike. White sucker are not covered by an advisory.

Comparison to Trigger Levels: Ten northern pike ranging in length from 18.5 to 30.5 inches were collected from Pere Marquette Lake in 2003. Four of the fish were longer than the 24-inch legal size limit. Total PCB concentrations were below women and children trigger levels in 3 northern pike and 7 fish were in the women and children “1 meal per week” range (Table 9; Figure 99). A total of 14 northern pike were collected since 1989. The median total PCB concentration in the legal size northern pike was 0.084 ppm.

Mercury concentrations were below the MDCH “restrict consumption” trigger level in all 10 northern pike. The median mercury concentration in the 7 legal size northern pike collected since 1989 was 0.30 ppm (Figure 100).

Ten white sucker ranging in length from 16.6 to 20.2 inches were collected from Pere Marquette Lake in 2003. Total PCB concentrations were below the women and children trigger levels in 2 fish, 6 fish were in the women and children “1 meal per week” range, and 2 fish were in the women and children “1 meal per month” range (Table 9; Figure 101). The median total PCB concentration was 0.114 ppm.

Recommendations: The MDCH should consider removing mercury from the list of contaminants causing the Pere Marquette Lake northern pike advisory.

Also, the MDCH should consider advising women and children to eat no more than 1 meal per week of white sucker from Pere Marquette Lake due to elevated concentrations of PCBs.

Additional northern pike should be collected from Pere Marquette Lake and analyzed for PCBs to evaluate the possibility of relaxing the advisory.

Rabbit River, Downstream of Hamilton Dam, Allegan County (ID 2003098)
Carp, Largemouth Bass, Northern Pike, Redhorse Sucker, and Rock Bass

Existing MDCH Advisory: Rabbit River carp, largemouth bass, northern pike, redhorse sucker, and rock bass are not covered by an advisory.

Comparison to Trigger Levels: Ten carp ranging in length from 20.1 to 25.7 inches were collected from the Rabbit River downstream of Hamilton Dam in 2003. Total PCB concentrations exceeded the general population trigger level in 4 (40%) fish (Table 9; Figure 102). Concentrations exceeded women and children trigger levels in all 10 fish. Three carp had total PCB concentrations in the women and children “1 meal per month” range, 3 were in the “6 meals per year” range, and 4 exceeded the “no consumption” trigger level. The median total PCB concentration was 1.54 ppm.

Four largemouth bass ranging in length from 10.4 to 15.6 inches in length were collected from the Rabbit River downstream of Hamilton Dam in 2003. Only 1 of the fish was longer than the 14-inch legal size limit. Total PCB concentrations were below women and children trigger levels in 2 largemouth bass. The concentration in 1 fish was in the “1 meal per week” range and 1 fish was in the “1 meal per month” range (Table 9; Figure 103). The median total PCB concentration was 0.093 ppm.

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in the 1 largemouth bass longer than the 14-inch legal size limit, and the median mercury concentration was 0.26 ppm (Table 10; Figure 104).

Three northern pike ranging in length from 17.7 to 22.8 inches were collected from the Rabbit River downstream of Hamilton Dam in 2003. All of the fish were below the 24-inch legal size limit. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 northern pike, and the median mercury concentration was 0.62 ppm (Table 10; Figure 105).

Ten redhorse sucker ranging in length from 10.1 to 16.4 inches were collected from the Rabbit River downstream of Hamilton Dam in 2003. Total PCB concentrations were below the women and children trigger levels in 9 fish, and 1 fish was in the women and children “1 meal per week” range (Table 9; Figure 106). The median concentration in fish less than 14 inches was 0.028 ppm and the median concentration for redhorse sucker greater than 14 inches was 0.040 ppm.

Five rock bass ranging in length from 7.0 to 8.3 inches were collected from the Rabbit River downstream of Hamilton in 2003. Contaminant concentrations were below MDCH trigger levels in all 5 fish.

Recommendations: The MDCH should consider advising the general population to eat no more than 1 meal per week and women and children to eat no more than 6 meals per year of carp from the Rabbit River downstream of the Hamilton Dam due to elevated concentrations of PCBs.

In addition, the MDCH should consider advising women and children to eat no more than 1 meal per month and the general population no more than 1 meal per week of largemouth bass from the Rabbit River downstream of the Hamilton Dam due to elevated concentrations of PCBs and mercury.

Also, the MDCH should consider advising women and children to eat no more than 1 meal per month and the general population to eat no more than 1 meal per week of northern pike from the Rabbit River downstream of the Hamilton Dam due to elevated concentrations of mercury.

Additional largemouth bass and northern pike should be collected from the Rabbit River below Hamilton Dam to evaluate the need for advisories based on PCBs and mercury.

Rabbit River, Upstream of Hamilton Dam, Allegan County (ID 2003096)
Carp, Largemouth Bass, Northern Pike, and Redhorse Sucker

Existing MDCH Advisory: Rabbit River carp and redhorse sucker are not covered by an advisory. Largemouth bass and northern pike from the impoundment above Hamilton Dam are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten carp ranging in length from 22.9 to 29.7 inches were collected from the Rabbit River upstream of the Hamilton Dam in 2003. Total PCB concentrations exceeded women and children trigger levels in 8 fish (Table 9; Figure 107). Concentrations in 2 fish were in the “1 meal per week” range, and 6 were in the “1 meal per month” range. The median total PCB concentration was 0.256 ppm.

Four largemouth bass ranging in length from 11.3 to 16.0 inches were collected from the Rabbit River above the Hamilton Dam in 2003. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 3 fish and the median mercury concentration was 0.60 ppm (Table 10; Figure 108). The median concentration in the 3 fish larger than the 14-inch legal size limit was 0.64 ppm.

Four northern pike ranging in length from 21.9 to 28.3 inches were collected from the Rabbit River above the Hamilton Dam in 2003. The mercury concentration in 1 northern pike was above the MDCH “restrict consumption” trigger level, and the median concentration was 0.44 ppm (Table 10; Figure 109). The median concentration in the 2 fish larger than the 24-inch legal size limit was 0.44 ppm.

Ten redhorse sucker ranging in length from 11.5 to 19.3 inches were collected from the Rabbit River upstream of the Hamilton Dam in 2003. The mercury concentration in 1 redhorse sucker exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 110). Linear regression analysis indicates that redhorse sucker longer than 19 inches are likely to have mercury concentrations exceeding the MDCH “restrict consumption” trigger level.

Recommendations: The MDCH should consider advising women and children to eat no more than 1 meal per month of carp from the Rabbit River above the Hamilton Dam due to elevated levels of PCBs. Also, the MDCH should consider advising the general population to eat no more than 1 meal per week and women and children no more than 1 meal per month of redhorse sucker longer than 18 inches due to elevated levels of mercury.

No additional monitoring is recommended.

Runkle Lake, Iron County (ID 2003104)
Northern Pike

Existing MDCH Advisory: Runkle Lake northern pike are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Eleven northern pike ranging in length from 22.4 to 25.0 inches were collected from Runkle Lake in 2003 and analyzed for mercury only. There is no size limit on northern pike from Runkle Lake. Mercury concentrations in 4 of the fish exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 111). The median mercury concentration was 0.47 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Silver Lake, Dickinson County (ID 2002111)
Walleye

Existing MDCH Advisory: Silver Lake walleye are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten walleye ranging in length from 15.6 to 19.6 inches were collected from Silver Lake in 2002. Mercury concentrations equaled or exceeded the MDCH “restrict consumption” trigger level in 6 fish (Table 10; Figure 112). The median mercury concentration in walleye less than 18 inches was 0.48 ppm. The median concentration in walleye greater than 18 inches was 0.66 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Six Mile Lake, Charlevoix County (ID 2003110)
Northern Pike

Existing MDCH Advisory: Six Mile Lake northern pike are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten northern pike ranging in length from 17.3 to 24.1 inches were collected from Six Mile Lake in 2003 and analyzed for mercury only. There is no size limit on Six Mile Lake northern pike. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 fish (Table 10; Figure 113). The median mercury concentration in northern pike less than 18 inches was 0.22 ppm and the median concentration in fish between 18 and 22 inches was 0.41 ppm. The 1 fish greater than 22 inches had a mercury concentration of 0.51 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

South Groveland Pond, Dickinson County (ID 2003146)
Walleye

Existing MDCH Advisory: South Groveland Pond walleye are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Eleven walleye ranging in length from 16.1 to 24.0 inches were collected from South Groveland Pond in 2003 and analyzed for mercury only. Mercury concentrations equaled or exceeded the MDCH “restrict consumption” trigger level in 5 fish (Table 10; Figure 114). The median mercury concentration in walleye less than 22 inches was 0.39 ppm, and the median concentration of fish greater than 22 inches was 0.6 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Thompson Lake, St. Joseph County (ID 2002036)
Brown Bullhead and Largemouth Bass

Existing MDCH Advisory: Thompson Lake largemouth bass are covered by the statewide mercury advisory. Brown bullhead are not covered by an advisory.

Comparison to Trigger Levels: Ten brown bullhead ranging in length from 11.9 to 14.7 inches were collected from Thompson Lake in 2002. Contaminant concentrations were below MDCH trigger levels in all 10 fish.

Ten largemouth bass ranging in length from 12.5 to 15.3 inches were collected from Thompson Lake in 2002. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 5 largemouth bass (Table 10; Figure 115), and the median concentration was 0.50 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Union Lake, Branch County (ID 2003135)
Carp, Channel Catfish, Largemouth Bass, and Walleye

Existing MDCH Advisory: Women and children should not eat more than 1 meal per week of Union Lake carp or channel catfish due to elevated levels of PCBs. Largemouth bass and walleye are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten carp ranging in length from 18.5 to 28.0 inches were collected from Union Lake in 2003. Total PCB concentrations in 3 fish were below women and children trigger levels (Table 9; Figure 116). Six of the carp had total PCB concentrations in the women and children “1 meal per week” range, and 1 was in the women and children “1 meal per month” range. The median total PCB concentration of the carp collected in 2003 was 0.082 ppm. A total of 15 carp were collected from Union Lake since 1991. The overall median total PCB concentration was 0.094 ppm.

Ten channel catfish ranging in length from 13.0 to 24.2 inches were collected from Union Lake in 2003. Total PCB concentrations in 9 fish were below women and children trigger levels and the concentration in 1 fish was in the women and children “1 meal per week” range (Table 9; Figure 117). The median total PCB concentration of channel catfish collected in 2003 was 0.012 ppm. A total of 20 channel catfish were collected from Union Lake since 1991. The median concentration has declined by a factor of 10, from 0.117 ppm in 1991 to 0.012 ppm in 2003.

Ten largemouth bass ranging in length from 13.7 to 20.7 inches were collected from Union Lake in 2003. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 1 fish (Table 10; Figure 118). The median mercury concentration was 0.27 ppm.

Five walleye ranging in length from 18.1 to 22.1 inches were collected from Union Lake in 2003. Mercury concentrations in all 5 fish were below the MDCH “restrict consumption” trigger level (Figure 119), and the median concentration was 0.16 ppm.

Recommendations: Additional channel catfish should be collected from Union Lake in Branch County and analyzed for PCBs to evaluate the possibility of relaxing the advisory.

3.1.2.5 Lake Superior Watershed

Lake Superior, Keweenaw Bay (ID 2003070)

Ciscowet

Existing MDCH Advisory: No one should eat any Lake Superior ciscowet greater than 18 inches, and women and children should eat no more than 1 meal per month of ciscowet less than 18 inches due to elevated levels of PCBs, chlordane, and dioxin.

Comparison to Trigger Levels: Eleven ciscowet ranging in length from 18.6 to 28.1 inches were collected from the Keweenaw Bay in 2003. Total PCB concentrations were below the general population trigger level in all 11 fish. Concentrations in 4 fish were in the women and children “1 meal per week” range, 3 fish were in the “1 meal per month” range, and 4 fish were in the “6 meals per year” range (Table 9; Figure 120). A total of 138 ciscowet were collected from Lake Superior since 1987. Total PCB concentrations have declined and concentrations have not exceeded the general population trigger level since 1987. A total of 39 fish were collected since 1996. The median concentration was 0.219 ppm in fish between 18 and 22 inches, 0.54 ppm in fish between 22 and 26 inches, and 1.14 ppm in fish 26 inches and greater collected since 1996.

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 5 of 11 ciscowet collected in 2003 (Table 10; Figure 121). A total of 120 ciscowet collected since 1987 were analyzed for mercury and concentrations have declined since 1987. A total of 39 fish were collected since 1996. The median concentration was 0.19 ppm in fish between 18 and 22 inches, 0.31 ppm in fish between 22 and 26 inches, and 0.52 ppm in fish 26 inches and greater collected since 1996.

Total chlordane concentrations exceeded the MDCH trigger level in 2 of 11 (18%) ciscowet collected in 2003 (Table 12; Figure 122). A total of 138 ciscowet were collected from Lake Superior since 1987 and concentrations have declined since 1987. A total of 39 fish were collected since 1996. Total chlordane concentrations were below the trigger level in all 18 of these fish that were between 18 and 22 inches. Concentrations exceeded the trigger level in 4 of 17 (24%) fish between 22 and 26 inches and in 2 of 4 (50%) fish 26 inches and greater collected since 1996.

Dioxin and furan congeners were analyzed in the 11 ciscowet collected in 2003. Dioxin TEQ concentrations exceeded the MDCH trigger level in 3 of 11 (27%) fish (Table 11; Figure 123). Dioxin TEQ concentrations exceeded the trigger level in 12 of 30 (40%) fish collected since 1995. Concentrations exceeded the trigger level in 9 of 27 (33%) fish between 18 and 26 inches and in all 3 fish 26 inches and greater.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Lake Superior, Portage Lake/Dollar Bay, Houghton County (ID 2003157)

Lake Sturgeon

Existing MDCH Advisory: Lake Superior lake sturgeon are not covered by an advisory; however, the MDNR forbids possession of Lake Superior lake sturgeon.

Comparison to Trigger Levels: One 57.9-inch lake sturgeon was found dead at Portage Lake and a skin-off steak was submitted for contaminant analyses. The total PCB concentration was

in the “1 meal per month” range (Table 9; Figure 124). A total of 3 Lake Superior lake sturgeon were analyzed since 2000 and the median total PCB concentration in all 3 fish was 0.201 ppm.

Recommendations: No changes to the advisory are warranted since possession of Lake Superior lake sturgeon is illegal.

At the request of the MDNR, the MDEQ will continue to analyze samples from lake sturgeon that are found dead.

Beaver Lake, Alger County (ID 2003150)
Walleye and Yellow Perch

Existing MDCH Advisory: Beaver Lake walleye and yellow perch greater than 9 inches are covered by the statewide mercury advisory.

Comparison to Trigger Levels: A total of 17 fish were collected from Beaver Lake by the National Park Service in 2003. These were submitted to the MDEQ for mercury analysis.

Five walleye ranging in length from 11.3 to 17.7 inches were collected. Four of the 5 walleye were longer than the 15-inch legal size limit. Mercury concentrations in all 5 fish were below the MDCH “restrict consumption” trigger levels (Figure 125) and the median concentration of the 4 legal size walleye was 0.36 ppm.

Twelve yellow perch ranging in length from 7.8 to 10.6 inches were collected. Mercury concentrations in all 12 fish were below the MDCH “restrict consumption” trigger levels (Figure 126) and the median concentration was 0.13 ppm. The median concentration in the 7 fish longer than 9 inches was 0.15 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Emily Lake, Houghton County (ID 2002110)
Walleye

Existing MDCH Advisory: Emily Lake walleye are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten walleye ranging in length from 15.6 to 23.4 inches were collected from Emily Lake in 2002. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 walleye (Table 10; Figure 127). The median concentration in walleye less than 18 inches was 0.34 ppm and 0.46 ppm in walleye greater than 18 inches.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Kingston Lake, Alger County (ID 2003047)
Largemouth Bass, Muskellunge, Smallmouth Bass, and Walleye

Existing MDCH Advisory: Kingston Lake largemouth bass, muskellunge, smallmouth bass, and walleye are covered by the statewide mercury advisory.

Comparison to Trigger Levels: A total of 10 fish were collected from Kingston Lake in 2003 and analyzed for mercury only.

Two largemouth bass ranging in length from 16.7 to 17.8 inches were collected. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 1 largemouth bass and the median concentration was 0.44 ppm (Table 10; Figure 128).

Two muskellunge ranging in length from 30.7 to 30.8 inches were collected. Mercury concentrations were below the MDCH “restrict consumption” trigger level in both fish and the median concentration was 0.30 ppm (Figure 128).

Two smallmouth bass ranging in length from 16.1 to 17.9 inches were collected. Mercury concentrations were below the MDCH “restrict consumption” trigger level in both fish and the median concentration was 0.29 ppm (Figure 128).

Four walleye ranging in length from 17.3 to 24.6 inches were collected. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 of 4 fish and the median concentration was 0.39 ppm (Table 10; Figure 128).

Recommendations: No changes to the advisory or additional monitoring are recommended.

Lake Gogebic, Gogebic/Ontonagon Counties (ID 2003156)
Rock Bass

Existing MDCH Advisory: Lake Gogebic rock bass greater than 9 inches are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten rock bass ranging in length from 9.1 to 10.6 inches were collected from Lake Gogebic in 2003 and analyzed for mercury only. Mercury concentrations in 1 fish exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 129). The median mercury concentration was 0.38 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Lake Le Vasseur, Marquette County (ID 2002104)
Northern Pike

Existing MDCH Advisory: Lake Le Vasseur northern pike are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten northern pike ranging in length from 21.5 to 32.5 inches were collected from Lake Le Vasseur in 2002. Mercury concentrations in all 10 fish exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 130) and concentrations in 2 northern pike exceeded the MDCH “no consumption” trigger level. Five of the northern pike were greater than the 24-inch legal size limit. Four of the legal sized fish were less than 26 inches and had a median mercury concentration of 1.3 ppm.

Recommendations: The MDCH should consider advising against consumption of Lake Le Vasseur northern pike greater than 26 inches due to elevated levels of mercury.

No additional monitoring is recommended.

Little Lake, Marquette County (ID 2002043)
Walleye

Existing MDCH Advisory: Little Lake walleye are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten walleye ranging in length from 15.3 to 20.8 inches were collected from Little Lake in 2002. Mercury concentrations in all 10 fish were below the MDCH “restrict consumption” trigger level (Figure 131), and the median concentration was 0.26 ppm. Linear regression analysis indicates that Little Lake walleye less than 22 inches will likely have mercury concentrations less than the “restrict consumption” trigger level.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Muskallonge Lake, Luce County (ID 2002070)
Brown Bullhead and Northern Pike

Existing MDCH Advisory: Muskallonge Lake northern pike are covered by the statewide mercury advisory. Brown bullhead are not covered by an advisory.

Comparison to Trigger Levels: Ten brown bullhead ranging in length from 8.9 to 10.6 inches were collected in 2002. Contaminant concentrations were below the MDCH “restrict consumption” trigger levels in all 10 fish.

Ten northern pike ranging in length from 18.3 to 28.3 inches were collected in 2002. There is no size limit on northern pike from Muskallonge Lake. Mercury concentrations in 7 fish exceeded the MDCH “restrict consumption” trigger level (Table 10; Figure 132). The median mercury concentration was 0.56 ppm.

Recommendations: No changes to the advisory or additional monitoring are recommended.

Siskiwit Lake, Isle Royale County (ID 2002105)
Lake Trout

Existing MDCH Advisory: Women and children should not eat more than 1 meal per week of Siskiwit Lake lake trout due to elevated concentrations of PCBs.

Comparison to Trigger Levels: Ten lake trout ranging in length from 19.2 to 25.0 inches were collected from Siskiwit Lake in 2002. Total PCB concentrations were below the women and children trigger levels in 9 fish and 1 fish was in the “1 meal per week” range (Table 9; Figure 133). The median concentration for lake trout collected in 2002 was 0.029 ppm. A total of 40 lake trout were collected since 1987; 30 were collected since 1993. Total PCB concentrations have declined since 1987. The median concentration in lake trout less than 22 inches collected since 1993 was 0.035, and in fish between 22 and 26 inches the median was 0.053 ppm.

Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 3 of 10 lake trout collected from Siskiwit Lake in 2002 (Table 10; Figure 134). The median concentration of mercury in the fish collected in 2002 was 0.43 ppm. The median concentration in lake trout less than 22 inches collected since 1993 was 0.40 ppm, and in fish between 22 and 26 inches the median was 0.38 ppm.

Recommendations: The MDCH should consider removing the women and children advisory on Siskiwit Lake lake trout less than 22 inches.

No additional monitoring is recommended.

Sunday Lake, Gogebic County (ID 2003126)
Black Crappie, Northern Pike, Walleye, and Yellow Perch

Existing MDCH Advisory: Sunday Lake black crappie greater than 9 inches, northern pike, walleye, and yellow perch greater than 9 inches are covered by statewide mercury advisory.

Comparison to Trigger Levels: A total of 20 fish were collected from Sunday Lake in 2003 and analyzed for mercury only.

Seven black crappie ranging in length from 10.0 to 12.4 inches were collected. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in 2 fish and the median concentration was 0.44 ppm (Table 10; Figure 135).

Three yellow perch ranging in length from 10.2 to 12.0 inches were collected. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in all 3 fish and the median concentration was 0.62 ppm (Table 10; Figure 135).

Eight northern pike ranging in length from 16.2 to 20.1 inches were collected. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in all 8 fish and the median concentration was 0.80 ppm (Table 10; Figure 136).

Two 17.1-inch walleye were collected. Mercury concentrations exceeded the MDCH “restrict consumption” trigger level in both fish and the median concentration was 1.04 ppm (Table 10; Figure 136).

Recommendations: No changes to the advisory or additional monitoring are recommended.

Tepee Lake, Iron County (ID 2003145)
Northern Pike

Existing MDCH Advisory: Tepee Lake northern pike are covered by the statewide mercury advisory.

Comparison to Trigger Levels: Ten northern pike ranging in length from 21.3 to 29.9 inches were collected from Tepee Lake in 2003 and analyzed for mercury only. Mercury concentrations exceeded the MDCH “no consumption” trigger level in 2 fish (Table 10; Figure 137). Eight northern pike had mercury concentrations exceeding the MDCH “restrict consumption” trigger level. The median mercury concentration was 1.06 ppm in the 5 northern pike larger than the 24-inch legal size limit.

Recommendations: No changes to the advisory or additional monitoring are recommended.

3.1.3 Summary of Recommendations

The MDCH should consider relaxing fish consumption advisories at 19 sites and adding or expanding advisories at 13 sites. Also, additional monitoring is recommended at 9 waterbodies

3.1.3.1 Summary of Recommendations for Relaxed Advisories

- The MDCH should consider removing the women and children advisory on Phoenix Lake carp less than 18 inches.
- The MDCH should consider removing the mercury advisory on Ess Lake northern pike less than 26 inches.
- The MDCH should consider removing the advisory on Gaylanta Lake northern pike less than 26 inches.
- Lake Emma northern pike are exempted from the statewide 24-inch legal size limit and the MDCH should consider removing the advisory on fish less than 18 inches.
- The MDCH should consider removing the mercury advisory for smallmouth bass from Lake Esau less than 18 inches in length.
- The MDCH should consider relaxing the general population advisory to no more than 1 meal per week of carp less than 22 inches from the Shiawassee River between Byron and Owosso. Also, the MDCH should consider relaxing the women and children advisory to no more than 6 meals per year of carp less than 22 inches.
- The MDCH should consider removing the mercury advisory on Wixom Lake northern pike less than 30 inches.
- The MDCH should consider removing the advisory on Austin Lake largemouth bass less than 18 inches.
- The MDCH should consider removing chlordane from the list of contaminants causing the advisory on Black River carp.
- The MDCH should consider removing the advisory on Camp Lake largemouth bass less than 18 inches.
- The MDCH should consider removing the advisory on rock bass from the Flat River upstream of Greenville.
- The MDCH should consider removing the advisory covering Lake Mitchell largemouth bass less than 18 inches.
- The MDCH should consider removing the advisory on Long Lake (Kalamazoo County) black crappie less than 14 inches.
- The MDCH should consider removing the advisory on Manistique Lake walleye less than 18 inches.
- The MDCH should consider removing the general population advisory covering Mona Lake carp. Also, the MDCH should consider relaxing the women and children advisory

to no more than 1 meal per month of Mona Lake carp greater than 22 inches and no more than 1 meal per week of carp less than 22 inches.

- The MDCH should consider removing the advisory on North Manistique Lake walleye less than 22 inches. The MDCH should also consider removing the consumption advisory on North Manistique Lake yellow perch.
- The MDCH should consider removing the advisory on Paint Lake northern pike less than 30 inches.
- The MDCH should consider removing mercury from the list of contaminants causing the Pere Marquette Lake northern pike advisory.
- The MDCH should consider removing the women and children advisory on Siskiwit Lake lake trout less than 22 inches.

3.1.3.2 Summary of Recommendations for Expanded Advisories

- The MDCH should consider advising women and children to eat no more than 1 meal per week of white sucker from Phoenix Lake greater than 14 inches in length due to elevated levels of PCBs.
- The MDCH should consider advising women and children to eat no more than 1 meal per week of Lobdell Lake carp between 18 and 30 inches, and no more than 1 meal per month of Lobdell Lake carp greater than 30 inches due to elevated levels of PCBs.
- The MDCH should consider advising women and children to eat no more than 1 meal per month and the general population to eat no more than 1 meal per week of Stevenson Lake bullhead greater than 12 inches due to elevated levels of mercury.
- The MDCH should consider advising women and children to eat no more than 1 meal per month of Tittabawassee River walleye less than 22 inches and no more than 6 meals per year of walleye greater than 22 inches due to elevated levels of PCBs. In addition, the MDCH should consider advising the general population to eat no more than 1 meal per week of Tittabawassee River walleye greater than 22 inches.
- The MDCH should consider advising women and children to eat no more than 1 meal per week of carp from the South Branch of the Black River above the Bangor Dam due to elevated levels of PCBs.
- The MDCH should consider advising women and children to eat no more than 1 meal per week of white sucker greater than 12 inches from the Flat River below Greenville due to elevated levels of PCBs.
- The MDCH should consider advising women and children to eat no more than 1 meal per month of Green Lake lake trout due to elevated levels of PCBs and mercury. Also, the MDCH should consider advising the general population to eat no more than 1 meal per week of Green Lake lake trout.

- The MDCH should consider advising women and children to eat no more than 1 meal per month of redhorse sucker and smallmouth bass from the Manistique River below the Manistique Papers Dam due to elevated levels of PCBs.
- The MDCH should consider advising women and children to eat no more than 1 meal per week of walleye less than 22 inches and no more than 1 meal per month of walleye greater than 22 inches from the Manistique River below the Manistique Papers Dam due to elevated concentrations of PCBs and mercury. In addition, the MDCH should consider advising the general public to eat no more than 1 meal per week of walleye greater than 22 inches due to elevated levels of mercury.
- The MDCH should consider advising the general population against eating more than 1 meal per week of lake trout from North Lake Leelanau due to elevated levels of mercury. In addition, the MDCH should consider advising women and children against eating more than 1 meal per month of lake trout from North Lake Leelanau due to elevated levels of mercury and PCBs.
- The MDCH should consider advising women and children against eating more than 1 meal per week of white sucker from North Lake Leelanau due to elevated concentrations of PCBs.
- The MDCH should consider advising women and children to eat no more than 1 meal per week of white sucker from Pere Marquette Lake due to elevated concentrations of PCBs.
- The MDCH should consider advising the general population to eat no more than 1 meal per week and women and children to eat no more than 6 meals per year of carp from the Rabbit River downstream of the Hamilton Dam due to elevated concentrations of PCBs.
- The MDCH should consider advising women and children to eat no more than 1 meal per month and the general population no more than 1 meal per week of largemouth bass from the Rabbit River downstream of the Hamilton Dam due to elevated concentrations of PCBs and mercury.
- The MDCH should consider advising women and children to eat no more than 1 meal per month and the general population to eat no more than 1 meal per week of northern pike from the Rabbit River downstream of the Hamilton Dam due to elevated concentrations of mercury.
- The MDCH should consider advising women and children to eat no more than 1 meal per month of carp from the Rabbit River upstream of the Hamilton Dam due to elevated levels of PCBs.
- The MDCH should consider advising the general population to eat no more than 1 meal per week and women and children no more than 1 meal per month of redhorse sucker longer than 18 inches from the Rabbit River upstream of the Hamilton Dam due to elevated levels of mercury.
- The MDCH should consider advising against consumption of Lake Le Vasseur northern pike greater than 26 inches due to elevated levels of mercury.

3.1.3.3 Summary of Recommendations for Additional Monitoring

Additional monitoring should be considered at the following sites:

- Additional carp greater than 18 inches should be collected from Phoenix Lake to evaluate the need for changes to the advisory based on total PCB concentrations.
- Additional walleye and northern pike should be collected from Alcona Pond to evaluate the possibility of relaxing the advisory based on mercury.
- Additional carp greater than 22 inches and smallmouth bass of legal size should be collected from the Shiawassee River between Byron and Owosso and analyzed for total PCBs to determine whether the advisory could be relaxed.
- Additional carp should be collected from the Black River downstream of Bangor to evaluate the possibility of relaxing the advisory based on PCBs.
- Additional rock bass and white sucker should be collected from the Flat River below Greenville and analyzed for PCBs to determine whether the advisory could be removed.
- Additional Morrison Lake (Ionia County) carp should be collected to evaluate the need for an advisory on carp greater than 26 inches.
- Additional Pere Marquette northern pike should be collected and analyzed for PCBs to determine whether the advisory could be relaxed.
- Additional largemouth bass and northern pike should be collected from the Rabbit River below Hamilton Dam to evaluate the need for advisories based on PCBs and mercury.
- Additional channel catfish should be collected from Union Lake in Branch County and analyzed for PCBs to evaluate the possibility of relaxing the advisory.

3.2 CAGED-FISH BIOCONCENTRATION STUDIES

Caged-fish bioconcentration monitoring was conducted at 32 locations in 6 watersheds in 2002. The raw data are presented in Appendix E (available upon request). General highlights of the caged-fish studies conducted in the Black, Galien, Huron, Manistique, Muskegon, and Saginaw River watersheds include:

- Net uptake of total lipid-normalized PCB was measured at 14 of the 32 caged-fish sites (Table 14). The highest net uptake was measured in fish from a cage set in the Pine River downstream of the St. Louis impoundment.
- Net uptake of total lipid-normalized DDT was measured at 23 of 32 sites. The highest net uptake was measured in fish from a cage set in the Pine River downstream of the St. Louis impoundment (Table 14).

- Net uptake of mercury was measured at 17 of 32 sites. The highest net uptake of mercury was measured in fish from cages set at the mouth of the Saginaw River and in the Shiawassee River at Fergus Road (Table 14).
- Net uptake of lipid-normalized total chlordane was measured at 13 of 32 sites. The highest net uptake was measured in fish from a cage set in the Saginaw River (Table 14).
- Net uptake of lipid-normalized hexachlorobenzene (HCB) was measured at 8 of 32 sites. All of the sites with net uptake were located in the Tittabawassee and Saginaw Rivers (Table 14).
- Net uptake of lipid-normalized dioxin TEQ was measured at 10 of 12 sites in the Saginaw River watershed. The highest concentrations were measured in the Tittabawassee River at stations located between Midland and the river mouth.

3.2.1 Black River Watershed Caged-Fish Study

Cages were placed at 3 locations in the Black River watershed in 2002 (Figure 4). The South Branch Black River downstream of the Bangor Dam and the Black River below the South Branch is covered by sport fish consumption advisories due to elevated concentrations of PCBs and chlordane. The study was conducted prior to the removal of approximately 27,000 cubic yards of PCB and chromium contaminated sediment from the Bangor Mill Pond and from a section of the South Branch Black River immediately downstream of the Bangor Dam. Sediment removal was completed in 2004 (USEPA, 2004).

Net uptake of lipid-normalized total PCB was quantifiable only at the river mouth (Table 14; Figure 138), suggesting there is a source of the contaminant to the Black River watershed other than the Bangor Mill Pond. The average net uptake of both total PCB and lipid-normalized total PCB was relatively low at the Black River mouth compared to other Great Lake tributary mouths (Figures 139 and 140).

Statistically significant uptake of mercury was detected and concentrations were equivalent at all three test sites (Table 14; Figure 138).

Net uptake of lipid-normalized total DDT was greater at the river mouth than at the site downstream of the Bangor Dam, and may indicate that a source of the contaminant exists between the two sites. However, total DDT concentrations at the mouth were not significantly different than concentrations in fish from the site upstream of the Bangor Dam (Table 14; Figure 138).

None of the other contaminants tested for were found above the detection level.

3.2.2 Galien River Watershed Study

One cage was set at the mouth of the Galien River in 2002 to determine whether bioaccumulative contaminants were present (Figure 5). Galien River carp are covered by a consumption advisory due to elevated levels of PCBs and chlordane.

Statistically significant uptake of mercury, total DDT, and total chlordane was detected at the river mouth (Table 14; Figure 141). No statistically significant uptake of PCB was detected.

3.2.3 Huron River Watershed Study

Cages were placed at 4 sites in the Huron River in 2002 (Figure 6). Ford and Belleville Lakes, impoundments on the Huron River, are covered by sport fish consumption advisories due to elevated levels of PCBs. Approximately 450,000 cubic yards of sediment contaminated with an estimated 440,000 pounds of PCBs were removed from Willow Run Creek in 1998 (USEPA, 2004). Willow Run Creek is a tributary to the Huron River, emptying into the river downstream of Ford Lake; the 2002 caged-fish study serves in part to evaluate the effectiveness of that sediment remediation project. Caged-fish studies have also been conducted at the Huron River mouth in 1991 and 1996 (Waggoner, 1992; Day, 1997).

Lipid-normalized total PCB uptake was not quantifiable at either of the sites upstream of Belleville Lake (Table 14; Figure 142). Both sites downstream of Belleville Lake had a net uptake of lipid-normalized total PCB. The downstream site nearest to Belleville Lake had a mean concentration nearly 6 times that measured at the river mouth. However, net uptake of total PCB and lipid-normalized total PCB was relatively low compared to concentrations measured at Great Lake tributary mouths (Figures 139 and 140).

Net uptake of lipid-normalized DDT was measured at all three of the Huron River sites downstream of Ford Lake (Table 14; Figure 142). Average net uptake of DDT was highest at the site downstream of Belleville Lake.

3.2.4 Manistique River Watershed Study

Cages were placed at 2 sites in the Manistique River in 2002 (Figure 7). The Manistique River is covered by sport fish consumption advisories due to elevated levels of PCBs and mercury. A USEPA Superfund sediment remediation project, completed in 2000, removed approximately 33,130 cubic yards of sediment contaminated with an estimated 10,600 pounds of PCBs from the Manistique River and Harbor (USEPA, 2004). A caged fish study was conducted at the same sites in 1990 (Gahsman, 1991).

No quantifiable uptake of lipid-normalized PCB was measured at either station in 2002 (Table 14). Concentrations measured at the two stations were not significantly different, and concentrations at the mouth declined following the sediment remediation project.

Net uptake of total PCB and lipid-normalized total PCB was relatively low compared to concentrations measured at other Great Lake tributary mouths (Figures 139 and 140). Neither site sampled in 2002 had quantifiable uptake of lipid-normalized PCBs.

Net uptake of lipid-normalized total DDT was equivalent at both Manistique River sites (Figure 143).

3.2.5 Muskegon River Watershed Study

Cages were placed at 3 sites in the Muskegon River in 2002 (Figure 8). The Muskegon River below Croton Dam is covered by sport fish consumption advisories due to elevated levels of PCBs and mercury.

Statistically significant uptake of mercury was measured at the M-82 at High Rollaway site but was not quantifiable at the other two sites (Table 14; Figure 144).

No statistically significant uptake of lipid-normalized total PCB was measured at any of the Muskegon River sites in 2002.

Statistically significant uptake of lipid-normalized total DDT was measured at all three sites (Table 14; Figure 144). The average net uptake increased slightly from upstream to downstream, but the difference was not statistically significant.

3.2.6 Saginaw River Watershed Caged-Fish Study

Cages were placed at 19 locations in the Saginaw River watershed in 2002, including sites in the Pine, Chippewa, Tittabawassee, Cass, Flint, Shiawassee, and Saginaw Rivers (Figure 9). All of the tested rivers are covered at least in part by sport fish consumption advisories due to elevated levels of PCBs. In addition, dioxin, mercury, DDT, and/or polybrominated biphenyls (PBBs) cause sport fish consumption advisories in portions of the watershed. The caged-fish study was conducted to help identify sources of contaminants in the watershed and evaluate the effectiveness of sediment remediation efforts. Several caged-fish studies were conducted in the Saginaw River watershed in the past (Cornelius, 1988; Morse, 1991 and 1995; Wood, 1993; Day, 1999; Day and Walsh, 2000 and 2001).

The St. Louis Impoundment of the Pine River is the site of the Velsicol Chemical Corporation (formerly Michigan Chemical Corporation) USEPA Superfund project; DDT is the primary contaminant of concern there. An ongoing remediation project is addressing the problem of contaminated sediments near that site. A second remediation project (completed in 2003) involved removal of sediments from a tributary to the Pine River and a portion of the upper St. Louis impoundment that were contaminated by petroleum refinery wastes. Several caged-fish studies have been conducted in the Pine River and will be used to evaluate the effect of those projects.

Dioxins are the primary contaminant of concern in the Tittabawassee River. Industrial chemical production is the likely source of most of the contamination problem there. The MDEQ recently reached an interim agreement with Dow Chemical Company to begin addressing dioxin contamination in the watershed.

PCB contamination due to industrial processes has been a concern in the Saginaw River. A sediment removal project was completed in 2001, and the 2002 caged-fish study was conducted in part to evaluate the effectiveness of that work.

The following discussion presents the results of the 2002 caged-fish study of the Saginaw River watershed organized by contaminants of concern.

Total PCBs

Net uptake of total PCB was measured in the Pine, Tittabawassee, Cass, and Saginaw Rivers in 2002 (Figure 145).

In the Pine River, net uptake of lipid-normalized PCB was measured at the St. Louis Impoundment downstream of M-46, below the St. Louis Dam near the WWTP, and further downstream at Gordonville Road (Table 14; Figure 145). No net uptake was measured at the

M-46 or Harrison Road sites, both of which are upstream of the Velsicol Chemical Corporation site. The results of the PCB analysis indicate that the St. Louis Impoundment is a likely source of the material for the waterbodies downstream, although pockets of contaminated sediment may be present in the river below the St. Louis Dam.

Comparison of lipid-normalized total PCB net uptake across sample years also suggests a source of the material within the St. Louis Impoundment (Figure 146). There was no change in concentrations upstream of the Alma Impoundment (Harrison Road) between 1999 and 2002. Average concentration in the St. Louis Impoundment upstream of the Velsicol site (M-46) declined between 1999 and 2002, while the sites nearest to and immediately downstream of Velsicol (St. Louis and WWTP) show an increase in concentrations over that time. Although the mean net uptake of lipid-normalized PCBs increased over time at the Gordonville Road site, the change was not statistically significant ($\alpha > 0.05$).

No net uptake of lipid-normalized PCB was measured in the Chippewa River at the Chippewa Nature Center (Table 14; Figure 145). The site, downstream of the confluence with the Pine River, was also tested in 2000 (Day and Walsh, 2001). No change in net uptake of lipid-normalized total PCB was observed.

In the Tittabawassee River, net uptake of lipid-normalized PCB was measured at all 5 sites downstream of the confluence with the Chippewa River in the city of Midland (Table 14; Figure 145). No net uptake of PCB was measured at Cook Road, upstream of Midland. The results suggest that there is a source of PCB in the Tittabawassee River downstream of Cook Road and the Chippewa River confluence.

Comparisons of lipid-normalized total PCB net uptake across sample years yielded mixed results for the Tittabawassee River tests (Figure 147). Concentrations measured at the Tittabawassee River mouth site in 2002 were significantly less than concentrations measured in 2000. No significant differences were observed between caged fish tested at Smiths Crossing in 2000 and 2002, or between caged fish tested at Center Road in 1988 and 2002. The latter two sites are between the river mouth and the city of Midland.

A slight net uptake of PCB was measured in the Cass River at M-13 (Table 14; Figure 145). The mean concentration measured in 2002 was not significantly different than that observed in 1988 (Morse, 1991).

No net uptake of lipid-normalized PCB was measured at the Flint River mouth in 2002 (Table 14; Figure 145). This is significantly lower than 1988 measurements (Morse, 1991).

No net uptake of lipid-normalized PCB was measured at either of the two Shiawassee River test sites (Table 14; Figure 145). The mean concentration measured at the river mouth was significantly lower in 2002 as compared to 1998 (Morse, 1991).

In the Saginaw River, net uptake of lipid-normalized PCB was measured at the Zilwaukee Bridge and at the river mouth, but no net uptake was measured at the Middle Ground Island site (Table 14; Figure 145). Contaminated sediments were removed from the Saginaw River during a remediation project completed in 2001. Although subsequent sediment testing indicated that the project goals for PCB reduction had been met (Taft, 2004), the 2002 caged-fish study suggests that there is still a source of PCB influencing the Saginaw River mouth.

The mean net uptake of lipid-normalized total PCB declined at all three Saginaw River sites in 2002 as compared to 1998, but the decline between those years was statistically significant only at the Zilwaukee Bridge site. There has been a general decline in total PCB concentration at the river mouth over time, and the mean concentration measured at the river mouth in 2002 was significantly lower than the average measured in 1988 (Figure 148). Net uptake of total PCB and lipid-normalized total PCB at the mouth of the Saginaw River was relatively high compared to other Great Lake tributary mouths (Figures 139 and 140).

Dioxin TEQ

Caged fish were tested for dioxins at a total of 12 sites in the Chippewa, Tittabawassee, Shiawassee, and Saginaw Rivers in 2002 (Table 14; Figure 149). Quantifiable uptake of lipid-normalized dioxin TEQ was measured at all 6 sites in the Tittabawassee River, all 3 sites in the Saginaw River, and 1 of 2 sites in the Shiawassee River.

The highest mean lipid-normalized dioxin concentrations were observed in the Tittabawassee River. Quantifiable levels were observed in caged fish at Cook Road (upstream of Midland) but the concentrations in the Tittabawassee River at the RR Bridge and below were significantly higher (Figure 149). In general, lipid-normalized dioxin TEQ concentrations increased from above Midland downstream to the mouth of the Tittabawassee River, suggesting one or more nonpoint sources of the contaminant throughout that portion of the watershed. Low levels were observed in the Shiawassee River upstream of the confluence of the Flint, Tittabawassee, and Cass Rivers. Concentrations at the three Saginaw River sites were equivalent and lower than those observed in the lower Tittabawassee River.

Total DDT

Net uptake of lipid-normalized total DDT was measured in the Pine, Tittabawassee, and Saginaw Rivers in 2002 (Table 14; Figure 150).

The highest net uptake of lipid-normalized total DDT was observed at the Pine River sites in and immediately downstream of the St. Louis Impoundment at the WWTP bridge but no quantifiable uptake was observed further downstream at either Gordonville Road or on the Chippewa River at the Chippewa Nature Center. There was no change in total DDT concentrations in the Pine River upstream of the Alma Impoundment (Harrison Road) between 1999 and 2002 (Figure 151). The USEPA began removing DDT contaminated sediments in 2000 and the average net uptake of lipid-normalized total DDT in the St. Louis Impoundment (M-46 and St. Louis) and immediately downstream of the dam have decreased since 1999.

Net uptake of lipid-normalized total DDT was measured at all 6 sites in the Tittabawassee River, including at Cook Road, upstream of the confluence with the Chippewa River (Table 14; Figure 150). Average concentrations declined between 2000 and 2002 at the Smiths Crossing Road site, but no significant changes were seen at the Center Road or river mouth sites (Figure 152).

Net uptake of lipid-normalized total DDT was measured in the Saginaw River at Middle Ground Island and at the river mouth, but not at the Zilwaukee Bridge site (Table 14; Figure 150). No significant changes in average total DDT concentration across years were observed at any of the three sites (Day, 1999).

No quantifiable uptake was measured at the Shiawassee, Flint, or Cass River sites in 2002 (Table 14; Figure 150), and no temporal changes were observed at those river mouths (Morse, 1991).

Mercury

Net uptake of mercury was measured in the Pine, Tittabawassee, Shiawassee, Cass, and Saginaw Rivers in 2002 (Table 14; Figure 153). Mean concentrations ranged from 4.0 to 7.0 parts per billion (ppb). There were no statistically significant differences in mean concentrations between sites where mercury uptake was quantified indicating that sources may be diffuse and ubiquitous.

Temporal changes in mercury concentrations were seen at several sites in the Saginaw River watershed (Figure 154). Statistically significant declines were observed in the Chippewa River (Nature Center), Tittabawassee River (Smiths Crossing Road), and Saginaw River (Middle Ground Island). No statistically different changes in mercury concentrations were measured at the Tittabawassee River mouth, the Shiawassee River mouth, the Saginaw River mouth, or any of the Pine River sites. No statistically significant increases in mercury concentrations were measured in 2002 compared to previous years.

Total Chlordane

Net uptake of lipid-normalized total chlordane was measured in the Pine, Chippewa, Tittabawassee, Flint, and Saginaw Rivers (Table 14; Figure 155). Mean lipid-normalized net uptake concentrations varied between 0.7 and 2 ppb. There were no statistical differences between sites where uptake was quantifiable, indicating that sources may be diffuse and ubiquitous.

Statistically significant declines in total chlordane concentrations were seen at 3 sites in the Saginaw River watershed (Figure 156).

Hexachlorobenzene

Net uptake of lipid-normalized hexachlorobenzene (HCB) was measured in the Tittabawassee River downstream of the Chippewa River confluence and at all three Saginaw River sites (Table 14; Figure 157), indicating that sources exist below Midland and in the Saginaw River. Mean lipid-normalized net uptake concentrations varied between 0.6 and 1.6 ppb.

HCB concentrations at the Tittabawassee River mouth were significantly higher than upstream at the RR Bridge below Midland, but all other sites were statistically equivalent.

No net uptake of HCB was observed at the Pine or Chippewa River sites (upstream of the Tittabawassee River) or at the Shiawassee, Flint, or Cass River sites in 2002.

No statistically significant temporal trends were observed.

PBB

Concentrations of PBB were below detection levels at all sites across all years sampled except for at the Pine River WWTP site. At that site in 1999 the average net uptake of lipid-normalized

PBB was 1.9 ppb (Day and Walsh, 2000). PBB concentrations there were below the detection level in 2002, significantly less than the level measured in 1999.

3.3 TREND MONITORING

Several agencies in the Great Lakes basin are monitoring fish contaminant trends. Michigan's fish contaminant trend monitoring effort was initiated in 1990 to identify temporal trends and spatial differences in contaminant levels in whole fish from the Great Lakes and connecting channels, inland lakes, and rivers. Also, the USEPA collects and analyzes whole lake trout or walleye from the open waters of each of the Great Lakes. Finally, the Great Lakes states and the USEPA work cooperatively to collect and analyze coho and chinook salmon from select Great Lakes tributaries during the fall spawning migration. The coho and chinook salmon are analyzed as composites of skin-on fillets.

Highlights of the 3 trend monitoring programs are presented below:

3.3.1 USEPA Great Lakes Whole-Fish Trend Monitoring

The USEPA-Great Lakes National Program Office collects and analyzes whole lake trout or walleye from the Great Lakes. Samples continue to be collected and contaminant data have been released as they become available. Contaminant data are now available for whole lake trout from Lakes Michigan (1970-2000), Superior (1977-2000), Huron (1978-2000), and Ontario (1986-2000) (DeVault et al., 1996; USEPA unpublished data). Also, contaminant concentrations in whole Lake Erie walleye are available from samples collected between 1986 and 2000 (DeVault et al., 1996; USEPA unpublished data).

General conclusions are presented below:

- The USEPA's lake trout data for Lakes Superior, Michigan, Huron, and Ontario indicate that total PCB and total DDT concentrations in all four lakes declined between the 1970s and 2000 (Figures 158 and 159). Also, Lake Michigan lake trout had higher levels of total PCB and total DDT than lake trout from the other Great Lakes.
- Total PCB and total DDT concentrations in Lake Superior lake trout showed no consistent trend between the late 1980s and 2000. Total PCB and total DDT concentrations in lake trout from Lakes Huron, Michigan, and Ontario continued to decline between 1986 and 2000 but at a slower rate than the declines observed between 1974 and 1986.
- Total chlordane concentrations declined at a fairly steady rate in lake trout from Lakes Huron and Ontario between 1986 and 2000 (Figure 160). Total chlordane levels in Lake Superior lake trout remained fairly constant from 1986 to 1995 but increased between 1997 and 2000. Lake trout from Lake Michigan exhibited a slow decline in total chlordane concentrations from 1986 to 2000.
- Apparent toxaphene concentrations declined between 1986 and 1998 in lake trout from each of the 4 Great Lakes monitored (Figure 161). The increases seen in the 2000 samples are due at least in part to a change in lab reporting methods (D. Swackhamer, personal communication).

- Contaminant concentrations in Lake Superior lake trout were lower than concentrations in lake trout from the other Great Lakes with the exception of apparent toxaphene. The relatively high apparent toxaphene concentrations in Lake Superior lake trout compared to Lake Ontario lake trout may be a result of local sources or variability in lake overflow rates, productivity, climate, and the relative efficiencies of internal removal processes (Eisenreich, 1996).
- Average total DDT and total PCB concentrations in Lake Erie walleye declined since 1977 while no trend in total chlordane concentrations is apparent between 1986 and 2000 (Figure 162).

3.3.2 Federal-State Chinook and Coho Salmon Fillet Trend Monitoring

Chinook and coho salmon fillets were collected and analyzed as part of a cooperative program administered by state and federal agencies. Samples were collected by state agencies and analyzed by federal contract laboratories. Although samples continue to be collected, recent results were not available for inclusion in this report.

The average total PCB, total DDT, and total chlordane concentrations in coho and chinook salmon fillet samples collected in Michigan's portion of Lake Michigan between 1983 and 1998 are presented in Figure 163. Average total chlordane, total PCB, and total DDT concentrations increased in Lake Michigan coho salmon until the mid-1990s and then began to decrease. Average total DDT, total PCB, and total chlordane concentrations decreased in Lake Michigan chinook salmon between 1983 and 1997.

The average total PCB, total DDT, and total chlordane concentrations in coho and chinook salmon fillet samples collected in Michigan's portion of Lake Huron between 1983 and 1998 are presented in Figure 164. Average total PCB and total DDT concentrations decreased in both coho and chinook salmon between 1983 and 1998. Also, total chlordane concentrations decreased in Lake Huron chinook salmon between 1991 and 1998.

However, contaminant concentrations in chinook and coho salmon collected during spawning runs vary with fish length, and conclusions regarding changes in average contaminant concentrations may be influenced by changes in the size of the fish over time. The salmon collected in the late 1990s were smaller than salmon collected during the 1980s and early 1990s (Day and Walsh, 2000).

3.3.3 Michigan's Whole-Fish Trend Monitoring

Trends analyses were conducted on a total of 32 data sets collected as part of Michigan's whole-fish trend monitoring program. These data sets included species and sites for which data were available from a minimum of three sampling events (Table 2). These include carp from 5 inland rivers; lake trout, walleye, or largemouth bass from 8 inland lakes; and 19 carp, walleye, or lake trout data sets from 10 Great Lake or connecting channel stations. A significant increase or decrease in at least one selected contaminant was detected in 30 of 32 data sets.

Often strong relationships exist between lipids and organic contaminant concentrations and length and contaminant concentrations. Therefore, multiple linear regression analyses were used to evaluate relationships between the natural log of contaminant concentrations and these potential explanatory variables. Natural log transformed contaminant concentrations (wet weight) were used to fit the data into exponential decay rate models and obtain estimates of

annual rates of change. The trend model for each subset of data was developed using an iterative process. The initial multiple linear regression model included length and collection date as explanatory variables for mercury concentrations. The model for organic contaminant concentrations used length, lipids, and collection date as explanatory variables. A final multiple linear regression model was developed for each subset by successively eliminating variables that did not have a statistically significant relationship ($p < 0.05$) to contaminant concentration.

Minimum detectable trends were calculated in cases where the regression model failed to detect a significant trend in contaminant concentrations. The statistical significance of slope (or trend) in a linear regression model is calculated using a t-test. The minimum detectable trend can be calculated by rearranging the t-test, establishing a desired significance level ($p = 0.05$), and obtaining the standard error of the slope from the regression analyses (Exponent, 2003). The minimum detectable trend is the smallest possible trend that could have been detected with the available data for each contaminant, species, and site. For example, a minimum detectable trend of $\pm 2.6\%$ per year in Houghton Lake largemouth bass mercury concentrations (Table 15) indicates that no mercury trend was detected and the data were sufficient to detect a trend with an absolute value greater than 2.6% per year. Therefore, the absolute value of the real trend (if any) was 2.6% per year or less.

Statistically significant changes in mercury concentrations were detected in 12 of 32 data sets (Table 15; Figure 165). Where trends could be detected, concentrations tended to increase in fish from the Great Lakes or connecting channels and decrease in fish from inland lakes and rivers. Mercury concentrations declined in fish from 5 of 7 inland lakes or inland rivers where trends could be detected. The average and median rates of change in fish from the 7 inland lakes or inland rivers was -1.5% and -2.1% per year, respectively. Significant trends were found in 1 species at each of 5 sites monitored in the Great Lakes and connecting channels. Mercury concentrations increased in 4 of the 5 datasets in which significant trends were detected. The average and median rates of change in these 5 data sets were $+2.5\%$ and $+3.3\%$ per year, respectively. Minimum detectable trends from all inland lake, river, Great Lakes, and connecting channel data sets ranged from $\pm 0.8\%$ to $\pm 8.6\%$ per year with a median minimum detectable trend of $\pm 2.8\%$ per year.

Statistically significant changes in total PCB concentrations were detected in 19 of 32 data sets (Table 15; Figure 166). Total PCB concentrations decreased in 18 of the 19 data sets where changes were statistically significant. Where trends could be detected, concentrations tended to decrease faster in fish from inland lakes and rivers compared to fish from the Great Lakes and connecting channels. Total PCB concentrations declined in fish from 10 of 11 inland lakes or inland rivers. The average and median rates of change in fish from all 11 sites were -8.2% and -6.4% per year, respectively. Concentrations declined in at least 1 species from 6 sites in the Great Lakes or connecting channels. The average and median rates of change in these data sets were -5.9% and -5.4% per year, respectively. Minimum detectable PCB trends from all inland lake, river, Great Lakes, and connecting channel data sets ranged from $\pm 2.2\%$ to $\pm 21.0\%$ per year with a median minimum detectable trend of $\pm 5.4\%$ per year.

Changes in total DDT concentrations were detected in 25 of 32 data sets (Table 15; Figure 167). Total DDT concentrations decreased in 24 of the 25 data sets where changes were statistically significant. Where trends could be detected, concentrations tended to decrease slightly faster in fish from inland lakes and rivers compared to fish from the Great Lakes and connecting channels. Concentrations declined in fish from 9 of 10 inland lakes or inland rivers. The average and median rates of change in fish from all 10 sites were -7.7% and -7.8% per year, respectively. Concentrations decreased in 15 data sets collected from 10

locations in the Great Lakes and connecting channels. The average and median rates of change in fish from these sites were -7.1% and -6.6% per year, respectively. Minimum detectable trends from all inland lake, river, Great Lakes, and connecting channel data sets ranged from +/-3.1% to +/-20.0% per year with a median minimum detectable trend of +/-4.3% per year.

Changes in total chlordane concentrations were observed in 23 of 30 data sets (Table 15; Figure 168). Total chlordane concentrations decreased in all 23 data sets where changes were statistically significant. Where trends could be detected, concentrations tended to decrease slightly faster in fish from inland lakes and rivers compared to fish from the Great Lakes and connecting channels. Total chlordane concentrations declined in fish from 7 inland lakes or inland rivers. The average and median rates of change in fish from these 7 sites were -10.4% and -8.6% per year, respectively. Concentrations of total chlordane changed in 16 data sets collected from 9 locations in the Great Lakes and connecting channels. The average and median rates of change in fish from these sites were -8.4% and -8.6% per year, respectively. Minimum detectable trends from all inland lake, river, Great Lakes, and connecting channel data sets ranged from +/- 3.4% to +/- 22.5% per year with a median detectable trend of +/-4.7% per year.

The Saginaw Bay carp dioxin and furan data were not available for inclusion in this report. However, changes in dioxin TEQ concentrations were measured in fish from 1 of 4 sites (Table 15). Concentrations declined 5.4% per year in Thunder Bay lake trout. The minimum detectable trend ranged from +/-6.4% to +/-7.6% per year in the remaining 3 data sets with a median concentration of +/-6.9% per year.

The minimum detectable trends in all data sets ranged from +/-0.8% to +/-22.5% per year. Ten percent of the minimum detectable trends were greater than +/-10% per year; 28% were between +/-5% and +/-10% per year; and 62% were less than +/-5% per year (Table 15). Michigan's whole fish contaminant trend monitoring program was sufficient to either detect statistically significant trends or estimate minimum detectable trends of less than +/-5% per year in 85% of the trend analyses conducted. The program was sufficient to either detect statistically significant trends or estimate minimum detectable trends of less than +/-10% per year in 96% of the trend analyses conducted.

In addition, the following general conclusions can be made:

- Lindane, terphenyl, PBB, heptachlor, and aldrin were not quantified in any of the fish sampled. However, heptachlor epoxide and dieldrin (breakdown products of heptachlor and aldrin) were quantified in most of the samples analyzed.
- In addition to heptachlor epoxide and dieldrin, several chemicals were quantified in fish consistently, indicating that they are ubiquitous in the aquatic environment. These include mercury, HCB, total PCB, total chlordane, and total DDT.
- Apparent toxaphene was found primarily in walleye and lake trout from the Great Lakes and connecting channels. However, lake trout collected from Higgins Lake in 1991 (Site 91001) had quantifiable levels of apparent toxaphene, while samples collected in 1995, 1998, and 2001 had concentrations below the quantification level. The highest concentrations of apparent toxaphene were quantified in lake trout from Lake Superior. The relatively high concentration in Lake Superior lake trout is consistent with the results reported by DeVault (1996) and discussed in Section 3.3.1.

- Largemouth bass and walleye from inland lakes tended to have the highest concentration of mercury. Fish from inland lakes tended to have higher concentrations of mercury than the same species from the Great Lakes or connecting channels.
- All species from the Great Lakes and connecting channels tended to have higher concentrations of chlorinated organic contaminants than the same species from inland lakes.
- Average total PCB concentrations were highest in carp from the Kalamazoo River site. The Kalamazoo River has a known total PCB contamination problem that is being addressed under state and federal programs.
- Carp and walleye from the St. Marys River had lower concentrations of organic contaminants than carp from Lake St. Clair and Detroit Rivers. Carp and walleye from the St. Marys River had higher concentrations of mercury than carp and walleye from Lake St. Clair and the Detroit River.

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SECTION 4.0

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Table 1. Standard edible portions of Michigan's sport and commercial fishes.

Standard Edible Portion	Common Name	Scientific Name
Skin-on Fillet	Yellow Perch	<i>Perca flavescens</i>
	Walleye	<i>Sander vitreum</i>
	Sauger	<i>Sander canadense</i>
	Largemouth Bass	<i>Micropterus salmonids</i>
	Smallmouth Bass	<i>Micropterus dolomieu</i>
	Bluegill	<i>Lepomis macrochirus</i>
	Pumpkinseed	<i>Lepomis gibbosus</i>
	Rock Bass	<i>Ambloplites rupestris</i>
	White Bass	<i>Morone chrysops</i>
	Black Crappie	<i>Pomoxis nigromaculatus</i>
	White Crappie	<i>Pomoxis annularis</i>
	Green Sunfish	<i>Lepomis cyanellus</i>
	Longear Sunfish	<i>Lepomis megalotis</i>
	Warmouth	<i>Lepomis gulosus</i>
	White Sucker	<i>Catostomus commersonii</i>
	Redhorse Sucker	<i>Moxostoma</i> spp.
	Lake Whitefish	<i>Coregonus clupeaformis</i>
	Lake Trout (lean & ciscowet)	<i>Salvelinus namaycush</i>
	Rainbow Trout (Steelhead)	<i>Oncorhynchus mykiss</i>
	Brown Trout	<i>Salmo trutta</i>
Brook Trout	<i>Salvelinus fontinalis</i>	
Splake	<i>Salvelinus fontinalis</i> X <i>Salvelinus namaycush</i>	
	Atlantic Salmon	<i>Salmo salar</i>
	Coho Salmon	<i>Oncorhynchus kisutch</i>
	Chinook Salmon	<i>Oncorhynchus tshawytscha</i>
	Pink Salmon	<i>Oncorhynchus gorbuscha</i>
Skin-off Fillet	Black Bullhead	<i>Ameiurus melas</i>
	Brown Bullhead	<i>Ameiurus nebulosus</i>
	Yellow Bullhead	<i>Ameiurus natalis</i>
	Channel Catfish	<i>Ictalurus punctatus</i>
	Muskellunge	<i>Esox masquinongy</i>
	Northern Pike	<i>Esox lucius</i>
	Round Whitefish (Menominee)	<i>Prosopium cylindraceum</i>
	Lake Herring	<i>Coregonus artedii</i>
	Chubs	<i>Coregonus</i> sp
	Carp	<i>Cyprinus carpio</i>
Freshwater Drum (Sheepshead)	<i>Aplodinotus grunniens</i>	
Buffalo	<i>Ictiobus cyprinellus</i>	
Burbot	<i>Lota lota</i>	
Quillback	<i>Carpiodes cyprinus</i>	
Skin-off Steak	Sturgeon	<i>Acipenser fulvescens</i>
Headless, Guttled	Rainbow Smelt	<i>Osmerus mordax</i>

Table 2. Whole-fish trend monitoring locations, target species and years monitored.

WATERBODY	SPECIES COLLECTED*	YEARS MONITORED
GREAT LAKES AND CONNECTING CHANNELS		
Lake Michigan		
Little Bay de Noc	Carp	1992, 94, 00, 03
	Walleye	1992, 94, 97, 00, 02
Grand Traverse Bay	Carp	1993, 95, 00, 03
	Lake Trout (D)	1990, 92, 95, 98, 01
Lake Huron		
Saginaw Bay	Carp (D)	1990, 92, 94, 98, 01, 03
	Walleye	1990, 91, 92, 94, 98, 03
Thunder Bay	Carp	1992, 94, 95, 99, 01
	Lake Trout (D)	1992, 94, 95, 98, 01
	Walleye	1991, 95, 98, 01
Lake Superior		
Keweenaw Bay	Lake Trout (D)	1991, 93, 96, 99, 01
Lake St. Clair		
L'Anse Creuse Bay	Carp	1990, 92, 94, 98, 02
	Walleye	1990, 92, 94, 98, 02
Lake Erie		
Brest Bay	Carp	1990, 92, 94, 97, 98, 02
	Walleye	1990, 92, 94, 98
St. Marys River		
Munuscong Bay	Carp	1993, 95, 98
	Walleye	1991, 93, 95, 98, 01
St. Clair River		
Algonac	Carp	1992, 94, 02
	Walleye	1992
Detroit River		
Grassy Island	Carp	1990, 92, 94, 96, 98, 01
	Walleye	1990, 94, 96, 98, 01
INLAND RIVERS		
Grand River	Carp	1990, 92, 95, 00, 03
Kalamazoo River	Carp	1990, 92, 94, 97, 99, 01, 03
Manistee River	Carp	1992, 94
Manistique River	Redhorse Sucker	1993, 03
Menominee River	Carp (D)	1991
	Redhorse Sucker	1994
Muskegon River	Carp	1991, 93, 95, 97, 00, 02
River Raisin	Carp	1991, 94, 97, 00
St. Joseph River	Carp	1991, 93, 97, 00, 02
INLAND LAKES		
Grand Sable Lake	Lake Trout	1991, 93, 95
Lake Gogebic	Walleye	1992, 94, 97, 00, 02
South Manistique Lake	Walleye	1991, 93, 95, 98, 01, 03
Higgins Lake	Lake Trout	1991, 95, 97, 00, 02
Houghton Lake	Largemouth Bass	1992, 94, 98, 01
Gull Lake	Largemouth Bass	1991, 93, 95, 97, 00, 02
Gun Lake	Largemouth Bass	1990, 92, 94, 97, 00, 02
Pontiac Lake	Largemouth Bass	1992, 94, 97, 99, 03

*D = dioxin and furan congeners.

Table 3. Contaminants monitored in edible portion and whole fish tissue samples.

<u>Standard Analyses</u>	<u>Level of Quantification</u>
Hexachlorobenzene	0.001 ppm
<i>gamma</i> -BHC (Lindane)	0.001 ppm
Aldrin	0.001 ppm
Dieldrin	0.001 ppm
4,4'-DDE	0.001 ppm
4,4'-DDD	0.001 ppm
4,4'-DDT	0.001 ppm
2,4'-DDE	0.001 ppm
2,4'-DDD	0.001 ppm
2,4'-DDT	0.001 ppm
Heptachlor Epoxide	0.001 ppm
Mercury	0.010 ppm
Oxychlordane	0.001 ppm
<i>gamma</i> -Chlordane	0.001 ppm
<i>trans</i> -Nonachlor	0.001 ppm
<i>alpha</i> -Chlordane	0.001 ppm
<i>cis</i> -Nonachlor	0.001 ppm
Octachlorostyrene	0.001 ppm
Hexachlorostyrene	0.001 ppm
Heptachlorostyrene	0.001 ppm
Pentachlorostyrene	0.001 ppm
Heptachlor	0.001 ppm
Terphenyl	0.250 ppm
Toxaphene	0.050 ppm
Mirex	0.001 ppm
PBB (FF-1, BP-6)	0.001 ppm

Table 4. Polychlorinated biphenyl (PCB) structure and corresponding identification number of congeners monitored in fish tissue samples.

BZ#	Structure	BZ#	Structure
	TRICHLOROBIPHENYLS		HEXACHLOROBIPHENYLS
17	2,2',4	128	2,2',3,3',4,4'
18	2,2',5	130	2,2',3,3',4,5'
22	2,3,4'	132	2,2',3,3',4,6'
25	2,3',4	135	2,2',3,3',5,6'
26	2,3',5	136	2,2',3,3',6,6'
28	2,4,4'	137	2,2',3,4,4',5
31	2,4',5	138	2,2',3,4,4',5'
32	2,4',6	141	2,2',3,4,5,5'
33	2',3,4	144	2,2',3,4,5',6
37	3,4,4'	146	2,2',3,4',5,5'
	TETRACHLOROBIPHENYLS	149	2,2',3,4',5',6
40	2,2',3,3'	151	2,2',3,5,5',6
42	2,2',3,4'	153	2,2',4,4',5,5'
44	2,2',3,5'	156	2,3,3',4,4',5
45	2,2',3,6	157	2,3,3',4,4',5'
47	2,2',4,4'	158	2,3,3',4,4',6
49	2,2',4,5'	163	2,3,3',4',5,6
52	2,2',5,5'	167	2,3',4,4',5,5'
56	2,3,3',4'		HEPTACHLOROBIPHENYLS
60	2,3,4,4'	170	2,2',3,3',4,4',5
63	2,3',4',5	171	2,2',3,3',4,4',6
64	2,3,4',6	172	2,2',3,3',4,5,5'
66	2,3',4,4'	174	2,2',3,3',4,5,6'
70	2,3',4',5	175	2,2',3,3',4,5',6
71	2,3',4',6	177	2,2',3,3',4',5,6
74	2,4,4',5	178	2,2',3,3',5,5',6
77	3,3',4,4'	179	2,2',3,3',5,6,6'
	PENTACHLOROBIPHENYLS	180	2,2',3,4,4',5,5'
82	2,2',3,3',4	182	2,2',3,4,4',5,6'
84	2,2',3,3',6	183	2,2',3,4,4',5',6
87	2,2',3,4,5'	185	2,2',3,4,5,5',6
90	2,2',3,4',5	187	2,2',3,4',5,5',6
91	2,2',3,4',6	190	2,3,3',4,4',5,6
92	2,2',3,5,5'	193	2,3,3',4',5,5',6
95	2,2',3,5',6		OCTACHLOROBIPHENYLS
97	2,2',3',4,5	194	2,2',3,3',4,4',5,5'
99	2,2',4,4',5	195	2,2',3,3',4,4',5,6
100	2,2',4,4',6	196	2,2',3,3',4,4',5,6'
101	2,2',4,5,5'	198	2,2',3,3',4,5,5',6
105	2,3,3',4,4'	199	2,2',3,3',4,5,6,6'
110	2,3,3',4',6	201	2,2',3,3',4,5,5',6'
118	2,3',4,4',5	203	2,2',3,4,4',5,5',6
126	3,3',4,4',5	205	2,3,3',4,4',5,5',6
			NONACHLOROBIPHENYLS
		206	2,2',3,3',4,4',5,5',6

BZ# = identification numbers adopted by the International Union of Pure and Applied Chemists (IUPAC).

Table 5. Chlorinated dibenzo-p-dioxin (CDD) and chlorinated dibenzofuran (CDF) congeners quantified in fish tissue samples.

<u>CDD</u>	<u>Level of Quantification</u>
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1.0 ppt
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PCDD)	1.0 ppt
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	1.0 ppt
1,2,3,6,7,8-HxCDD	1.0 ppt
1,2,3,7,8,9-HxCDD	1.0 ppt
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	1.0 ppt
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	1.0 ppt
<u>CDF</u>	
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	1.0 ppt
1,2,3,7,8-Pentachlorodibenzofuran (PCDF)	1.0 ppt
2,3,4,7,8-PCDF	1.0 ppt
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	1.0 ppt
1,2,3,6,7,8-HxCDF	1.0 ppt
1,2,3,7,8,9-HxCDF	1.0 ppt
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	1.0 ppt
1,2,3,4,7,8,9-HpCDF	1.0 ppt
1,2,3,4,6,7,8,9-Octachlorodibenzofuran (OCDF)	1.0 ppt

Table 6. Contaminants analyzed by Research Productivity Council in caged fish tissue samples.

<u>Analytes monitored for all caged fish sites:</u>	<u>Level of Detection</u>
Mercury	0.01 ppm
Hexachlorobenzene	0.002 ppm
Dieldrin	0.002 ppm
4,4'-DDE	0.005 ppm
4,4'-DDD	0.002 ppm
4,4'-DDT	0.004 ppm
Heptachlor	0.002 ppm
Heptachlor Epoxide	0.002 ppm
Oxychlordane	0.002 ppm
<i>gamma</i> -Chlordane	0.002 ppm
<i>trans</i> -Nonachlor	0.002 ppm
<i>alpha</i> -Chlordane	0.002 ppm
<i>cis</i> -Nonachlor	0.003 ppm
Total PCB (sum of 83 congeners)	0.001 ppm

Additional analytes for the Saginaw River watershed:

2,4'-DDD	0.002 ppm
2,4'-DDT	0.004 ppm
PBB (Firemaster BP-6)	0.04 ppm
Pentachlorostyrene	0.034 ppm
Hexachlorostyrene	0.018 ppm
Heptachlorostyrene	0.006 ppm
Octachlorostyrene	0.001 ppm

Table 7. Trigger levels used by the Michigan Department of Community Health (MDCH) to establish sport fish consumption advisories.

Chemical	MDCH Trigger Level
Total Chlordane	0.3 ppm (= mg/kg)
Total DDT	5.0 ppm
Dieldrin	0.3 ppm
Dioxin Toxic Equivalents#	10.0 ppt (= ng/kg)
Heptachlor (+Heptachlor Epoxide)	0.3 ppm
Mercury	
Restrict Consumption	0.5 ppm
No Consumption	1.5 ppm
Mirex	0.1 ppm
Total PCB	
General Population	2.0 ppm
Women of Child Bearing Age and Children Under 15 Years	
1 Meal Per Week	0.05 ppm
1 Meal Per Month	0.2 ppm
6 Meals Per Year	1.0 ppm
No Consumption	1.9 ppm
Toxaphene	5.0 ppm

The MDCH advisory trigger level for dioxin applies to total 2,3,7,8-TCDD toxic equivalent concentrations.

Table 8. Summary of chemicals quantified in edible-portion fish tissue samples.

Chemical*	# of Sites Monitored	# of Sites Quantified	Concentration Range (ppm)	Location and Species with Maximum Concentration
a-Chlordane	49	34	K 0.001– 0.050	Rabbit River – Carp
g-Chlordane	49	30	K 0.001– 0.019	Lake Michigan – Lake Sturgeon
cis-Nonachlor	49	34	K 0.001– 0.169	Lake Superior – Ciscowet
Trans-Nonachlor	49	39	K 0.001– 0.659	Tittabawassee River – Carp
Oxychlordane	49	21	K 0.001– 0.039	Lake Superior – Ciscowet
Total Chlordane	49	42	K 0.001–0.710	Tittabawassee River – Carp
4,4'-DDD	49	39	K 0.001– 8.595	Tittabawassee River – Carp
4,4'-DDE	49	48	K 0.001– 3.377	Tittabawassee River – Carp
4,4'-DDT	49	27	K 0.001– 0.086	Lake Michigan – Lake Sturgeon
2,4'-DDT	49	8	K 0.001–0.040	Lake Michigan – Lake Sturgeon
2,4'-DDD	49	21	K 0.001–2.181	Tittabawassee River – Carp
Total DDT	49	48	K 0.001–14.58	Tittabawassee River – Carp
Dieldrin	49	33	K 0.001– 0.065	Lake Superior – Ciscowet
Heptachlor	49	3	K 0.001– 0.004	Lake Superior – Ciscowet
Heptachlor Epoxide	49	13	K 0.001– 0.011	Union Lake – Channel Catfish
Hexachlorobenzene	49	25	K 0.001 – 0.043	Tittabawassee River – Carp
Lindane	49	2	K 0.001 – 0.002	Lake Superior – Ciscowet
Mirex	49	10	K 0.001– 0.026	Lake Superior – Ciscowet
Mercury	67	67	0.01 – 2.7	Lake Le Vasseur – Northern Pike
Octachlorostyrene	49	7	K 0.001 – 0.152	Tittabawassee River – Carp
PBB	49	1	K 0.001 – 0.001	Tittabawassee River – Walleye
Total PCB	49	45	K 0.001 – 9.686	Tittabawassee River – Carp
Apparent Toxaphene	49	6	K 0.050 – J 2.264	Lake Superior – Ciscowet
Dioxin TEQ	2	2	1.70 – 81.0 ppt	Tittabawassee River – Carp

K = Unquantified at the level shown.

J = Estimated value, value may not be precise.

* Aldrin, Heptachlorostyrene, Hexachlorostyrene, Pentachlorostyrene, and Terphenyl were not quantified at any of the sites monitored.

Table 9. Edible-portion fish tissue samples with total PCB concentrations exceeding the Michigan Department of Community Health's (MDCH) sport fish consumption advisory trigger levels.

				Number of Fish in Each Consumption Advisory Category*					General Population Trigger Level	Current Advisory
				Women and Children Consumption Advisory Categories						
Site ID	Location	Species	Median Conc. ppm	1 meal/week 0.05-0.2 ppm	1 meal/month 0.2-1.0 ppm	6 meals/year 1.0-1.9 ppm	No Cons. > 1.9 ppm	2.0 ppm		
Lake Erie Watershed										
2003069	Lake St. Clair Michigan Waters	Smallmouth Bass	0.120	5/10	2/10				Yes	
2002086	Rouge River Phoenix Lake	Carp Northern Pike White Sucker	0.046 0.032 0.030	1/4 2/10 3/10					Yes Yes No	
2003107	Sand Lake Lenawee County	Walleye	0.034	1/10					Yes#	
202100	Union Lake Oakland County	Largemouth Bass Smallmouth Bass	0.051 0.037	1/1 2/8					Yes# Yes#	
Lake Huron Watershed										
2003072	Lobdell Lake Genessee County	Carp	0.070	6/10					No	
2003109	Shiawassee River	Carp Smallmouth Bass	0.788 0.073	7/10	6/10	3/10	1/10	1/10	Yes Yes	
2003132	Tittabawassee River Midland County Smiths Road Crossing	Carp Channel Catfish Smallmouth Bass Walleye White Bass	2.05 0.510 0.176 0.220 1.46	2/9 6/10 5/10	2/10 6/9 4/10 5/10 2/10	3/10 1/9	5/10	5/10 1/10	Yes Yes Yes Yes Yes	
2002102	Wixom Lake Gladwin County	Channel Catfish	0.021	1/10					No	

* Number of samples exceeding trigger level/number of samples analyzed.

Covered by the statewide mercury advisory or an advisory based on contaminants other than total PCBs.

Table 9. Continued

				Number of Fish in Each Consumption Advisory Category*					
				Women and Children Consumption Advisory Categories				General Population Trigger Level	
Site ID	Location	Species	Median Conc. ppm	1 meal/week 0.05-0.2 ppm	1 meal/month 0.2-1.0 ppm	6 meals/year 1.0-1.9 ppm	No Cons > 1.9 ppm	2.0 ppm	Current Advisory
Lake Michigan Watershed									
2002112	Lake Michigan	Lake Sturgeon	0.780		3/5	1/5			Yes
2003155	South of Frankfort								
2003158	(Bridgeman, Kalamazoo								
2003159	River, Manistee Lake,								
2003160	New Buffalo)								
2003154	Austin Lake	Carp	0.007	2/10					No
	Kalamazoo County								
2002008	Black River, South Branch	Carp	1.12	1/9	3/9	3/9	2/9	2/9	Yes
#	Bangor	White Sucker	0.038	2/6					Yes
2002106	Black River, South Branch	Carp	0.101	7/10	2/10				No
	Upstream Bangor Dam								
2002009	Bristol Lake	White Sucker	0.002	1/10					No
	Barry County								
2003015	Camp Lake	Brown Bullhead	0.010	1/10					No
	Kent County								
2003031	Flat River	White Sucker	0.020	2/10					No
	Ingalls Road								
2002113	Grand River	Northern Pike	0.183	1/2	1/2				Yes
	Maple Grove Rd.								
2003139	Green Lake	Lake Trout	0.059	7/10	2/10				No
	Grand Traverse County								
2003077	Manistique River	Redhorse Sucker	0.274	2/10	6/10				No
	Manistique, US-2 Bridge	Smallmouth Bass	0.216	1/4	3/4				No
		Walleye	0.024	1/10	1/10				No

* Number of samples exceeding trigger level/number of samples analyzed.

Covered by the statewide mercury advisory or an advisory based on contaminants other than total PCBs.

Table 9. Continued

				Number of Fish in Each Consumption Advisory Category*					General Population Trigger Level	Current Advisory
				Women and Children Consumption Advisory Categories						
Site ID	Location	Species	Median Conc. ppm	1 meal/week 0.05-0.2 ppm	1 meal/month 0.2-1.0 ppm	6 meals/year 1.0-1.9 ppm	No Cons > 1.9 ppm	2.0 ppm		
2002069	Mona Lake Muskegon County	Carp	0.162	6/10	3/10				Yes	
2002078	North Lake Leelanau	Lake Trout	0.265	5/12	7/12				No	
2003082	Leelanau County	White Sucker	0.064	5/10					No	
2003086	Pere Marquette Lake Mason County	Northern Pike White Sucker	0.072 0.114	7/10 6/10	2/10				Yes No	
2003096	Rabbit River Above Hamilton Dam	Carp	0.256	2/10	6/10				No	
2003098	Rabbit River Below Hamilton	Carp	1.548		3/10	3/10	4/10	4/10	No	
		Largemouth Bass	0.093	1/4	1/4				No	
		Redhorse Sucker	0.033	1/10					No	
2003135	Union Lake Branch County	Carp	0.082	6/10	1/10				Yes	
		Channel Catfish	0.012	1/10					Yes	
Lake Superior Watershed										
2003070	Lake Superior Keweenaw Bay	Ciscowet	0.812	4/11	3/11	4/11			Yes	
2003157	Lake Superior Portage Lake	Lake Sturgeon	0.201		1/1				No	
2002105	Siskiwit Lake Isle Royale County	Lake Trout	0.029	1/10					Yes	

* Number of samples exceeding trigger level/number of samples analyzed.

Covered by the statewide mercury advisory or an advisory based on contaminants other than total PCBs.

Table 10. Edible-portion fish tissue samples with mercury concentrations exceeding the Michigan Department of Community Health's (MDCH) sport fish consumption advisory trigger level.

Site ID	Location	Species	Species Median Concentration (ppm)	Range (ppm)	Exceedance* Rate	Current Advisory
Lake Erie Watershed						
2003017	Chenango Lake Livingston County	Largemouth Bass	0.40	0.29-0.84	3/8	Yes (a)
2003069	Lake St. Clair Michigan Waters	Smallmouth Bass	0.38	0.17-1.13	4/10	Yes
2003107	Sand Lake Lenawee County	Walleye	0.53	0.35-0.73	6/10	Yes (a)
2002100	Union Lake Oakland County	Largemouth Bass	0.80	0.80	1/1	Yes (a)
		Smallmouth Bass	0.72	0.20-0.87	7/8	Yes (a)
Lake Huron Watershed						
2003002	Au Sable River Alcona Dam Pond	Walleye	0.38	0.28-0.54	1/7	Yes (a)
2003023	Ess Lake Montmorency County	Northern Pike	0.38	0.29-0.56	1/10	Yes (a)
2003040	Gaylanta Lake Montmorency County	Northern Pike	0.38	0.27-0.55	1/10	Yes (a)
2003050	Lake Emma Presque Isle County	Northern Pike	0.44	0.26-0.65	3/10	Yes (a)
2003072	Lobdell Lake Genesee County	Largemouth Bass	0.62	0.36-0.80	9/11	Yes (a)
2003095	Pratt Lake Gladwin County	Largemouth Bass	0.36	0.20-0.54	2/10	Yes (a)
2002096	Stevenson Lake Isabella County	Bullhead (Yellow and Brown)	0.38	0.02-0.61	1/10	No
		Largemouth Bass	0.83	0.80-0.8	4/4	Yes (a)
		Northern Pike	0.49	0.32-0.71	4/10	Yes (a)

* Number of samples exceeding trigger levels/number of samples analyzed.

a The species and waterbody are covered by the statewide mercury advisory.

Covered by an advisory based on contaminants other than mercury

Table 10. Continued

Site ID	Location	Species	Species Median Concentration (ppm)	Range (ppm)	Exceedance* Rate	Current Advisory
2002097	Thunder Bay River Seven Mile Pond	Largemouth Bass	0.32	0.23-0.66	2/10	Yes (a)
2003132	Tittabawassee River Smiths Crossing Road	Channel Catfish	0.37	0.14-1.23	4/9	Yes#
		Walleye	0.12	0.09-0.53	1/10	Yes#
		White Bass	0.40	0.28-0.72	2/10	Yes#
2002102	Wixom Lake Gladwin County	Channel Catfish	0.26	0.18-0.65	1/10	No
Lake Michigan Watershed						
2002112	Lake Michigan	Lake Sturgeon	0.23	0.05-0.59	2/5	Yes#
2003155	South of Frankfort					
2003158						
2003159						
2003160						
2002008	Black River, South Branch Bangor	Northern Pike	0.42	0.18-0.82	2/5	Yes#
2003015	Camp Lake Kent County	Northern Pike	0.46	0.36-0.58	2/4	Yes (a)
2003020	Crooked Lake Barry County	Brown Bullhead	0.05	0.02-0.79	1/10	No
		Largemouth Bass	0.19	0.13-0.52	1/10	Yes (a)
2003021	Deer Lake Charlevoix County	Largemouth Bass	0.29	0.25-0.68	1/10	Yes (a)
		Northern Pike	0.40	0.13-0.71	2/5	Yes (a)
2002113	Grand River Maple Grove Rd	Northern Pike	0.53	0.46-0.60	1/2	Yes#
2003139	Green Lake Grand Traverse County	Lake Trout	0.56	0.54-1.1	10/10	No
2003141	Lake Mitchell Wexford County	Largemouth Bass	0.30	0.25-0.58	1/10	Yes (a)

* Number of samples exceeding trigger levels/number of samples analyzed.

a The species and waterbody are covered by the statewide mercury advisory.

Covered by an advisory based on contaminants other than mercury

Table 10. Continued

Site ID	Location	Species	Species Median Concentration (ppm)	Range (ppm)	Exceedance* Rate	Current Advisory
2003152	Lake Ovid Clinton County	Largemouth Bass	0.37	0.28-0.74	2/10	Yes (a)
2003075	Manistique Lake Mackinac County	Walleye	0.42	0.31-0.73	3/10	Yes (a)
2003077	Manistique River Manistique, US-2 Bridge	Redhorse Sucker Walleye	0.18 0.08	0.09-0.54 0.06-0.52	1/10 1/10	No No
2003065	Montcalm Lake Montcalm County	Largemouth Bass	0.41	0.2-0.64	1/10	Yes (a)
2003082	North Lake Leelanau, Leelanau County	Lake Trout	0.60	0.54-0.78	12/12	No
2003096	Rabbit River Above Hamilton Dam	Largemouth Bass Northern Pike Redhorse Sucker	0.60 0.44 0.10	0.20-0.72 0.35-0.64 0.07-0.53	3/4 1/4 1/10	Yes (a) Yes (a) No
2003098	Rabbit River Below Hamilton	Largemouth Bass Northern Pike	0.26 0.62	0.16-0.56 0.37-0.78	1/4 2/3	No No
2003104	Runkle Lake Iron County	Northern Pike	0.47	0.35-0.72	4/11	Yes (a)
2002111	Silver Lake Dickinson County	Walleye	0.52	0.36-1.17	6/10	Yes (a)
2003110	Six Mile Lake Charlevoix County	Northern Pike	0.40	0.21-0.52	2/10	Yes (a)
2003146	South Groveland Pond Dickinson County	Walleye	0.49	0.22-0.65	5/11	Yes (a)
2002036	Thompson Lake St. Joseph County	Largemouth Bass	0.50	0.37-0.61	5/10	Yes (a)
2003135	Union Lake Branch County	Largemouth Bass	0.27	0.17-0.56	1/10	Yes (a)

* Number of samples exceeding trigger levels/number of samples analyzed.
a The species and waterbody are covered by the statewide mercury advisory.
Covered by an advisory based on contaminants other than mercury

Table 10. Continued

Site ID	Location	Species	Species Median Concentration (ppm)	Range (ppm)	Exceedance* Rate	Current Advisory
Lake Superior Watershed						
2003070	Lake Superior Keweenaw Bay	Ciscowet	0.40	0.14-0.72	5/11	Yes#
2002110	Emily Lake Houghton County	Walleye	0.40	0.32-0.59	2/10	Yes (a)
2003047	Kingston Lake Alger County	Largemouth Bass	0.44	0.30-0.59	1/2	Yes (a)
		Walleye	0.39	0.14-0.68	2/4	Yes (a)
2003156	Lake Gogebic Gogebic/Ontonagon County	Rock Bass	0.38	0.19-0.55	1/10	Yes (a)
2002104	Lake Le Vasseur Marquette County	Northern Pike	1.28	0.89-2.70	10/10	Yes (a)
2002070	Muskallonge Lake Luce County	Northern Pike	0.56	0.37-1.38	7/10	Yes (a)
2002105	Siskiwit Lake Isle Royale County	Lake Trout	0.43	0.36-0.60	3/10	Yes#
2003126	Sunday Lake Gogebic County	Black Crappie	0.44	0.34-0.87	2/7	Yes (a)
		Northern Pike	0.80	0.59-1.22	8/8	Yes (a)
		Walleye	1.04	0.90-1.18	2/2	Yes (a)
		Yellow Perch	0.62	0.61-0.77	3/3	Yes (a)
2003145	Tepee Lake Iron County	Northern Pike	0.84	0.73-1.75	10/10	Yes (a)

* Number of samples exceeding trigger levels/number of samples analyzed.

a The species and waterbody are covered by the statewide mercury advisory.

Covered by an advisory based on contaminants other than mercury

Table 11. Edible portion fish tissue samples with dioxin TEQ concentrations exceeding the Michigan Department of Community Health's (MDCH) sport fish consumption advisory trigger level.

Site ID	Location	Species	Species Median Concentration (ppt)	Range (ppt)	Exceedance* Rate	Current Advisory
2003070	Lake Superior Keweenaw Bay Baraga County	Ciscowet	5.07	1.94-11.3	3/11	Yes
2003132	Tittabawassee River Smiths Crossing Road	Carp	23.6	3.04-81.0	8/10	Yes
		Channel Catfish	11.4	3.91-31.0	5/9	Yes
		Smallmouth Bass	7.60	3.09-14.5	3/10	Yes
		White Bass	12.2	6.76-20.3	8/10	Yes

* Number of samples exceeding trigger level/number of samples analyzed.

Table 12. Edible portion fish tissue samples with total chlordane concentrations exceeding the Michigan Department of Community Health's (MDCH) sport fish consumption advisory trigger level.

Site ID	Location	Species	Species Median Concentration (ppt)	Range (ppt)	Exceedance* Rate	Current Advisory
2003132	Tittabawassee River Smiths Crossing Road	Carp	0.034	0.005-0.710	1/10	Yes#
2003070	Lake Superior Keweenaw Bay Baraga County	Ciscowet	0.134	0.029-0.392	2/11	Yes

* Number of samples exceeding trigger level/number of samples analyzed.

Advisory based on contaminants other than chlordane.

Table 13. Edible portion fish tissue samples with total DDT concentrations exceeding the Michigan Department of Community Health's (MDCH) sport fish consumption advisory trigger level.

Site ID	Location	Species	Species Median Concentration (ppt)	Range (ppt)	Exceedance* Rate	Current Advisory
2003132	Tittabawassee River Smiths Crossing Road	Carp	0.506	0.086-14.577	2/10	Yes#

* Number of samples exceeding trigger level/number of samples analyzed.

Advisory based on contaminants other than DDT.

Table 14. Net uptake of contaminants and 95% confidence interval in caged-fish tissue samples collected in 2002. Concentrations of organic contaminants are lipid normalized; mercury concentrations are wet weight.

Site Number		Sample Size	Mercury (ppb)	Total PCB (ppb)	Total Chlordane (ppb)	Total DDT (ppb)
<u>Black River</u>						
2002004	Black River Control	4	11 ± 2	0.4 ± 0.6	ND	2.0 ± 0.8
2002005	South Branch Black River Upstream of Bangor	4	5.2 ± 2.2	NQU	ND	4.6 ± 3.7
2002006	South Branch Black River Downstream of Bangor	4	4.4 ± 0.8	NQU	ND	3.8 ± 1.4
2002007	Black River River Mouth	4	5.2 ± 2.6	1.0 ± 0.3	ND	6.1 ± 0.5
<u>Galien River</u>						
2002004	Galien River Control	4	11 ± 2	0.4 ± 0.6	ND	2.0 ± 0.8
2002031	Galien River River Mouth	4	1.8 ± 1.5	NQU	0.4 ± 0.1	3.3 ± 0.7
<u>Huron River</u>						
2002072	Huron River Control	4	17 ± 5	0.3 ± 0.3	0.5 ± 0.6	5.3 ± 3.3
2002039	Huron River Upstream of Dexter	4	NQU	NQU	ND	NQU
2002040	Huron River Downstream of Ford Lake	4	NQU	NQU	ND	7.8 ± 6.0
2002041	Huron River Downstream of Belleville Lake	4	NQU	2.4 ± 2.2	ND	24 ± 23
2002042	Huron River Rockwood, River Mouth	4	NQU	0.4 ± 0.3	ND	11 ± 5

NQU = no quantifiable uptake
 ND = not detected

Table 14. Continued

Site Number		Sample Size	Mercury (ppb)	Total PCB (ppb)	Total Chlordane (ppb)	Total DDT (ppb)
<u>Manistique River</u>						
2002072	Manistique River Control	4	17 ± 5	0.3 ± 0.3	0.5 ± 0.6	5.3 ± 3.3
2002066	Manistique River Soo Line RR Bridge	4	NQU	NQU	ND	2.0 ± 0.3
2002067	Manistique River River Mouth	4	NQU	NQU	ND	1.9 ± 0.2
<u>Muskegon River</u>						
2002072	Muskegon River Control	4	17 ± 5	0.3 ± 0.3	0.5 ± 0.6	5.3 ± 3.3
2002073	Muskegon River Vance Road	4	NQU	NQU	ND	5.2 ± 5.4
2002074	Muskegon River M-82 at High Rollaway	4	5 ± 2	NQU	NQU	9.7 ± 6.2
2002075	Muskegon River Maple Island Road	4	NQU	NQU	ND	10.3 ± 8.3

NQU = no quantifiable uptake
 ND = not detected

Table 14. Continued

Site Number		Sample Size	Mercury (ppb)	Total PCB (ppb)	Total Chlordane (ppb)	Total DDT (ppb)	HCB (ppb)	Sample Size	Dioxin TEQ (ppt)
SAGINAW WATERSHED									
2002010	Control	4	11 ± 4	ND	ND	5.5 ± 1.1	ND	3	0.04 ± 0.05
<u>Pine River</u>									
2002011	Harrison Road	4	5 ± 2	NQU	NQU	NQU	NQU	NT	---
2002012	M-46	4	4 ± 3	NQU	0.8 ± 0.5	9.3 ± 2.6	NQU	NT	---
2002103	St. Louis Impoundment	4	NQU	18 ± 10	0.7 ± 0.3	58 ± 24	NQU	NT	---
2002013	WWTP	4	NQU	70 ± 8	1 ± 0.8	199 ± 44	NQU	NT	---
2002014	Gordonville Road	4	5 ± 0.8	22 ± 14	NQU	NQU	NQU	NT	---
<u>Chippewa River</u>									
2002015	Nature Center	4	NQU	NQU	0.7 ± 0.3	NQU	NQU	3	NQU
<u>Tittabawassee River</u>									
2002016	Cook Road	4	5 ± 3	NQU	NQU	2.4 ± 1.8	NQU	4	0.07 ± 0.06
2002018	RR Bridge	4	NQU	3.5 ± 2.6	0.7 ± 0.9	9.5 ± 2.6	0.7 ± 0.2	4	0.48 ± 0.29
2002017	Smith Crossing	4	5 ± 2	3.2 ± 1.1	NQU	15 ± 10	0.9 ± 0.2	3	0.56 ± 0.20
2002019	Freeland	4	4 ± 3	10 ± 5	0.9 ± 0.8	16 ± 7	1.1 ± 0.6	4	1.4 ± 0.68
2002020	Center Road	4	4 ± 4	6.2 ± 5.4	1.5 ± 2.3	18 ± 14	1.6 ± 1.1	4	2.5 ± 1.7
2002021	River Mouth	4	5 ± 3	3.8 ± 0.3	1.1 ± 1.2	12 ± 6	1.1 ± 0.3	4	2.1 ± 1.6

NQU = no quantifiable uptake;

ND = not detected;

NT = not tested

Table 14. Continued

Site Number		Sample Size	Mercury (ppb)	Total PCB (ppb)	Total Chlordane (ppb)	Total DDT (ppb)	HCB (ppb)	Sample Size	Dioxin TEQ (ppt)
SAGINAW WATERSHED									
2002010	Control	4	11 ± 4	ND	ND	5.5 ± 1.1	ND	3	0.04 ± 0.05
Shiawassee River									
2002022	Fergus Road	4	7 ± 3	NQU	NQU	NQU	NQU	4	0.34 ± 0.38
2002025	River Mouth	4	NQU	NQU	NQU	NQU	NQU	3	NQU
Flint River									
2002023	River Mouth	4	NQU	NQU	0.8 ± 0.7	NQU	NQU	NT	---
Cass River									
2002024	M-13	4	4 ± 2	0.1 ± 0.06	NQU	NQU	NQU	NT	---
Saginaw River									
2002026	Zilwaukee Bridge	4	NQU	3 ± 2	0.8 ± 0.4	NQU	0.8 ± 0.8	4	1.0 ± 0.4
2002027	u/s Middle Ground Island	4	4 ± 2	NQU	2.2 ± 1.8	9.4 ± 3.9	0.8 ± 0.3	4	1.0 ± 0.2
2002028	River Mouth	4	7 ± 2	65 ± 38	0.9 ± 0.7	6.9 ± 4.9	0.6 ± 0.4	4	1.1 ± 0.5

NQU = no quantifiable uptake

ND = not detected

NT = not tested

Table 15. Annual rates of change in contaminant concentrations measured in whole fish collected from fixed station trend monitoring sites.

WATERBODY	SPECIES	RATE OF CHANGE (%) AND PROBABILITY (p)									
		Mercury		Total PCB		Total DDT		Total Chlordane		Dioxin TEQ	
		%	p	%	p	%	p	%	p	%	p
GREAT LAKES AND CONNECTING CHANNELS											
Lake Michigan											
Little Bay de Noc	Carp	*+/-2.5		+/-5.4		-6.2	<0.05	-8.5	<0.01		
	Walleye	3.3	<0.05	-4.9	<0.05	-7.0	<0.01	-10.1	<0.001		
Grand Traverse Bay	Carp	+/-2.6		-10.3	<0.01	-10.5	<0.01	-8.6	<0.01		
	Lake Trout	7.6	<0.001	+/-2.2		-5.1	<0.05	-4.6	<0.01	+/-6.4	
Lake Huron											
Saginaw Bay	Carp	+/-2.8		-6.1	<0.001	+/-3.5		-6.1	<0.001	+/-6.9	
	Walleye	3.0	<0.05	-2.6	<0.05	-4.8	<0.01	-6.0	<0.01		
Thunder Bay	Carp	+/-6.2		+/-5.4		+/-4.8		-10.2	<0.001		
	Lake Trout	+/-3.3		-5.5	<0.05	-4.8	<0.01	-9.8	<0.001	-5.4	<0.05
	Walleye	+/-3.3		-5.3	<0.05	-6.6	<0.01	-7.5	<0.001		
Lake Superior											
Keweenaw Bay	Lake Trout	+/-2.5		-4.4	<0.01	-9.8	<0.001	-8.5	<0.001	+/-7.6	
Lake Erie											
Brest Bay	Carp	7.4	<0.01	+/-5.1		+/-4.3		-6.0	<0.001		
	Walleye	+/-6.0		+/-6.9		-6.6	<0.05	-9.9	<0.01		
Lake St. Clair											
L'Anse Creuse Bay	Carp	+/-3.7		+/-5.6		-5.7	<0.05	-7.2	<0.001		
	Walleye	+/-0.8		-8.4	<0.001	-12.0	<0.001	-12.5	<0.001		
St. Clair River											
Algonac	Carp	+/-8.6		+/-21.0		-12.1	<0.10	+/-17.1			
Detroit River											
Grassy Island	Carp	-8.9	<0.001	+/-4.8		-3.7	<0.05	+/-4.7			
	Walleye	+/-2.5		+/-3.0		-3.9	<0.05	-8.9	<0.001		
St. Marys River											
Munuscong Bay	Carp	+/-4.5		+/-14.9		+/-20.0		+/-22.5			
	Walleye	+/-3.1		+/-4.1		-8.1	<0.05	-10.0	<0.001		
	Average**	2.5		-5.9		-7.1		-8.4			
	Median**	3.3		-5.4		-6.6		-8.6			

*+/- indicates that no significant trend was measured (p>0.05) and the value presented is an estimate of the minimum detectable trend.

**Average and median concentrations were calculated using only Great Lakes and Connecting Channels and species with significant trends.

Table 15. Continued

WATERBODY	SPECIES	RATE OF CHANGE (%) AND PROBABILITY (p)									
		Mercury		Total PCB		Total DDT		Total Chlordane		Dioxin TEQ	
		%	p	%	p	%	p	%	p	%	p
INLAND RIVERS											
Grand River	Carp	3.7	<0.05	+/-4.5		5.7	<0.01	+/-3.4			
Kalamazoo River	Carp	+/-2.0		-9.4	<0.001	-10.5	<0.001	-7.5	<0.001		
Muskegon River	Carp	-5.8	<0.005	-23.6	<0.001	-16.3	<0.001	-18.5	<0.001		
River Raisin	Carp	+/-2.8		+/-7.4		+/-5.2		+/-3.9			
St. Joseph River	Carp	-1.8	<0.10	-5.7	<0.01	-7.9	<0.005	+/-4.7			
INLAND LAKES											
Grand Sable Lake	Lake Trout	7.6	<0.01	9.1	<0.001	+/-4.3		-8.6	<0.05		
Lake Gogebic	Walleye	-8.7	<0.001	-19.0	<0.001	-6.2	<0.001	#NA			
South Manistique Lake	Walleye	-3.2	<0.001	-4.7	<0.001	+/-1.9		NA			
Higgins Lake	Lake Trout	-2.1	<0.10	-10.7	<0.001	-14.7	<0.001	-7.4	<0.005		
Houghton Lake	Largemouth Bass	+/-2.6		-11.0	<0.001	-7.8	<0.001	+/-5.6			
Gull Lake	Largemouth Bass	+/-1.2		-6.4	<0.001	-9.1	<0.001	-12.8	<0.001		
Gun Lake	Largemouth Bass	+/-1.7		-4.6	<0.05	-4.6	<0.05	-5.3	<0.05		
Pontiac Lake	Largemouth Bass	+/-3.3		-4.6	<0.05	-5.2	<0.05	-12.5	<0.001		
	Average**	-1.5		-8.2		-7.7		-10.4			
	Median**	-2.1		-6.4		-7.8		-8.6			

*+/- indicates that no significant trend was measured (p>0.05) and the value presented is an estimate of the minimum detectable trend.

**Average and median concentrations were calculated using only inland rivers and lakes and species with significant trends.

#Trend estimates were not available because contaminant concentrations were below the analytical detection level.

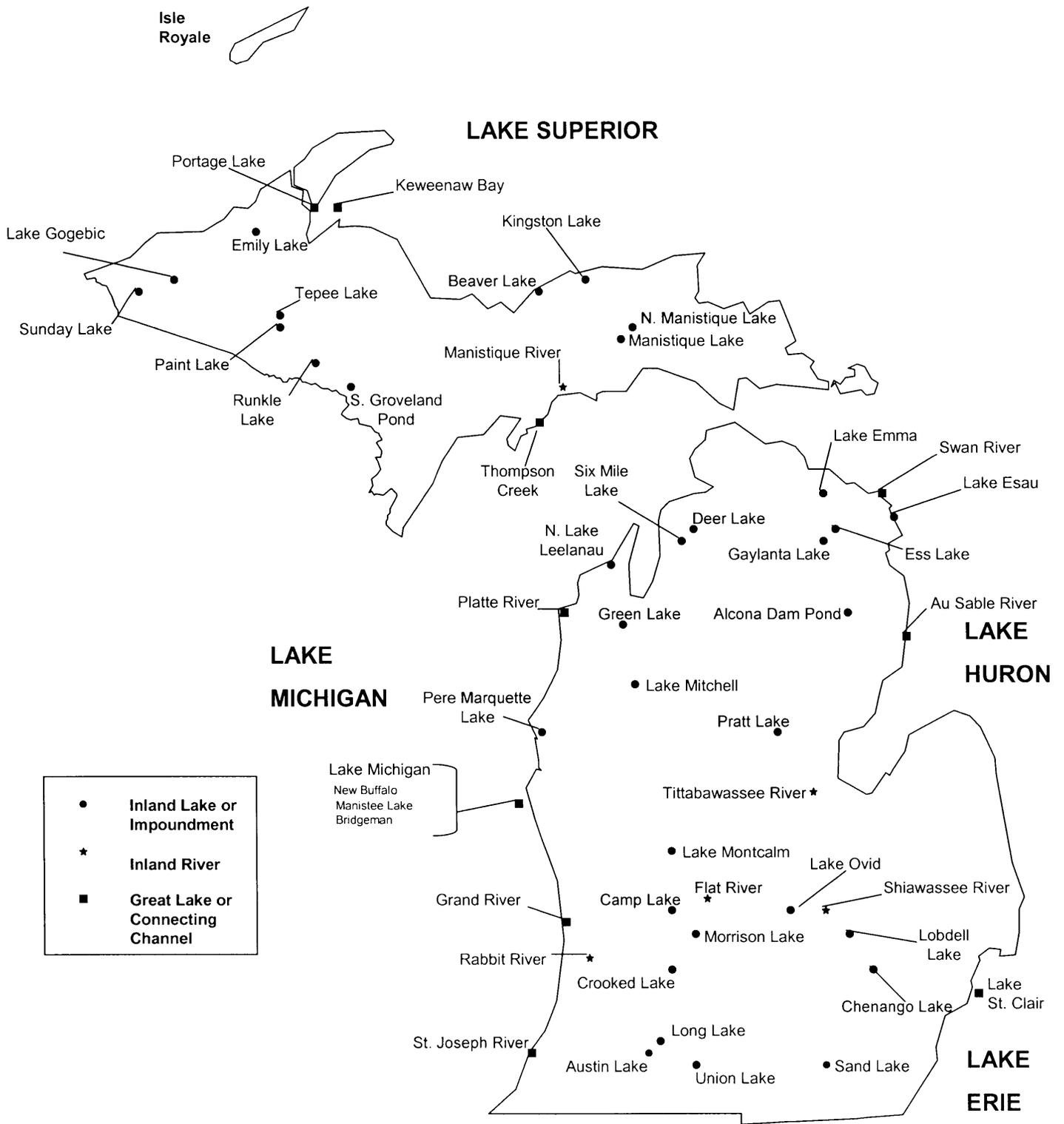


Figure 1. 2003 edible-portion monitoring locations.

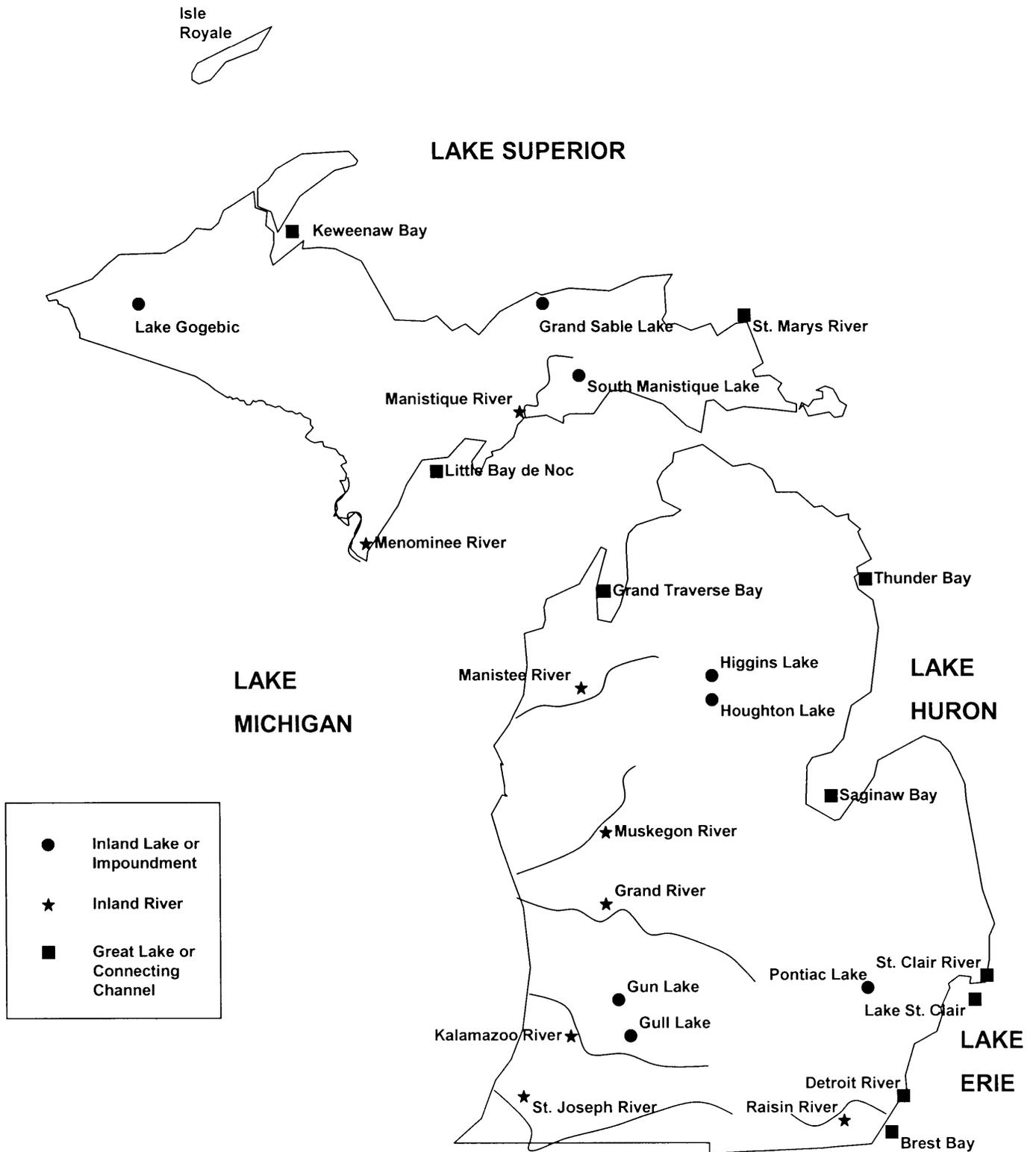


Figure 2. Whole-fish trend monitoring sites.



Figure 3. Edible-portion monitoring locations. Samples were collected from these sites in 2002 and 2003 and the data are summarized in the 2004 annual report.

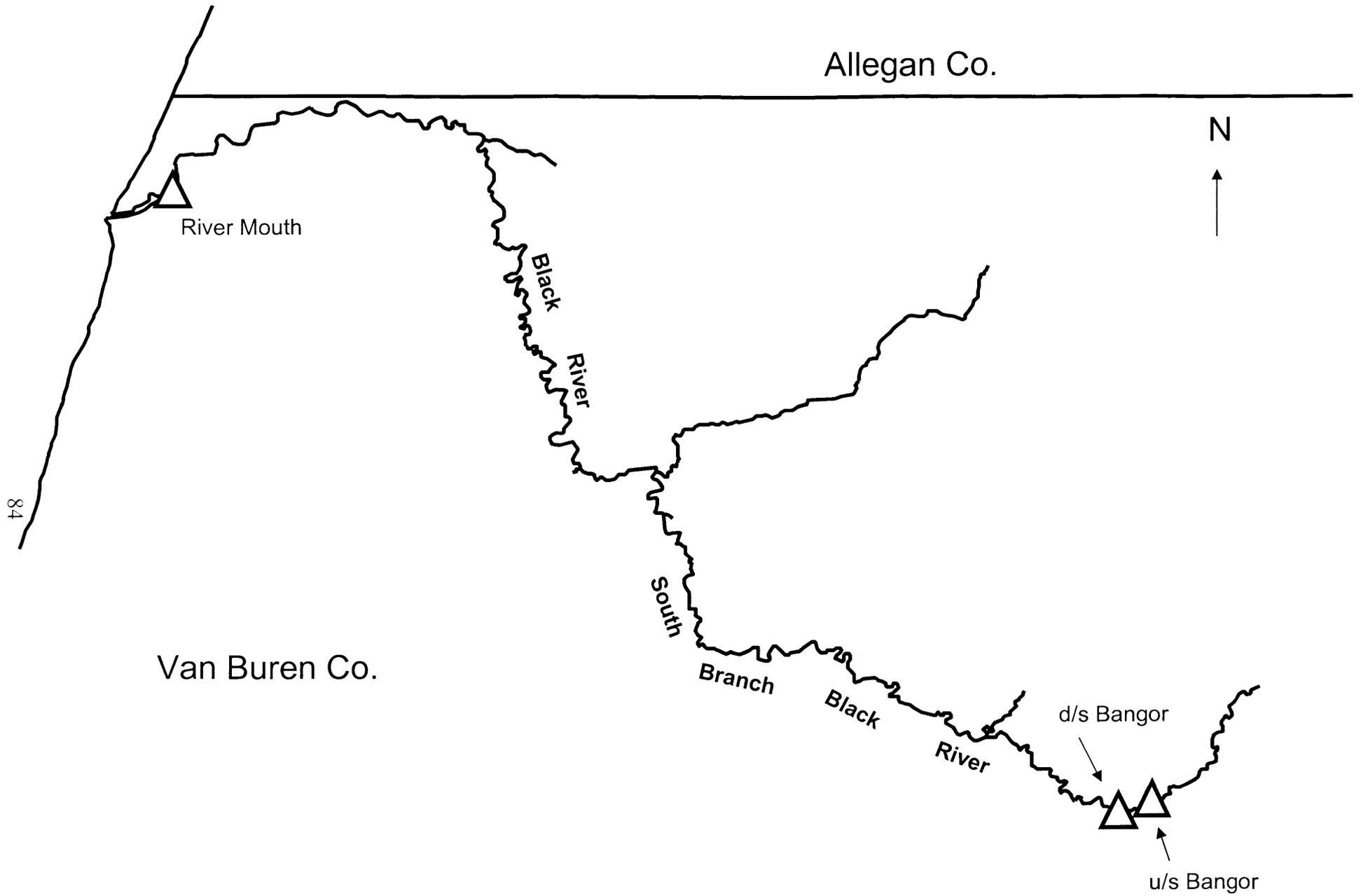


Figure 4. 2002 Black River caged-fish monitoring locations.

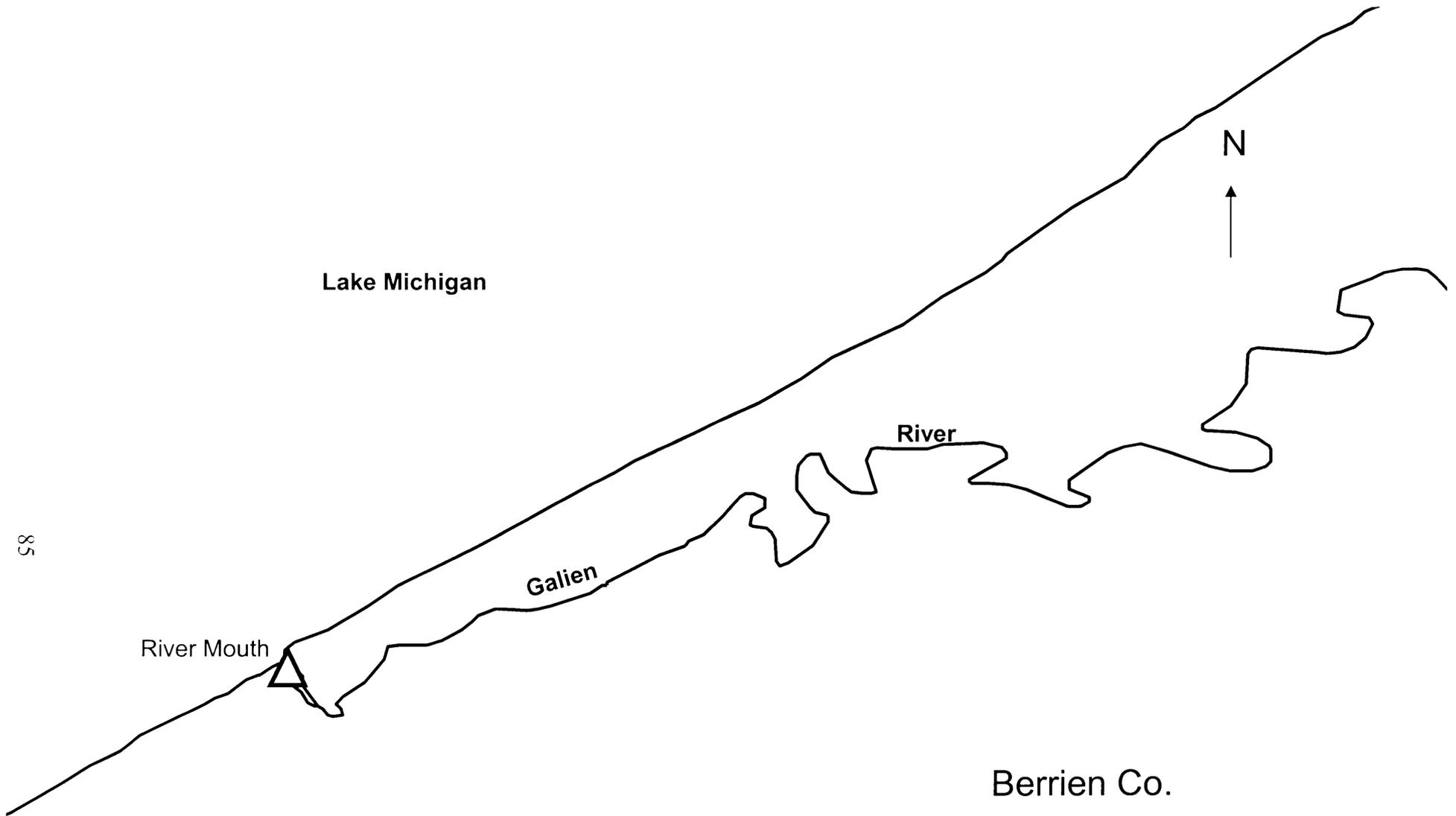


Figure 5. 2002 Galien River caged-fish monitoring location.

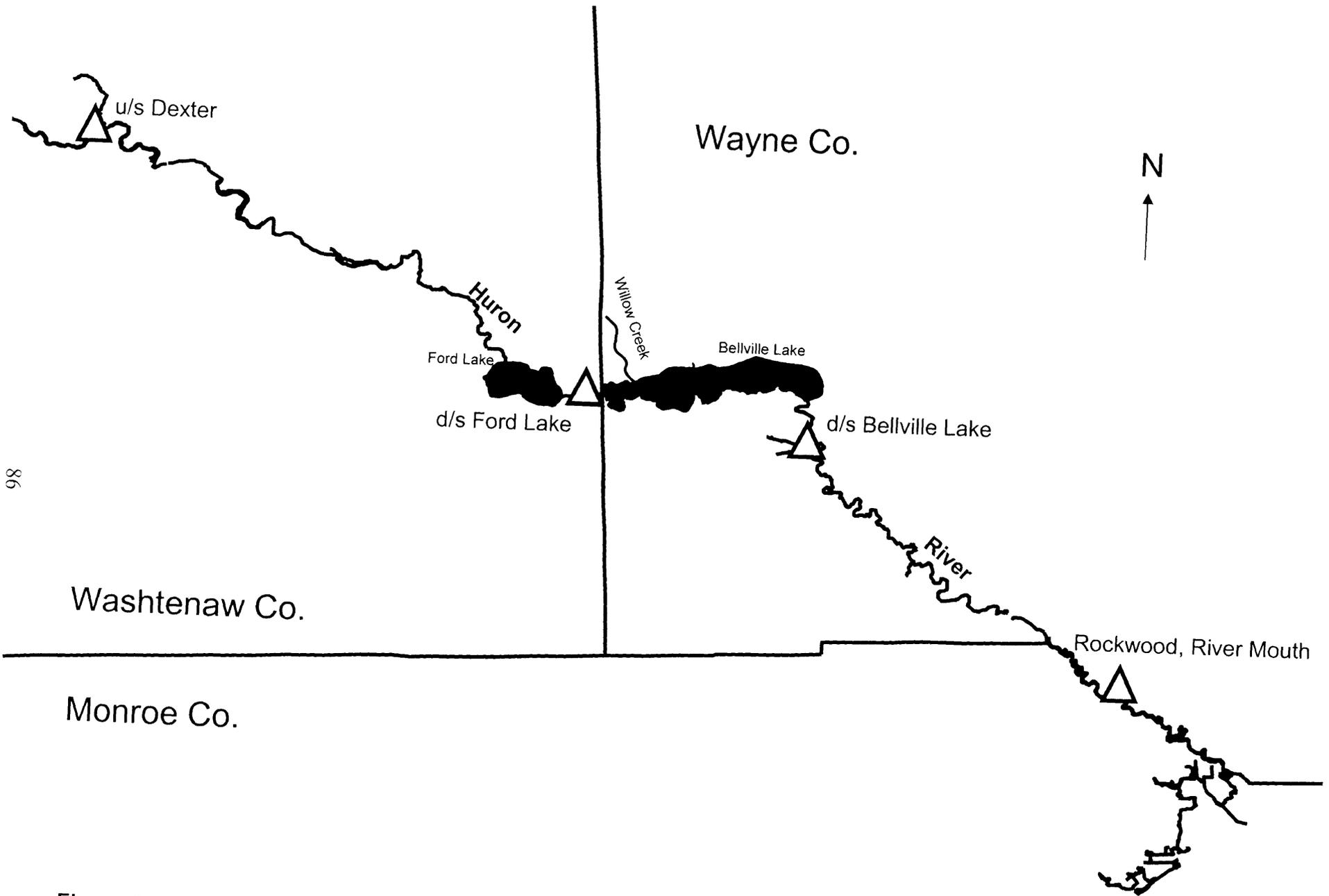


Figure 6. 2002 Huron River caged-fish monitoring locations.

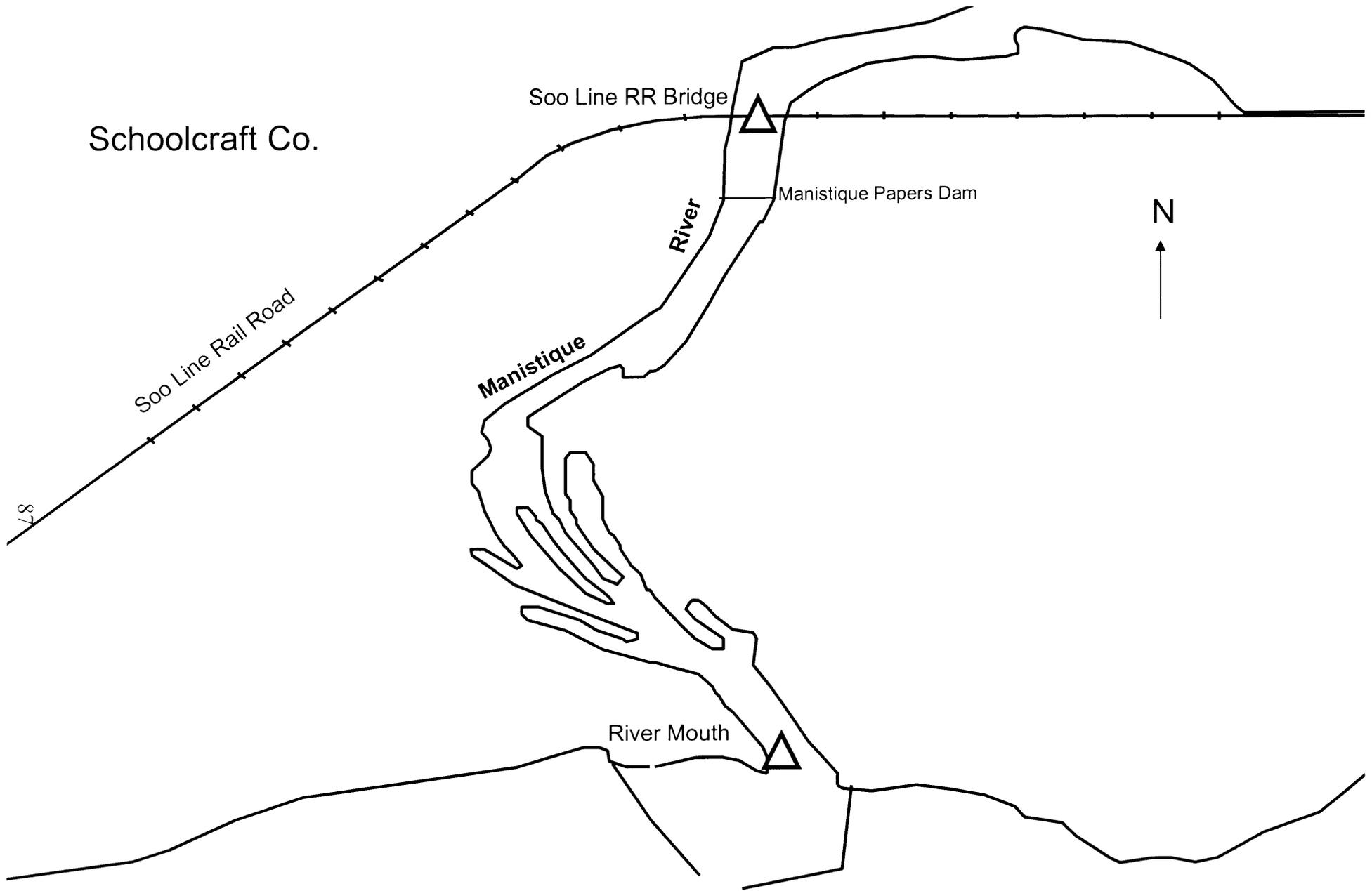


Figure 7. 2002 Manistique River caged-fish monitoring locations.

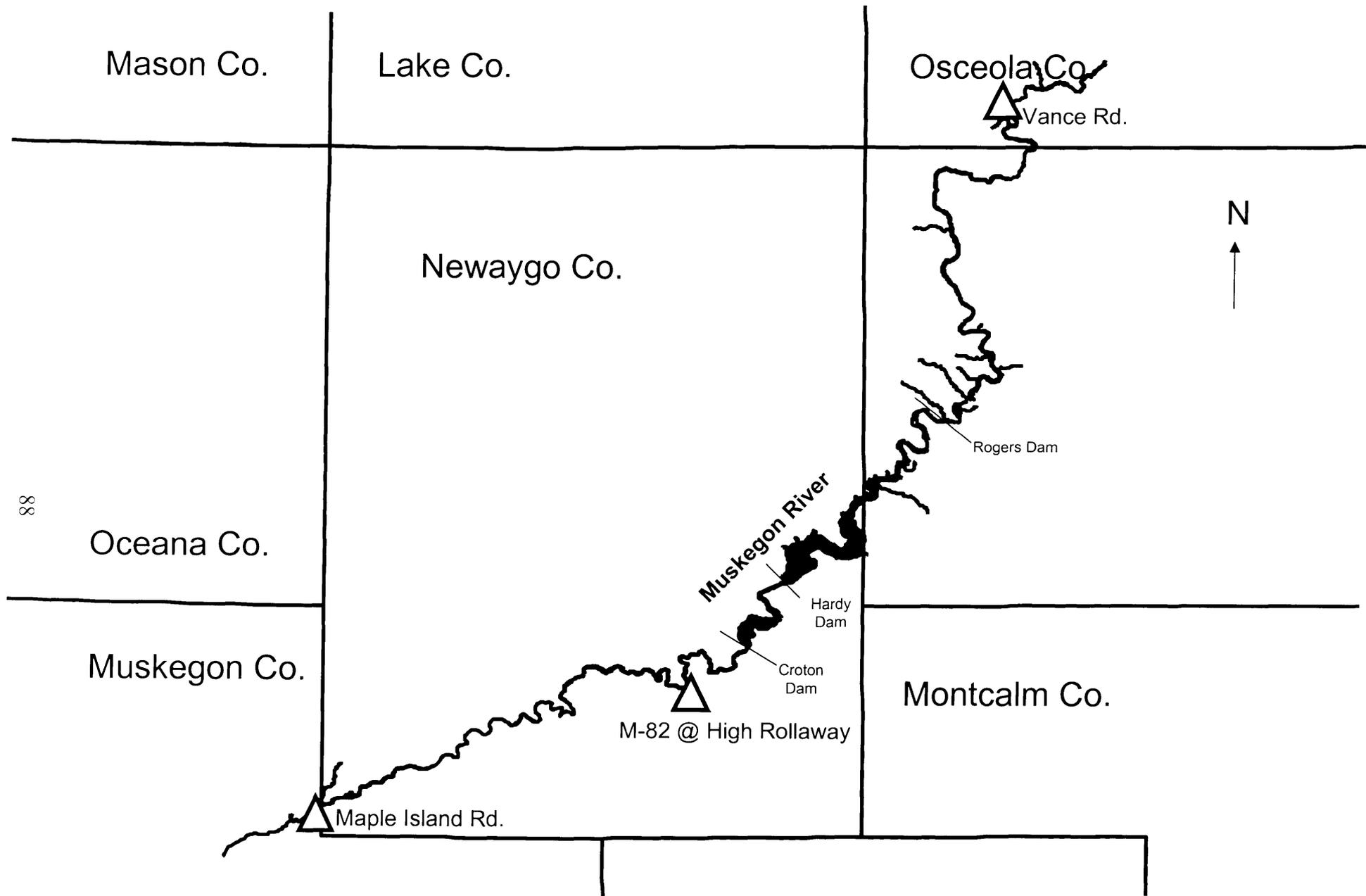


Figure 8. 2002 Muskegon River caged-fish monitoring locations.

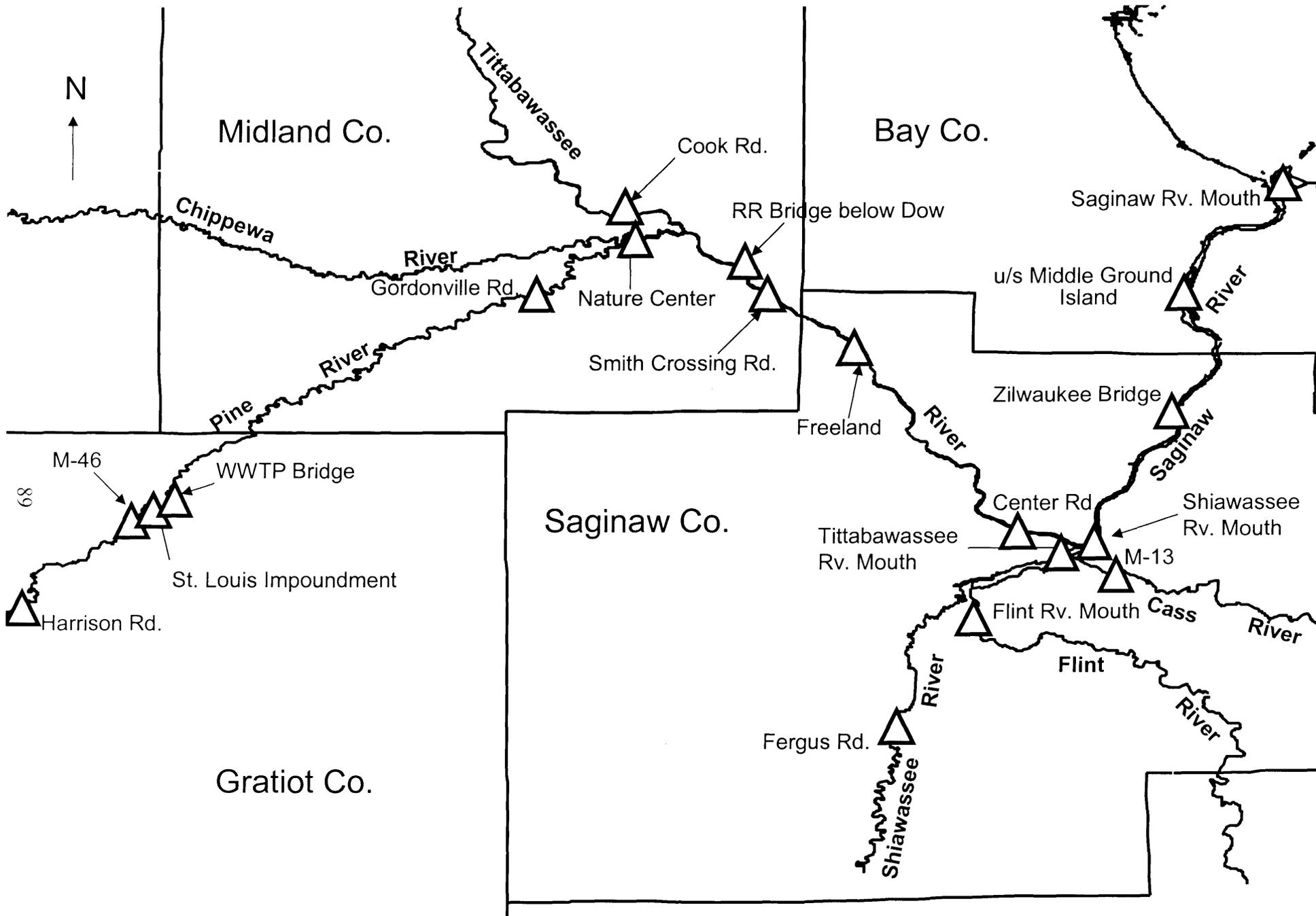


Figure 9. 2002 Saginaw River Watershed caged-fish monitoring locations.

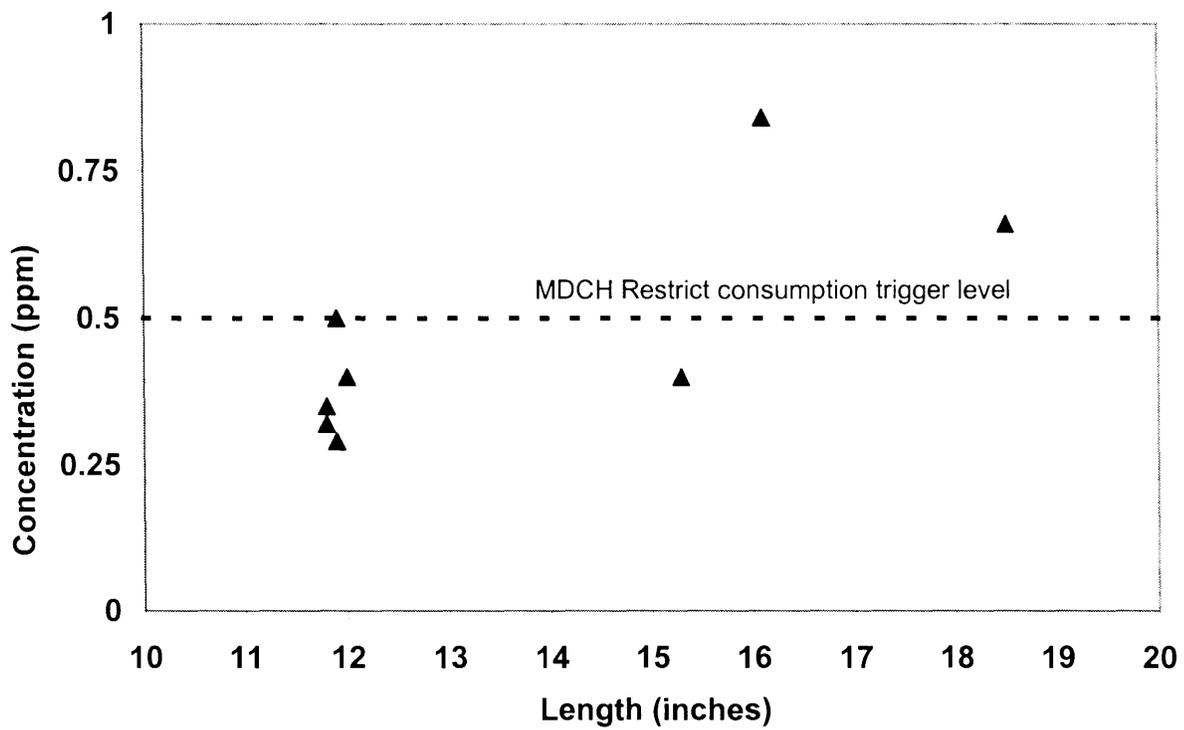


Figure 10. Total length versus mercury concentration in largemouth bass collected from Chenango Lake, Livingston County in 2003 (ID 2003017).

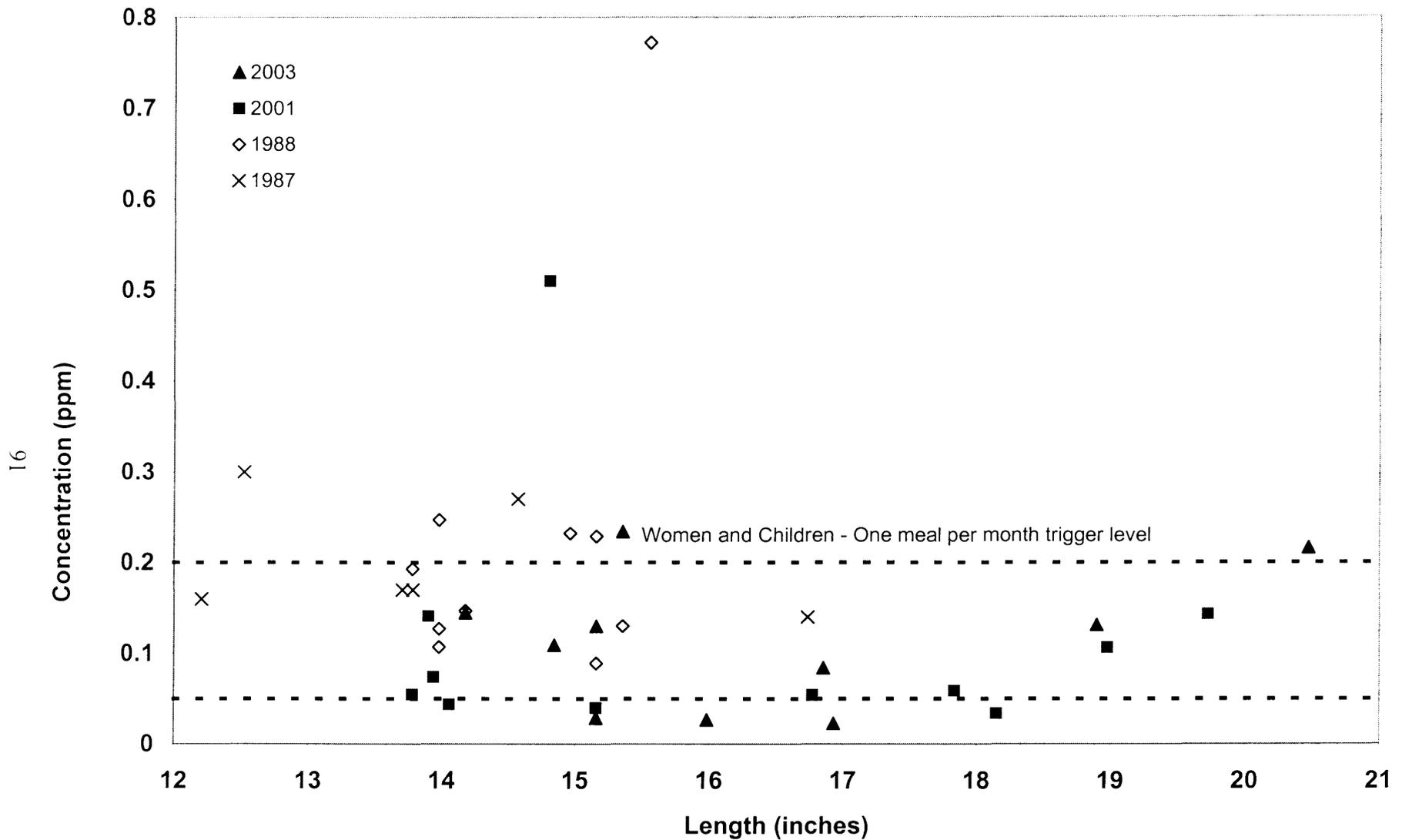


Figure 11. Total length versus total PCB concentration in smallmouth bass collected from Lake St. Clair in 1987 (ID 87035), 1988 (ID 88026), 2001 (ID 2001077), and 2003 (ID 2003069).

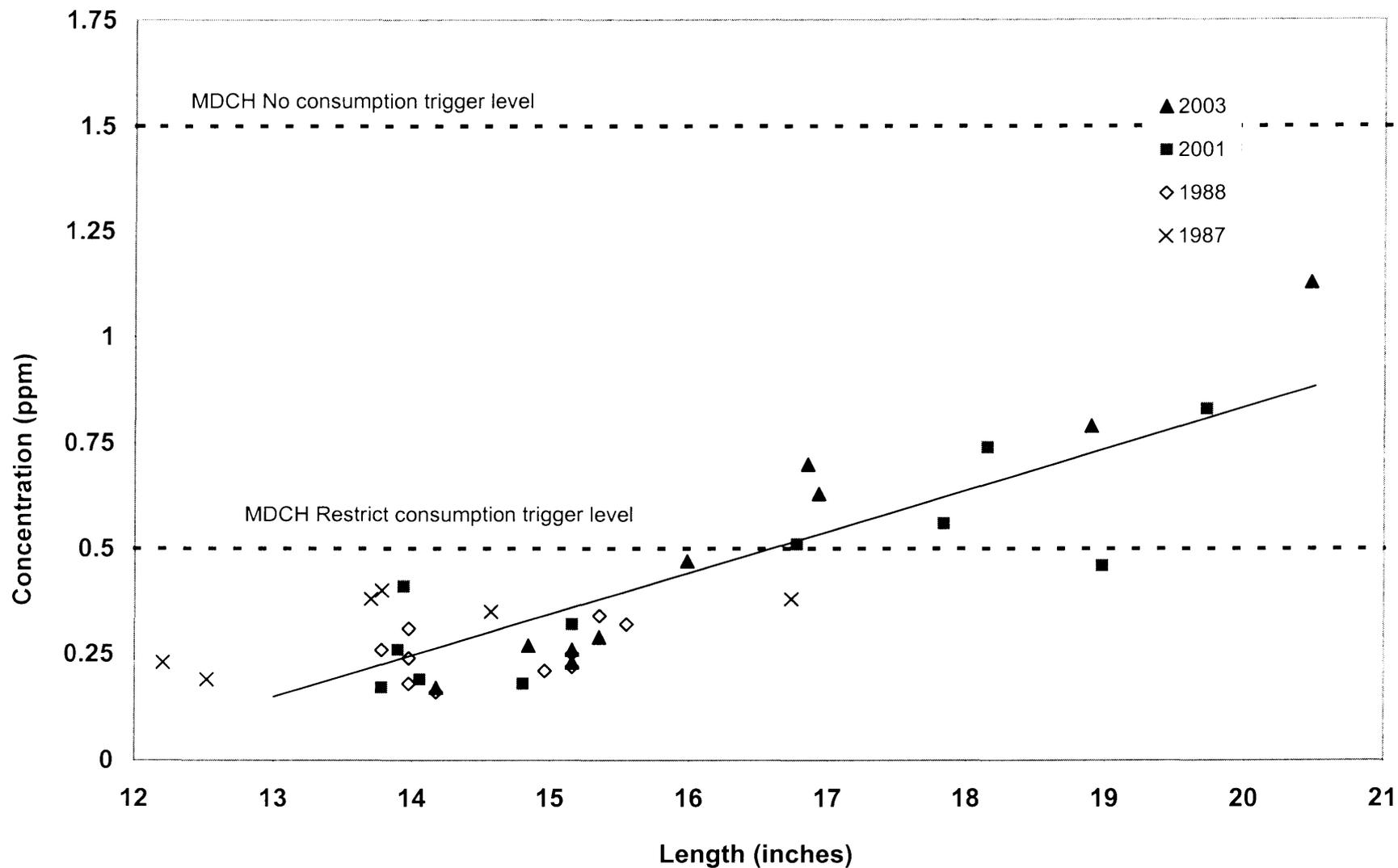


Figure 12. Total length versus mercury concentration in smallmouth bass collected from Lake St. Clair in 1987 (ID 87035), 1988 (ID 88026), 2001 (ID 2001077), and 2003 (ID 2003069).



Figure 13. Total length versus total PCB concentration in carp collected from the Rouge River, Phoenix Lake in 1988 (ID 88012), 1995 (ID 95023), 2001 (ID 2001098), and 2002 (ID 2002086).

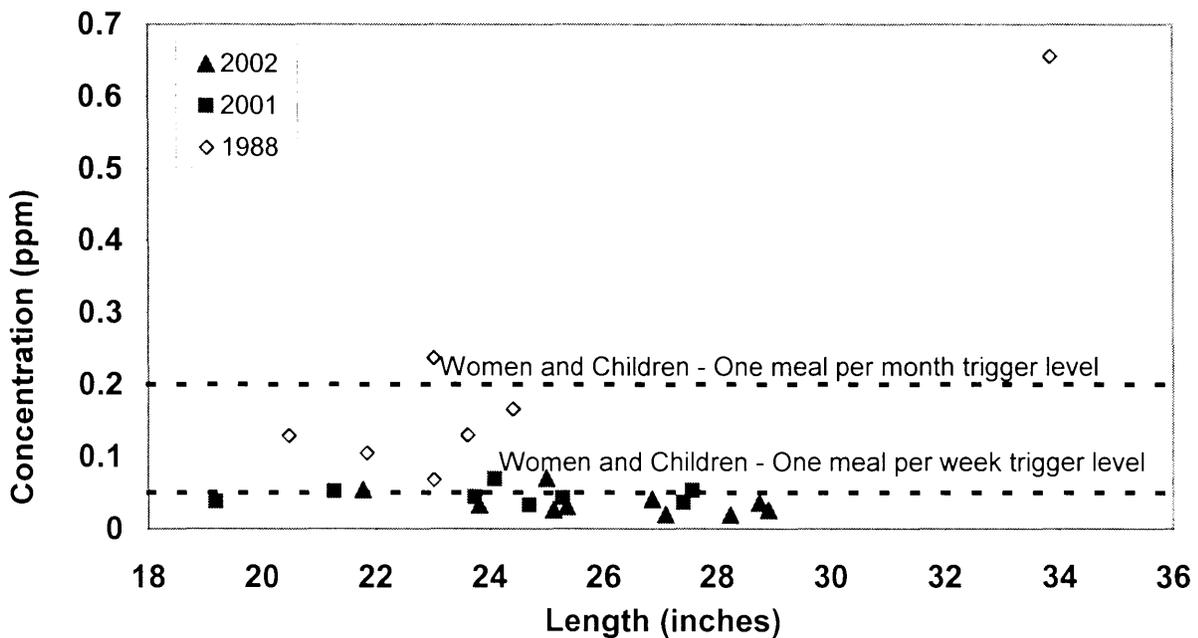


Figure 14. Total length versus total PCB concentration in northern pike collected from the Rouge River, Phoenix Lake in 1988 (ID 88012), 2001 (ID 2001098), and 2002 (ID 2002086).

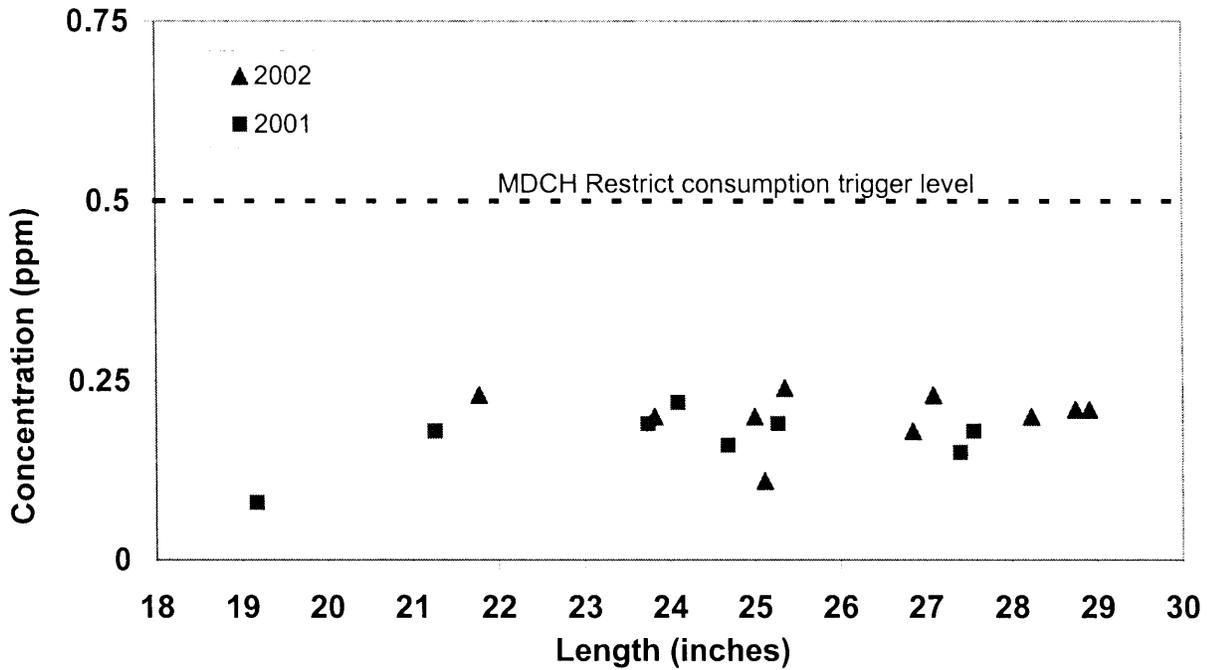


Figure 15. Total length versus mercury concentration in northern pike collected from the Rouge River, Phoenix Lake in 2001 (ID 2001098) and 2002 (ID 2002086).

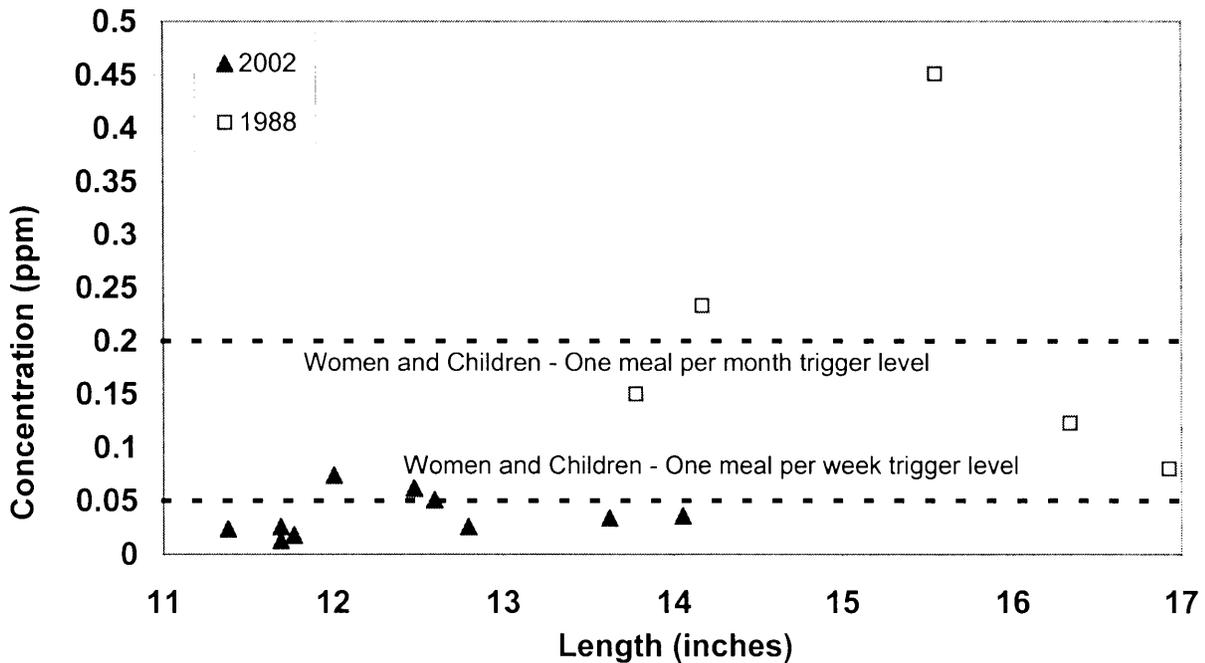


Figure 16. Total length versus total PCB concentration in white sucker collected from the Rouge River, Phoenix Lake in 1988 (ID 88012) and 2002 (ID 2002086).

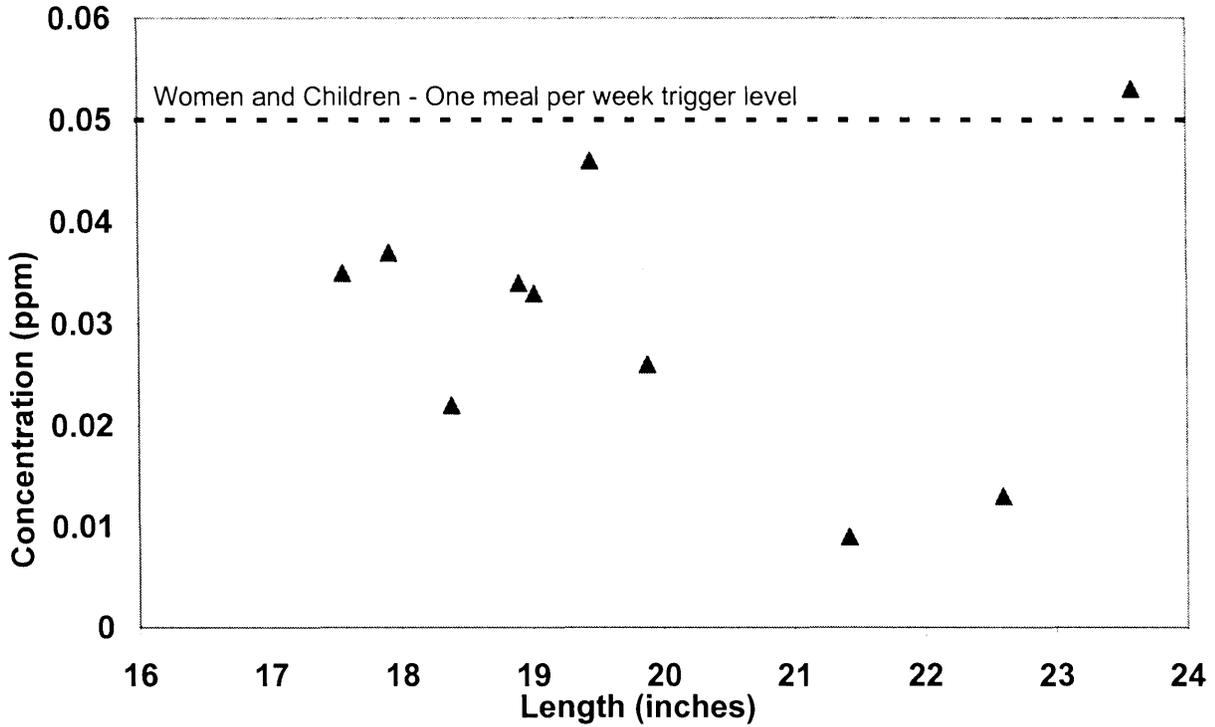


Figure 17. Total length versus total PCB concentration in walleye collected from Sand Lake, Lenawee County in 2003 (ID 2003107).

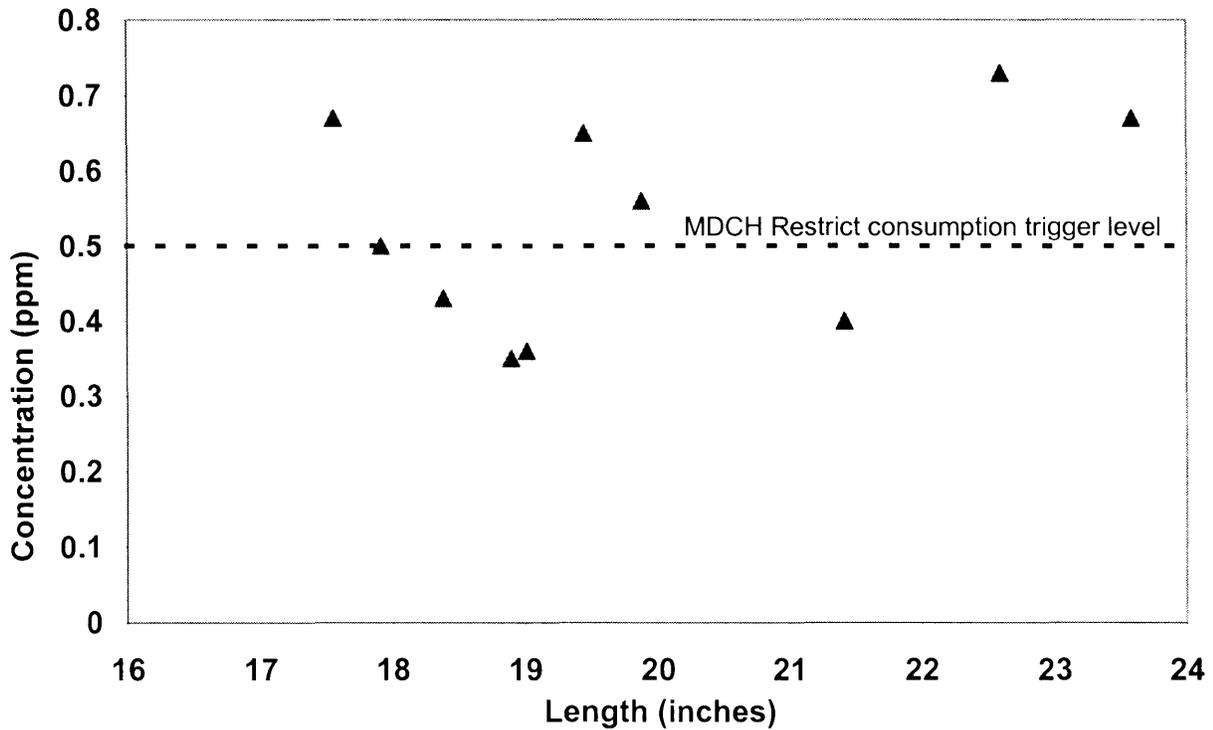


Figure 18. Total length versus mercury concentration in walleye collected from Sand Lake, Lenawee County in 2003 (ID 2003107).

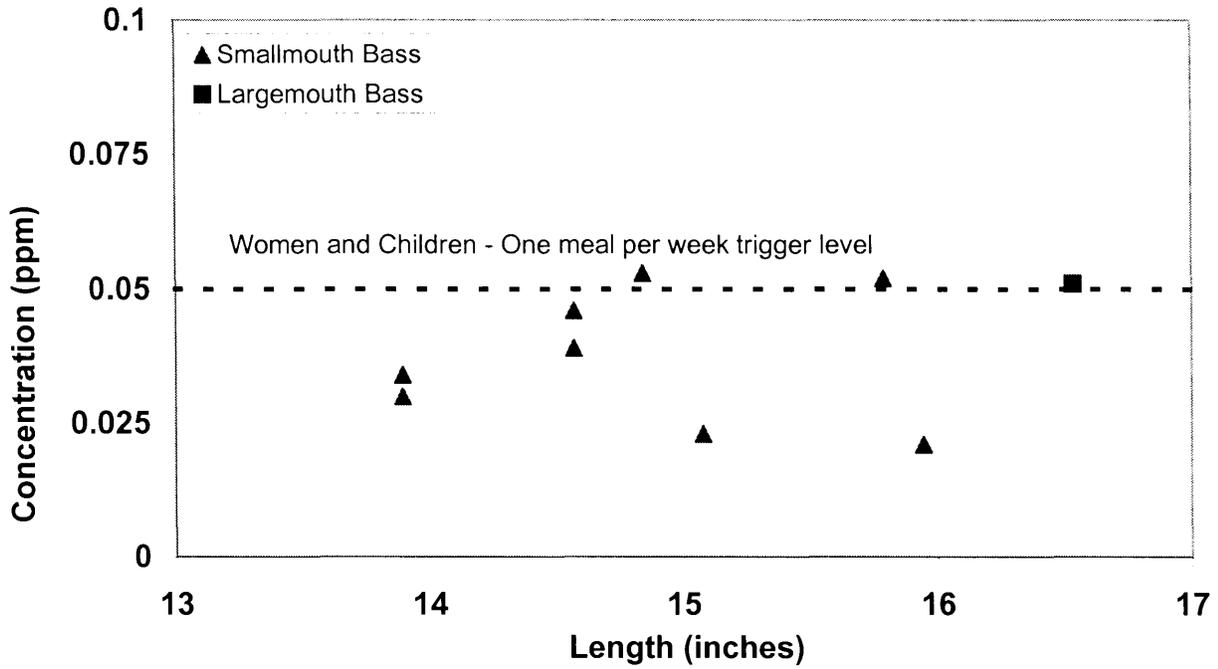


Figure 19. Total length versus total PCB concentration in smallmouth and largemouth bass collected from Union Lake, Oakland County in 2002 (ID 2002100).

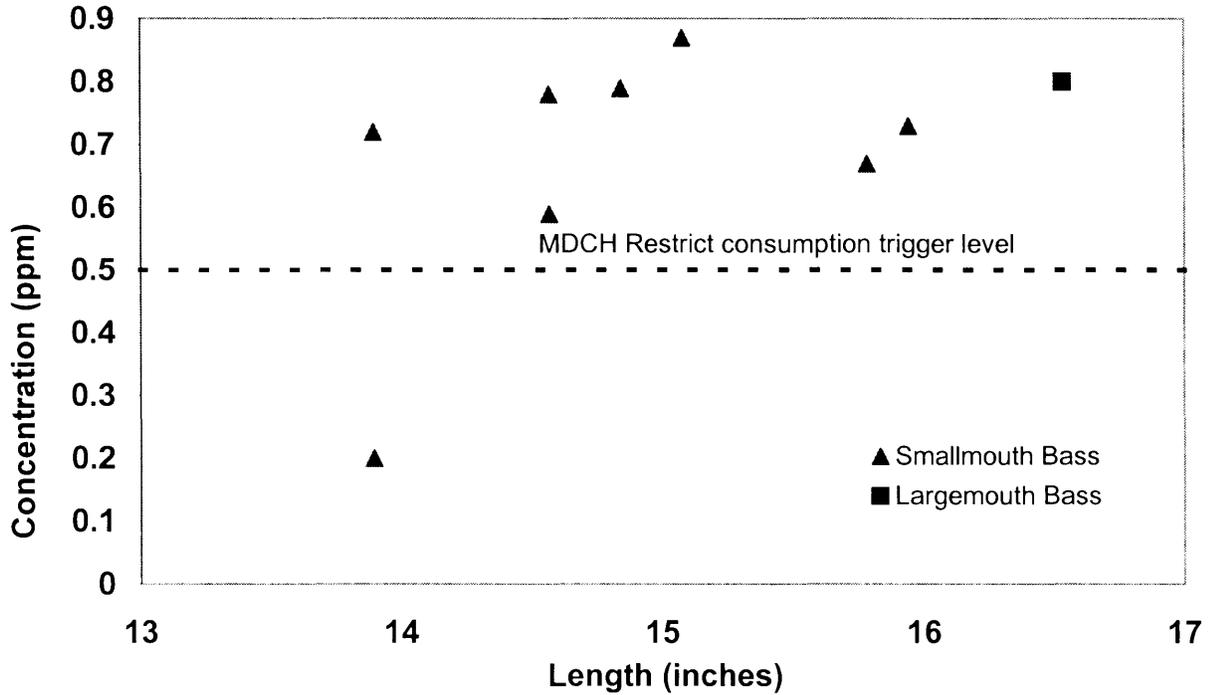


Figure 20. Total length versus mercury concentration in smallmouth and largemouth bass collected from Union Lake, Oakland County in 2002 (ID 2002100).

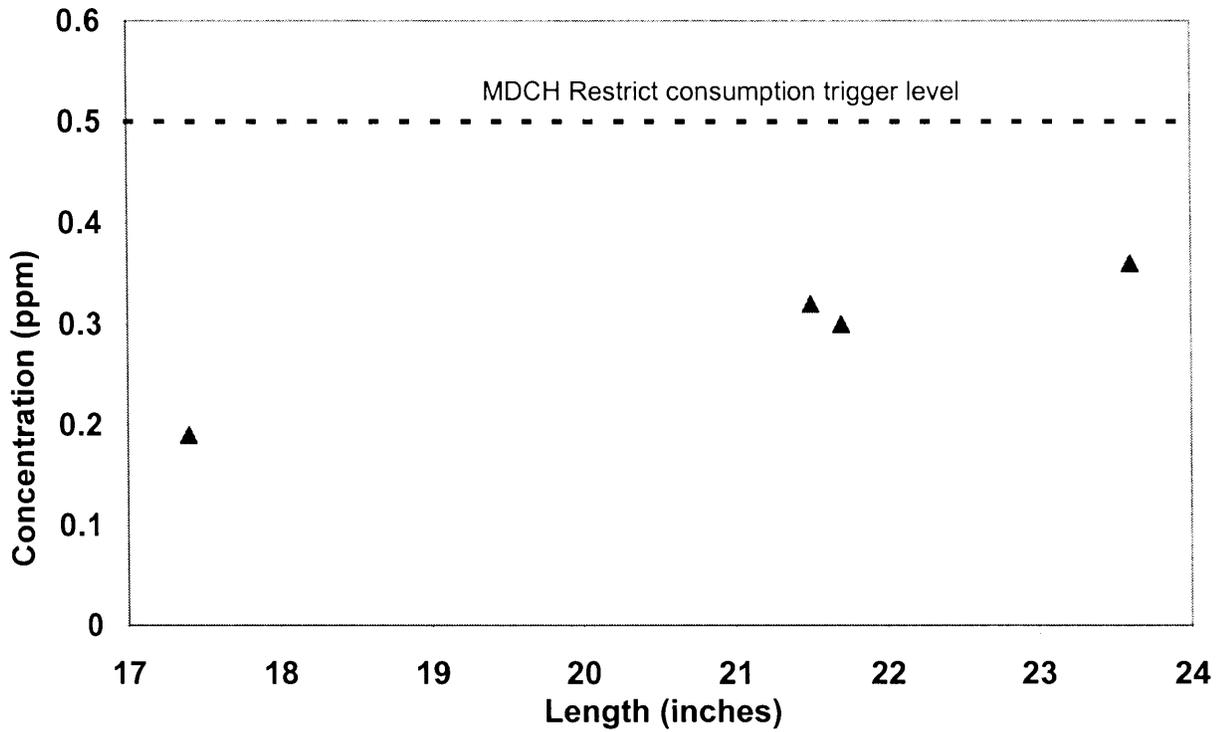


Figure 21. Total length versus mercury concentration in northern pike collected from Au Sable River, Alcona Pond 2003 (ID 2003002).

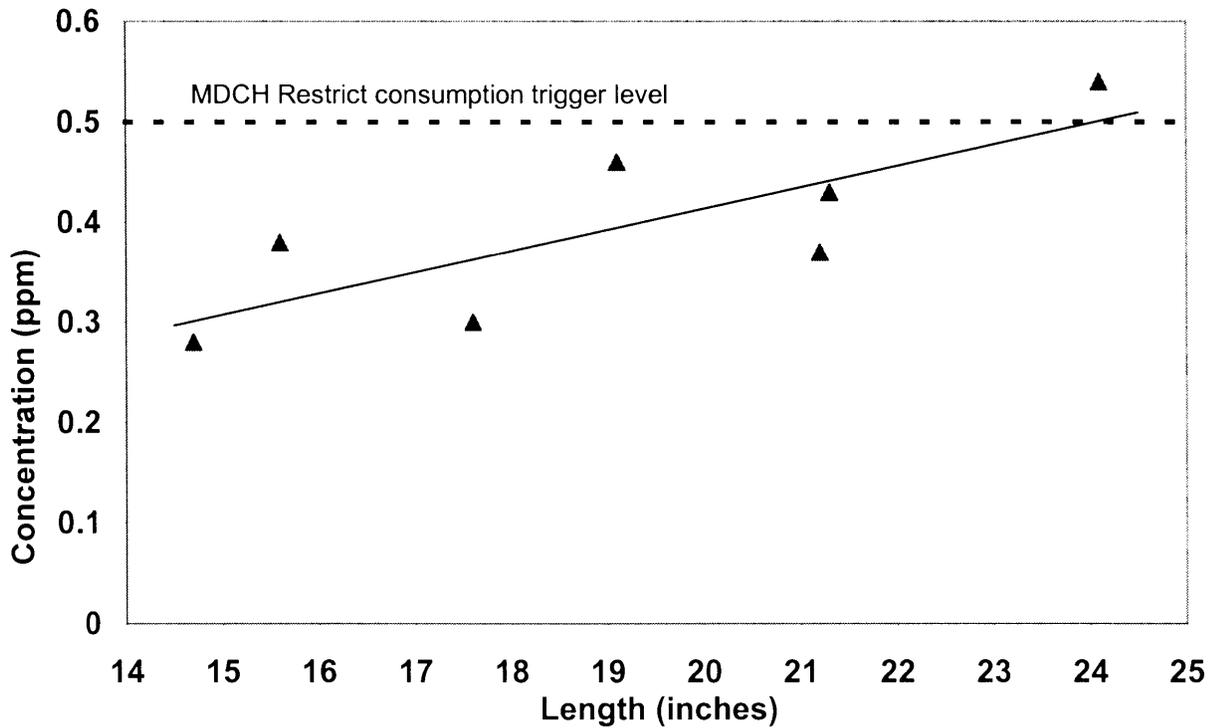


Figure 22. Total length versus mercury concentration in walleye collected from Au Sable River, Alcona Pond 2003 (ID 2003002).

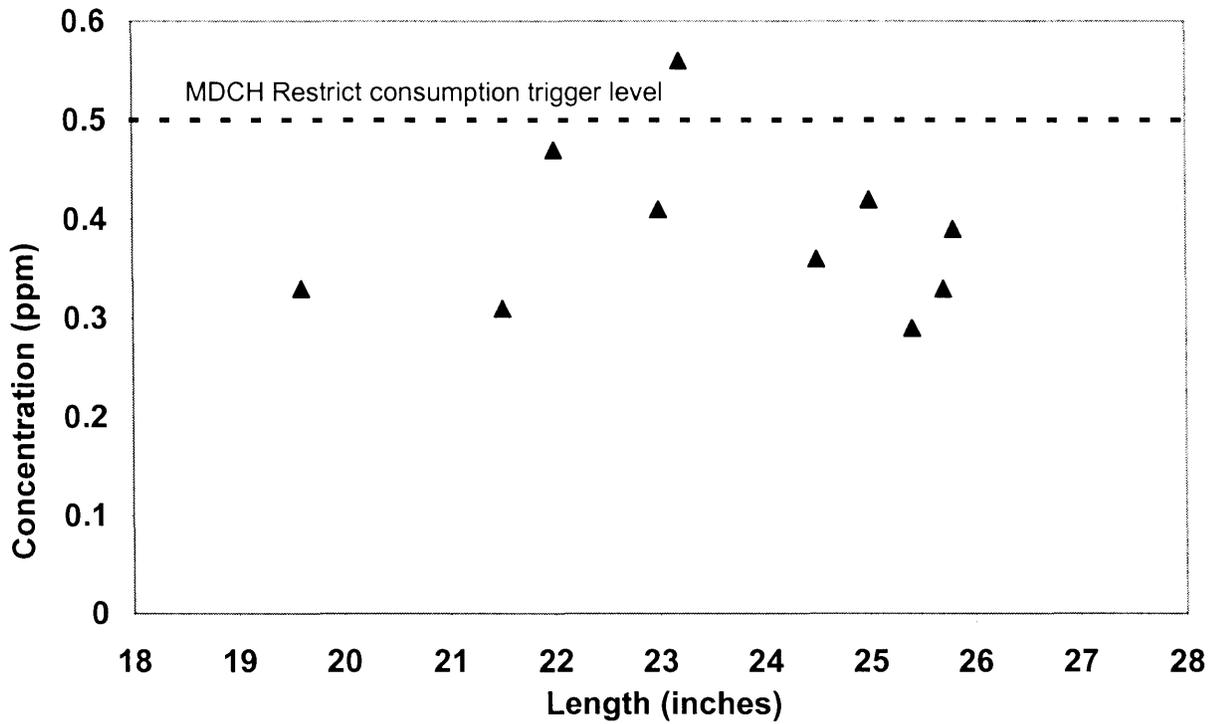


Figure 23. Total length versus mercury concentration in northern pike collected from Ess Lake, Montmorency County in 2003 (ID 2003035)

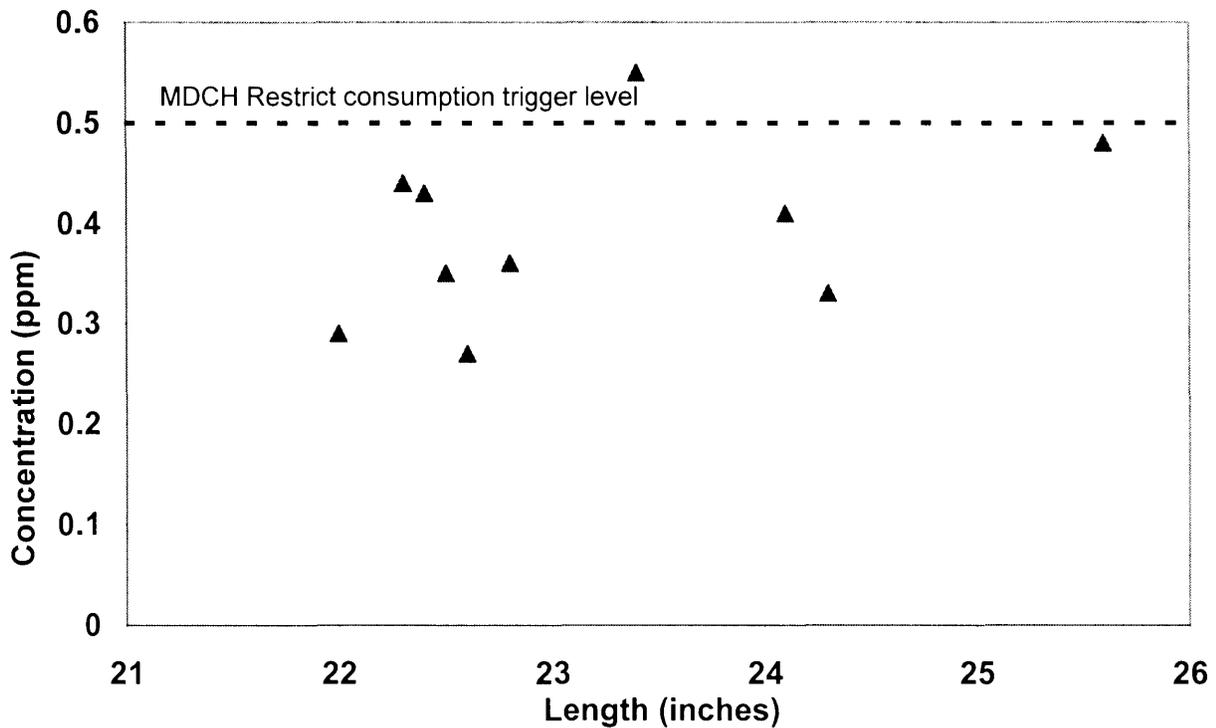


Figure 24. Total length versus mercury concentration in northern pike collected from Gaylanta Lake, Montmorency County in 2003 (ID 2003040).

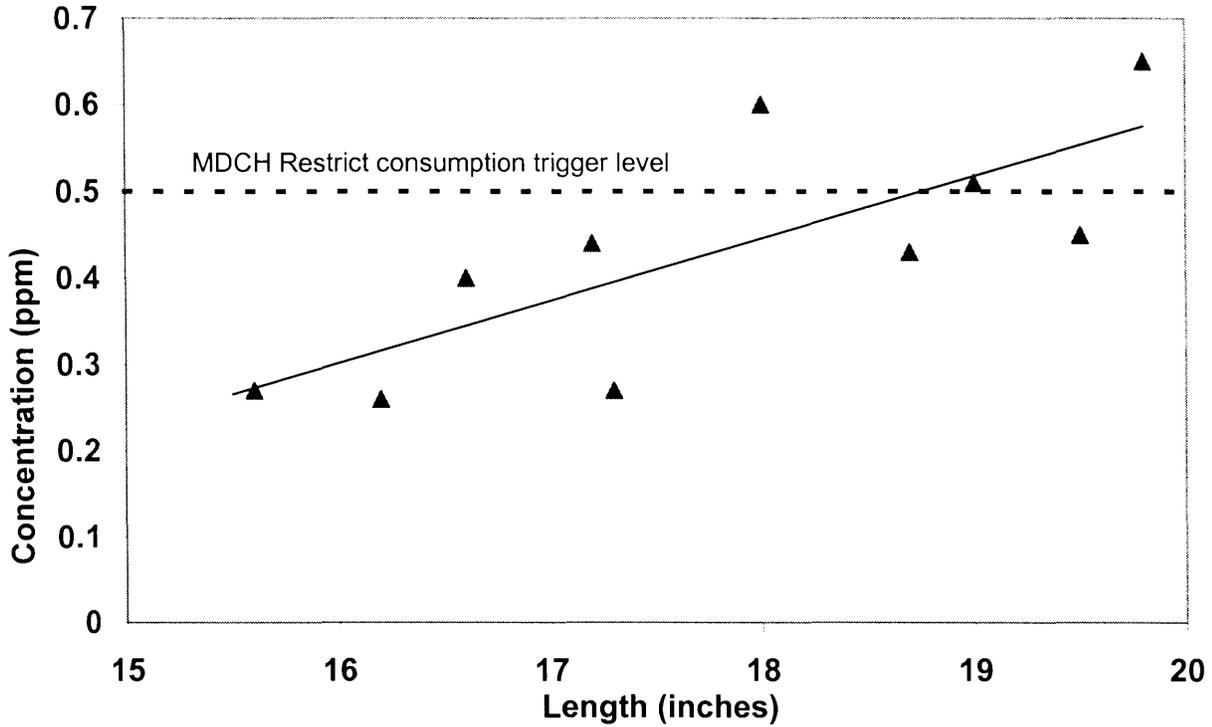


Figure 25. Total length versus mercury concentration in northern pike collected from Lake Emma, Presque Isle County in 2003 (ID 2003050).

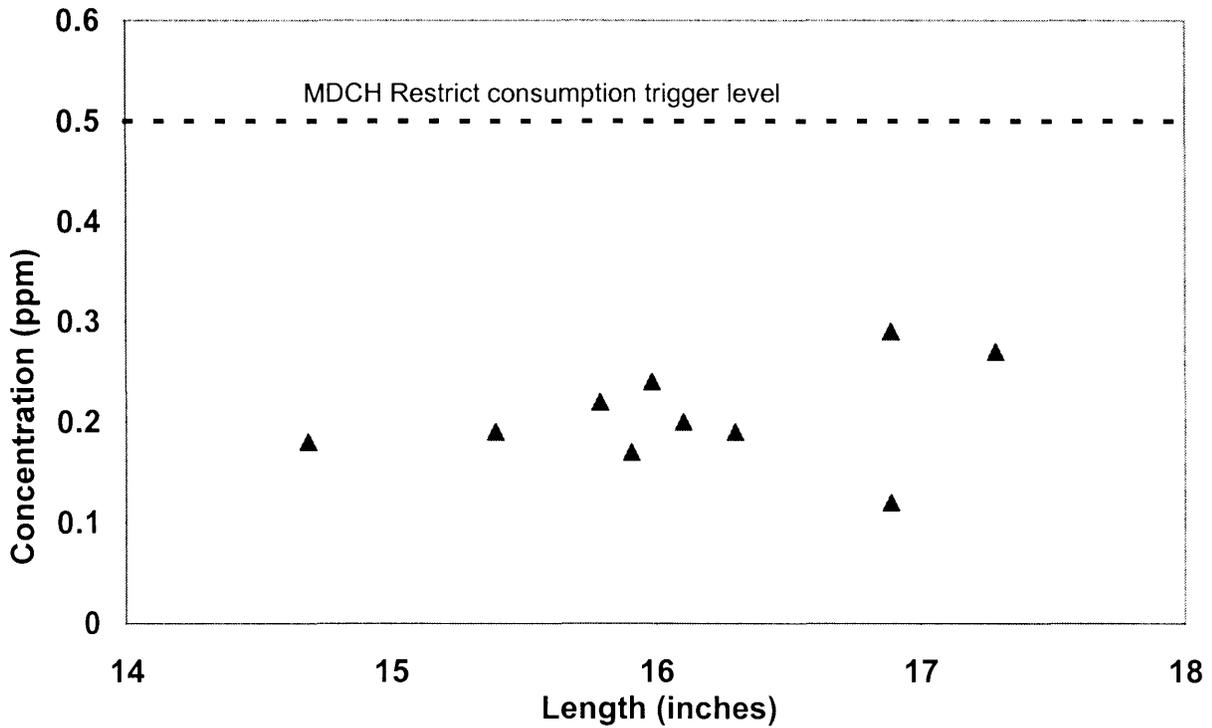


Figure 26. Total length versus mercury concentration in smallmouth bass collected from Lake Esau, Presque Isle County in 2003 (ID 2003052).

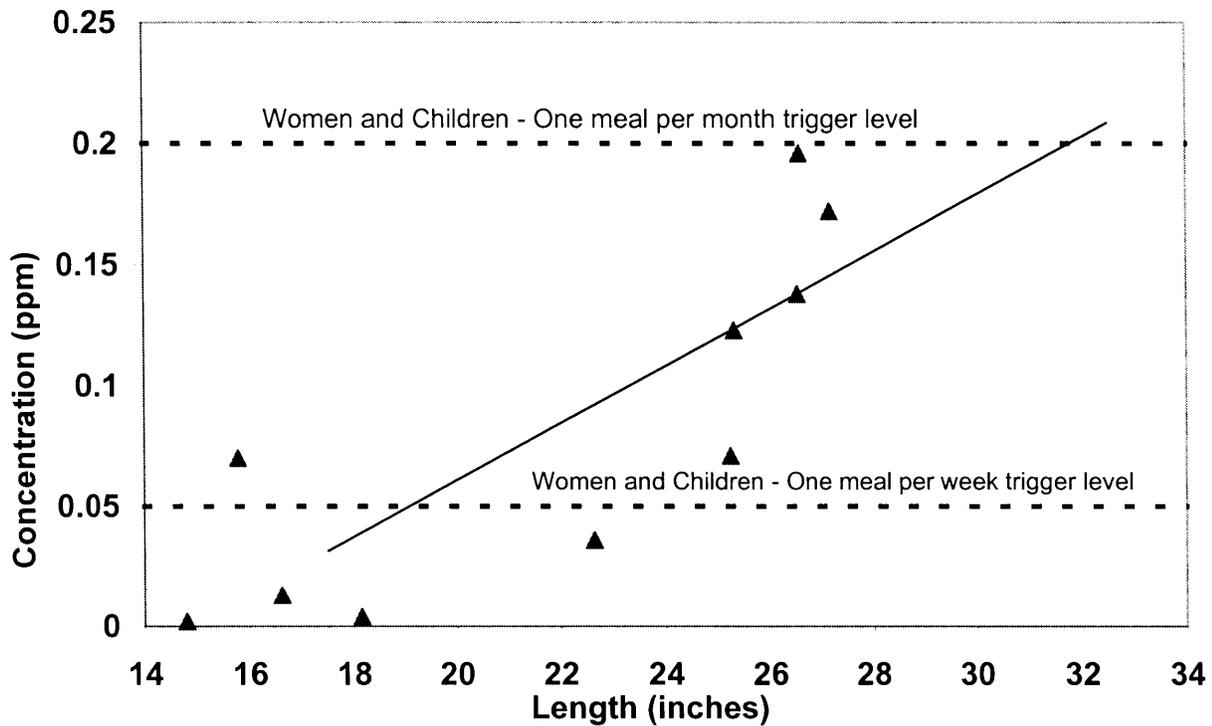


Figure 27. Total length versus total PCB concentration in carp collected from Lobdell Lake, Genesee County in 2003 (ID 2003072).

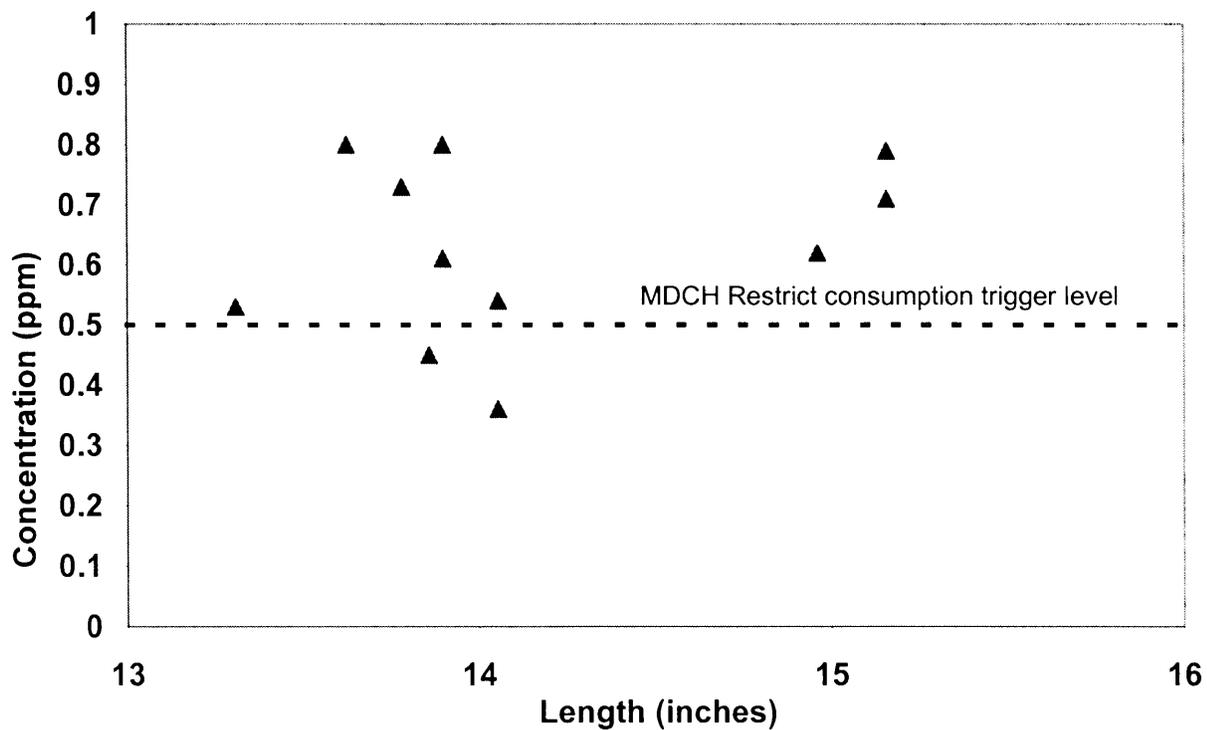


Figure 28. Total length versus mercury concentration in largemouth bass collected from Lobdell Lake, Genesee County in 2003 (ID 2003072).

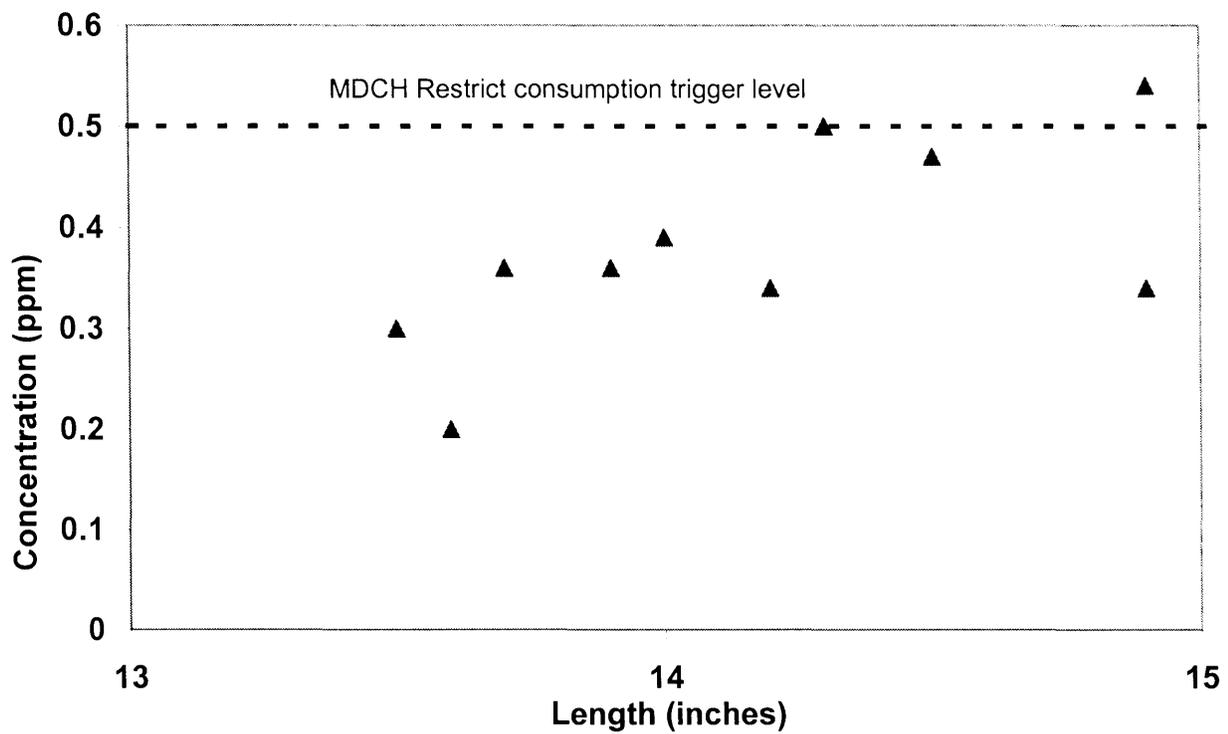


Figure 29. Total length versus mercury concentration in largemouth bass collected from Pratt Lake, Gladwin County in 2003 (ID 2003095).

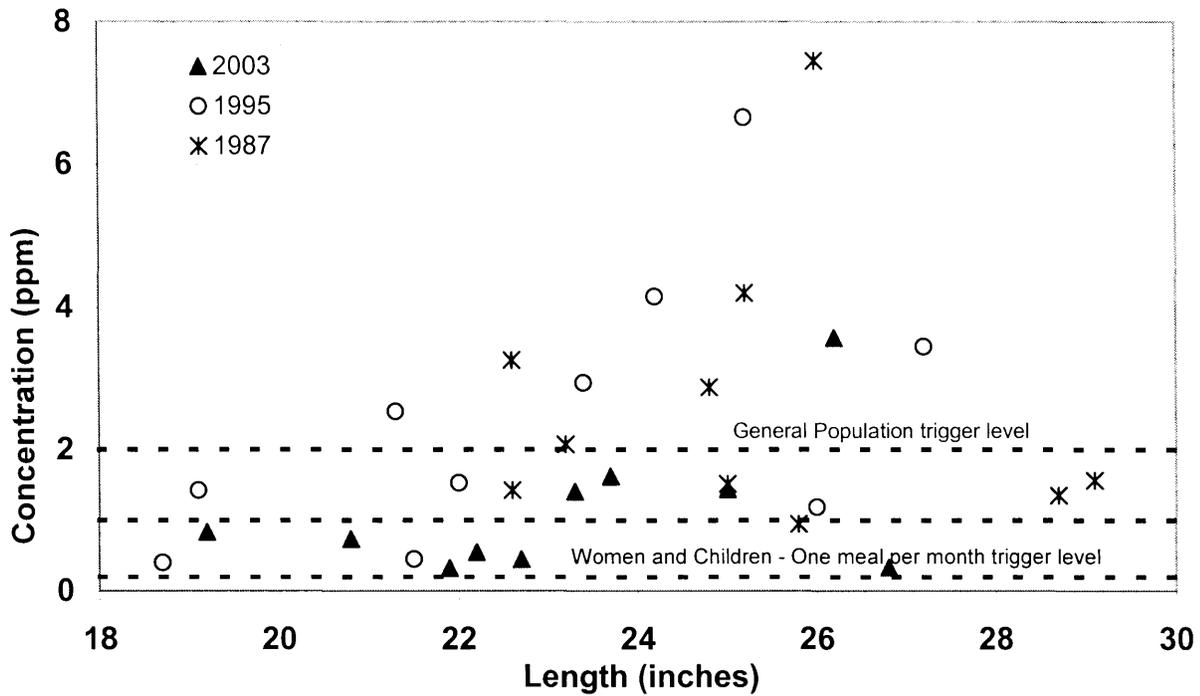


Figure 30. Total length versus total PCB concentration in carp collected from the Shiawassee River between Byron and Owosso, Shiawassee County in 1987 (ID 87066), 1995 (ID 95039), and 2003 (ID 2003109).

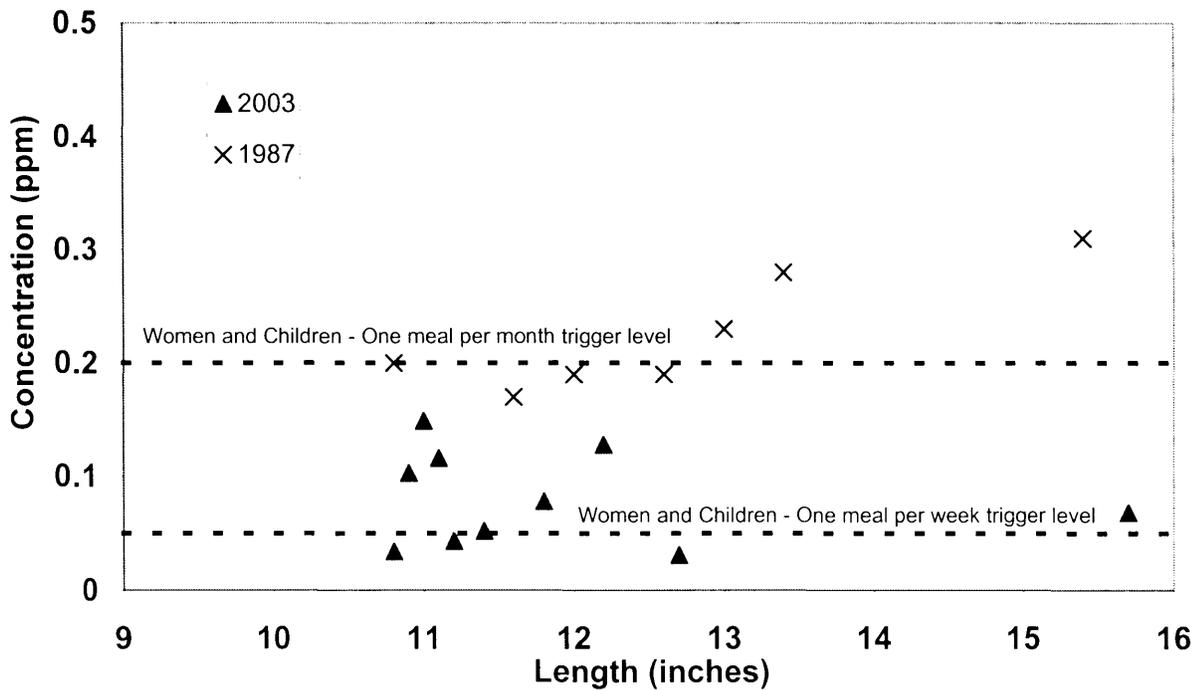


Figure 31. Total length versus total PCB concentration in smallmouth bass collected from the Shiawassee River between Byron and Owosso, Shiawassee County in 1987 (ID 87066) and 2003 (ID 2003109).

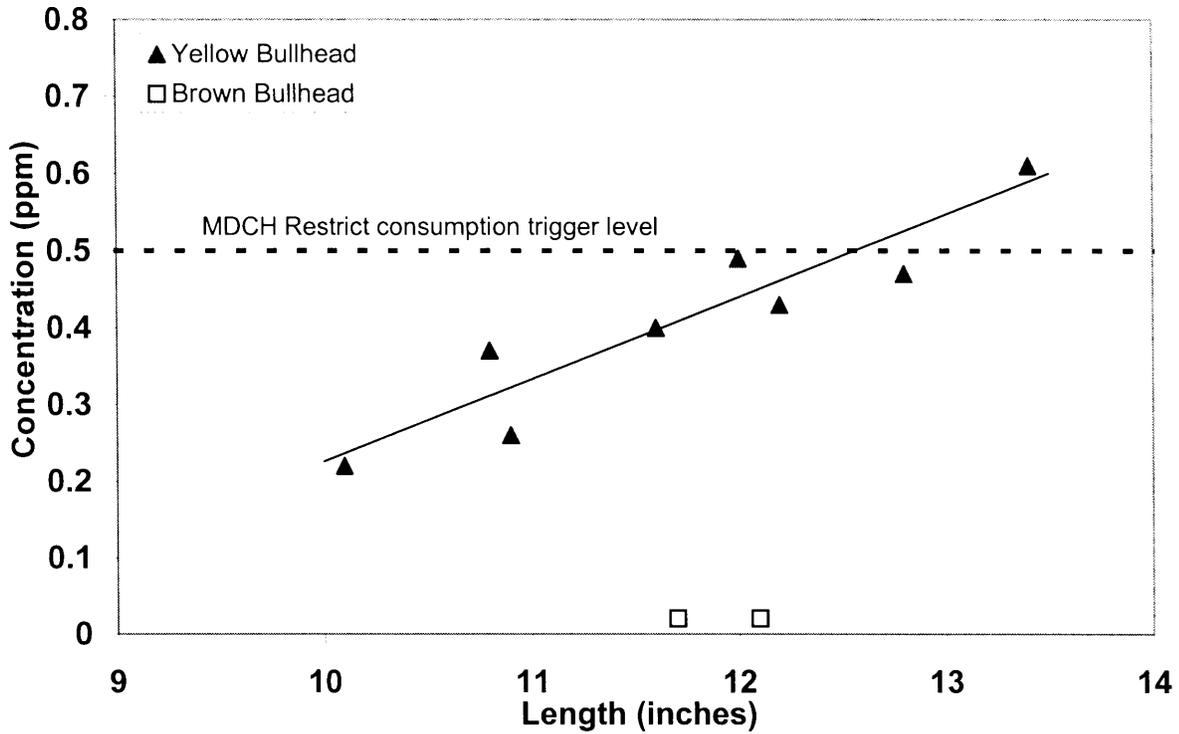


Figure 32. Total length versus mercury concentration in yellow and brown bullhead collected from Stevenson Lake, Isabella County in 2002 (ID 2002096).

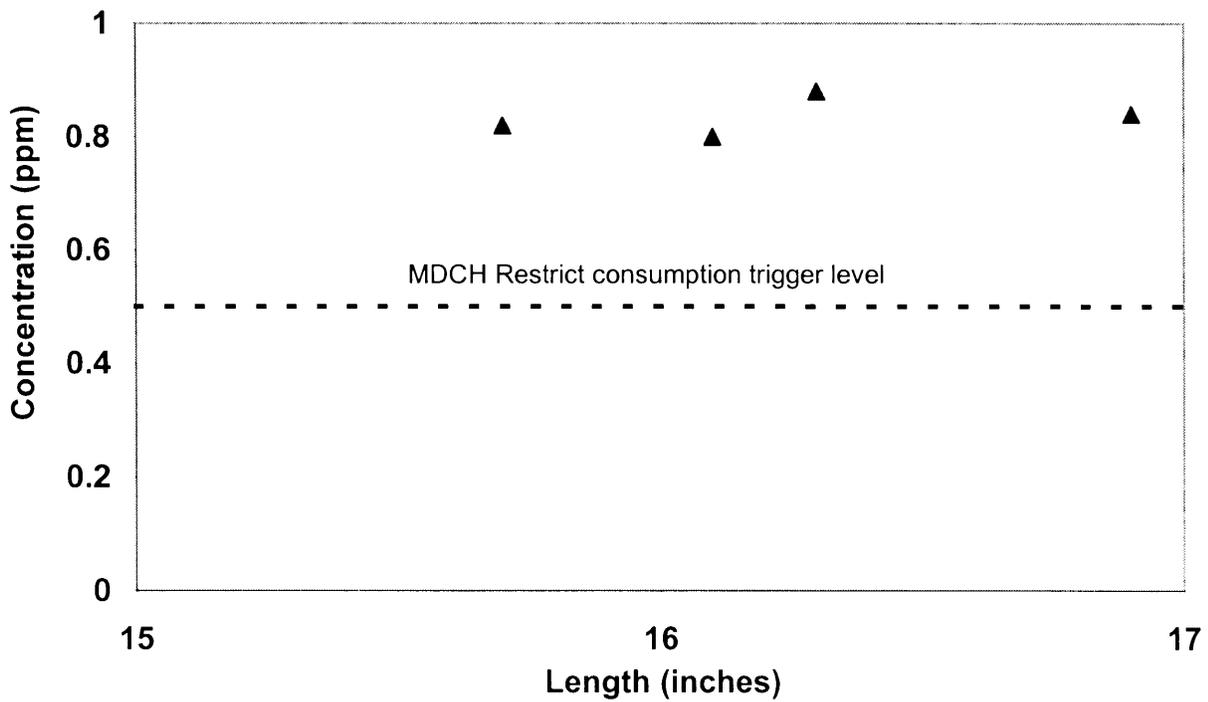


Figure 33. Total length versus mercury concentration in largemouth bass collected from Stevenson Lake, Isabella County in 2002 (ID 2002096).

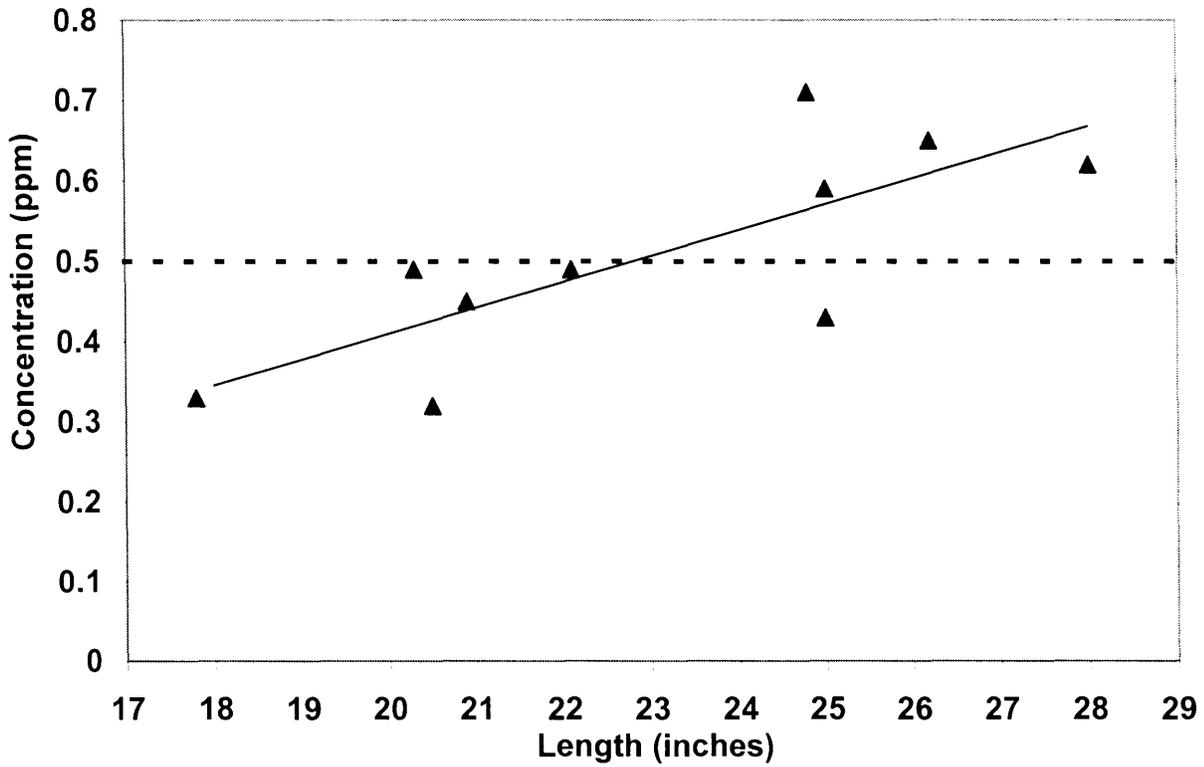


Figure 34. Total length versus mercury concentration in northern pike collected from Stevenson Lake, Isabella County in 2002 (ID 2002096).

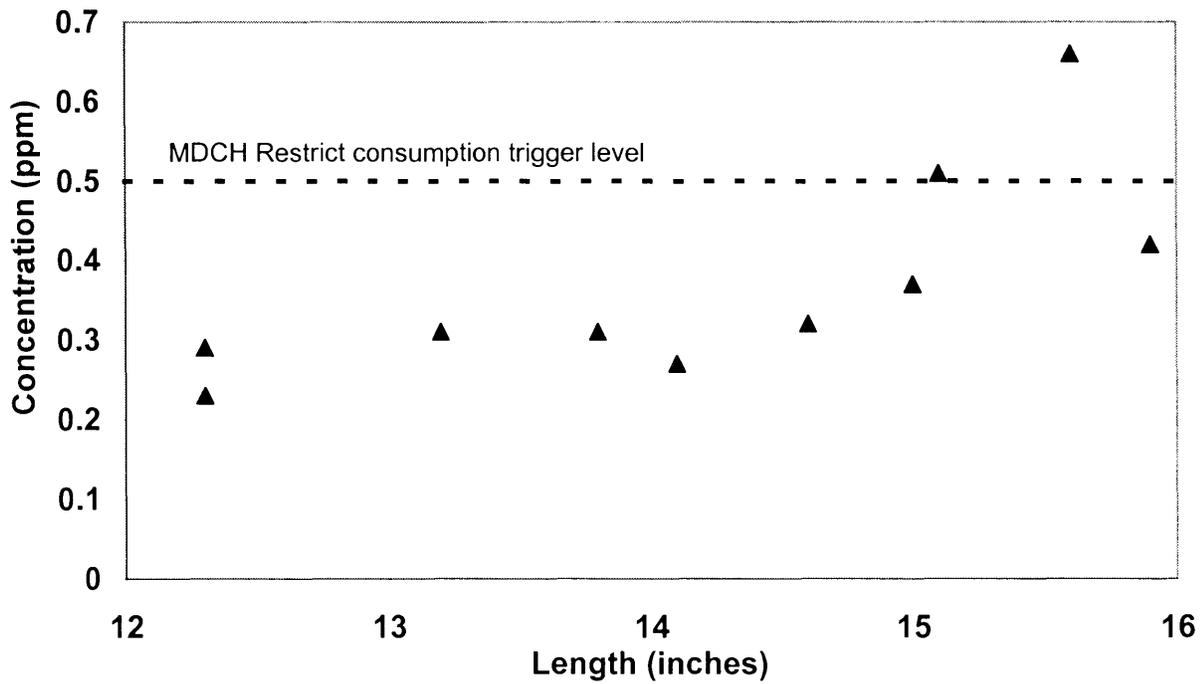


Figure 35. Total length versus mercury concentration in largemouth bass collected from the Thunder Bay River, Seven Mile Pond in 2002 (ID 2002097).

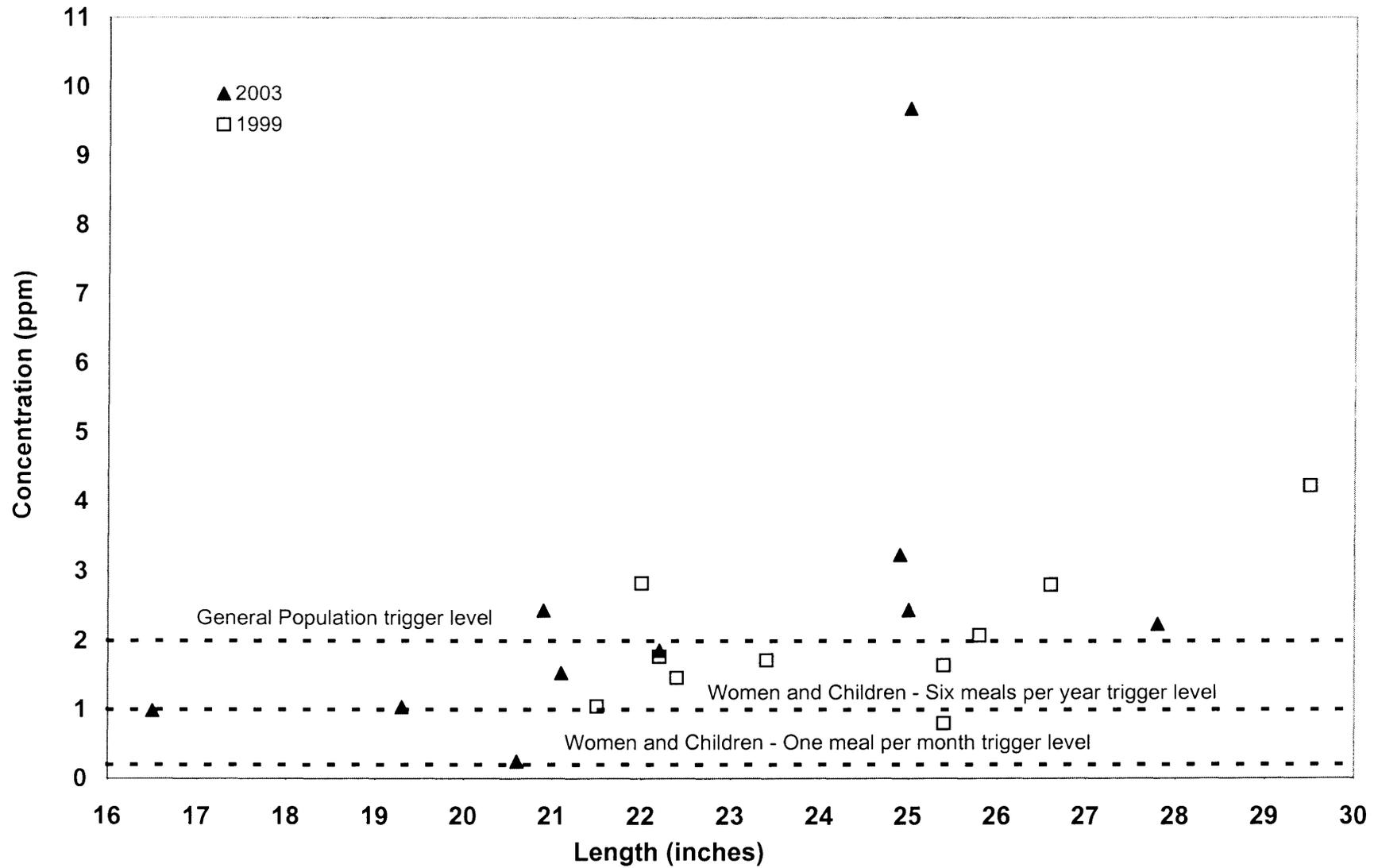


Figure 36. Total length versus total PCB concentration in carp collected from the Tittabawassee River, Midland County in 1999 (ID 1999066) and 2003 (ID 2003132).

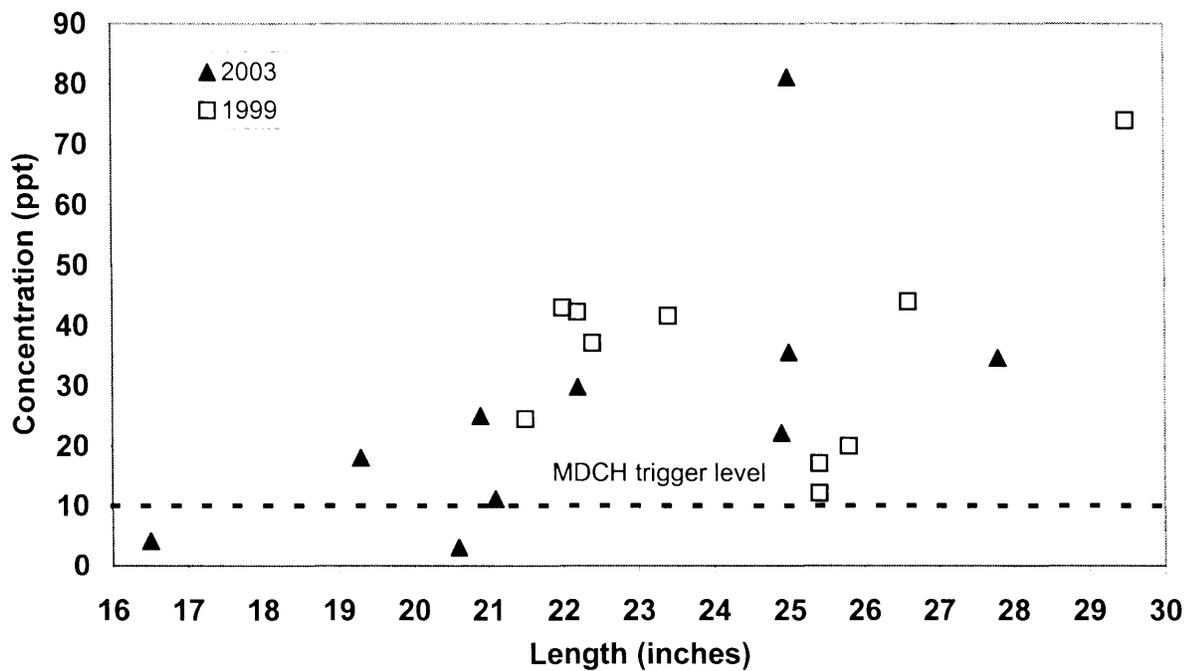


Figure 37. Total length versus dioxin TEQ concentration in carp collected from the Tittabawassee River, Midland County in 1999 (ID 1999066) and 2003 (ID 2003132).

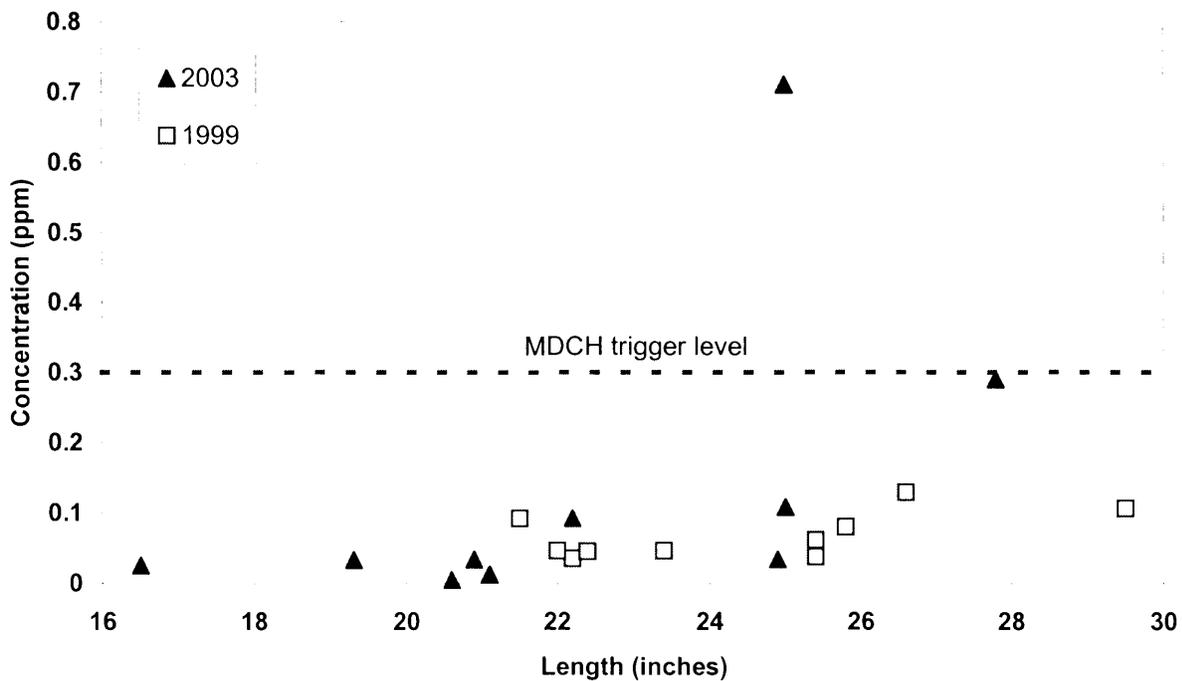


Figure 38. Total length versus total chlordane concentration in carp collected from the Tittabawassee River, Midland County in 1992 (ID 92064), 1999 (ID 1999066), and 2003 (ID 2003132).

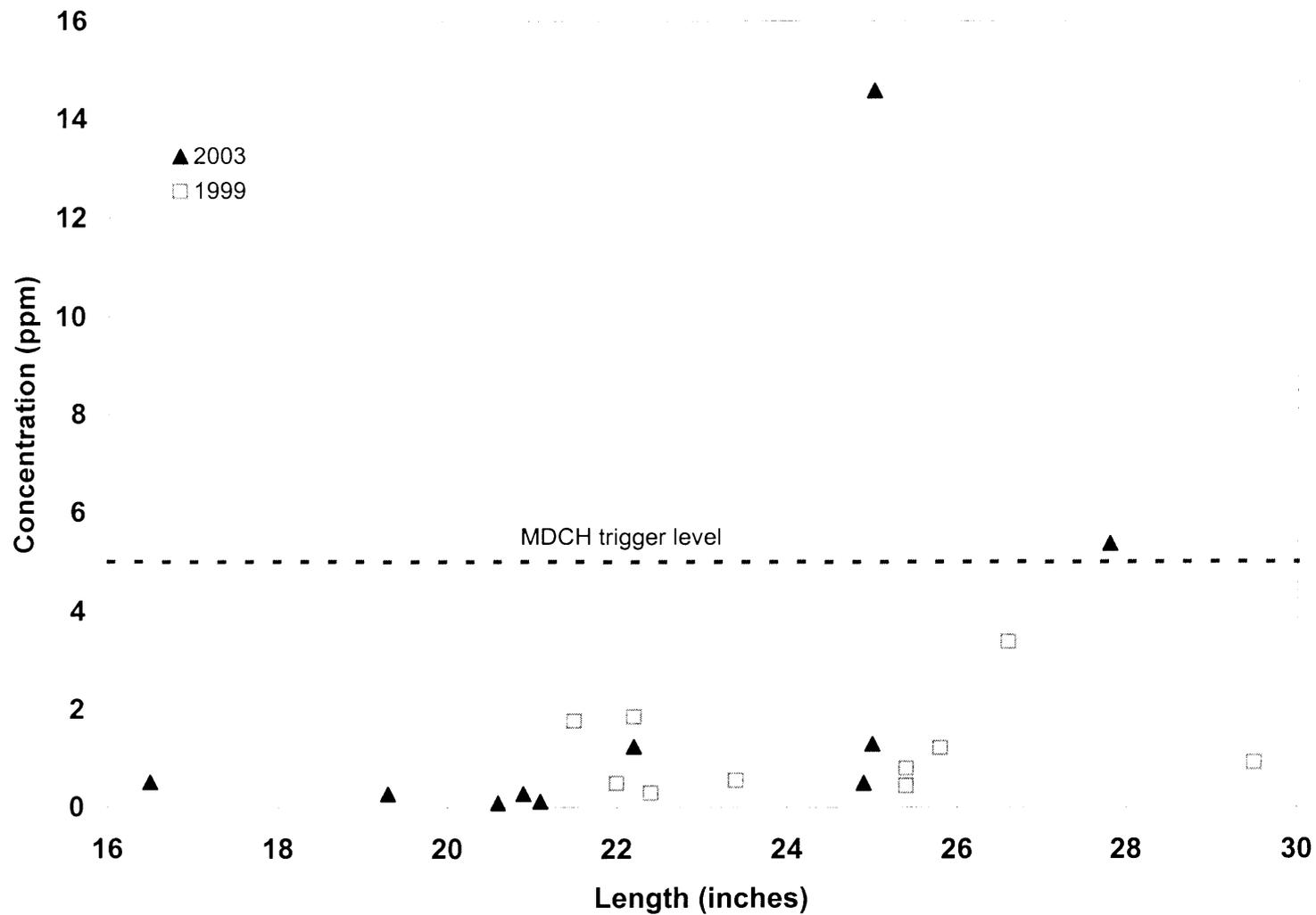


Figure 39. Total length versus total DDT concentration in carp collected from the Tittabawasse River, Midland County in 1999 (ID 1999066) and 2003 (ID 2003132).

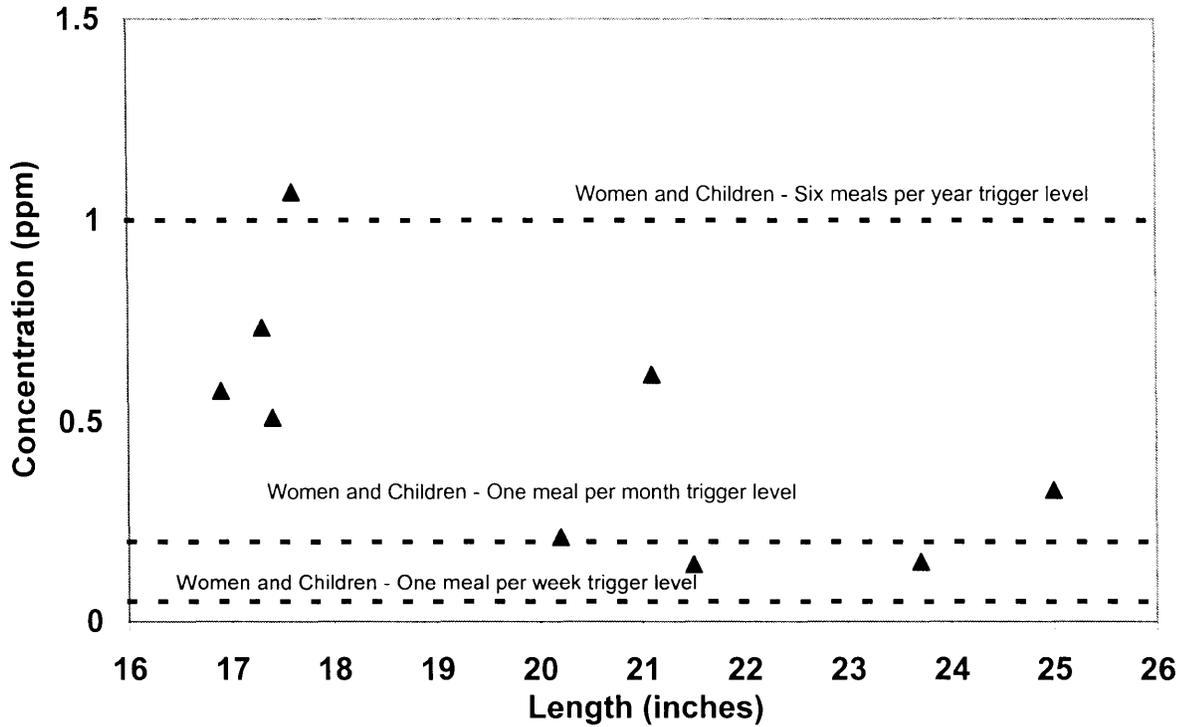


Figure 40. Total length versus total PCB concentration in channel catfish collected from the Tittabawassee River, Midland County in 2003 (ID 2003132).

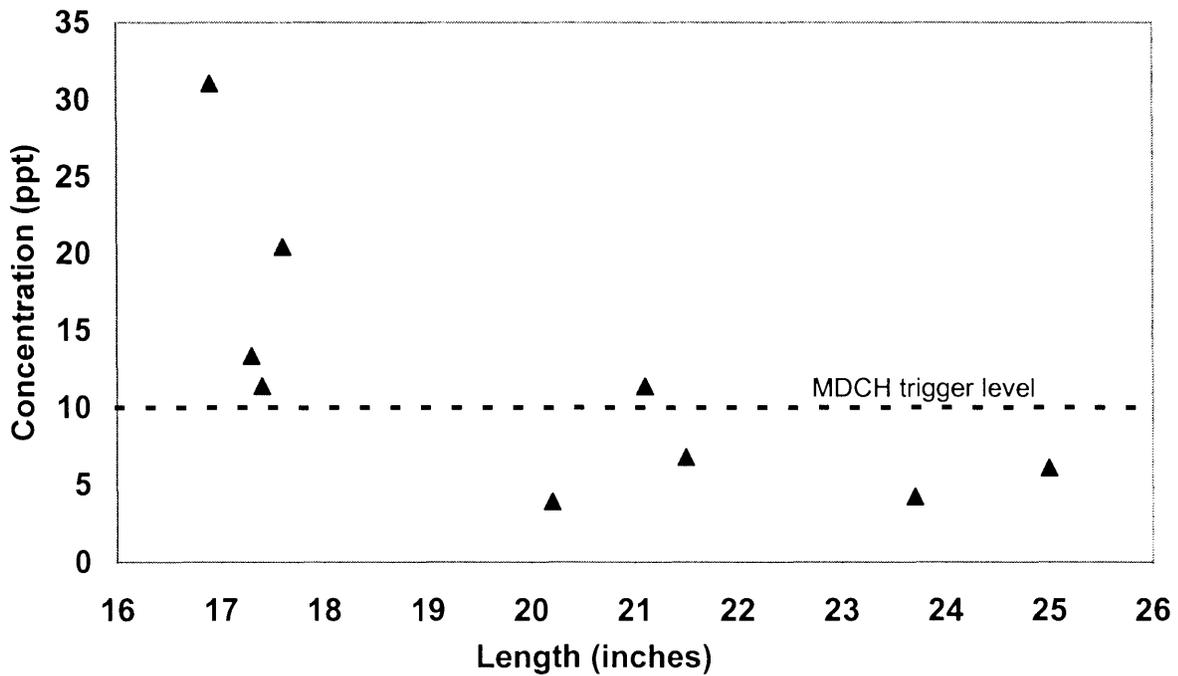


Figure 41. Total length versus dioxin TEQ concentration in channel catfish collected from the Tittabawassee River, Midland County in 2003 (ID 2003132).

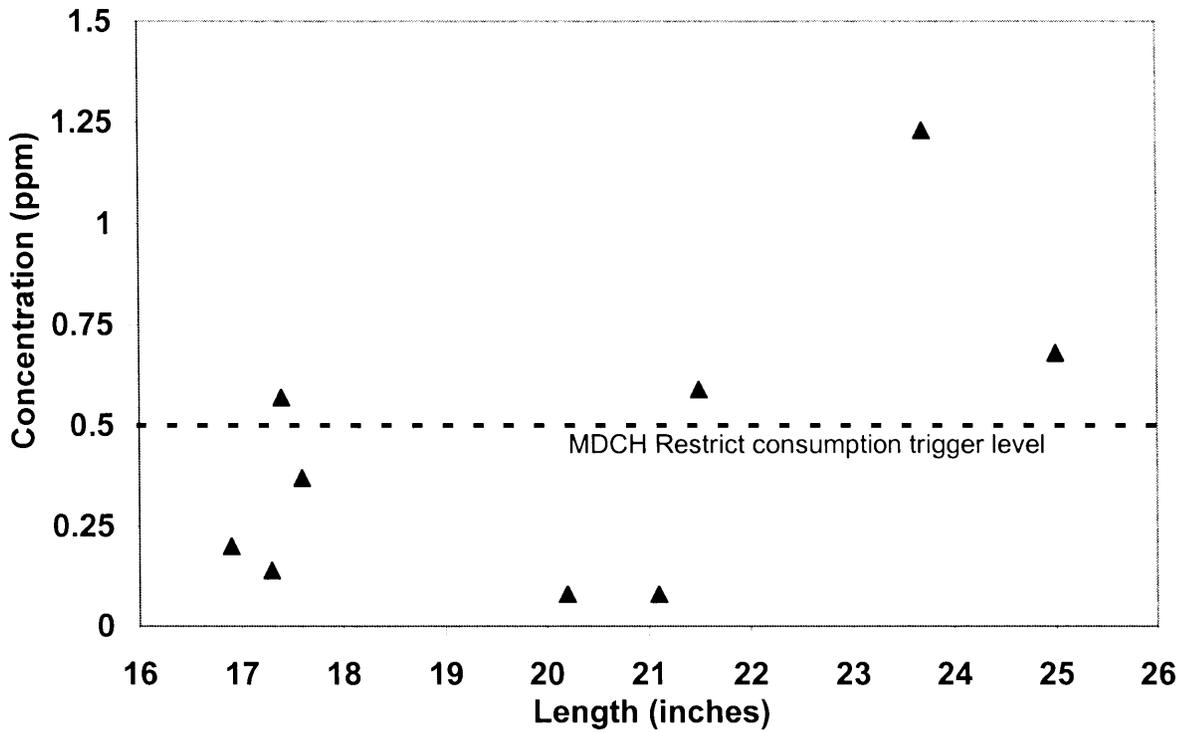


Figure 42. Total length versus mercury concentration in channel catfish collected from the Tittabawassee River, Midland County in 2003 (ID 2003132).

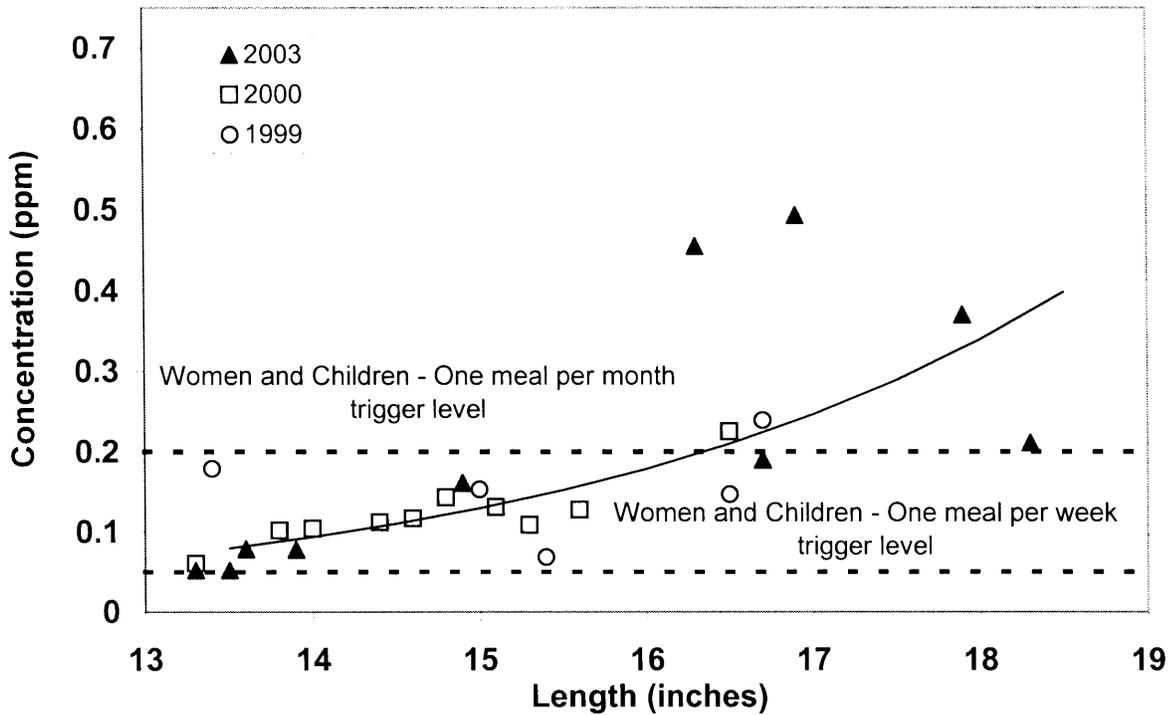


Figure 43. Total length versus total PCB concentration in smallmouth bass collected from the Tittabawassee River, Midland County in 1999 (ID 1999066), 2000 (ID 2000093) and 2003 (ID 2003132).

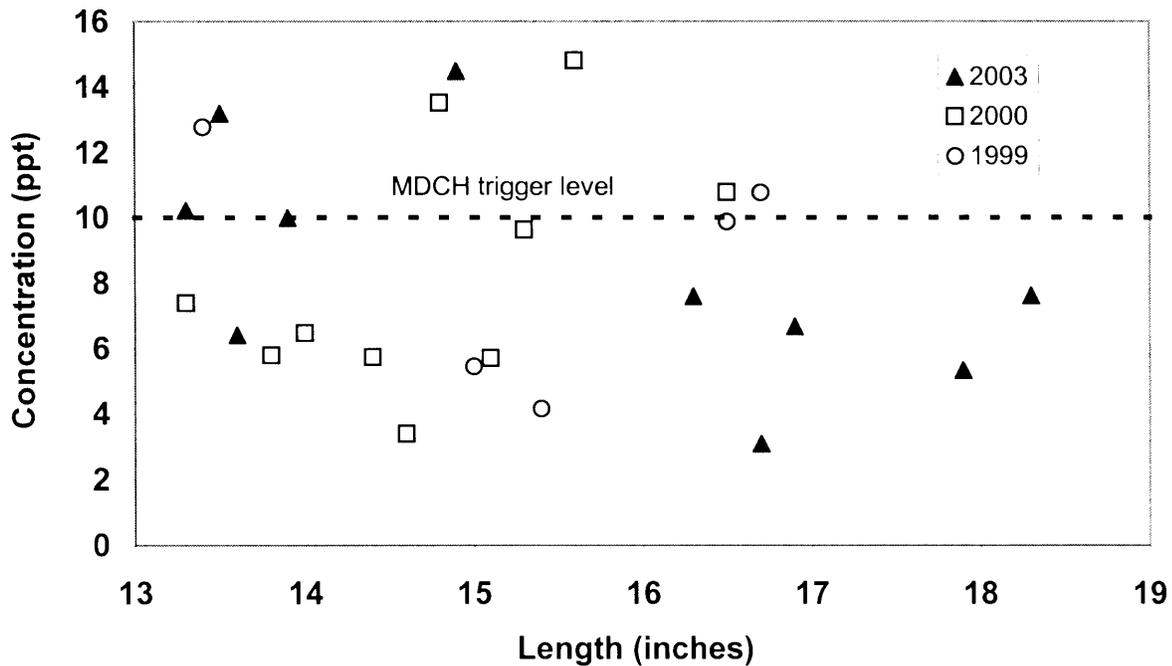


Figure 44. Total length versus dioxin TEQ concentration in smallmouth bass collected from the Tittabawassee River, Midland County in 1999 (ID 1999066), 2000 (ID 2000093) and 2003 (ID 2003132).

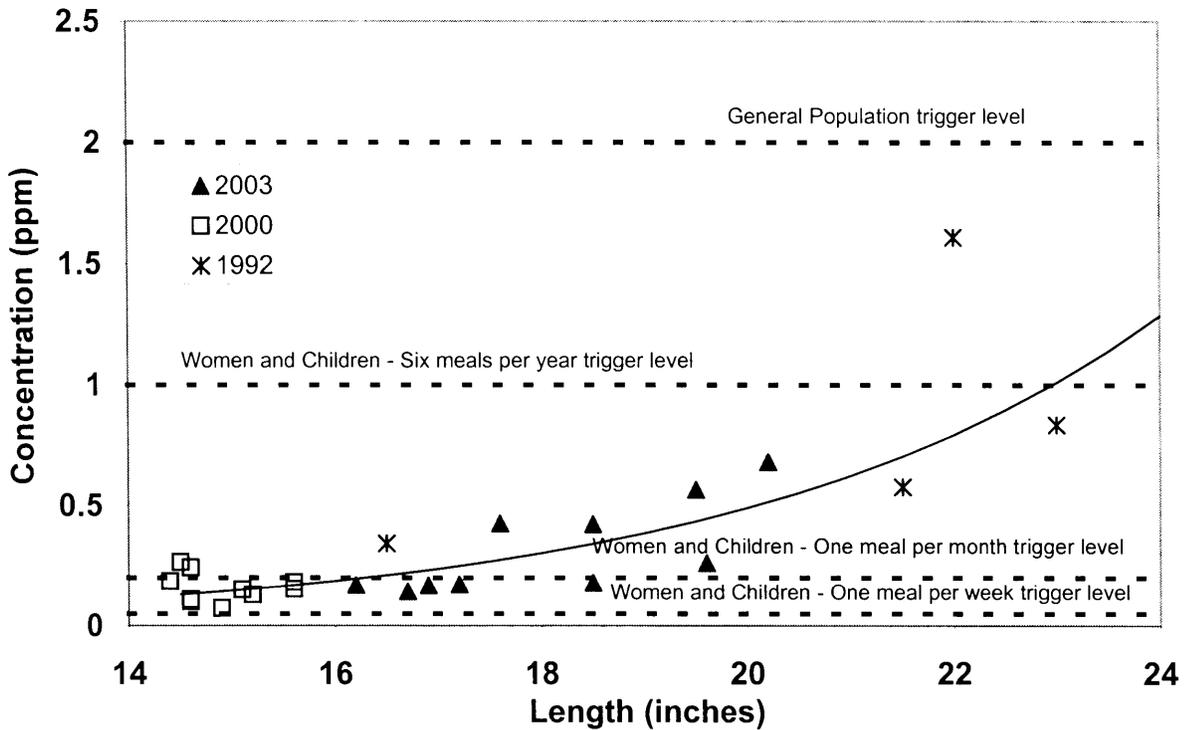


Figure 45. Total length versus total PCB concentration in walleye collected from the Tittabawassee River, Midland County in 1992 (ID 92064), 2000 (ID 2000093), and 2003 (ID 2003132).

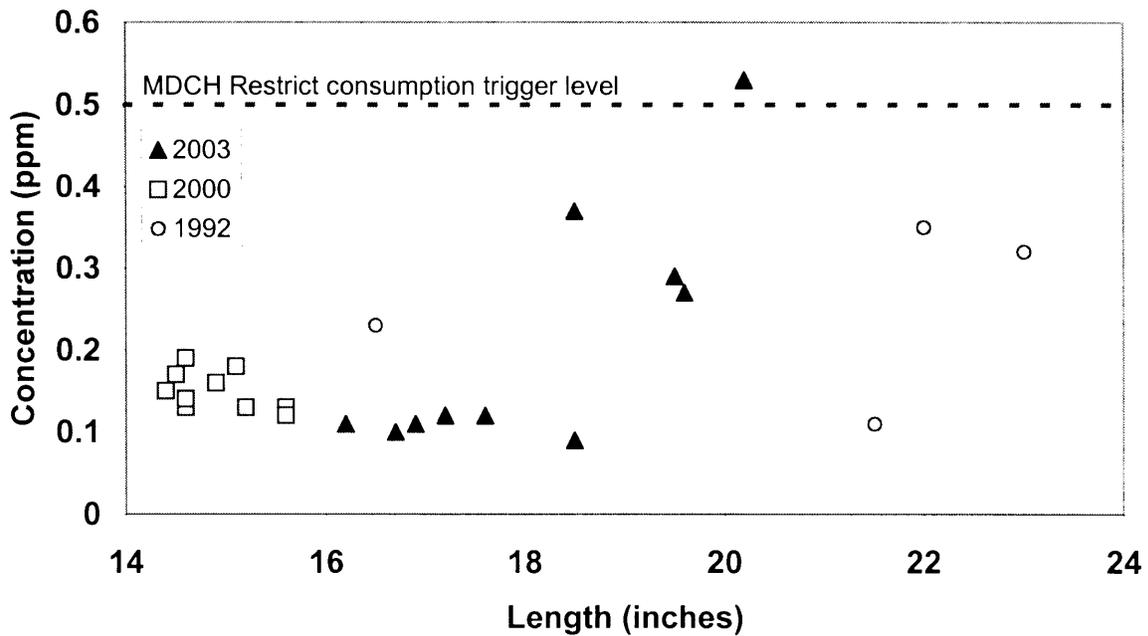


Figure 46. Total length versus mercury concentration in walleye from the Tittabawassee River, Midland County in 1992 (ID 92064), 2000 (ID 2000093), and 2003 (ID 2003132).

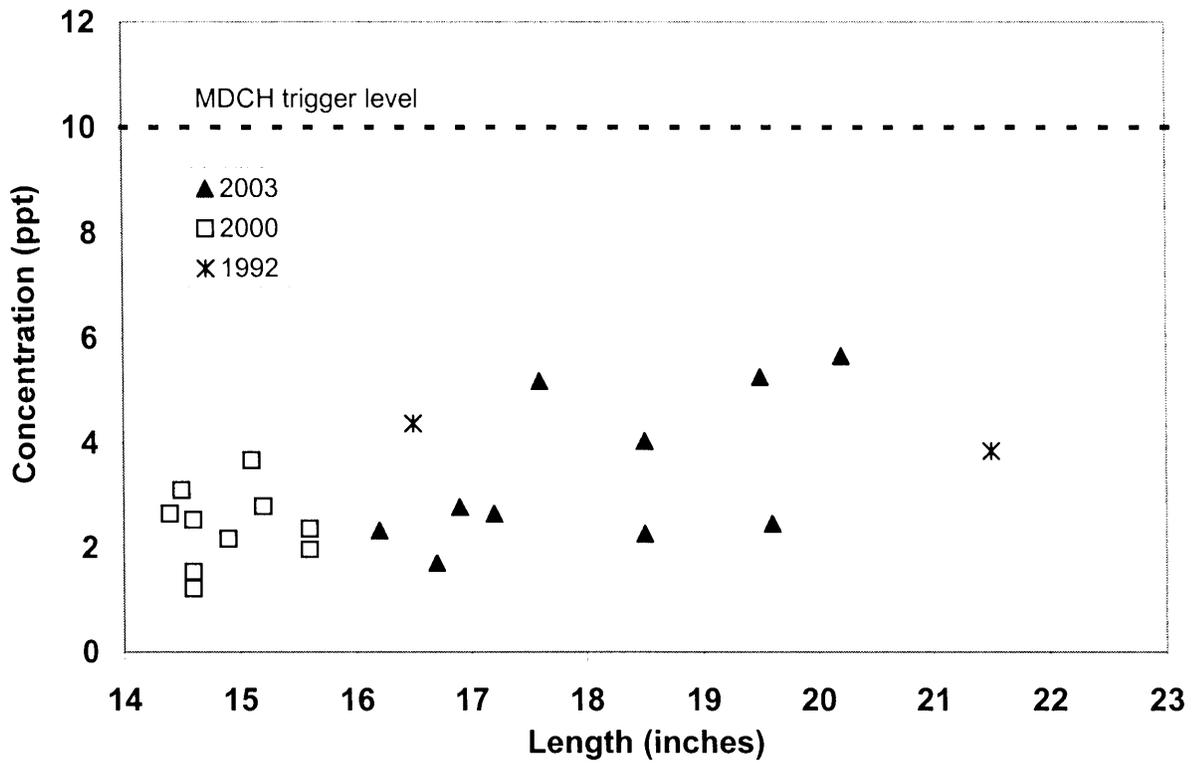


Figure 47. Total length versus dioxin TEQ concentration in walleye collected from the Tittabawassee River, Midland County in 1992 (ID 92064), 2000 (ID 2000093), and 2003 (ID 2003132).

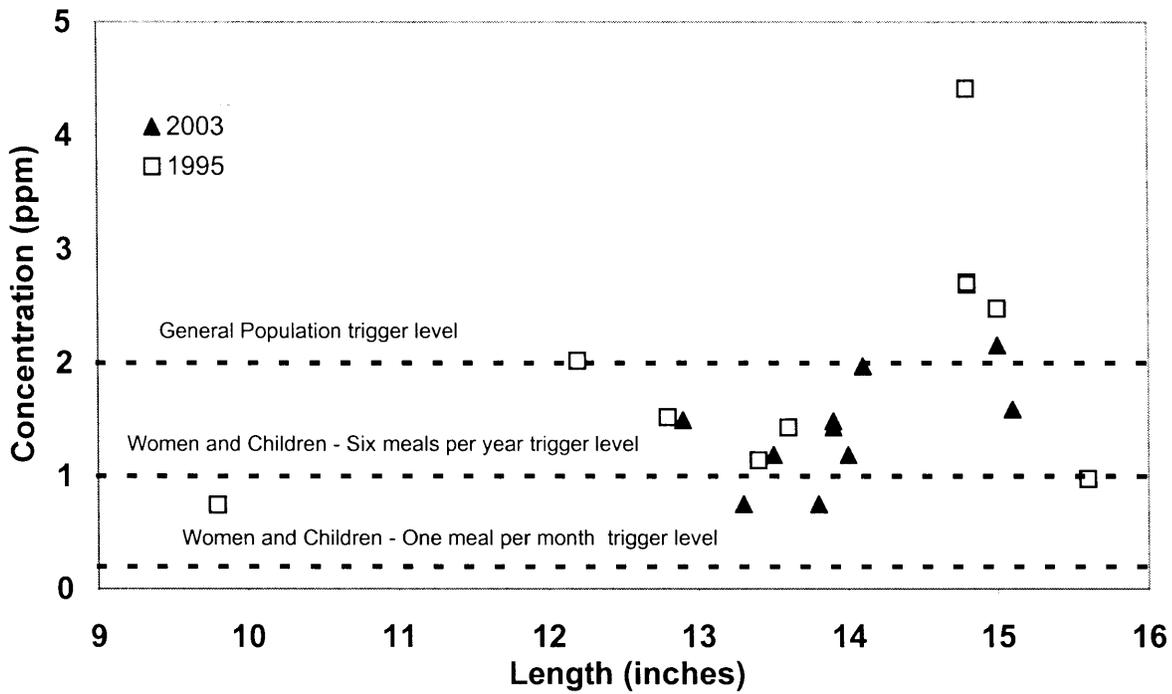


Figure 48. Total length versus total PCB concentration in white bass collected from the Tittabawassee River, Midland County in 1995 (ID 95013) and 2003 (ID 2003132).

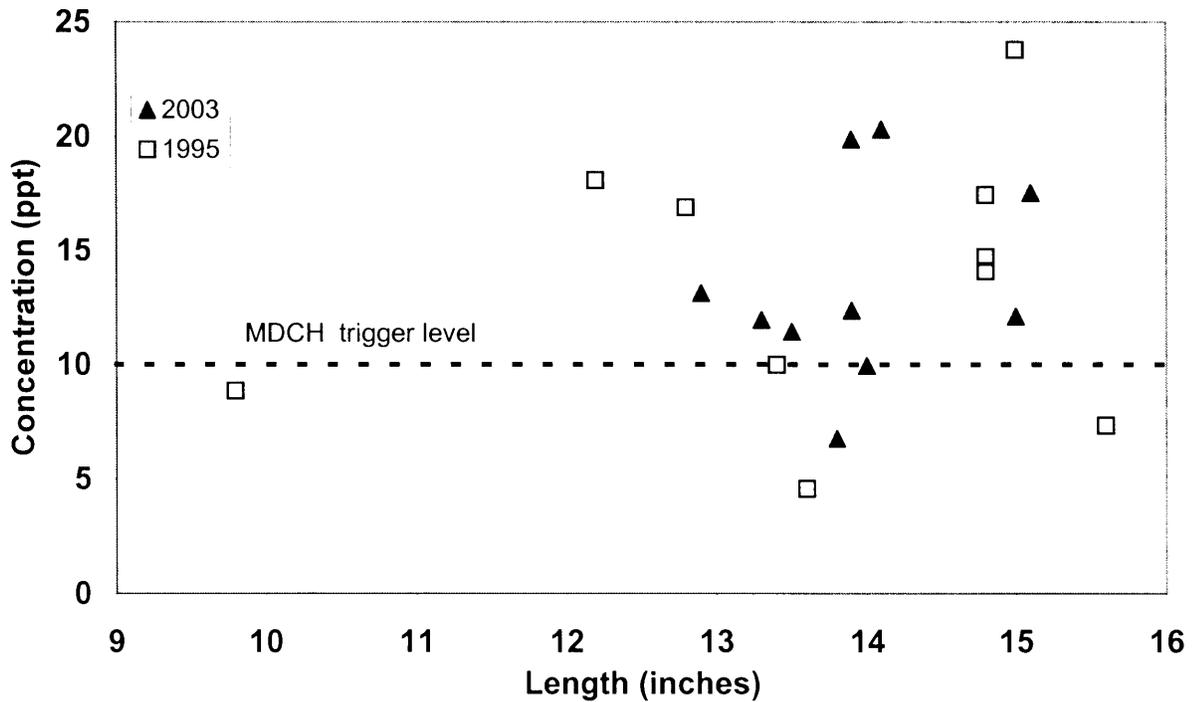


Figure 49. Total length versus dioxin TEQ concentration in white bass collected from the Tittabawassee River, Midland County in 1995 (ID 95013) and 2003 (ID 2003132).

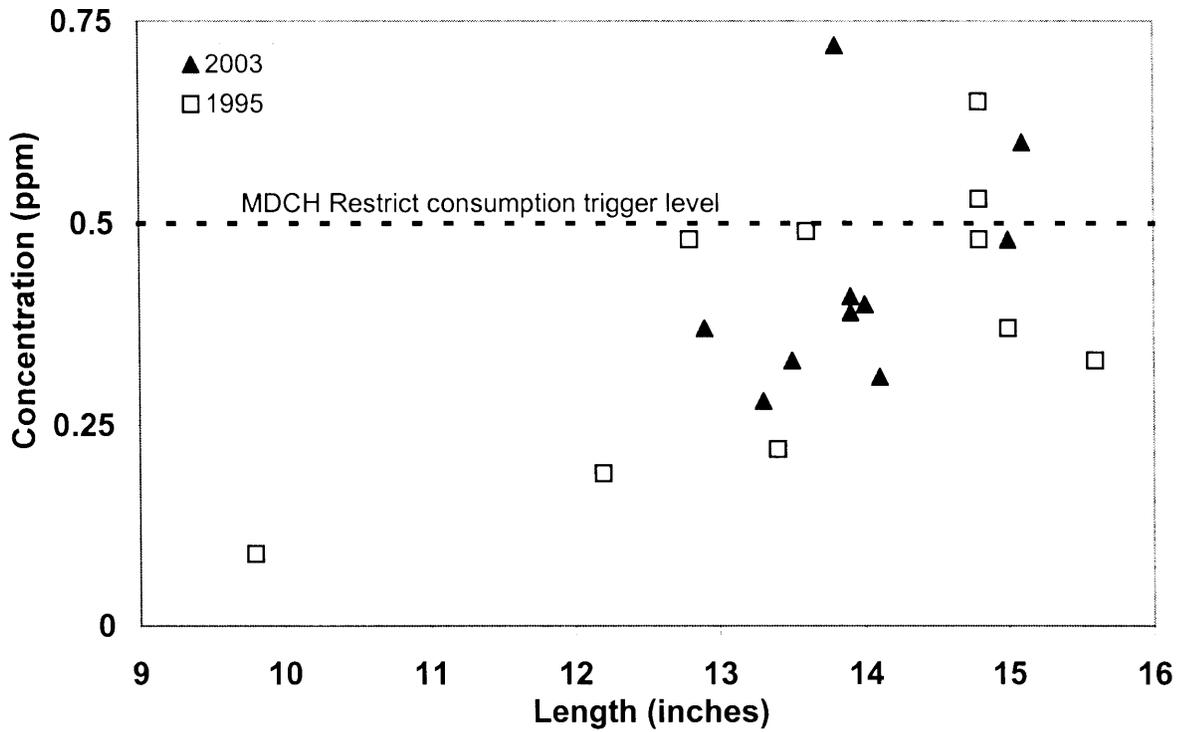


Figure 50. Total length versus mercury concentration in white bass collected from the Tittabawassee River, Midland County in 1995 (ID 95013) and 2003 (ID 2003132).

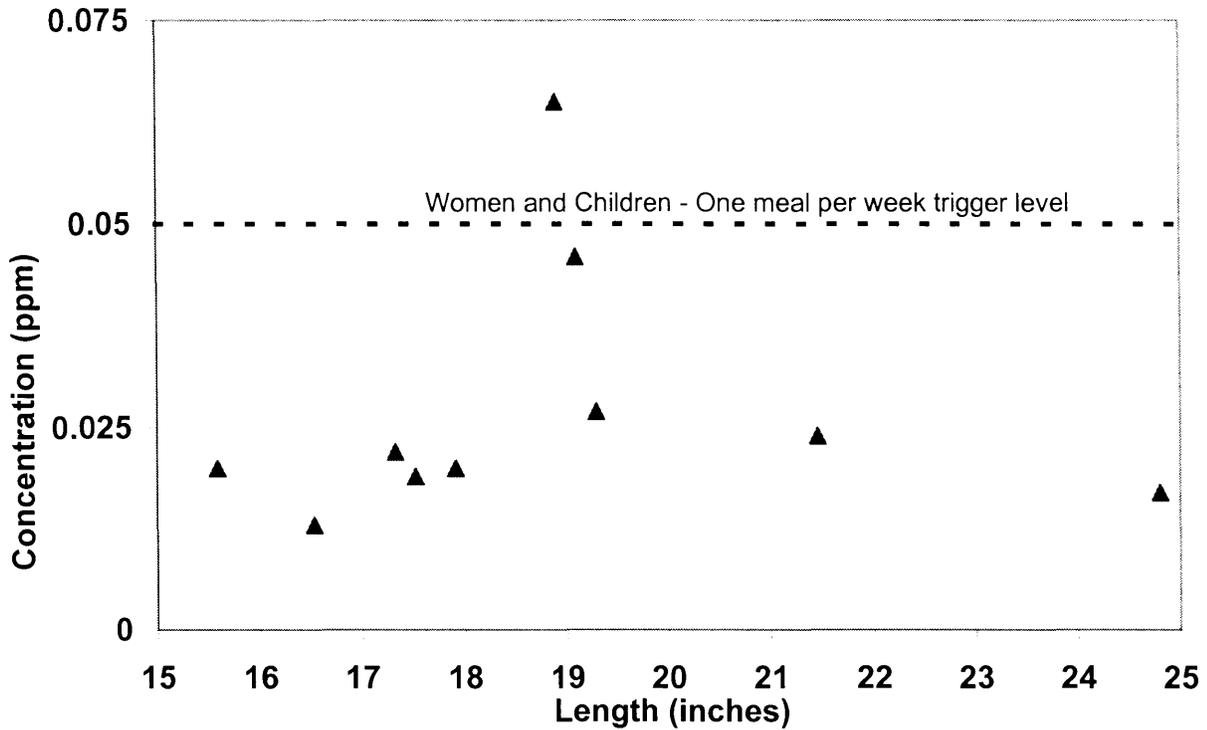


Figure 51. Total length versus total PCB concentration in channel catfish collected from Wixom Lake in 2002 (ID 2002102).

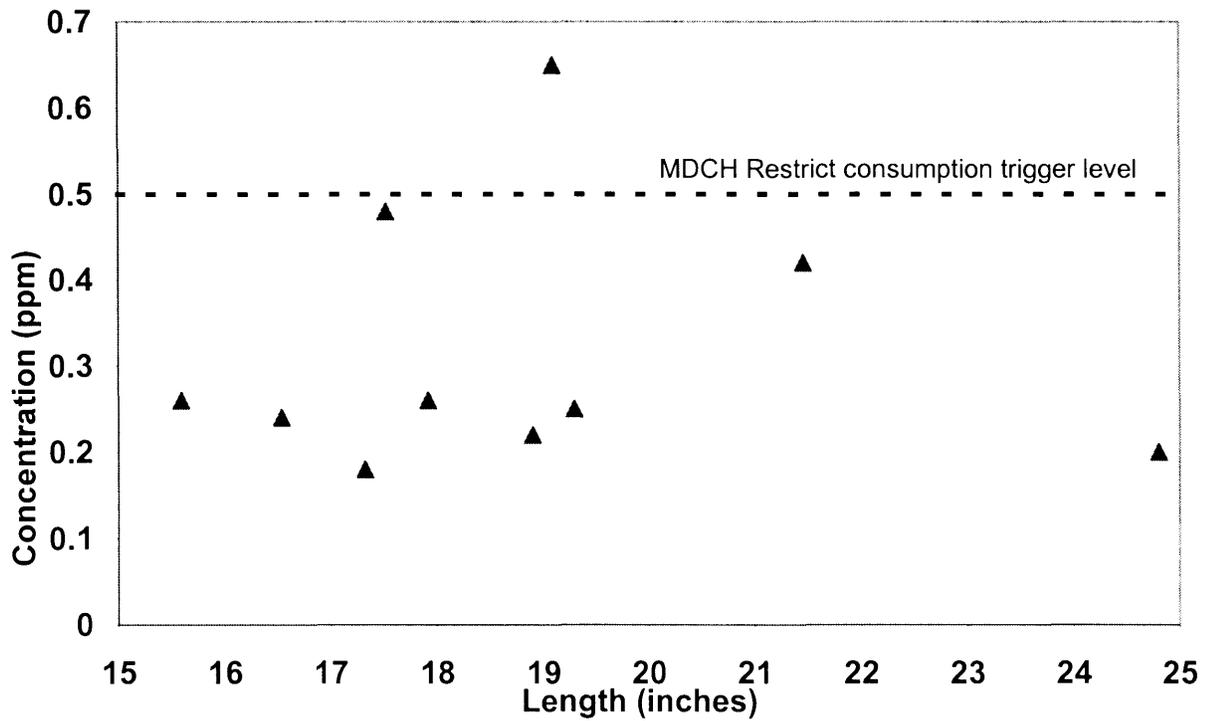


Figure 52. Total length versus mercury concentration in channel catfish collected from Wixom Lake in 2002 (ID 2002102).

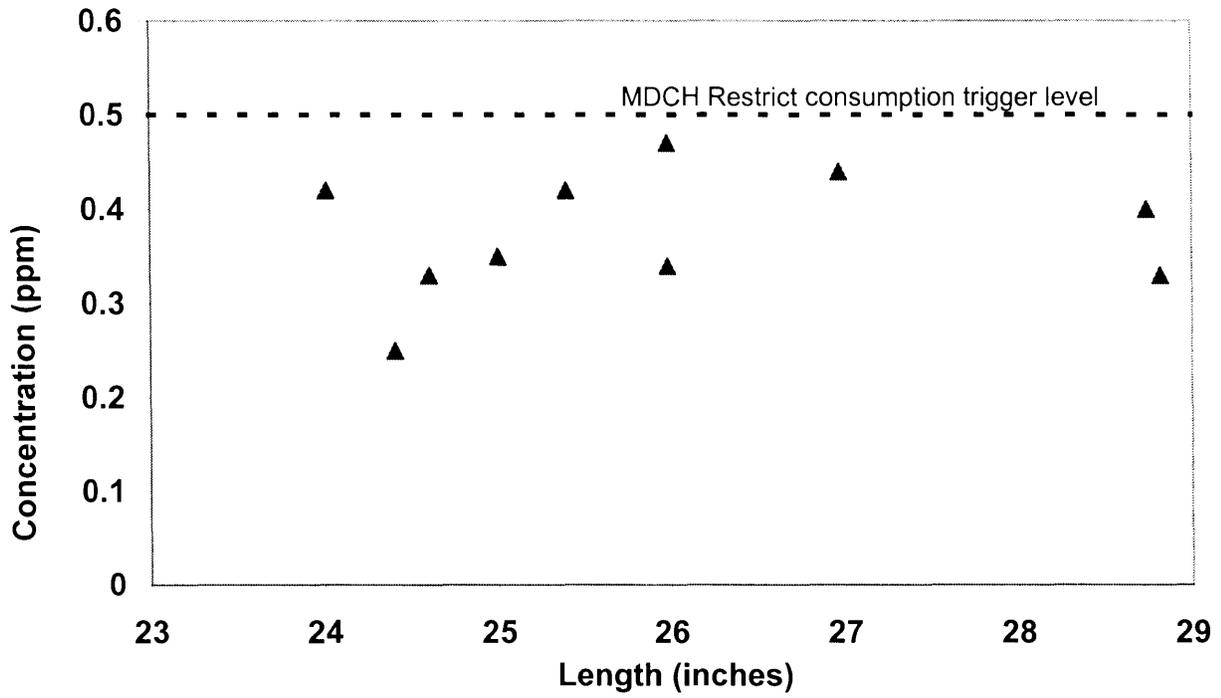


Figure 53. Total length versus mercury concentration in northern pike collected from Wixom Lake, Gladwin County in 2002 (ID 2002102).

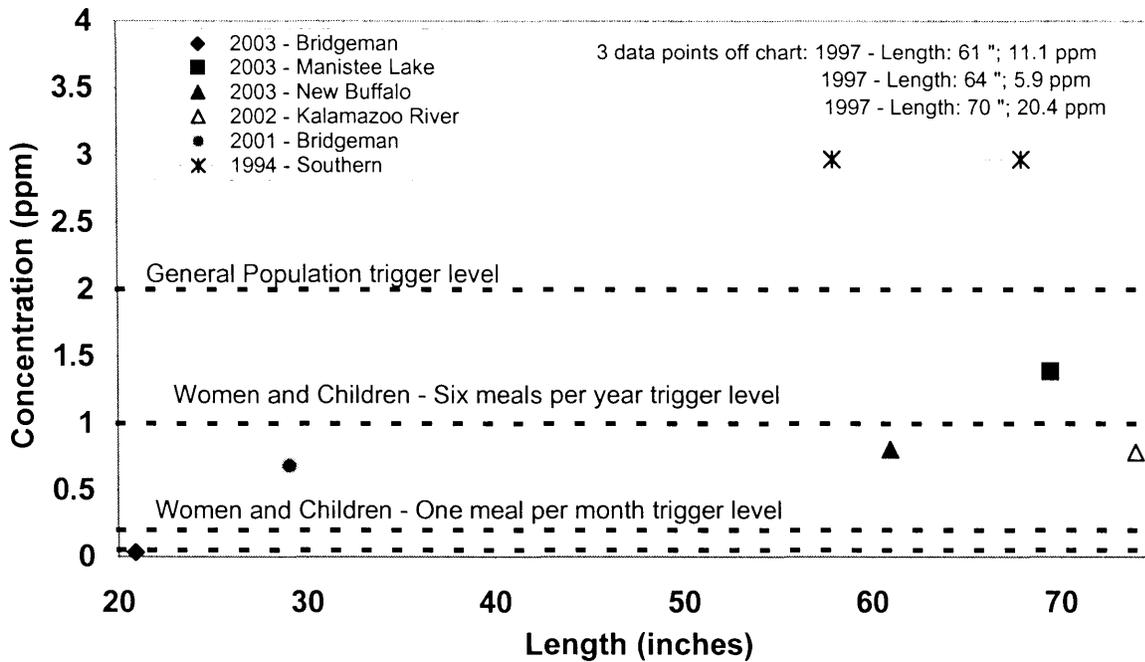


Figure 54. Total length versus total PCB concentration in lake sturgeon collected from Lake Michigan south of Frankfort in 1994 (ID 94057), 1997 (ID 97069), 2001 (ID 2002112), 2002 (ID 2003155) and 2003 (IDs 2003158, 2003159, and 2003160).

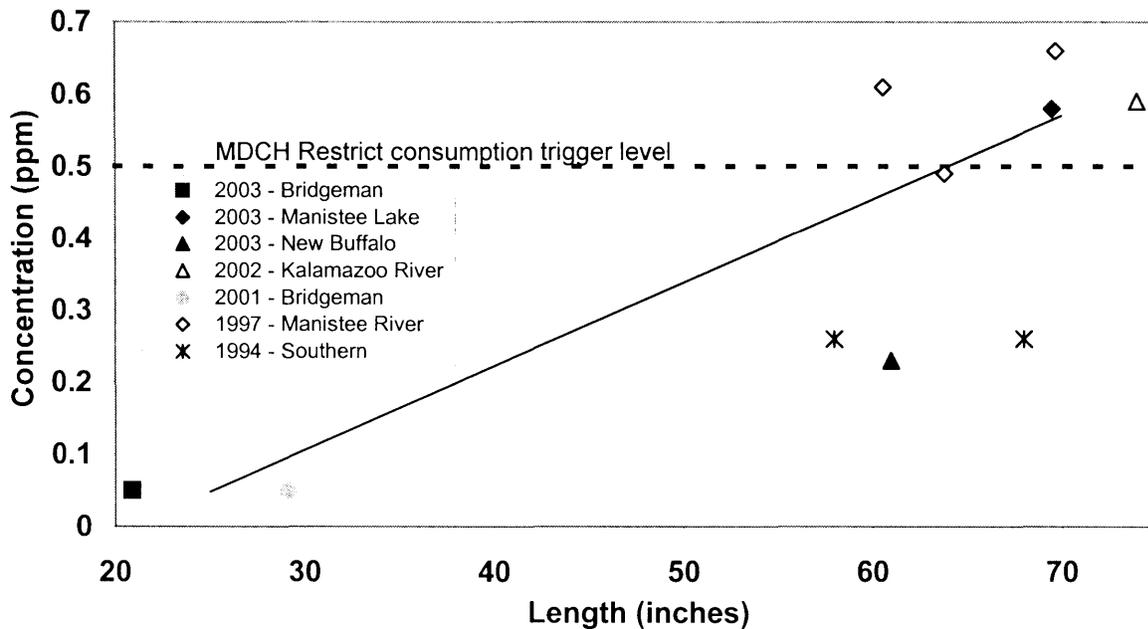


Figure 55. Total length versus mercury concentration in lake sturgeon collected from Lake Michigan south of Frankfort in 1994 (ID 94057), 1997 (ID 97069), 2001 (ID 2002112), 2002 (ID 2003155), and 2003 (IDs 2003158, 2003159, and 2003160).

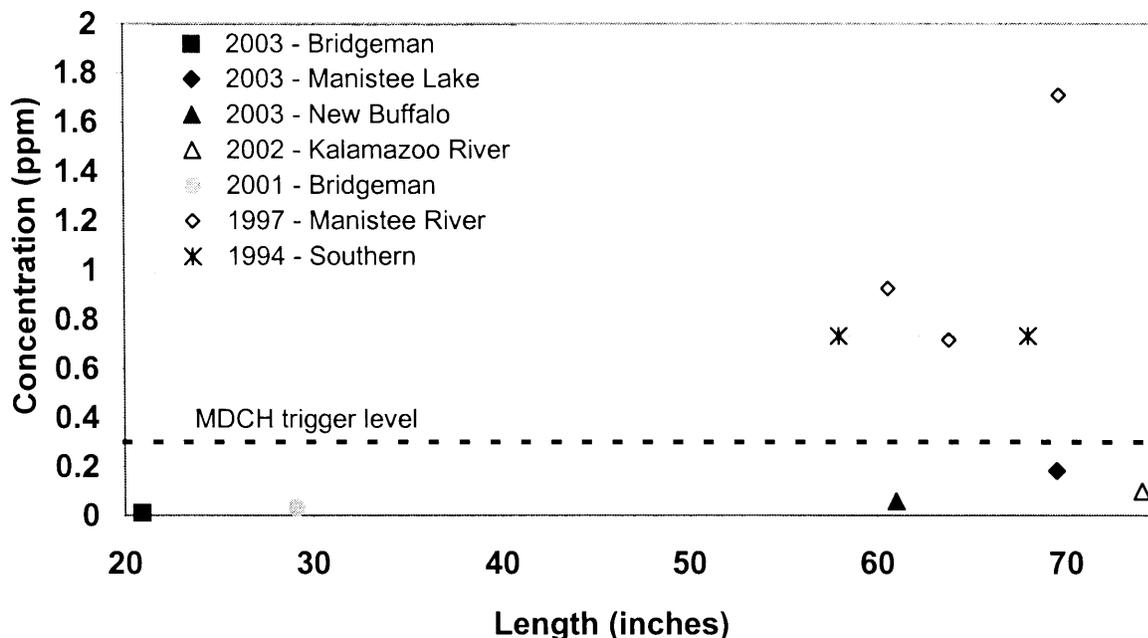


Figure 56. Total length versus total chlordane concentration in lake sturgeon collected from Lake Michigan south of Frankfort in 1994 (ID 94057), 1997 (ID 97069), 2001 (ID 2002112), 2002 (ID 2003155), and 2003 (IDs 2003158, 2003159, and 2003160).

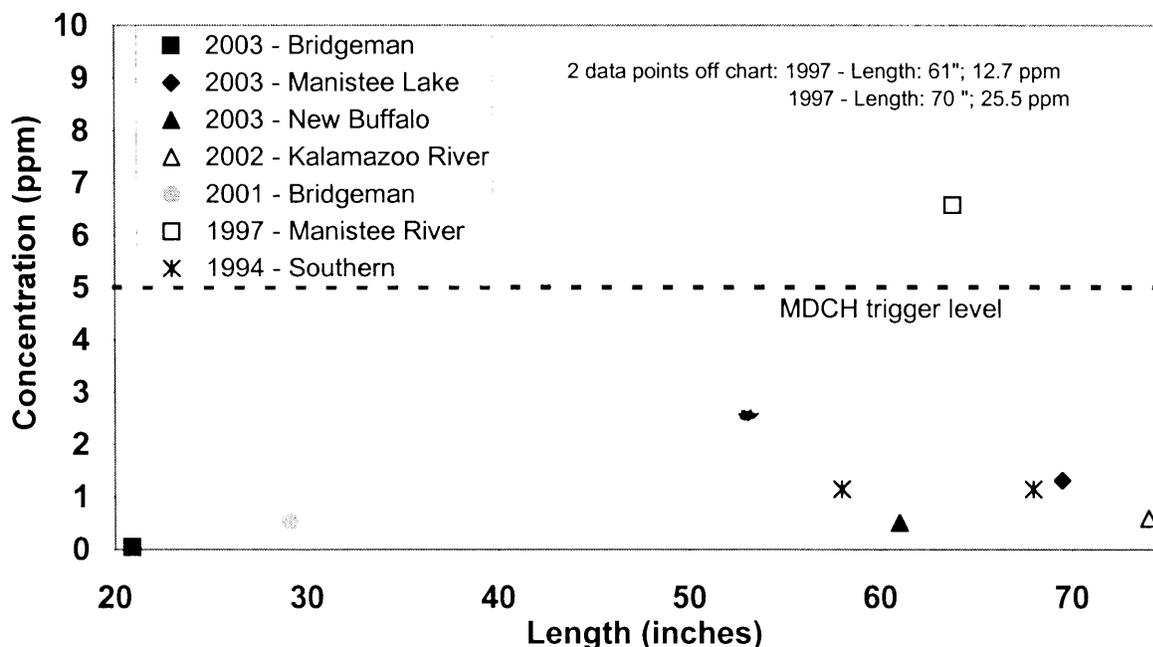


Figure 57. Total length versus total DDT concentration in lake sturgeon collected from Lake Michigan south of Frankfort in 1994 (ID 94057), 1997 (ID 97069), 2001 (ID 2002112), 2002 (ID 2003155), and 2003 (IDs 2003158, 2003159, and 2003160).

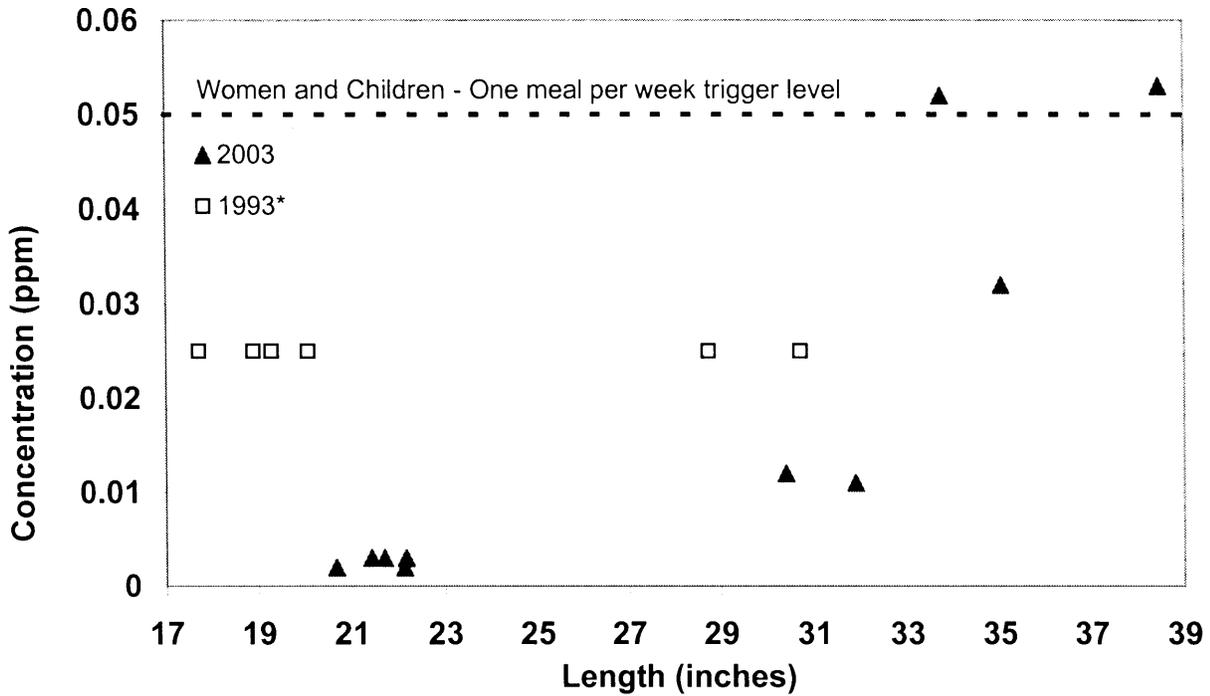


Figure 58. Total length versus total PCB concentration in carp collected from Austin Lake, Kalamazoo County in 1993 (ID 93091) and 2003 (ID 2003154).
 * all concentrations below the 0.025 ppm quantification level

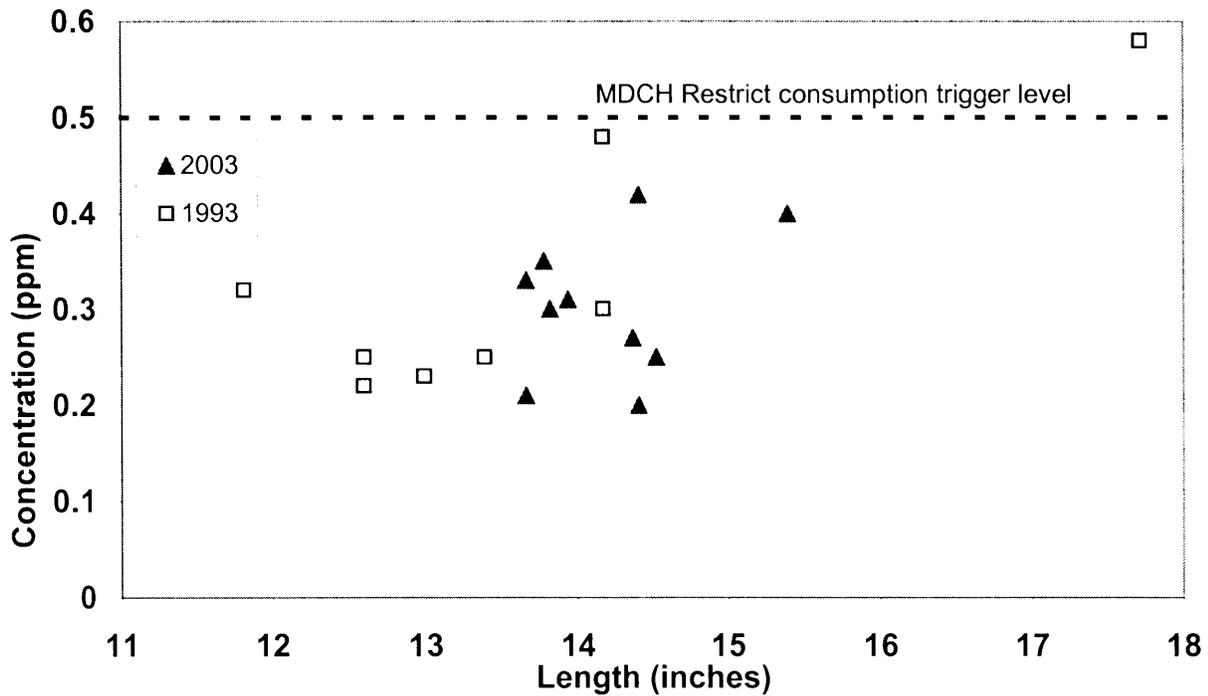


Figure 59. Total length versus mercury concentration in largemouth bass collected from Austin Lake, Kalamazoo County in 1993 (ID 93091) and 2003 (ID 2003154).

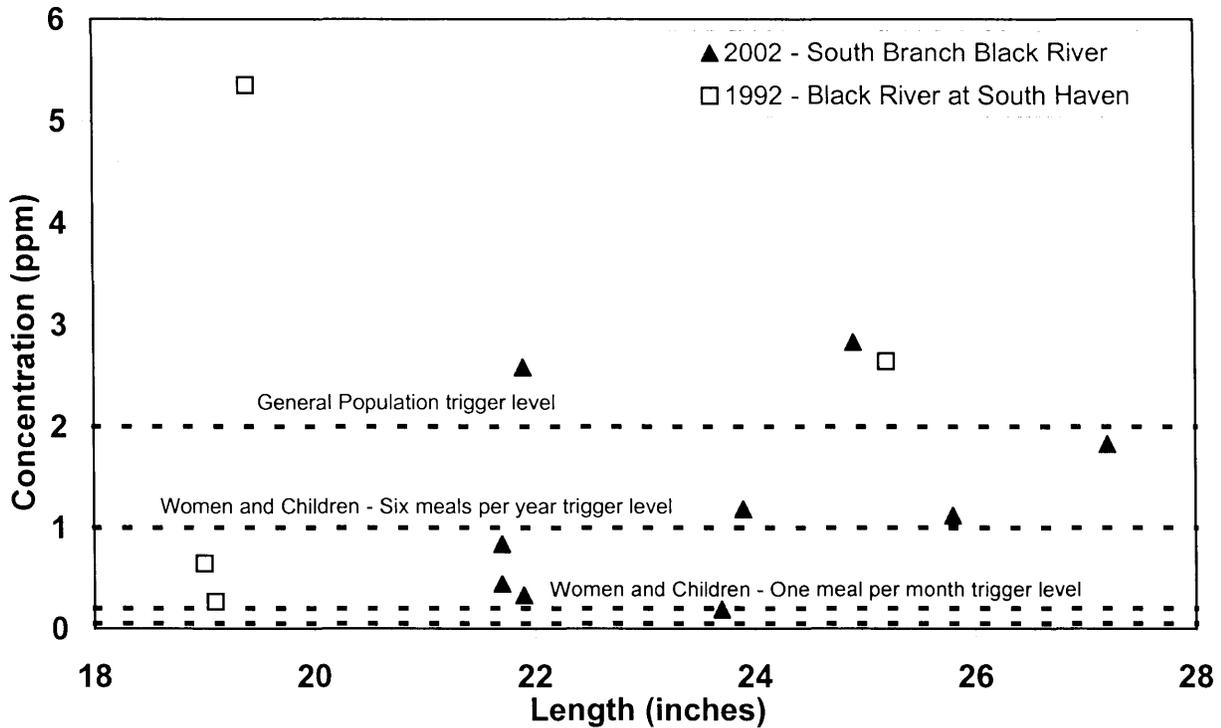


Figure 60. Total length versus total PCB concentration in carp collected from South Branch Black River, downstream of Bangor Dam in 1992 (ID 92016) and 2002 (ID 2002008).

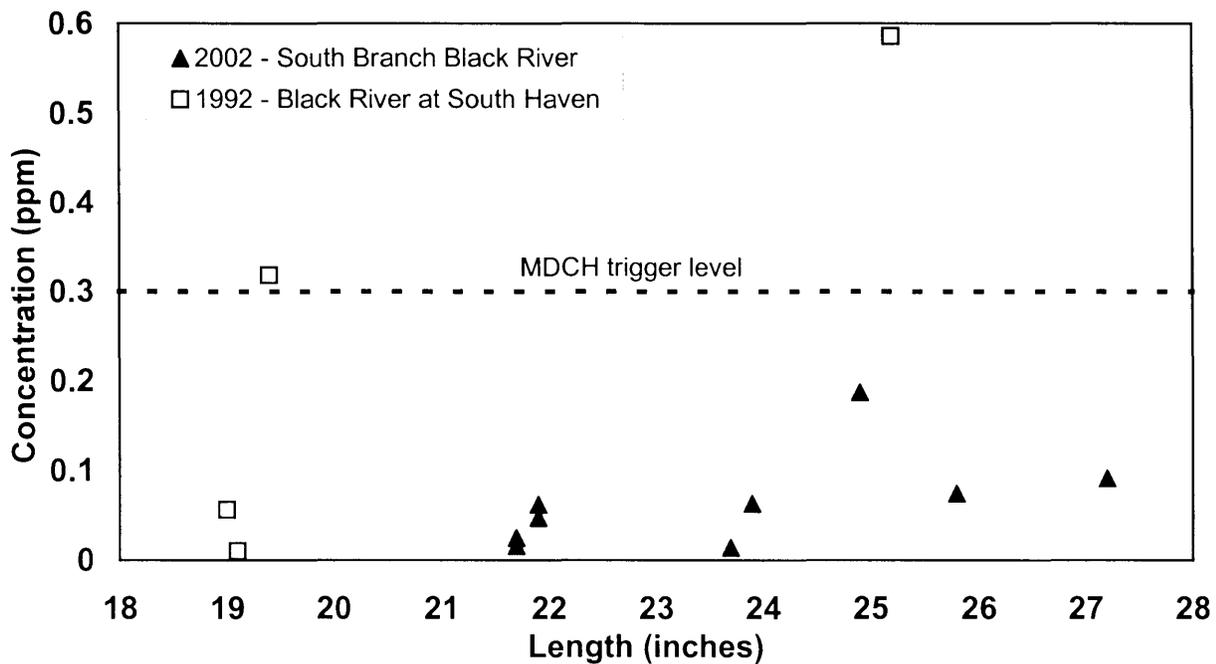


Figure 61. Total length versus total chlordane concentration in carp collected from South Branch Black River, downstream of Bangor Dam in 1992 (ID 92016) and 2002 (ID 2002008).

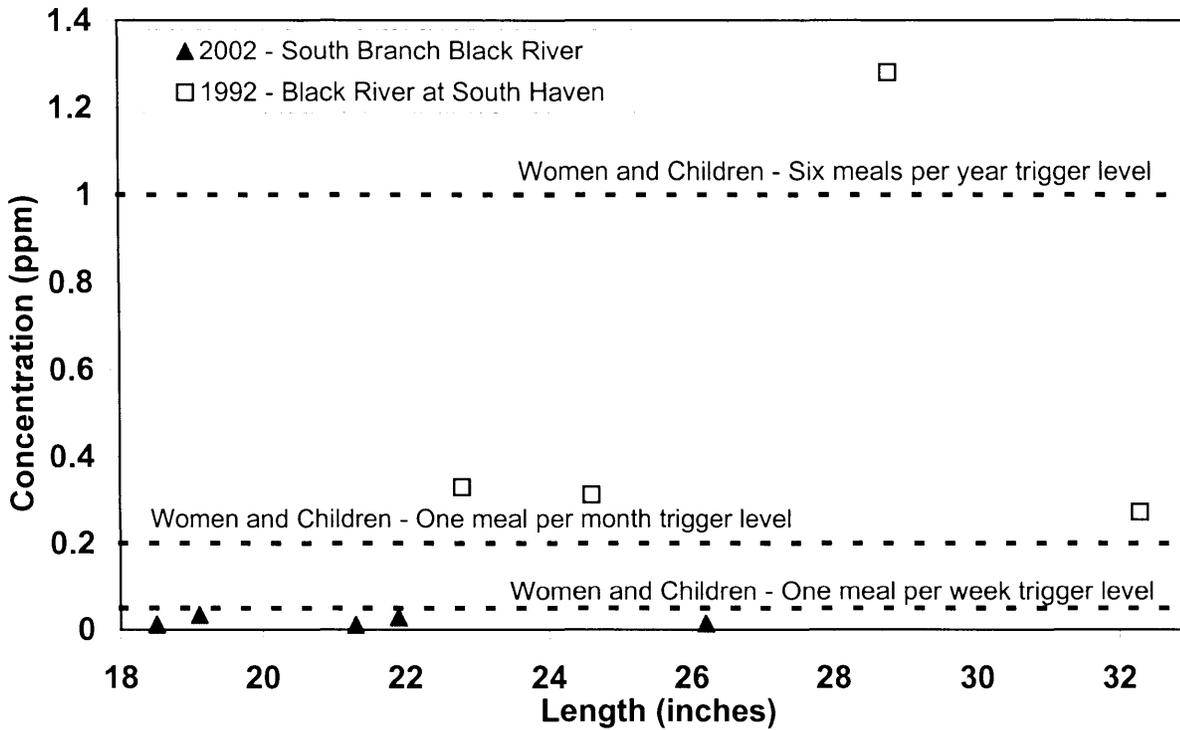


Figure 62. Total length versus total PCB concentration in northern pike collected from South Branch Black River, downstream of Bangor Dam in 1992 (ID 92016) and 2002 (ID 2002008).

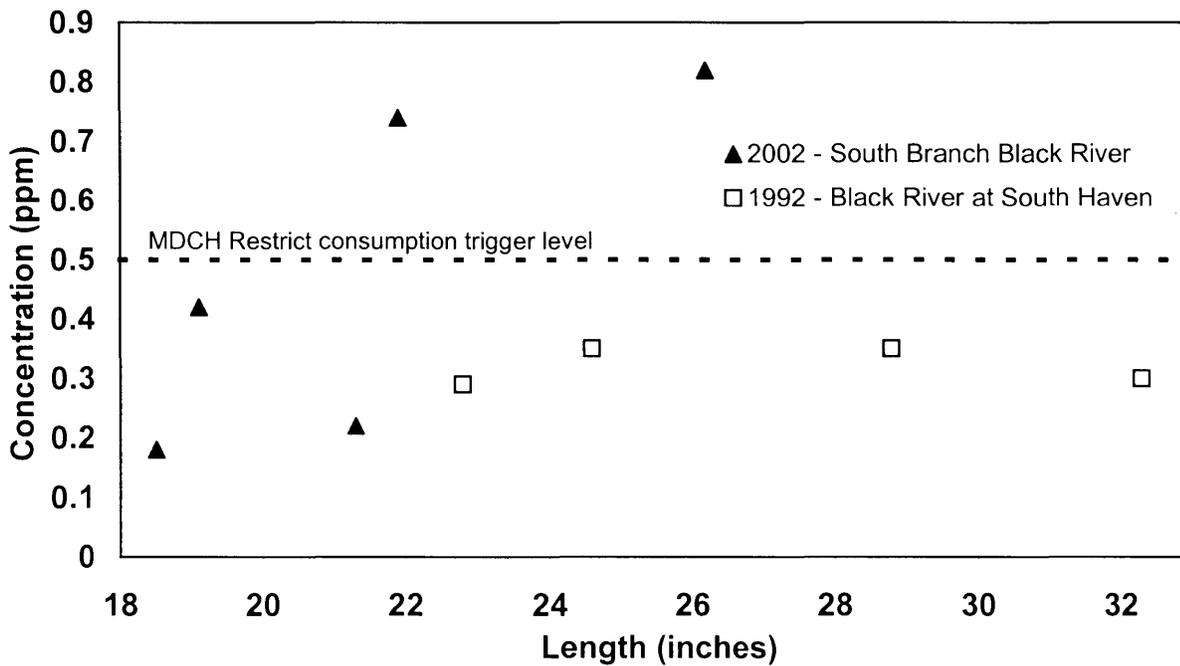


Figure 63. Total length versus mercury concentration in northern pike collected from South Branch Black River, downstream Bangor Dam in 1992 (ID 92016) and 2002 (ID 2002008).

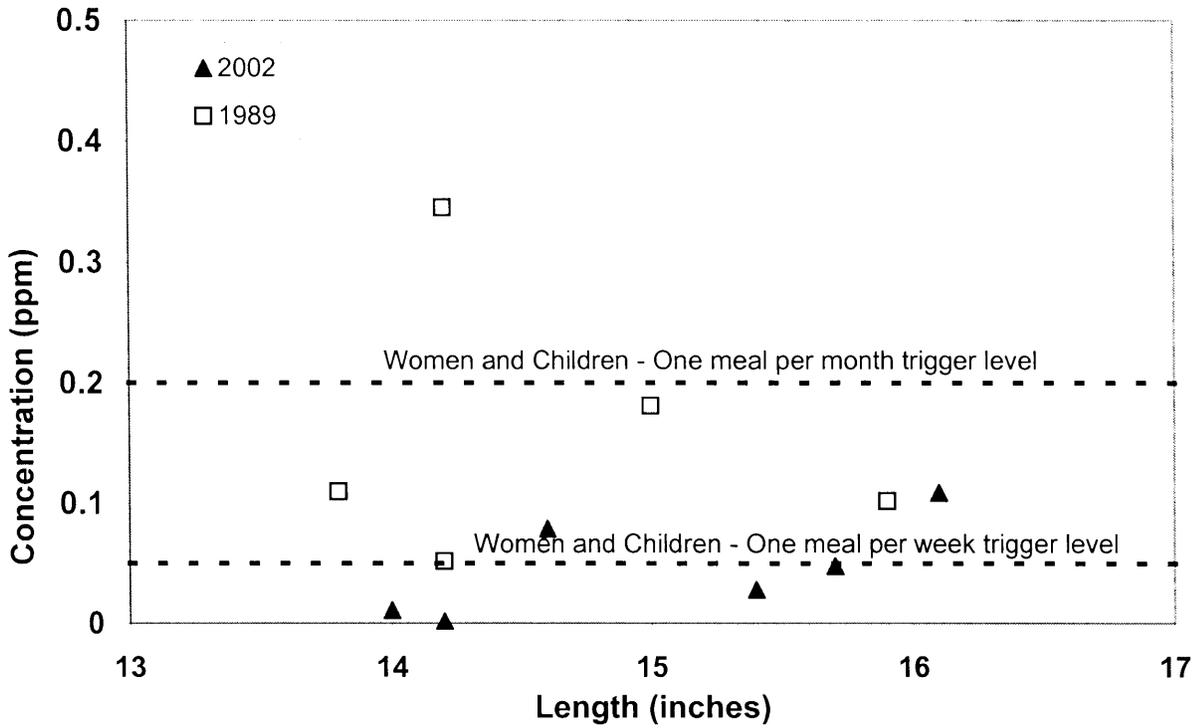


Figure 64. Total length versus total PCB concentration in white sucker collected from South Branch Black River, downstream of Bangor Dam in 1989 (ID 89020) and 2002 (ID 2002008).

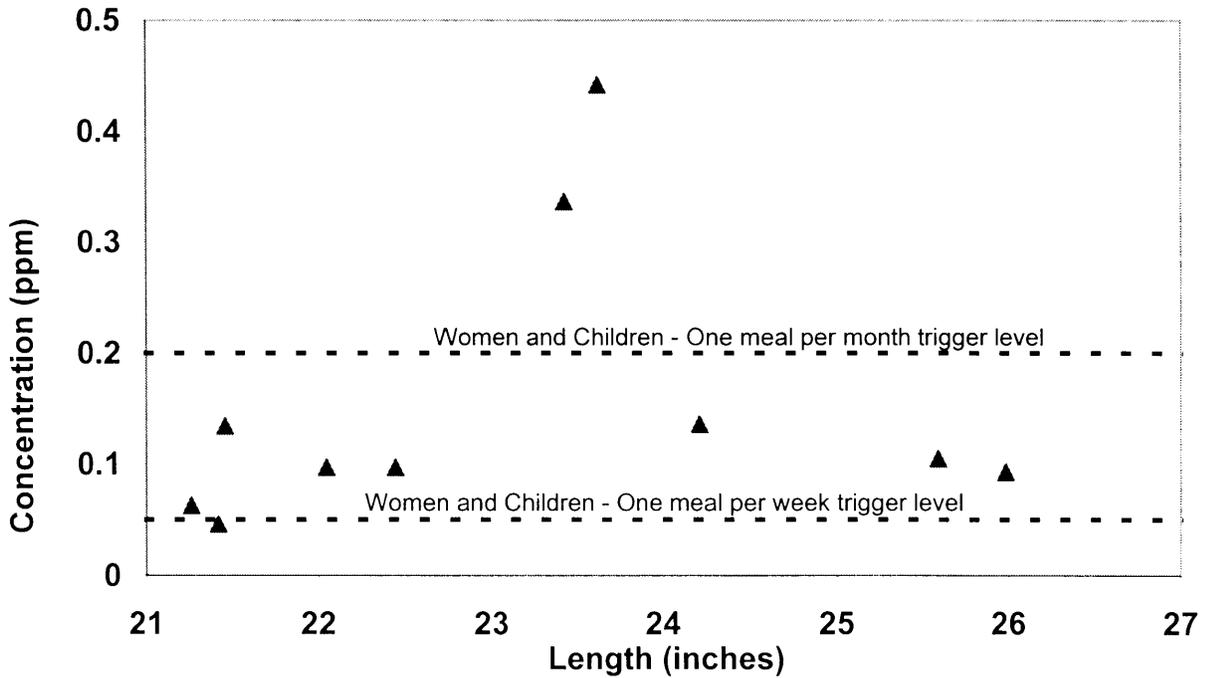


Figure 65. Total length versus total PCB concentration in carp collected from South Branch Black River, upstream of Bangor Dam in 2002 (ID 2002106).

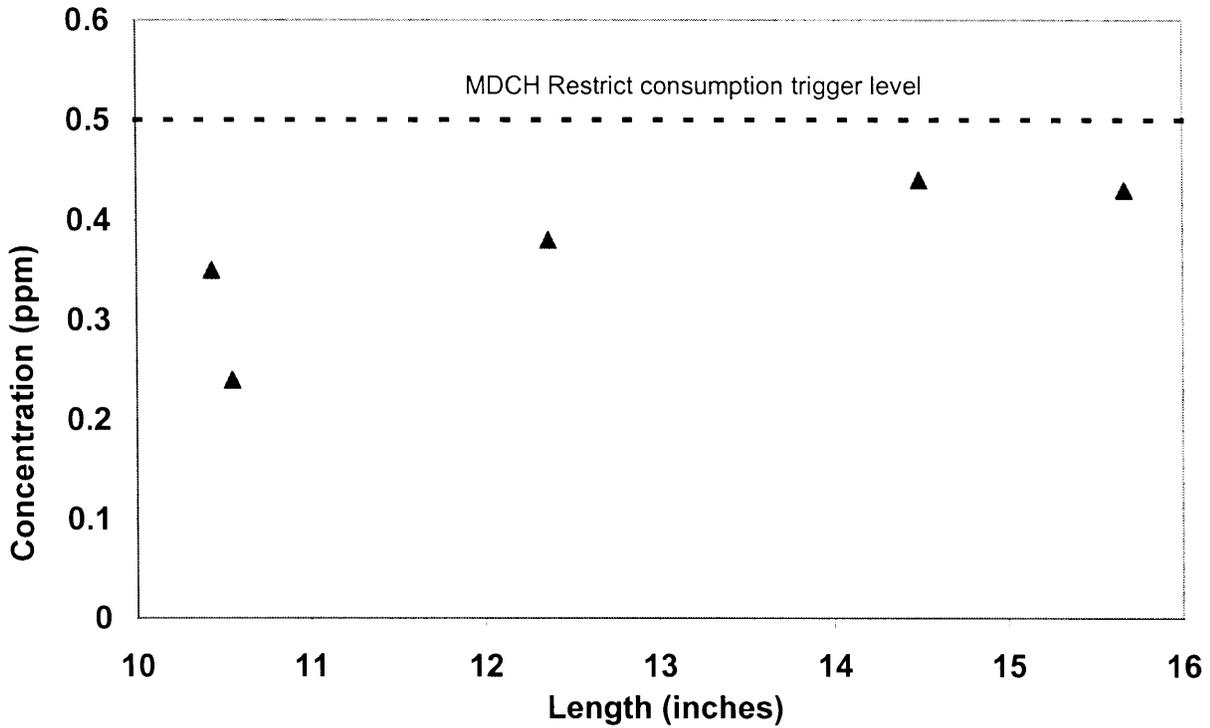


Figure 66. Total length versus mercury concentration in largemouth bass collected from Bristol Lake, Barry County in 2002 (ID 2002009).

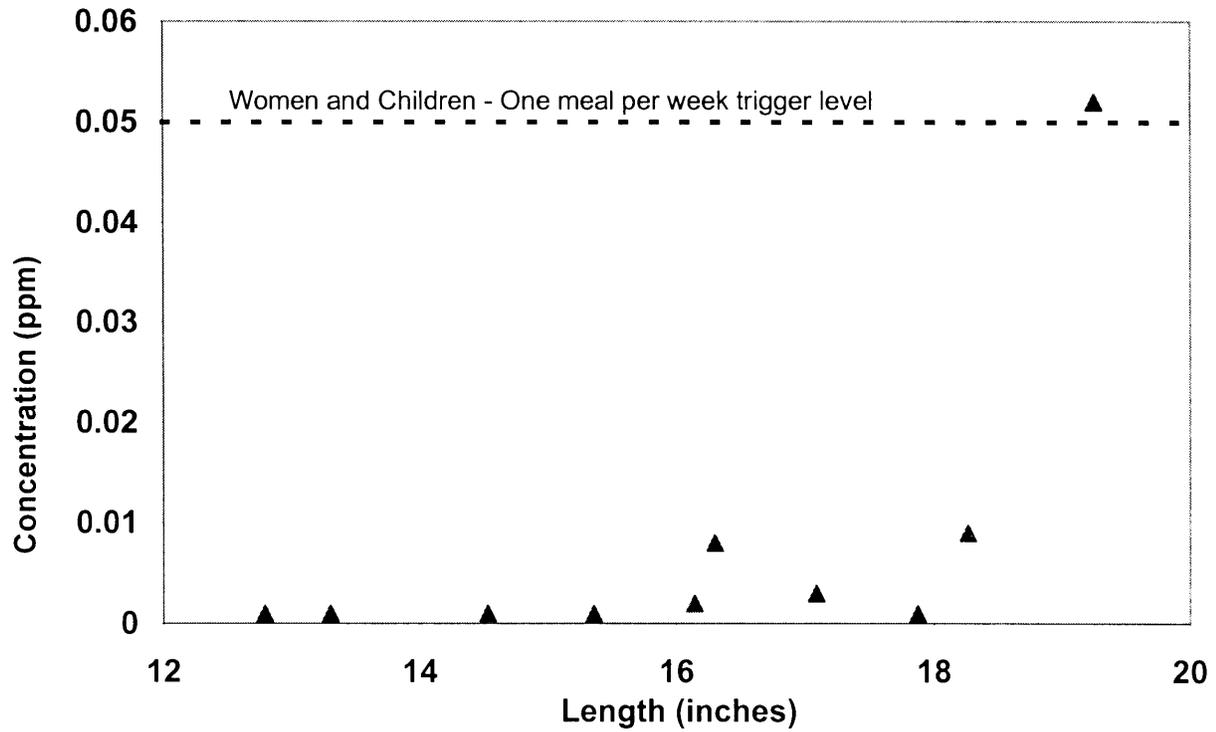


Figure 67. Total length versus total PCB concentration in white sucker collected from Bristol Lake, Barry County in 2002 (ID 2002009).

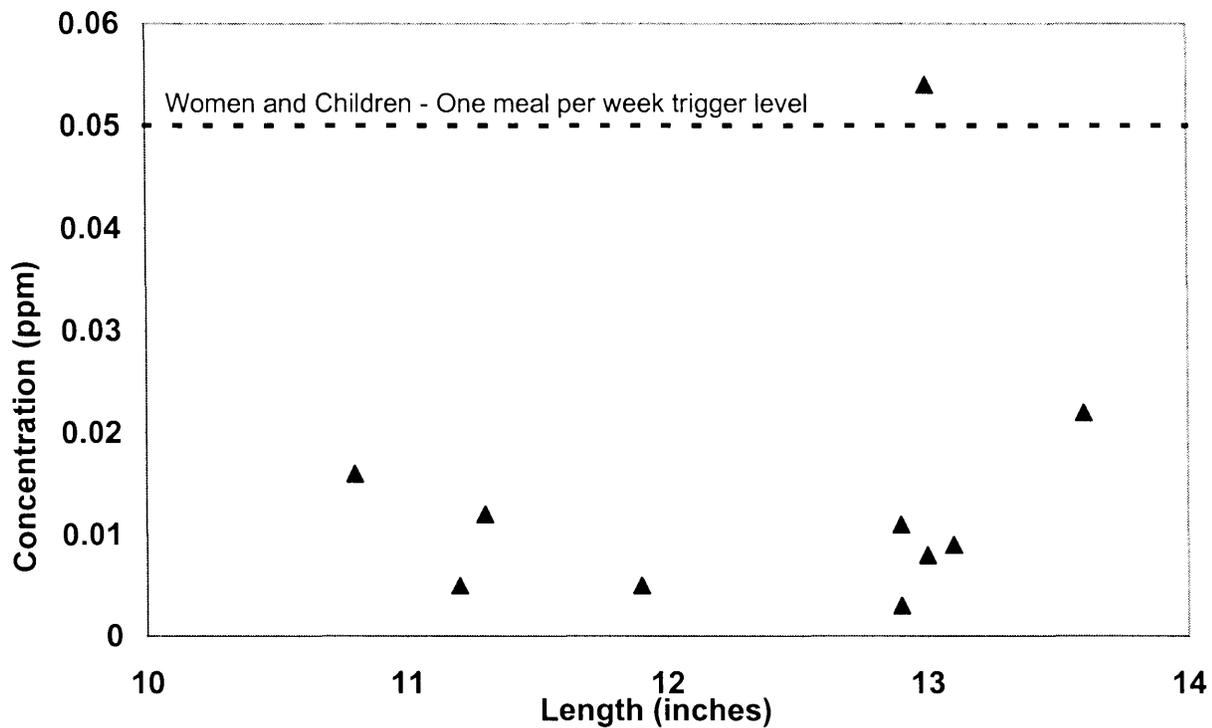


Figure 68. Total length versus total PCB concentration in brown bullhead collected from Camp Lake, Kent County in 2003 (ID 2003015).

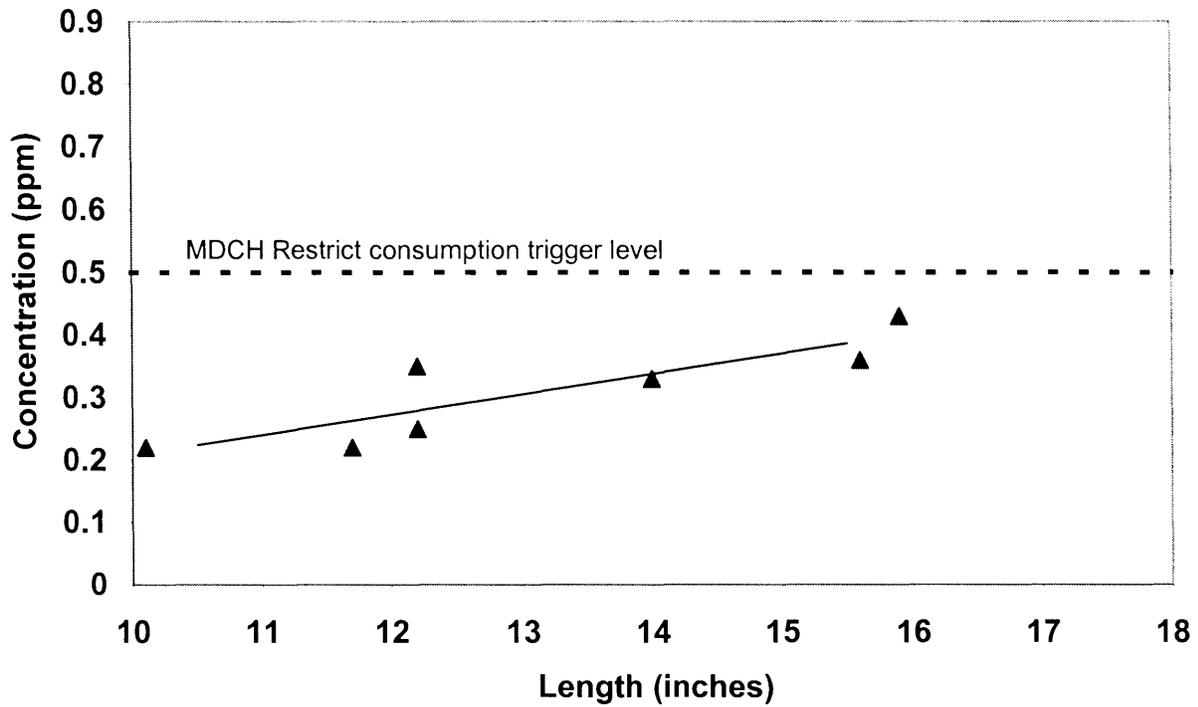


Figure 69. Total length versus mercury concentration in largemouth bass collected from Camp Lake, Kent County in 2003 (ID 2003015).

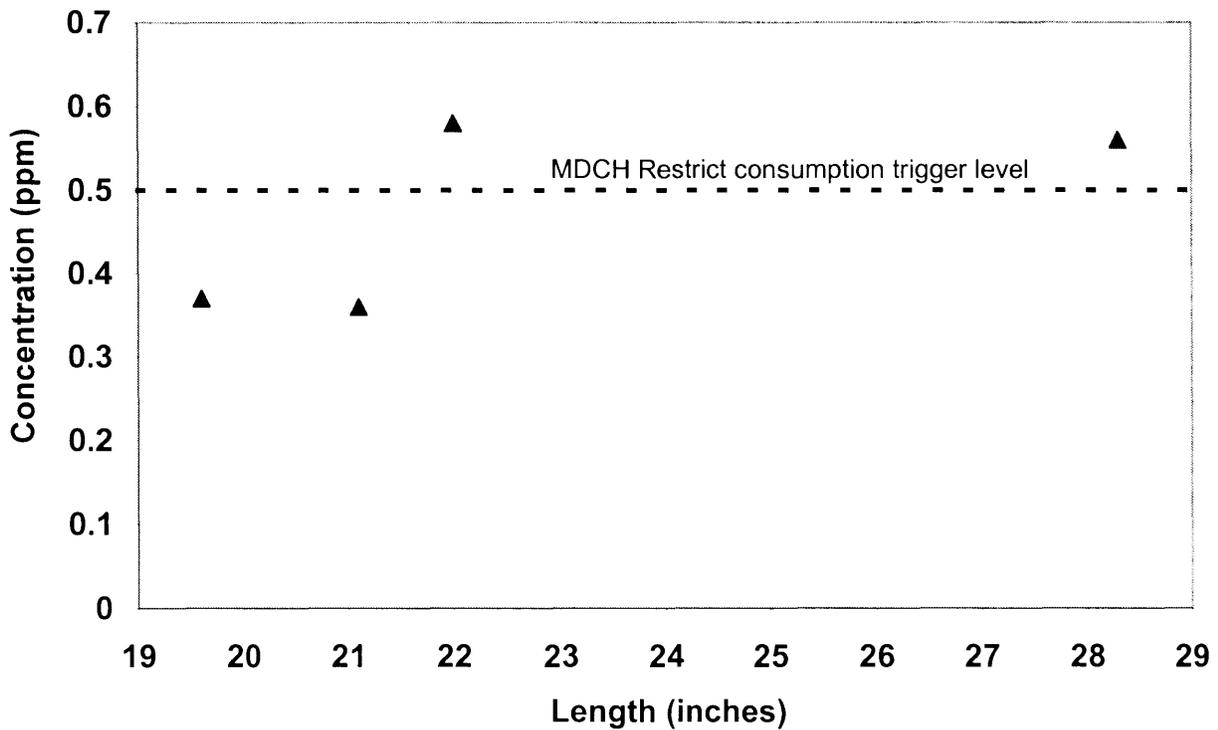


Figure 70. Total length versus mercury concentration in northern pike collected from Camp Lake, Kent County in 2003 (ID 2003015).

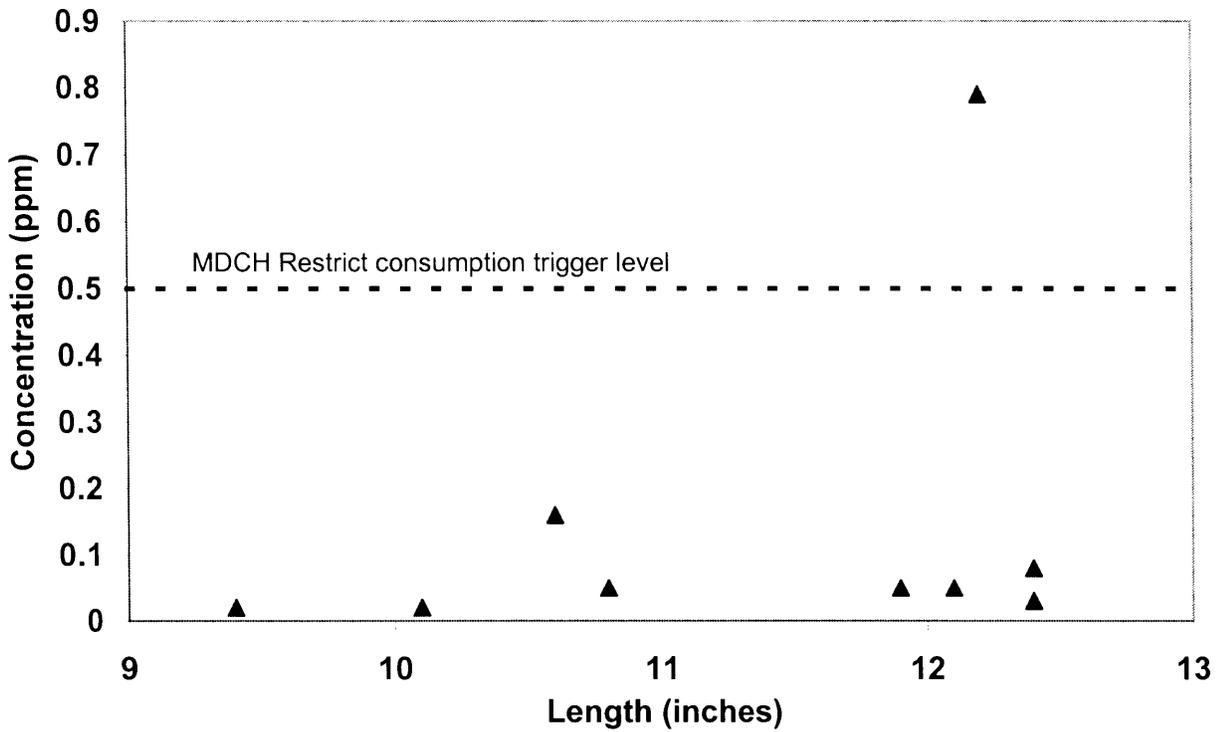


Figure 71. Total length versus mercury concentration in brown bullhead collected from Crooked Lake, Barry County in 2003 (ID 2003020).

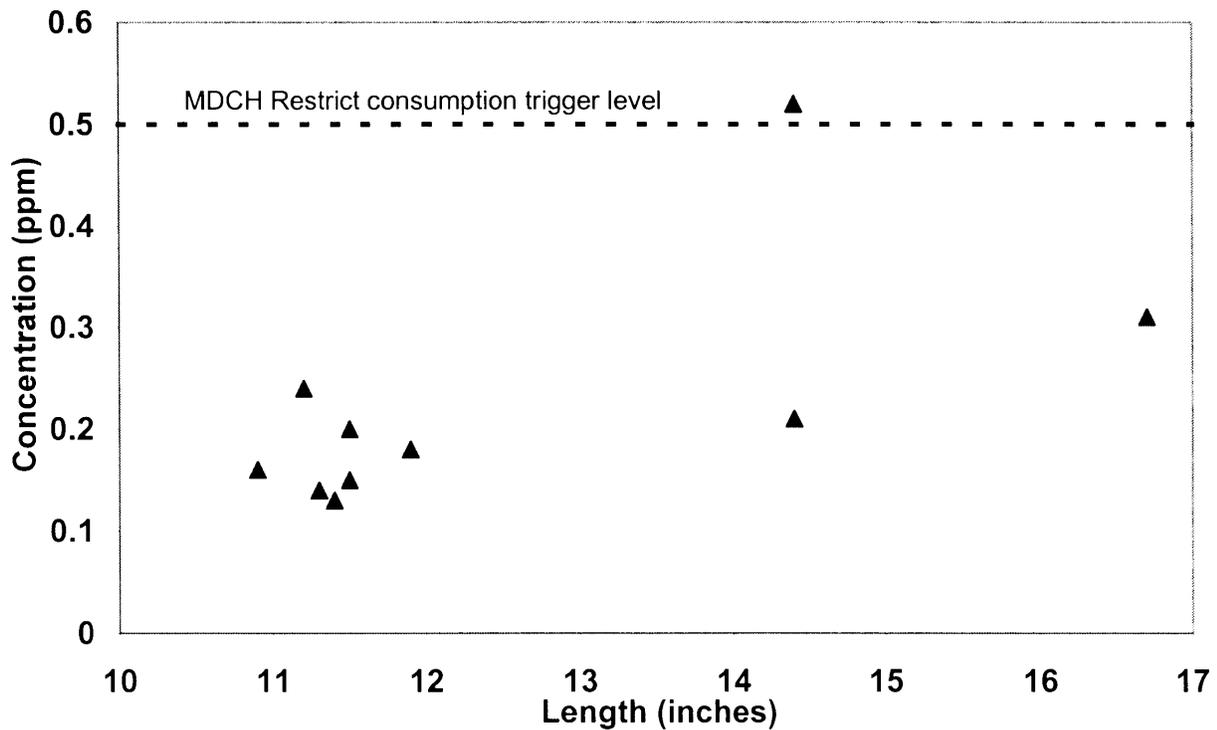


Figure 72. Total length versus mercury concentration in largemouth bass collected from Crooked Lake, Barry County in 2003 (ID 2003020).

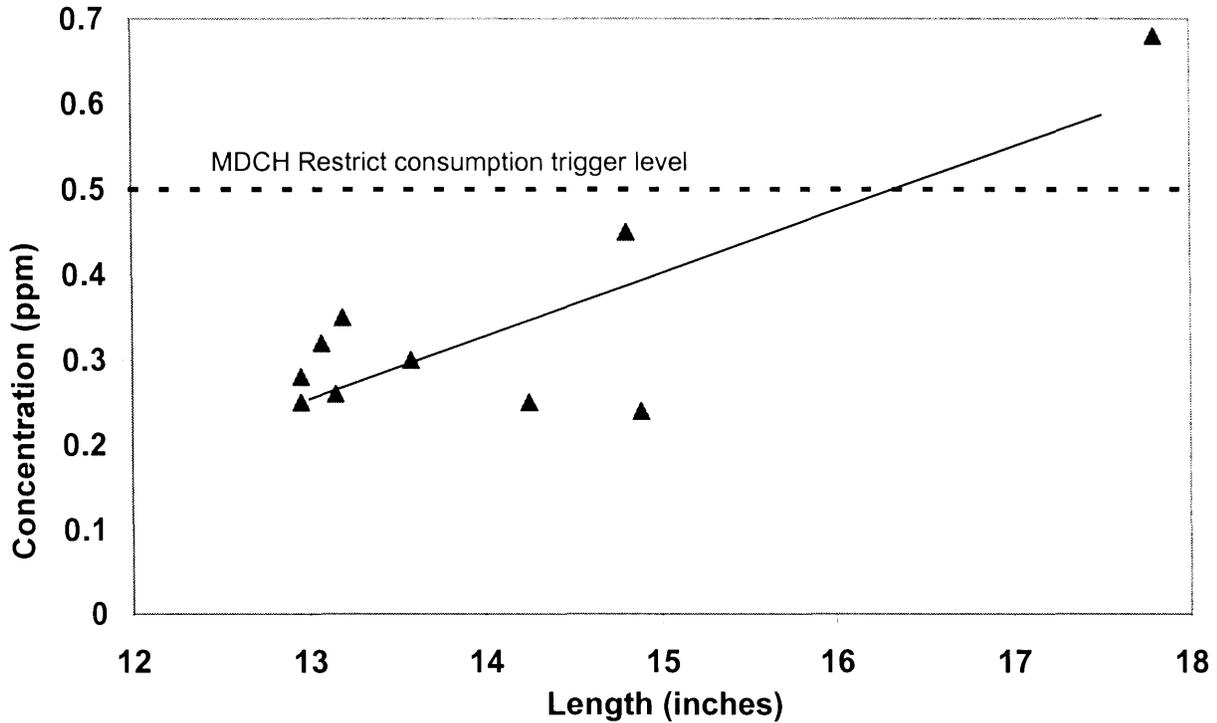


Figure 73. Total length versus mercury concentration in largemouth bass collected from Deer Lake, Charlevoix County in 2003 (ID 2003021).

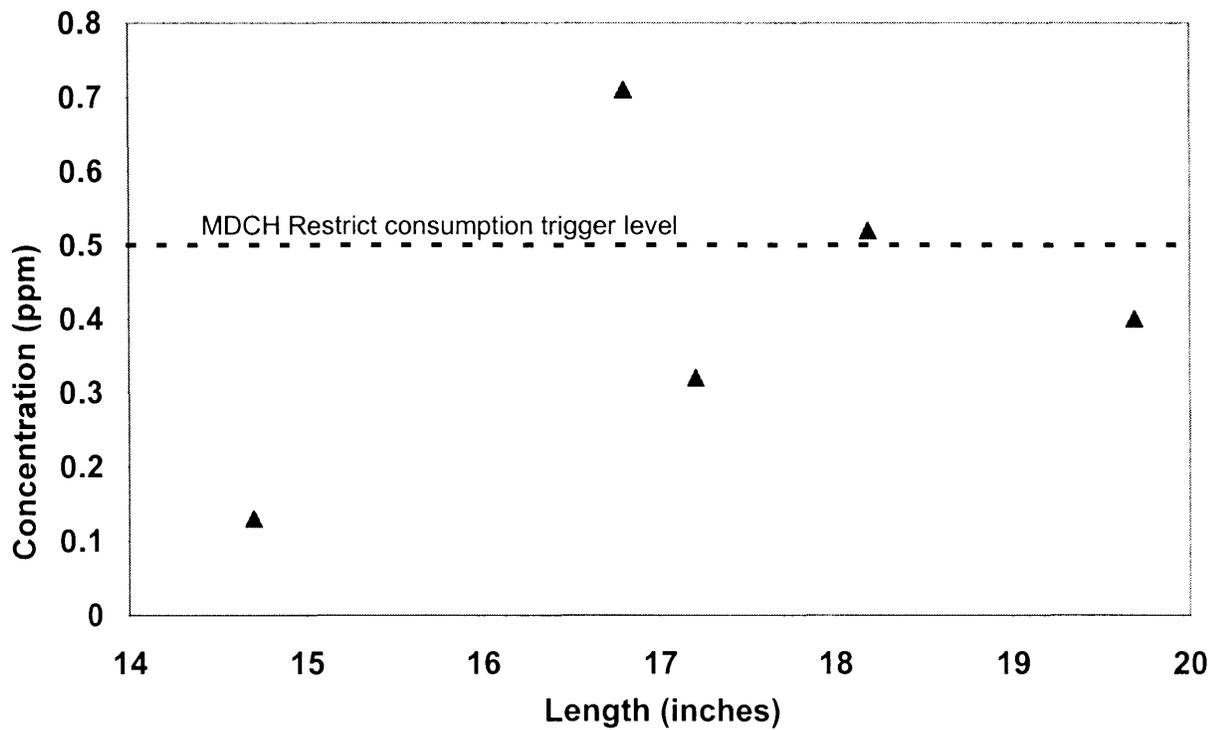


Figure 74. Total length versus mercury concentration in northern pike collected from Deer Lake, Charlevoix County in 2003 (ID 2003021).

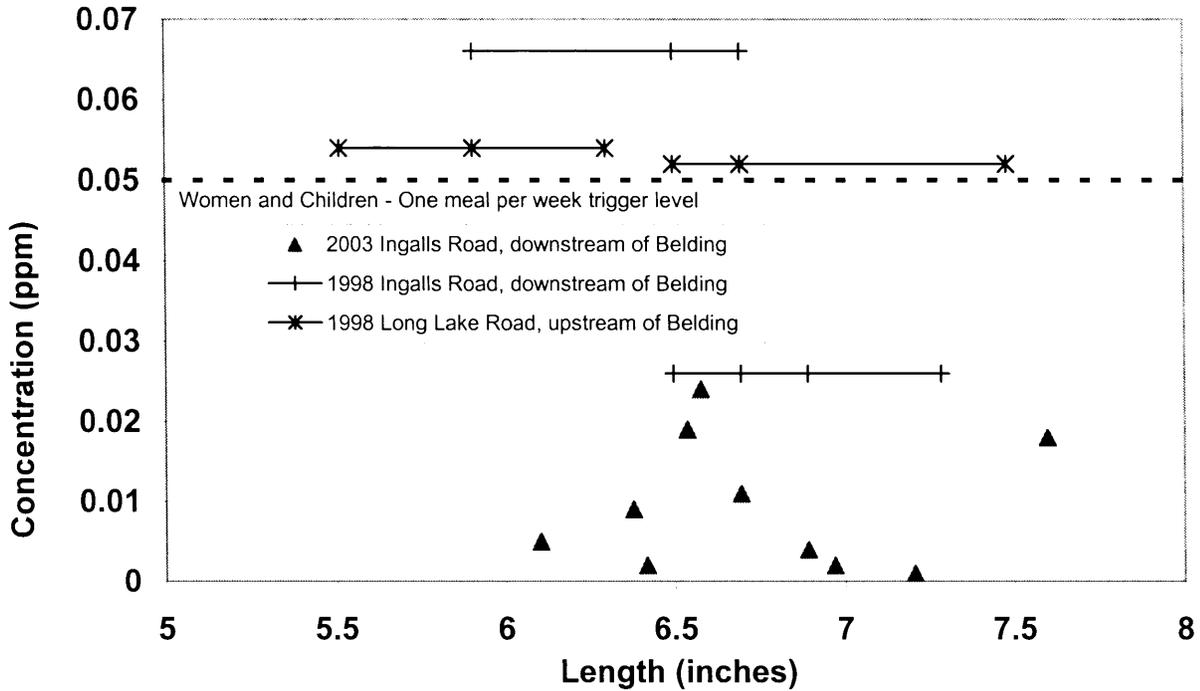


Figure 75. Total length versus total PCB concentration in rock bass collected from Flat River, downstream of Greenville in 1998 (ID 1998036) and 2003 (ID 2003031).

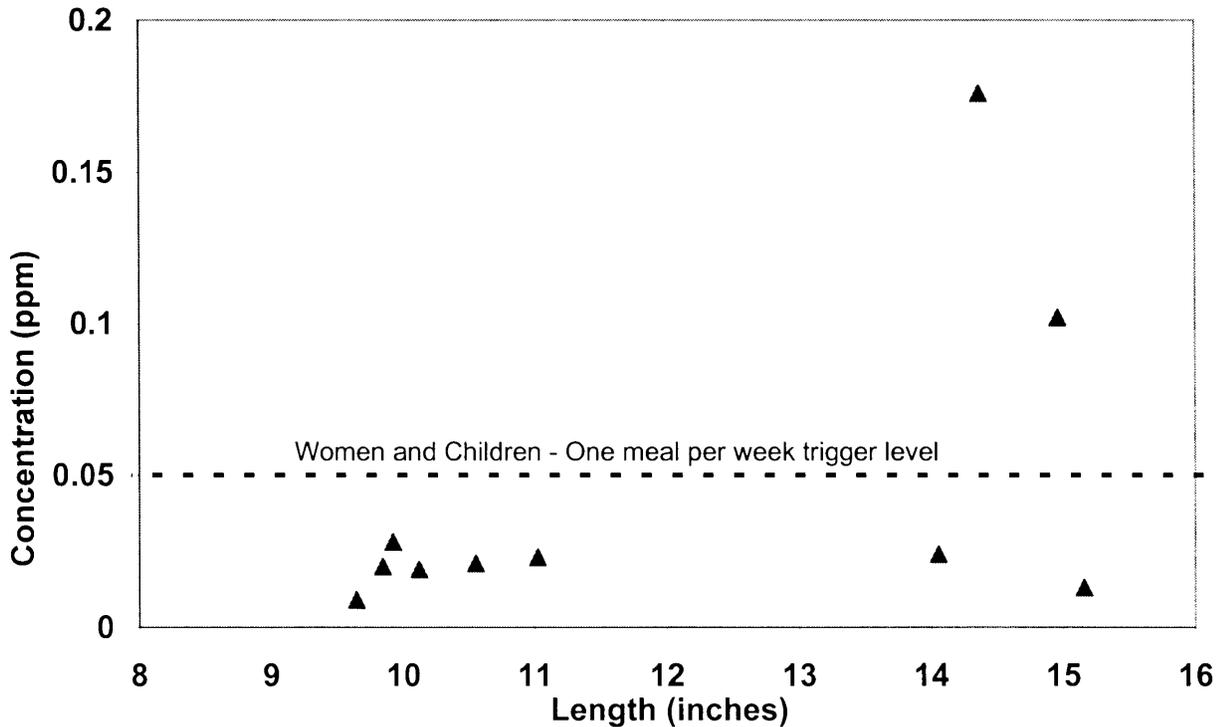


Figure 76. Total length versus total PCB concentration in white sucker collected from Flat River at Ingalls Road, downstream of Belding in 2003 (ID 2003031).

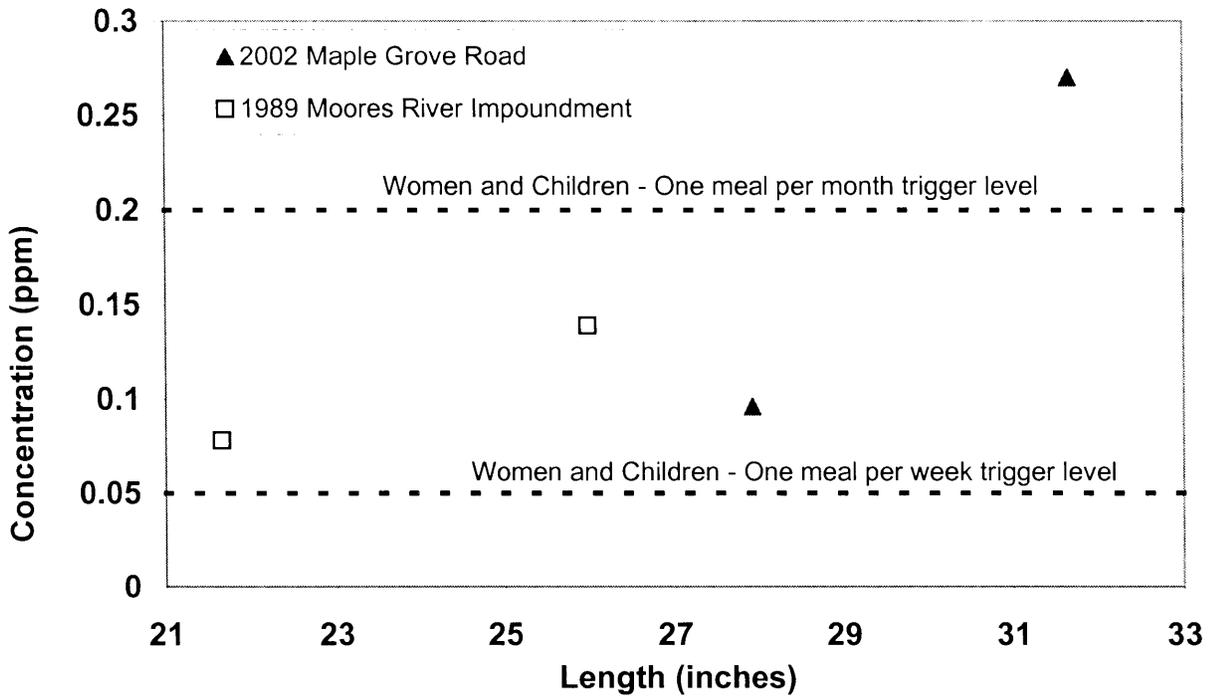


Figure 77. Total length versus total PCB concentration in northern pike collected from the Grand River in 1989 (ID 89054) and 2002 (ID 2002112).



Figure 78. Total length versus mercury concentration in northern pike collected from the Grand River in 1989 (ID 89054) and 2002 (ID 2002112).

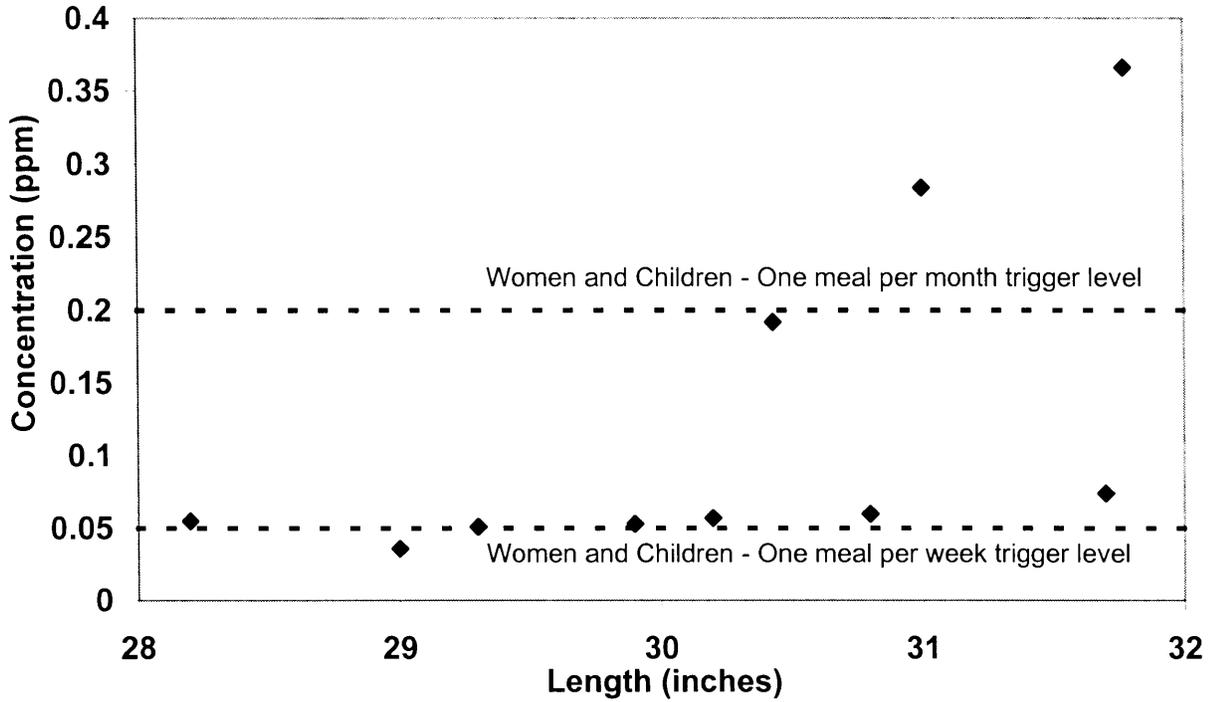


Figure 79. Total length versus total PCB concentration in lake trout collected from Green Lake, Grand Traverse County in 2003 (ID 2003139).

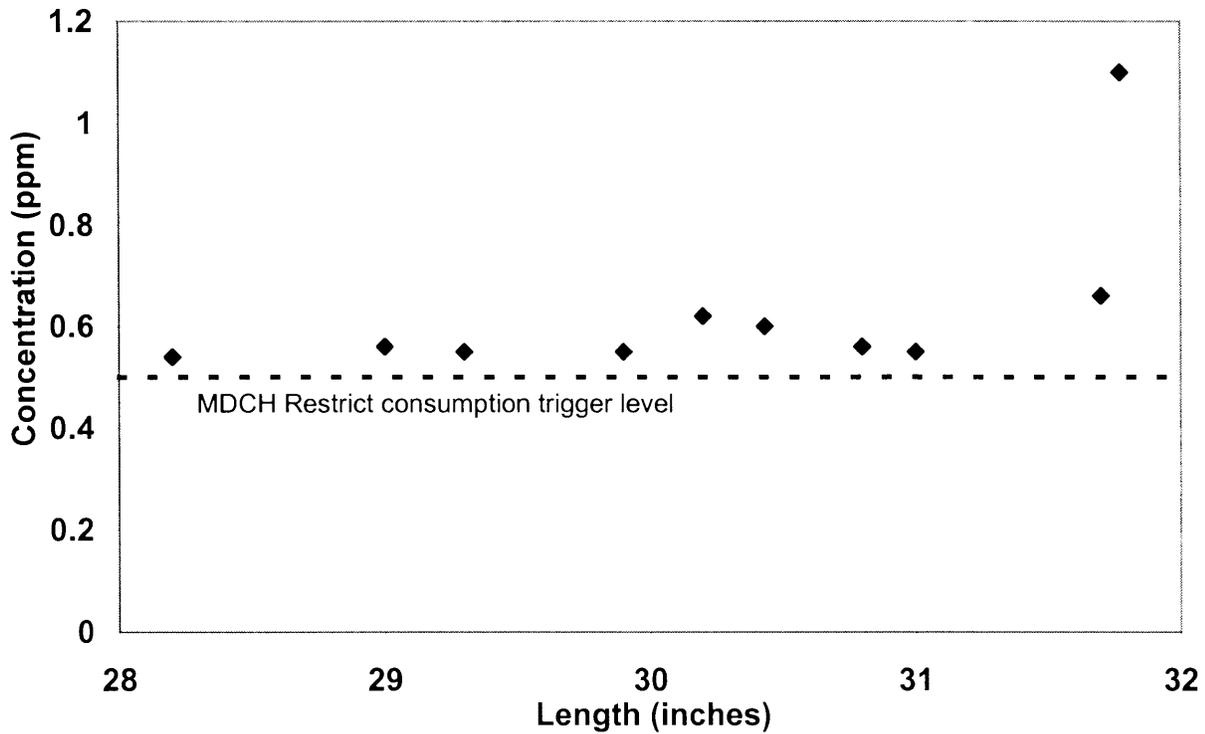


Figure 80. Total length versus mercury concentration in lake trout collected from Green Lake, Grand Traverse County in 2003 (ID 2003139).

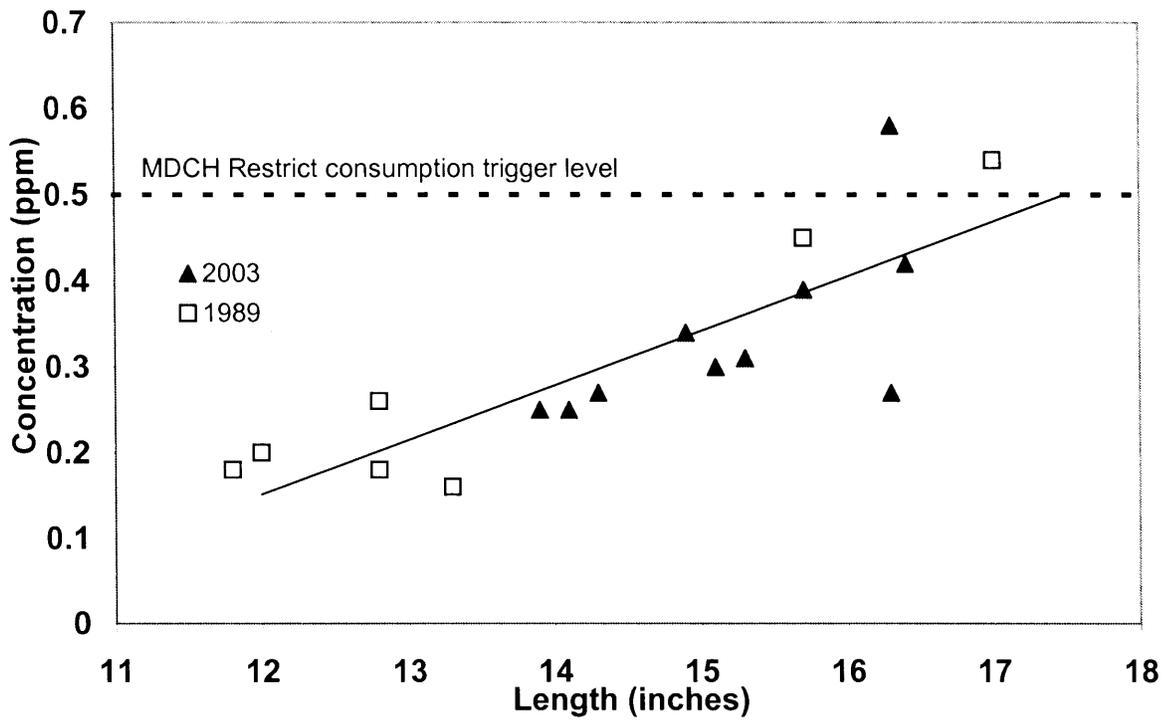


Figure 81. Total length versus mercury concentration in largemouth bass collected from Lake Mitchell, Cadillac County in 2003 (ID 2003141).

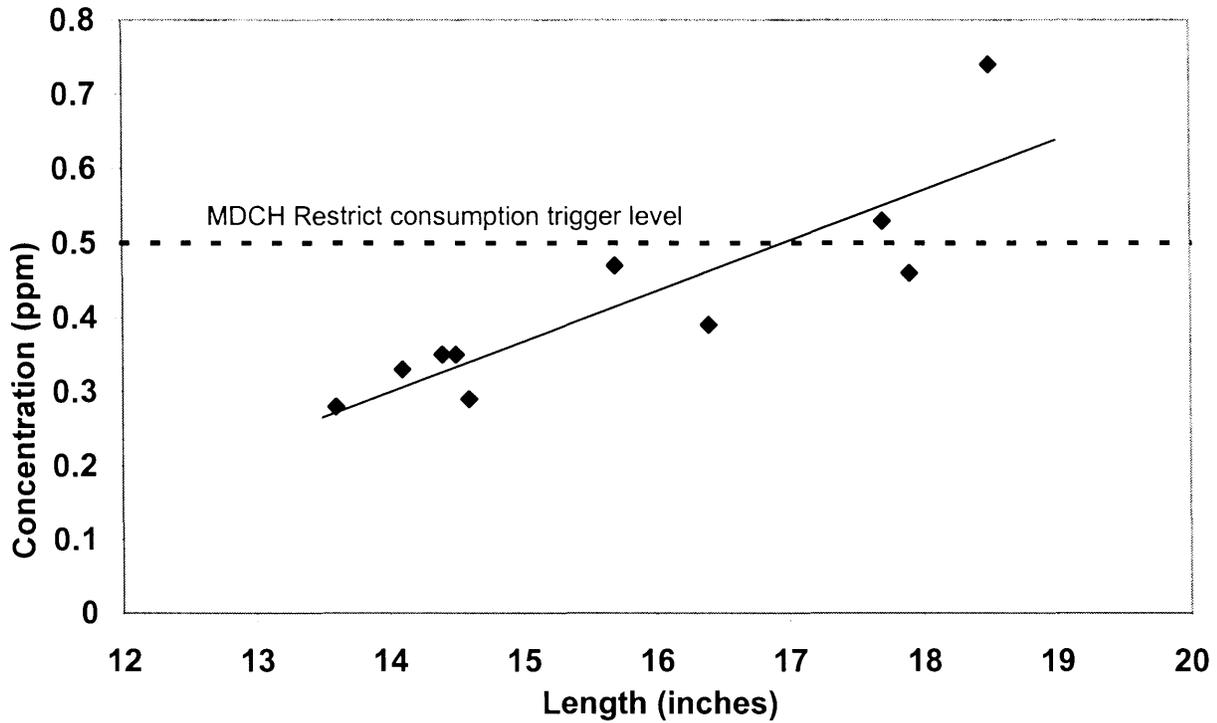


Figure 82. Total length versus mercury concentration in largemouth bass collected from Lake Ovid, Clinton County in 2003 (ID 2003152).

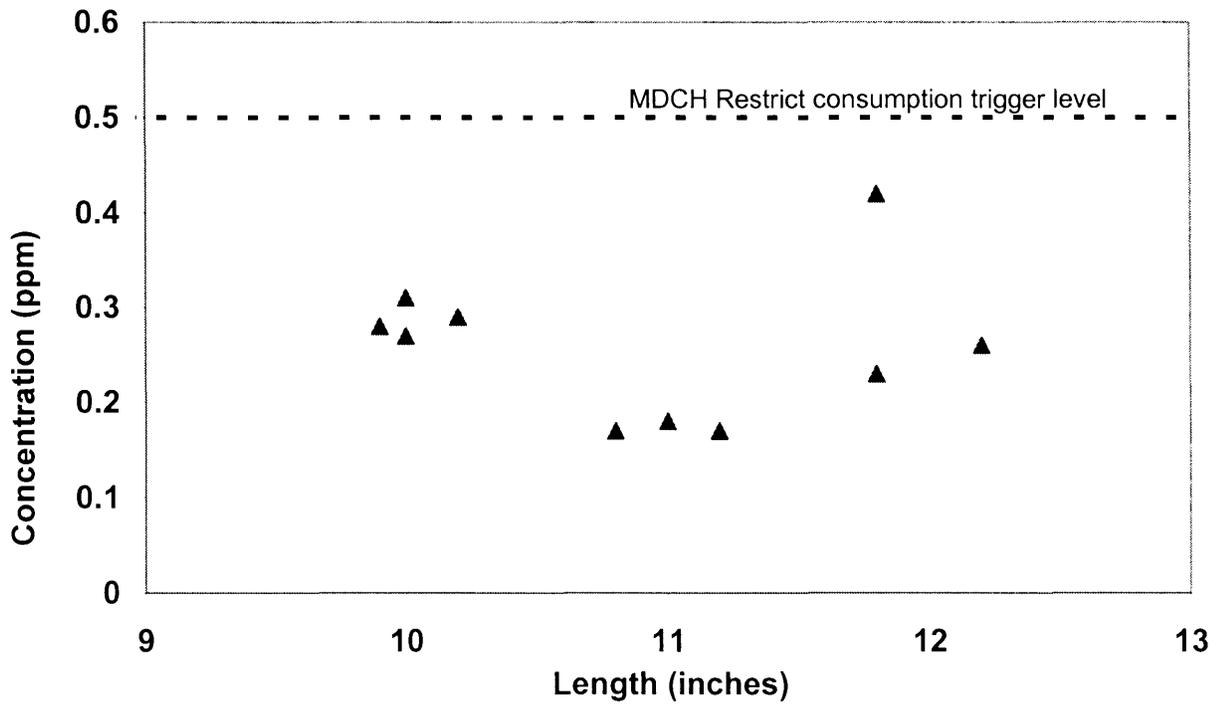


Figure 83. Total length versus mercury concentration in black crappie collected from Long Lake, Kalamazoo County in 2002 (ID 2002064).

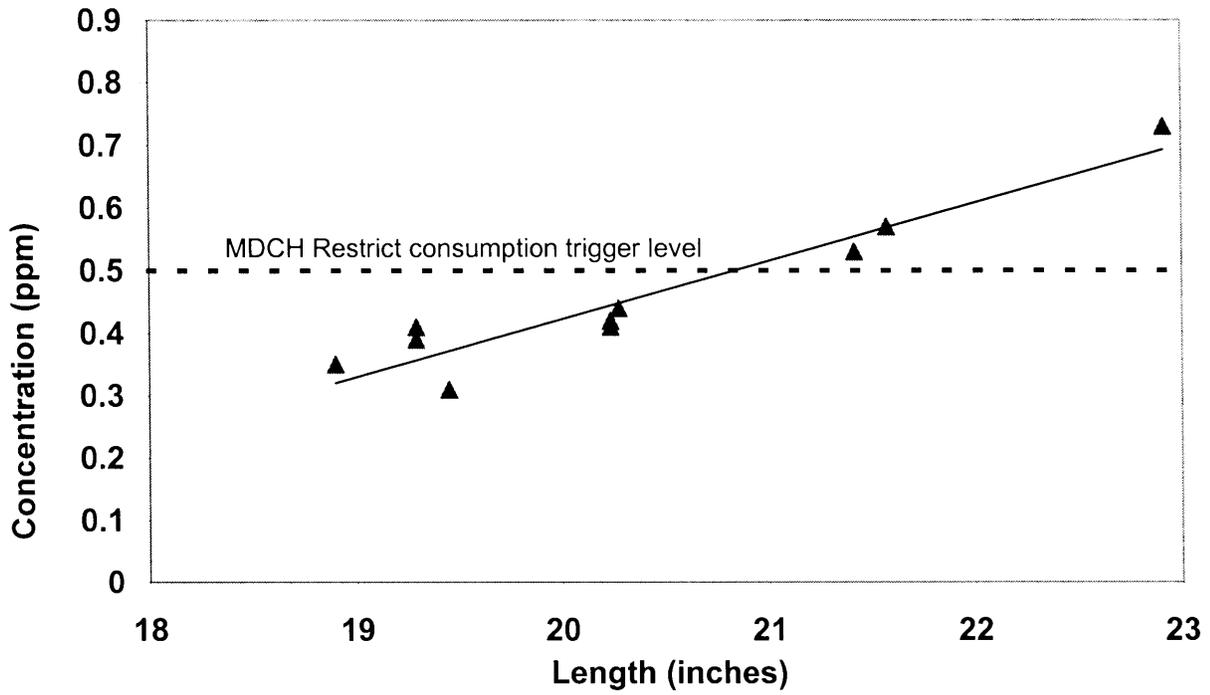


Figure 84. Total length versus mercury concentration in walleye collected from Manistique Lake in 2003 (ID 2003075).



Figure 85. Total length versus total PCB concentration in redhorse sucker collected from the Manistique River downstream of the Manistique Papers Dam in 2003 (ID 2003077).

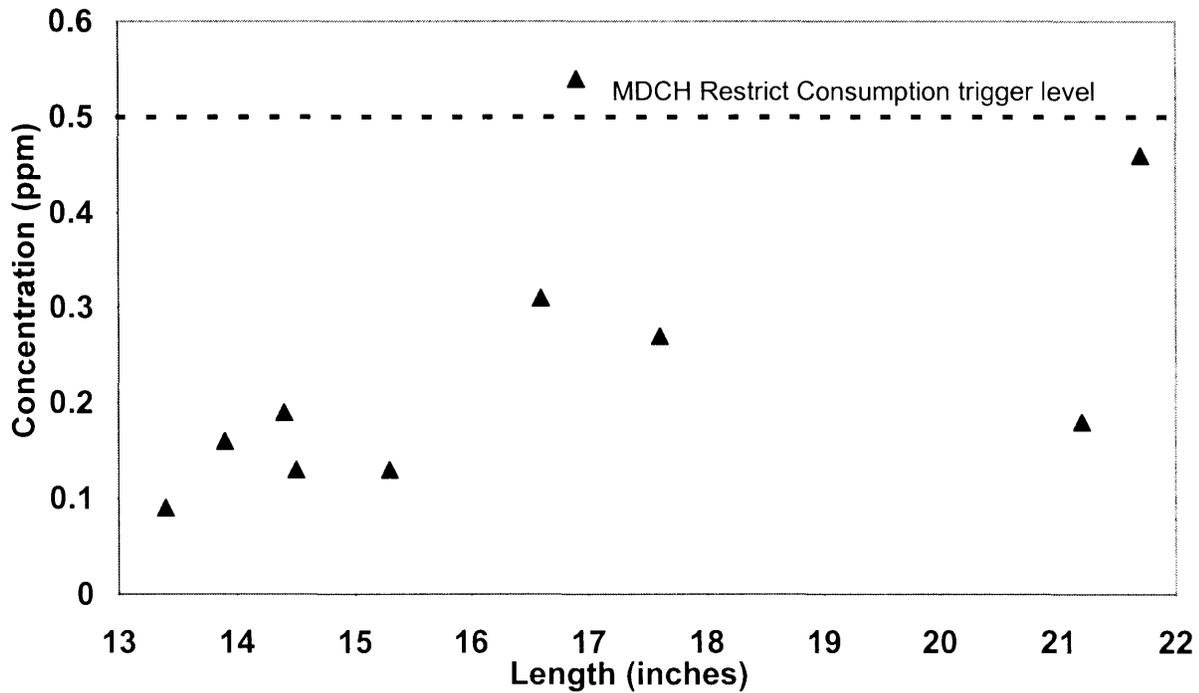


Figure 86. Total length versus mercury concentration in redhorse sucker collected from the Manistique River downstream of the Manistique Papers Dam in 2003 (ID 2003077).



Figure 87. Total length versus total PCB concentration in smallmouth bass collected from the Manistique River downstream of the Manistique Papers Dam in 2003 (ID 2003077).

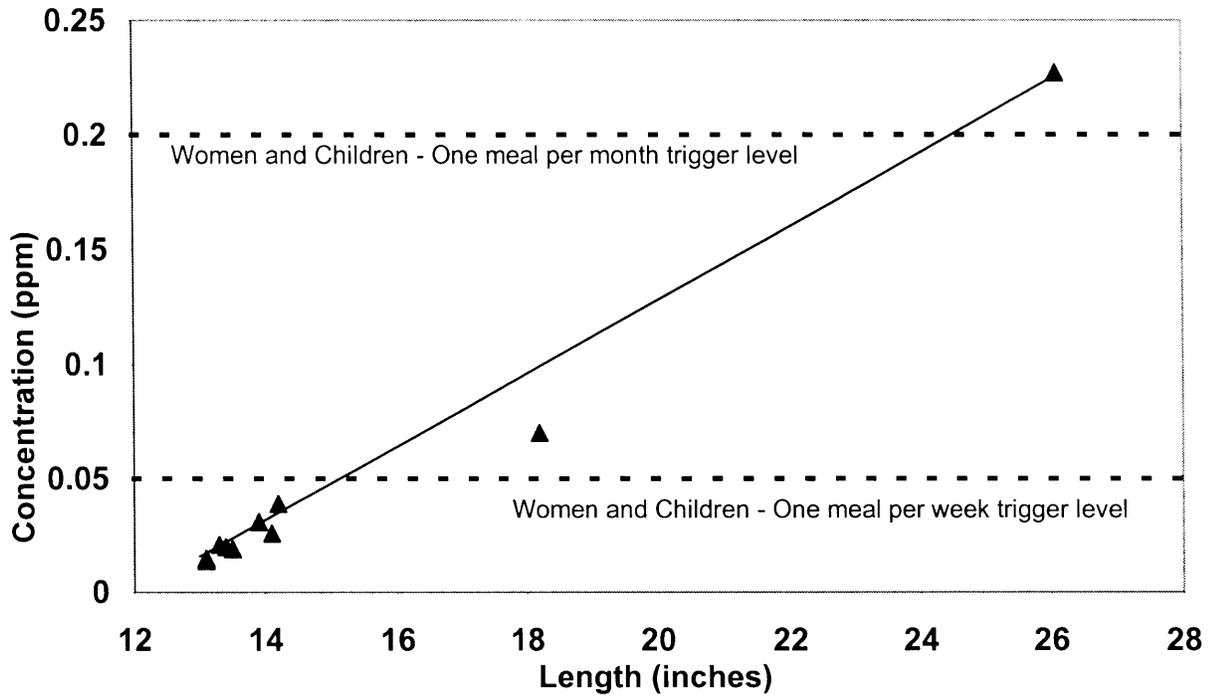


Figure 88. Total length versus total PCB concentration in walleye collected from the Manistique River downstream of the Manistique Papers Dam in 2003 (ID 2003077).

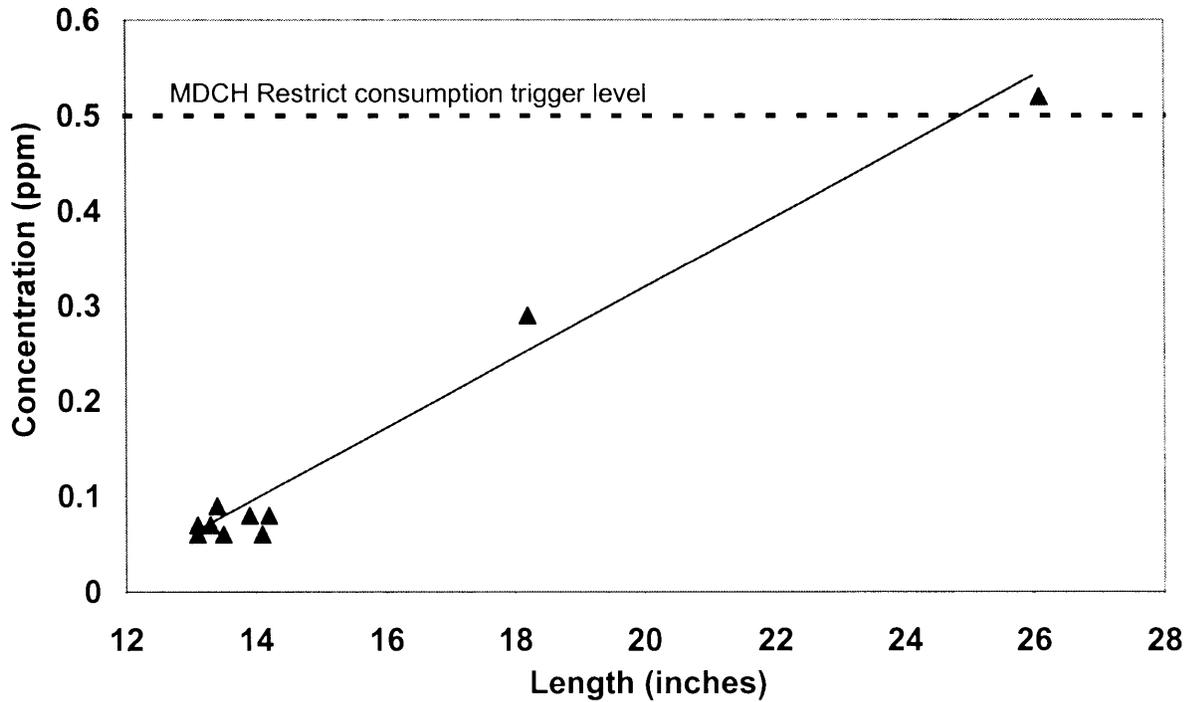


Figure 89. Total length versus mercury concentration in walleye collected from the Manistique River downstream of the Manistique Papers Dam in 2003 (ID 2003077).

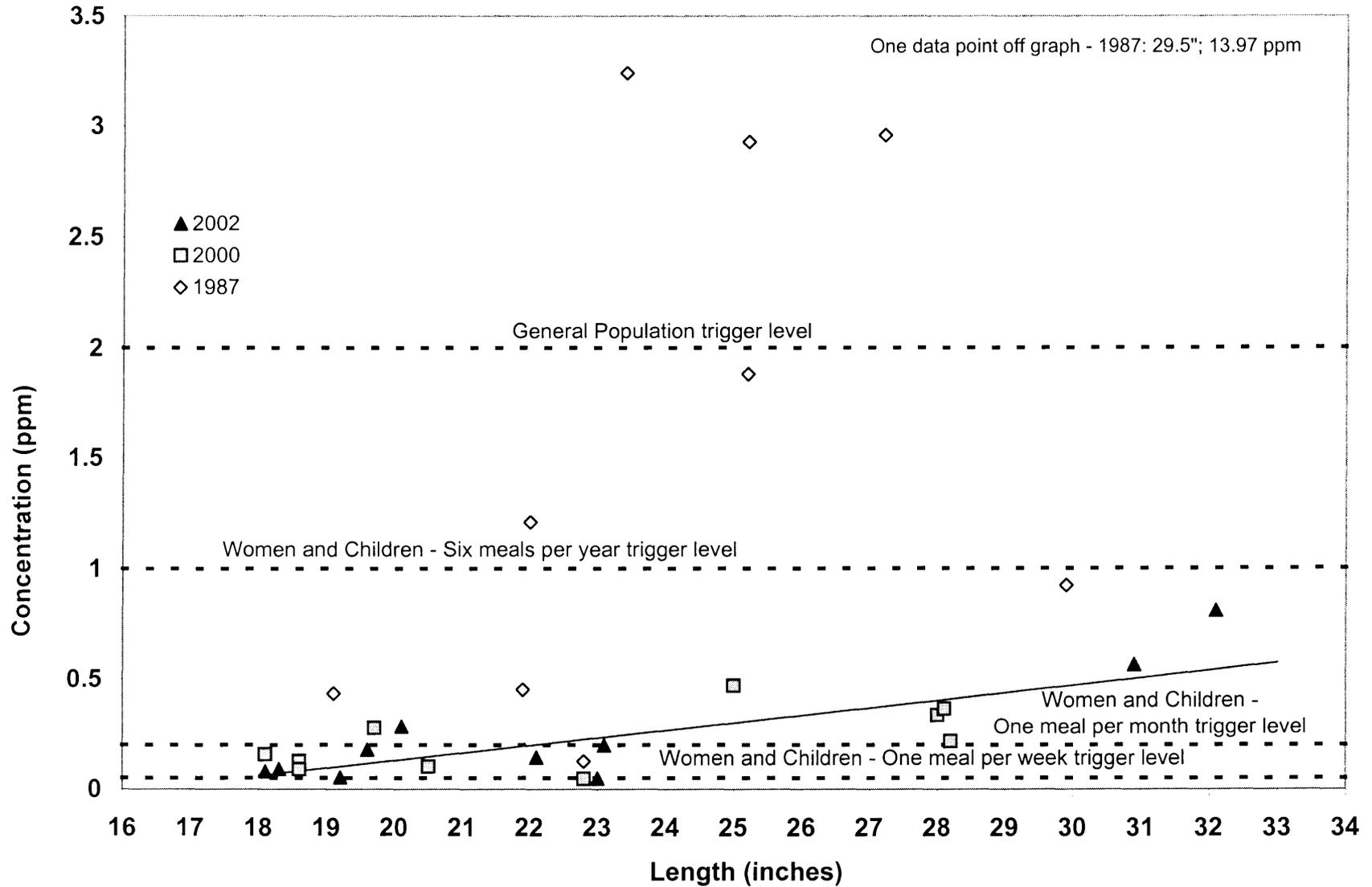


Figure 90. Total length versus total PCB concentration in carp collected from Mona Lake, Muskegon County in 1987 (ID 87056), 2000 (ID 2000055), and 2002 (ID 2002069).

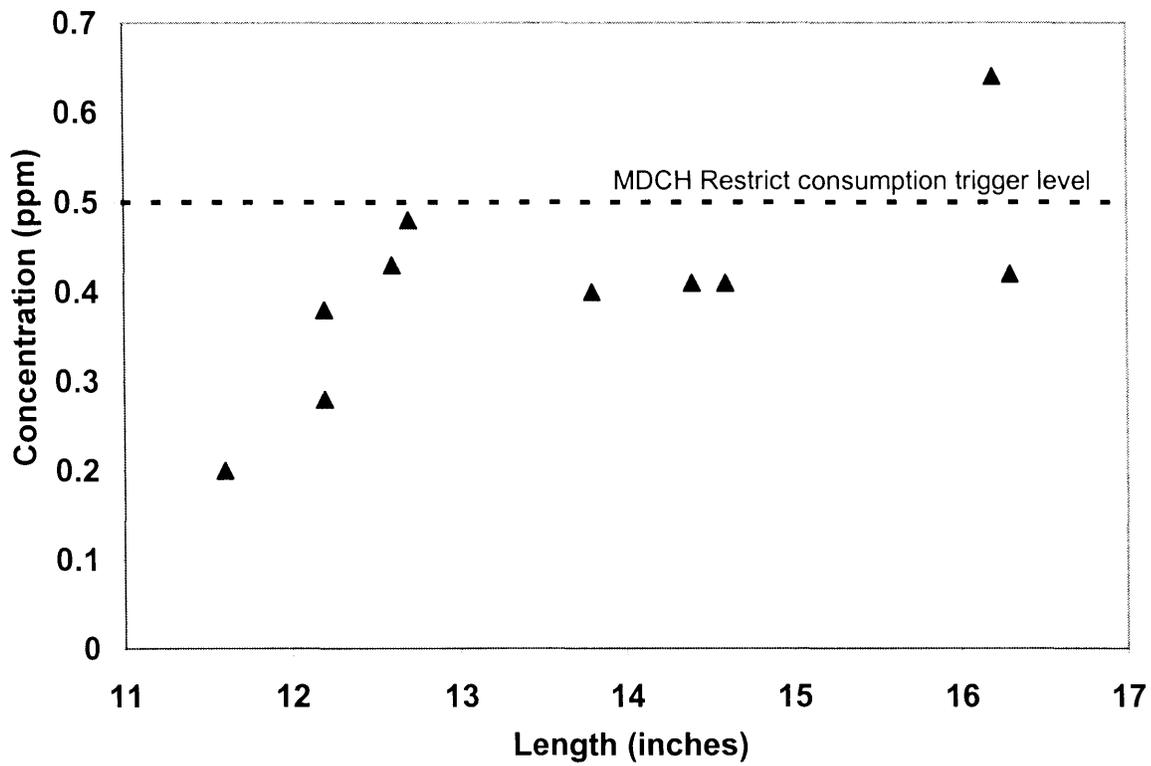


Figure 91. Total length versus mercury concentration in largemouth bass collected from Montcalm Lake, Montcalm County in 2003 (ID 2003065).

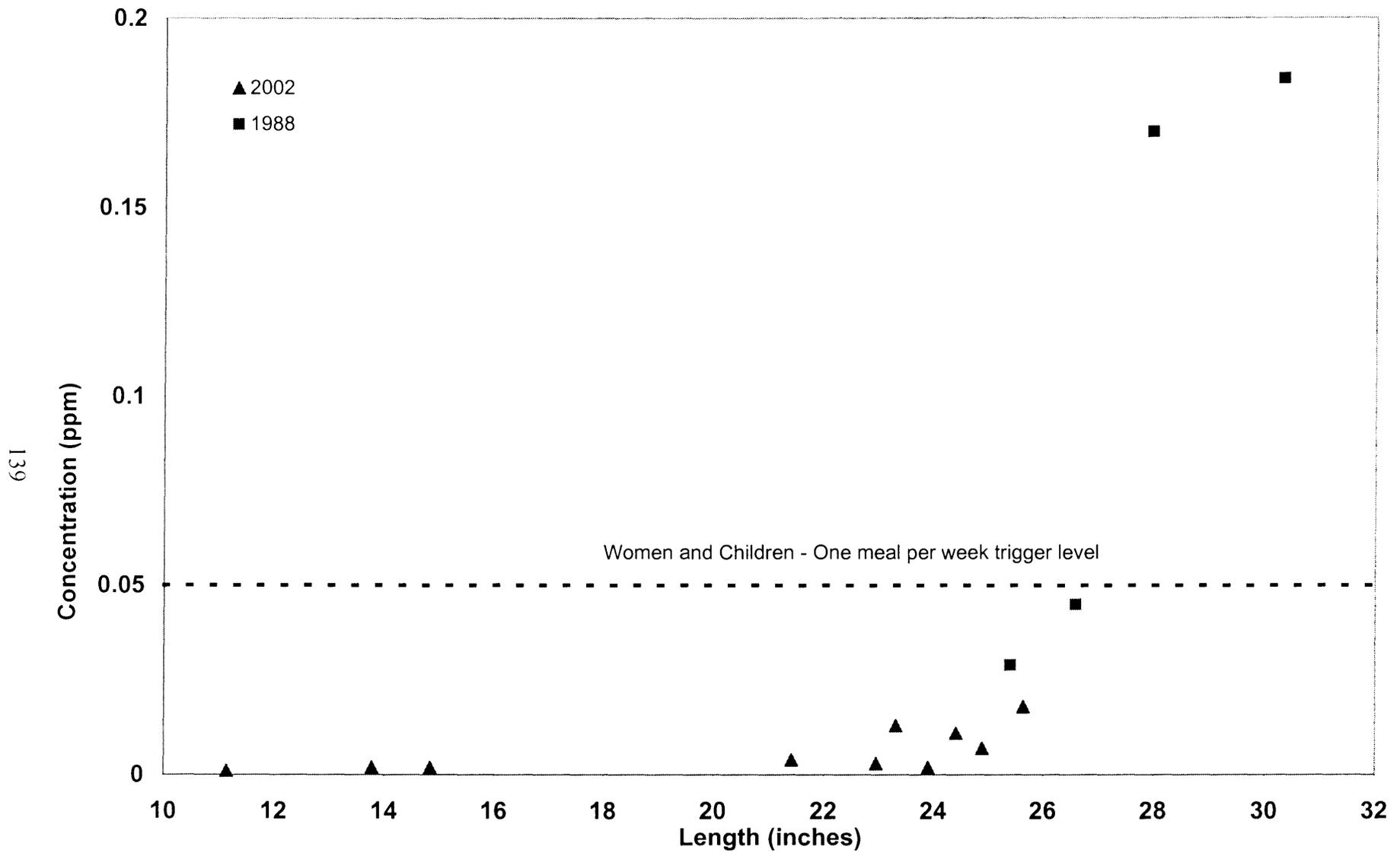


Figure 92. Total length versus total PCB concentration in carp collected from Morrison Lake, Ionia County in 1988 (ID 88002) and 2003 (ID 2003081).

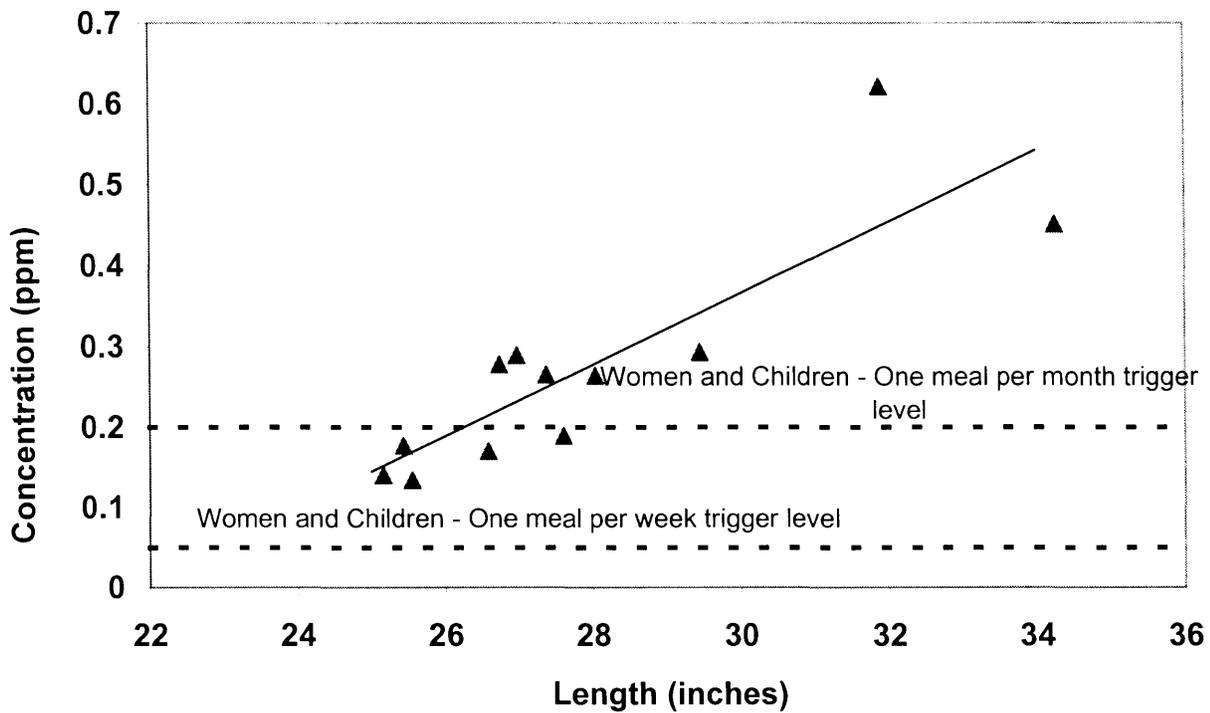


Figure 93. Total length versus total PCB concentration in lake trout collected from North Lake Leelanau, Leelanau County in 2003 (ID 2003082).

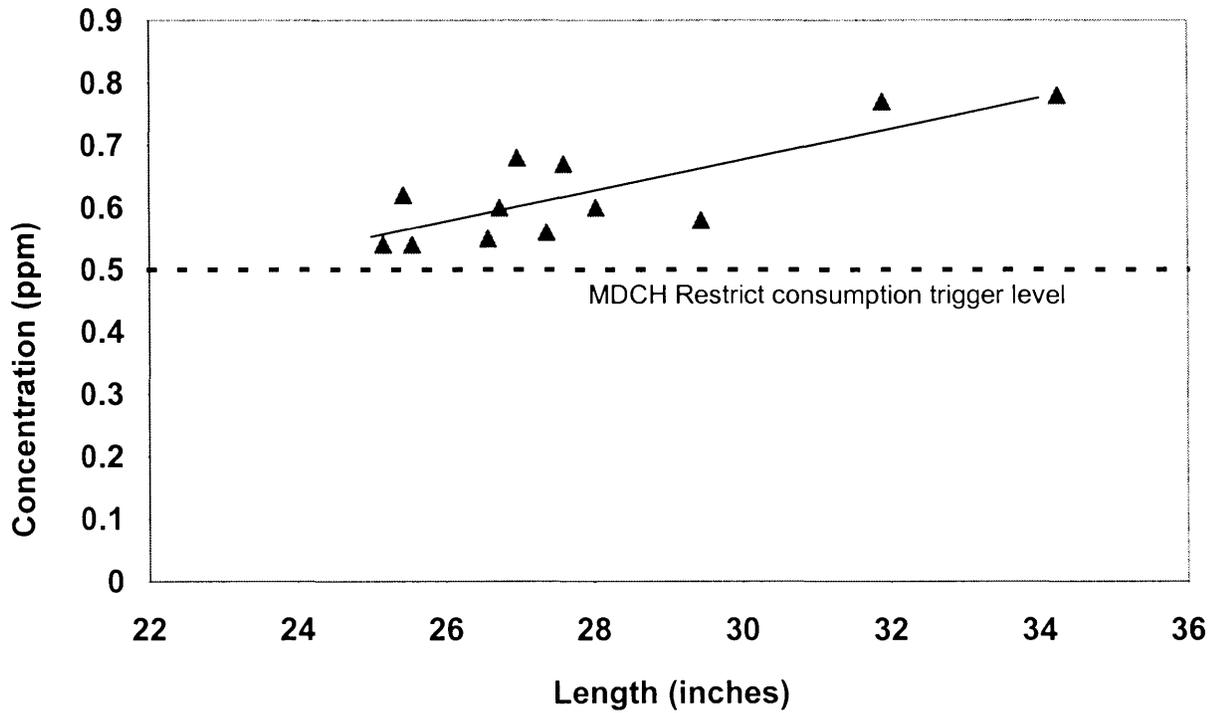


Figure 94. Total length versus mercury concentration in lake trout collected from North Lake Leelanau, Leelanau County in 2003 (ID 2003082).

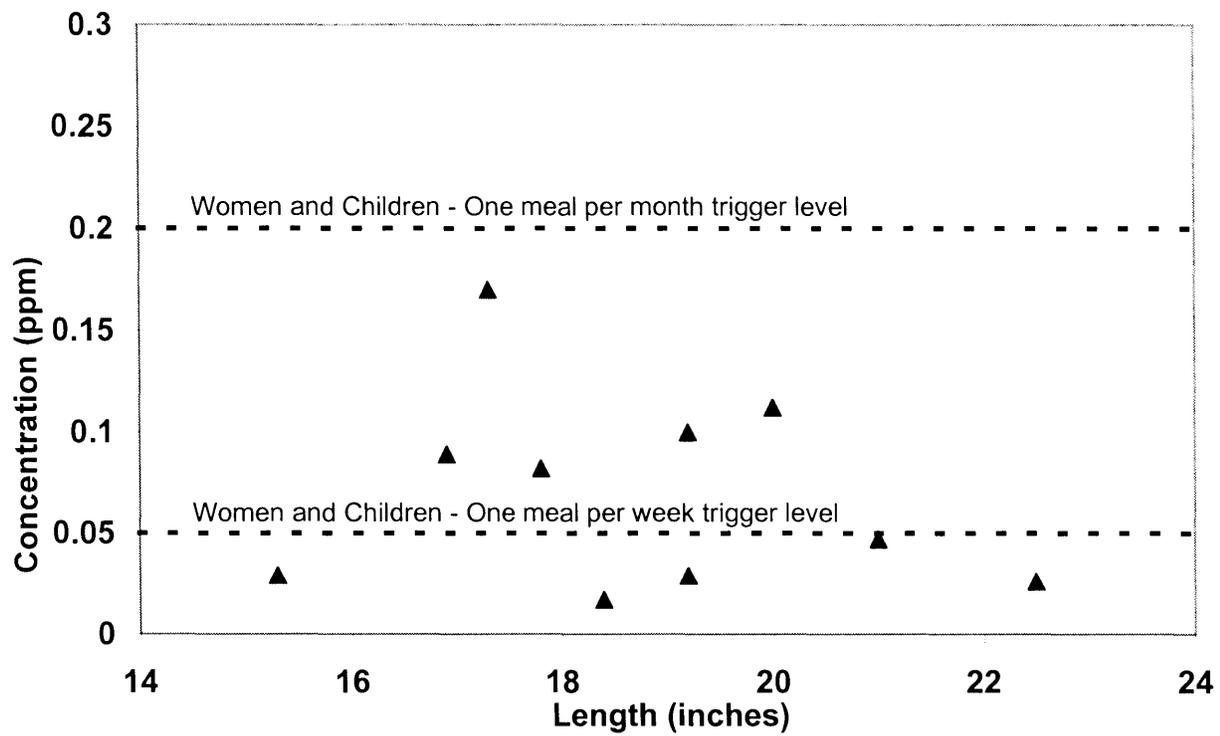


Figure 95. Total length versus total PCB concentration in white sucker collected from North Lake Leelanau, Leelanau County in 2002 (ID 2002078).

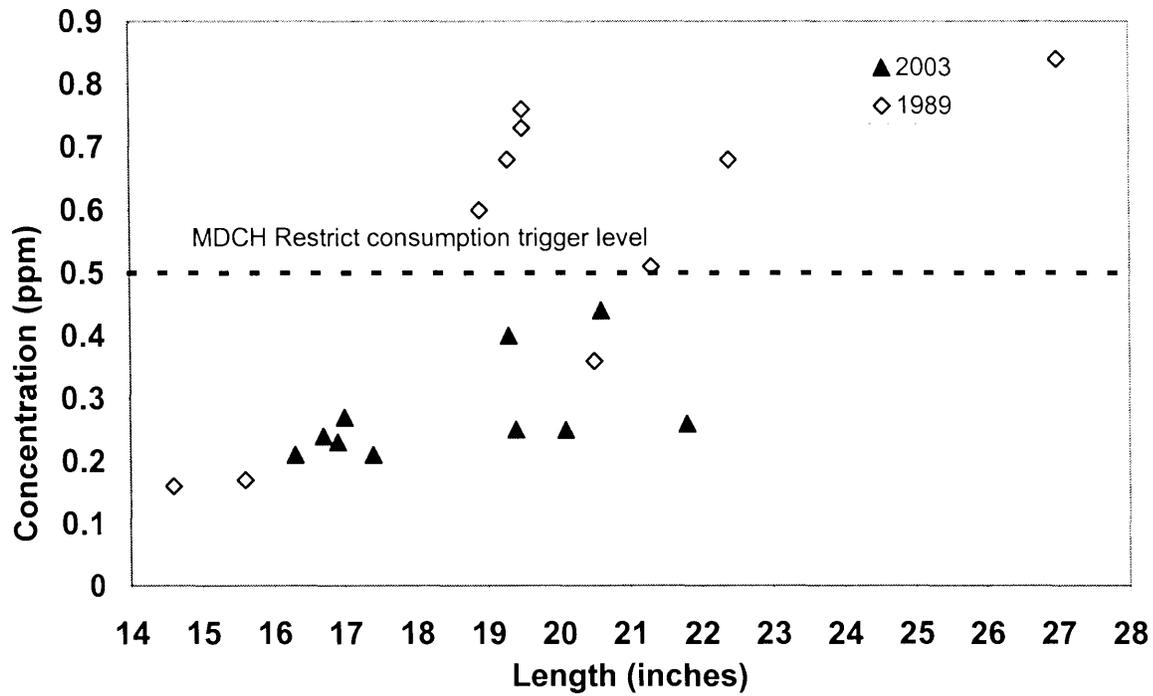


Figure 96. Total length versus mercury concentration in walleye collected from North Manistique Lake, Luce County in 1989 (ID 89048) and 2003 (ID 2003083).

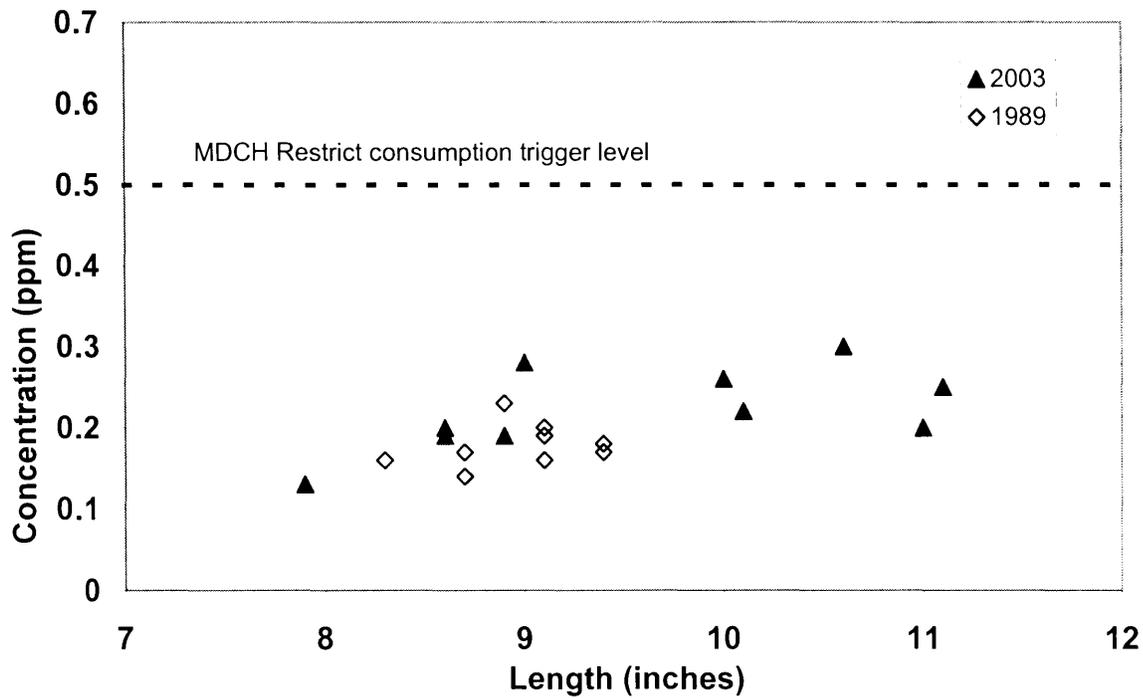


Figure 97. Total length versus mercury concentration in yellow perch collected from North Manistique Lake, Luce County in 1989 (ID 89048) and 2003 (ID 2003083).

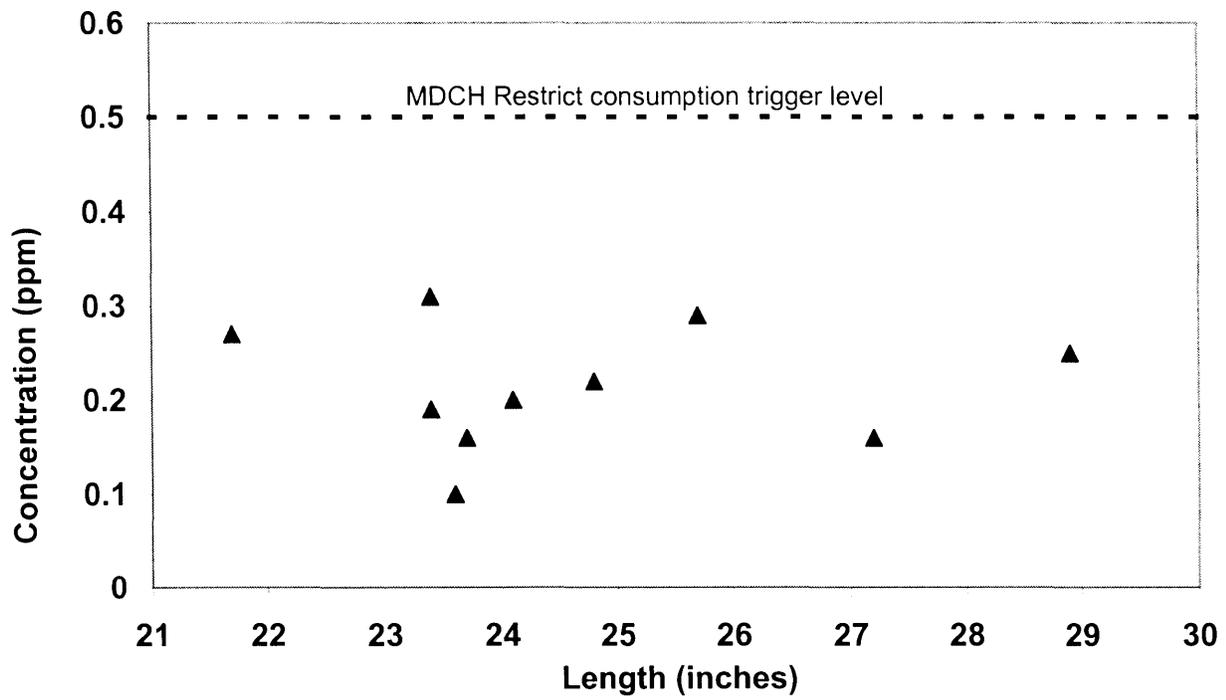


Figure 98. Total length versus mercury concentration in northern pike collected from Paint Lake, Iron County in 2003 (ID 2003144).

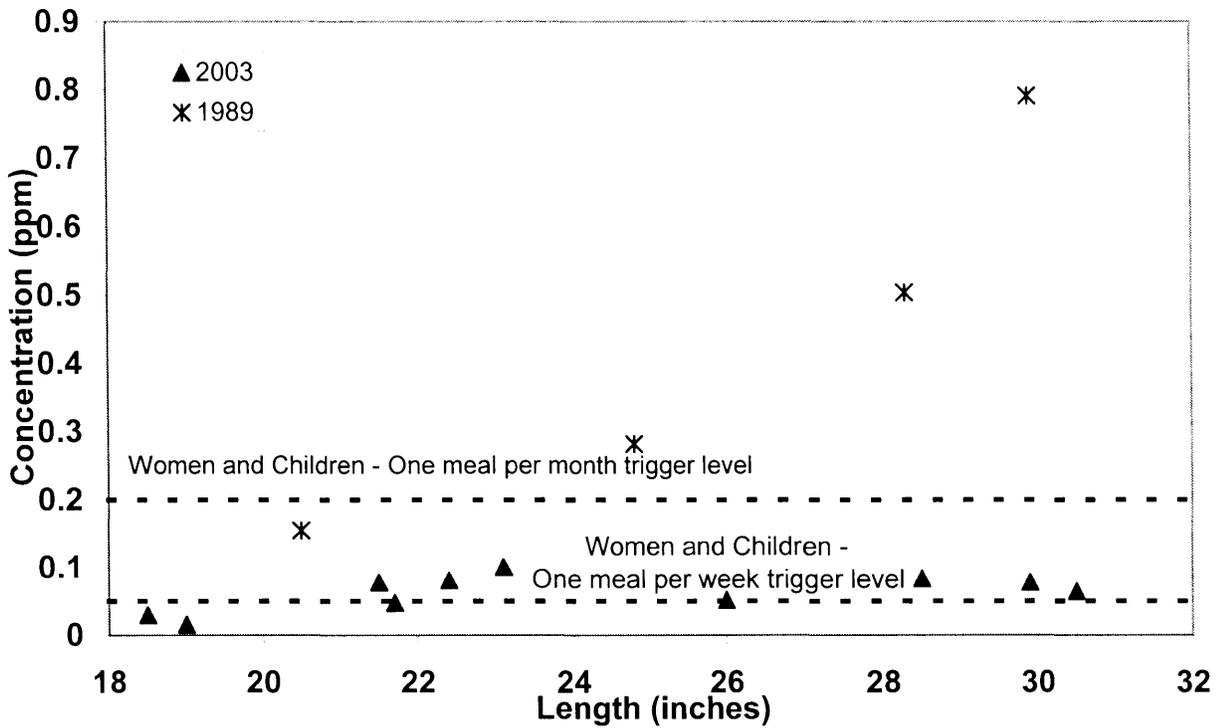


Figure 99. Total length versus total PCB concentration in northern pike collected from Pere Marquette Lake, Mason County in 1989 (ID89075) and 2003 (ID 2003086).

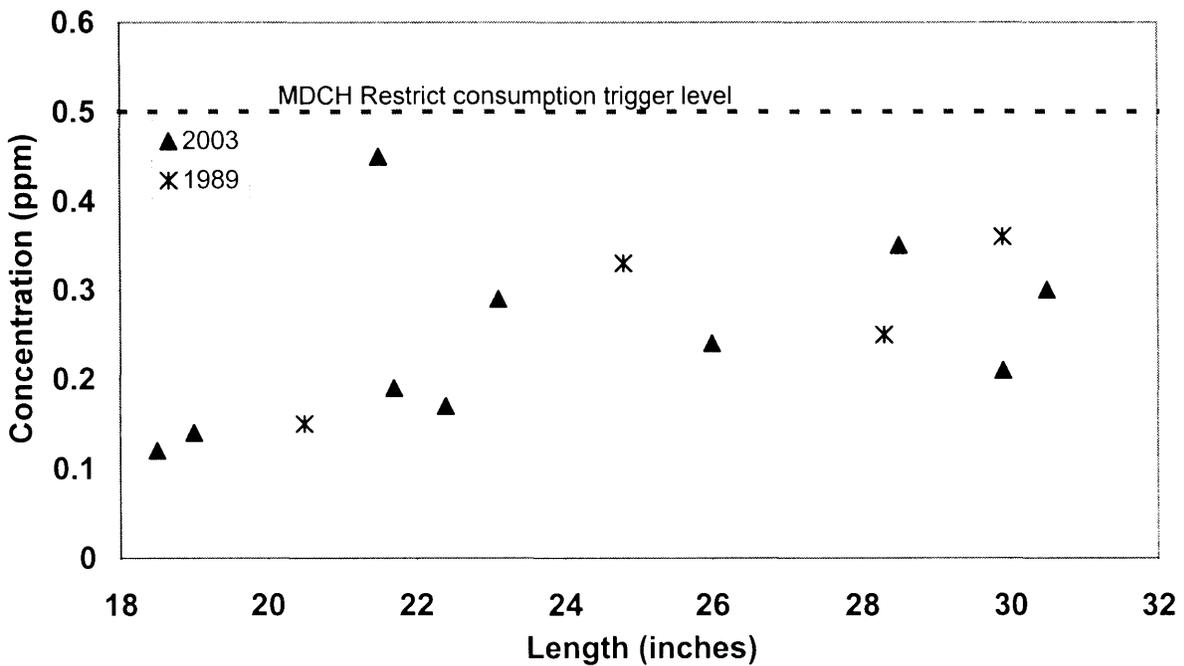


Figure 100. Total length versus mercury concentration in northern pike collected from Pere Marquette Lake, Mason County in 1989 (ID 89075) and 2003 (ID 2003086).

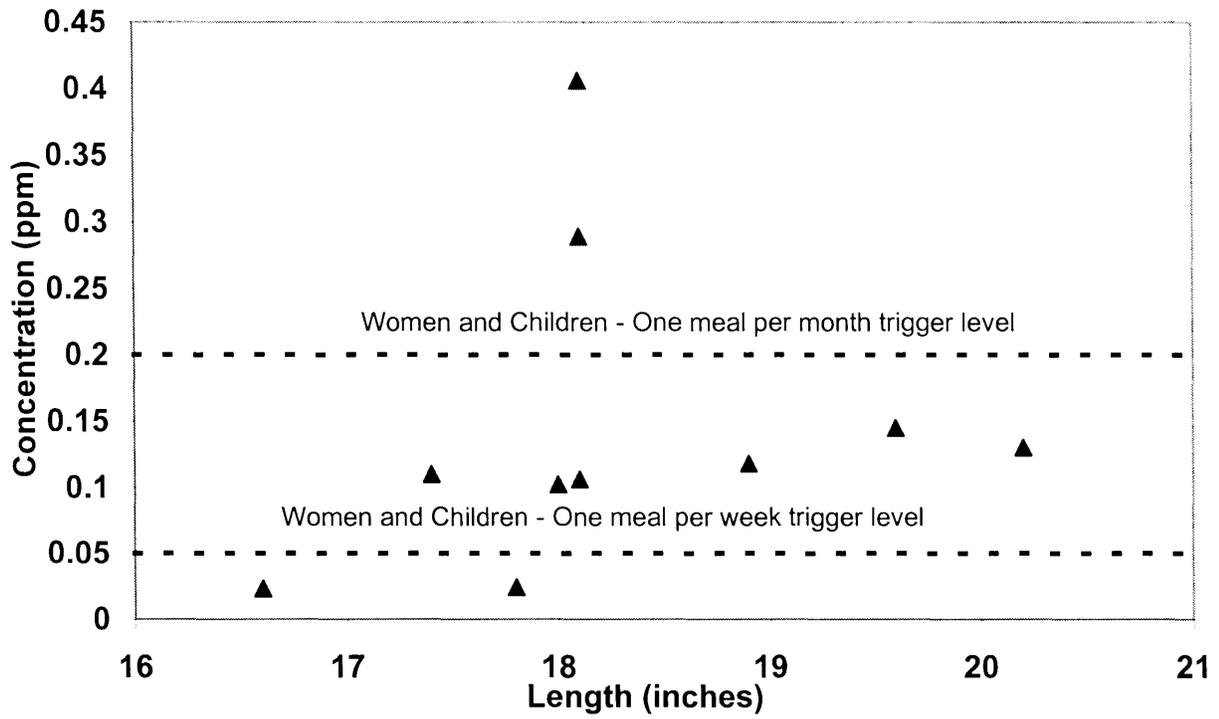


Figure 101. Total length versus total PCB concentration in white sucker collected from Pere Marquette Lake, Mason County in 2003 (ID 2003086).

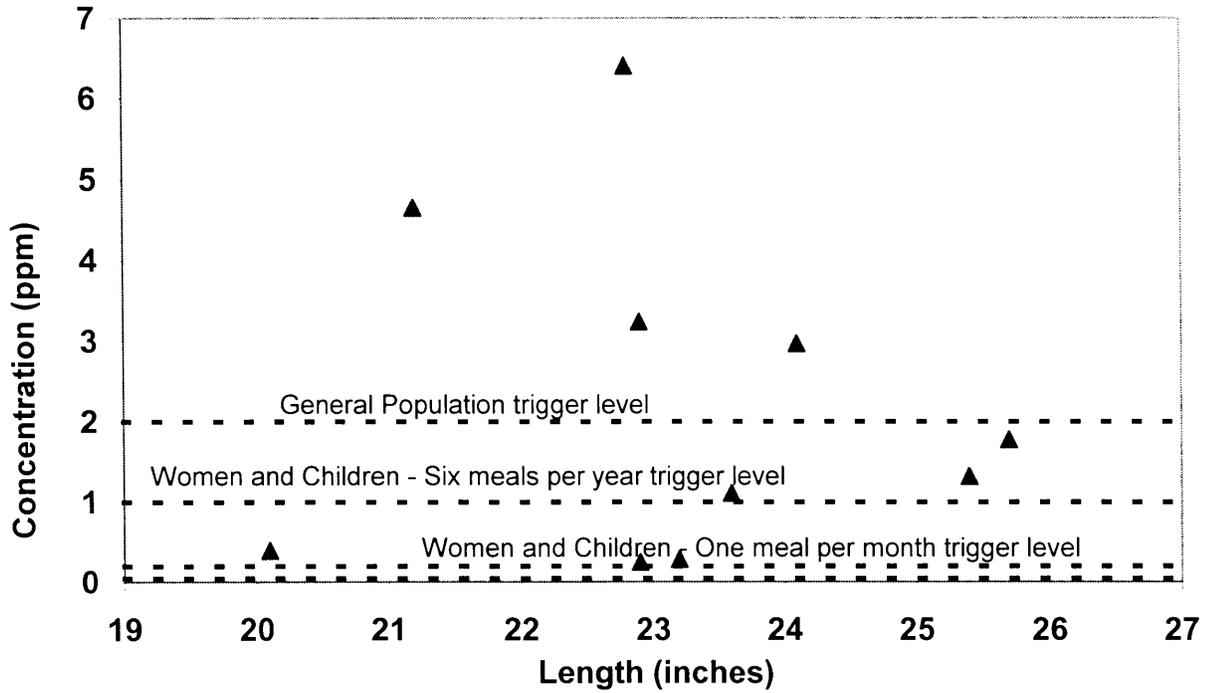


Figure 102. Total length versus total PCB concentration in carp collected from the Rabbit River, downstream of Hamilton Dam in 2003 (ID 2003098).

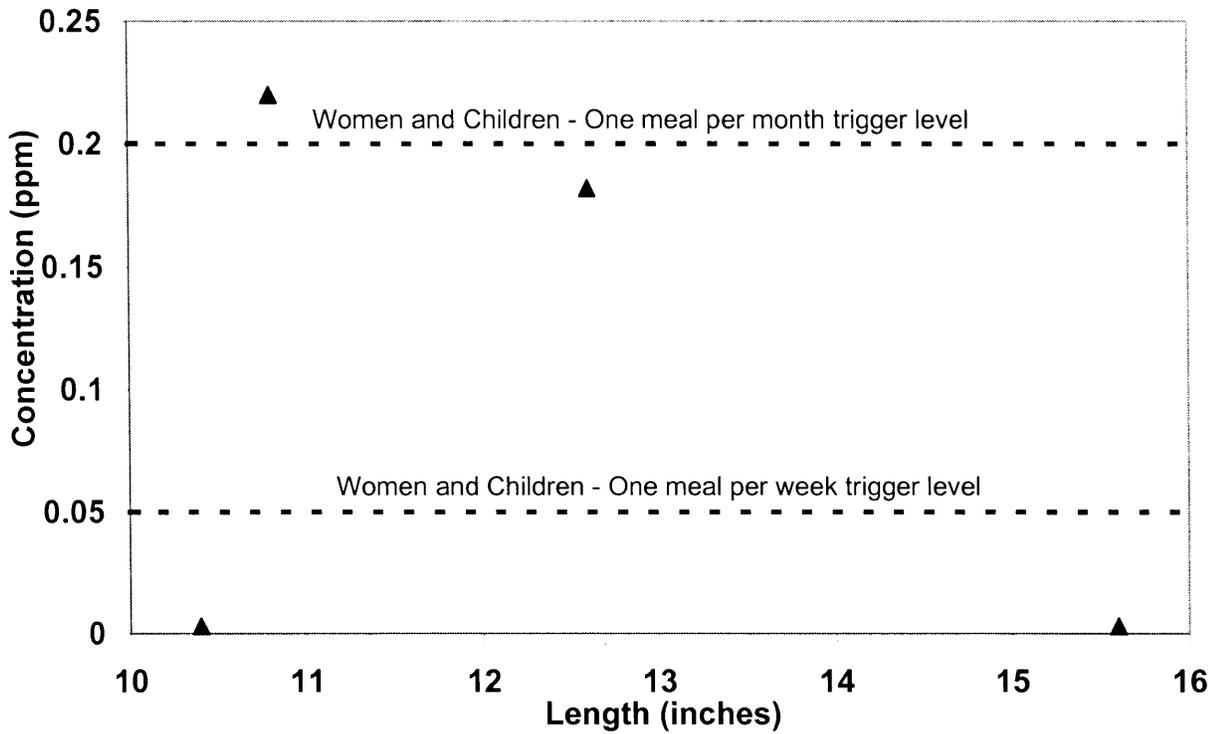


Figure 103. Total length versus total PCB concentration in largemouth bass collected from the Rabbit River, downstream of Hamilton Dam in 2003 (ID 2003098).

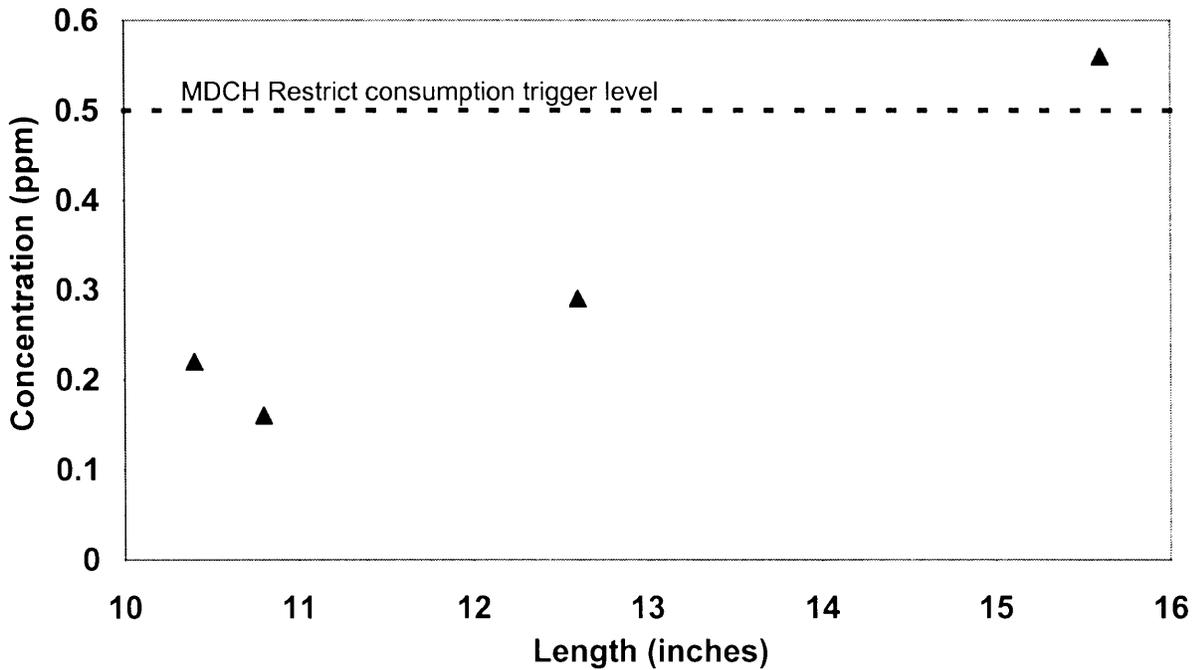


Figure 104. Total length versus mercury concentration in largemouth bass collected from the Rabbit River, downstream of Hamilton Dam in 2003 (ID 2003098).

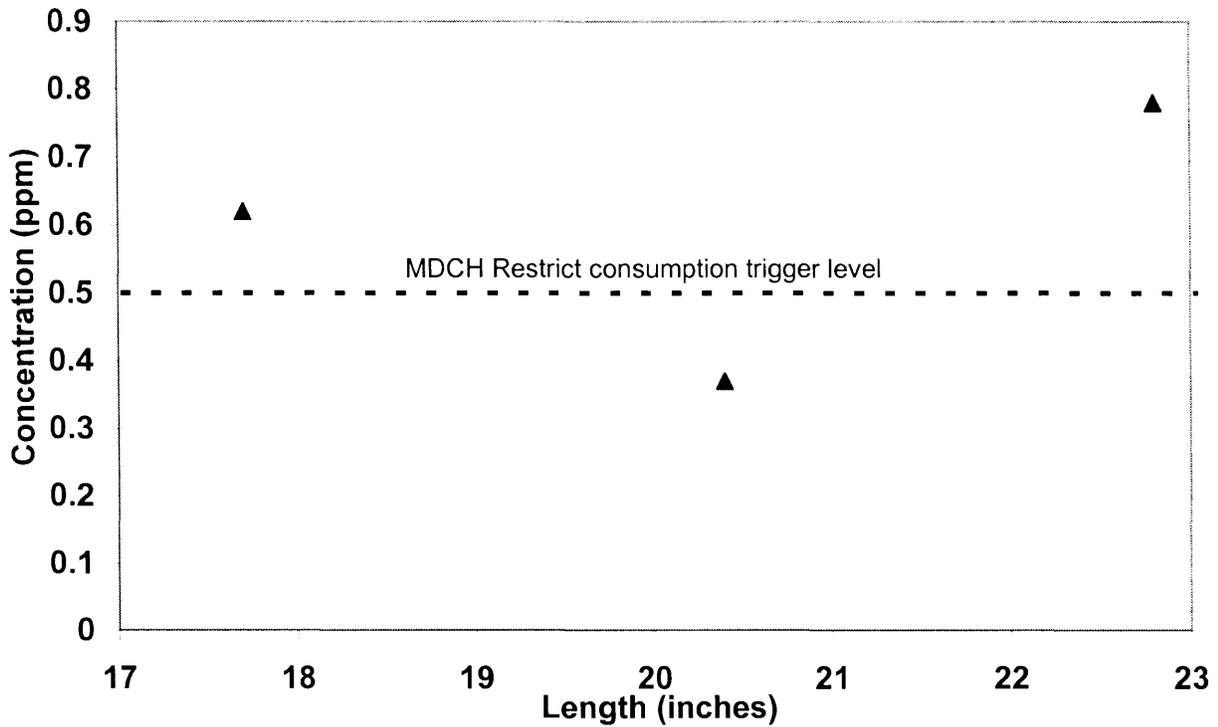


Figure 105. Total length versus mercury concentration in northern pike collected from the Rabbit River, downstream of Hamilton Dam in 2003 (ID 2003098).

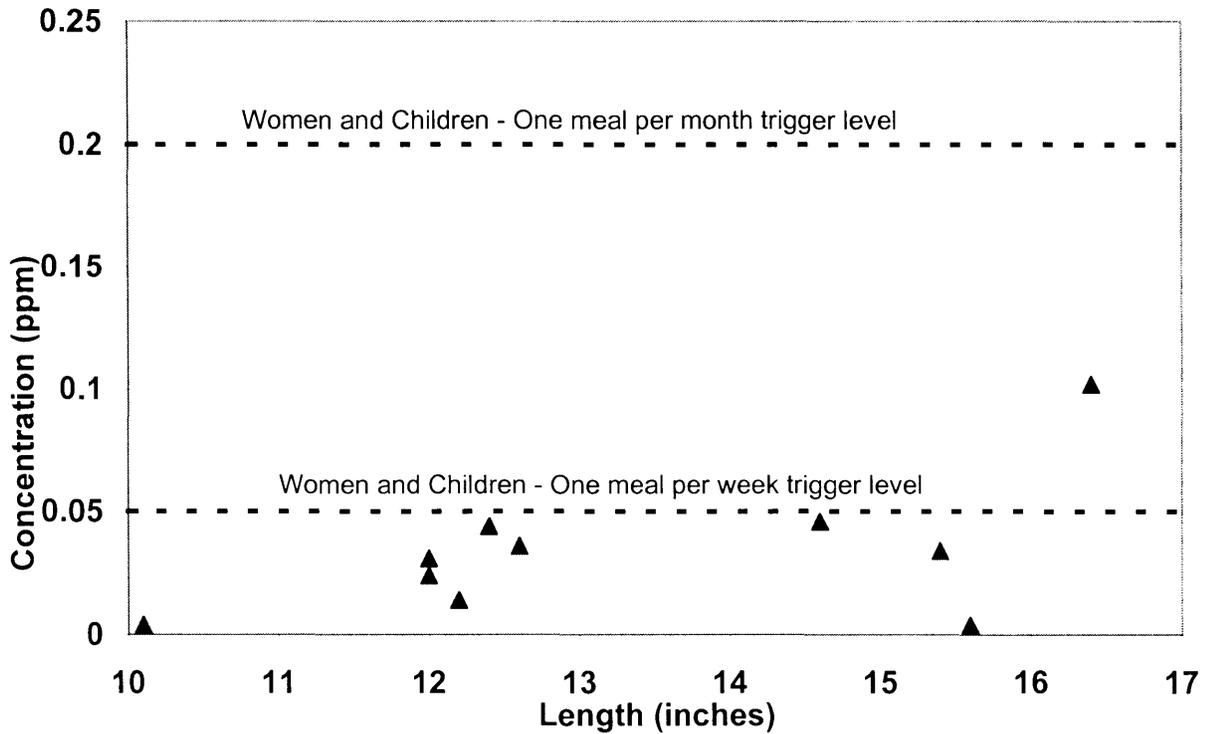


Figure 106. Total length versus total PCB concentration in redhorse sucker collected from the Rabbit River, downstream of Hamilton Dam in 2003 (ID 2003098).



Figure 107. Total length versus total PCB concentration in carp collected from the Rabbit River, upstream of Hamilton Dam in 2003 (ID 2003096).

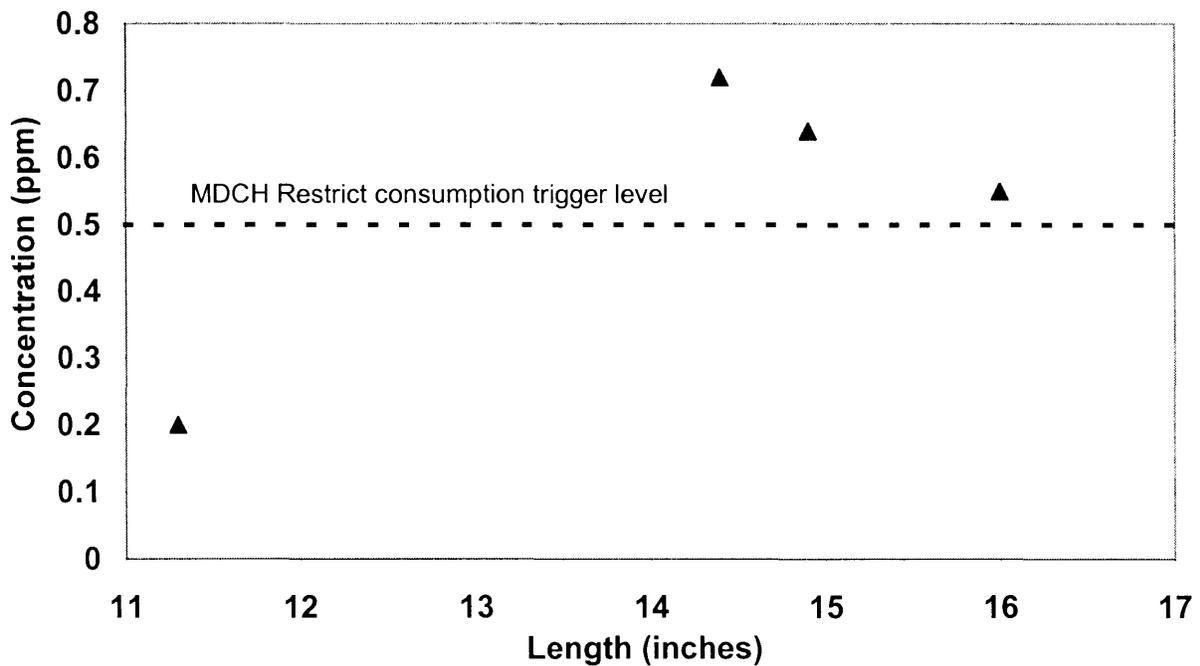


Figure 108. Total length versus mercury concentration in largemouth bass collected from the Rabbit River, upstream of Hamilton Dam in 2003 (ID 2003096).

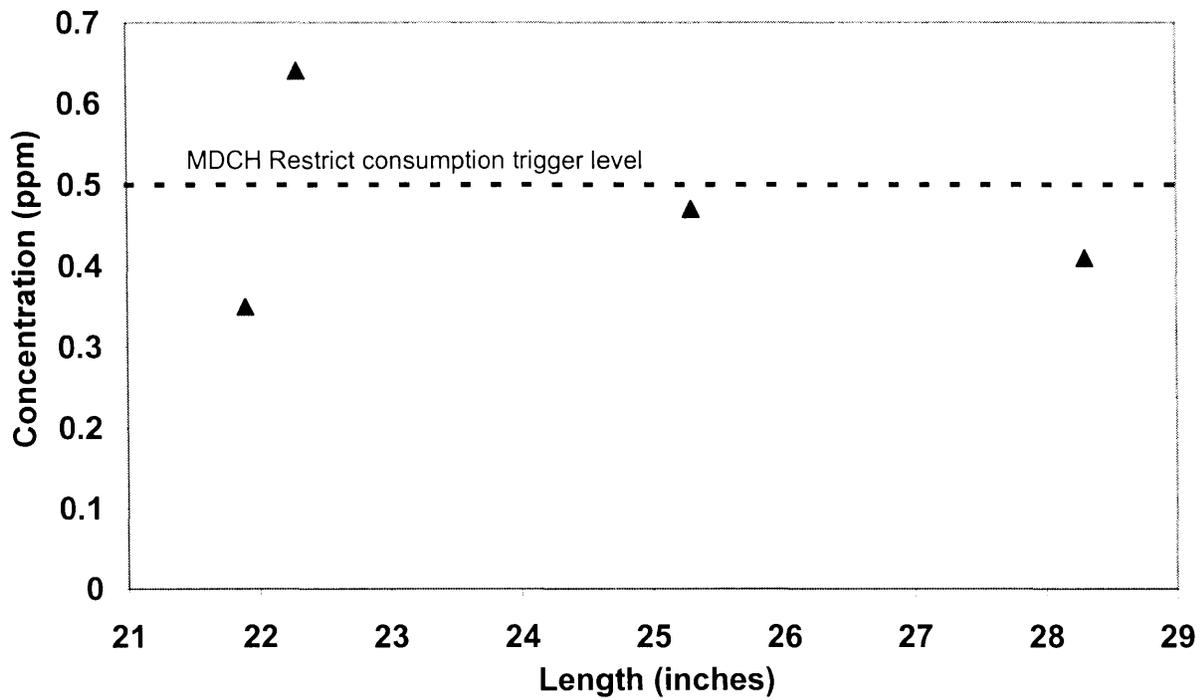


Figure 109. Total length versus mercury concentration in northern pike collected from the Rabbit River, upstream of Hamilton Dam in 2003 (ID 2003096).

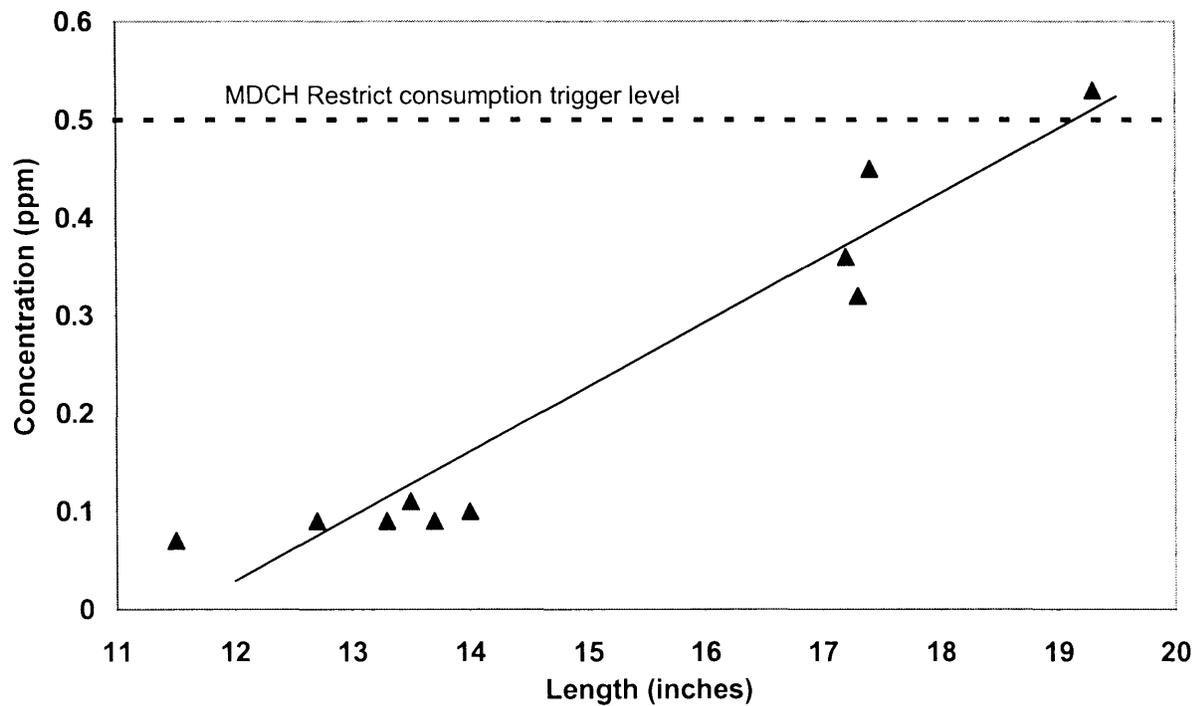


Figure 110. Total length versus mercury concentration in redhorse sucker collected from the Rabbit River, upstream of Hamilton Dam in 2003 (ID 2003096).

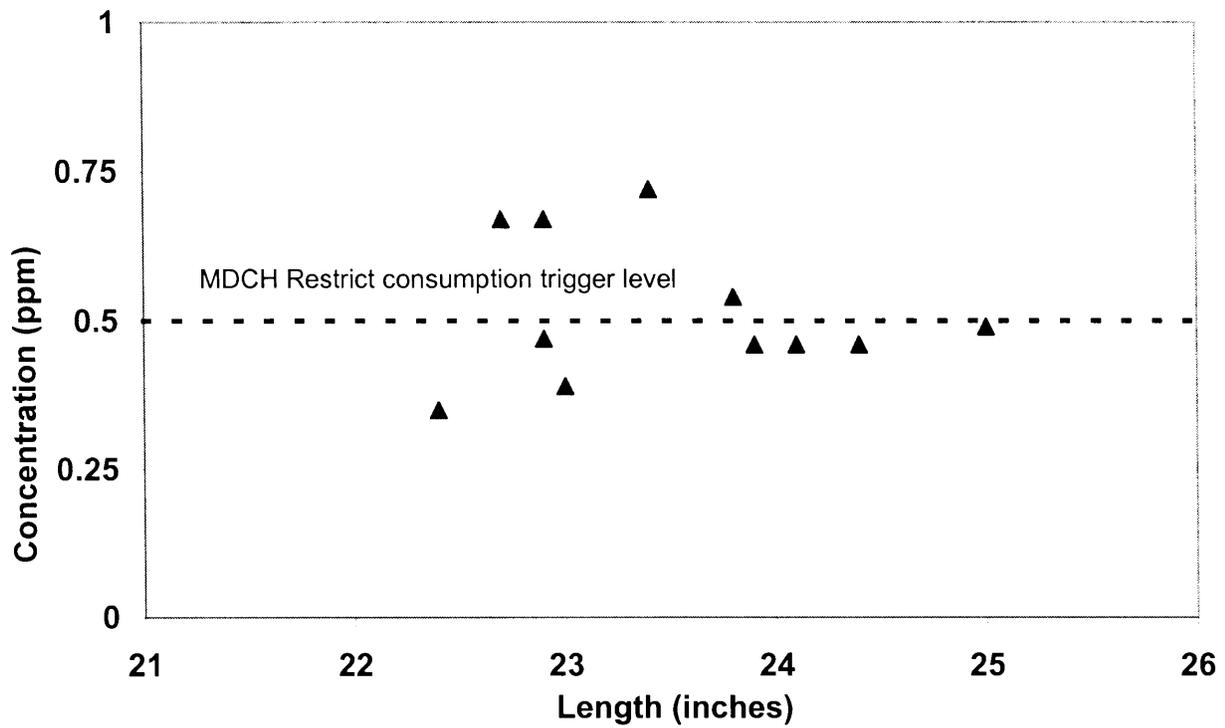


Figure 111. Total length versus mercury concentration in northern pike collected from Runkle Lake, Iron County in 2003 (ID 2003104).

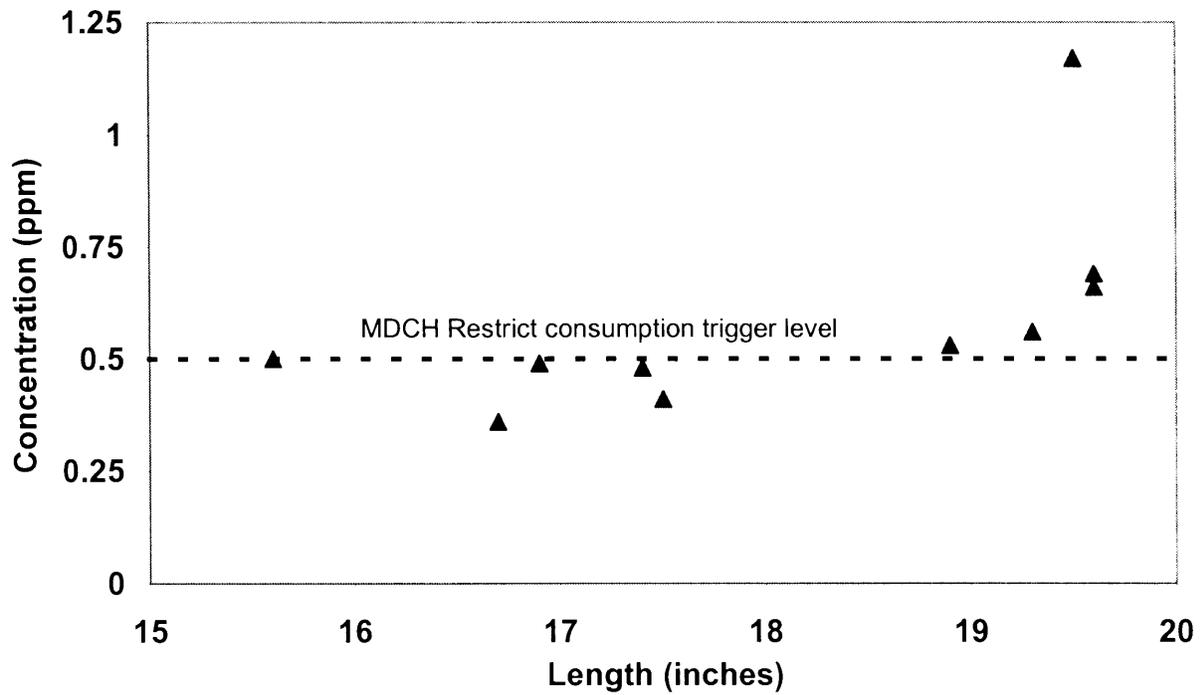


Figure 112. Total length versus mercury concentration in walleye collected from Silver Lake, Dickinson County in 2002 (ID 2002111).

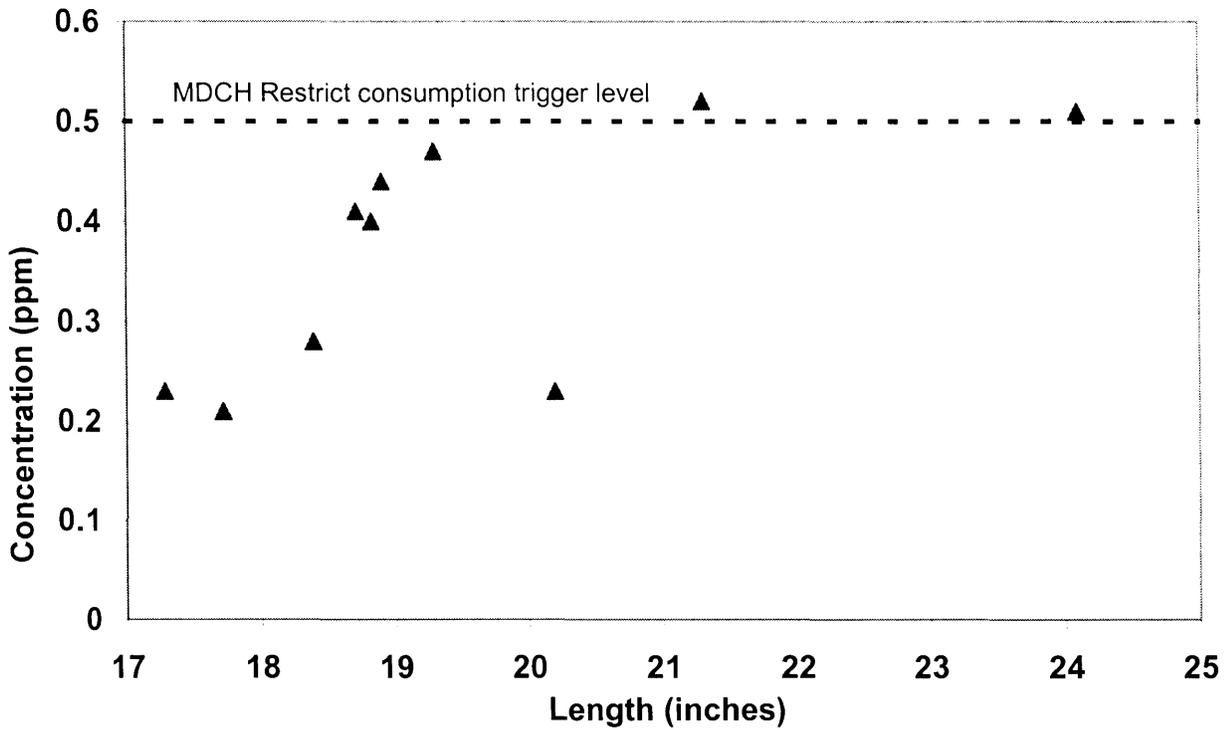


Figure 113. Total length versus mercury concentration in northern pike collected from Six Mile Lake, Charlevoix County in 2003 (ID 2003110).

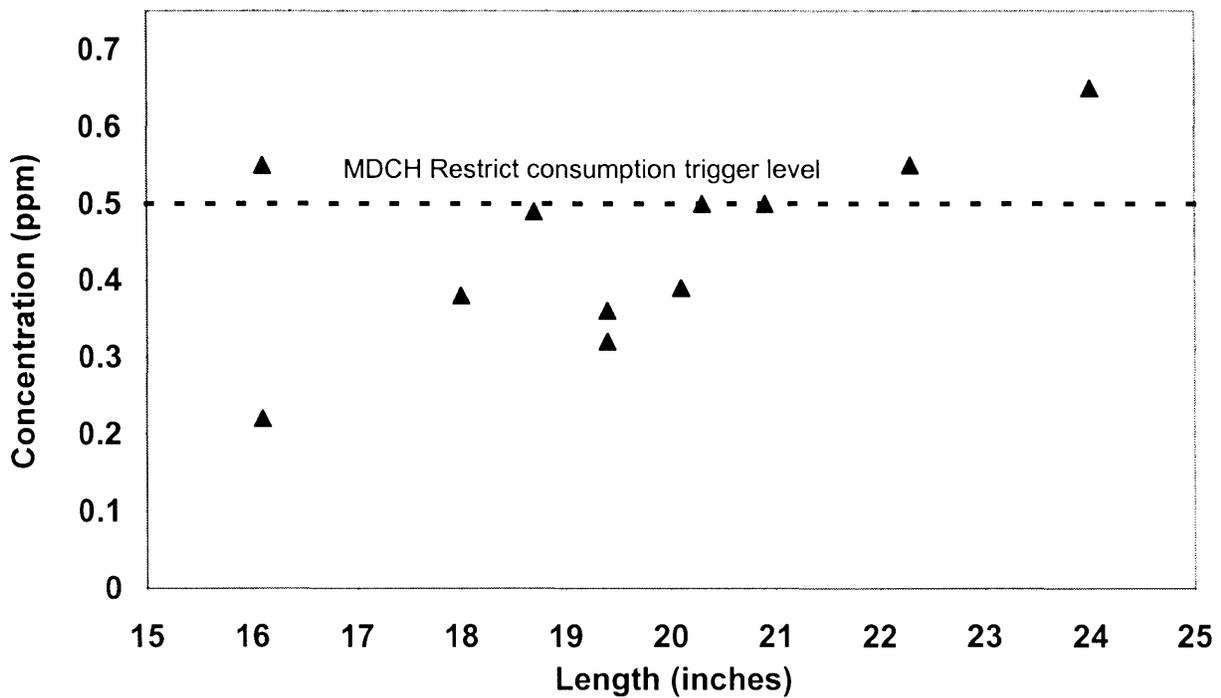


Figure 114. Total length versus mercury concentration in walleye collected from South Groveland Pond, Dickinson County in 2003 (ID 2003146).

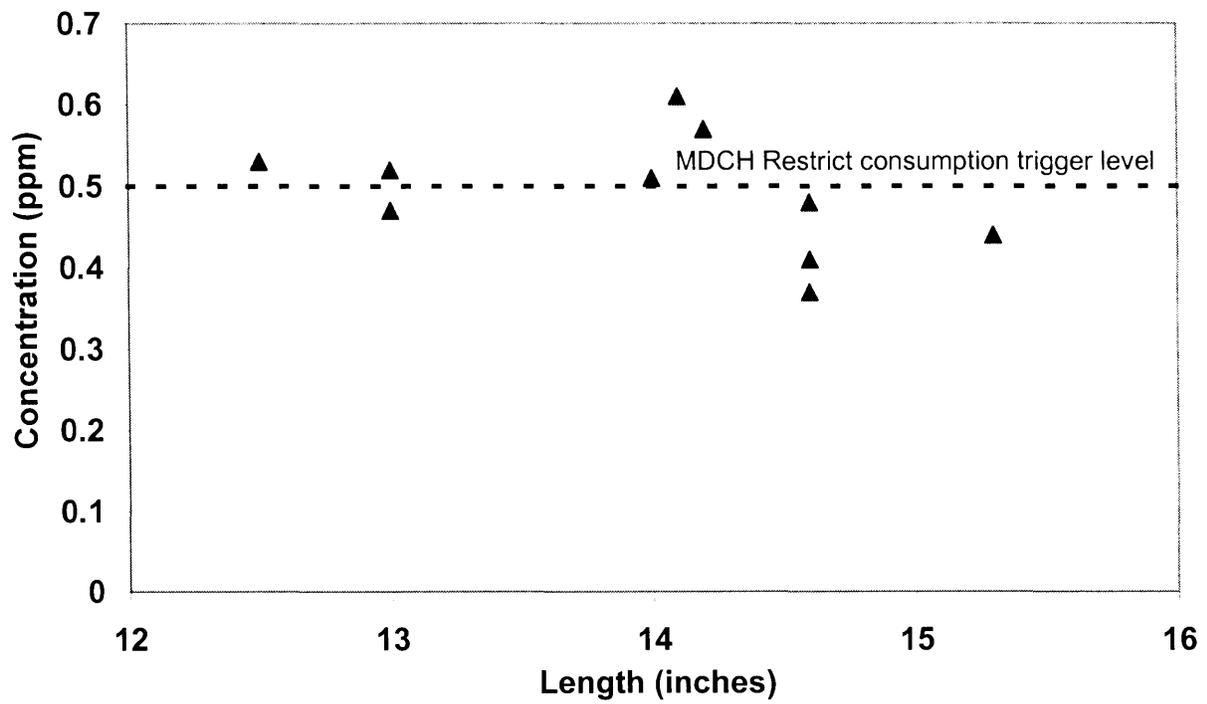


Figure 115. Total length versus mercury concentration in largemouth bass collected from Thompson Lake, St. Joseph County in 2002 (ID 2002036).



Figure 116. Total length versus total PCB concentration in carp collected from Union Lake, Branch County in 1991 (ID 91026) and 2003 (ID 2003135).

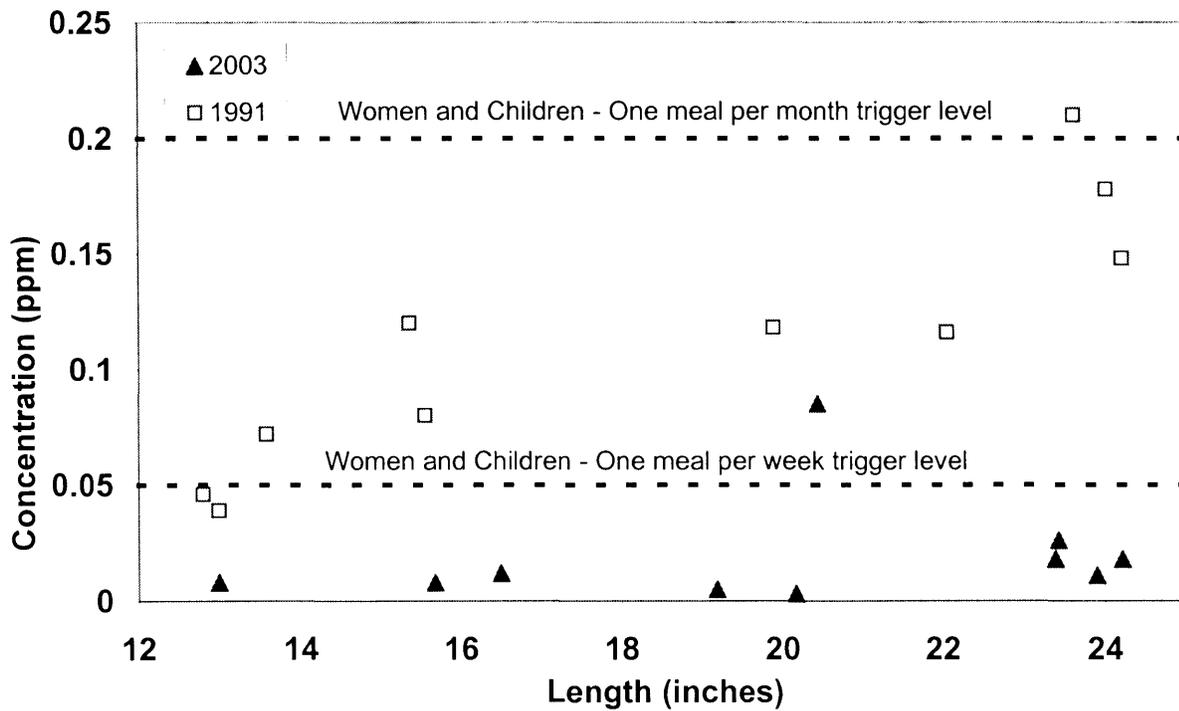


Figure 117. Total length versus total PCB concentration in channel catfish collected from Union Lake, Branch County in 1991 (ID 91026) and 2003 (ID 2003135).

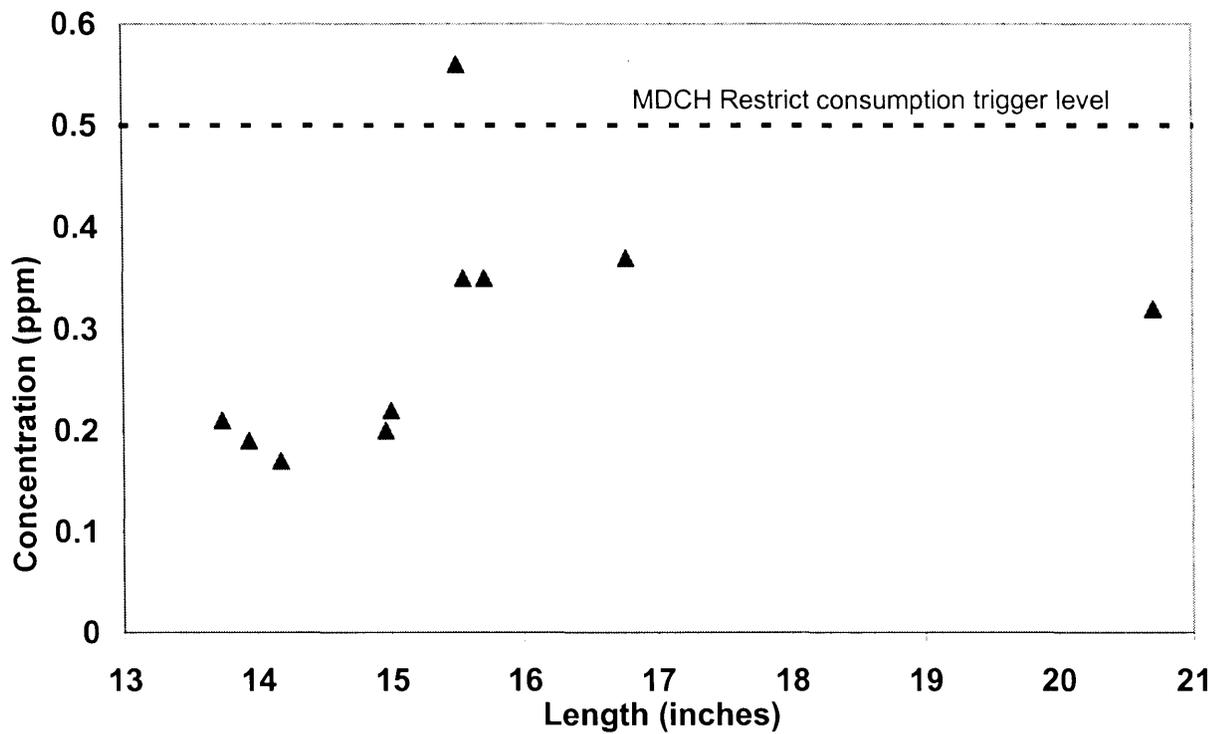


Figure 118. Total length versus mercury concentration in largemouth bass collected from Union Lake, Branch County in 2003 (ID 2003135).

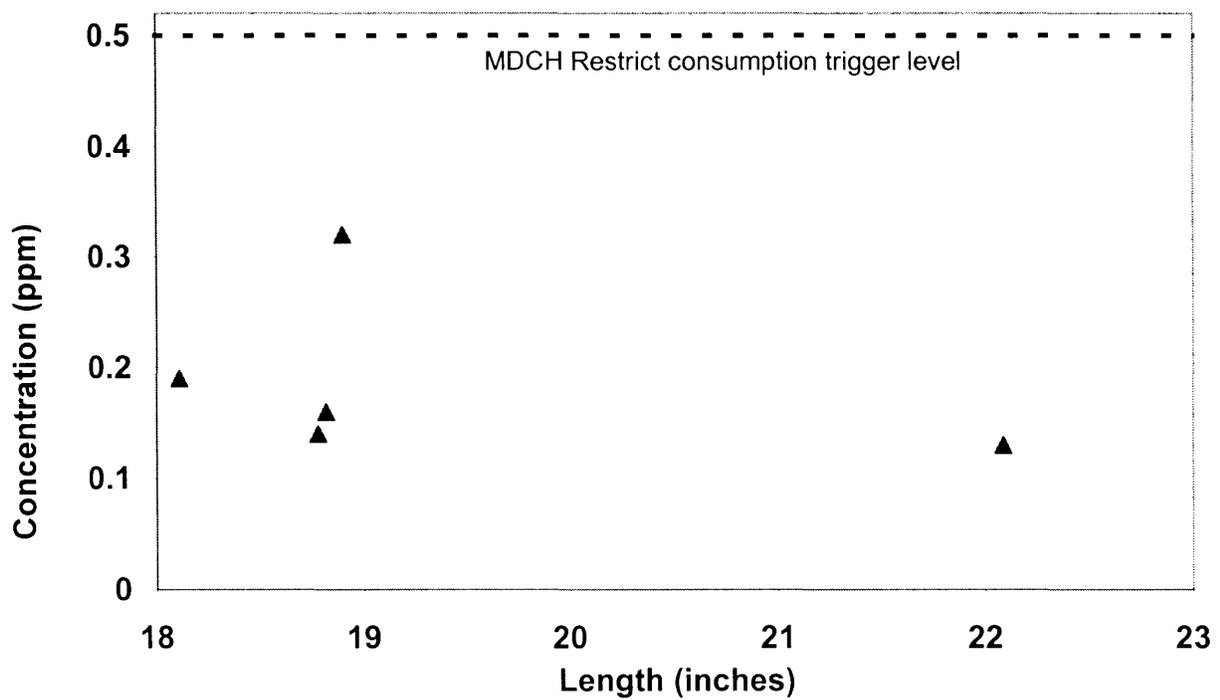


Figure 119. Total length versus mercury concentration in walleye collected from Union Lake, Branch County in 2003 (ID 2003135).

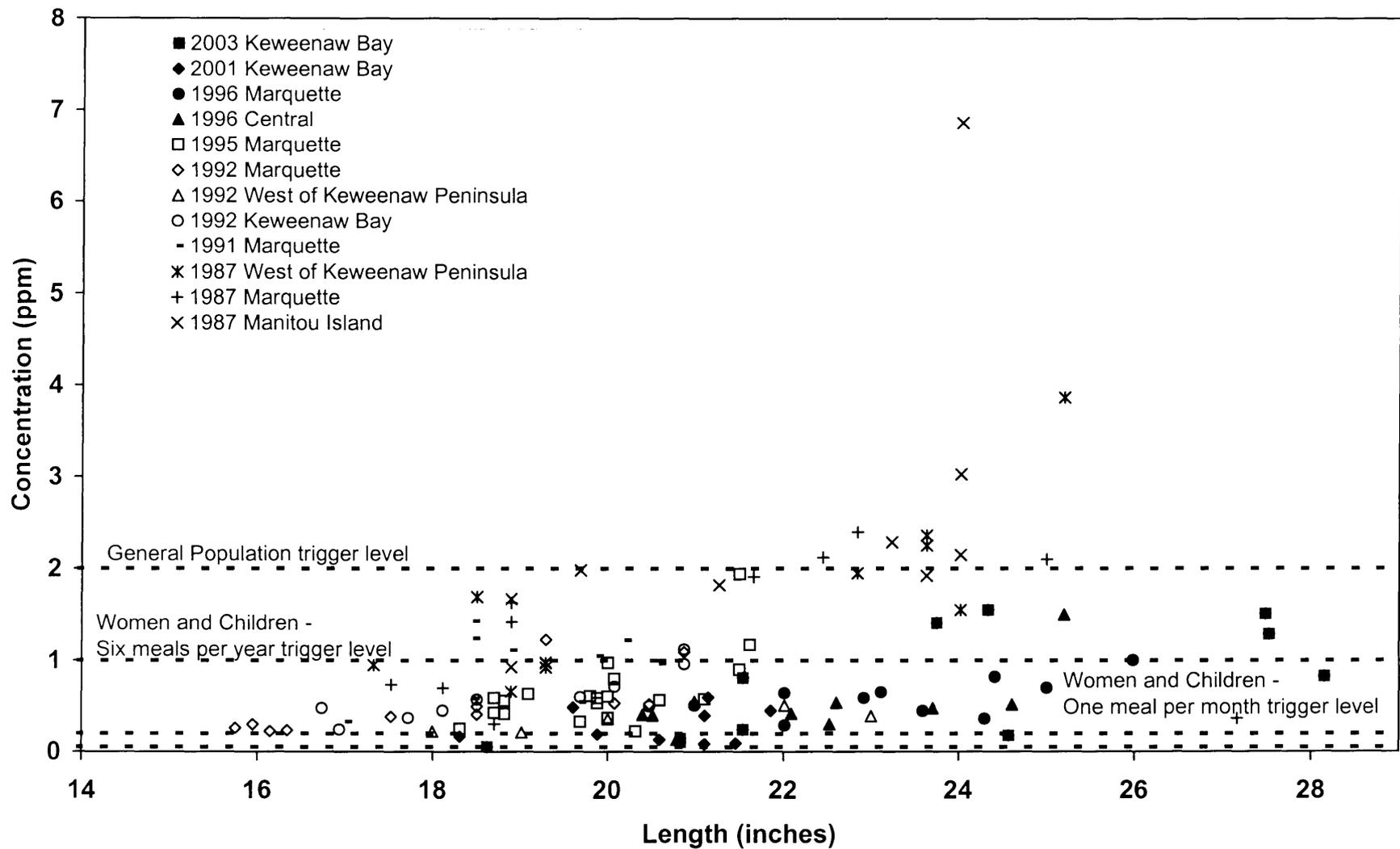


Figure 120. Total length versus total PCB concentration in cisco collected from Lake Superior in 1987 (ID 87069, 87071, 87072), 1991 (ID 92042), 1992 (ID 92073, 92074, 92077), 1995 (ID 95065), 1996 (ID 96038, 96034), 2001 (ID 2001079), and 2003 (ID 2003070).

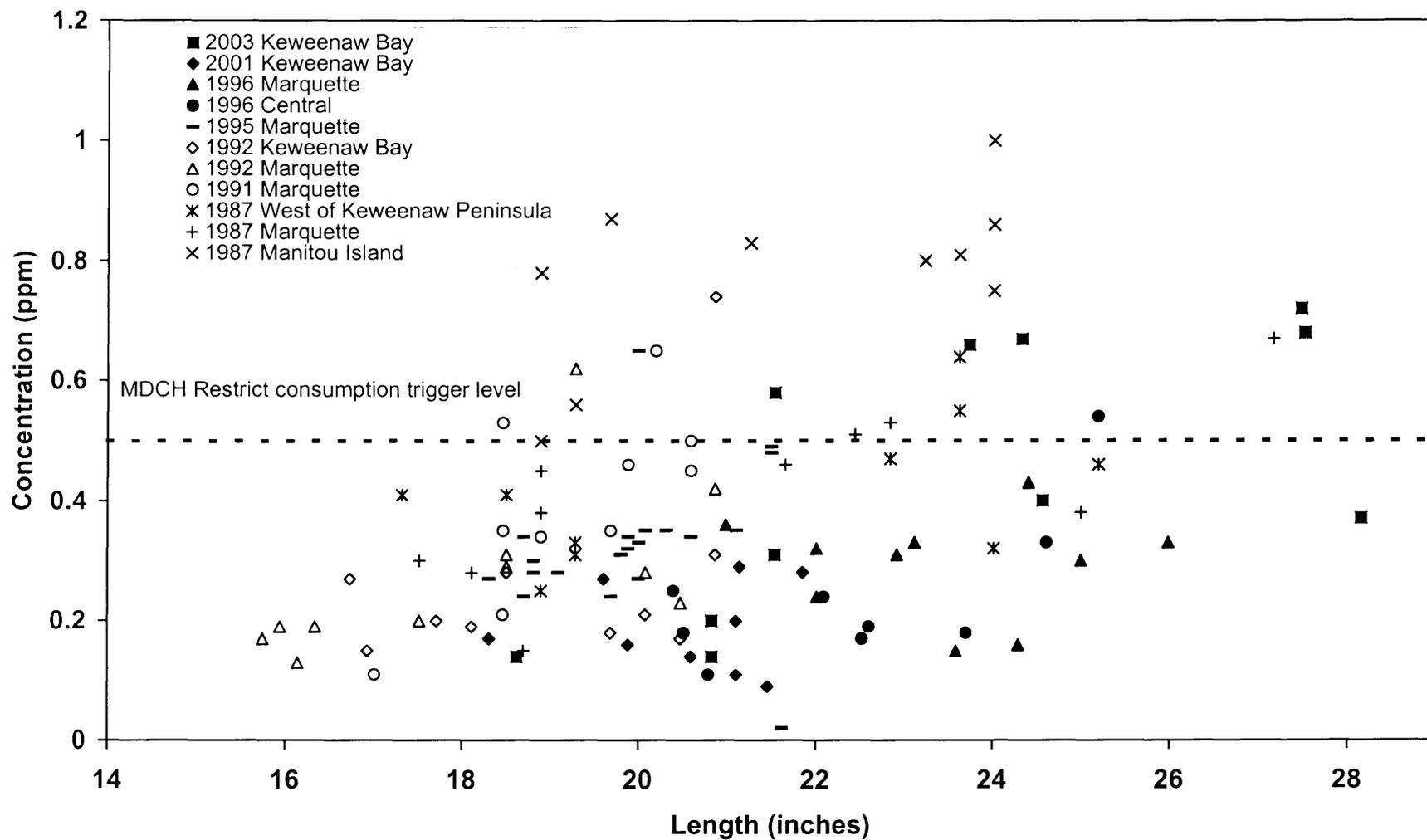


Figure 121. Total length versus mercury concentration in ciscowet collected from Lake Superior in 1987 (ID 87069, 87071, 87072), 1991 (ID 92042), 1992 (ID 92073, 92074), 1995 (ID 95065), 1996 (ID 96038, 96034), 2001 (ID 2001079), and 2003 (ID 2003070).

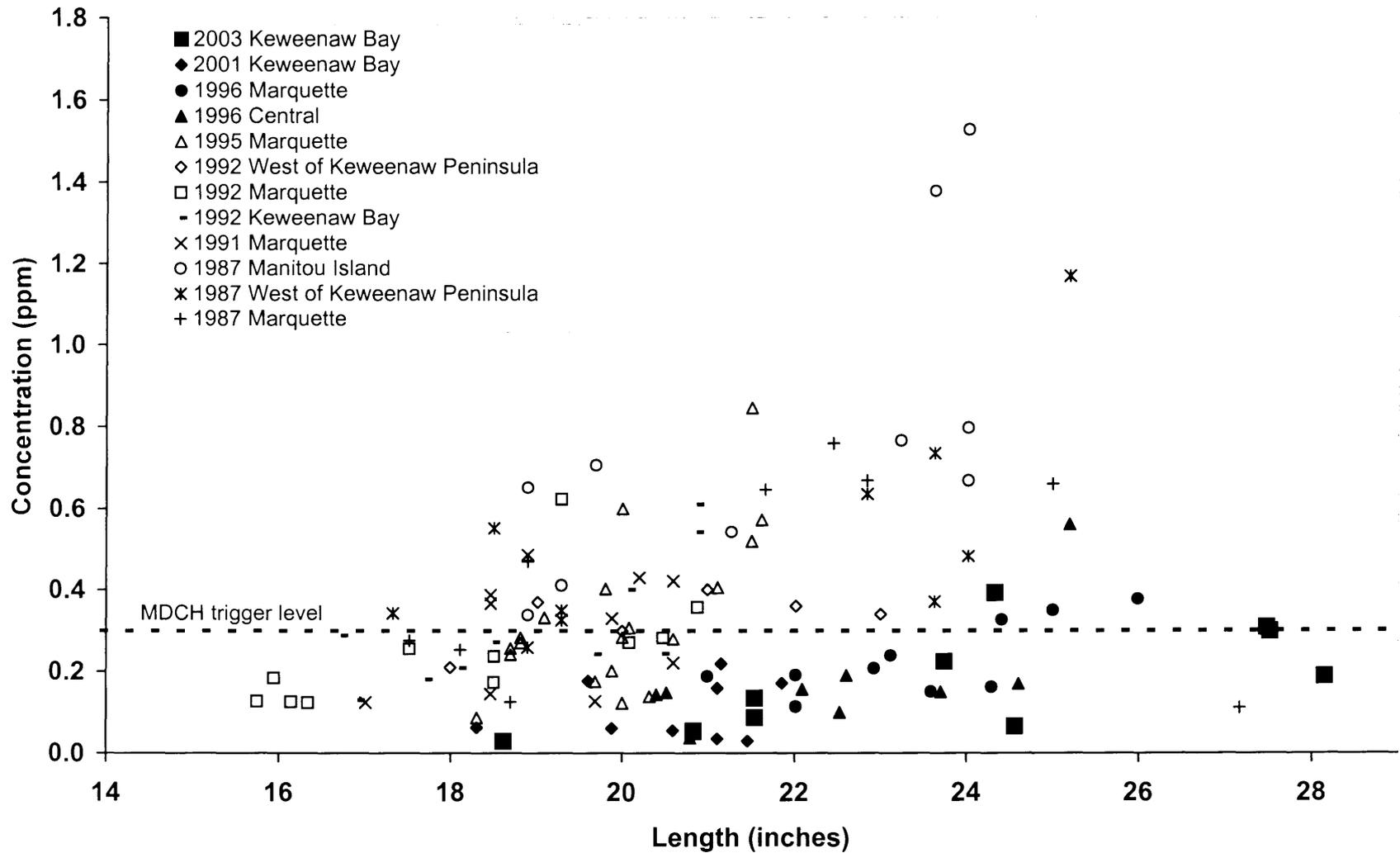


Figure 122. Total length versus total chlordane concentration in ciscowet collected from Lake Superior in 1987 (ID 87069, 87071, 87072), 1991 (ID 92042), 1992 (ID 92073, 92074, 92077), 1995 (ID 95065), 1996 (ID 96034, 96038), 2001 (ID 2001079), and 2003 (ID 2003070).

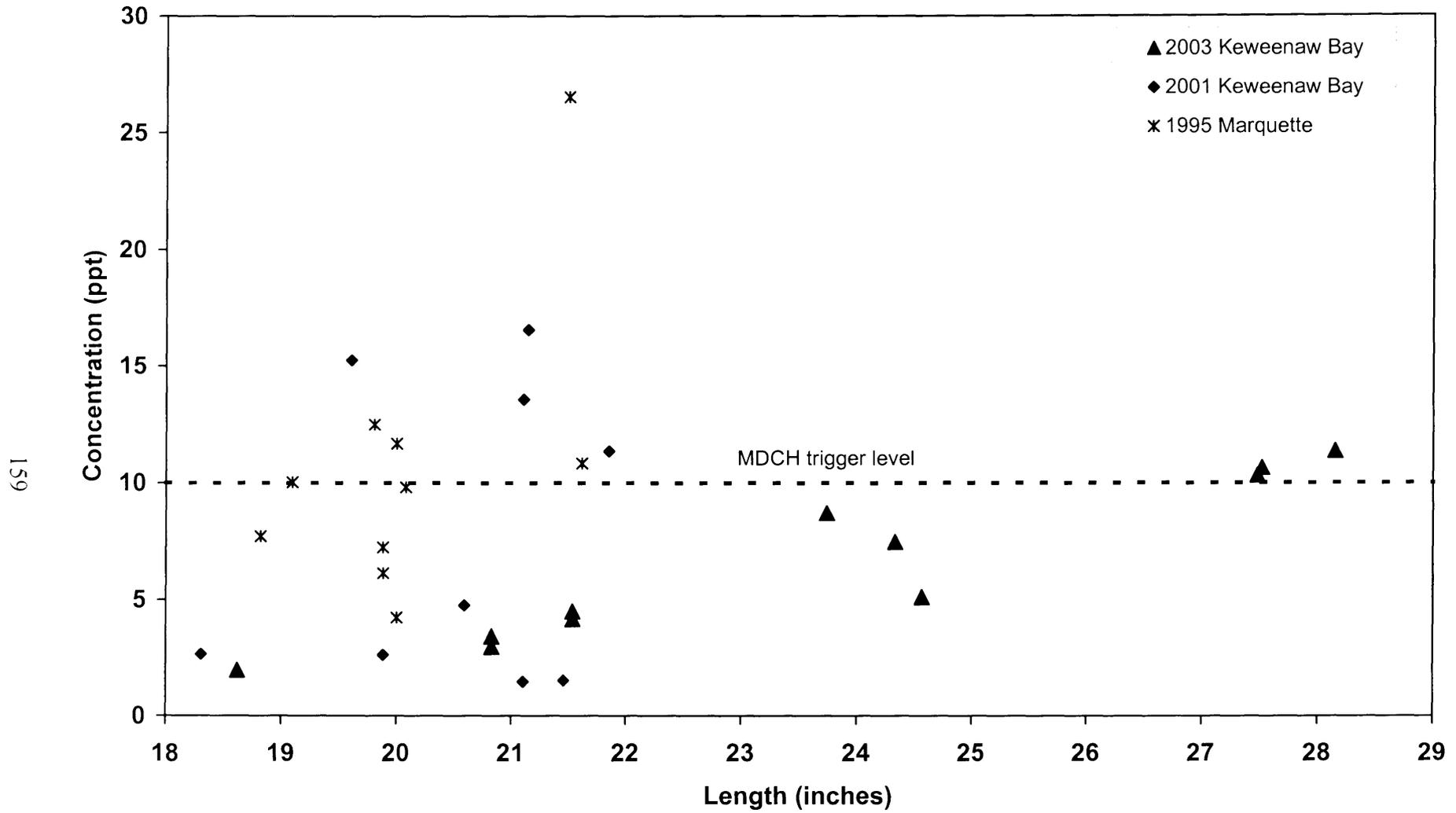


Figure 123. Total length versus dioxin TEQ concentration in ciscoes collected from Lake Superior in 1995 (ID 95065), 2001 (ID 2001110), and 2003 (ID 2003070).

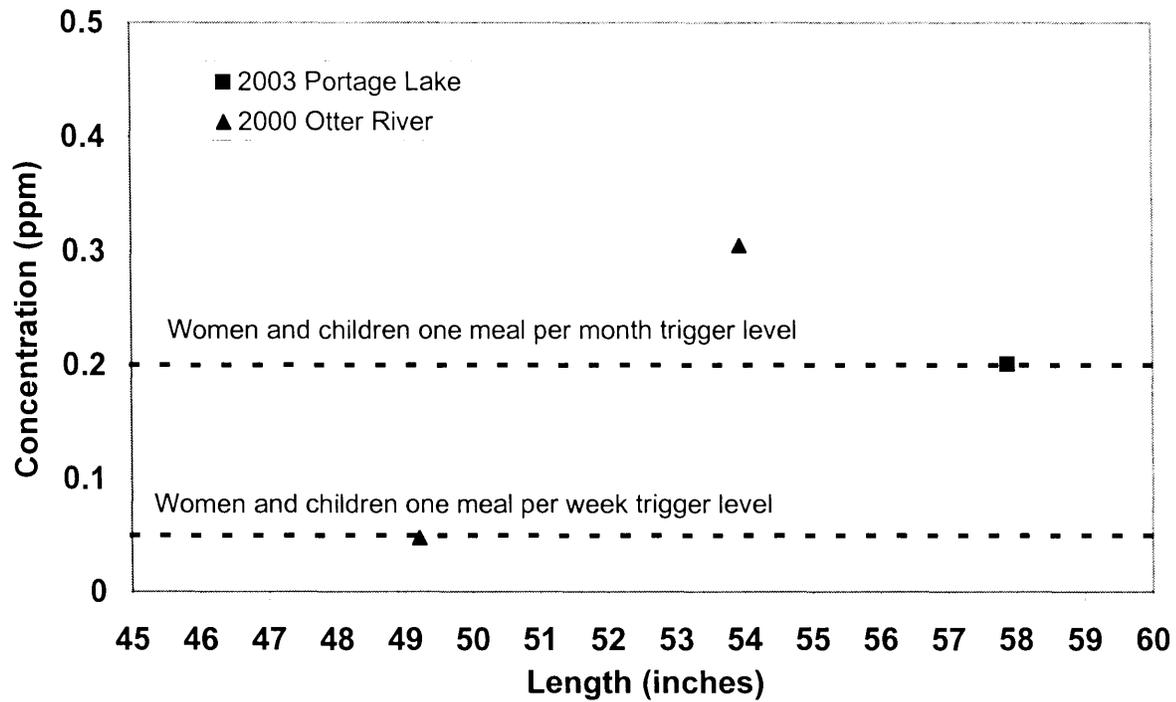


Figure 124. Total length versus PCB concentration in lake sturgeon collected from Lake Superior at Otter River in 2000 (ID 2000119) and Portage Lake in 2003 (ID 2003157).

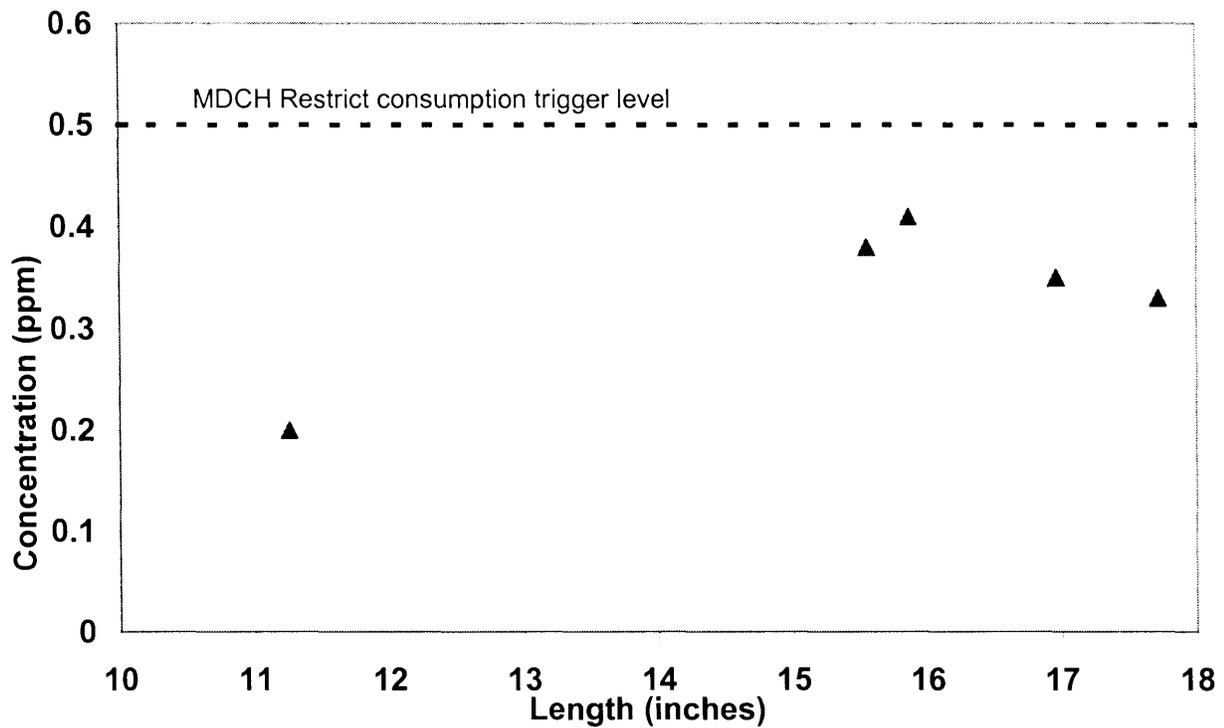


Figure 125. Total length versus mercury concentration in walleye collected from Beaver Lake, Alger County in 2003 (ID 2003150).

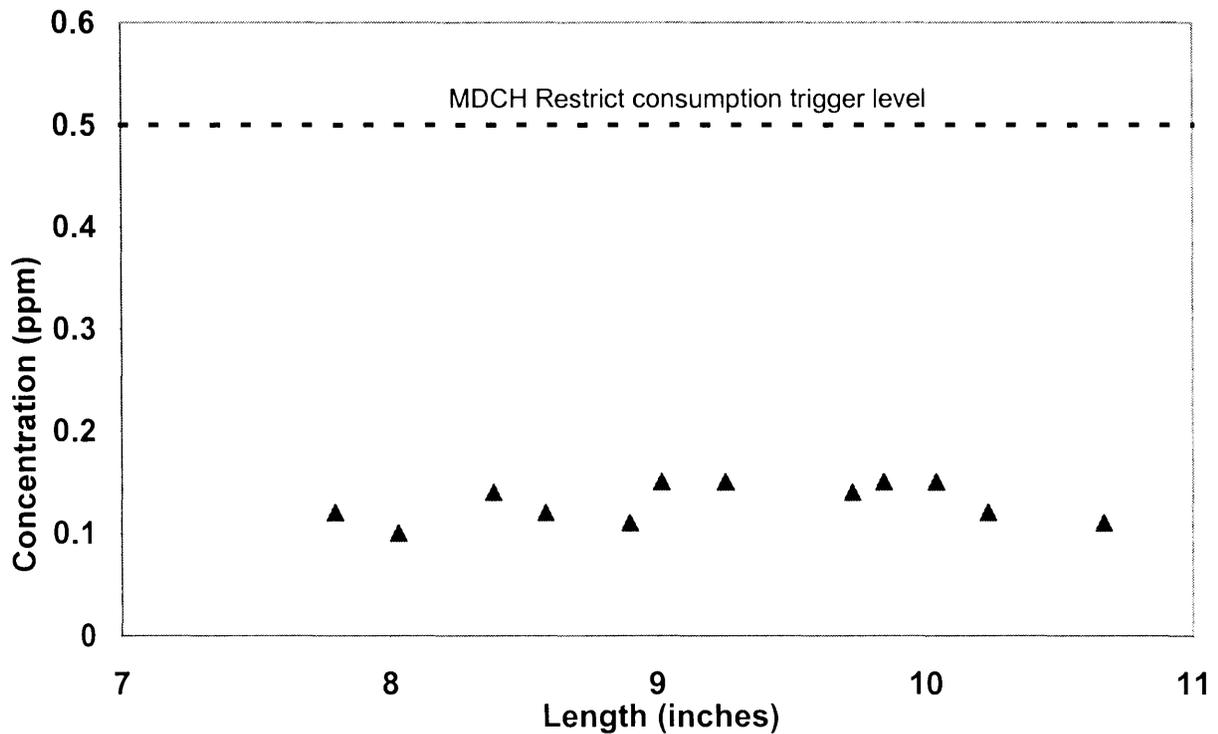


Figure 126. Total length versus mercury concentration in yellow perch collected from Beaver Lake, Alger County in 2003 (ID 2003150).

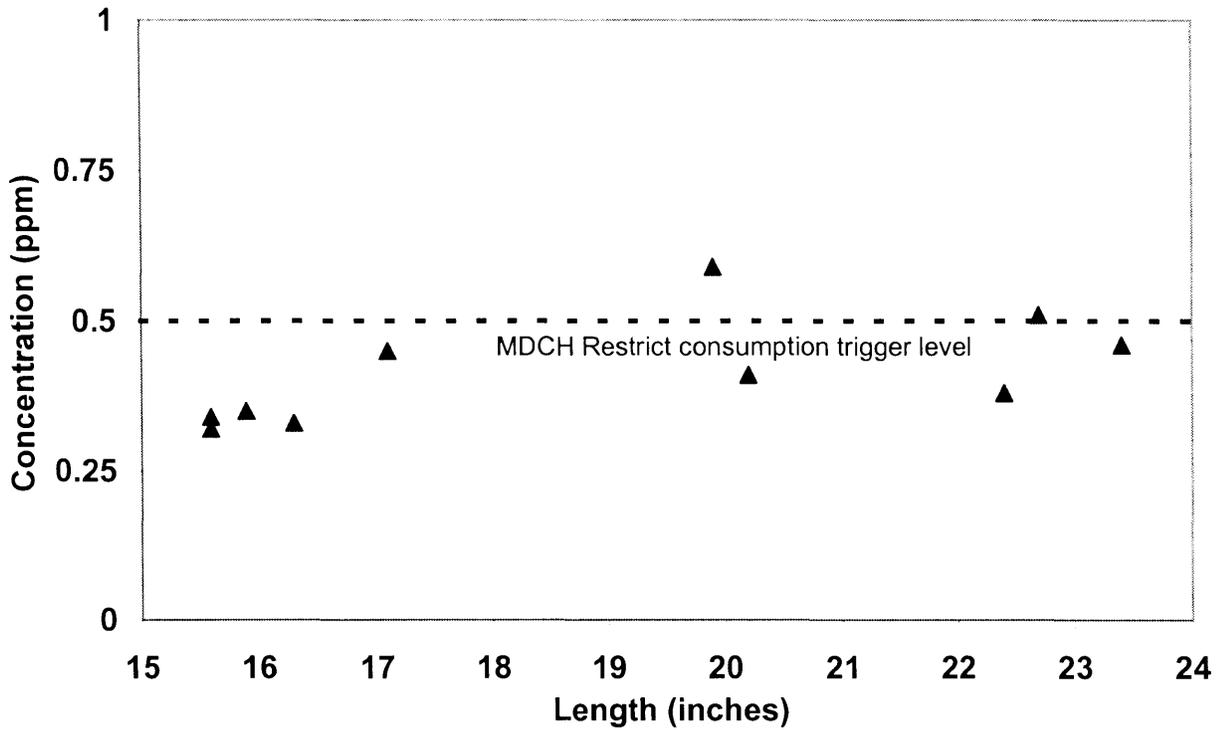


Figure 127. Total length versus mercury concentration in walleye collected from Emily Lake, Houghton County in 2002 (ID 2002110).

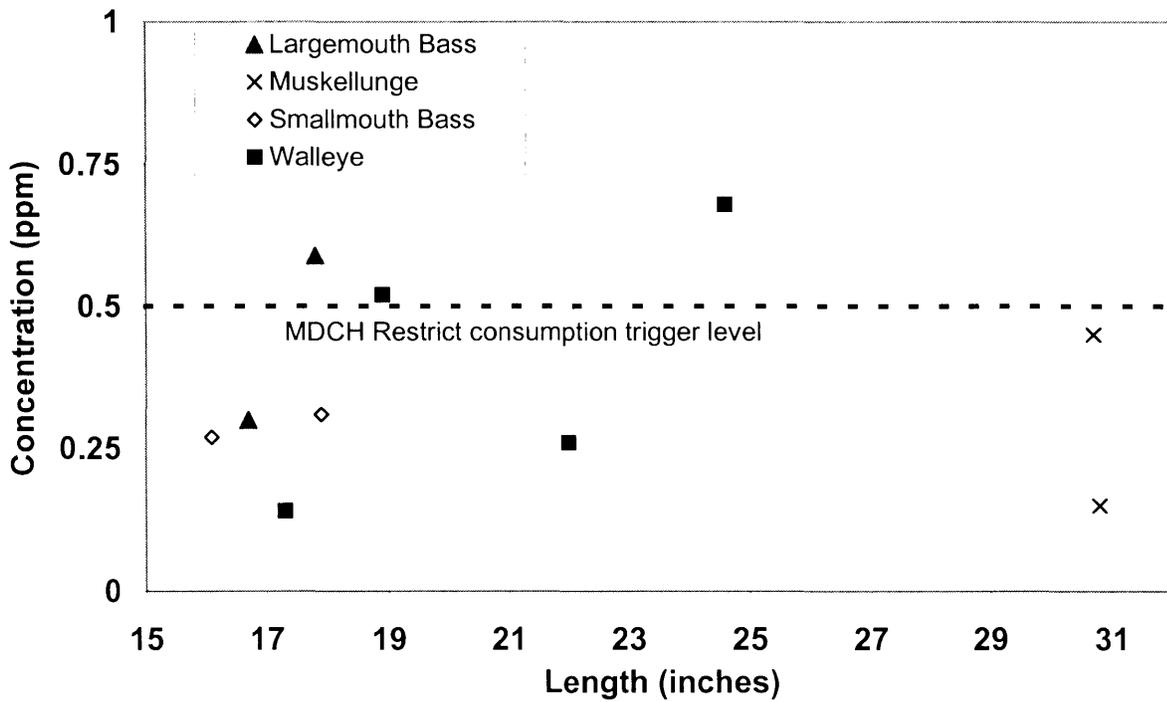


Figure 128. Total length versus mercury concentration in largemouth bass, muskellunge, smallmouth bass, and walleye collected from Kingston Lake, Alger County 2003 (ID 2003047).

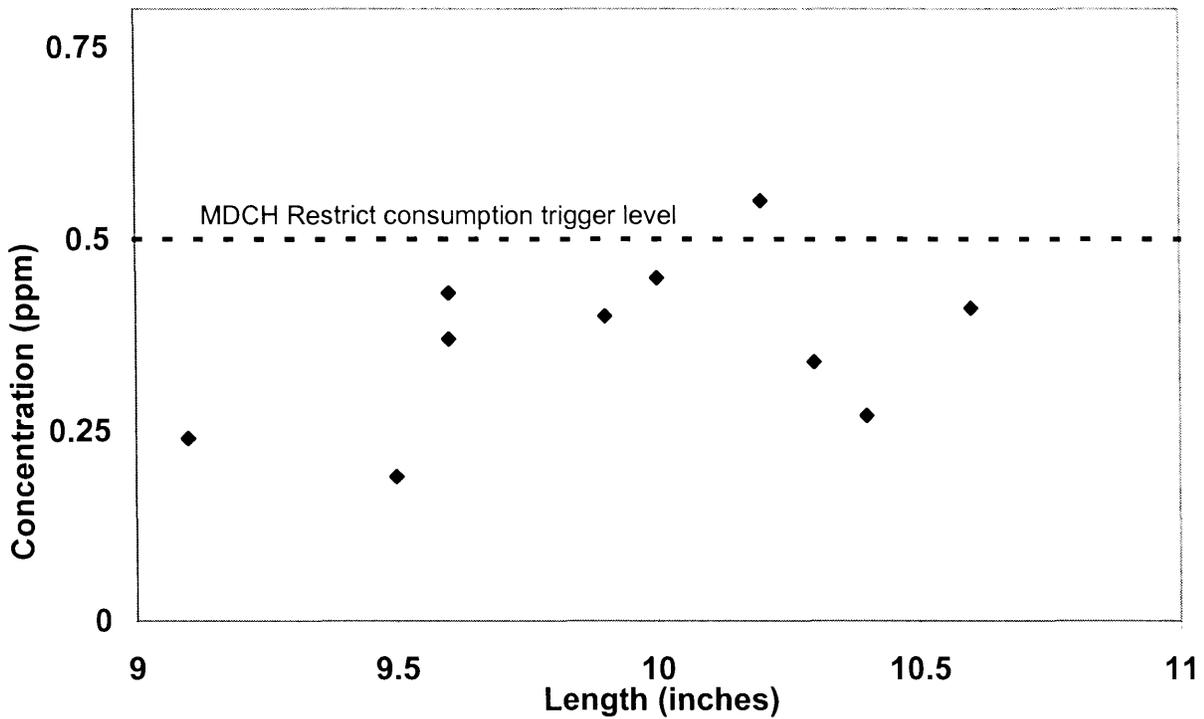


Figure 129. Total length versus mercury concentration in rock bass collected from Lake Gogebic, Gogebic and Ontonagon Counties in 2003 (ID 2003156).

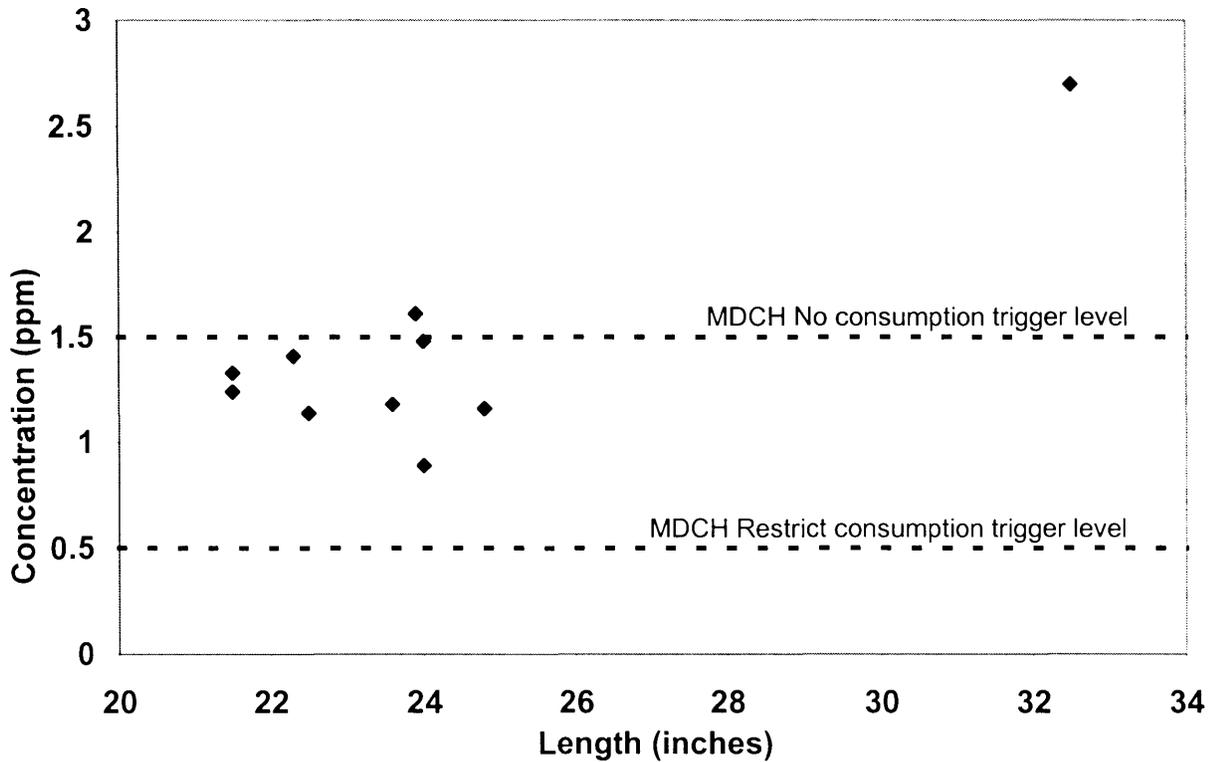


Figure 130. Total length versus mercury concentration in northern pike collected from Lake LeVasseur, Marquette County in 2002 (ID 2002104).

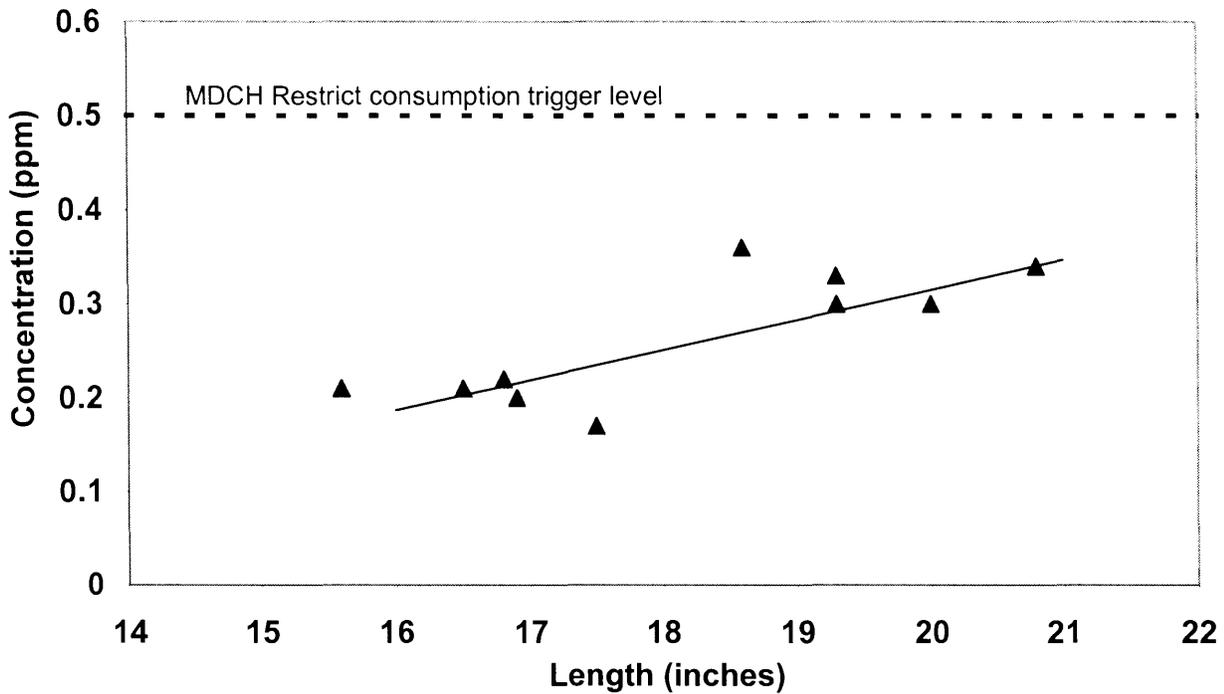


Figure 131. Total length versus mercury concentration in walleye collected from Little Lake, Marquette County in 2002 (ID 2002043).

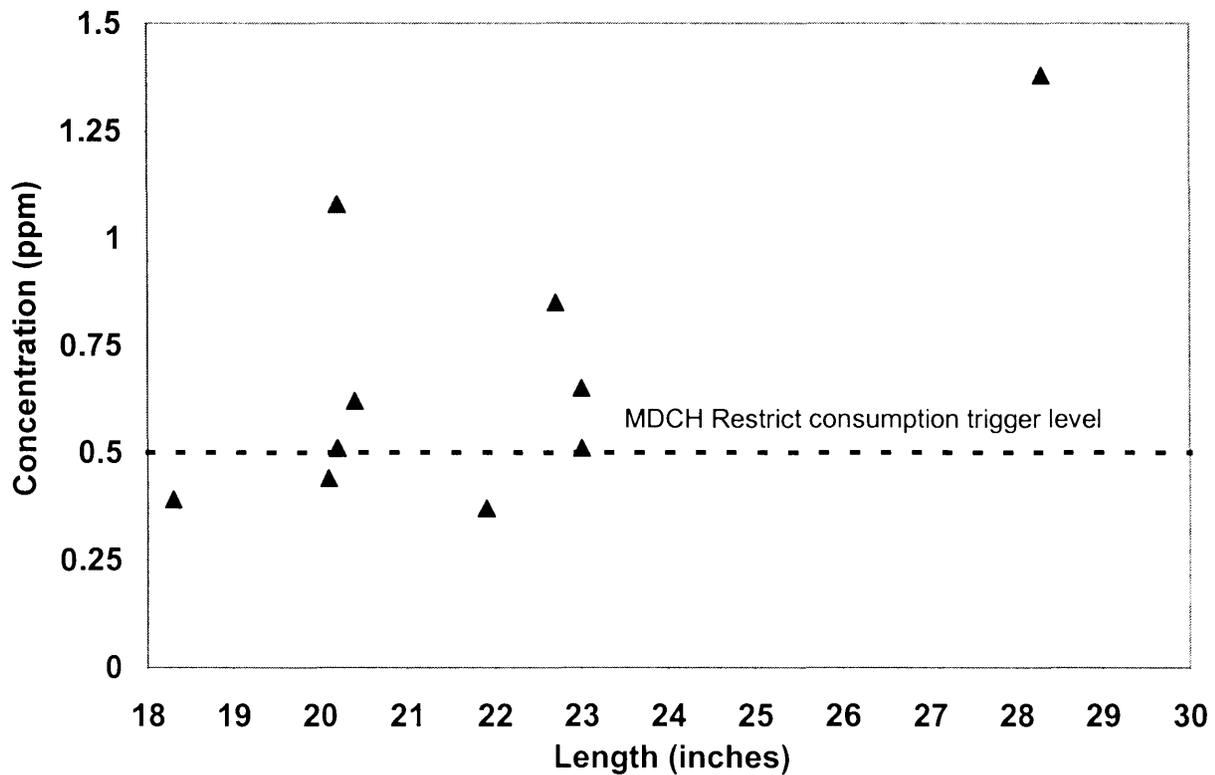


Figure 132. Total length versus mercury concentration in northern pike collected from Muskallonge Lake, Luce County in 2002 (ID 2002070).

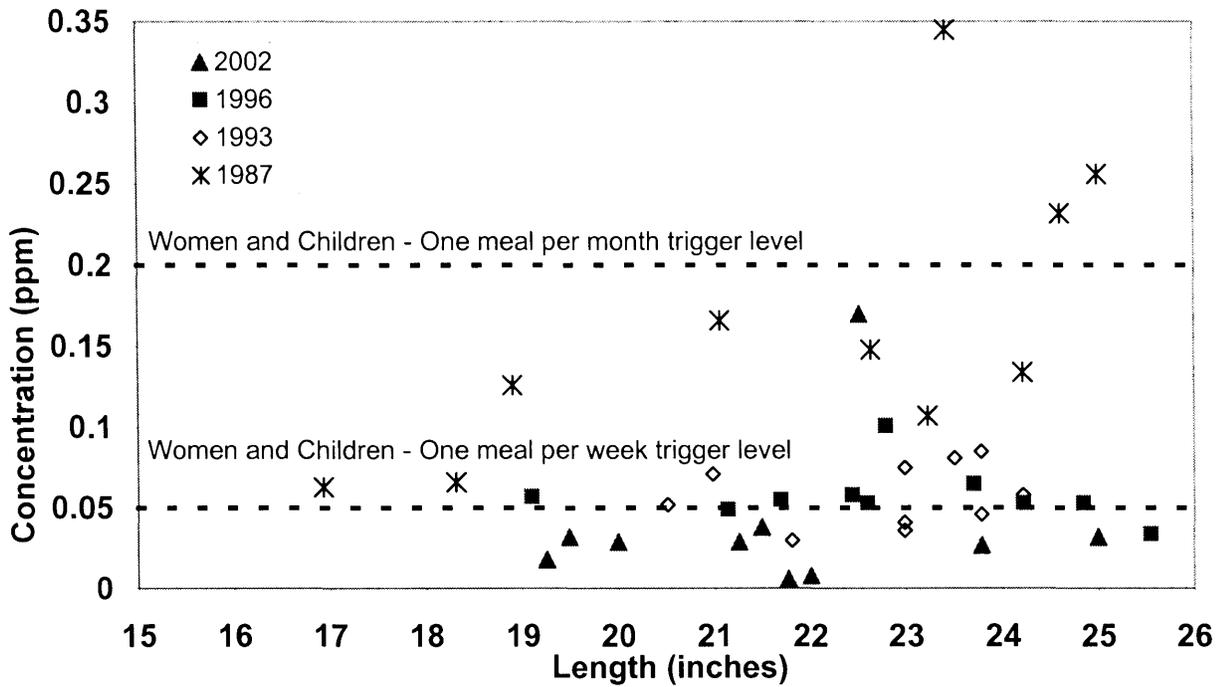


Figure 133. Total length versus total PCB concentration in lake trout collected from Siskiwit Lake, Isle Royale in 1987 (ID 87033), 1993 (ID 93029), 1996 (ID 96049), and 2002 (ID 2002105).

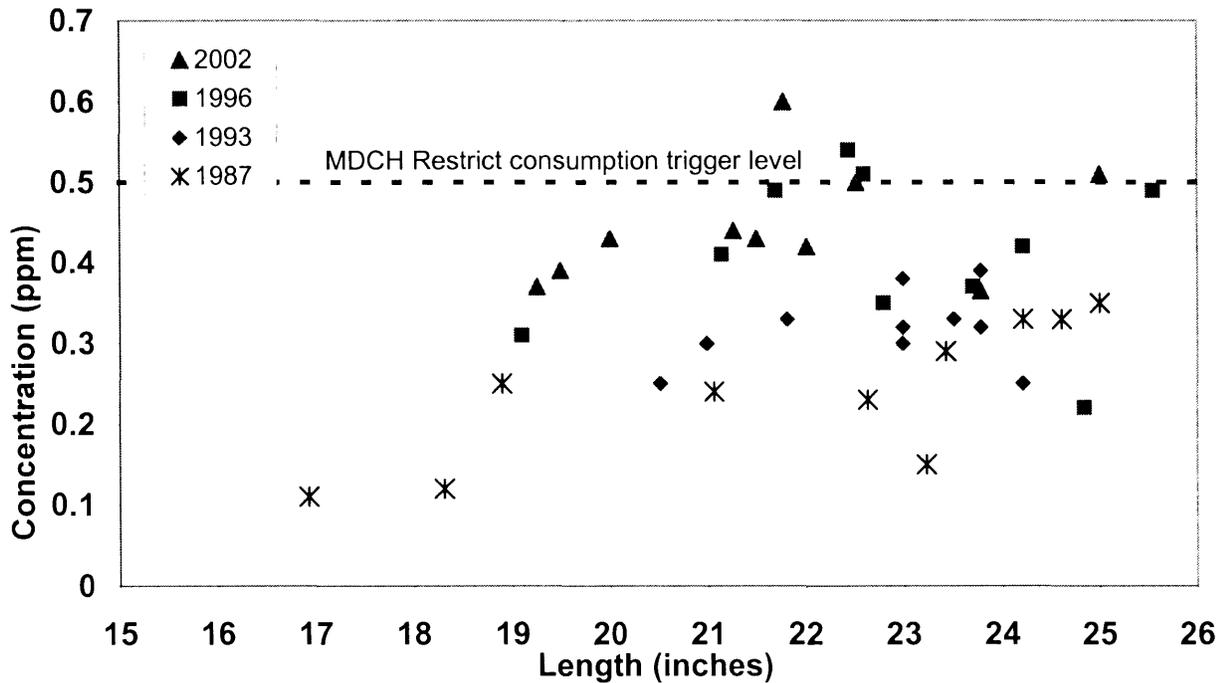


Figure 134. Total length versus mercury concentration in lake trout collected from Siskiwit Lake, Isle Royale in 1987 (ID 87033), 1993 (ID 93029), 1996 (ID 96049), and 2002 (ID 2002105).

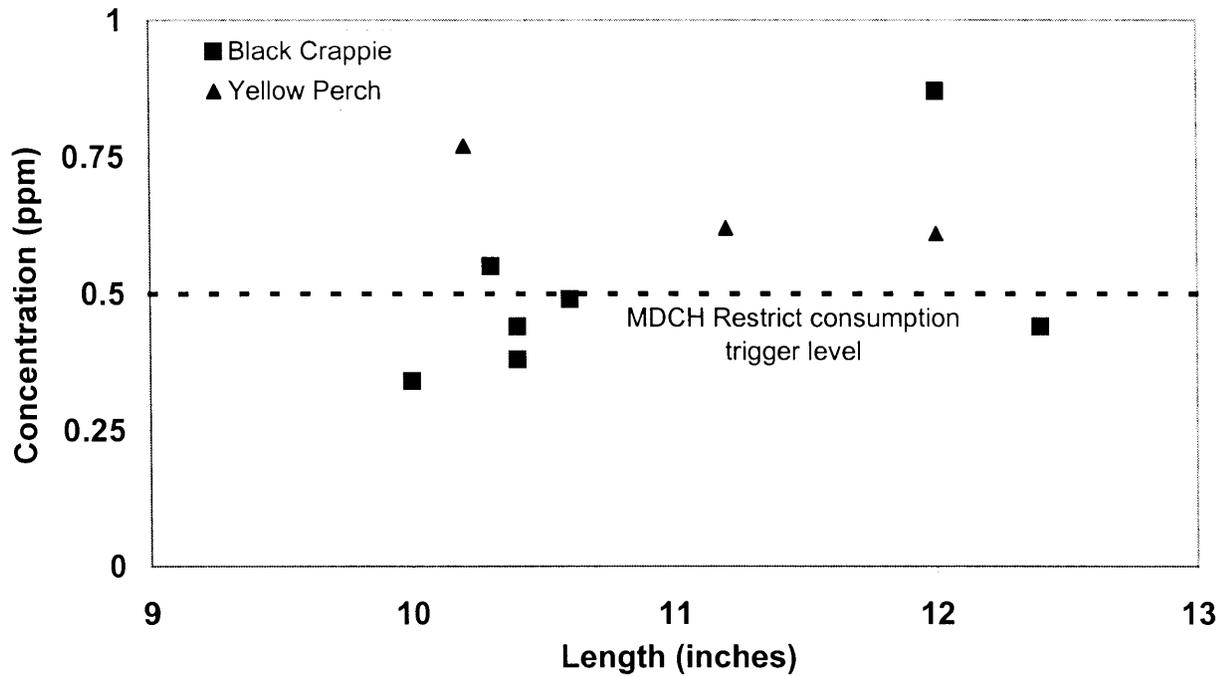


Figure 135. Total length versus mercury concentration in black crappie and yellow perch collected from Sunday Lake, Gogebic County in 2003 (ID 2003126).

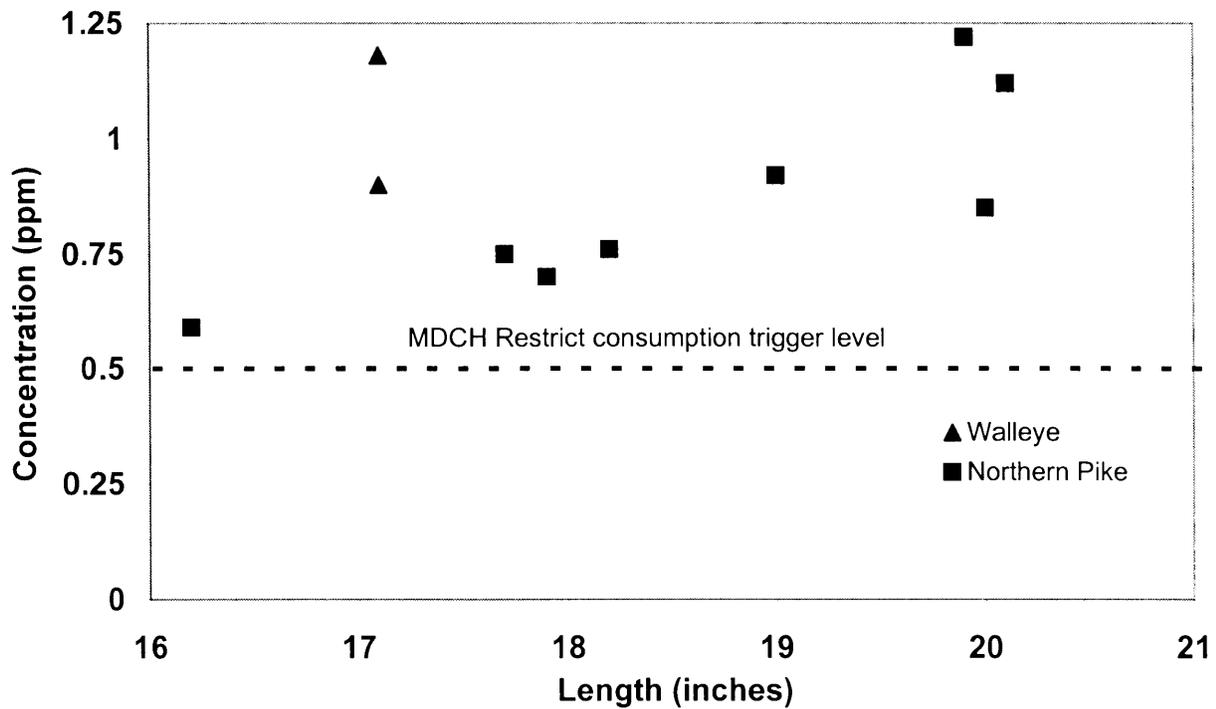


Figure 136. Total length versus mercury concentration in walleye and northern pike collected from Sunday Lake, Gogebic County in 2003 (ID 2003126).

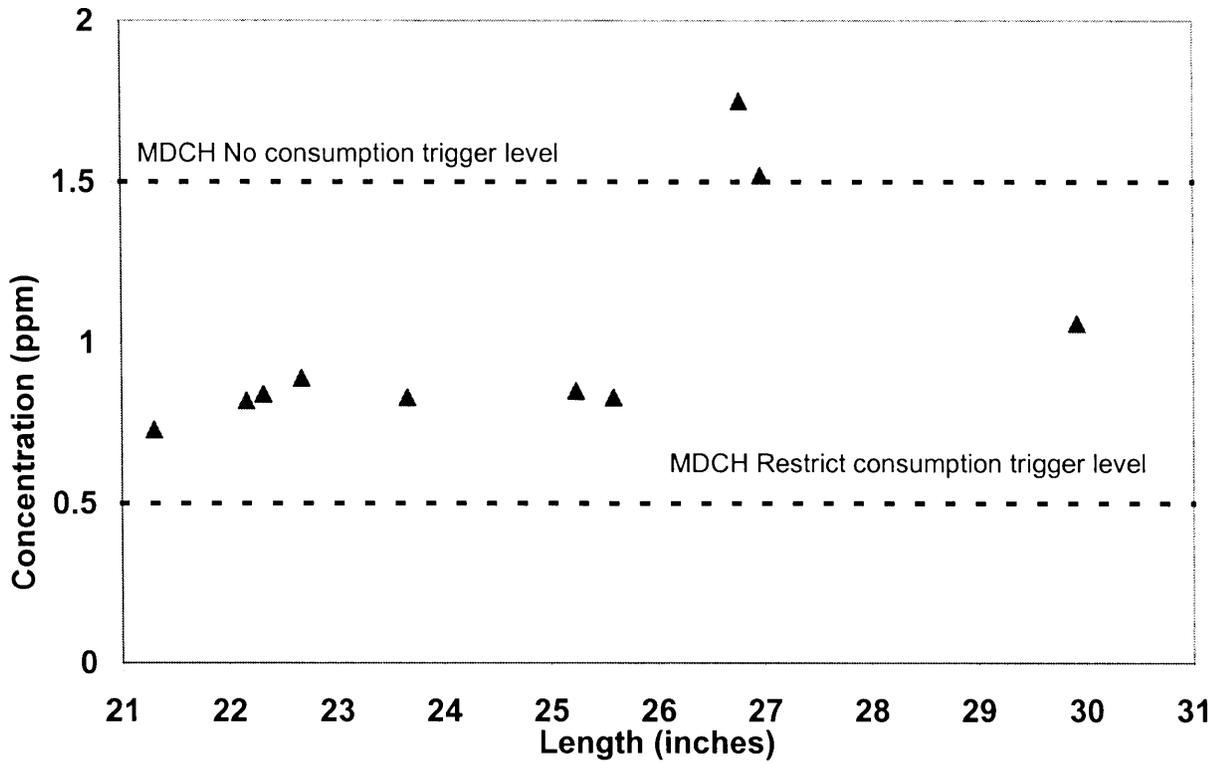


Figure 137. Total length versus mercury concentration in northern pike collected from Tepee Lake, Iron County in 2003 (ID 2003145).

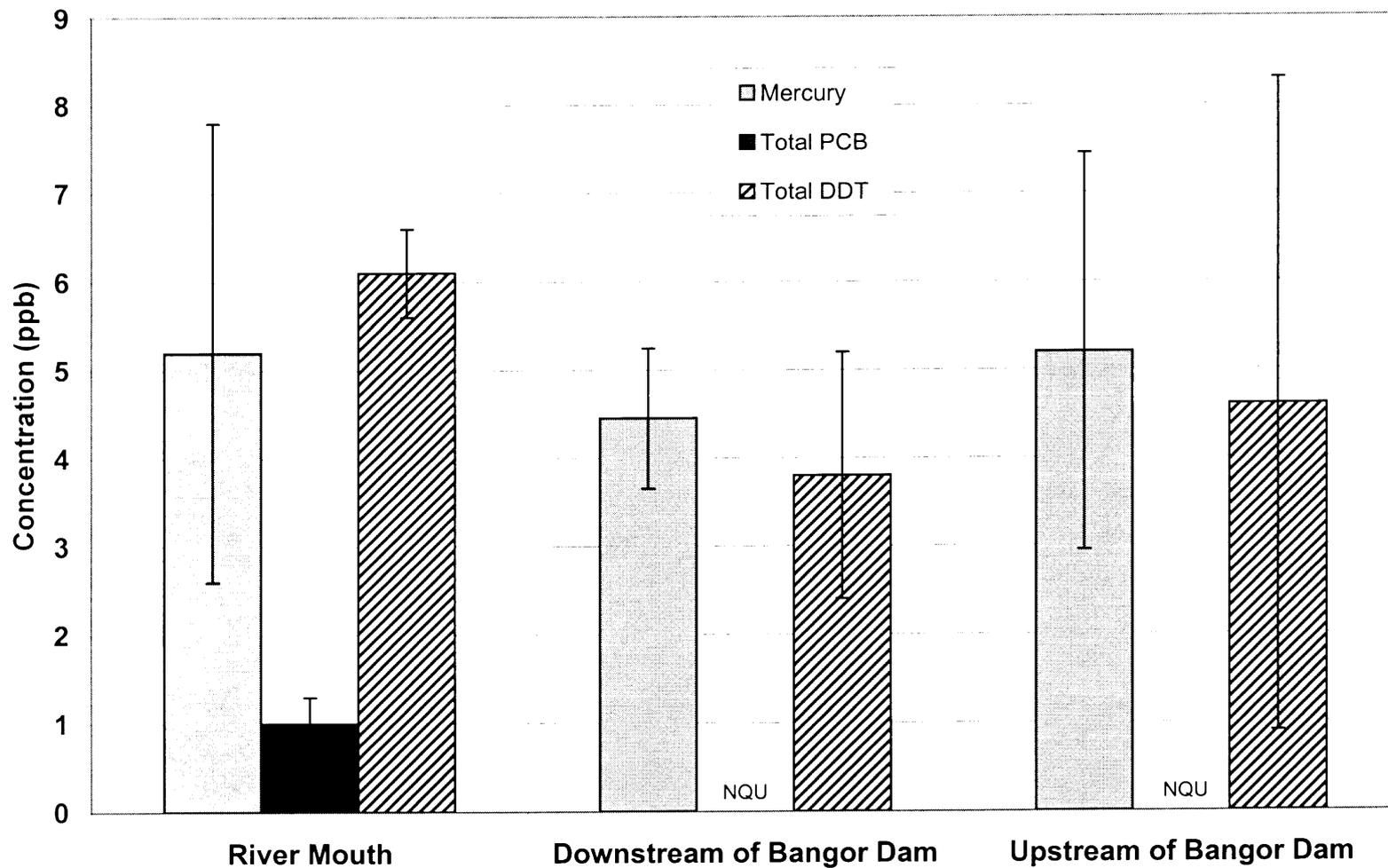


Figure 138. Net uptake of contaminants in Black River (Van Buren County) caged fish monitored in 2002. Mercury concentrations are wet weight and all other concentrations are lipid normalized. Error bars indicate 95% confidence intervals.

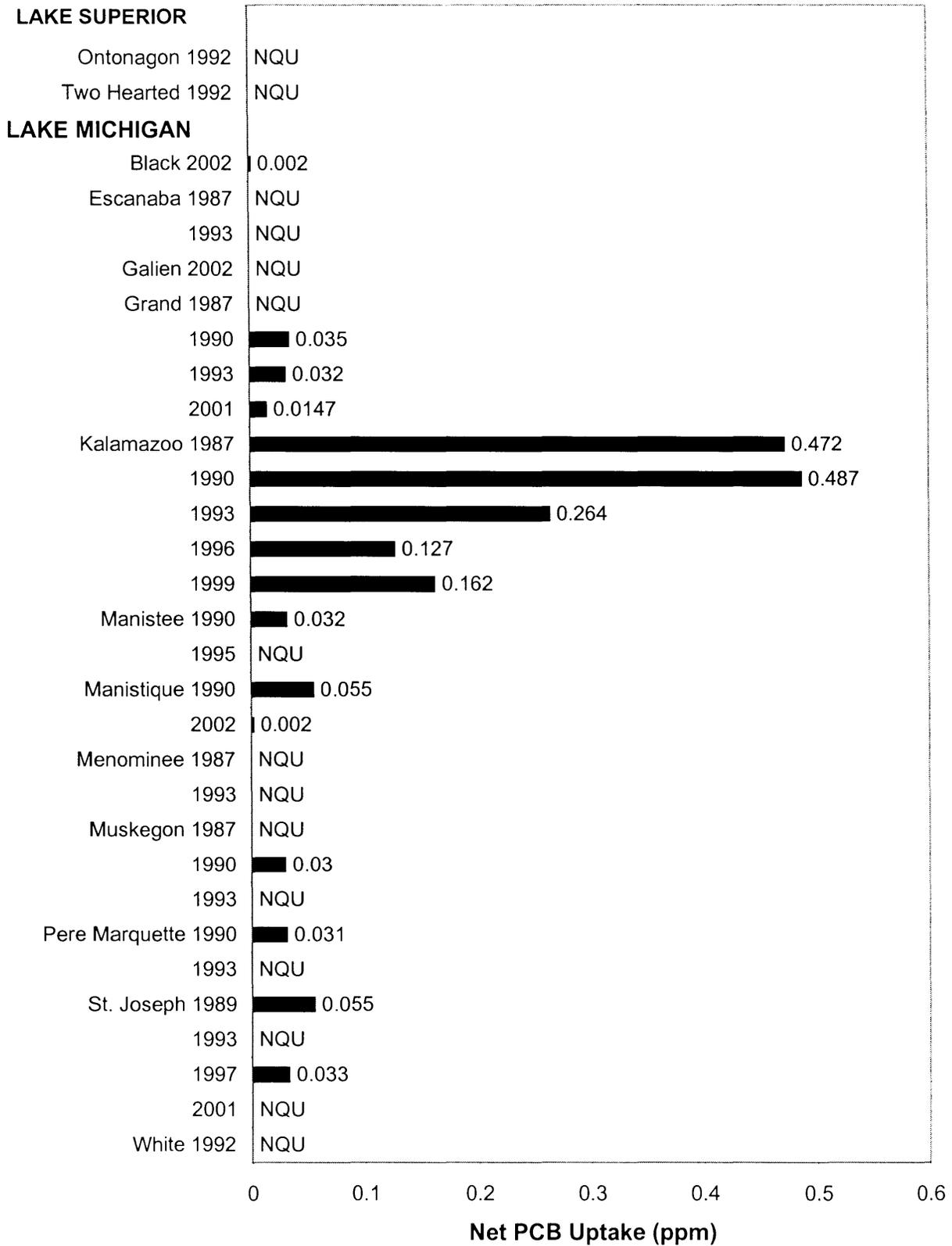


Figure 139. Net uptake of total PCB in caged fish from the mouths of selected Michigan rivers (NQU = no quantifiable uptake).

LAKE HURON

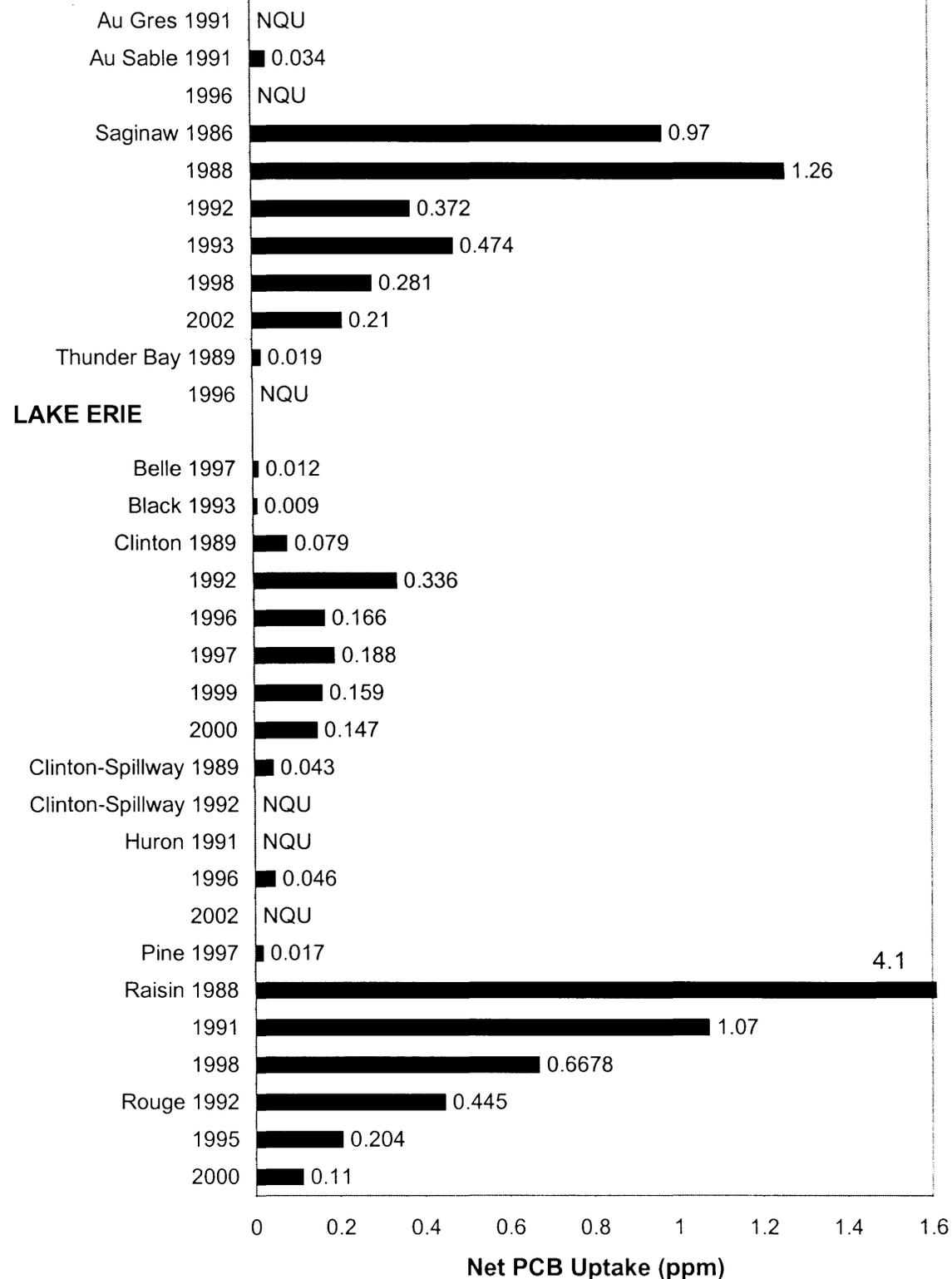


Figure 139. Continued.

LAKE SUPERIOR

Ontonagon 1992 NQU
 Two Hearted 1992 NQU

LAKE MICHIGAN

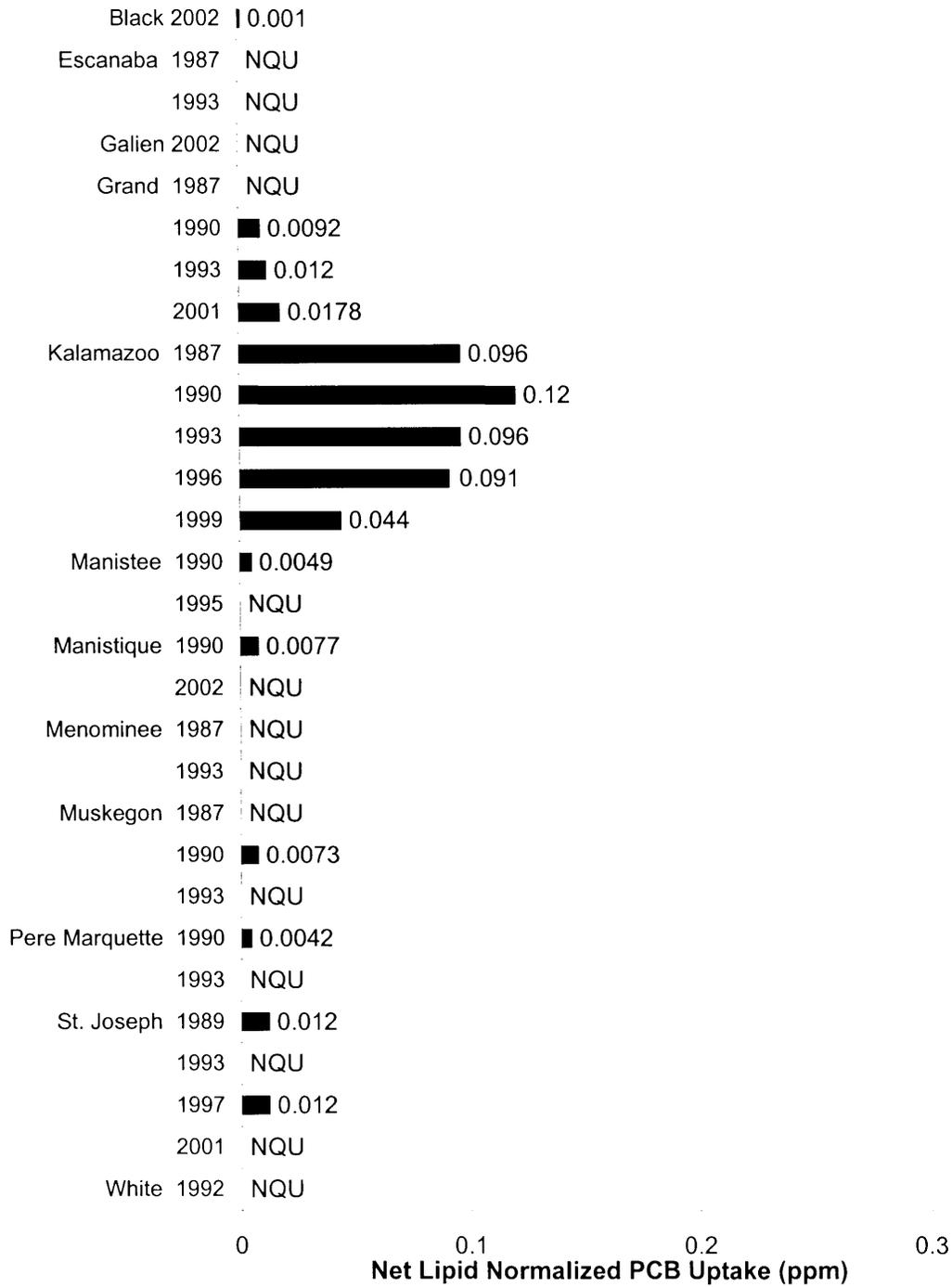
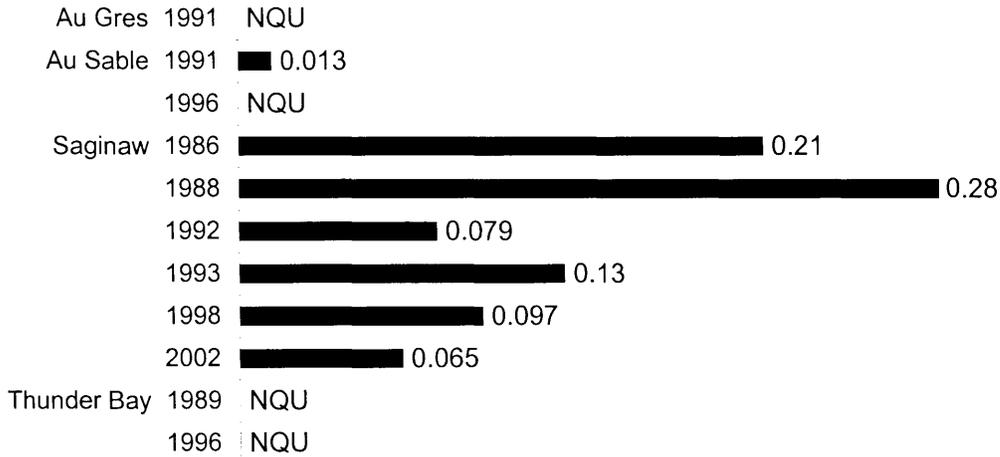


Figure 140. Net uptake of lipid normalized total PCB in caged fish from the mouths of selected Michigan rivers (NQU = no quantifiable uptake).

LAKE HURON



LAKE ERIE

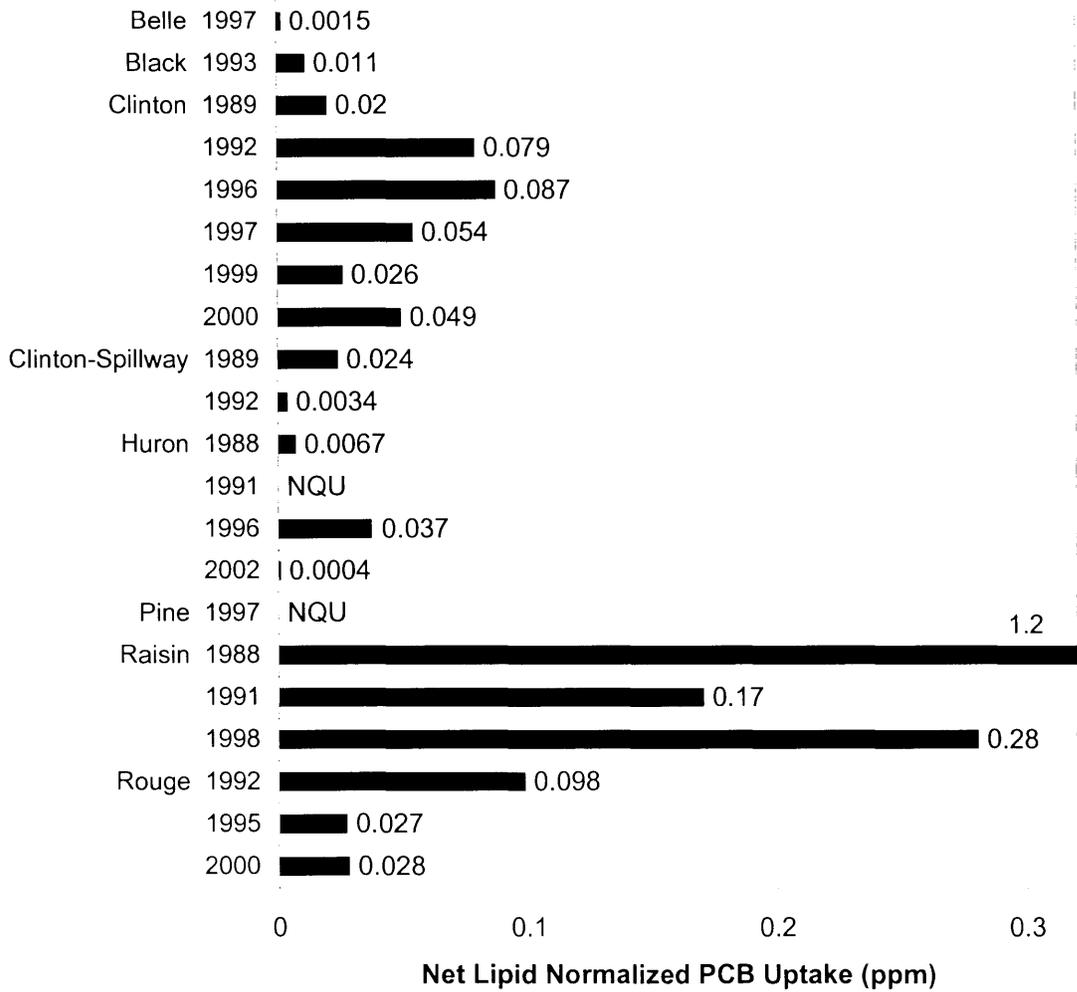


Figure 140. Continued

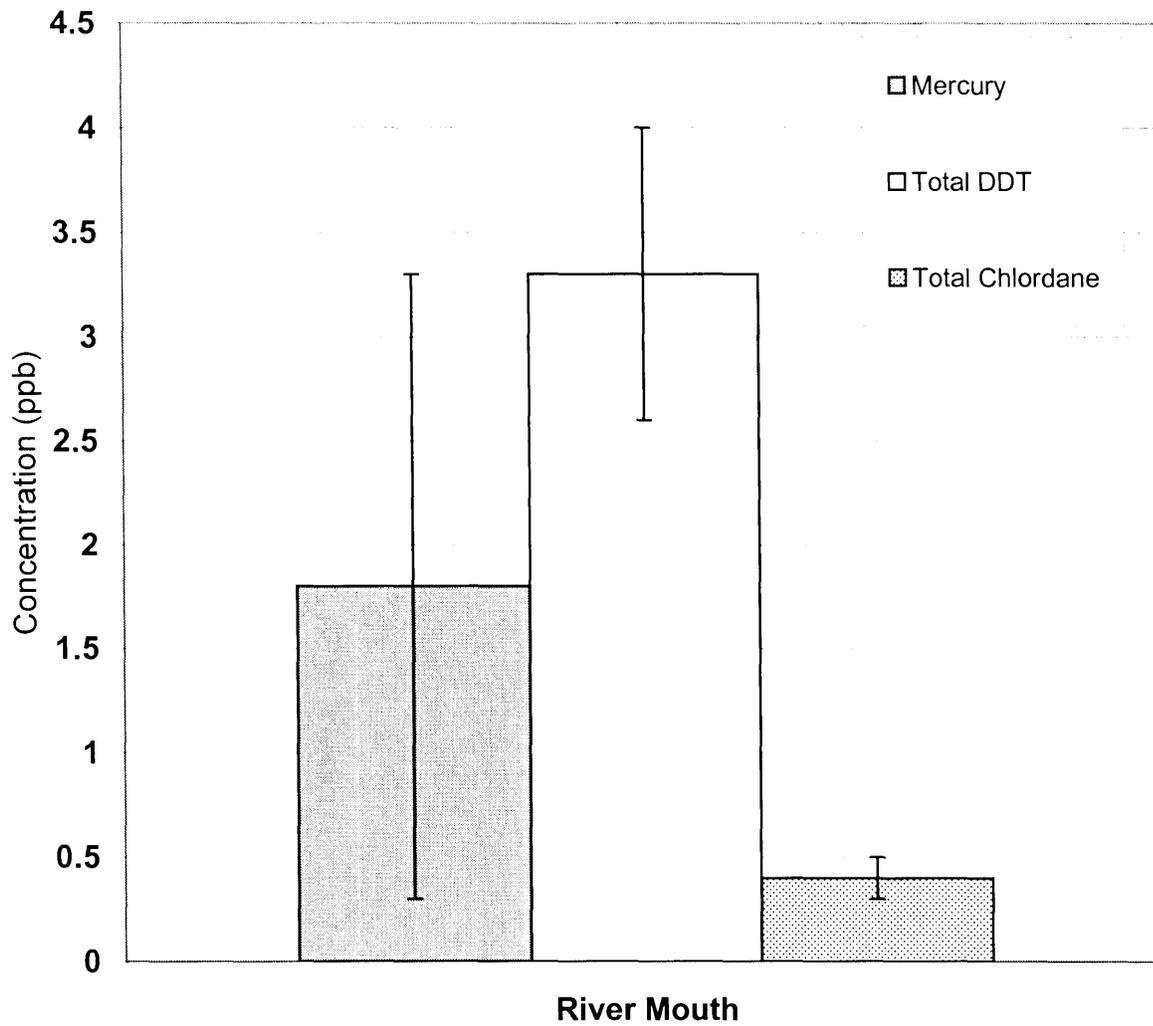


Figure 141. Net uptake of contaminants in Galien River caged fish monitored in 2002. Mercury concentrations are wet weight and all other concentrations are lipid normalized. Error bars indicate 95% confidence intervals.

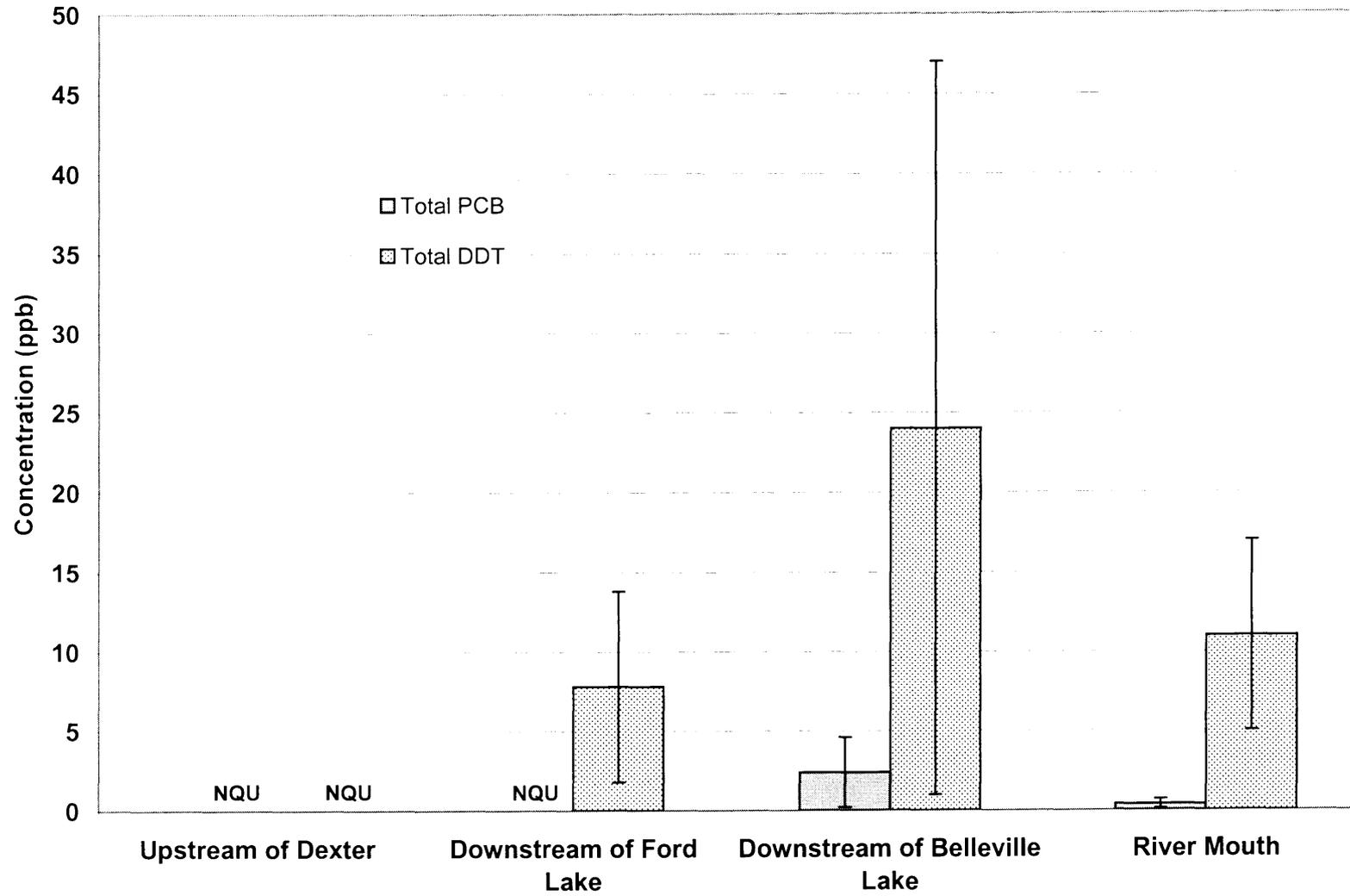


Figure 142. Net uptake of contaminants in Huron River caged fish monitored in 2002. Concentrations are lipid normalized. Error bars indicate 95% confidence intervals.

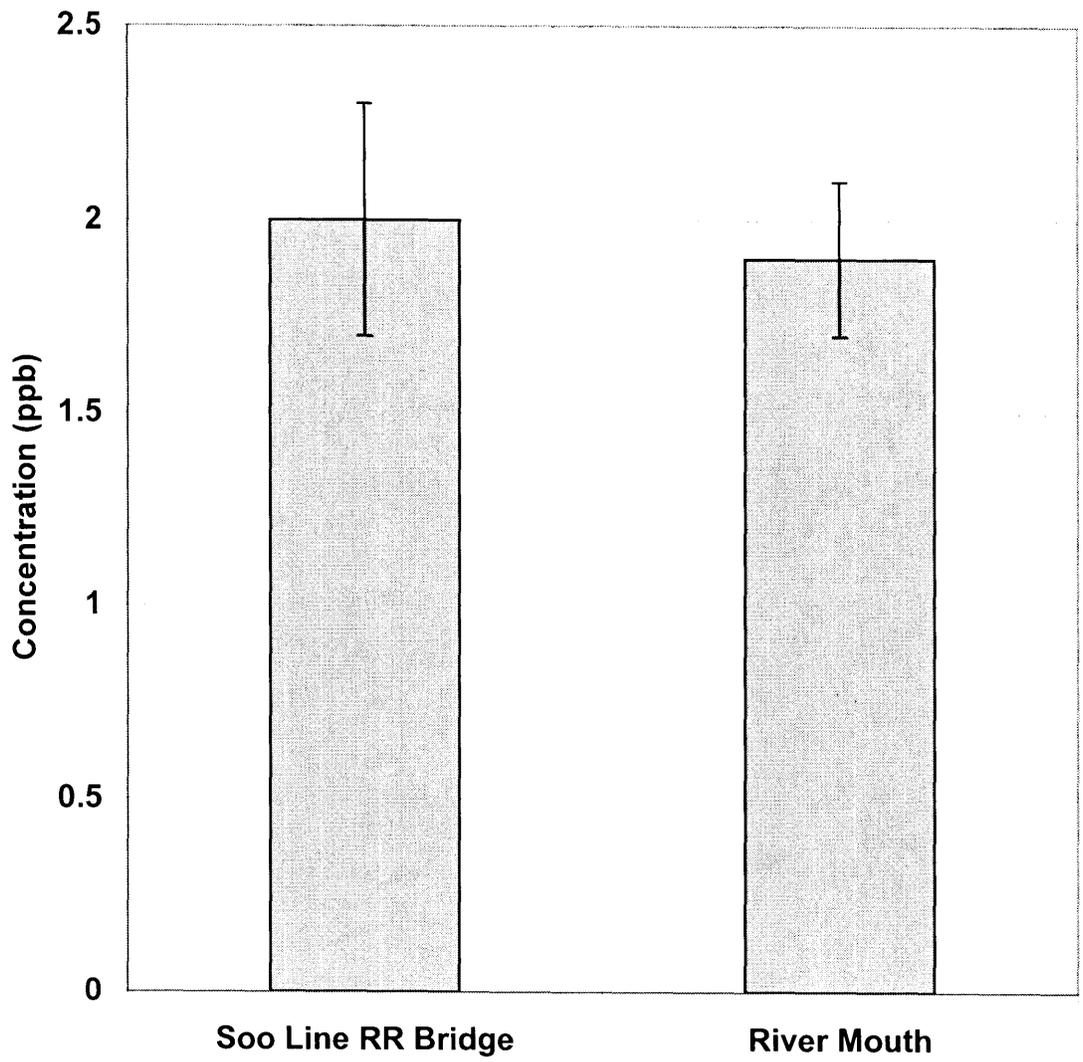


Figure 143. Net uptake of total DDT in Manistique River caged fish monitored in 2002. Concentrations are lipid normalized. Error bars indicate 95% confidence intervals.

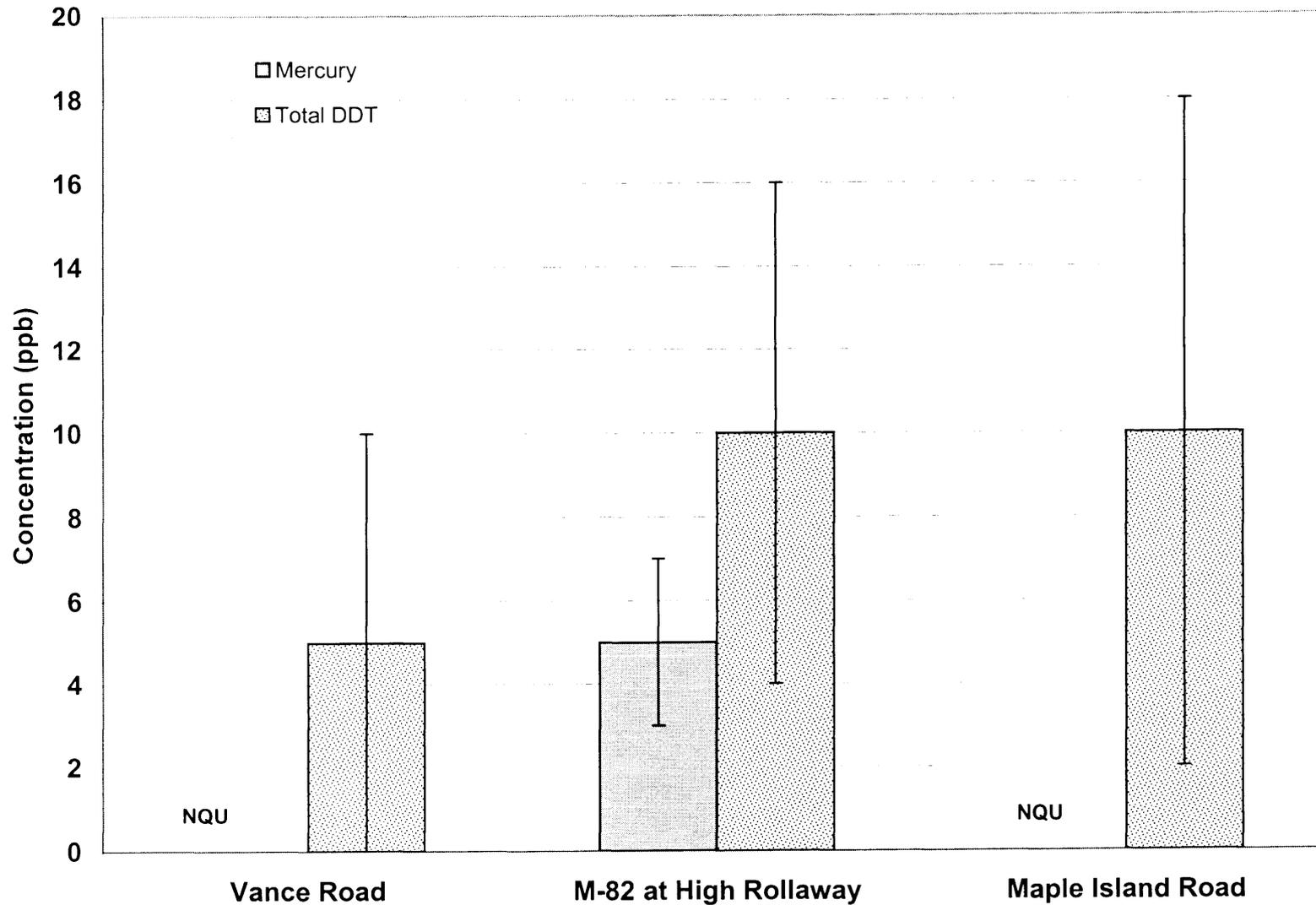


Figure 144. Net uptake of contaminants in Muskegon River caged fish monitored in 2002. Mercury concentrations are wet weight; total DDT concentrations are lipid normalized. Error bars indicate 95% confidence intervals.

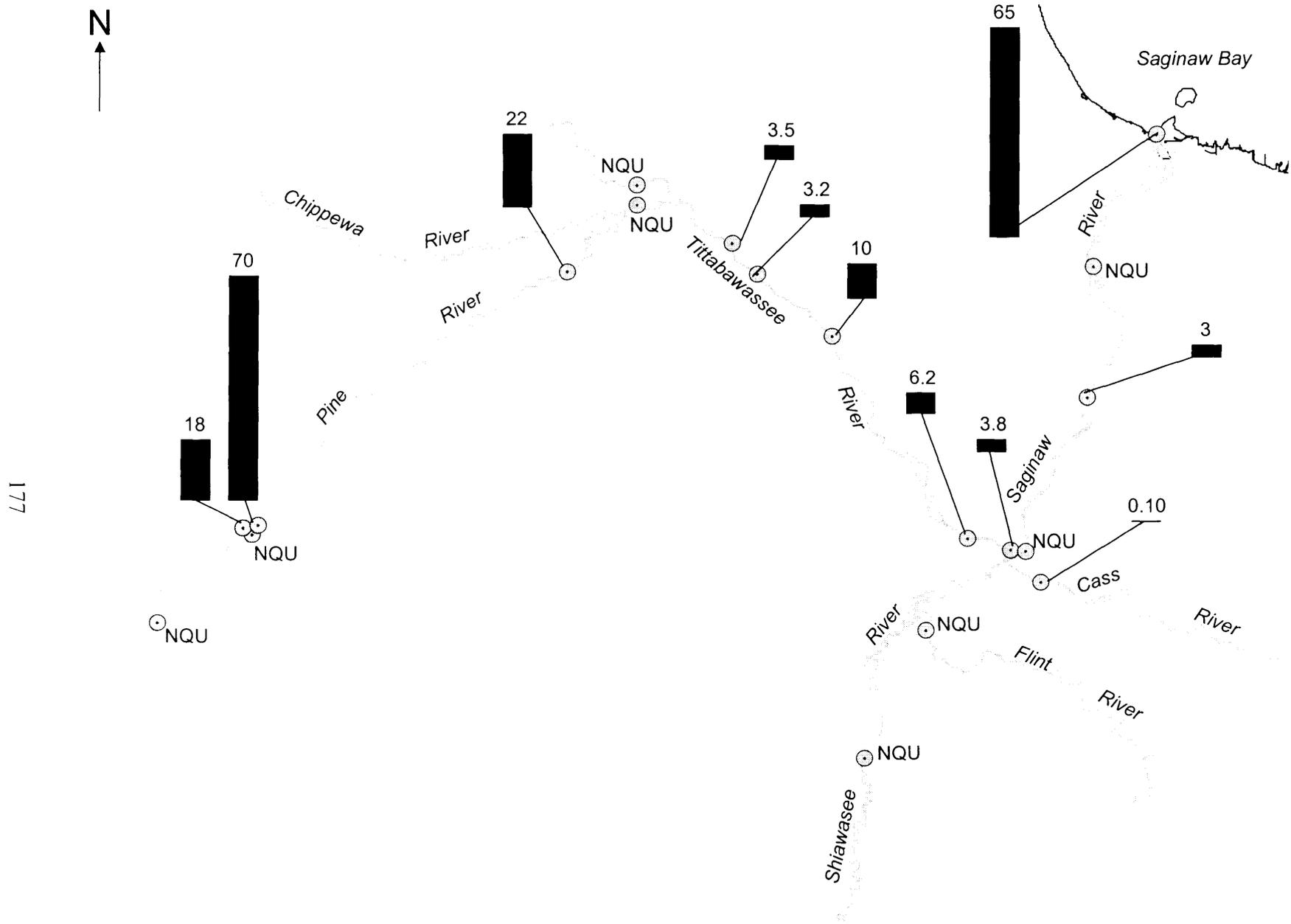


Figure 145. Net uptake of lipid normalized concentrations (ppb) of total PCBs in Saginaw River watershed caged fish, 2002.
 (NQU = no quantifiable uptake)

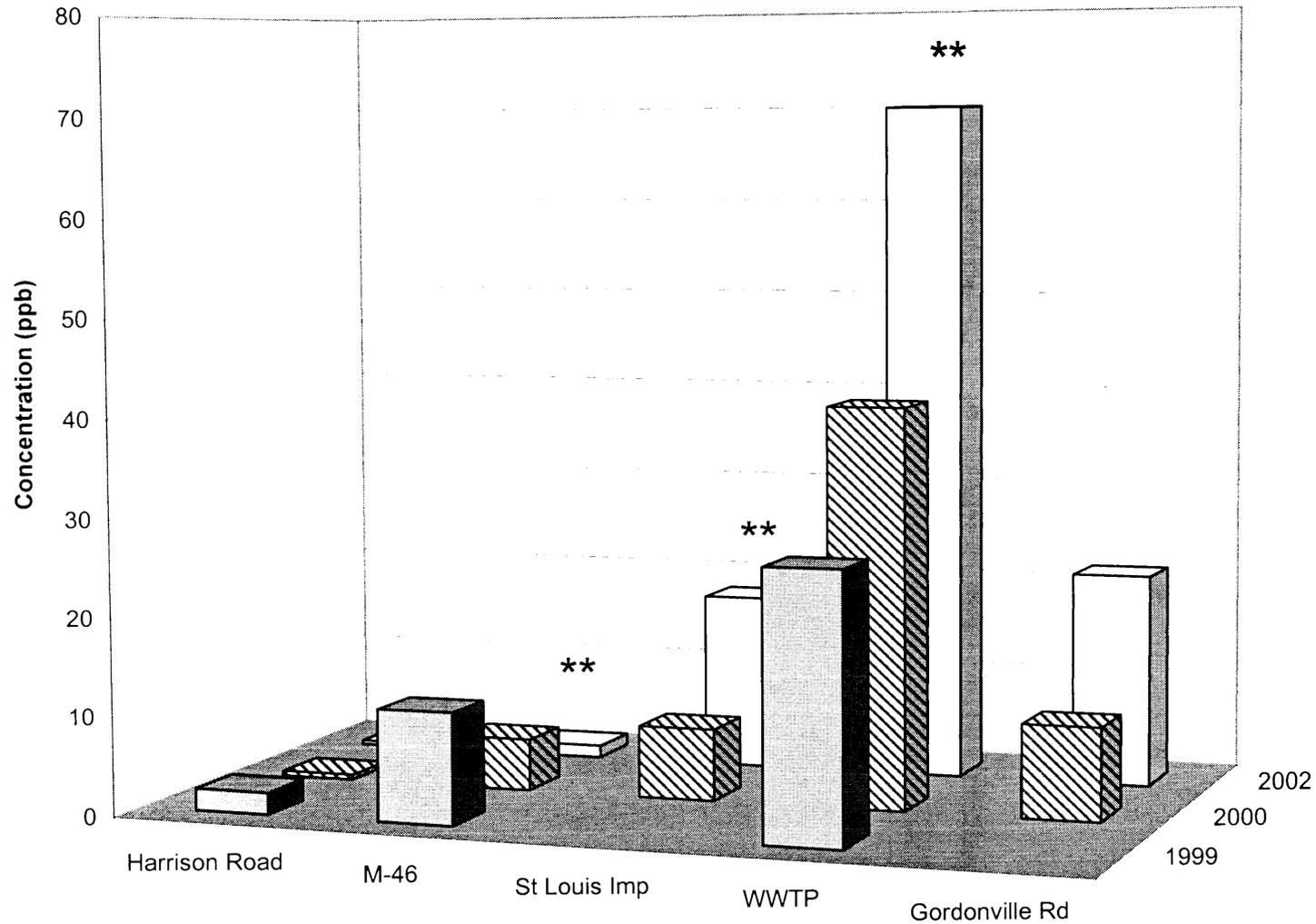


Figure 146. Comparison of mean net uptake of lipid-normalized total PCB across years at five sites on the Pine River.

** Signifies statistically significant difference ($\alpha \leq 0.05$).

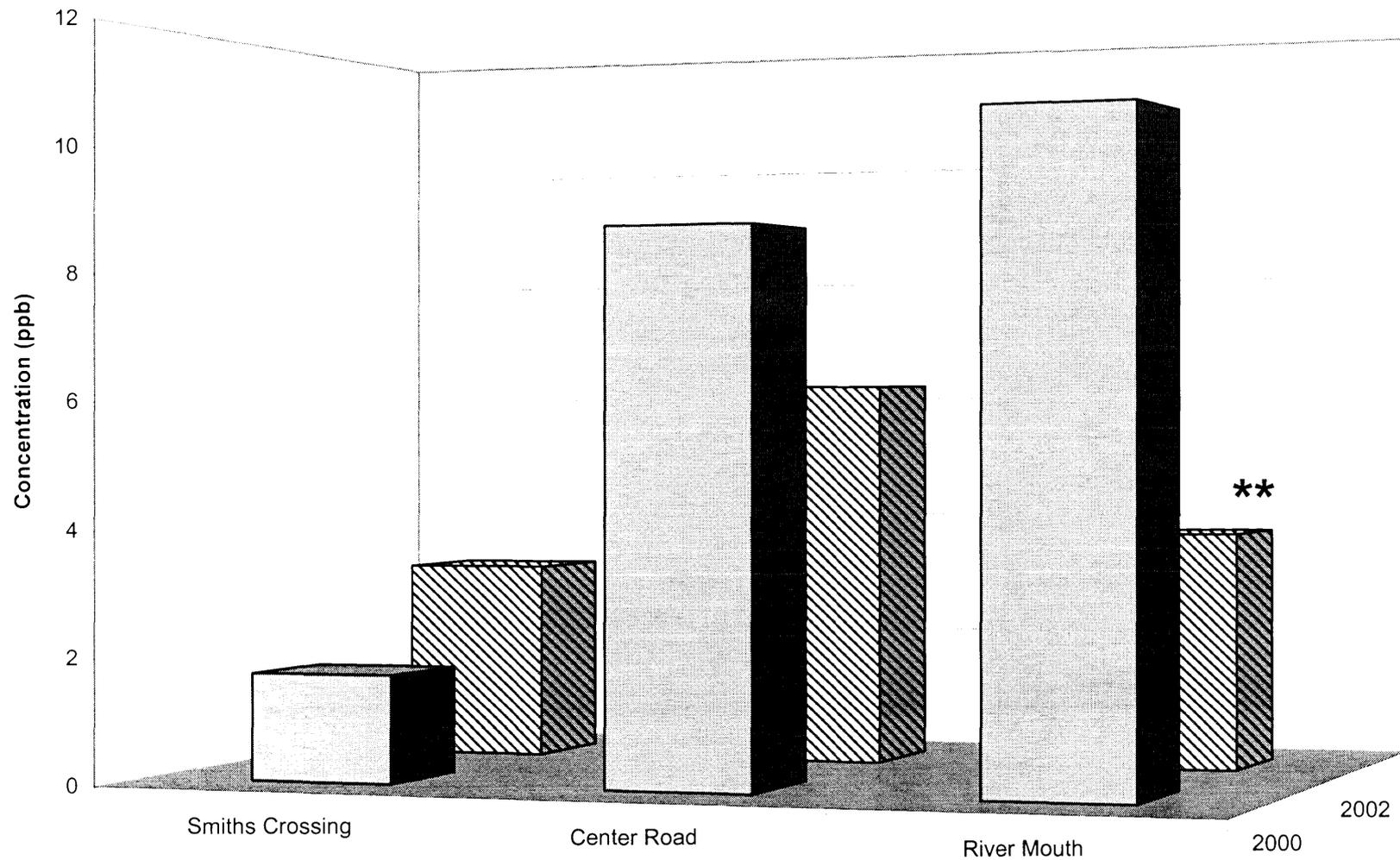


Figure 147. Comparison of mean net uptake of lipid-normalized total PCB across years at three sites on the Tittabawassee River.

** Signifies statistically significant difference ($\alpha \leq 0.05$)

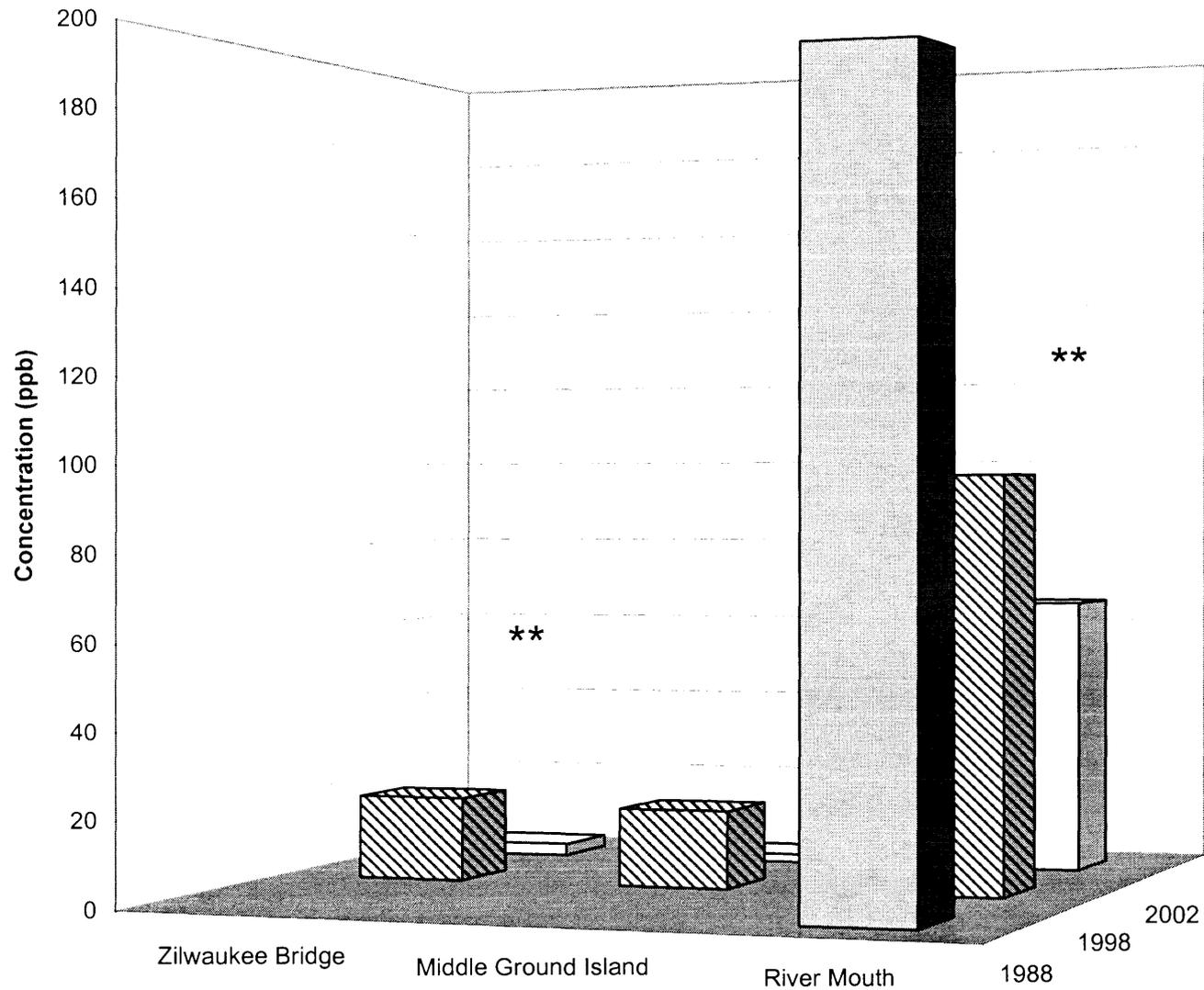


Figure 148. Comparison of mean net uptake of lipid-normalized total PCB across years at three sites on the Saginaw River.

** Signifies statistically significant difference ($\alpha \leq 0.05$).

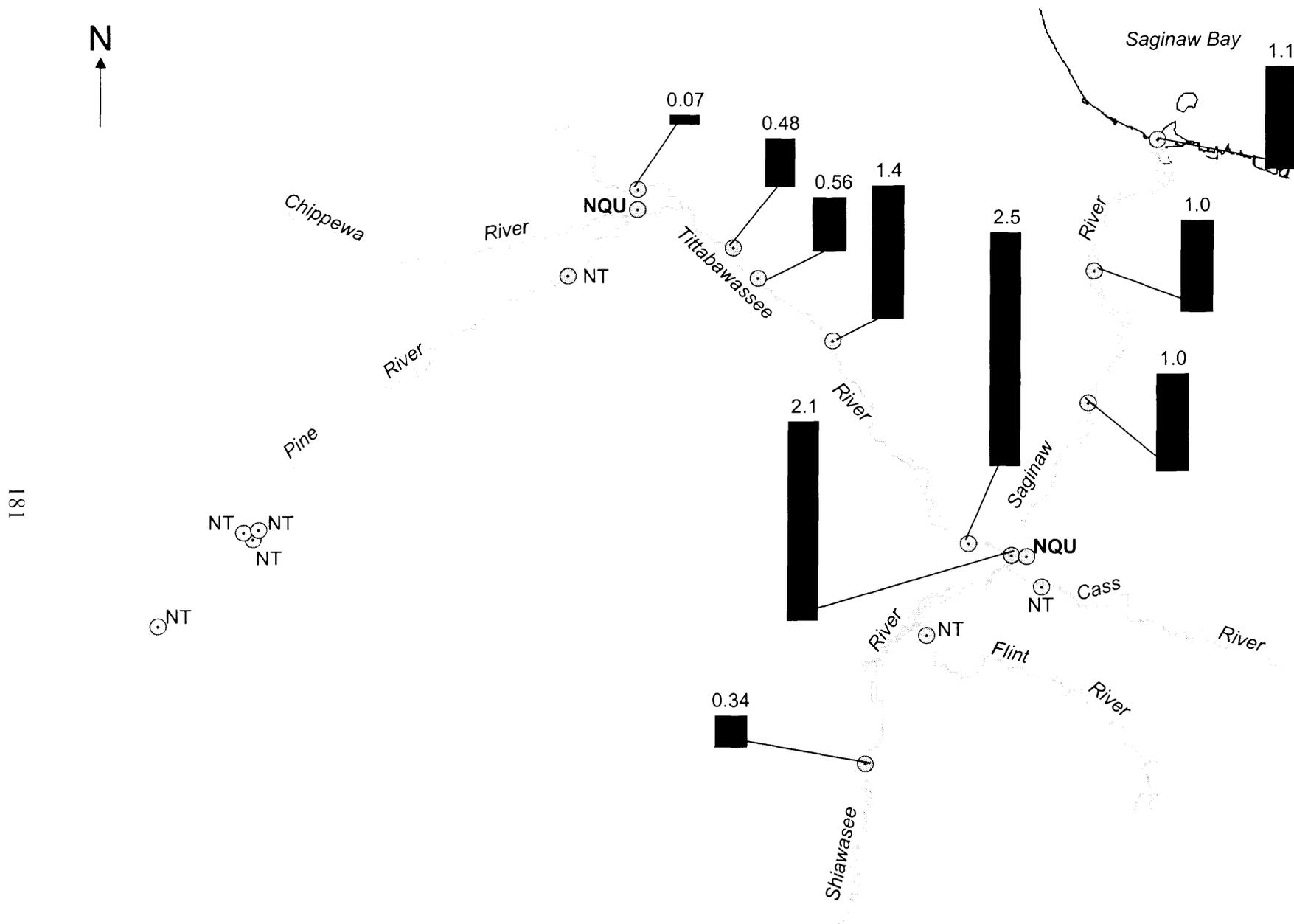


Figure 149. Net uptake of lipid normalized concentrations (ppt) of dioxin TEQ in Saginaw River watershed caged fish, 2002. (NQU = no quantifiable uptake, NT = not tested)

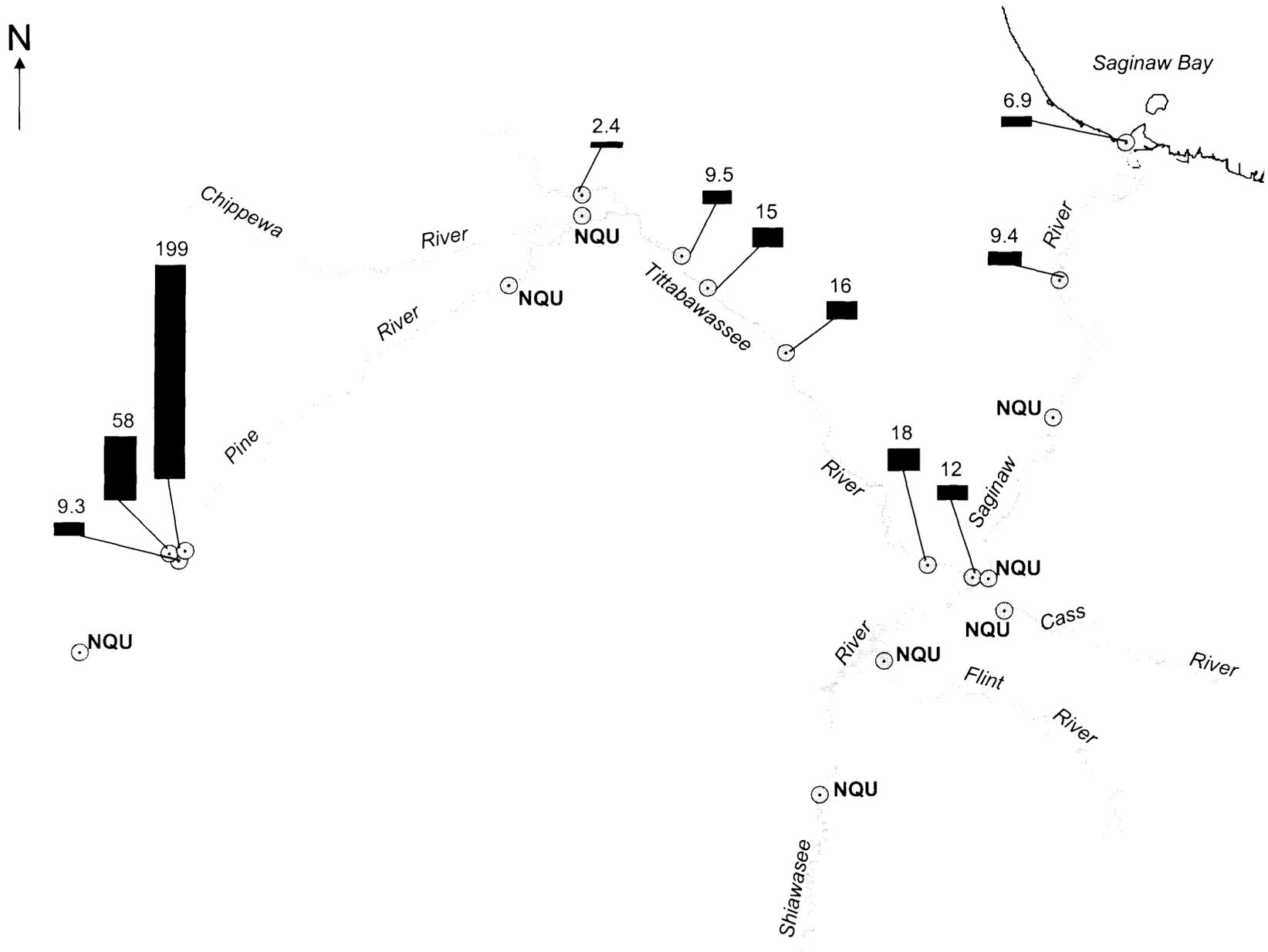


Figure 150. Net uptake of lipid normalized concentrations (ppb) of total DDT in Saginaw River watershed caged fish, 2002. (NQU = no quantifiable uptake)

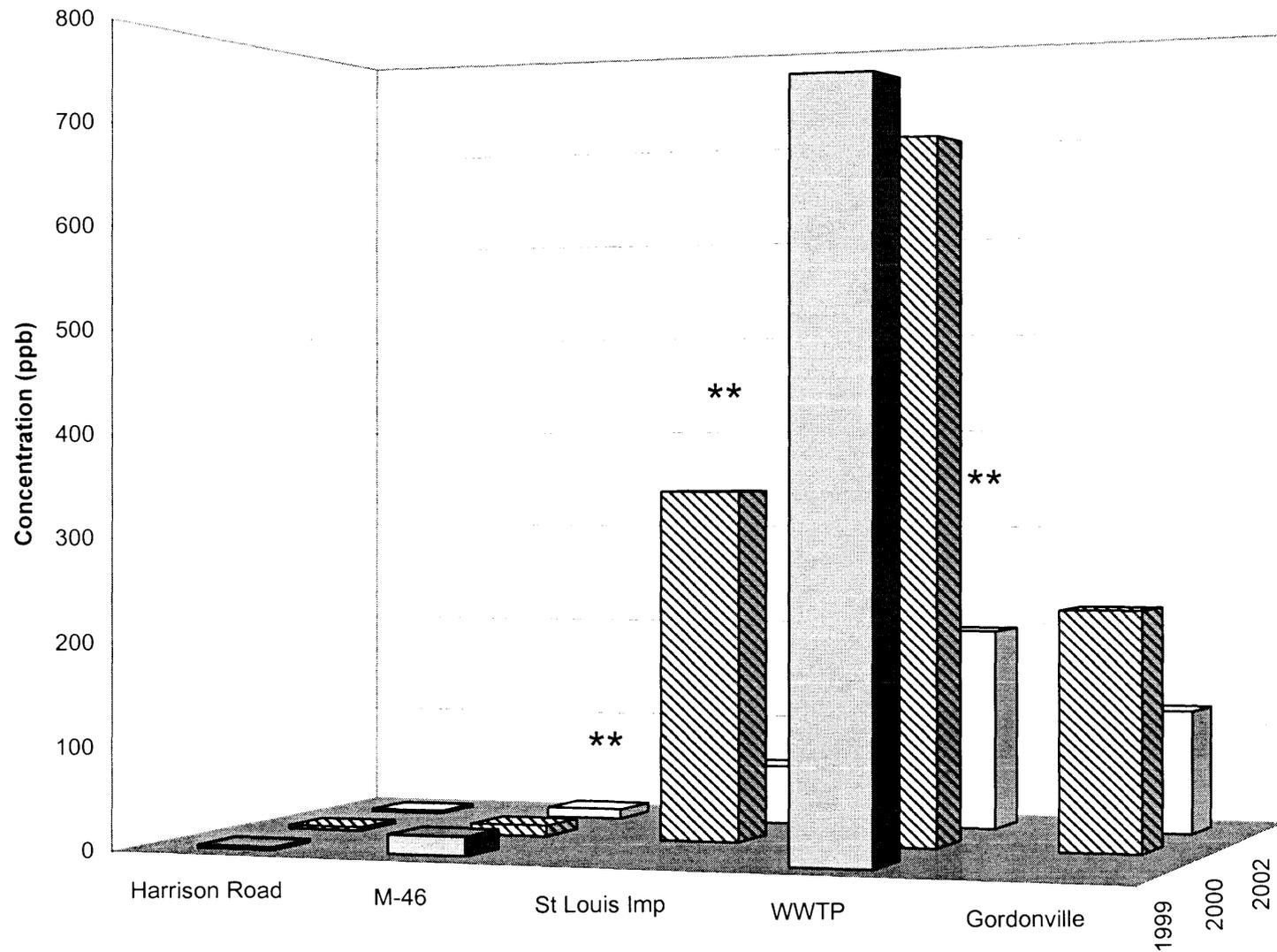


Figure 151. Comparison of mean net uptake of lipid-normalized total DDT across years at five sites on the Pine River.

** Signifies statistically significant difference ($\alpha \leq 0.05$).

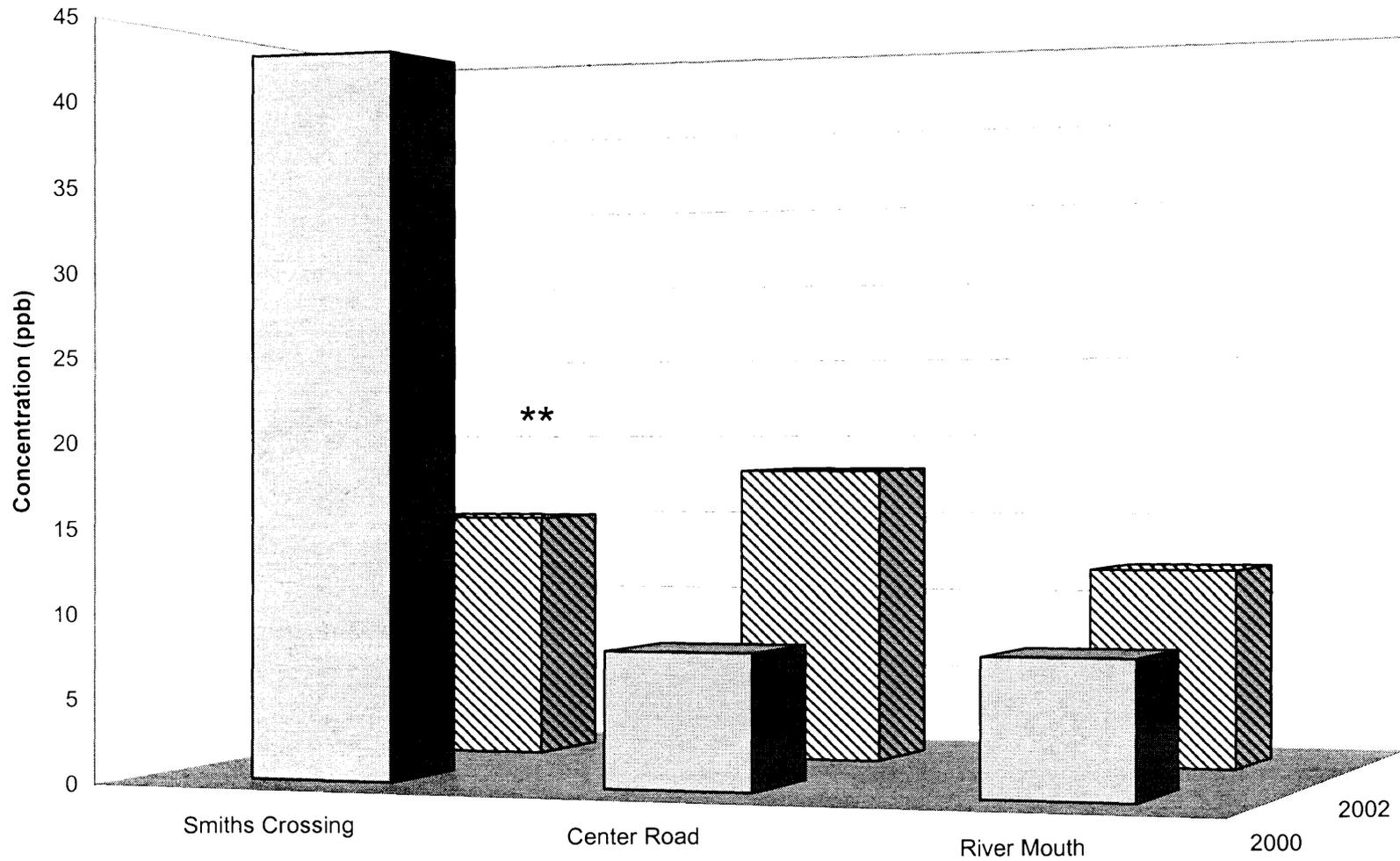


Figure 152. Comparison of mean net uptake of lipid-normalized total DDT across years at three sites on the Tittabawassee River.

** Signifies statistically significant difference ($\alpha \leq 0.05$).

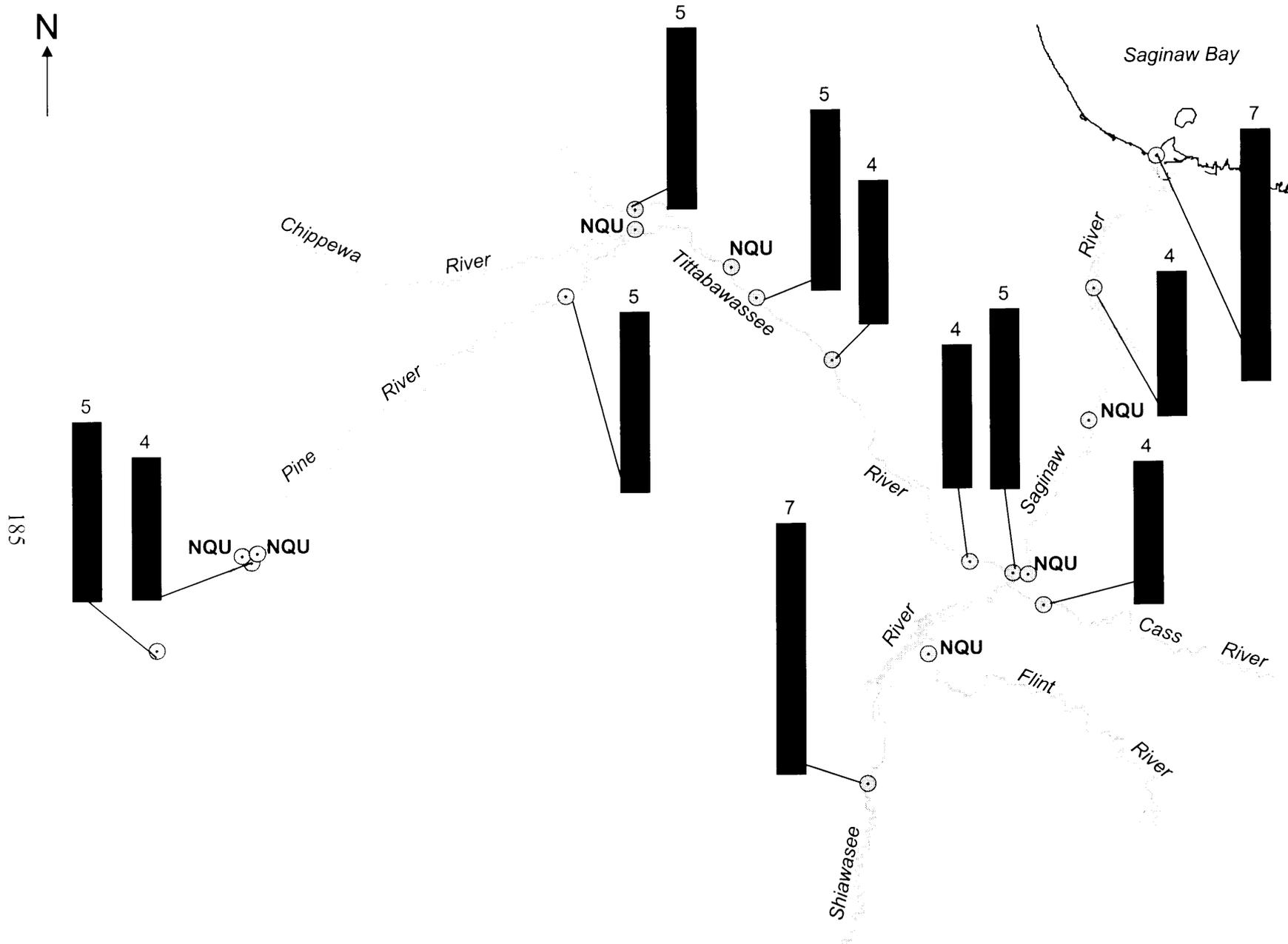


Figure 153. Net uptake of mercury (ppb) in Saginaw River watershed caged fish, 2002.
 (NQU = no quantifiable uptake)

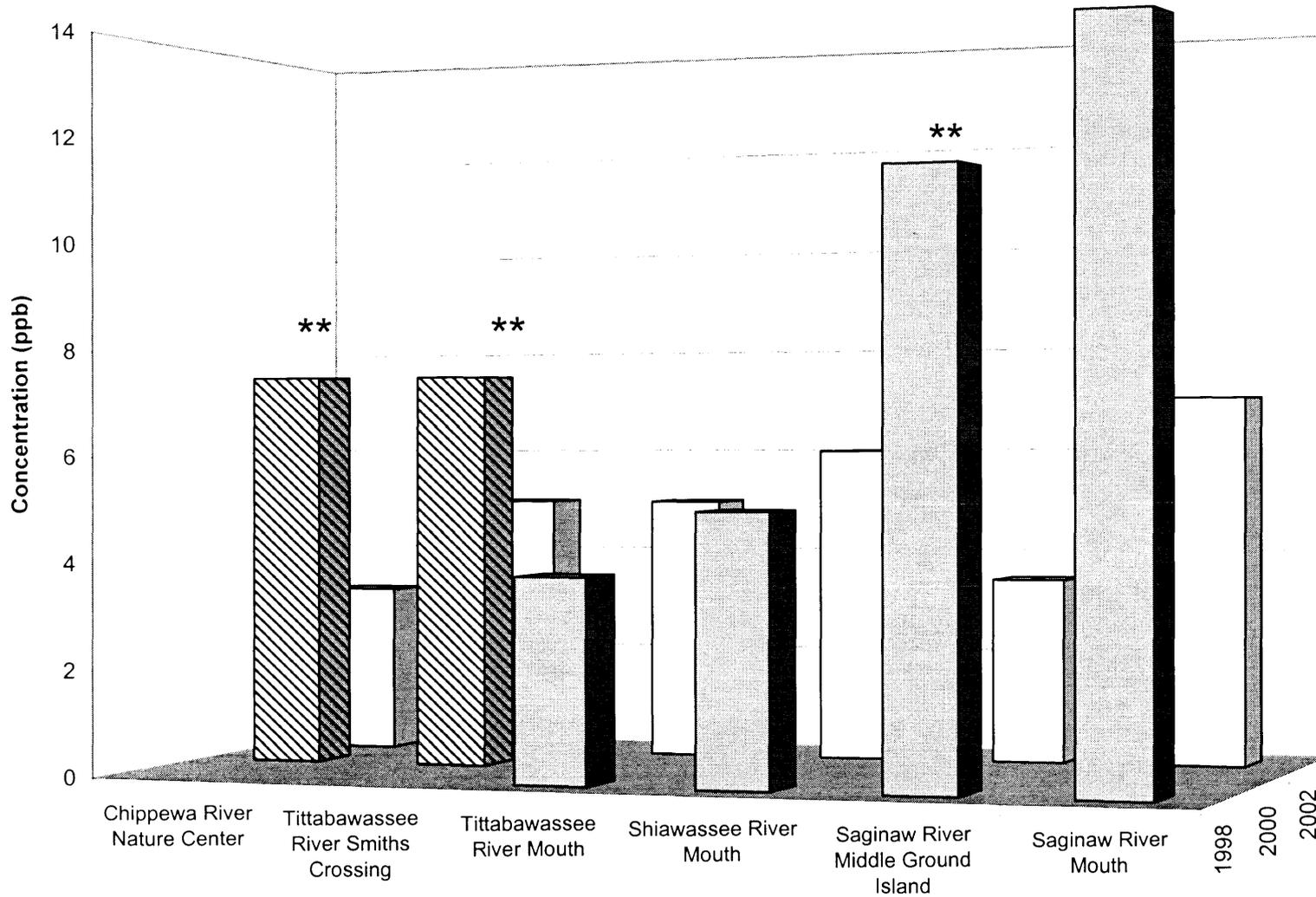


Figure 154. Comparison of mean net uptake of mercury across years at selected sites in the Saginaw River watershed.

**** Signifies statistically significant difference ($\alpha \leq 0.05$).**

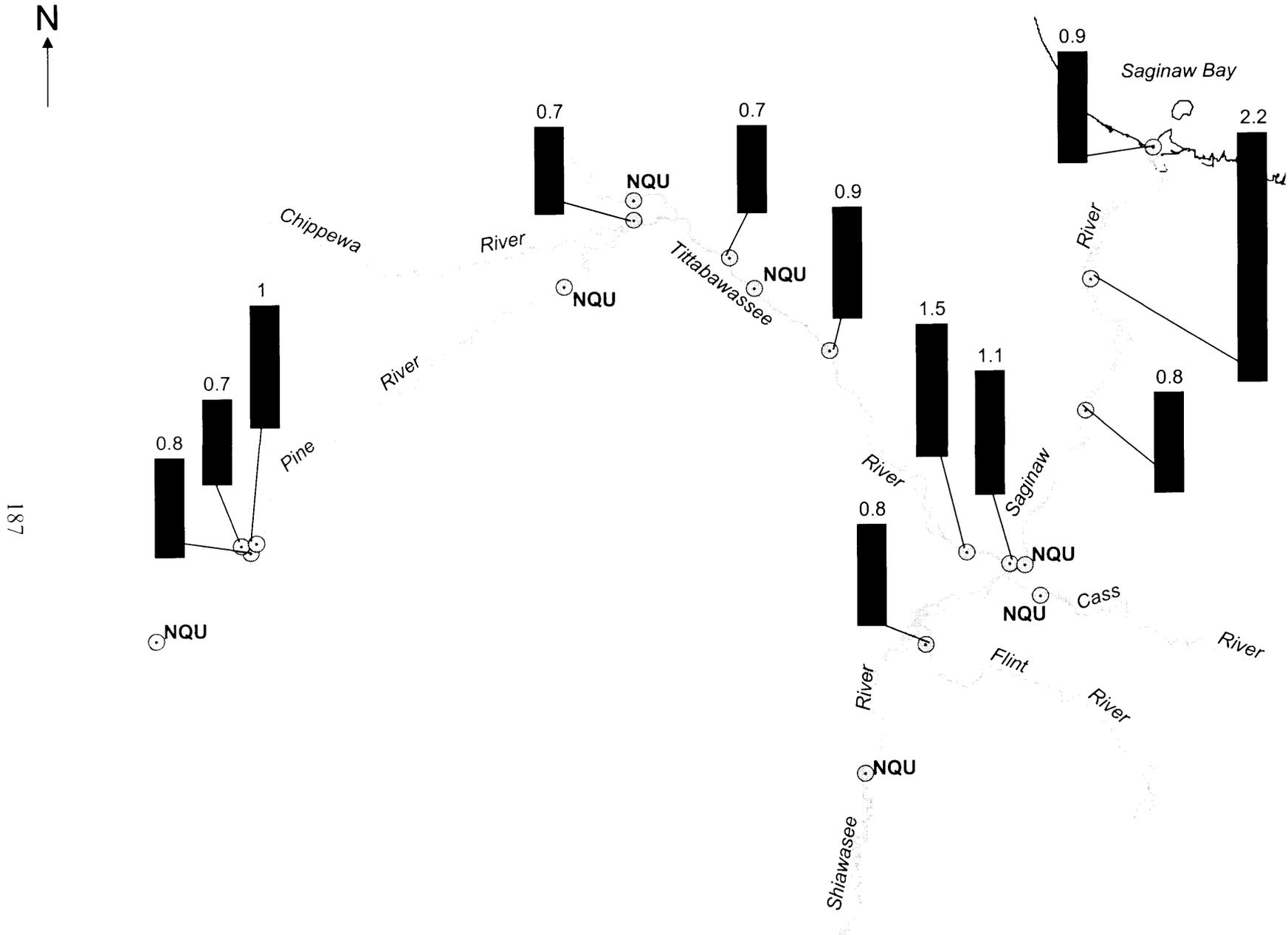


Figure 155. Net uptake of lipid normalized concentrations (ppb) of total chlordane in Saginaw River watershed caged fish, 2002.
(NQU = no quantifiable uptake)

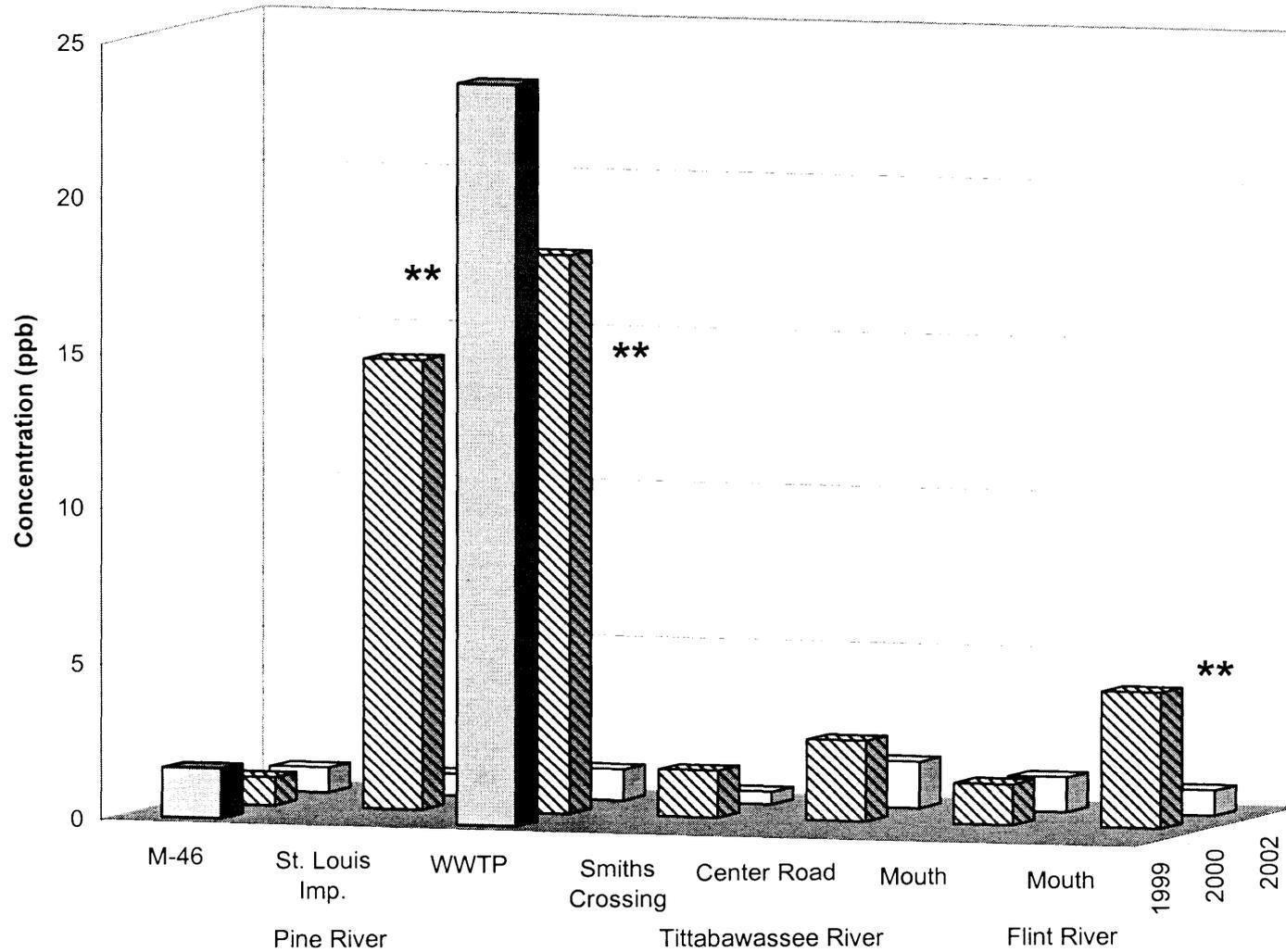


Figure 156. Comparison of mean net uptake of lipid normalized chlordane across years at selected sites in the Saginaw River watershed.

** Signifies statistically significant difference ($\alpha \leq 0.05$).

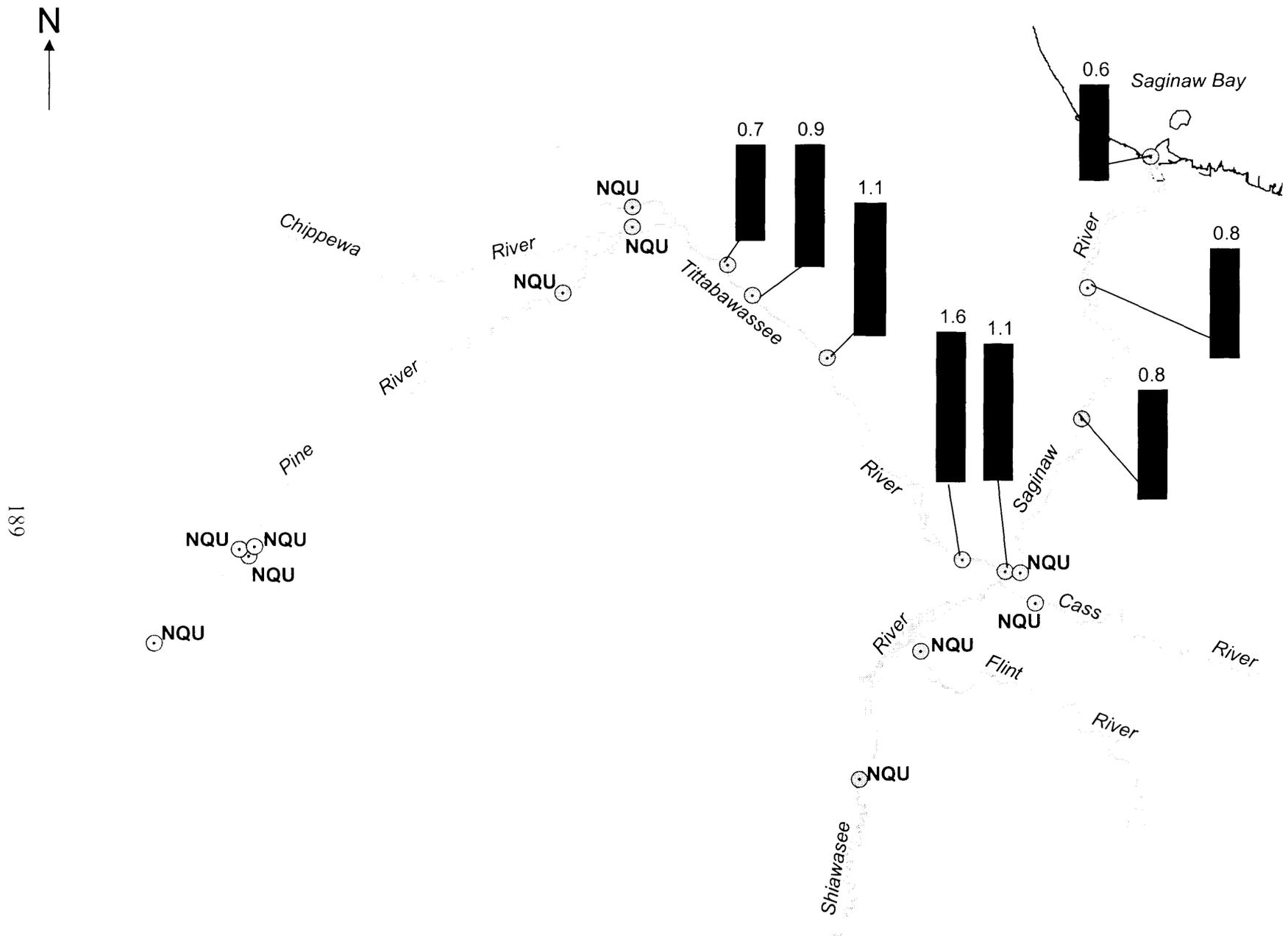


Figure 157. Net uptake of lipid normalized concentrations (ppb) of hexachlorobenzene in Saginaw River watershed caged fish, 2002. (NQU = no quantifiable uptake)

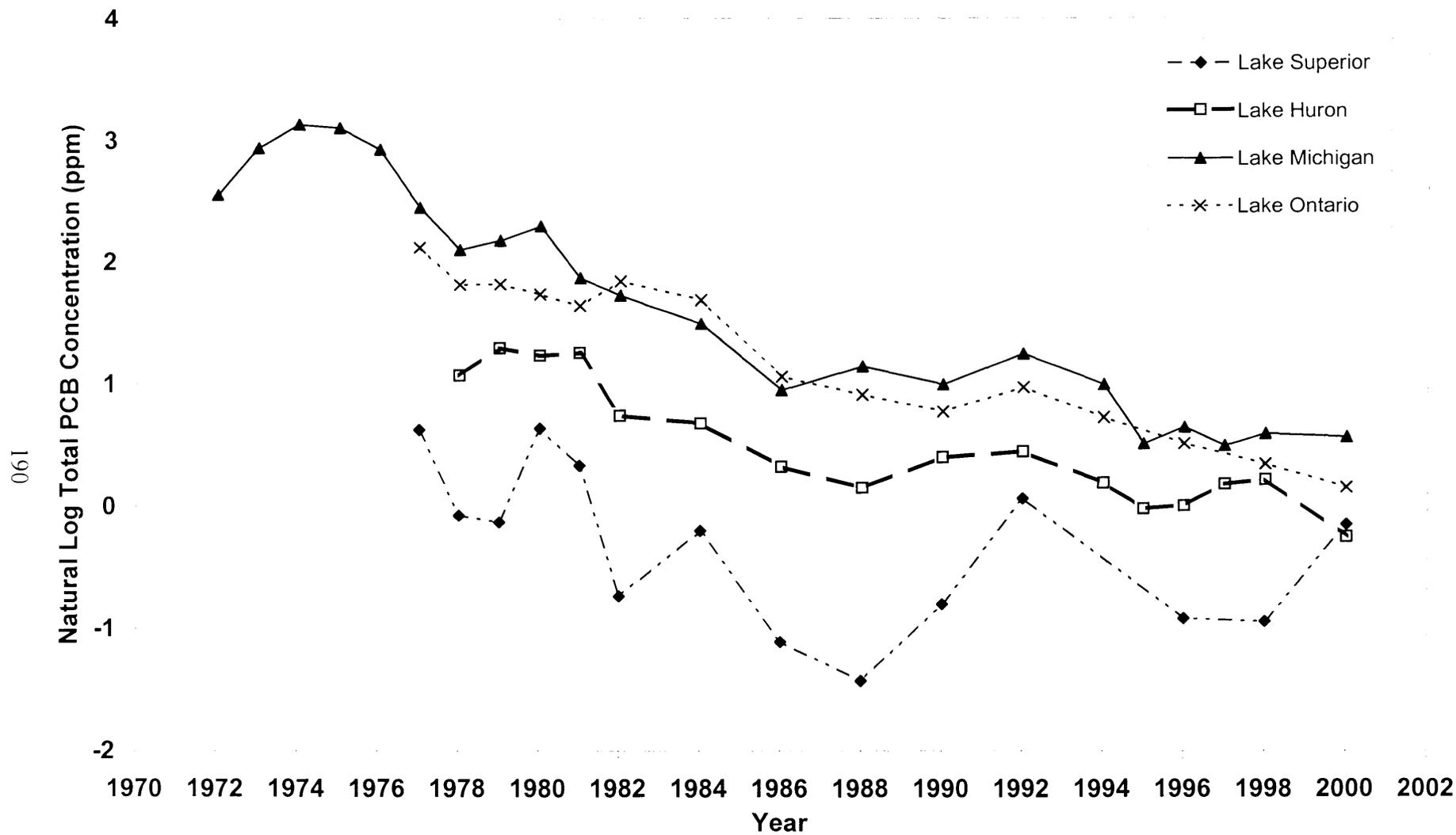


Figure 158. Natural log of average total PCB concentrations in whole lake trout from the Great Lakes, 1970-2000 (DeVault et al. 1996; USEPA unpublished data).

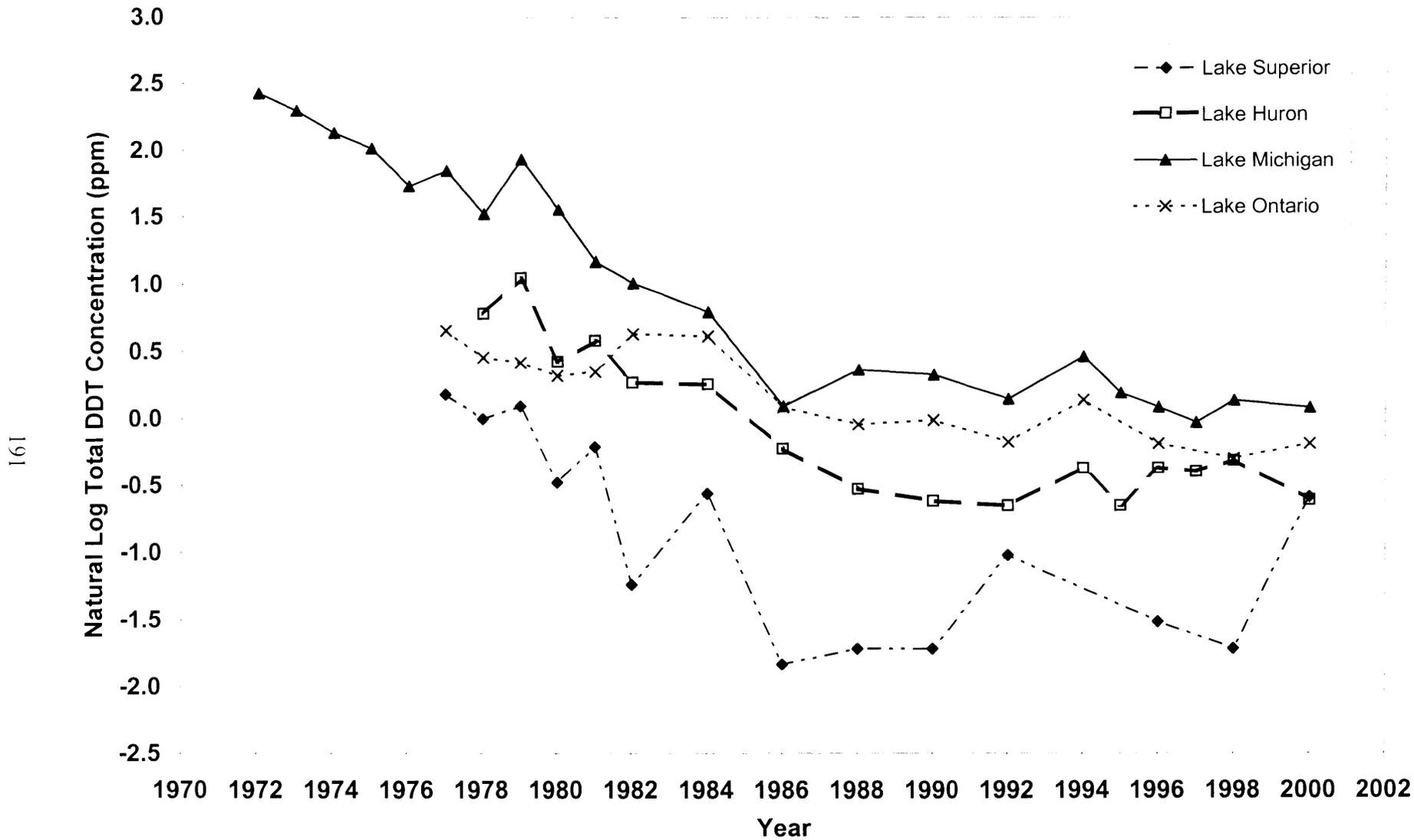


Figure 159. Natural log of average total DDT concentrations in whole lake trout from the Great Lakes, 1970-2000 (DeVault et al. 1996; USEPA unpublished data).

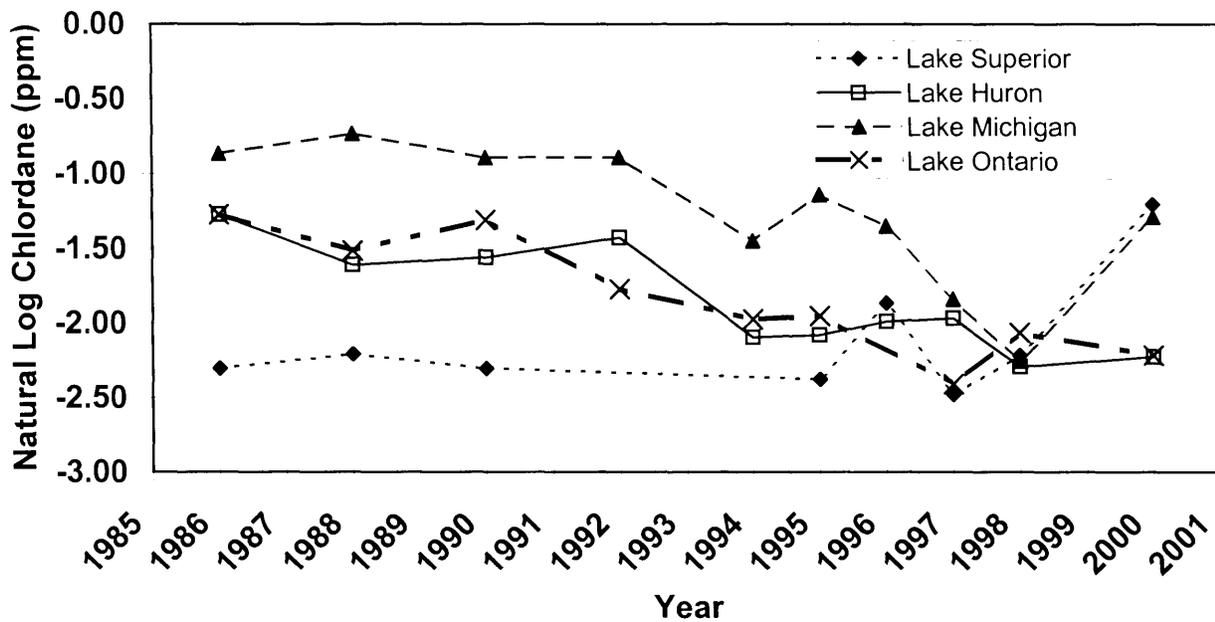


Figure 160. Natural log of average total chlordane concentrations in whole lake trout from the Great Lakes, 1986-2000 (DeVault et al. 1996; USEPA unpublished data).

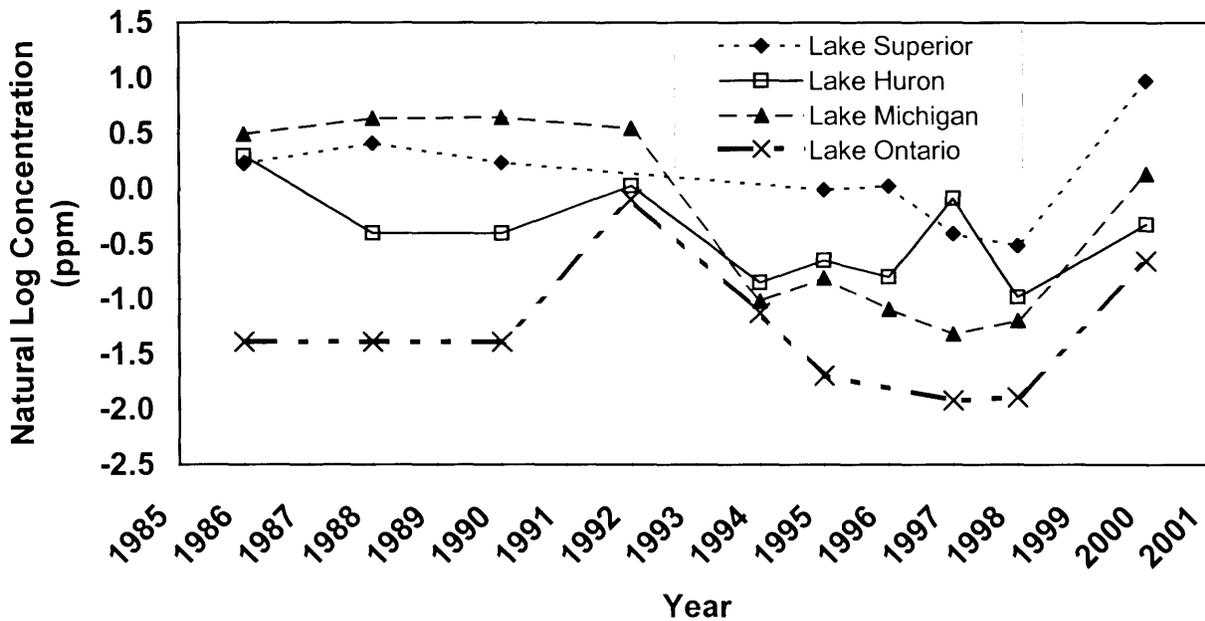


Figure 161. Natural log of average apparent toxaphene concentrations in whole lake trout from the Great Lakes, 1986-2000 (DeVault et al. 1996; USEPA unpublished data). Concentrations were below the quantification level in Lake Ontario fish collected between 1986 and 2000.

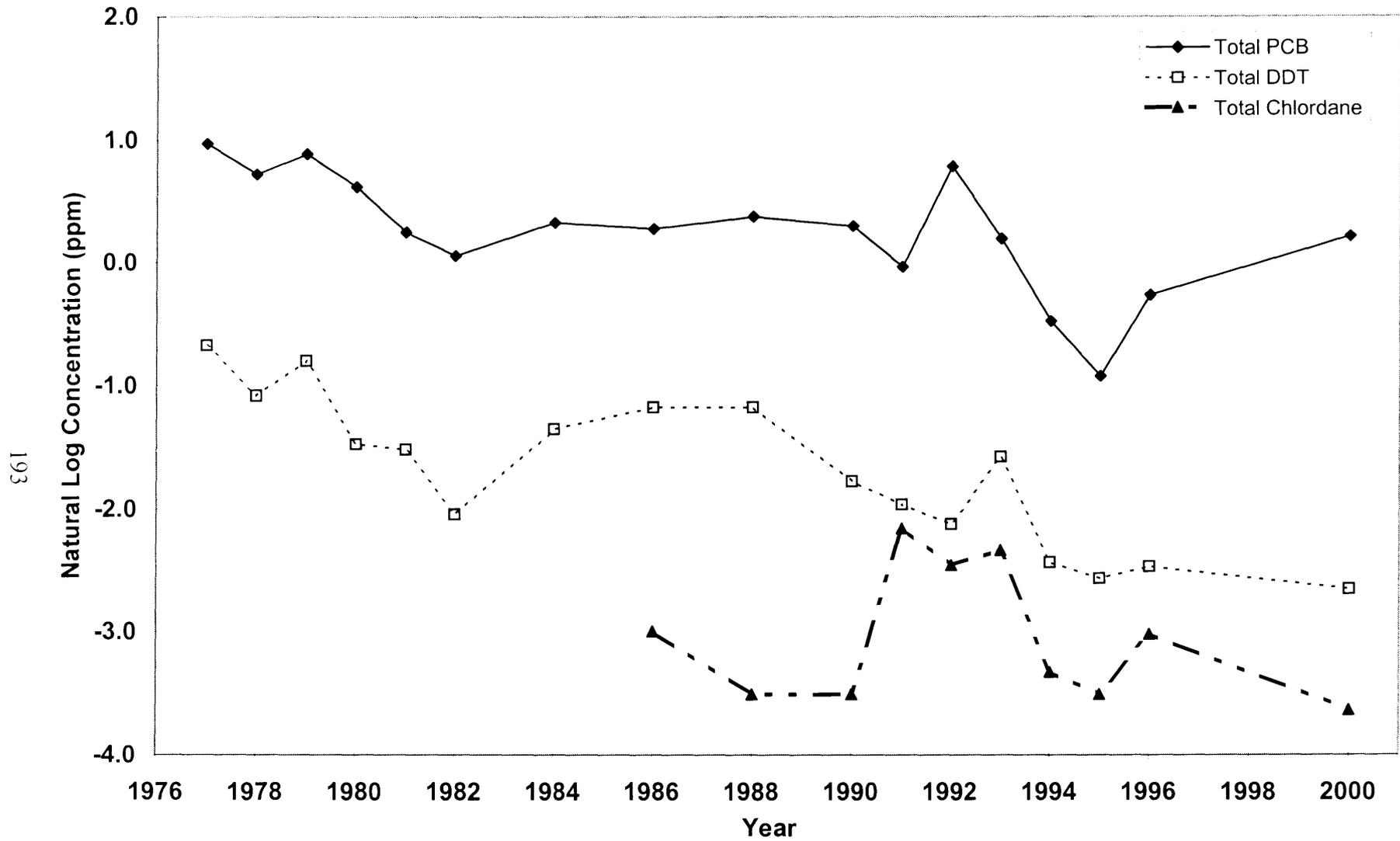


Figure 162. Natural log of average total PCB, total DDT and total chlordane concentrations in whole walleye from Lake Erie, 1986-2000 (DeVault et al. 1996; USEPA unpublished data).

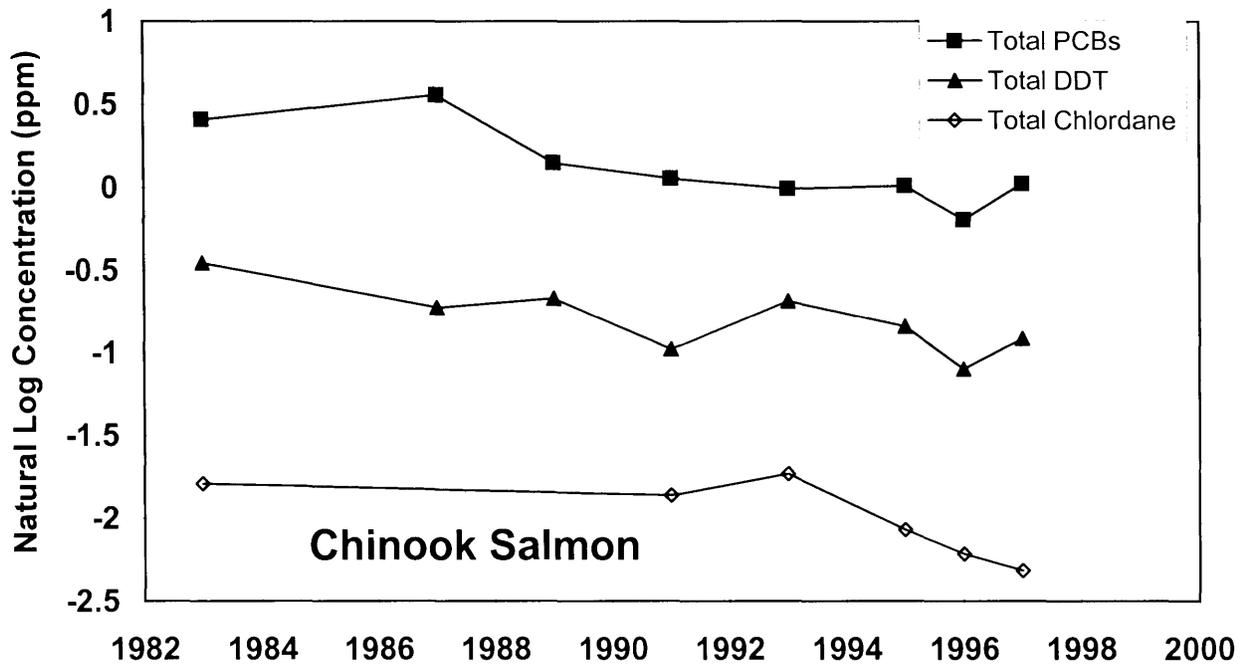
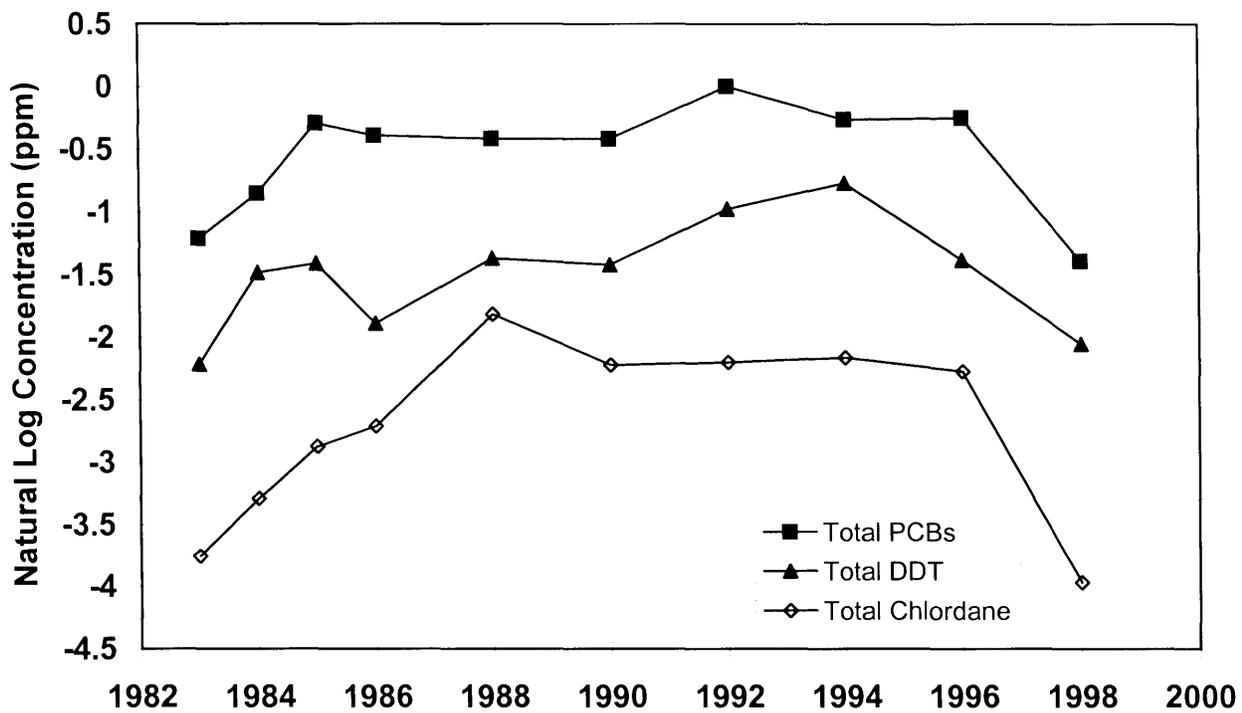


Figure 163. Natural log of average total PCB, total DDT and total chlordane concentrations in coho and chinook salmon fillet samples from Lake Michigan.

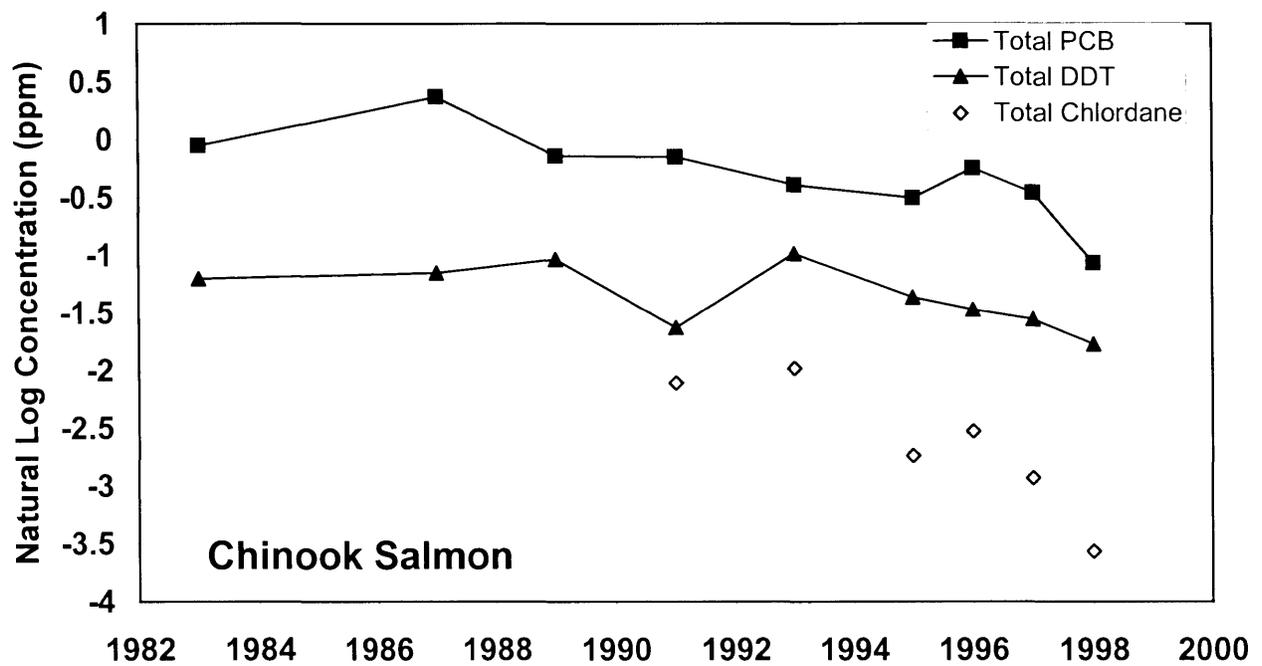
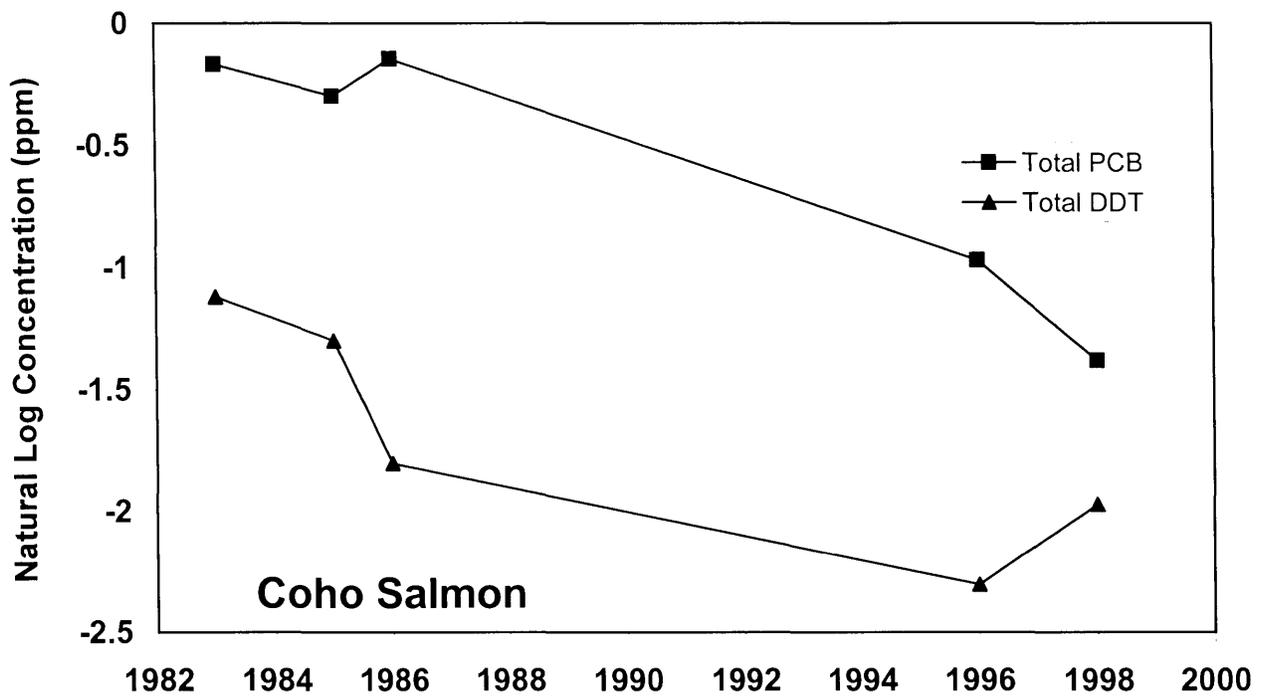


Figure 164. Natural log of average total PCB, total DDT and total chlordane concentrations in coho and chinook salmon fillet samples from Lake Huron.

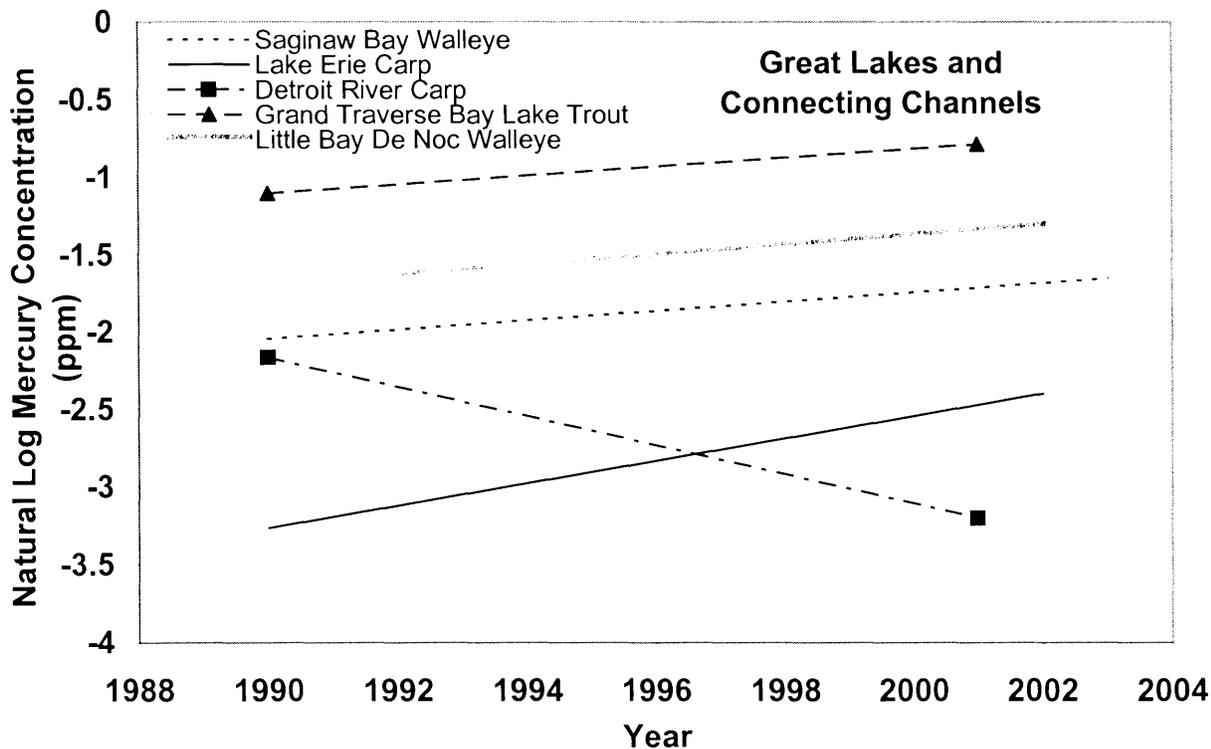
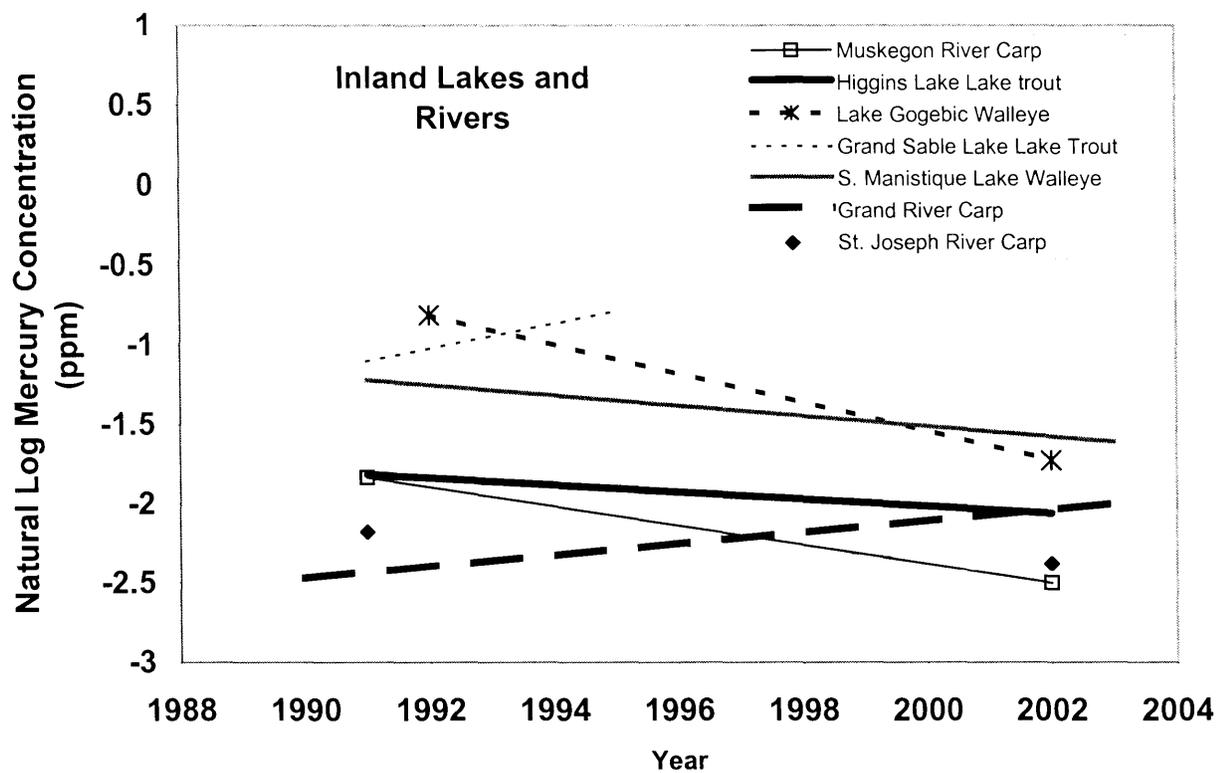


Figure 165. Temporal changes in mercury concentrations at selected whole-fish trend monitoring sites.

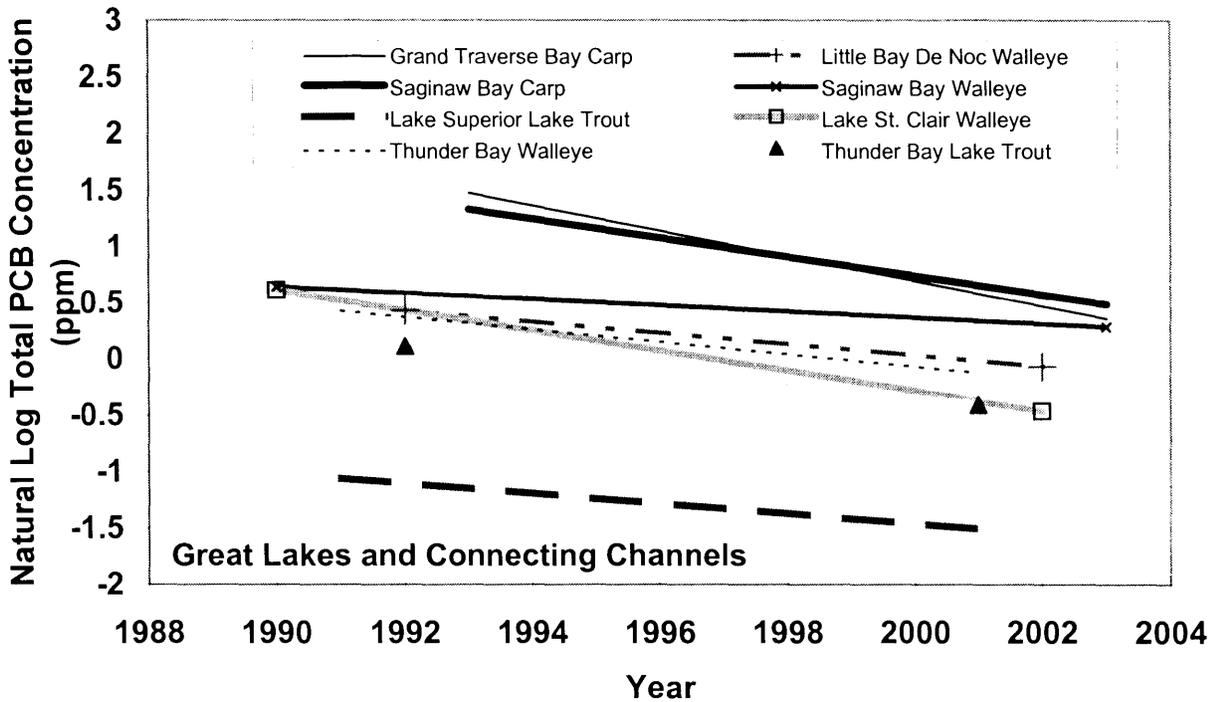
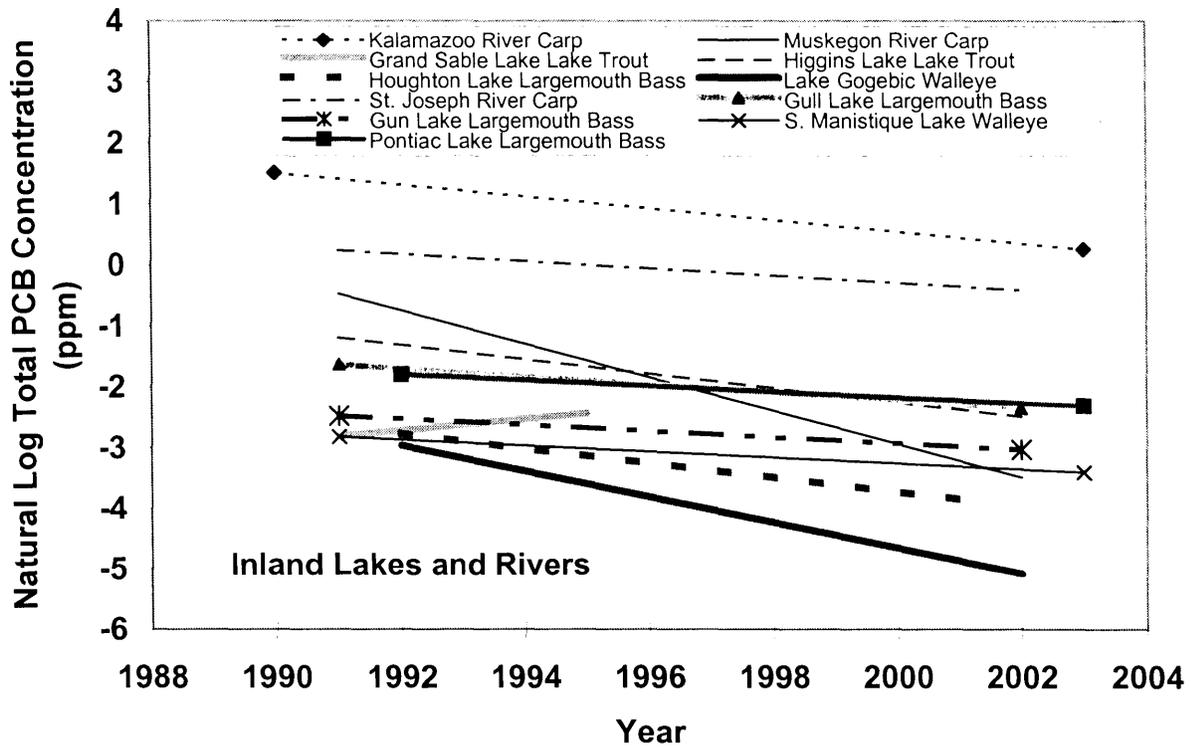


Figure 166. Temporal changes in total PCB concentrations at selected whole-fish trend monitoring sites.

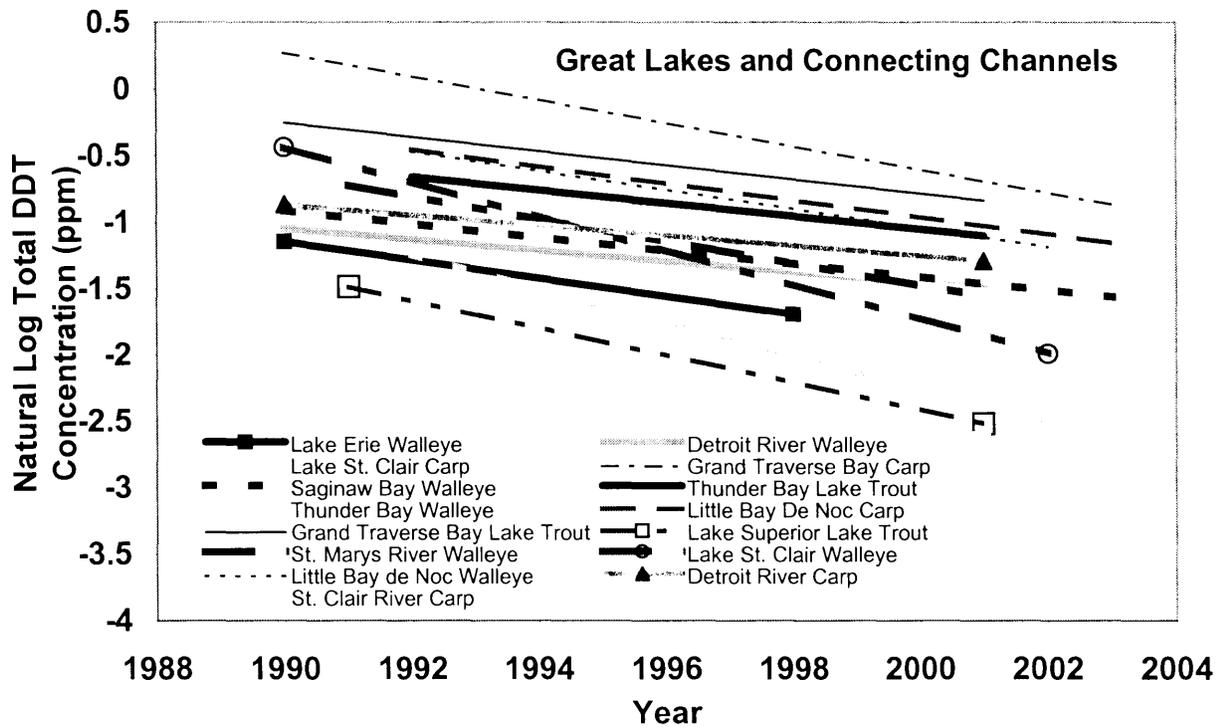
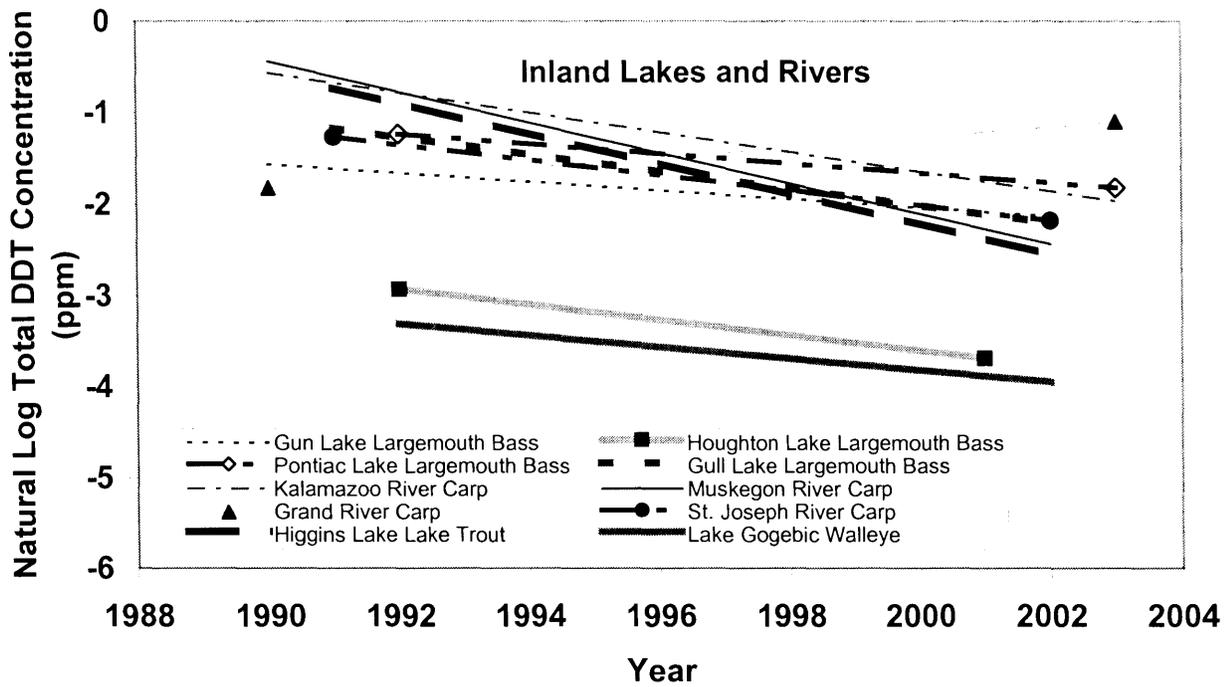


Figure 167. Temporal changes in total DDT concentrations at selected whole-fish trend monitoring sites.

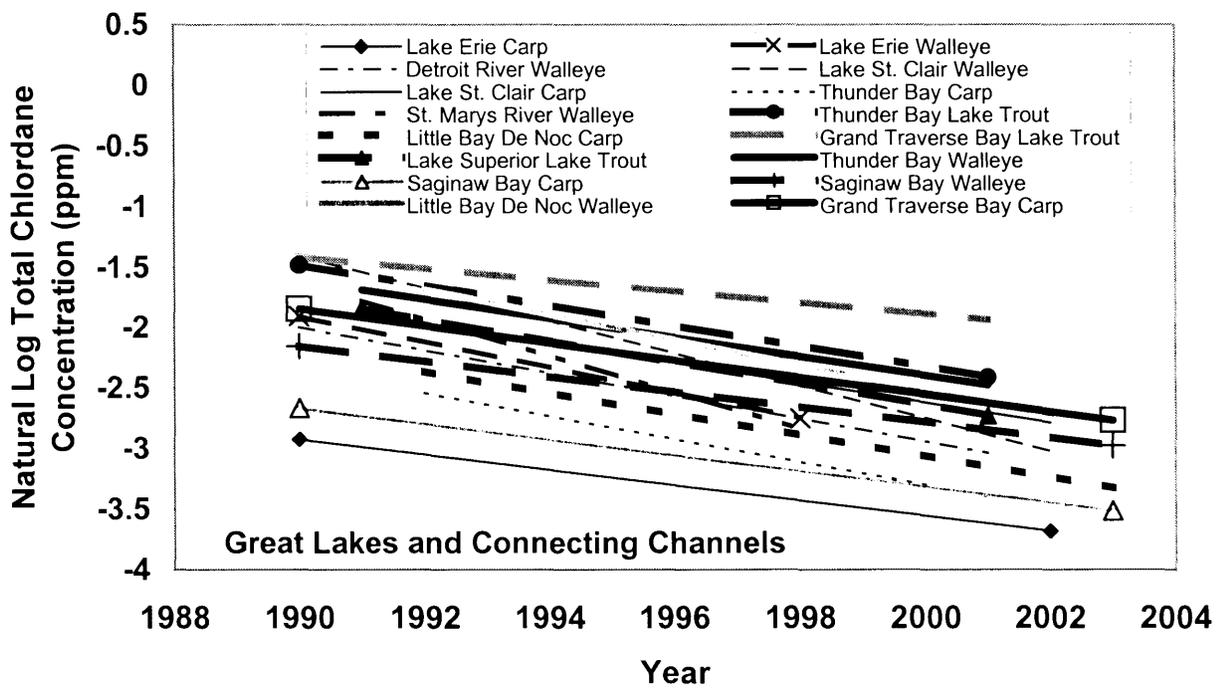
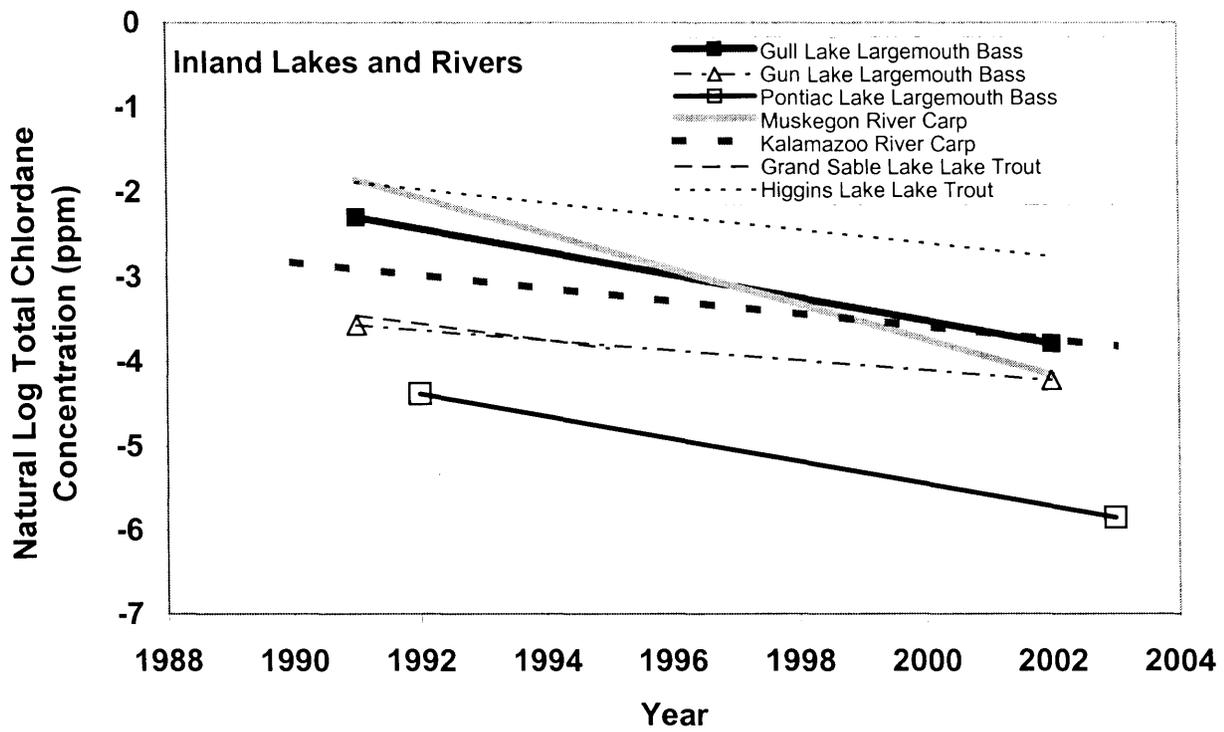


Figure 168. Temporal changes in total chlordane concentrations at selected whole-fish trend monitoring sites.

APPENDIX A

INVENTORY OF FISH CONTAMINANT MONITORING SITES AND SPECIES, 1980-2003

Waterbody	Location	Visit ID#	Date	Species
Adrian Lake	Lenawee County	90007	Jun/13/1990	Carp, Northern Pike
Antoine Lake	Dickinson County	88004	May/24/1988	Largemouth Bass, Smallmouth Bass, Walleye
Arbutus Lake	Grand Traverse County	93066	May/11/1993	Northern Pike
Au Gres River	Au Gres, river mouth	91002	Sep/03/1991	Channel Catfish
Au Sable River	Alcona Dam Pond	2003002	Jun/10/2003	Carp, Northern Pike, Walleye
Au Sable River	Chase River Road	1998136	Aug/25/1998	Brown Trout, White Sucker
Au Sable River	Oscoda	86037	Jul/31/1986	Carp
Au Sable River	Oscoda	97001	May/21/1997	Carp, Walleye
Au Sable River	Oscoda	1999001	Sep/20/1999	Carp, Walleye
Au Sable River	Oscoda, river mouth	91003	Sep/03/1991	Channel Catfish
Au Sable River	Oscoda, river mouth	96002	Aug/19/1996	Channel Catfish
Au Sable River	Thendara Road	1998144	Sep/08/1998	Brown Trout, White Sucker
Au Sable River, Middle Branch	Alcona County, above Alcona Pond	1998073	May/20/1998	Walleye, White Sucker
Au Sable River, North Branch	Lovells	96003	Sep/10/1996	Brown Trout
Au Sable River, North Branch	Otsego County, Dam #2	88039	Nov/03/1988	Brown Trout
Au Train Basin	Alger County	90060	Aug/30/1990	Northern Pike, Yellow Perch
Au Train Lake	Alger County	87003	Apr/14/1987	Northern Pike, Walleye
Au Train Lake	Alger County	93048	May/11/1993	Northern Pike, Walleye
Austin Lake	Kalamazoo County	93091	May/04/1993	Carp, Largemouth Bass
Austin Lake	Kalamazoo County	2003154	Jul/21/2003	Carp, Largemouth Bass, Yellow Bullhead
Bad River	Saginaw County	94034	Aug/30/1994	Channel Catfish, Northern Pike
Barton Lake	Kalamazoo County	91057	Oct/01/1991	Carp, Largemouth Bass, Northern Pike
Bass Lake	Grand Traverse County	95063	Jun/20/1995	Bluegill, Northern Pike, Yellow Perch
Battle Creek River	Battle Creek, Davison St.	91004	Oct/24/1991	Carp, Smallmouth Bass
Bear Lake	Kalkaska County	87036	Jun/24/1987	Brown Trout, Smallmouth Bass
Bear Lake	Muskegon County	86062	Oct/29/1986	Carp, Largemouth Bass, Northern Pike
Bear Lake	Muskegon County	93002	Nov/02/1993	Northern Pike, Walleye
Bear River	Emmet County	1998006	Aug/04/1998	Brown Trout, White Sucker
Beatons Lake	Gogebic County	87005	Apr/28/1987	Largemouth Bass, Rainbow Trout
Beaufort Lake	Baraga County	87039	Jun/17/1987	Northern Pike, Walleye
Beaver Lake	Alger County	2003150	Aug/28/2003	Walleye, Yellow Perch
Beaver Lake	Alpena County	87022	Jun/03/1987	Northern Pike, Smallmouth Bass
Bellaire Lake	Antrim County	87095	Sep/16/1987	Splake, Walleye
Belle River	Marine City	97002	Sep/17/1997	Channel Catfish
Big Blue Lake	Muskegon County	88054	Oct/06/1988	Largemouth Bass, Northern Pike
Big Creek, West Branch	Crawford County, County Road 612	88059	Nov/03/1988	Brown Trout
Big Portage Lake	Jackson County	89042	May/23/1989	Black Crappie, Largemouth Bass, Northern Pike
Big Shag Lake	Marquette County	2001003	May/01/2001	Northern Pike
Bills Lake	Newaygo County	88055	Oct/05/1988	Largemouth Bass, Walleye
Bird Lake	Hillsdale County	87019	May/27/1987	Bluegill, Northern Pike, Yellow Perch
Bishop Lake	Livingston County	87014	May/12/1987	Largemouth Bass, Northern Pike
Bishop Lake	Livingston County	89010	Jun/28/1989	Largemouth Bass, Northern Pike
Black Creek	Lenawee County	91005	Jun/13/1991	Carp
Black Creek	Muskegon County, US-31	87013	May/05/1987	Brown Trout, Carp, White Sucker

Waterbody	Location	Visit ID#	Date	Species
Black Lake	Cheboygan County	90052	Feb/01/1989	Lake Sturgeon
Black River	Mouth	2002007	Aug/02/2002	Channel Catfish
Black River	Port Huron, river mouth	93003	Aug/31/1993	Channel Catfish
Black River	Sanilac County, Croswell Impoundment	89017	Apr/20/1989	Carp
Black River	South Haven	92016	Aug/25/1992	Carp, Northern Pike
Black River, South Branch	Bangor	89020	Jul/07/1989	Carp, Largemouth Bass, Northern Pike, Rock Bass, White Sucker
Black River, South Branch	Bangor	2002008	Sep/23/2002	Carp, Northern Pike, White Sucker
Black River, South Branch	Upstream of Bangor Dam	2002106	Sep/23/2002	Carp, Northern Pike, White Sucker
Boardman Lake	Grand Traverse County	91006	Sep/26/1991	Northern Pike, Walleye, White Sucker
Bob Lake	Houghton County	2001134	Oct/03/2001	Walleye
Boston Pond	Houghton County	2000105	Jul/11/2000	White Sucker, Yellow Perch
Boyne River	Charlevoix County	1998011	Aug/05/1998	Brown Trout, White Sucker
Brevoort Lake	Mackinac County	89033	May/01/1989	Rock Bass, Walleye
Bristol Lake	Barry County	2002009	May/15/2002	Largemouth Bass, White Sucker
Burt Lake	Cheboygan County	90061	May/07/1990	Northern Pike, Walleye
Burt Lake	Cheboygan County	2001005	Oct/10/2001	Walleye, White Sucker
Cable Lake	Iron County	88005	May/26/1988	Largemouth Bass, Walleye
Camp Lake	Kent County	2003015	May/21/2003	Brown Bullhead, Largemouth Bass, Northern Pike
Caribou Lake	Chippewa County	86004	May/21/1986	Rock Bass, Walleye
Carney Lake	Dickinson County	89031	May/08/1989	Northern Pike, Walleye
Carp Lake	Chippewa County	87089	Oct/23/1987	Northern Pike, Walleye
Carp River	Carp River Basin	1999003	Aug/20/1999	Brook Trout, Northern Pike
Carp River	Eagle Mills Pump House	88068	Oct/06/1988	Northern Pike, Yellow Perch
Carp River	Eagle Mills Pump House	93074	Jul/23/1993	Brook Trout, Northern Pike
Carp River	M-35	84012	Sep/27/1984	Brook Trout, White Sucker, Yellow Perch
Cary Lake	Branch County	2001140	Oct/02/2001	Largemouth Bass, White Sucker
Cass Lake	Oakland County	91007	Sep/26/1991	Northern Pike, Smallmouth Bass, Walleye
Cass River	Above Caro	88008	May/30/1988	Carp, Northern Pike
Cass River	Bridgeport	85003	Aug/29/1985	Black Bullhead, Channel Catfish
Cass River	Bridgeport	92035	Jul/21/1992	Carp, Channel Catfish, Largemouth Bass, Northern Pike
Cass River	Caro Impoundment	1998019	Oct/27/1998	Carp, Largemouth Bass
Cass River	Saginaw County, Dixie Highway	85039	Jan/31/1985	Carp, Freshwater Drum, Smallmouth Bass
Cass River	Saginaw County, M-13	88025	Aug/02/1988	Channel Catfish
Cass River	Saginaw County, M-13	2002024	Jul/16/2002	Channel Catfish
Cass River	Tuscola County, above Frankenmuth	88009	Jun/07/1988	Redhorse Sucker, Rock Bass, Smallmouth Bass
Cedar Lake	Alcona County	90067	Oct/09/1990	Largemouth Bass, Northern Pike
Cedar River	Antrim County	1998020	Aug/17/1998	Brown Trout, White Sucker
Chaney Lake	Gogebic County	87037	Jun/08/1987	Black Crappie, Northern Pike
Chaney Lake	Gogebic County	93049	Jun/03/1993	Northern Pike, Yellow Perch
Chaney Lake	Gogebic County	1998147	Oct/01/1998	Northern Pike, Walleye
Chaney Lake	Gogebic County	2000003	Apr/26/2000	Northern Pike, Walleye, Yellow Perch
Cheboyganing Creek	Saginaw County	89058	Aug/02/1989	Carp, Northern Pike
Cheboyganing Creek	Saginaw County	94035	Aug/01/1994	Carp

Waterbody	Location	Visit ID#	Date	Species
Chenango Lake	Livingston County	2003017	Oct/16/2003	Largemouth Bass, Yellow Bullhead
Chicagon Lake	Iron County	86006	May/22/1986	Rock Bass, Smallmouth Bass, Walleye
Chicagon Lake	Iron County	94022	Apr/27/1994	Walleye
Chicagon Lake	Iron County	2001007	Nov/22/2000	Lake Whitefish
Chippewa River	9 Mile Road	2000004	Jul/20/2000	Channel Catfish
Chippewa River	Midland County	84007	Sep/08/1984	Black Crappie, Channel Catfish, Redhorse Sucker, Smallmouth Bass, White Sucker
Chippewa River	Midland County, M-20	85005	Jun/08/1985	Carp
Chippewa River	Nature Center	2000005	Jul/25/2000	Channel Catfish
Chippewa River	Nature Center	2000071	Sep/18/2000	Redhorse Sucker
Chippewa River	Nature Center	2002015	Jul/16/2002	Channel Catfish
Chippewa River	Upstream of Lake Isabella, Roland/Drew	97005.2	Aug/13/1997	Rock Bass
Chippewa River	Upstream of Lake Isabella, Wyman Road	97005.1	Aug/13/1997	Carp, White Sucker
Cisco Lake	Gogebic County	88030	Jul/11/1988	Northern Pike, Walleye
Cisco Lake	Gogebic County	1999005	Apr/19/1999	Walleye
Cisco Lake	Gogebic County, Cisco Lake Chain	95031	Aug/14/1995	Bluegill, Walleye
Clark Lake	Jackson	88043	Sep/29/1988	Black Crappie, Largemouth Bass, Rock Bass
Clear Spring Lake	Macomb County	1999088	Sep/20/1999	Largemouth Bass
Clinton River	Mt. Clemens, VFW Hall	2001116	Aug/29/2001	Channel Catfish
Clinton River	Adams Road	2000009	Aug/28/2000	Channel Catfish
Clinton River	Bridgeview Road	1999070	Aug/06/1999	Channel Catfish
Clinton River	Bridgeview Road	2000015	Aug/28/2000	Channel Catfish
Clinton River	Cass Road	1999072	Aug/06/1999	Channel Catfish
Clinton River	Crystal Lake	2000007	Aug/28/2000	Channel Catfish
Clinton River	Harris Lake	1999074	Aug/06/1999	Channel Catfish
Clinton River	M-97	2000012	Aug/28/2000	Channel Catfish
Clinton River	Macomb Co above Utica, Avon Road	86044	Aug/26/1986	Carp, Walleye
Clinton River	Macomb County above I-94 overpass	83003	Apr/15/1983	Carp, Walleye, White Sucker
Clinton River	Macomb County above I-94 overpass	97007	Sep/17/1997	Channel Catfish
Clinton River	Macomb County above I-94 overpass	1999071	Aug/06/1999	Channel Catfish
Clinton River	Macomb County above I-94 overpass	2000014	Aug/28/2000	Channel Catfish
Clinton River	Macomb County, Mt. Clemens	83045	Apr/26/1983	Carp
Clinton River	Macomb County, Mt. Clemens	86015	Jun/16/1986	Carp, Largemouth Bass, Smallmouth Bass, Walleye
Clinton River	Moravian/Belleview Road	2000013	Aug/28/2000	Channel Catfish
Clinton River	Mt. Clemens, City Park	2001115	Aug/29/2001	Channel Catfish
Clinton River	Mt. Clemens, Firehouse	2001117	Aug/29/2001	Channel Catfish
Clinton River	Mt. Clemens, Market Street	97006	Sep/17/1997	Channel Catfish
Clinton River	Mt. Clemens, river mouth	89023.1	Aug/29/1989	Channel Catfish
Clinton River	Mt. Clemens, river mouth	92003.1	Aug/17/1992	Channel Catfish
Clinton River	Mt. Clemens, river mouth	96005	Aug/20/1996	Channel Catfish
Clinton River	Mt. Clemens, river mouth	97008	Sep/17/1997	Channel Catfish
Clinton River	Mt. Clemens, river mouth	1999069	Aug/06/1999	Channel Catfish

Waterbody	Location	Visit ID#	Date	Species
Clinton River	Mt. Clemens, river mouth	2000016	Aug/28/2000	Channel Catfish
Clinton River	Opdyke Road	2000008	Aug/28/2000	Channel Catfish
Clinton River	Ryan Road, Utica	84014	Sep/23/1984	Carp, White Sucker
Clinton River	Ryan Road, Utica	94003	May/25/1994	Carp, Rock Bass, White Sucker
Clinton River	Ryan Road, Utica	1999073	Aug/06/1999	Channel Catfish
Clinton River	Spillway Mouth	89023.2	Aug/29/1989	Channel Catfish
Clinton River	Spillway Mouth	92003.2	Aug/17/1992	Channel Catfish
Clinton River, North Branch	Macomb County	96006	Jun/17/1996	Rock Bass, Smallmouth Bass
Coldwater Lake	Branch County	88061	Oct/31/1988	Largemouth Bass, Northern Pike, Rock Bass
Coldwater Lake	Branch County	93067	Oct/04/1993	Largemouth Bass, Northern Pike
Coldwater Lake	Branch County	94019	Apr/12/1994	Bluegill, Largemouth Bass, Northern Pike
Coldwater Lake	Isabella County	89061	Aug/09/1989	Largemouth Bass, Walleye
Coldwater River	Brown Road	1998021	Jul/14/1998	White Sucker
Craig Lake	Baraga County	89074	Aug/23/1989	Walleye
Craig Lake	Baraga County	91028	Jun/04/1991	Northern Pike, Walleye
Crego Park Pond	Lansing	86033	Jul/29/1986	Black Bullhead, Bluegill, Goldfish
Crooked Lake	Barry County	2003020	Sep/19/2003	Brown Bullhead, Largemouth Bass
Crooked Lake	Emmet County	89057	Jun/04/1989	Largemouth Bass, Walleye
Crystal Lake	Benzie County	89077	Aug/01/1989	Brown Trout, Lake Trout, Yellow Perch
Crystal Lake	Benzie County	97061	Jul/23/1997	Lake Trout, White Sucker
Crystal Lake	Benzie County	2000017	Sep/06/2000	Lake Trout, White Sucker
Dead River	Forestville Basin	96007	Jun/06/1996	Smallmouth Bass, Walleye
Dead River	Forestville Basin	97075	Sep/08/1997	Smallmouth Bass, Walleye
Deer Lake	Charlevoix County	2003021	Oct/30/2003	Largemouth Bass, Northern Pike
Deer Lake	Marquette County	84011	Oct/09/1984	Northern Pike, White Sucker, Yellow Perch
Deer Lake	Marquette County	87099	Oct/26/1987	Brown Bullhead, Northern Pike, Walleye, Yellow Perch
Deer Lake	Marquette County	88067	Oct/06/1988	Brook Trout, Northern Pike, Yellow Perch
Deer Lake	Marquette County	91032	Nov/02/1990	Walleye
Deer Lake	Marquette County	93083	Sep/14/1993	Northern Pike, Walleye
Deer Lake	Marquette County	96008	Oct/02/1996	Walleye
Deer Lake	Marquette County	97070	Oct/02/1997	Northern Pike, Walleye, Yellow Perch
Deer Lake	Marquette County	1998024	Oct/09/1998	Northern Pike, Walleye, Yellow Perch
Deer Lake	Marquette County	1999006	May/04/1999	Northern Pike, Walleye, Yellow Perch
Deer Lake	Marquette County	2001008	May/01/2001	Northern Pike, Walleye, Yellow Perch
Deer Lake	Marquette County	2003161	May/03/2003	Northern Pike, Walleye
Detroit River	Belle Isle	85009	Jun/19/1985	Carp
Detroit River	Belle Isle	90031	Aug/27/1990	Freshwater Drum, Walleye
Detroit River	Fighting Island	86063	Jun/03/1986	Carp
Detroit River	Gibraltar Bay	86011	Jun/03/1986	Carp
Detroit River	Grassy Island	85010	Jun/19/1985	Carp
Detroit River	Grassy Island	86064	Jun/03/1986	Walleye
Detroit River	Grassy Island	90033	Aug/28/1990	Carp, Walleye
Detroit River	Grassy Island	92033	Aug/17/1992	Carp, Walleye

Waterbody	Location	Visit ID#	Date	Species
Detroit River	Grassy Island	94018	Aug/25/1994	Carp
Detroit River	Grassy Island	94050	Aug/25/1994	Carp, Walleye
Detroit River	Grassy Island	96009	Jul/12/1996	Carp, Walleye
Detroit River	Grassy Island	1998025	Sep/22/1998	Carp, Walleye
Detroit River	Grassy Island	2001009	Oct/18/2001	Carp, Walleye
Detroit River	Grassy Island	2001010	Oct/30/2001	Walleye
Detroit River	Michigan waters	93068	Apr/01/1993	Lake Sturgeon
Detroit River	Trenton Channel	90032	Aug/30/1990	Carp, Freshwater Drum, Walleye
Detroit River	Trenton Channel	93020	Sep/01/1993	Freshwater Drum, Northern Pike, Redhorse Sucker, Yellow Perch
Detroit River	Wyandotte	1999007	Oct/29/1999	Walleye
Dowagiac Creek	Dutch Settlement Road	1998027	Sep/02/1998	Brown Trout, White Sucker
Dowagiac River	Cass County, M-51	91008	Jul/18/1991	Carp
Dowagiac River	Cass County, Sink Road	2000020	Sep/18/2000	Carp
Duck Creek	Gogebic County	1998135	Jun/04/1998	Brook Trout, White Sucker
Duck Lake	Calhoun County	94011	May/23/1994	Bluegill, Largemouth Bass, Redear Sunfish, Walleye, Yellow Perch
Duck Lake	Gogebic County	86029	Jul/08/1986	Northern Pike, Rock Bass, Walleye
Duck Lake	Gogebic County	1999009	Apr/22/1999	Walleye
Echo Lake	Grand Isle, Alger County	95060	Jun/21/1995	Northern Pike, Yellow Perch
Elk Lake	Grand Traverse/Antrim County	90023	Sep/12/1990	Lake Trout
Elk Lake	Grand Traverse/Antrim County	96059	Dec/01/1996	Lake Trout
Elk Lake	Grand Traverse/Antrim County	97076	Dec/30/1997	Lake Trout
Ellsworth Lake	Antrim County	85065	Nov/27/1985	Bluegill, Largemouth Bass, Northern Pike, Rock Bass, Yellow Perch
Ellsworth Lake	Antrim County	86009	May/28/1986	Largemouth Bass, Northern Pike, White Sucker
Ellsworth Lake	Antrim County	94063	Jun/09/1994	Brown Bullhead, Largemouth Bass, White Sucker
Emily Lake	Houghton County	2002110	Jun/06/2002	Walleye
Emily Lake	Iron County	88006	May/25/1988	Largemouth Bass, Walleye
Erickson Power Plant Pond	Eaton County	86003	May/14/1986	Brown Bullhead, Sunfish, Yellow Perch
Escanaba River	Delta County, between Dams 1 & 2	88047	Oct/04/1988	Northern Pike, White Sucker
Escanaba River	Delta County, between Dams 1 & 2	90071	Nov/13/1990	Northern Pike, White Sucker
Escanaba River	Delta County, between Dams 1 & 2	93075	Aug/12/1993	Northern Pike, Yellow Perch
Escanaba River	Delta County, Dam 3	85029	Jun/26/1985	Rock Bass
Escanaba River	Escanaba, river mouth	86065	Jul/30/1986	Walleye
Escanaba River	Escanaba, river mouth	93032	Jun/02/1993	Carp
Escanaba River	Escanaba, river mouth	93040	Jun/30/1993	Channel Catfish
Escanaba River	Greenwood Reservoir	92045	Jul/30/1992	Black Crappie, Largemouth Bass, Northern Pike
Escanaba River	Greenwood Reservoir	1999077	May/04/1999	Northern Pike
Ess Lake	Montmorency County	2003023	May/29/2003	Northern Pike
Fawn River	St. Joseph County, Stubey Road	90016	Jul/18/1990	Carp, Redhorse Sucker, Smallmouth Bass, White Sucker
Fawn River	St. Joseph County, Stubey Road	2000021	Sep/06/2000	Redhorse Sucker, Rock Bass

Waterbody	Location	Visit ID#	Date	Species
Fenner Lake	Allegan County	92072	Aug/04/1992	Carp, Largemouth Bass
First Sister Lake	Washtenaw County	94062.2	Sep/20/1994	Brown Bullhead, White Crappie
Fish Lake	Barry County	91034	Sep/04/1991	Largemouth Bass, Northern Pike
Fish Lake	Marquette County	88046	Oct/04/1988	Largemouth Bass, Northern Pike, Sunfish, Yellow Perch
Five Lakes	Clare County	91009	Apr/16/1991	Largemouth Bass, Northern Pike
Flat River	Fallasberg Park	1998035	Oct/27/1998	Carp
Flat River	Ingalls Road	1998037	Jul/30/1998	Rock Bass
Flat River	Ingalls Road	2003031	Jul/29/2003	Rock Bass, White Sucker
Flat River	Long Lake Road	1998036	Jul/30/1998	Rock Bass
Flat River	Lowell	2001017	Jul/23/2001	Channel Catfish
Flat River	Miller Rd	2003032	Jul/29/2003	Rock Bass, White Sucker
Flint River	Birch Run Road	93005	Aug/30/1993	Carp
Flint River	Flushing	1998038	Oct/08/1998	Carp, Smallmouth Bass
Flint River	Genessee County, Elms Road	85030	Jun/17/1985	Black Crappie, Carp, Walleye
Flint River	Holloway Reservoir	89041	May/18/1989	Black Crappie, Channel Catfish, Largemouth Bass, Smallmouth Bass
Flint River	Mott Reservoir	96011	Apr/16/1996	Carp, Walleye
Flint River	Saginaw County, river mouth	88022	Aug/02/1988	Channel Catfish
Flint River	Saginaw County, river mouth	2002023	Jul/16/2002	Channel Catfish
Fortune Lake	Iron County	90012	May/29/1990	Largemouth Bass, Smallmouth Bass
Four Mile Lake	Washtenaw County	2000022	May/12/2000	Northern Pike
Fremont Lake	Newaygo County	90062	Oct/26/1990	Carp
Fumee Lake	Dickinson County	90011	May/25/1990	Smallmouth Bass
Galien River	Mouth	2002031	Aug/02/2002	Channel Catfish
Galien River	New Buffalo	92017	Aug/06/1992	Carp, Largemouth Bass, Rock Bass
Gaylanta Lake	Montmorency County	2003040	May/08/2003	Northern Pike
Glen Lake	Leelanau County	90053	Oct/18/1990	Lake Trout, Smallmouth Bass
Goose Lake	Marquette County	88045	Oct/06/1988	Northern Pike, Walleye, Yellow Perch
Goose Lake	Marquette County	2001011	May/01/2001	Northern Pike, Walleye, Yellow Perch
Grand Lake	Presque Isle County	95015	May/22/1995	Rock Bass, Smallmouth Bass, Walleye
Grand River	Below Jackson, Thompkins Road	2001014	Jul/23/2001	Channel Catfish
Grand River	Below Lansing, Clintonia Road	2001016	Jul/23/2001	Channel Catfish
Grand River	Clinton County, State Road	83053	May/11/1983	Carp, Largemouth Bass, Smallmouth Bass, Yellow Bullhead
Grand River	Clinton County, State Road	84006	Aug/29/1984	Carp, Largemouth Bass, Smallmouth Bass
Grand River	Clinton County, State Road	85004	Jul/24/1985	Carp
Grand River	Clinton County, State Road	90022	Sep/06/1990	Carp, Largemouth Bass, Smallmouth Bass
Grand River	Eaton Rapids, Gale Road/Waverly Road	2001021	Oct/03/2001	Carp, Largemouth Bass, Walleye, White Sucker
Grand River	Grand Haven, river mouth	86039	Aug/04/1986	Carp, Largemouth Bass, Walleye
Grand River	Grand Haven, river mouth	90018	Sep/04/1990	Channel Catfish
Grand River	Grand Haven, river mouth	93036	Jun/09/1993	Carp

Waterbody	Location	Visit ID#	Date	Species
Grand River	Grand Haven, river mouth	93043	Jul/01/1993	Channel Catfish
Grand River	Grand Haven, river mouth	2001020	Jul/23/2001	Channel Catfish
Grand River	Grand Rapids, below 6th Street dam	1998148	Mar/05/1998	Northern Pike, Redhorse Sucker, Walleye
Grand River	Jackson County, Maple Grove Road	90021	Aug/14/1990	Carp, Walleye
Grand River	Jackson, above Jackson WWTP	90025	Sep/05/1990	Channel Catfish
Grand River	Jackson, below Jackson WWTP	90024	Aug/08/1990	Channel Catfish
Grand River	Kent County, above 6th St. Dam	90030	Aug/22/1990	Carp
Grand River	Kent County, above 6th St. Dam	92053	Oct/01/1992	Carp
Grand River	Kent County, above 6th St. Dam	94002	Jun/23/1994	Carp
Grand River	Kent County, above 6th St. Dam	1999011	Mar/17/1999	Northern Pike
Grand River	Kent County, above 6th St. Dam	2000024	Oct/25/2000	Carp
Grand River	Kent County, above 6th St. Dam	2003042	Sep/20/2003	Carp
Grand River	Kent County, below Grand Rapids	90029	Aug/23/1990	Carp
Grand River	Kent County, below Grand Rapids	91036	Mar/20/1991	Walleye
Grand River	M-21	2001018	Jul/23/2001	Channel Catfish
Grand River	Maple Grove Road	2002113	Oct/03/2002	Northern Pike
Grand River	Moore's River Impoundment	89054	Jul/27/1989	Channel Catfish, Largemouth Bass, Northern Pike, Smallmouth Bass, Walleye
Grand River	Moore's River Impoundment	96013	May/07/1996	Carp, Largemouth Bass
Grand River	Portland Impoundment	92051	Oct/01/1992	Carp
Grand River	Upstream Jackson, Reed Road	2001013	Jul/23/2001	Channel Catfish
Grand River	Upstream Knapp St. Bridge	96058	Aug/15/1996	Unionidae
Grand River	Upstream M-21	96057	Aug/15/1996	Unionidae
Grand Sable Lake	Alger County	87088	Oct/22/1987	Lake Trout, Northern Pike
Grand Sable Lake	Alger County	91010	May/20/1991	Lake Trout
Grand Sable Lake	Alger County	93006	Jun/01/1993	Lake Trout
Grand Sable Lake	Alger County	95047	Sep/07/1995	Lake Trout
Gratiot Lake	Keweenaw County	87038	Jan/01/1987	Rock Bass, Smallmouth Bass
Green Lake	Grand Traverse County	93065	May/11/1993	Northern Pike, White Sucker
Green Lake	Grand Traverse County	2003139	Jun/04/2003	Lake Trout
Gull Lake	Kalamazoo County	89073	Nov/01/1989	Largemouth Bass, Northern Pike
Gull Lake	Kalamazoo County	91058	Sep/12/1991	Largemouth Bass
Gull Lake	Kalamazoo County	93063	Jun/10/1993	Largemouth Bass
Gull Lake	Kalamazoo County	93064	Jun/10/1993	Largemouth Bass, Northern Pike
Gull Lake	Kalamazoo County	95035	Jun/01/1995	Largemouth Bass
Gull Lake	Kalamazoo County	97011	Jun/15/1997	Largemouth Bass
Gull Lake	Kalamazoo County	2000025	Jul/11/2000	Largemouth Bass
Gull Lake	Kalamazoo County	2002034	Jun/30/2002	Largemouth Bass
Gulliver Lake	Schoolcraft County	90015	May/15/1990	Northern Pike, Smallmouth Bass, Walleye
Gun Lake	Barry County	90006	Jul/01/1990	Largemouth Bass

Waterbody	Location	Visit ID#	Date	Species
Gun Lake	Barry County	92066	Jun/15/1992	Largemouth Bass
Gun Lake	Barry County	94023	Jul/17/1994	Largemouth Bass
Gun Lake	Barry County	97012	Jul/17/1997	Largemouth Bass
Gun Lake	Barry County	2000026	Jul/25/2000	Largemouth Bass
Gun Lake	Barry County	2002035	Jun/06/2002	Largemouth Bass
Hagerman Lake	Iron County	88050	Oct/12/1988	Smallmouth Bass, Walleye
Hamilton Lake	Dickinson County	94024	Apr/19/1994	Northern Pike, Walleye
Hamlin Lake	Mason County	90070	Feb/05/1991	Black Crappie, Northern Pike
Hawk Lake	Oakland County	90004	May/01/1990	Brown Bullhead, Northern Pike
Heron Lake	Oakland County	2000027	Jul/08/2000	Largemouth Bass
Hersey River	Osceola County, Diamond Road	85035	May/15/1985	Brown Trout, White Sucker
Hersey River	Osceola County, Reed City	86013	Jun/09/1986	Brown Trout, Northern Pike, White Sucker
Hersey River	Osceola County, Reed City	1998041	Jul/08/1998	Brown Trout
Hess Lake	Newaygo County	97062	Aug/26/1997	Carp, Largemouth Bass, Mirror Carp
Higgins Lake	Roscommon County	88038	Oct/27/1988	Brown Trout, Lake Herring, Lake Trout
Higgins Lake	Roscommon County	91001	May/02/1991	Lake Trout
Higgins Lake	Roscommon County	95057.1	Oct/31/1995	Lake Herring, Lake Trout
Higgins Lake	Roscommon County	95057.2	Oct/31/1995	Lake Trout
Higgins Lake	Roscommon County	97013	Oct/22/1997	Lake Trout, Yellow Perch
Higgins Lake	Roscommon County	1998042	Nov/25/1998	Lake Trout
Higgins Lake	Roscommon County	2000028	Oct/11/2000	Lake Trout
Higgins Lake	Roscommon County	2002037	Oct/02/2002	Lake Trout
Hopkins Lake	Shiawassee County	91033	Sep/04/1991	Largemouth Bass
Houghton Lake	Roscommon County	87063	Aug/05/1987	Carp, Northern Pike, Walleye
Houghton Lake	Roscommon County	92037	Jun/13/1992	Largemouth Bass
Houghton Lake	Roscommon County	93050	Jun/01/1993	Walleye
Houghton Lake	Roscommon County	94006	Jun/07/1994	Largemouth Bass
Houghton Lake	Roscommon County	1998126	Jun/16/1998	Largemouth Bass
Houghton Lake	Roscommon County	1998127	Jun/16/1998	Carp
Houghton Lake	Roscommon County	2001026	Oct/11/2001	Largemouth Bass
Hubbard Lake	Alcona County	89076	Oct/16/1989	Northern Pike, Walleye
Hudson Lake	Lenawee County	89003	Apr/03/1989	Carp, Muskellunge, Northern Pike
Hudson Lake	Lenawee County	2000032	Jul/21/2000	Carp, Largemouth Bass
Huron River	Barton Pond	92021	May/07/1992	Carp, Smallmouth Bass
Huron River	Belleville Lake	88003	May/10/1988	Carp, Walleye
Huron River	Belleville Lake	1999014	May/19/1999	Carp, Gizzard Shad, Walleye, White Sucker
Huron River	Downstream Belleville Lake	2002041	Aug/20/2002	Channel Catfish
Huron River	Downstream Ford Lake	2002040	Aug/20/2002	Channel Catfish
Huron River	Ford Lake	83002	Sep/12/1983	Black Crappie, Brown Bullhead, Carp, Largemouth Bass, Walleye, White Sucker
Huron River	Ford Lake	89026	May/02/1989	Black Crappie, Walleye
Huron River	Ford Lake	92020	May/05/1992	Carp, Walleye
Huron River	Ford Lake	1999015	May/19/1999	Black Crappie, Carp, Channel Catfish, Walleye
Huron River	Rockwood, river mouth	91012	Sep/06/1991	Channel Catfish
Huron River	Rockwood, river mouth	96015	Aug/20/1996	Channel Catfish
Huron River	Rockwood, river mouth	2002042	Aug/20/2002	Channel Catfish

Waterbody	Location	Visit ID#	Date	Species
Huron River	Upstream Dexter	2002039	Aug/20/2002	Channel Catfish
Huron River	Wayne County, Flat Rock	83043	Apr/21/1983	Carp
Intermediate Lake	Antrim County	90044	Sep/19/1990	Rock Bass, Smallmouth Bass, Walleye
Iron River	Above Wild River Road	1998045	Jun/04/1998	Brown Trout
Jordan Lake	Ionia/Barry County	89047	Jun/21/1989	Largemouth Bass
Kalamazoo River	Above Otsego City Dam	93073.3	Oct/11/1993	Walleye
Kalamazoo River	Above Otsego City Dam	1999085	Oct/13/1999	Carp, Smallmouth Bass
Kalamazoo River	Above Otsego City Dam	1999096	Sep/08/1999	Channel Catfish
Kalamazoo River	Above Otsego City Dam	2001049	Sep/20/2001	Carp, Smallmouth Bass
Kalamazoo River	Below Lake Allegan Dam	1999020	Sep/08/1999	Channel Catfish
Kalamazoo River	Below Otsego Dam	1999023	Sep/08/1999	Channel Catfish
Kalamazoo River	Below Trowbridge Dam, 26th St. Bridge	1999022	Sep/08/1999	Channel Catfish
Kalamazoo River	Ceresco (12 Mile Road)	1999099	Sep/08/1999	Channel Catfish
Kalamazoo River	Ceresco (12 Mile Road)	2000114	Oct/04/2000	Channel Catfish
Kalamazoo River	Ceresco Impoundment, 12 Mile Road	1999082	Oct/07/1999	Carp, Smallmouth Bass
Kalamazoo River	Ceresco Impoundment, 12 Mile Road	2000120	Sep/21/2000	Carp, Smallmouth Bass
Kalamazoo River	Ceresco Impoundment, 12 Mile Road	2001042	Oct/11/2001	Carp, Smallmouth Bass
Kalamazoo River	Ceresco Impoundment, 15 Mile Road	87048	Jul/22/1987	Carp, Largemouth Bass, Smallmouth Bass
Kalamazoo River	City of Allegan Dam	1999092	Nov/09/1999	Carp, Smallmouth Bass
Kalamazoo River	City of Allegan Dam	2001052	Sep/17/2001	Carp, Smallmouth Bass
Kalamazoo River	City of Allegan, M-89	1999021	Sep/08/1999	Channel Catfish
Kalamazoo River	D-Avenue	2000112	Oct/04/2000	Channel Catfish
Kalamazoo River	D-Avenue	2000123	Aug/31/2000	Carp, Smallmouth Bass
Kalamazoo River	Galesburg, 35th St. Bridge	1999098	Sep/08/1999	Channel Catfish
Kalamazoo River	Kalamazoo Avenue	2000113	Oct/04/2000	Channel Catfish
Kalamazoo River	Kalamazoo Avenue	2000122	Aug/29/2000	Carp, Northern Pike, Rock Bass, Smallmouth Bass
Kalamazoo River	Kalamazoo Lake	83008	Jul/01/1984	Carp
Kalamazoo River	Kalamazoo Lake	85054	Jul/01/1985	Carp, Largemouth Bass, Smallmouth Bass
Kalamazoo River	Kalamazoo Lake	86027	Jul/09/1986	Carp, Largemouth Bass
Kalamazoo River	Kalamazoo Lake	87010	Mar/31/1987	Black Crappie, Bluegill, Brown Trout, Channel Catfish, Flathead Catfish, Freshwater Drum, Largemouth Bass, N. Pike Eggs, Northern Pike, Rainbow Trout, Rock Bass, Walleye, White Sucker, Yellow Perch
Kalamazoo River	Kalamazoo Lake	87046	Jul/13/1987	Carp
Kalamazoo River	Kalamazoo Lake	93035	Jun/08/1993	Carp
Kalamazoo River	Kalamazoo Lake	93073.6	Oct/09/1993	Walleye
Kalamazoo River	Kalamazoo Lake	1999095	Oct/19/1999	Brown Trout, Carp, Smallmouth Bass
Kalamazoo River	Kalamazoo Lake	2001055	Oct/03/2001	Carp, Channel Catfish, Smallmouth Bass
Kalamazoo River	Lake Allegan	83007	Jul/01/1983	Carp
Kalamazoo River	Lake Allegan	83034	May/01/1983	Largemouth Bass, Sunfish
Kalamazoo River	Lake Allegan	83046	May/12/1983	Carp

Waterbody	Location	Visit ID#	Date	Species
Kalamazoo River	Lake Allegan	85053	Jul/01/1985	Carp, Largemouth Bass, Smallmouth Bass
Kalamazoo River	Lake Allegan	86026	Jul/07/1986	Carp
Kalamazoo River	Lake Allegan	87045	Jul/14/1987	Carp, Northern Pike, Smallmouth Bass
Kalamazoo River	Lake Allegan	90050	Oct/11/1990	Carp
Kalamazoo River	Lake Allegan	90073	Oct/11/1990	Carp
Kalamazoo River	Lake Allegan	92018	Oct/27/1992	Carp
Kalamazoo River	Lake Allegan	92019	Oct/27/1992	Carp
Kalamazoo River	Lake Allegan	93073.1	Sep/16/1993	Walleye
Kalamazoo River	Lake Allegan	94012	Jun/22/1994	Carp
Kalamazoo River	Lake Allegan	94025	Jun/22/1994	Carp
Kalamazoo River	Lake Allegan	97016	Aug/28/1997	Carp
Kalamazoo River	Lake Allegan	1999016	Aug/05/1999	Carp
Kalamazoo River	Lake Allegan	1999087	Oct/05/1999	Carp, Channel Catfish, Smallmouth Bass
Kalamazoo River	Lake Allegan	2000110	Jan/04/2000	Channel Catfish
Kalamazoo River	Lake Allegan	2000124	Sep/18/2000	Black Crappie, Carp, Largemouth Bass, Smallmouth Bass, Walleye
Kalamazoo River	Lake Allegan	2001053	Aug/23/2001	Carp, Channel Catfish, Smallmouth Bass
Kalamazoo River	Lake Allegan	2001056	Aug/23/2001	Carp
Kalamazoo River	Lake Allegan	2003147	Jun/07/2003	Carp
Kalamazoo River	Morrow Pond	85049	Jul/01/1985	Carp, Largemouth Bass, Smallmouth Bass
Kalamazoo River	Morrow Pond	86022	Jul/07/1986	Carp
Kalamazoo River	Morrow Pond	87043	Jul/14/1987	Carp, Smallmouth Bass
Kalamazoo River	Morrow Pond	93073.2	Oct/15/1993	Walleye
Kalamazoo River	Morrow Pond	1999083	Jul/28/1999	Carp, Smallmouth Bass
Kalamazoo River	Morrow Pond	2001043	Aug/17/2001	Carp, Channel Catfish, Smallmouth Bass
Kalamazoo River	Mosel Avenue	83006	Jul/01/1983	Carp
Kalamazoo River	Mosel Avenue	85051	Jul/01/1985	Carp, Smallmouth Bass
Kalamazoo River	Mosel Avenue	86024	Jul/07/1986	Carp
Kalamazoo River	Mosel Avenue	93073.5	Oct/15/1993	Walleye
Kalamazoo River	Mosel Avenue	2001046	Sep/25/2001	Smallmouth Bass
Kalamazoo River	New Richmond	93073.4	Sep/21/1993	Walleye
Kalamazoo River	New Richmond	1999094	Nov/18/1999	Carp, Channel Catfish, Largemouth Bass, Smallmouth Bass
Kalamazoo River	New Richmond	2001054	Oct/16/2001	Carp, Flathead Catfish, Smallmouth Bass
Kalamazoo River	Otsego Dam Impoundment	1999086	Oct/29/1999	Carp, Smallmouth Bass
Kalamazoo River	Otsego Dam Impoundment	2001050	Sep/18/2001	Carp, Smallmouth Bass
Kalamazoo River	Plainwell Dam Reservoir	83005	Jul/01/1983	Carp
Kalamazoo River	Plainwell Dam Reservoir	85052	Jul/01/1985	Carp, Smallmouth Bass
Kalamazoo River	Plainwell Dam Reservoir	86025	Jul/08/1986	Carp
Kalamazoo River	Plainwell Dam Reservoir	87044	Jul/14/1987	Carp
Kalamazoo River	Plainwell Dam Reservoir	1999084	Oct/12/1999	Carp, Smallmouth Bass
Kalamazoo River	Plainwell Dam Reservoir	2001048	Sep/05/2001	Carp, Smallmouth Bass
Kalamazoo River	Plainwell, M-89	2000111	Oct/04/2000	Channel Catfish
Kalamazoo River	River mouth, Old US-31 Bridge	90019	Aug/07/1990	Channel Catfish
Kalamazoo River	River mouth, Old US-31 Bridge	93044	Jul/01/1993	Channel Catfish

Waterbody	Location	Visit ID#	Date	Species
Kalamazoo River	River mouth, Old US-31 Bridge	96016	Aug/21/1996	Channel Catfish
Kalamazoo River	River mouth, Old US-31 Bridge	1999019	Sep/08/1999	Channel Catfish
Kalamazoo River	Trowbridge Dam Impoundment	1999093	Nov/03/1999	Carp, Channel Catfish, Smallmouth Bass
Kalamazoo River	Trowbridge Dam Impoundment	2001051	Oct/09/2001	Carp, Smallmouth Bass
Kalamazoo River	Trowbridge Dam Impoundment	2003142	Aug/18/2003	Carp, Smallmouth Bass
Kalamazoo River, South Branch	Hillsdale County	1998103	Apr/22/1998	White Sucker
Kawkawlin River	Bay County, M-247	88027	Aug/04/1988	Carp, Northern Pike
Kawkawlin River	Route 13 (S. Huron Road)	2001127	Jul/23/2001	Channel Catfish
Kawkawlin River	Wheeler Road	2001128	Jul/23/2001	Channel Catfish
Kearsley Creek	Kearsley Reservoir	2000029	Jul/07/2000	Carp, Largemouth Bass
Kent Lake	Oakland County	90017	Jul/18/1990	Black Crappie, Largemouth Bass, Smallmouth Bass, Walleye
Kent Lake	Oakland County	1998050	Jul/27/1998	Carp, Largemouth Bass, Smallmouth Bass
Kingston Lake	Alger County	2003047	May/29/2003	Largemouth Bass, Muskellunge, Smallmouth Bass, Walleye
Klinger Lake	St. Joseph County	90034	Oct/02/1990	Largemouth Bass
Klinger Lake	St. Joseph County	2001145	Aug/22/2001	Largemouth Bass
Lake 27	Otsego County	95033	Jun/10/1995	Northern Pike
Lake Ann	Benzie County	89013	May/31/1989	Northern Pike, Smallmouth Bass
Lake Charlevoix	Charlevoix County	90051	Nov/01/1990	Brown Trout, Lake Trout
Lake Emma	Presque Isle County	2003050	May/22/2003	Northern Pike
Lake Erie	Brest Bay	90003	Apr/09/1990	Carp, Walleye
Lake Erie	Brest Bay	92026	Apr/10/1992	Carp, Walleye
Lake Erie	Brest Bay	92062	Oct/15/1992	Walleye
Lake Erie	Brest Bay	94026	Apr/19/1994	Carp, Walleye
Lake Erie	Brest Bay	97017	Apr/21/1997	Carp
Lake Erie	Brest Bay	1998051	Apr/15/1998	Carp, Walleye
Lake Erie	Brest Bay	2002044	Apr/26/2002	Carp
Lake Erie	Huron River, Flat Rock	84050	Jan/01/1984	Coho
Lake Erie	Huron River, Flat Rock	97018	Oct/17/1997	Chinook, Steelhead
Lake Erie	N. Maumee Bay	95008	Apr/26/1995	Carp
Lake Erie	Off Monroe	86002	Apr/22/1986	Carp, Channel Catfish, Walleye
Lake Erie	Off Monroe	87093	Oct/20/1987	Walleye
Lake Erie	Off Monroe	94027	Apr/19/1994	Walleye
Lake Erie	Off Monroe	95040	Apr/26/1995	Freshwater Drum, White Bass, White Perch
Lake Erie	Off Monroe	2000030	Apr/04/2000	Carp
Lake Erie	Western Basin	93082	Apr/01/1993	Carp, Channel Catfish, Gizzard Shad, White Bass, Yellow Perch
Lake Erie	Western Basin	95058	Oct/11/1995	Walleye
Lake Erie	Western Basin	97019	Apr/15/1997	Lake Whitefish, Smallmouth Bass, Yellow Perch
Lake Erie	Western Basin	2002045	Apr/05/2002	Channel Catfish
Lake Esau	Presque Isle County	2003052	Jun/18/2003	Smallmouth Bass
Lake Fenton	Genesee County	87059	Jul/22/1987	Largemouth Bass
Lake Fenton	Genesee County	89037	May/09/1989	Largemouth Bass
Lake Fenton	Genesee County	90005	May/23/1990	Largemouth Bass, Northern Pike, Walleye

Waterbody	Location	Visit ID#	Date	Species
Lake Geneserath	Charlevoix County, Beaver Island	90072	Jun/01/1990	Largemouth Bass, Northern Pike
Lake Gogebic	Gogebic/Ontonagon County	85062	Jul/30/1985	Walleye, White Sucker
Lake Gogebic	Gogebic/Ontonagon County	92043	May/05/1992	Walleye
Lake Gogebic	Gogebic/Ontonagon County	94028	Apr/29/1994	Walleye
Lake Gogebic	Gogebic/Ontonagon County	97020	May/04/1997	Walleye, Yellow Perch
Lake Gogebic	Gogebic/Ontonagon County	2000031	Apr/18/2000	Walleye
Lake Gogebic	Gogebic/Ontonagon County	2002046	Apr/28/2002	Walleye
Lake Gogebic	Gogebic/Ontonagon County	2002047	Apr/28/2002	Walleye
Lake Gogebic	Gogebic/Ontonagon County	2003156	Oct/14/2003	Rock Bass
Lake Huron	Alpena	85024	Oct/10/1985	Brown Trout
Lake Huron	Au Sable River	83014	Oct/11/1983	Chinook
Lake Huron	Au Sable River	83041	Oct/08/1983	Chinook
Lake Huron	Au Sable River	84046	Sep/19/1984	Chinook
Lake Huron	Au Sable River	86052	Sep/26/1986	Chinook
Lake Huron	Au Sable River	87079	Sep/17/1987	Chinook
Lake Huron	Au Sable River	89062	Oct/11/1989	Chinook
Lake Huron	Au Sable River	91048	Sep/30/1991	Chinook
Lake Huron	Au Sable River	93060	Oct/12/1993	Chinook
Lake Huron	Au Sable River	97022	Oct/06/1997	Chinook
Lake Huron	Black River	95053	Oct/18/1995	Chinook
Lake Huron	Black River	96018	Oct/15/1996	Coho
Lake Huron	Black River	1998052	Oct/14/1998	Coho
Lake Huron	East of Bois Blanc Island	83025	Nov/08/1983	Lake Trout
Lake Huron	Grindstone City	89050	May/30/1989	Lake Trout
Lake Huron	Hammond Bay	83018	Oct/25/1983	Lake Trout, Lake Whitefish
Lake Huron	Harbor Beach	89068	Nov/01/1989	Brown Trout
Lake Huron	Les Cheneaux Islands	95003	Apr/17/1995	Yellow perch
Lake Huron	Lexington	85027	Oct/22/1985	Brown Trout
Lake Huron	Marquette Island	83024	Nov/08/1983	Lake Trout
Lake Huron	Nunns Creek	93051	Apr/25/1993	Rainbow Smelt
Lake Huron	Oscoda	85025	Oct/10/1985	Brown Trout
Lake Huron	Port Austin	86007	May/27/1986	Lake Trout
Lake Huron	Port Austin	91052	May/20/1991	Lake Trout
Lake Huron	Port Austin	96019	May/16/1996	Lake Trout, Lake Whitefish
Lake Huron	Port Sanilac	85026	Oct/23/1985	Brown Trout
Lake Huron	Rock Falls Creek	91023	Apr/26/1991	Rainbow Trout
Lake Huron	Rock Falls Creek	92006	Apr/09/1992	Rainbow Trout
Lake Huron	Rockport	86021	Jun/19/1986	Lake Trout
Lake Huron	Rockport	89049	May/15/1989	Lake Trout
Lake Huron	Saginaw Bay	85031	May/23/1985	Channel Catfish
Lake Huron	Saginaw Bay	90063	Apr/24/1990	Carp, Walleye
Lake Huron	Saginaw Bay	91041	Oct/02/1991	Walleye
Lake Huron	Saginaw Bay	92028	May/19/1992	Carp, Walleye
Lake Huron	Saginaw Bay	94037	Sep/26/1994	Carp, Walleye
Lake Huron	Saginaw Bay	1998139	Sep/21/1998	Carp, Walleye
Lake Huron	Saginaw Bay	2001059	Aug/22/2001	Carp
Lake Huron	Saginaw Bay	2003055	Sep/17/2003	Alewife, Spottail Shiner
Lake Huron	Saginaw Bay	2003056	Aug/26/2003	Carp, Walleye
Lake Huron	Saginaw Bay, Au Gres	87017	Jun/22/1987	Carp, Channel Catfish, Walleye, Yellow Perch

Waterbody	Location	Visit ID#	Date	Species
Lake Huron	Saginaw Bay, Au Gres	91037	Sep/25/1991	Carp, Channel Catfish, Walleye, White Sucker, Yellow Perch
Lake Huron	Saginaw Bay, Bay Port	84043	Jul/31/1984	Carp
Lake Huron	Saginaw Bay, Bay Port	87015	May/12/1987	Carp, Channel Catfish, Walleye, Yellow Perch
Lake Huron	Saginaw Bay, Caseville	86028	Jun/25/1986	Channel Catfish, Walleye
Lake Huron	Saginaw Bay, Charity Island	84044	Sep/27/1984	Walleye
Lake Huron	Saginaw Bay, Fish Point	91038	Oct/01/1991	Carp, Channel Catfish, Walleye, White Sucker, Yellow Perch
Lake Huron	Saginaw Bay, near Saginaw River mouth	84042	Jun/04/1984	Carp, Channel Catfish
Lake Huron	Saginaw Bay, near Saginaw River mouth	85032	May/31/1985	Walleye
Lake Huron	Saginaw Bay, near Saginaw River mouth	85034	May/28/1985	Carp, Channel Catfish
Lake Huron	Saginaw Bay, near Saginaw River mouth	92054	Sep/23/1992	Lake Whitefish, Walleye
Lake Huron	Saginaw Bay, near Saginaw River mouth	93069	Jun/04/1993	Alewife, Brown Trout, Carp, Lake Trout, Northern Pike, White Bass, Yellow Perch
Lake Huron	Saginaw Bay, near Saginaw River mouth	94038	Sep/27/1994	Walleye, White Perch
Lake Huron	Saginaw Bay, near Saginaw River mouth	1998140	Sep/21/1998	Carp, Channel Catfish, Walleye
Lake Huron	Saginaw Bay, near Saginaw River mouth	1999089	Oct/21/1999	Channel Catfish
Lake Huron	Saginaw Bay, off Saginaw River	87016	May/17/1987	Carp, Channel Catfish, Walleye, Yellow Perch
Lake Huron	Saginaw Bay, Pinconning	86068	Jun/23/1986	Carp, Channel Catfish
Lake Huron	Saginaw Bay, Rifle River	93009	Apr/19/1993	Rainbow Trout, White Sucker
Lake Huron	Saginaw Bay, Sand Point	83032	May/01/1983	Walleye
Lake Huron	Saginaw Bay, Sebewaing	86069	Apr/22/1986	Channel Catfish
Lake Huron	Saginaw Bay, Wildfowl Bay	85033	May/23/1985	Carp
Lake Huron	Saginaw Bay, Wildfowl Bay	85063	Sep/25/1985	Carp
Lake Huron	Saginaw Bay, Wildfowl Bay	85064	Apr/26/1985	Carp, Channel Catfish
Lake Huron	Saginaw Bay, Wildfowl Bay	86070	Apr/21/1986	Carp
Lake Huron	Saginaw Bay, Wildfowl Bay	86071	May/12/1986	Channel Catfish
Lake Huron	Saginaw Bay, Wildfowl Bay	86072	Jul/21/1986	Carp
Lake Huron	Saginaw Bay, Wildfowl Bay	88010	Jun/14/1988	Carp, Channel Catfish, Walleye, Yellow Perch
Lake Huron	South Point	92055	Jun/02/1992	Lake Trout, Lake Whitefish
Lake Huron	Swan River	84054	Sep/30/1984	Coho
Lake Huron	Swan River	86055	Oct/07/1986	Chinook
Lake Huron	Swan River	86067	Oct/10/1986	Coho
Lake Huron	Swan River	87080	Sep/18/1987	Chinook
Lake Huron	Swan River	88090	Sep/01/1988	Chinook
Lake Huron	Swan River	89064	Oct/20/1989	Chinook
Lake Huron	Swan River	91047	Sep/30/1991	Chinook
Lake Huron	Swan River	93052	Oct/13/1993	Chinook
Lake Huron	Swan River	95048	Oct/10/1995	Chinook
Lake Huron	Swan River	96021	Oct/18/1996	Chinook
Lake Huron	Swan River	97021	Oct/13/1997	Chinook
Lake Huron	Swan River	1998053	Oct/01/1998	Chinook
Lake Huron	Tawas Bay	90068	Oct/10/1990	Burbot
Lake Huron	Tawas River	83009	Oct/11/1983	Chinook Coho

Waterbody	Location	Visit ID#	Date	Species
Lake Huron	Tawas River	84056	Oct/01/1984	Coho
Lake Huron	Tawas River	85056	Oct/08/1985	Coho
Lake Huron	Tawas River	86051	Sep/26/1986	Chinook, Coho
Lake Huron	Thunder Bay	86046	Jul/23/1986	Brown Trout
Lake Huron	Thunder Bay	90069	Oct/15/1990	Brown Trout
Lake Huron	Thunder Bay	91053	Jun/19/1991	Brown Trout
Lake Huron	Thunder Bay	91054	Jun/25/1991	Walleye
Lake Huron	Thunder Bay	92056	Jun/04/1992	Carp, Lake Trout
Lake Huron	Thunder Bay	92057	Jun/01/1992	Brown Trout, Lake Whitefish
Lake Huron	Thunder Bay	93070	Jun/14/1993	Alewife, Brown Trout, Carp, Channel Catfish, Chub, Lake Trout, Walleye
Lake Huron	Thunder Bay	94029	Jun/27/1994	Carp, Lake Trout
Lake Huron	Thunder Bay	95036	Jun/16/1995	Carp, Lake Trout, Spottail Shiner, Walleye
Lake Huron	Thunder Bay	96022	Jun/26/1996	Lake Trout, Lake Whitefish
Lake Huron	Thunder Bay	1998054	Aug/22/1998	Lake Trout, Walleye
Lake Huron	Thunder Bay	1998055	Aug/20/1998	Lake Whitefish
Lake Huron	Thunder Bay	1999028	Sep/28/1999	Carp, Yellow Perch
Lake Huron	Thunder Bay	1999029	Aug/03/1999	Carp, Lake Whitefish, Walleye
Lake Huron	Thunder Bay	2001061	Jul/02/2001	Carp
Lake Huron	Thunder Bay	2001062	Jun/13/2001	Carp, Lake Trout, Walleye
Lake Huron	Thunder Bay River	89051	Jun/29/1989	Carp, Channel Catfish, Walleye
Lake Independence	Marquette County	89034	May/08/1989	Northern Pike, Walleye
Lake Independence	Marquette County	95009	May/09/1995	Lake Herring, Northern Pike, Walleye
Lake Lansing	Ingham County	89036	Jun/07/1989	Black Crappie, Largemouth Bass
Lake Le Vasseur	Marquette County	2002104	Jun/19/2002	Northern Pike
Lake Macatawa	Ottawa County	80002	Jan/01/1980	Black Crappie, Bluegill, Carp, Channel Catfish, Northern Pike, Smallmouth Bass, Walleye, White Sucker, Yellow Perch
Lake Macatawa	Ottawa County	84002	Apr/10/1984	Carp, Walleye
Lake Macatawa	Ottawa County	87061	Jul/16/1987	Carp, Walleye
Lake Macatawa	Ottawa County	95006	May/05/1995	Carp, Walleye
Lake Margrethe	Crawford County	95002	Mar/31/1995	Walleye
Lake Michigamme	Marquette County	84019	Aug/22/1984	Northern Pike, Rock Bass, Walleye, White Sucker, Yellow Perch
Lake Michigamme	Marquette County	97023	Jun/07/1997	Lake Herring, Northern Pike, White Sucker
Lake Michigan	Big Bay De Noc	90059	May/30/1990	Lake Whitefish
Lake Michigan	Bridgeman	2002112	Oct/03/2001	Lake Sturgeon
Lake Michigan	Bridgeman	2003159	Sep/05/2003	Lake Sturgeon
Lake Michigan	Charlevoix	86012	Jun/06/1986	Brown Trout, Chinook, Lake Trout
Lake Michigan	Charlevoix	96027	Aug/27/1996	Lake Trout
Lake Michigan	Charlevoix/Little Traverse Bay	89043	May/17/1989	Lake Trout
Lake Michigan	Epoufette	83019	Nov/08/1983	Lake Whitefish
Lake Michigan	Glen Haven	83022	Oct/20/1983	Lake Trout
Lake Michigan	Glen Haven	84040	Jun/04/1984	Chub
Lake Michigan	Grand Haven	86001	Apr/04/1986	Lake Trout, Yellow Perch
Lake Michigan	Grand Haven	87011	Apr/07/1987	Lake Trout

Waterbody	Location	Visit ID#	Date	Species
Lake Michigan	Grand Haven	96025	May/29/1996	Lake Trout
Lake Michigan	Grand Haven	97030	Apr/11/1997	Yellow Perch
Lake Michigan	Grand River, Grand Rapids	84055	Sep/28/1984	Coho
Lake Michigan	Grand River, Grand Rapids	94059	Oct/01/1994	Rainbow Trout
Lake Michigan	Grand River, Webber Dam	83015	Oct/06/1983	Chinook, Coho
Lake Michigan	Grand River, Webber Dam	85057	Sep/27/1985	Coho
Lake Michigan	Grand River, Webber Dam	86050	Oct/03/1986	Coho
Lake Michigan	Grand River, Webber Dam	87086	Sep/23/1987	Chinook
Lake Michigan	Grand River, Webber Dam	88041	Sep/19/1988	Coho
Lake Michigan	Grand River, Webber Dam	90046	Sep/25/1990	Coho
Lake Michigan	Grand River, Webber Dam	91045	Oct/10/1991	Chinook
Lake Michigan	Grand River, Webber Dam	92052	Sep/22/1992	Coho
Lake Michigan	Grand River, Webber Dam	93077	Sep/21/1993	Chinook
Lake Michigan	Grand River, Webber Dam	94043	Sep/15/1994	Coho
Lake Michigan	Grand River, Webber Dam	95054	Oct/12/1995	Chinook
Lake Michigan	Grand River, Webber Dam	97024	Sep/29/1997	Chinook
Lake Michigan	Grand River, Webber Dam	1998056	Oct/28/1998	Coho
Lake Michigan	Grand Traverse Bay	83016	Aug/16/1983	Lake Whitefish
Lake Michigan	Grand Traverse Bay	83026	Nov/29/1983	Lake Trout
Lake Michigan	Grand Traverse Bay	90074	Jun/20/1990	Lake Trout
Lake Michigan	Grand Traverse Bay	91061	Oct/29/1991	Lake Whitefish
Lake Michigan	Grand Traverse Bay	92059	Jul/15/1992	Lake Trout
Lake Michigan	Grand Traverse Bay	92060	Aug/05/1992	Brown Trout, Lake Whitefish
Lake Michigan	Grand Traverse Bay	93010	Aug/12/1993	Carp
Lake Michigan	Grand Traverse Bay	95050	Jul/19/1995	Carp, Lake Trout
Lake Michigan	Grand Traverse Bay	97025	Oct/02/1997	Lake Trout
Lake Michigan	Grand Traverse Bay	97077	Dec/30/1997	Lake Whitefish
Lake Michigan	Grand Traverse Bay	1998057	Oct/07/1998	Lake Trout
Lake Michigan	Grand Traverse Bay	1998141	Sep/09/1998	Lake Trout
Lake Michigan	Grand Traverse Bay	2000036	Sep/13/2000	Carp
Lake Michigan	Grand Traverse Bay	2001065	Aug/15/2001	Lake Trout
Lake Michigan	Grand Traverse Bay	2003060	Oct/31/2003	Carp
Lake Michigan	Grand Traverse Bay, East Arm	84031	Mar/01/1984	Lake Trout
Lake Michigan	Grand Traverse Bay, East Arm	90065	Nov/11/1990	Lake Whitefish, Yellow Perch
Lake Michigan	Grand Traverse Bay, East Arm	96024	Dec/05/1996	Lake Whitefish
Lake Michigan	Grand Traverse Bay, East Arm	96060	Dec/05/1996	Lake Whitefish
Lake Michigan	Grand Traverse Bay, East Arm	96061	Mar/01/1996	Lake Whitefish
Lake Michigan	Grand Traverse Bay, West Arm	84032	Mar/20/1984	Lake Trout
Lake Michigan	Grand Traverse Bay, West Arm	84037	May/29/1984	Lake Trout
Lake Michigan	Grand Traverse Bay, West Arm	90066	Jun/20/1990	Lake Whitefish
Lake Michigan	Grand Traverse Bay, West Arm	93088	Jun/07/1993	Brown Trout, Lake Whitefish
Lake Michigan	Green Bay	93078	Apr/18/1993	Brown Trout, Splake
Lake Michigan	Green Bay	1999032	Aug/02/1999	Lake Whitefish
Lake Michigan	Green Bay	2001066	Apr/13/2001	Brown Trout

Waterbody	Location	Visit ID#	Date	Species
Lake Michigan	Green Bay	2002054	Apr/11/2002	Brown Trout
Lake Michigan	Green Bay	2003148	Apr/10/2003	Brown Trout
Lake Michigan	Green Bay, Cedar River	88057	Jul/19/1988	Longnose Sucker, White Sucker
Lake Michigan	Green Bay, Cedar River	92022	Apr/29/1992	Brown Trout, Chinook, Rainbow Trout, Smallmouth Bass, Splake, Walleye
Lake Michigan	Green Bay, Cedar River	2000037	Apr/10/2000	Carp
Lake Michigan	Kalamazoo River mouth	2003155	May/17/2002	Lake Sturgeon
Lake Michigan	Leland	84049	Aug/06/1984	Chub
Lake Michigan	Little Bay De Noc	83017	Oct/20/1983	Lake Trout, Lake Whitefish
Lake Michigan	Little Bay De Noc	87004	Apr/14/1987	Northern Pike, Walleye
Lake Michigan	Little Bay De Noc	89032	Apr/10/1989	Carp
Lake Michigan	Little Bay De Noc	90001	Feb/28/1990	Burbot
Lake Michigan	Little Bay De Noc	91022	Apr/16/1991	Longnose Sucker, Walleye
Lake Michigan	Little Bay De Noc	92046	Jun/04/1992	Carp, Walleye
Lake Michigan	Little Bay De Noc	92049	Jun/04/1992	Walleye
Lake Michigan	Little Bay De Noc	93079	Apr/27/1993	Carp, Yellow Perch
Lake Michigan	Little Bay De Noc	94041	Apr/20/1994	Carp, Walleye
Lake Michigan	Little Bay De Noc	94042	Apr/20/1994	White Sucker
Lake Michigan	Little Bay De Noc	95016	Feb/12/1995	Lake Sturgeon
Lake Michigan	Little Bay De Noc	97026	Apr/28/1997	Walleye, Yellow Perch
Lake Michigan	Little Bay De Noc	2000039	Oct/05/2000	Carp, Walleye
Lake Michigan	Little Bay De Noc	2002055	Apr/19/2002	Walleye
Lake Michigan	Little Bay De Noc	2003061	Apr/15/2003	Carp
Lake Michigan	Little Manistee River Weir	85021	Sep/09/1985	Brown Trout
Lake Michigan	Little Manistee River Weir	86053	Oct/06/1986	Brown Trout, Chinook, Rainbow Trout
Lake Michigan	Little Manistee River Weir	94044	Nov/07/1994	Rainbow Trout
Lake Michigan	Little Traverse Bay	83021	Sep/27/1983	Lake Trout
Lake Michigan	Little Traverse Bay	84036	May/02/1984	Lake Trout
Lake Michigan	Ludington	90058	Oct/21/1990	Yellow Perch
Lake Michigan	Ludington	2000118	Jul/19/1999	Lake Sturgeon
Lake Michigan	Manistee	83029	May/12/1983	Chub
Lake Michigan	Manistee Lake	2003158	Jul/10/2003	Lake Sturgeon
Lake Michigan	Manistee River	83020	Sep/20/1983	Chinook
Lake Michigan	Manistee River	84045	Sep/06/1984	Chinook, Coho
Lake Michigan	Manistee River	84047	Sep/19/1984	Chinook
Lake Michigan	Manistee River	85066	Sep/25/1985	Chinook
Lake Michigan	Manistee River	86066	Oct/10/1986	Chinook, Coho
Lake Michigan	Manistee River	88092	Sep/10/1988	Chinook, Chinook Eggs, Coho
Lake Michigan	Manistee River	97069	May/15/1997	Lake Sturgeon
Lake Michigan	Manistique River	85036	May/15/1985	Rainbow Trout
Lake Michigan	Manitou Islands	83031	Oct/20/1983	Chub
Lake Michigan	Menominee River	88052	Oct/12/1988	Brown Trout
Lake Michigan	Millecoquins River	2000115	Dec/14/2000	Lake Sturgeon
Lake Michigan	Muskegon	88060	Jun/01/1988	Carp, Walleye
Lake Michigan	Muskegon	90009	May/30/1990	Lake Whitefish
Lake Michigan	Muskegon	97027	Jul/01/1997	Lake Whitefish
Lake Michigan	New Buffalo	2003160	Aug/19/2003	Lake Sturgeon
Lake Michigan	Northern Lake Michigan	97028	Mar/26/1997	Lake Whitefish
Lake Michigan	Northern Lake Michigan	2001132	Oct/31/2001	Burbot

Waterbody	Location	Visit ID#	Date	Species
Lake Michigan	Norwood	84033	Mar/20/1984	Lake Trout
Lake Michigan	Pentwater	83028	May/06/1983	Chub
Lake Michigan	Pentwater	84034	Apr/09/1984	Lake Trout
Lake Michigan	Pentwater	84041	Aug/02/1984	Chub
Lake Michigan	Pentwater	89039	May/02/1989	Lake Trout
Lake Michigan	Pentwater	91025	Apr/12/1991	Brown Trout, Lake Trout
Lake Michigan	Platte River	83011	Oct/07/1983	Chinook, Coho
Lake Michigan	Platte River	83040	Sep/20/1983	Coho
Lake Michigan	Platte River	84048	Sep/30/1984	Coho
Lake Michigan	Platte River	84053	Oct/09/1984	Coho
Lake Michigan	Platte River	85022	Sep/25/1985	Brown Trout
Lake Michigan	Platte River	85055	Sep/25/1985	Coho
Lake Michigan	Platte River	85068	Sep/25/1985	Coho
Lake Michigan	Platte River	86054	Oct/06/1986	Coho
Lake Michigan	Platte River	87091	Oct/06/1987	Chinook
Lake Michigan	Platte River	88066	Sep/26/1988	Coho
Lake Michigan	Platte River	88091	Sep/10/1988	Coho, Coho Eggs
Lake Michigan	Platte River	89067	Oct/30/1989	Chinook
Lake Michigan	Platte River	90048	Oct/01/1990	Coho
Lake Michigan	Platte River	91055	Oct/09/1991	Chinook
Lake Michigan	Platte River	92068	Sep/23/1992	Coho
Lake Michigan	Platte River	92069	Oct/21/1992	Brown Trout
Lake Michigan	Platte River	93053	Sep/29/1993	Chinook
Lake Michigan	Platte River	94045	Oct/01/1994	Coho
Lake Michigan	Platte River	94046	Oct/15/1994	Rainbow Trout
Lake Michigan	Platte River	95049	Oct/09/1995	Chinook
Lake Michigan	Platte River	96028	Oct/01/1996	Coho
Lake Michigan	Platte River	97029	Oct/15/1997	Chinook
Lake Michigan	Platte River	1998059	Sep/24/1998	Coho
Lake Michigan	Platte River Hatchery	94060	Oct/19/1994	Coho
Lake Michigan	Point Betsie	84035	Apr/15/1984	Lake Trout
Lake Michigan	South Fox Island	83027	Nov/29/1983	Lake Trout
Lake Michigan	South Haven	83030	Aug/08/1983	Chub
Lake Michigan	South Haven	86008	Jun/07/1986	Brown Trout, Chinook, Rainbow Trout
Lake Michigan	South Haven	87034	Jun/13/1987	Lake Trout
Lake Michigan	South Haven	90041	Sep/11/1990	Yellow Perch
Lake Michigan	South Haven	1998060	Apr/23/1998	Rainbow Smelt
Lake Michigan	Southern	94057	Jul/01/1994	Lake Sturgeon
Lake Michigan	Southern	95064	Sep/24/1995	Lake Sturgeon
Lake Michigan	Southern	1998152	Sep/25/1998	Rainbow Smelt
Lake Michigan	St. Joseph River, Berrien Springs	83010	Oct/05/1983	Chinook, Coho
Lake Michigan	St. Joseph River, Berrien Springs	84051	Oct/03/1984	Coho
Lake Michigan	St. Joseph River, Berrien Springs	85023	Sep/20/1985	Brown Trout
Lake Michigan	St. Joseph River, Berrien Springs	85059	Sep/19/1985	Coho
Lake Michigan	St. Joseph River, Berrien Springs	86048	Sep/15/1986	Chinook

Waterbody	Location	Visit ID#	Date	Species
Lake Michigan	St. Joseph River, Berrien Springs	86049	Sep/15/1986	Coho
Lake Michigan	St. Joseph River, Berrien Springs	87001	Apr/07/1987	Rainbow Trout
Lake Michigan	St. Joseph River, Berrien Springs	87084	Sep/30/1987	Chinook
Lake Michigan	St. Joseph River, Berrien Springs	87085	Sep/30/1987	Chinook
Lake Michigan	St. Joseph River, Berrien Springs	88032	Sep/15/1988	Coho
Lake Michigan	St. Joseph River, Berrien Springs	89065	Oct/27/1989	Chinook
Lake Michigan	St. Joseph River, Berrien Springs	89066	Oct/27/1989	Brown Trout
Lake Michigan	St. Joseph River, Berrien Springs	90042	Sep/19/1990	Brown Trout
Lake Michigan	St. Joseph River, Berrien Springs	90043	Sep/20/1990	Coho
Lake Michigan	St. Joseph River, Berrien Springs	91043	Sep/30/1991	Chinook
Lake Michigan	St. Joseph River, Berrien Springs	92067	Sep/22/1992	Coho
Lake Michigan	St. Joseph River, Berrien Springs	93061	Sep/09/1993	Chinook
Lake Michigan	St. Joseph River, Berrien Springs	94047	Sep/29/1994	Coho
Lake Michigan	St. Joseph River, Berrien Springs	94048	Sep/12/1994	Rainbow Trout
Lake Michigan	St. Joseph River, Berrien Springs	95055	Oct/13/1995	Chinook
Lake Michigan	St. Joseph River, Berrien Springs	96030	Oct/22/1996	Chinook
Lake Michigan	St. Joseph River, Berrien Springs	97031	Oct/31/1997	Chinook
Lake Michigan	St. Joseph River, Berrien Springs	1998061	Sep/25/1998	Coho
Lake Michigan	Sturgeon Bay	83023	Oct/20/1983	Lake Trout
Lake Michigan	Thompson Creek	83012	Oct/31/1983	Chinook, Coho
Lake Michigan	Thompson Creek	84052	Oct/17/1984	Coho
Lake Michigan	Thompson Creek	85020	Oct/15/1985	Brown Trout
Lake Michigan	Thompson Creek	85058	Sep/19/1985	Coho
Lake Michigan	Thompson Creek	86060	Oct/17/1986	Coho
Lake Michigan	Thompson Creek	87094	Oct/01/1987	Chinook
Lake Michigan	Thompson Creek	88048	Sep/18/1988	Coho
Lake Michigan	Thompson Creek	89071	Oct/01/1989	Brown Trout
Lake Michigan	Thompson Creek	89072	Oct/01/1989	Chinook
Lake Michigan	Thompson Creek	96031	Oct/01/1996	Coho
Lake Michigan	Thompson Creek	97032	Oct/14/1997	Chinook
Lake Michigan	Thompson Creek	1998062	Oct/20/1998	Coho
Lake Mitchell	Wexford County	89012	Jun/14/1989	Largemouth Bass, Walleye
Lake Mitchell	Wexford County	2003141	May/01/2003	Largemouth Bass
Lake Nepessing	Lapeer County	97033	Sep/11/1997	Largemouth Bass
Lake Orion	Oakland County	87021	May/29/1987	Largemouth Bass
Lake Orion	Oakland County	89005	Jun/07/1989	Largemouth Bass, Northern Pike
Lake Orion	Oakland County	2001071	May/01/2001	Carp, Largemouth Bass

Waterbody	Location	Visit ID#	Date	Species
Lake Ovid	Clinton County	89011	Apr/28/1989	Black Bullhead, Black Crappie, Largemouth Bass, Northern Pike, Tiger Muskie, Yellow Bullhead
Lake Ovid	Clinton County	2003152	Jun/25/2003	Largemouth Bass
Lake Paradise	Emmet County	2001073	Oct/09/2001	Largemouth Bass, Smallmouth Bass, White Sucker
Lake Ponemah	Genesee County	2000044	Jul/07/2000	Carp, Largemouth Bass
Lake St. Clair	Bouvier Bay	86017	Jun/17/1986	Carp, Smallmouth Bass
Lake St. Clair	L'Anse Creuse Bay	90002	Apr/02/1990	Carp, Walleye
Lake St. Clair	L'Anse Creuse Bay	92029	Jun/04/1992	Carp, Walleye
Lake St. Clair	L'Anse Creuse Bay	94049	Aug/24/1994	Bluegill, Brown Bullhead, Channel Catfish, Freshwater Drum, Largemouth Bass, Northern Pike, Rock Bass, Smallmouth Bass, Yellow Perch
Lake St. Clair	L'Anse Creuse Bay	94058	Jul/13/1994	Carp, Walleye
Lake St. Clair	L'Anse Creuse Bay	97034	Jun/01/1997	Black Crappie, Bluegill, Northern Pike, Pumpkinseed, Walleye, White Bass
Lake St. Clair	L'Anse Creuse Bay	1998063	Jun/15/1998	Carp, Walleye
Lake St. Clair	L'Anse Creuse Bay	1998064	Jun/15/1998	Bluegill, Carp, Channel Catfish, Freshwater Drum, Walleye
Lake St. Clair	L'Anse Creuse Bay	2002059	May/23/2002	Carp, Walleye
Lake St. Clair	Michigan waters	85014	Sep/10/1985	Muskellunge
Lake St. Clair	Michigan waters	87035	Jun/18/1987	Bluegill, Channel Catfish, Freshwater Drum, Largemouth Bass, Rock Bass, Smallmouth Bass, Walleye
Lake St. Clair	Michigan waters	88026	Aug/19/1988	Bluegill, Freshwater Drum, Smallmouth Bass, White Bass, Yellow Perch
Lake St. Clair	Michigan waters	90054	Jul/15/1990	Lake Sturgeon
Lake St. Clair	Michigan waters	91056	Oct/28/1991	Lake Sturgeon, Walleye
Lake St. Clair	Michigan waters	2000108	Aug/28/2000	Lake Sturgeon
Lake St. Clair	Michigan waters	2001077	Jun/26/2001	Carp, Muskellunge, Smallmouth Bass, Walleye
Lake St. Clair	Michigan waters	2003069	Sep/15/2003	Smallmouth Bass
Lake St. Clair	St. Johns Marsh	85013	Jul/15/1985	Carp
Lake Superior	Carp River	95021	Oct/04/1995	Coho
Lake Superior	Carp River	97036	Oct/01/1997	Chinook, Coho
Lake Superior	Carp River	2000045	Oct/12/2000	Chinook
Lake Superior	Central	92076	Aug/19/1992	Lake Trout
Lake Superior	Central	96034	May/23/1996	Ciscowet, Lake Trout, Lake Whitefish
Lake Superior	Central	2000046	Apr/30/2000	Lake Herring, Lake Whitefish
Lake Superior	Chink Creek	95022	Oct/26/1995	Coho
Lake Superior	Chocolay River	94061	Nov/02/1994	Coho
Lake Superior	Copper Harbor	87007	Apr/29/1987	Lake Trout
Lake Superior	Grand Marais	84005	Jun/15/1984	Lake Trout
Lake Superior	Isle Royale	89046	Aug/09/1989	Lake Trout
Lake Superior	Isle Royale	92063	Aug/04/1992	Lake Trout
Lake Superior	Keweenaw Bay	91024	May/01/1991	Lake Trout
Lake Superior	Keweenaw Bay	93054	May/19/1993	Rainbow Smelt
Lake Superior	Keweenaw Bay	93055	May/03/1993	Lake Trout
Lake Superior	Keweenaw Bay	96035	May/23/1996	Lake Trout

Waterbody	Location	Visit ID#	Date	Species
Lake Superior	Keweenaw Bay	1999039	May/13/1999	Lake Trout
Lake Superior	Keweenaw Bay	2001078	Apr/30/2001	Lake Trout
Lake Superior	Keweenaw Bay	2003070	May/29/2003	Ciscowet
Lake Superior	Keweenaw Bay, Keystone Point	92073	Jul/31/1992	Ciscowet, Lake Whitefish
Lake Superior	Keweenaw Bay, L'Anse Bay	89029	Apr/24/1989	Lake Trout
Lake Superior	Keweenaw Bay, Traverse Island	91060	May/01/1991	Lake Trout
Lake Superior	Keweenaw Bay, Traverse Island	2001079	Jun/08/2001	Ciscowet
Lake Superior	Laughing Whitefish River	88036	Sep/27/1988	Chinook
Lake Superior	Manitou Island	87072	Jun/26/1987	Ciscowet
Lake Superior	Marquette	86031	Jun/06/1986	Lake Trout, Lake Whitefish
Lake Superior	Marquette	87009	Apr/27/1987	Lake Trout
Lake Superior	Marquette	89028	Apr/27/1989	Lake Trout
Lake Superior	Marquette	92042	Jun/19/1991	Ciscowet
Lake Superior	Marquette	92074	Aug/18/1992	Ciscowet, Lake Whitefish
Lake Superior	Marquette	93089	Jul/01/1993	Lake Whitefish
Lake Superior	Marquette	95065	Dec/13/1995	Ciscowet
Lake Superior	Marquette	96038	Jun/10/1996	Ciscowet, Lake Trout, Lake Whitefish
Lake Superior	Marquette	2002060	May/13/2002	Lake Trout, Lake Whitefish
Lake Superior	Middle Branch Ontonagon River	1999040	Nov/15/1999	Brown Trout
Lake Superior	Mineral River	1998134	Jun/07/1998	Longnose Sucker
Lake Superior	Munising	87069	Aug/10/1987	Ciscowet
Lake Superior	Munising	94056	Dec/16/1994	Lake Herring
Lake Superior	Munising	95066	Jul/27/1995	Lake Herring
Lake Superior	Ontonagon	85028	Aug/01/1985	Lake Trout, Lake Whitefish, White Sucker
Lake Superior	Otter River Fish Ladder	2000119	May/27/2000	Lake Sturgeon
Lake Superior	Pendills Creek	96037	Sep/15/1996	Coho
Lake Superior	Portage Lake/Dollar Bay	2003157	Sep/12/2003	Lake Sturgeon
Lake Superior	Tahquamenon River	84003	May/10/1984	Lake Whitefish
Lake Superior	West of Keweenaw Peninsula	87008	Apr/28/1987	Lake Trout
Lake Superior	West of Keweenaw Peninsula	87071	Jun/25/1987	Ciscowet
Lake Superior	West of Keweenaw Peninsula	92077	Jul/13/1992	Ciscowet
Lake Superior	Whitefish Bay	93090	Jul/30/1993	Yellow Perch
Lakeville Lake	Oakland County	2000047	Apr/22/2000	Carp, Largemouth Bass
Langford Lake	Gogebic County	86030	Jul/08/1986	Bluegill, Northern Pike, Walleye
Langford Lake	Gogebic County	94051	Jul/20/1994	Northern Pike, Walleye
LeFarge Corp. Discharge Canal	Below quarry	94033	May/19/1994	Channel Catfish
Lily Lake	Clare County	90064	Aug/23/1990	Largemouth Bass, Northern Pike
Lincoln Lake	Kent County	88033	Sep/14/1988	Northern Pike, Rock Bass, Walleye
Little Lake	Marquette County	2002043	May/24/2002	Walleye
Little S. Br. Pere Marquette River	Taylor Bridge	94032	Aug/17/1993	Brown Trout
Littlefield Lake	Isabella County	95014	May/24/1995	Bluegill, Largemouth Bass
Lobdell Lake	Genesee County	2003072	May/20/2003	Carp, Largemouth Bass
Long Lake	Ionia County	90035	Oct/01/1990	Largemouth Bass
Long Lake	Iosco County	90036	Jun/12/1990	Largemouth Bass, Northern Pike

Waterbody	Location	Visit ID#	Date	Species
Long Lake	Kalamazoo County	2002064	Oct/16/2002	Black Crappie
Long Lake	Kalamazoo County	2003153	Mar/28/2003	Brown Bullhead
Long Lake	St. Joseph County	2001142	Nov/19/2001	Brown Bullhead, Largemouth Bass
Looking Glass River	Dewitt	1998132	May/20/1998	Rock Bass, White Sucker
Loon Lake	Oakland County	2000050	Jul/20/2000	Carp, Largemouth Bass, Smallmouth Bass
Lower Trout Lake	Oakland County	90049	Sep/27/1990	Largemouth Bass, Northern Pike
Lower Trout Lake	Oakland County	93062	May/27/1993	Largemouth Bass
Maceday Lake	Oakland County	91049	Sep/16/1991	Northern Pike
Maceday Lake	Oakland County	96040	Apr/24/1996	Northern Pike
Manistee Lake	Manistee County	91015	Jun/19/1991	Smallmouth Bass, Walleye
Manistee Lake	Manistee County	92027	May/12/1992	Black Crappie, Largemouth Bass, Rock Bass
Manistee Lake	Manistee County	95019	Jun/07/1995	Bluegill
Manistee River	Above Hodenpyl Dam	92034	Jun/09/1992	Carp
Manistee River	Above Hodenpyl Dam	94030	Jun/15/1994	Carp
Manistee River	Cameron Bridge	1998069	Aug/26/1998	Brown Trout
Manistee River	M-72	1998123	Aug/27/1998	White Sucker
Manistee River	Manistee, river mouth	90026	Aug/21/1990	Channel Catfish
Manistee River	Manistee, river mouth	95028	Jul/24/1995	Channel Catfish
Manistique Lake	Mackinac County	2003075	Apr/25/2003	Walleye
Manistique River	d/s Manistique Papers Dam	84009	Oct/18/1984	Redhorse Sucker, Walleye, White Sucker
Manistique River	d/s Manistique Papers Dam	85008	Jun/01/1985	Carp, Largemouth Bass, Walleye
Manistique River	d/s Manistique Papers Dam	88017	Aug/03/1988	Channel Catfish
Manistique River	d/s Manistique Papers Dam	93033	Jun/02/1993	Carp
Manistique River	d/s Manistique Papers Dam	2003077	Oct/07/2003	Redhorse Sucker, Smallmouth Bass, Walleye
Manistique River	Manistique, above Dam	87090	Oct/21/1987	Northern Pike, Redhorse Sucker
Manistique River	Manistique, above Dam	93056	Jun/03/1993	Redhorse Sucker
Manistique River	Manistique, above Dam	2003076	Oct/08/2003	Redhorse Sucker
Manistique River	Manistique, river mouth	86035	Jul/31/1986	Carp, Walleye
Manistique River	Manistique, river mouth	90028.1	Sep/24/1990	Channel Catfish
Manistique River	Manistique, river mouth	2002067	Aug/21/2002	Channel Catfish
Manistique River	Soo Line RR Bridge	90028.2	Sep/24/1990	Channel Catfish
Manistique River	Soo Line RR Bridge	2002066	Aug/21/2002	Channel Catfish
Mann Creek	Moraine Lake	92041.2	Oct/21/1992	Northern Pike
Mann Creek	Sloan Lake	92041.1	Oct/21/1992	Northern Pike
Mann Creek	Sloan Lake	94001	May/25/1994	Bluegill, Northern Pike
Marion Lake	Gogebic County	87070	Jul/29/1987	Rock Bass, Walleye
Marten Lake	Iron County	85019	Oct/25/1985	Brown Bullhead, Northern Pike
Menominee River	Badwater Impoundment	92024	Apr/17/1992	Walleye
Menominee River	Below Grand Rapids Dam	97038	May/27/1997	Carp, Redhorse Sucker
Menominee River	Below Quinnesec	88053	Oct/11/1988	Northern Pike, Redhorse Sucker, Smallmouth Bass, Walleye
Menominee River	Below Quinnesec	1999080	May/25/1999	Northern Pike
Menominee River	Below Sturgeon Falls Dam	92048	Jul/28/1992	Carp, Walleye
Menominee River	Below White Rapids Dam	97039	May/27/1997	Redhorse Sucker
Menominee River	Big Quinnesec Falls Flowage	95034	Apr/17/1995	Rock Bass, Walleye, White Sucker
Menominee River	Chalk Hills Impoundment	91030	Jul/08/1991	Carp, Walleye
Menominee River	Chalk Hills Impoundment	96041	Oct/13/1996	Carp, Redhorse Sucker, Walleye

Waterbody	Location	Visit ID#	Date	Species
Menominee River	Chalk Hills Impoundment	97040	May/27/1997	Redhorse Sucker
Menominee River	Dickenson County, Vulcan	86058	Oct/09/1986	Northern Pike, Redhorse Sucker, Smallmouth Bass, Walleye
Menominee River	Dickinson County, below Piers Gorge	89078	Sep/12/1989	Redhorse Sucker, Walleye
Menominee River	Dickinson County, Little Quinnesec Flowage	89079	Apr/21/1989	Carp, Walleye, White Sucker
Menominee River	Iron County	84017	Aug/01/1984	Rock Bass
Menominee River	Lower Scott Flowage, between Dams 1 and 2	90055	Oct/01/1990	Rock Bass, Walleye
Menominee River	Lower Scott Flowage, between Dams 1 and 2	91039	Jun/26/1991	Carp
Menominee River	Lower Scott Flowage, between Dams 1 and 2	94052	Jun/13/1994	Redhorse Sucker
Menominee River	Menominee, river mouth	88007	May/26/1988	Carp, Walleye
Menominee River	Menominee, river mouth	91040	Apr/20/1991	Lake Sturgeon
Menominee River	Menominee, river mouth	93031	Jun/01/1993	Carp
Menominee River	Menominee, river mouth	93039	Jun/30/1993	Channel Catfish
Menominee River	Menominee, river mouth	2001146	Oct/10/2000	Lake Sturgeon
Menominee River	Sturgeon Falls Impoundment	1999080	May/25/1999	Northern Pike
Menominee River	Upper Scott Flowage, Chappée Rapids	90057	Sep/20/1990	Rock Bass, Walleye
Menominee River	Upper Scott Flowage, Highway JJ	90056	Sep/27/1990	Rock Bass, Walleye
Menominee River	White Rapids Flowage	1999091	Oct/18/1999	Redhorse Sucker
Michigamme River	Iron County	84022	Aug/31/1984	Walleye
Michigamme River	Iron County, Michigamme Falls Impoundment	84025	Aug/24/1984	Black Crappie, Northern Pike, Pumpkinseed, Smallmouth Bass, Walleye, Yellow Perch
Michigamme River	Marquette County	84021	Aug/16/1984	Northern Pike, Walleye
Michigamme River	Michigamme Reservoir	84026	Jun/01/1984	Northern Pike, Walleye, White Sucker
Michigamme River	Michigamme Reservoir	92075	Sep/14/1992	Northern Pike, Walleye
Michigamme River	Michigamme Reservoir	95061	Oct/03/1995	Northern Pike, Walleye
Michigamme River	Michigamme Reservoir	1998072	Sep/29/1998	Northern Pike, Walleye
Michigamme River	Michigamme Reservoir	2000052	Sep/13/2000	Northern Pike, Walleye
Michigamme River	Peavy Pond	84023	Aug/10/1984	Northern Pike, Rock Bass, Walleye, White Sucker, Yellow Perch
Michigamme River	Peavy Pond	97043	Oct/30/1997	Burbot, Walleye
Michigamme River	Peavy Pond	1998145	Oct/13/1998	Lake Whitefish, Northern Pike, Rock Bass, Smallmouth Bass, Walleye, White Sucker, Yellow Perch
Milakokia Lake	Mackinac County	85061	Jun/18/1985	Walleye, White Sucker
Milakokia Lake	Mackinac County	94031	Jun/21/1994	Walleye, White Sucker, Yellow Perch
Mill Creek	Washtenaw County	89021	Jul/24/1989	White Sucker
Millecoquin Lake	Mackinac County	89038	May/11/1989	Northern Pike, Walleye
Millecoquin Lake	Mackinac County	92071	Aug/05/1992	Lake Sturgeon
Mona Lake	Muskegon County	87056	Jul/14/1987	Carp, Smallmouth Bass
Mona Lake	Muskegon County	2000055	Oct/25/2000	Carp, Smallmouth Bass, Walleye
Mona Lake	Muskegon County	2002069	Jul/08/2002	Carp
Montcalm Lake	Montcalm County	2003065	Jul/07/2003	Largemouth Bass

Waterbody	Location	Visit ID#	Date	Species
Morrison Lake	Ionia County	88002	May/03/1988	Carp, Largemouth Bass, Walleye, White Sucker
Morrison Lake	Ionia County	1998076	Oct/27/1998	Largemouth Bass
Morrison Lake	Ionia County	2003081	Jun/15/2003	Carp
Mullett Lake	Cheboygan County	88035	Oct/18/1988	Northern Pike, Smallmouth Bass, Walleye
Muskallonge Lake	Luce County	2002070	May/15/2002	Brown Bullhead, Northern Pike
Muskegon Lake	Muskegon County	83052	May/27/1983	Carp, Northern Pike
Muskegon Lake	Muskegon County	86061	Oct/29/1986	Carp, Largemouth Bass, Northern Pike, Walleye
Muskegon Lake	Muskegon County	87054	Jul/07/1987	Largemouth Bass, Smallmouth Bass, Walleye
Muskegon Lake	Muskegon County	93071	Aug/19/1993	Carp, Walleye
Muskegon Lake	Muskegon County	2001082	Sep/13/2001	Largemouth Bass, Smallmouth Bass
Muskegon Lake	Muskegon County	2002071	Sep/04/2002	Carp, Walleye
Muskegon River	M-82 at High Rollaway	2002074	Aug/20/2002	Channel Catfish
Muskegon River	Maple Island Road	2002075	Aug/20/2002	Channel Catfish
Muskegon River	Muskegon, river mouth	90020	Aug/07/1990	Channel Catfish
Muskegon River	Muskegon, river mouth	93038	Jun/09/1993	Carp
Muskegon River	Muskegon, river mouth	93042	Jul/01/1993	Channel Catfish
Muskegon River	Newaygo County, below Croton Dam	89002	Apr/10/1989	Walleye Eggs
Muskegon River	Newaygo County, below Croton Dam	93011	Apr/04/1993	Walleye
Muskegon River	Newaygo County, below Croton Dam	96042	Mar/29/1996	Redhorse Sucker, Walleye
Muskegon River	Newaygo County, Croton Dam Pond	91029	Apr/04/1991	Carp
Muskegon River	Newaygo County, Croton Dam Pond	93080	Jun/28/1993	Carp
Muskegon River	Newaygo County, Croton Dam Pond	95041	Sep/27/1995	Carp
Muskegon River	Newaygo County, Croton Dam Pond	97047	Sep/30/1997	Walleye, White Sucker
Muskegon River	Newaygo County, Croton Dam Pond	97048	Sep/30/1997	Carp, Yellow Perch
Muskegon River	Newaygo County, Croton Dam Pond	2000058	Sep/06/2000	Carp, Yellow Perch
Muskegon River	Newaygo County, Croton Dam Pond	2002076	Jul/08/2002	Carp
Muskegon River	Vance Road	2002073	Aug/20/2002	Channel Catfish
Nawakwa Lake	Alger County	89055	Jun/20/1989	Northern Pike, Walleye
Nawakwa Lake	Alger County	1999076	May/06/1999	Northern Pike, Walleye
Net River	Iron County, The Wide Waters	89030	May/01/1989	Northern Pike, Walleye
Nettie Lake	Presque Isle County	95032	Jun/05/1995	Largemouth Bass, Northern Pike
North Lake Leelanau	Leelanau County	2002078	Apr/26/2002	White Sucker
North Lake Leelanau	Leelanau County	2003082	Oct/21/2003	Lake Trout
North Manistique Lake	Luce County	89048	Jun/07/1989	Northern Pike, Walleye, Yellow Perch
North Manistique Lake	Luce County	2003083	Apr/24/2003	Walleye, Yellow Perch
Norvell Lake	Jackson County	2001084	Oct/17/2001	Carp, Largemouth Bass
Nottawa River	Calhoun County	1998080	Jul/29/1998	Brown Trout, Northern Hogsucker, White Sucker
Ontonagon River	Bond Falls	1999047	Apr/18/1999	Walleye

Waterbody	Location	Visit ID#	Date	Species
Ontonagon River	Ontonagon, river mouth	92008	Aug/04/1992	Channel Catfish
Ontonagon River	Victoria Impoundment	88065	Jul/06/1988	Northern Pike, Walleye
Ontonagon River	Victoria Impoundment	2000060	May/17/2000	Walleye
Orchard Lake	Oakland County	87087	Sep/25/1987	Largemouth Bass, Northern Pike
Orchard Lake	Oakland County	89006	Jun/07/1989	Largemouth Bass, Northern Pike, Smallmouth Bass
Orchard Lake	Oakland County	94036	May/10/1994	Northern Pike
Osmun Lake	Oakland County	1999048	Jul/07/1999	Carp, Largemouth Bass
Ottawa Lake	Iron County	86005	May/22/1986	Northern Pike, Rock Bass, Walleye
Ottawa River	Mouth	93047	Sep/29/1993	Carp, Largemouth Bass
Otter Lake	Houghton County	2000061	May/25/2000	Walleye, White Sucker
Ox Creek	Berrien County	96043	Aug/06/1996	Largemouth Bass, White Sucker
Ox Creek	Mouth	2001092	Jul/30/2001	Channel Catfish
Paint Creek	Oakland County	1998081	Aug/19/1998	White Sucker
Paint Lake	Iron County	2003144	Jun/11/2003	Northern Pike
Paint River	Paint River Pond	84024	Aug/28/1984	Muskellunge, Rock Bass, Walleye, Yellow Perch
Palmer Lake	St. Joseph County	2001141	Aug/30/2001	Largemouth Bass
Parker Creek	Grand Traverse County	1998048	Jul/09/1998	Brown Trout
Paw Paw River	Above Ox Creek	2001093	Jul/30/2001	Channel Catfish
Paw Paw River	Below Ox Creek	2001094	Jul/30/2001	Channel Catfish
Pearl Lake	Benzie County	97050	Jan/01/1997	Northern Pike
Perch Lake	Iron County	88051	Oct/12/1988	Northern Pike, Walleye
Perch Lake	Marquette County	84020	Aug/16/1984	Lake Whitefish, Longnose Sucker, Northern Pike, Rock Bass, Smallmouth Bass, White Sucker, Yellow Perch
Pere Marquette Lake	Mason County	89075	Aug/23/1989	Largemouth Bass, Northern Pike
Pere Marquette Lake	Mason County	2003086	May/05/2003	Northern Pike, White Sucker
Pere Marquette River	Ludington, river mouth	90027	Sep/18/1990	Channel Catfish
Pere Marquette River	Ludington, river mouth	93037	Jun/09/1993	Redhorse Sucker
Pere Marquette River	Ludington, river mouth	93041	Jul/01/1993	Channel Catfish
Pickerel Lake	Dickinson County	87082	Sep/24/1987	Largemouth Bass, Northern Pike
Pickerel Lake	Emmet County	89069	May/23/1989	Largemouth Bass, Smallmouth Bass, Walleye
Pike Lake	Luce County	89056	Jun/28/1989	Walleye
Pine Lake	Barry County	95001	Mar/20/1995	Black Crappie, Northern Pike
Pine Lake	Manistee County	87042	Jun/02/1987	Brown Trout, Largemouth Bass, Rock Bass
Pine River	Above Alma	1998085	Oct/15/1998	Rock Bass, White Sucker
Pine River	Alma Impoundment	95018	Jun/07/1995	Carp, Largemouth Bass
Pine River	Below Alma Dam	97060	Jul/29/1997	Carp, Largemouth Bass
Pine River	Gordonville Road	2000070	Jul/20/2000	Channel Catfish
Pine River	Gordonville Road	2002014	Jul/16/2002	Channel Catfish
Pine River	Gratiot County, Alma	83047	May/31/1983	Carp
Pine River	Gratiot County, below St Louis Dam	83001	Oct/31/1983	Brown Bullhead, Carp, Common Shiner, Rock Bass, Smallmouth Bass, White Sucker
Pine River	Gratiot County, below St Louis Dam	85007	Aug/06/1985	Carp
Pine River	Gratiot County, below St Louis Dam	94021	Aug/23/1994	Carp
Pine River	Gratiot County, below St Louis Dam	97072	Oct/16/1997	Carp

Waterbody	Location	Visit ID#	Date	Species
Pine River	Harrison Road	1999049	Jun/24/1999	Channel Catfish
Pine River	Harrison Road	2000066	Jul/20/2000	Channel Catfish
Pine River	Harrison Road	2002011	Jul/16/2002	Channel Catfish
Pine River	M-46	1999050	Jun/24/1999	Channel Catfish
Pine River	M-46	2000067	Jul/20/2000	Channel Catfish
Pine River	M-46	2002012	Jul/16/2002	Channel Catfish
Pine River	Midland County, Homer Road	85060	Apr/11/1985	Carp, Smallmouth Bass, White Sucker
Pine River	Mill Street	2000068	Jul/20/2000	Channel Catfish
Pine River	Montcalm County, Edmore	86041	Jul/29/1986	Brown Trout, Hognose sucker, Redhorse Sucker, White Sucker
Pine River	Nine Mile Road	1999053	Jun/24/1999	Channel Catfish
Pine River	St. Clair	97051	Sep/17/1997	Channel Catfish
Pine River	St. Clair County, Griswold Road	92009	Jul/30/1992	Carp
Pine River	St. Louis	96500	Oct/15/1996	Muskrat, Raccoon
Pine River	St. Louis Impoundment	86042	Aug/07/1986	Carp, Crappie, Largemouth Bass, Northern Pike, Smallmouth Bass
Pine River	St. Louis Impoundment	89027	Apr/27/1989	Black Crappie, Carp, Largemouth Bass
Pine River	St. Louis Impoundment	95005	Apr/24/1995	Black Crappie, Carp
Pine River	St. Louis Impoundment	97071	Oct/17/1997	Carp, Smallmouth Bass
Pine River	St. Louis Impoundment	2002103	Jul/16/2002	Channel Catfish
Pine River	WWTP Bridge	1999052	Jun/24/1999	Channel Catfish
Pine River	WWTP Bridge	2000069	Jul/20/2000	Channel Catfish
Pine River	WWTP Bridge	2002013	Jul/16/2002	Channel Catfish
Platte River	Burnt Mill Road, Benzie County	1998087	Aug/05/1998	Brown Trout, White Sucker
Plum Creek	Monroe	1999090	Nov/01/1999	Black Buffalo, Carp, Channel Catfish, White Bass
Pomeroy Lake	Gogebic County	97052	Apr/30/1997	Walleye
Pomeroy Lake	Gogebic County	1999055	Apr/28/1999	Walleye
Pontiac Lake	Oakland County	92070	Jul/27/1992	Largemouth Bass
Pontiac Lake	Oakland County	94007	Oct/01/1994	Largemouth Bass
Pontiac Lake	Oakland County	97053	May/22/1997	Largemouth Bass
Pontiac Lake	Oakland County	1999056	Apr/06/1999	Largemouth Bass
Pontiac Lake	Oakland County	1999079	Apr/06/1999	Channel Catfish
Pontiac Lake	Oakland County	2003094	Jun/25/2003	Largemouth Bass
Portage Creek	Bryant Mill Pond	85050	Jul/01/1985	Carp
Portage Creek	Bryant Mill Pond	86023	Jul/08/1986	Carp
Portage Creek	Bryant Mill Pond	87047	Jul/14/1987	Carp
Portage Creek	Bryant Mill Pond	2000121	Aug/10/2000	Brown Trout, Carp
Portage Creek	Bryant Mill Pond	2001044	Aug/29/2001	Carp, White Sucker
Portage Creek	Bryant Mill Pond	2002108	Aug/19/2002	Carp
Portage Creek	Kalamazoo, Crosstown Pkwy.	89059	Aug/30/1989	Channel Catfish
Portage Creek	Monarch Pond	2001045	Oct/17/2001	Carp
Portage Creek	Mouth, Alcott St.	1999097	Sep/08/1999	Channel Catfish
Portage Lake	Houghton County	88016	Aug/04/1988	Brown Trout, Northern Pike, Walleye
Portage Lake	Houghton County	1998151	Sep/15/1998	Walleye, White Sucker
Portage Lake	Manistee County	90008	Jun/12/1990	Largemouth Bass, Northern Pike, Smallmouth Bass

Waterbody	Location	Visit ID#	Date	Species
Portage Lake	Washtenaw/Livingston County	89009	May/10/1989	Largemouth Bass, Walleye
Prairie River Lake	St. Joseph County	86043	Aug/12/1986	Largemouth Bass
Pratt Lake	Gladwin County	2003095	May/22/2003	Largemouth Bass
Rabbit River	Hamilton, downstream	2003098	Sep/17/2003	Carp, Largemouth Bass, Northern Pike, Redhorse Sucker, Rock Bass
Rabbit River	Hamilton, upstream	2003096	Sep/17/2003	Carp, Largemouth Bass, Northern Pike, Redhorse Sucker
Rainbow Lake	Montcalm County	90045	Sep/21/1990	Largemouth Bass, Northern Pike
Raisin River	Above Monroe Dam	91050	Sep/25/1991	Carp
Raisin River	Above Monroe Dam	94010	Jun/10/1994	Carp
Raisin River	Above Monroe Dam	97054	Oct/02/1997	Carp
Raisin River	Above Monroe Dam	2000072	Oct/12/2000	Carp
Raisin River	Below Turning Basin	1998091	Sep/10/1998	Channel Catfish
Raisin River	Monroe County, above Monroe Dam	87024	Jun/09/1987	Carp, Smallmouth Bass
Raisin River	Monroe, below Winchester Bridge	83044	Apr/22/1983	Carp
Raisin River	Monroe, below Winchester Bridge	84015	Jun/28/1984	Carp, Largemouth Bass, Rock Bass, Smallmouth Bass
Raisin River	Monroe, below Winchester Bridge	86019	Jun/19/1986	Carp, White Bass
Raisin River	Monroe, below Winchester Bridge	1998089	Sep/18/1998	Carp, Freshwater Drum, Smallmouth Bass
Raisin River	Monroe, river mouth	91018	Sep/06/1991	Channel Catfish
Raisin River	Monroe, river mouth	1998090	Sep/10/1998	Channel Catfish
Raisin River	Near Grand Trunk RR Bridge	1998092	Sep/10/1998	Channel Catfish
Raisin River, South Branch	Lenawee County, below Adrian	91051	Aug/29/1991	Carp, Northern Pike, Redhorse Sucker
Randall Lake Chain	Craig Lake	90014.2	Jun/27/1990	Largemouth Bass, Northern Pike
Randall Lake Chain	Randall Lake	90014.1	Jun/27/1990	Black Crappie, Largemouth Bass, Northern Pike
Rapid River	Kalkaska County	1998137	Sep/01/1998	Brown Trout
Red Cedar River	Gramer Road	91019.2	Jun/27/1991	Carp
Red Cedar River	Gregory Road	91019.1	Jun/27/1991	Carp, Northern Pike
Red Cedar River	M-52	91019.3	Jun/27/1991	Carp, Northern Pike
Red Cedar River	Mouth	2001015	Jul/23/2001	Channel Catfish
Red Cedar River	MSU	2000075	Aug/01/2000	Carp, Northern Pike, Rock Bass, Smallmouth Bass
Red Cedar River	MSU	2001096	Apr/27/2001	Carp, Northern Pike, Rock Bass
Reed's Lake	Kent County	89070	Sep/20/1989	Largemouth Bass, Northern Pike
Reed's Lake	Kent County	1998094	Oct/30/1998	Northern Pike, Walleye
Rice Lake	Houghton County	91027	May/02/1991	Northern Pike, Walleye
Rifle River	Arenac County	88040	Aug/22/1988	Redhorse Sucker, Rock Bass
Robinson Creek	Roscommon	89053	Jul/12/1989	Brook Trout, Brown Trout
Rogue River	11 Mile/Granger	1998095	Aug/17/1998	Brown Trout, White Sucker
Rogue River	Kent County, above Rockford Dam	93072	Nov/01/1993	White Sucker
Roland Lake	Houghton County	87040	Jun/30/1988	Rock Bass, Smallmouth Bass
Rouge River	Bell Branch	92040	Aug/25/1992	Channel Catfish
Rouge River	Below M-153	95059	Apr/24/1995	Carp, Northern Pike, White Sucker
Rouge River	Below Newburgh Lake	2000116	Oct/04/2000	Channel Catfish
Rouge River	Below Phoenix Lake	2000077	Aug/28/2000	Channel Catfish

Waterbody	Location	Visit ID#	Date	Species
Rouge River	Dearborn, river mouth	86016	Jun/24/1986	Carp
Rouge River	Dearborn, river mouth	92010	Aug/25/1992	Channel Catfish
Rouge River	Dearborn, river mouth	95044	Oct/09/1995	Channel Catfish
Rouge River	Dearborn, river mouth	2000079	Aug/28/2000	Channel Catfish
Rouge River	Dearborn, river mouth	2000117	Oct/04/2000	Channel Catfish
Rouge River	Evergreen Road	95042	Oct/09/1995	Channel catfish
Rouge River	Greenfield Road	95043	Oct/09/1995	Channel Catfish
Rouge River	Oakland County, Lahser Road	87029	Jun/17/1987	Carp, Rock Bass, White Sucker
Rouge River	Wayne County, above turning basin	85012	Jun/19/1985	Carp
Rouge River	Wayne County, below Jefferson Ave	85011	Jun/19/1985	Carp
Rouge River	Wayne County, Eliza Howell Park	87031	Jun/17/1987	White Sucker
Rouge River	Wayne County, Eliza Howell Park	94015	Sep/13/1994	White Sucker
Rouge River, Lower Branch	Wayne County, Gully Road	87025	Jun/16/1987	Carp
Rouge River, Middle Branch	Inkster Road below Newburgh Lake	2002084	Sep/06/2002	White Sucker
Rouge River, Middle Branch	Newburgh Lake	88011	Jul/19/1988	Largemouth Bass, Northern Pike, White Sucker
Rouge River, Middle Branch	Newburgh Lake	93014	Nov/17/1993	Northern Pike, White Sucker
Rouge River, Middle Branch	Newburgh Lake	95024	May/30/1995	Bluegill, Largemouth Bass
Rouge River, Middle Branch	Newburgh Lake	2001097	Oct/30/2001	Carp, Channel Catfish, Largemouth Bass, White Sucker
Rouge River, Middle Branch	Newburgh Lake	2002085	Sep/24/2002	Carp, Channel Catfish, Northern Pike, White Sucker
Rouge River, Middle Branch	Oakland County, 9 Mile Road	87028	Jun/16/1987	Brown Bullhead, Carp, Channel Catfish, Rock Bass, White Sucker
Rouge River, Middle Branch	Phoenix Lake	88012	Jul/19/1988	Carp, Northern Pike, White Sucker
Rouge River, Middle Branch	Phoenix Lake	95023	Jun/13/1995	Bluegill, Carp
Rouge River, Middle Branch	Phoenix Lake	2001098	Oct/30/2001	Carp, Channel Catfish, Northern Pike
Rouge River, Middle Branch	Phoenix Lake	2002086	Oct/22/2002	Carp, Northern Pike, White Sucker
Rouge River, Middle Branch	Wayne County, Haggerty/Hines Drain	87027	Jun/16/1987	Rock Bass, Smallmouth Bass, White Sucker
Rouge River, Middle Branch	Wayne County, Inkster Road	87026	Jun/16/1987	Goldfish
Rouge River, Middle Branch	Wayne County, Merriman Road	2000083	Jul/24/2000	White Sucker
Rouge River, Upper Branch	Oakland County, Powers Road	87032	Jun/17/1987	White Sucker
Rouge River, Upper Branch	Wayne County, 7 Mile Road	87030	Jun/17/1987	White Sucker
Round Lake	Delta County	87083	Sep/23/1987	Northern Pike, Walleye
Ruddiman Creek	Lagoon	2001131	Sep/13/2001	Carp, Largemouth Bass
Runkle Lake	Iron County	85018	Jun/11/1985	Northern Pike
Runkle Lake	Iron County	2003104	Apr/21/2003	Northern Pike
Saginaw River	Bay County	86014	Jun/10/1986	Carp, Walleye
Saginaw River	Bay County, LaFayette	84013	Aug/09/1984	Carp, Northern Pike, White Bass
Saginaw River	Bay County, river mouth	88020	Aug/01/1988	Channel Catfish
Saginaw River	Bay County, river mouth	92011	Aug/12/1992	Channel Catfish
Saginaw River	Bay County, river mouth	1998096	Sep/04/1998	Channel Catfish
Saginaw River	Bay County, river mouth	2002028	Jul/16/2002	Channel Catfish

Waterbody	Location	Visit ID#	Date	Species
Saginaw River	Saginaw County, Crow Island	92036	Jul/15/1992	Carp
Saginaw River	Saginaw County, Saginaw	88021	Aug/01/1988	Channel Catfish
Saginaw River	upstream of Middle Ground Isle	1998097	Sep/04/1998	Channel Catfish
Saginaw River	upstream of Middle Ground Isle	2002027	Jul/16/2002	Channel Catfish
Saginaw River	Zilwaukee Bridge	1998098	Sep/04/1998	Channel Catfish
Saginaw River	Zilwaukee Bridge	2002026	Jul/16/2002	Channel Catfish
Sand Lake	Lenawee County	2003107	May/29/2003	Walleye
Sand Lake	Newaygo County	92058	May/22/1992	Black Crappie, Largemouth Bass
Schweitzer Creek	Schweitzer Reservoir	92047	Aug/07/1992	Northern Pike, Smallmouth Bass, Walleye
Sebewaing River	Huron County	88037	Oct/20/1988	Carp, Northern Pike
Second Sister Lake	Washtenaw County	94062.1	Sep/20/1994	Brown Bullhead
Selkirk Lake	Allegan County	93057	May/20/1993	Largemouth Bass, Yellow Bullhead
Shiawassee River	City of Byron	95039	Jun/22/1995	Carp, Northern Pike
Shiawassee River	Exchange Road	2003109	Jul/22/2003	Carp, Smallmouth Bass
Shiawassee River	Fergus Road	2002022	Jul/16/2002	Channel Catfish
Shiawassee River	Genesee County, Duffield Road	81007	Jun/03/1981	Carp, Hognose Sucker, Northern Pike, Rock Bass, Sunfish
Shiawassee River	Henderson	92012	Sep/22/1992	Carp, Smallmouth Bass
Shiawassee River	Mouth	1998099	Sep/04/1998	Channel Catfish
Shiawassee River	Mouth	2002025	Jul/16/2002	Channel Catfish
Shiawassee River	Oakland County, Fish Lake Road	87062	Jul/28/1987	Carp, Largemouth Bass, Rock Bass
Shiawassee River	Saginaw County below Chesaning	87064	Aug/05/1987	Carp, Rock Bass, Smallmouth Bass
Shiawassee River	Saginaw County, Miller Road	88024	Aug/18/1988	Channel Catfish
Shiawassee River	Shiawassee County, Bryon Road	81006	Jun/03/1981	Black Crappie, Carp, Northern Pike, Redhorse Sucker, Rock Bass, Sunfish
Shiawassee River	Shiawassee County, Bryon Road	85002	Jul/17/1985	Carp, Redhorse Sucker, Rock Bass, Smallmouth Bass
Shiawassee River	Shiawassee County, New Lothrop Road	81008	Jun/03/1981	Black Crappie, Carp, Hognose Sucker, Minnow, Rock Bass, Sunfish, White Sucker
Shiawassee River	Shiawassee County, New Lothrop Road	85001	Jul/17/1985	Carp, Crappie, Rock Bass
Shiawassee River	Shiawassee County, New Lothrop Road	87066	Jul/30/1987	Carp, Northern Pike, Smallmouth Bass
Shiawassee River	Shiawassee Pond	81009	Jun/03/1981	Black Bullhead, Carp, Sunfish
Shiawassee River, South Branch	Livingston County, Bowen Road	81002	Jun/03/1981	Black Bullhead, Minnow, Northern Pike, Sunfish, White Sucker
Shiawassee River, South Branch	Livingston County, Bowen Road	84008	Jun/02/1984	Black Crappie, Grass Pickerel, Northern Pike, Rock Bass, White Sucker
Shiawassee River, South Branch	Livingston County, Chase Lake Road	81004	Jun/03/1981	Carp, Minnow, Northern Pike, Rock Bass, Sunfish, White Sucker, Yellow Bullhead
Shiawassee River, South Branch	Livingston County, Chase Lake Road	86036	Jul/30/1986	Carp, Northern Pike, Rock Bass, White Sucker
Shiawassee River, South Branch	Livingston County, Grand River Road	81001	Jun/03/1981	Minnow, Sunfish, White Sucker
Shiawassee River, South Branch	Livingston County, Marr Road	81003	Jun/03/1981	Carp, Minnow, Northern Pike, Sunfish, White Sucker, Yellow Bullhead

Waterbody	Location	Visit ID#	Date	Species
Shiawassee River, South Branch	Livingston County, Marr Road	87065	Jul/29/1987	Rock Bass, White Sucker
Shiawassee River, South Branch	Livingston County, Oak Grove Road	81005	Jun/03/1981	Black Crappie, Carp, Rock Bass, White Sucker
Shupac Lake	Crawford County	89044	May/23/1989	Largemouth Bass, Rainbow Trout, Smallmouth Bass, Yellow Perch
Silver Lake	Dickinson County	2002111	Jun/19/2002	Walleye
Silver Lead Creek	Marquette County, K.I. Sawyer AFB	96056	Nov/04/1996	Brook Trout
Siskiwit Lake	Isle Royale	87033	Jun/17/1987	Lake Trout
Siskiwit Lake	Isle Royale	93029	May/20/1993	Lake Trout, Lake Whitefish, Northern Pike
Siskiwit Lake	Isle Royale	96049	Aug/09/1996	Lake Trout
Siskiwit Lake	Isle Royale	96050	Aug/09/1996	Lake Trout
Siskiwit Lake	Isle Royale	2002105	Jun/29/2002	Lake Trout
Six Mile Lake	Charlevoix County	2003110	May/08/2003	Northern Pike
Six Mile Lake	Houghton County	95012	May/16/1995	Bluegill, Walleye
Smokey Lake	Iron County	86056	Oct/07/1986	Lake Trout, Rock Bass, Smallmouth Bass, White Sucker
South Branch Black River	Downstream of Bangor	2002006	Aug/02/2002	Channel Catfish
South Branch Black River	Upstream Bangor	2002005	Aug/02/2002	Channel Catfish
South Groveland Pond	Dickinson County	2003146	Jun/04/2003	Walleye
South Lake	Washtenaw County	87020	Jun/09/1987	Largemouth Bass, Northern Pike, Rock Bass
South Lake	Washtenaw County	88062	Sep/19/1988	Largemouth Bass, Northern Pike
South Lake	Washtenaw County	89008	Jun/28/1989	Largemouth Bass, Northern Pike
South Manistique Lake	Mackinac County	88034	Sep/20/1988	Rock Bass, Walleye
South Manistique Lake	Mackinac County	91016	Apr/24/1991	Walleye
South Manistique Lake	Mackinac County	93027	Apr/28/1993	Walleye
South Manistique Lake	Mackinac County	95056	Apr/27/1995	Walleye
South Manistique Lake	Mackinac County	1998105	Apr/06/1998	Walleye
South Manistique Lake	Mackinac County	2001099	Nov/11/2001	Walleye
South Manistique Lake	Mackinac County	2003112	Apr/25/2003	Walleye
Sporley Lake	Marquette County	93058	Jun/01/1993	White Sucker
Spring Brook	Kalamazoo County	1998106	Aug/19/1998	Brown Trout
Squaw Lake	Dickinson/Marquette County	89018	May/08/1989	Rainbow Trout, Splake, Yellow Perch
Squaw Lake	Dickinson/Marquette County	93059	May/18/1993	Largemouth Bass, White Sucker
St. Clair River	Algonac	83049	Jul/27/1983	Carp
St. Clair River	Algonac	86018	Jun/18/1986	Carp, Walleye
St. Clair River	Algonac	92061	Jun/21/1992	Carp, Walleye
St. Clair River	Algonac	94009	Aug/25/1994	Carp
St. Clair River	Algonac	2002093	May/24/2002	Carp
St. Clair River	Marine City	91031	May/14/1991	Walleye
St. Clair River	Port Huron	86038	Jul/31/1986	Freshwater Drum, Walleye
St. Clair River	Rivermouth, North Channel	94008	Aug/25/1994	Carp, Freshwater Drum
St. Clair River	St. Clair	85006	Oct/10/1985	Walleye
St. Joseph River	Above Niles	2001086	Jul/30/2001	Channel Catfish
St. Joseph River	Above Niles Dam	95052	Jul/07/1995	Carp
St. Joseph River	Above Paw Paw River	2001090	Jul/30/2001	Channel Catfish
St. Joseph River	Below Buchanan	97065	Sep/16/1997	Channel Catfish
St. Joseph River	Below Buchanan	2001087	Jul/30/2001	Channel Catfish
St. Joseph River	Below Niles	97066	Sep/16/1997	Channel Catfish

Waterbody	Location	Visit ID#	Date	Species
St. Joseph River	Benton Harbor, river mouth	89022	Aug/28/1989	Channel Catfish
St. Joseph River	Benton Harbor, river mouth	93034	Jun/08/1993	Carp
St. Joseph River	Benton Harbor, river mouth	93045	Jul/01/1993	Channel Catfish
St. Joseph River	Benton Harbor, river mouth	97063	Sep/16/1997	Channel Catfish
St. Joseph River	Benton Harbor, river mouth	2001091	Jul/30/2001	Channel Catfish
St. Joseph River	Berrien Springs, below Dam	84004	Oct/03/1984	Carp, Smallmouth Bass
St. Joseph River	Berrien Springs, below Dam	87096	Nov/18/1987	Carp, Smallmouth Bass, Walleye
St. Joseph River	Berrien Springs, below Dam	97064	Sep/16/1997	Channel Catfish
St. Joseph River	Berrien Springs, below Dam	2001089	Jul/30/2001	Channel Catfish
St. Joseph River	Chapin Lake	83033	May/01/1983	Redhorse Sucker, Smallmouth Bass
St. Joseph River	Chapin Lake	83042	May/10/1983	Carp
St. Joseph River	Chapin Lake	87097	Nov/19/1987	Carp, Smallmouth Bass
St. Joseph River	Chapin Lake	91044	Aug/20/1991	Carp
St. Joseph River	Chapin Lake	93081	Oct/06/1993	Carp
St. Joseph River	Chapin Lake	95051	Jul/06/1995	Carp, Smallmouth Bass
St. Joseph River	Chapin Lake	2000088	Oct/17/2000	Carp
St. Joseph River	Chapin Lake	2002094	Oct/21/2002	Carp
St. Joseph River	Constantine Impoundment	1998110	Jun/24/1998	Channel Catfish, Redhorse Sucker
St. Joseph River	St. Joseph County, Constantine	92031	Apr/02/1992	Carp, Walleye
St. Joseph River	St. Joseph County, Three Rivers	92032	Apr/03/1992	Walleye
St. Joseph River	State Line, Berrien County	97067	Sep/16/1997	Channel Catfish
St. Marys River	Michigan Waters	95046	Aug/01/1995	Northern Pike, Walleye, Yellow Perch
St. Marys River	Munuscong Bay	86045	Aug/26/1986	Northern Pike, Walleye
St. Marys River	Munuscong Bay	91021	Apr/23/1991	Walleye
St. Marys River	Munuscong Bay	91059	Apr/23/1991	Walleye
St. Marys River	Munuscong Bay	93015	Apr/27/1993	Carp, Walleye
St. Marys River	Munuscong Bay	95004	Apr/17/1995	Carp, Walleye
St. Marys River	Munuscong Bay	1998112	Apr/29/1998	Carp, Walleye
St. Marys River	Munuscong Bay	2001102	Apr/23/2001	Walleye
St. Marys River	N. Drummond Island	89035	May/11/1989	Yellow Perch
St. Marys River	Sugar Island	87049	Sep/11/1987	Northern Pike, Walleye, White Sucker
Stanley Lake	Iron County	90013	May/31/1990	Largemouth Bass, Smallmouth Bass, Walleye
Stanley Lake	Iron County	2001143	Sep/10/2001	Walleye
Stevenson Lake	Isabella County	2002096	May/08/2002	Brown Bullhead, Largemouth Bass, Northern Pike, Yellow Bullhead
Stony Creek Impoundment	Macomb County	89025	Apr/16/1989	Crappie, Northern Pike, Walleye
Sudden Lake	Ontonagon County	2001144	Oct/03/2001	Walleye
Sunday Lake	Gogebic County	2003126	May/29/2003	Black Crappie, Northern Pike, Walleye, Yellow Perch
Sunset Lake	Iron County	88049	Oct/11/1988	Northern Pike, Walleye
Swan Creek	Monroe County	86059	Oct/09/1986	White Sucker
Tahquamenon River	Dollarville	1998114	Jul/06/1998	Walleye, White Sucker
Tahquamenon River	Luce County, Slater's Landing	88028	Aug/08/1988	Northern Pike, Walleye
Tannery Creek	Emmet County	87058	Jul/21/1987	Brook Trout
Tawas River	Iosco County	88058	Oct/14/1988	Northern Pike, White Sucker
Tepee Lake	Iron County	2003145	Jun/19/2003	Northern Pike

Waterbody	Location	Visit ID#	Date	Species
Terry Lake	Oakland County	1999064	Jul/07/1999	Carp, Largemouth Bass
Thompson Lake	Livingston County	86010	Jun/03/1986	Carp, Northern Pike, Yellow Perch
Thompson Lake	Livingston County	95038	Jun/13/1995	Black Crappie, Carp
Thompson Lake	St. Joseph County	2002036	Jun/25/2002	Brown Bullhead, Largemouth Bass
Thornapple River	Gresham Highway	1998117	Jul/02/1998	White Sucker
Thornapple River	Mouth	2001019	Jul/23/2001	Channel Catfish
Thornapple River	Thornapple Lake, Barry County	93016	May/12/1993	Largemouth Bass, Redhorse Sucker
Thousand Island Lake	Gogebic County	1999065	Apr/23/1999	Walleye
Thread Creek	Genesee County	93017	Aug/30/1993	Carp, Northern Pike
Thread Creek	Thread Lake	2000092	Sep/28/2000	Carp, Largemouth Bass
Thunder Bay River	Alpena County, Lake Besser	89052	Jun/29/1989	Carp, Redhorse Sucker, Smallmouth Bass, Walleye
Thunder Bay River	Alpena County, Lake Besser	93018	Oct/15/1993	Carp
Thunder Bay River	Alpena, river mouth	89024	Sep/02/1989	Channel Catfish
Thunder Bay River	Alpena, river mouth	96053	Aug/19/1996	Channel Catfish
Thunder Bay River	Seven Mile Pond	2002097	Oct/15/2002	Brown Bullhead, Largemouth Bass
Tittabawassee River	Cook Road	2002016	Jul/16/2002	Channel Catfish
Tittabawassee River	Freeland	2002019	Jul/16/2002	Channel Catfish
Tittabawassee River	Midland County, below Dow Dam	84010	Apr/03/1984	Carp, Walleye, White Sucker
Tittabawassee River	Midland County, below Dow Dam	87002	Apr/07/1987	Walleye
Tittabawassee River	Midland County, below Dow Dam	89001	Apr/06/1989	Walleye Eggs
Tittabawassee River	Midland County, below Dow Dam	92064	Oct/30/1992	Carp, Walleye
Tittabawassee River	Midland County, below Dow Dam	95013	Apr/06/1995	White Bass, White Sucker
Tittabawassee River	Midland County, below Dow Dam	1999066	May/26/1999	Carp, Smallmouth Bass
Tittabawassee River	Midland County, below Dow Dam	2000093	Jul/05/2000	Smallmouth Bass, Walleye
Tittabawassee River	Midland County, Smiths Crossing Road	83054	Aug/23/1983	Carp, Channel Catfish, Smallmouth Bass, Walleye
Tittabawassee River	Midland County, Smiths Crossing Road	85015	Apr/17/1985	Walleye
Tittabawassee River	Midland County, Smiths Crossing Road	85016	May/23/1985	Black Crappie, Northern Pike, Smallmouth Bass, White Bass
Tittabawassee River	Midland County, Smiths Crossing Road	85017	Jul/16/1985	Walleye
Tittabawassee River	Midland County, Smiths Crossing Road	2000095	Jul/20/2000	Channel Catfish
Tittabawassee River	Midland County, Smiths Crossing Road	2002017	Jul/16/2002	Channel Catfish
Tittabawassee River	Midland County, Smiths Crossing Road	2003132	Apr/02/2003	Carp, Channel Catfish, Smallmouth Bass, Walleye, White Bass
Tittabawassee River	Mouth	1998119	Sep/04/1998	Channel Catfish
Tittabawassee River	Mouth	2002021	Jul/16/2002	Channel Catfish
Tittabawassee River	RR Bridge below Dow	2002018	Jul/16/2002	Channel Catfish
Tittabawassee River	Saginaw County, Center Road	88023	Aug/02/1988	Channel Catfish
Tittabawassee River	Saginaw County, Center Road	2002020	Jul/16/2002	Channel Catfish
Tittabawassee River	Sanford Lake	89004	Apr/07/1989	Black Crappie, Northern Pike, Walleye

Waterbody	Location	Visit ID#	Date	Species
Tittabawassee River	Sanford Lake	92065	Sep/15/1992	Carp
Tittabawassee River	Sanford Lake	1999081	May/20/1999	Black Crappie, Channel Catfish, Rock Bass
Todd Lake	Osceola County	87041	Jul/02/1987	Largemouth Bass, Northern Pike
Tonquish Creek	Above Wayne Road, South of Joy Road	92039	Sep/14/1992	Channel Catfish
Topico Wetland	Bay County	96054	May/21/1996	Carp, Northern Pike
Torch Lake	Antrim County	91035	Sep/11/1991	Lake Trout, Smallmouth Bass
Torch Lake	Antrim County	93085	Nov/03/1993	Brown Trout, Lake Trout
Torch Lake	Antrim County	94054	Jul/15/1994	Lake Whitefish
Torch Lake	Antrim County	2000125	Mar/07/1996	Lake Trout
Torch Lake	Antrim County	2001110	Oct/08/2001	Lake Whitefish, Yellow Perch
Torch Lake	Houghton County	88015	Aug/23/1988	Northern Pike, Smallmouth Bass, Walleye
Torch Lake	Houghton County	2000096	May/03/2000	Northern Pike, Smallmouth Bass, Walleye
Two Hearted River	Mouth	92013	Aug/04/1992	Channel Catfish
Union Lake	Branch County	91026	Jun/12/1991	Carp, Channel Catfish, Crappie, Northern Pike
Union Lake	Branch County	2003135	Jun/17/2003	Carp, Channel Catfish, Largemouth Bass, Walleye
Union Lake	Oakland County	2002100	May/29/2002	Largemouth Bass, Smallmouth Bass
Unnamed Lake	Washtenaw County	89007	May/02/1989	Bullhead, Largemouth Bass
Van Etten Lake	Iosco County, Oscoda	90010	Jun/06/1990	Carp, Channel Catfish, Walleye
Vandercook Lake	Jackson County	88042	Sep/27/1988	Carp
Vermilac Lake	Baraga County	88029	May/16/1988	Northern Pike, Yellow Perch
Vermilac Lake	Baraga County	2001135	Oct/04/2001	Walleye
W. Branch Maple River	Emmet County	1998070	Jul/28/1998	Brown Trout, White Sucker
Wabascon Creek	Bedford	1998133	May/18/1998	Rock Bass, White Sucker
Wabasis Lake	Kent County	90047	Sep/25/1990	Largemouth Bass, Northern Pike
Walkup Lake	Newaygo County	1999075	Jun/21/1999	Bluegill
Walled Lake	Oakland County	88031	Aug/24/1988	Carp, Northern Pike
Walloon Lake	Charlevoix County	87023	Jun/04/1987	Smallmouth Bass
Walloon Lake	Charlevoix County	2000099	Oct/10/2000	Rock Bass, White Sucker, Yellow Bullhead, Yellow Perch
Wamplers Lake	Jackson/Lenawee County	89040	May/19/1989	Black Crappie, Largemouth Bass, Northern Pike
Wamplers Lake	Jackson/Lenawee County	94055	Oct/17/1994	Largemouth Bass, Northern Pike
White Lake	Muskegon County	80001	Jul/02/1980	Carp, Largemouth Bass, Northern Pike, Redhorse Sucker, Smallmouth Bass, White Sucker, Yellow Perch
White Lake	Muskegon County	84001	Jul/24/1984	Carp, Northern Pike, Redhorse Sucker, Smallmouth Bass, Walleye
White Lake	Muskegon County	87057	Jul/14/1987	Smallmouth Bass, Walleye
White Lake	Muskegon County	91046	Aug/21/1991	Carp, Walleye
White Lake	Oakland Co.	2001111	Oct/18/2001	Brown Bullhead, Rock Bass
White River	White Lake outlet, river mouth	92014	Aug/18/1992	Channel Catfish
Whitmore Lake	Livingston County	92038	Jun/09/1992	Carp, Largemouth Bass, Northern Pike
Wixom Lake	Gladwin County	2002102	May/16/2002	Channel Catfish, Northern Pike
Wolf Creek	Montcalm County, Grove Road	2000103	Sep/18/2000	White Sucker

Waterbody	Location	Visit ID#	Date	Species
Wolf Creek	Montcalm County, Vickeryville Road	92015	Jun/01/1992	Brown Trout, Rock Bass
Woodland Lake	Livingston County	2000104	May/02/2000	Carp, Largemouth Bass

APPENDIX B

INVENTORY OF WHOLE-FISH TREND MONITORING SITES AND SPECIES

Waterbody	Location	Visit ID#	Date	Species
Detroit River	Grassy Island	90033	Aug/28/1990	Carp, Walleye
Detroit River	Grassy Island	92033	Aug/17/1992	Carp, Walleye
Detroit River	Grassy Island	94050	Aug/25/1994	Carp, Walleye
Detroit River	Grassy Island	96009	Jul/12/1996	Carp, Walleye
Detroit River	Grassy Island	1998025	Sep/22/1998	Carp, Walleye
Detroit River	Grassy Island	2001009	Oct/18/2001	Carp, Walleye
Grand River	Kent County, above 6th St. Dam	90030	Aug/22/1990	Carp
Grand River	Kent County, above 6th St. Dam	92053	Oct/01/1992	Carp
Grand River	Kent County, above 6th St. Dam	94002	Jun/23/1994	Carp
Grand River	Kent County, above 6th St. Dam	2000024	Oct/25/2000	Carp
Grand River	Kent County, above 6th St. Dam	2003042	Sep/20/2003	Carp
Grand Sable Lake	Alger County	91010	May/20/1991	Lake Trout
Grand Sable Lake	Alger County	93006	Jun/01/1993	Lake Trout
Grand Sable Lake	Alger County	95047	Sep/07/1995	Lake Trout
Gull Lake	Kalamazoo County	91058	Sep/12/1991	Largemouth Bass
Gull Lake	Kalamazoo County	93063	Jun/10/1993	Largemouth Bass
Gull Lake	Kalamazoo County	95035	Jun/01/1995	Largemouth Bass
Gull Lake	Kalamazoo County	97011	Jun/15/1997	Largemouth Bass
Gull Lake	Kalamazoo County	2000025	Jul/11/2000	Largemouth Bass
Gull Lake	Kalamazoo County	2002034	Jun/30/2002	Largemouth Bass
Gun Lake	Barry County	90006	Jul/01/1990	Largemouth Bass
Gun Lake	Barry County	92066	Jun/15/1992	Largemouth Bass
Gun Lake	Barry County	94023	Jul/17/1994	Largemouth Bass
Gun Lake	Barry County	97012	Jul/17/1997	Largemouth Bass
Gun Lake	Barry County	2000026	Jul/25/2000	Largemouth Bass
Gun Lake	Barry County	2002035	Jun/06/2002	Largemouth Bass
Higgins Lake	Roscommon County	91001	May/02/1991	Lake Trout
Higgins Lake	Roscommon County	95057.2	Oct/31/1995	Lake Trout
Higgins Lake	Roscommon County	97013	Oct/22/1997	Lake Trout, Yellow Perch
Higgins Lake	Roscommon County	2000028	Oct/11/2000	Lake Trout
Higgins Lake	Roscommon County	2002037	Oct/02/2002	Lake Trout
Houghton Lake	Roscommon County	92037	Jun/13/1992	Largemouth Bass
Houghton Lake	Roscommon County	94006	Jun/07/1994	Largemouth Bass
Houghton Lake	Roscommon County	1998126	Jun/16/1998	Largemouth Bass
Houghton Lake	Roscommon County	2001026	Oct/11/2001	Largemouth Bass
Kalamazoo River	Lake Allegan	90073	Oct/11/1990	Carp
Kalamazoo River	Lake Allegan	92018	Oct/27/1992	Carp
Kalamazoo River	Lake Allegan	94012	Jun/22/1994	Carp
Kalamazoo River	Lake Allegan	97016	Aug/28/1997	Carp
Kalamazoo River	Lake Allegan	1999016	Aug/05/1999	Carp
Kalamazoo River	Lake Allegan	2001056	Aug/23/2001	Carp
Kalamazoo River	Lake Allegan	2003147	Jun/07/2003	Carp
Lake Erie	Brest Bay	90003	Apr/09/1990	Carp, Walleye
Lake Erie	Brest Bay	92026	Apr/10/1992	Carp, Walleye
Lake Erie	Brest Bay	94026	Apr/19/1994	Carp, Walleye
Lake Erie	Brest Bay	97017	Apr/21/1997	Carp
Lake Erie	Brest Bay	1998051	Apr/15/1998	Carp, Walleye

Waterbody	Location	Visit ID#	Date	Species
Lake Erie	Brest Bay	2002044	Apr/26/2002	Carp
Lake Gogebic	Gogebic/Ontonagon County	92043	May/05/1992	Walleye
Lake Gogebic	Gogebic/Ontonagon County	94028	Apr/29/1994	Walleye
Lake Gogebic	Gogebic/Ontonagon County	97020	May/04/1997	Walleye, Yellow Perch
Lake Gogebic	Gogebic/Ontonagon County	2000031	Apr/18/2000	Walleye
Lake Gogebic	Gogebic/Ontonagon County	2002047	Apr/28/2002	Walleye
Lake Huron	Saginaw Bay	90063	Apr/24/1990	Carp, Walleye
Lake Huron	Saginaw Bay	91041	Oct/02/1991	Walleye
Lake Huron	Saginaw Bay	92028	May/19/1992	Carp, Walleye
Lake Huron	Saginaw Bay	94037	Sep/26/1994	Carp, Walleye
Lake Huron	Saginaw Bay	1998139	Sep/21/1998	Carp, Walleye
Lake Huron	Saginaw Bay	2001059	Aug/22/2001	Carp
Lake Huron	Saginaw Bay	2003056	Aug/26/2003	Carp, Walleye
Lake Huron	Thunder Bay	91054	Jun/25/1991	Walleye
Lake Huron	Thunder Bay	92056	Jun/04/1992	Carp, Lake Trout
Lake Huron	Thunder Bay	94029	Jun/27/1994	Carp, Lake Trout
Lake Huron	Thunder Bay	95036	Jun/16/1995	Carp, Lake Trout, Spottail Shiner, Walleye
Lake Huron	Thunder Bay	1998054	Aug/22/1998	Lake Trout, Walleye
Lake Huron	Thunder Bay	1999028	Sep/28/1999	Carp, Yellow Perch
Lake Huron	Thunder Bay	2001062	Jun/13/2001	Carp, Lake Trout, Walleye
Lake Michigan	Grand Traverse Bay	90074	Jun/20/1990	Lake Trout
Lake Michigan	Grand Traverse Bay	92059	Jul/15/1992	Lake Trout
Lake Michigan	Grand Traverse Bay	93010	Aug/12/1993	Carp
Lake Michigan	Grand Traverse Bay	95050	Jul/19/1995	Carp, Lake Trout
Lake Michigan	Grand Traverse Bay	1998057	Oct/07/1998	Lake Trout
Lake Michigan	Grand Traverse Bay	2000036	Sep/13/2000	Carp
Lake Michigan	Grand Traverse Bay	2001065	Aug/15/2001	Lake Trout
Lake Michigan	Grand Traverse Bay	2003060	Oct/31/2003	Carp
Lake Michigan	Little Bay De Noc	92046	Jun/04/1992	Carp, Walleye
Lake Michigan	Little Bay De Noc	94041	Apr/20/1994	Carp, Walleye
Lake Michigan	Little Bay De Noc	97026	Apr/28/1997	Walleye, Yellow Perch
Lake Michigan	Little Bay De Noc	2000039	Oct/05/2000	Carp, Walleye
Lake Michigan	Little Bay De Noc	2002055	Apr/19/2002	Walleye
Lake Michigan	Little Bay De Noc	2003061	Apr/15/2003	Carp
Lake St. Clair	L'Anse Creuse Bay	90002	Apr/02/1990	Carp, Walleye
Lake St. Clair	L'Anse Creuse Bay	92029	Jun/04/1992	Carp, Walleye
Lake St. Clair	L'Anse Creuse Bay	94058	Jul/13/1994	Carp, Walleye
Lake St. Clair	L'Anse Creuse Bay	1998063	Jun/15/1998	Carp, Walleye
Lake St. Clair	L'Anse Creuse Bay	2002059	May/23/2002	Carp, Walleye
Lake Superior	Keweenaw Bay	91024	May/01/1991	Lake Trout
Lake Superior	Keweenaw Bay	93055	May/03/1993	Lake Trout
Lake Superior	Keweenaw Bay	96035	May/23/1996	Lake Trout
Lake Superior	Keweenaw Bay	1999039	May/13/1999	Lake Trout
Lake Superior	Keweenaw Bay	2001078	Apr/30/2001	Lake Trout
Manistee River	Above Hodenpyl Dam	92034	Jun/09/1992	Carp
Manistee River	Above Hodenpyl Dam	94030	Jun/15/1994	Carp
Manistique River	Manistique, above Dam	93056	Jun/03/1993	Redhorse Sucker
Manistique River	Manistique, above Dam	2003076	Oct/08/2003	Redhorse Sucker
Menominee River	Lower Scott Flowage, between Dams 1 and 2	91039	Jun/26/1991	Carp

Waterbody	Location	Visit ID#	Date	Species
Menominee River	Lower Scott Flowage, between Dams 1 and 2	94052	Jun/13/1994	Redhorse Sucker
Muskegon River	Newaygo County, Croton Dam Pond	91029	Apr/04/1991	Carp
Muskegon River	Newaygo County, Croton Dam Pond	93080	Jun/28/1993	Carp
Muskegon River	Newaygo County, Croton Dam Pond	95041	Sep/27/1995	Carp
Muskegon River	Newaygo County, Croton Dam Pond	97048	Sep/30/1997	Carp, Yellow Perch
Muskegon River	Newaygo County, Croton Dam Pond	2000058	Sep/06/2000	Carp, Yellow Perch
Muskegon River	Newaygo County, Croton Dam Pond	2002076	Jul/08/2002	Carp
Pontiac Lake	Oakland County	92070	Jul/27/1992	Largemouth Bass
Pontiac Lake	Oakland County	94007	Oct/01/1994	Largemouth Bass
Pontiac Lake	Oakland County	97053	May/22/1997	Largemouth Bass
Pontiac Lake	Oakland County	1999056	Apr/06/1999	Largemouth Bass
Pontiac Lake	Oakland County	2003094	Jun/25/2003	Largemouth Bass
Raisin River	Above Monroe Dam	91050	Sep/25/1991	Carp
Raisin River	Above Monroe Dam	94010	Jun/10/1994	Carp
Raisin River	Above Monroe Dam	97054	Oct/02/1997	Carp
Raisin River	Above Monroe Dam	2000072	Oct/12/2000	Carp
South Manistique Lake	Mackinac County	91016	Apr/24/1991	Walleye
South Manistique Lake	Mackinac County	93027	Apr/28/1993	Walleye
South Manistique Lake	Mackinac County	95056	Apr/27/1995	Walleye
South Manistique Lake	Mackinac County	1998105	Apr/06/1998	Walleye
South Manistique Lake	Mackinac County	2001099	Nov/11/2001	Walleye
South Manistique Lake	Mackinac County	2003112	Apr/25/2003	Walleye
St. Clair River	Algonac	92061	Jun/21/1992	Carp, Walleye
St. Clair River	Algonac	94009	Aug/25/1994	Carp
St. Clair River	Algonac	2002093	May/24/2002	Carp
St. Joseph River	Chapin Lake	91044	Aug/20/1991	Carp
St. Joseph River	Chapin Lake	93081	Oct/06/1993	Carp
St. Joseph River	Chapin Lake	95051	Jul/06/1995	Carp, Smallmouth Bass
St. Joseph River	Chapin Lake	2000088	Oct/17/2000	Carp
St. Joseph River	Chapin Lake	2002094	Oct/21/2002	Carp
St. Marys River	Munuscong Bay	91059	Apr/23/1991	Walleye
St. Marys River	Munuscong Bay	93015	Apr/27/1993	Carp, Walleye
St. Marys River	Munuscong Bay	95004	Apr/17/1995	Carp, Walleye
St. Marys River	Munuscong Bay	1998112	Apr/29/1998	Carp, Walleye
St. Marys River	Munuscong Bay	2001102	Apr/23/2001	Walleye

APPENDIX C

INVENTORY OF CAGED-FISH BIOCONCENTRATION STUDIES

Waterbody	Location	Visit ID#	Date	Species
Au Gres River	Au Gres, river mouth	91002	Sep/03/1991	Channel Catfish
Au Sable River	Oscoda, river mouth	91003	Sep/03/1991	Channel Catfish
Au Sable River	Oscoda, river mouth	96002	Aug/19/1996	Channel Catfish
Belle River	Marine City	97002	Sep/17/1997	Channel Catfish
Black River	Mouth	2002007	Aug/02/2002	Channel Catfish
Black River	Port Huron, river mouth	93003	Aug/31/1993	Channel Catfish
Cass River	Saginaw County, M-13	88025	Aug/02/1988	Channel Catfish
Cass River	Saginaw County, M-13	2002024	Jul/16/2002	Channel Catfish
Chippewa River	9 Mile Road	2000004	Jul/20/2000	Channel Catfish
Chippewa River	Nature Center	2000005	Jul/25/2000	Channel Catfish
Chippewa River	Nature Center	2002015	Jul/16/2002	Channel Catfish
Clinton River	Mt. Clemens, VFW Hall	2001116	Aug/29/2001	Channel Catfish
Clinton River	Adams Road	2000009	Aug/28/2000	Channel Catfish
Clinton River	Bridgeview Road	1999070	Aug/06/1999	Channel Catfish
Clinton River	Bridgeview Road	2000015	Aug/28/2000	Channel Catfish
Clinton River	Cass Road	1999072	Aug/06/1999	Channel Catfish
Clinton River	Crystal Lake	2000007	Aug/28/2000	Channel Catfish
Clinton River	Harris Lake	1999074	Aug/06/1999	Channel Catfish
Clinton River	M-97	2000012	Aug/28/2000	Channel Catfish
Clinton River	Macomb County above I-94 overpass	97007	Sep/17/1997	Channel Catfish
Clinton River	Macomb County above I-94 overpass	1999071	Aug/06/1999	Channel Catfish
Clinton River	Macomb County above I-94 overpass	2000014	Aug/28/2000	Channel Catfish
Clinton River	Moravian/Belleview Road	2000013	Aug/28/2000	Channel Catfish
Clinton River	Mt. Clemens, City Park	2001115	Aug/29/2001	Channel Catfish
Clinton River	Mt. Clemens, Firehouse	2001117	Aug/29/2001	Channel Catfish
Clinton River	Mt. Clemens, Market Street	97006	Sep/17/1997	Channel Catfish
Clinton River	Mt. Clemens, river mouth	89023.1	Aug/29/1989	Channel Catfish
Clinton River	Mt. Clemens, river mouth	92003.1	Aug/17/1992	Channel Catfish
Clinton River	Mt. Clemens, river mouth	96005	Aug/20/1996	Channel Catfish
Clinton River	Mt. Clemens, river mouth	97008	Sep/17/1997	Channel Catfish
Clinton River	Mt. Clemens, river mouth	1999069	Aug/06/1999	Channel Catfish
Clinton River	Mt. Clemens, river mouth	2000016	Aug/28/2000	Channel Catfish
Clinton River	Opdyke Road	2000008	Aug/28/2000	Channel Catfish
Clinton River	Ryan Road, Utica	1999073	Aug/06/1999	Channel Catfish
Clinton River	Spillway Mouth	89023.2	Aug/29/1989	Channel Catfish
Clinton River	Spillway Mouth	92003.2	Aug/17/1992	Channel Catfish
Escanaba River	Escanaba, river mouth	93040	Jun/30/1993	Channel Catfish
Flat River	Lowell	2001017	Jul/23/2001	Channel Catfish
Flint River	Saginaw County, river mouth	88022	Aug/02/1988	Channel Catfish
Flint River	Saginaw County, river mouth	2002023	Jul/16/2002	Channel Catfish
Galien River	Mouth	2002031	Aug/02/2002	Channel Catfish
Grand River	Below Jackson, Thompkins Road	2001014	Jul/23/2001	Channel Catfish
Grand River	Below Lansing, Clintonia Road	2001016	Jul/23/2001	Channel Catfish
Grand River	Grand Haven, river mouth	90018	Sep/04/1990	Channel Catfish
Grand River	Grand Haven, river mouth	93043	Jul/01/1993	Channel Catfish

Waterbody	Location	Visit ID#	Date	Species
Grand River	Grand Haven, river mouth	2001020	Jul/23/2001	Channel Catfish
Grand River	Jackson, above Jackson WWTP	90025	Sep/05/1990	Channel Catfish
Grand River	Jackson, below Jackson WWTP	90024	Aug/08/1990	Channel Catfish
Grand River	M-21	2001018	Jul/23/2001	Channel Catfish
Grand River	Upstream Jackson, Reed Road	2001013	Jul/23/2001	Channel Catfish
Huron River	Downstream Belleville Lake	2002041	Aug/20/2002	Channel Catfish
Huron River	Downstream Ford Lake	2002040	Aug/20/2002	Channel Catfish
Huron River	Rockwood, river mouth	91012	Sep/06/1991	Channel Catfish
Huron River	Rockwood, river mouth	96015	Aug/20/1996	Channel Catfish
Huron River	Rockwood, river mouth	2002042	Aug/20/2002	Channel Catfish
Huron River	Upstream Dexter	2002039	Aug/20/2002	Channel Catfish
Kalamazoo River	Above Otsego City Dam	1999096	Sep/08/1999	Channel Catfish
Kalamazoo River	Below Lake Allegan Dam	1999020	Sep/08/1999	Channel Catfish
Kalamazoo River	Below Otsego Dam	1999023	Sep/08/1999	Channel Catfish
Kalamazoo River	Below Trowbridge Dam, 26th St. Bridge	1999022	Sep/08/1999	Channel Catfish
Kalamazoo River	Ceresco (12 Mile Road)	1999099	Sep/08/1999	Channel Catfish
Kalamazoo River	Ceresco (12 Mile Road)	2000114	Oct/04/2000	Channel Catfish
Kalamazoo River	City of Allegan, M-89	1999021	Sep/08/1999	Channel Catfish
Kalamazoo River	D-Avenue	2000112	Oct/04/2000	Channel Catfish
Kalamazoo River	Galesburg, 35th St. Bridge	1999098	Sep/08/1999	Channel Catfish
Kalamazoo River	Kalamazoo Avenue	2000113	Oct/04/2000	Channel Catfish
Kalamazoo River	Lake Allegan	2000110	Jan/04/2000	Channel Catfish
Kalamazoo River	Plainwell, M-89	2000111	Oct/04/2000	Channel Catfish
Kalamazoo River	River mouth, Old US-31 Bridge	90019	Aug/07/1990	Channel Catfish
Kalamazoo River	River mouth, Old US-31 Bridge	93044	Jul/01/1993	Channel Catfish
Kalamazoo River	River mouth, Old US-31 Bridge	96016	Aug/21/1996	Channel Catfish
Kalamazoo River	River mouth, Old US-31 Bridge	1999019	Sep/08/1999	Channel Catfish
Kawkawlin River	Route 13 (S. Huron Road)	2001127	Jul/23/2001	Channel Catfish
Kawkawlin River	Wheeler Road	2001128	Jul/23/2001	Channel Catfish
LeFarge Corp. Discharge Canal	Below quarry	94033	May/19/1994	Channel Catfish
Manistee River	Manistee, river mouth	90026	Aug/21/1990	Channel Catfish
Manistee River	Manistee, river mouth	95028	Jul/24/1995	Channel Catfish
Manistique River	Manistique, river mouth	90028.1	Sep/24/1990	Channel Catfish
Manistique River	Manistique, river mouth	2002067	Aug/21/2002	Channel Catfish
Manistique River	Soo Line RR Bridge	90028.2	Sep/24/1990	Channel Catfish
Manistique River	Soo Line RR Bridge	2002066	Aug/21/2002	Channel Catfish
Menominee River	Menominee, river mouth	93039	Jun/30/1993	Channel Catfish
Muskegon River	M-82 at High Rollaway	2002074	Aug/20/2002	Channel Catfish
Muskegon River	Maple Island Road	2002075	Aug/20/2002	Channel Catfish
Muskegon River	Muskegon, river mouth	90020	Aug/07/1990	Channel Catfish
Muskegon River	Muskegon, river mouth	93042	Jul/01/1993	Channel Catfish
Muskegon River	Vance Road	2002073	Aug/20/2002	Channel Catfish
Ontonagon River	Ontonagon, river mouth	92008	Aug/04/1992	Channel Catfish
Ox Creek	Mouth	2001092	Jul/30/2001	Channel Catfish
Paw Paw River	Above Ox Creek	2001093	Jul/30/2001	Channel Catfish

Waterbody	Location	Visit ID#	Date	Species
Paw Paw River	Below Ox Creek	2001094	Jul/30/2001	Channel Catfish
Pere Marquette River	Ludington, river mouth	90027	Sep/18/1990	Channel Catfish
Pere Marquette River	Ludington, river mouth	93041	Jul/01/1993	Channel Catfish
Pine River	Gordonville Road	2000070	Jul/20/2000	Channel Catfish
Pine River	Gordonville Road	2002014	Jul/16/2002	Channel Catfish
Pine River	Harrison Road	1999049	Jun/24/1999	Channel Catfish
Pine River	Harrison Road	2000066	Jul/20/2000	Channel Catfish
Pine River	Harrison Road	2002011	Jul/16/2002	Channel Catfish
Pine River	M-46	1999050	Jun/24/1999	Channel Catfish
Pine River	M-46	2000067	Jul/20/2000	Channel Catfish
Pine River	M-46	2002012	Jul/16/2002	Channel Catfish
Pine River	Mill Street	2000068	Jul/20/2000	Channel Catfish
Pine River	Nine Mile Road	1999053	Jun/24/1999	Channel Catfish
Pine River	St. Clair	97051	Sep/17/1997	Channel Catfish
Pine River	St. Louis Impoundment	2002103	Jul/16/2002	Channel Catfish
Pine River	WWTP Bridge	1999052	Jun/24/1999	Channel Catfish
Pine River	WWTP Bridge	2000069	Jul/20/2000	Channel Catfish
Pine River	WWTP Bridge	2002013	Jul/16/2002	Channel Catfish
Portage Creek	Kalamazoo, Crosstown Pkwy.	89059	Aug/30/1989	Channel Catfish
Portage Creek	Mouth, Alcott St.	1999097	Sep/08/1999	Channel Catfish
Raisin River	Below Turning Basin	1998091	Sep/10/1998	Channel Catfish
Raisin River	Monroe, river mouth	91018	Sep/06/1991	Channel Catfish
Raisin River	Monroe, river mouth	1998090	Sep/10/1998	Channel Catfish
Raisin River	Near Grand Trunk RR Bridge	1998092	Sep/10/1998	Channel Catfish
Red Cedar River	Mouth	2001015	Jul/23/2001	Channel Catfish
Rouge River	Bell Branch	92040	Aug/25/1992	Channel Catfish
Rouge River	Below Newburgh Lake	2000116	Oct/04/2000	Channel Catfish
Rouge River	Below Phoenix Lake	2000077	Aug/28/2000	Channel Catfish
Rouge River	Dearborn, river mouth	92010	Aug/25/1992	Channel Catfish
Rouge River	Dearborn, river mouth	95044	Oct/09/1995	Channel Catfish
Rouge River	Dearborn, river mouth	2000079	Aug/28/2000	Channel Catfish
Rouge River	Dearborn, river mouth	2000117	Oct/04/2000	Channel Catfish
Rouge River	Evergreen Road	95042	Oct/09/1995	Channel catfish
Rouge River	Greenfield Road	95043	Oct/09/1995	Channel Catfish
Saginaw River	Bay County, river mouth	88020	Aug/01/1988	Channel Catfish
Saginaw River	Bay County, river mouth	92011	Aug/12/1992	Channel Catfish
Saginaw River	Bay County, river mouth	1998096	Sep/04/1998	Channel Catfish
Saginaw River	Bay County, river mouth	2002028	Jul/16/2002	Channel Catfish
Saginaw River	Saginaw County, Saginaw	88021	Aug/01/1988	Channel Catfish
Saginaw River	upstream of Middle Ground Isle	1998097	Sep/04/1998	Channel Catfish
Saginaw River	upstream of Middle Ground Isle	2002027	Jul/16/2002	Channel Catfish
Saginaw River	Zilwaukee Bridge	1998098	Sep/04/1998	Channel Catfish
Saginaw River	Zilwaukee Bridge	2002026	Jul/16/2002	Channel Catfish
Shiawassee River	Fergus Road	2002022	Jul/16/2002	Channel Catfish
Shiawassee River	Mouth	1998099	Sep/04/1998	Channel Catfish
Shiawassee River	Mouth	2002025	Jul/16/2002	Channel Catfish
Shiawassee River	Saginaw County, Miller Road	88024	Aug/18/1988	Channel Catfish

Waterbody	Location	Visit ID#	Date	Species
South Branch Black River	Downstream of Bangor	2002006	Aug/02/2002	Channel Catfish
South Branch Black River	Upstream Bangor	2002005	Aug/02/2002	Channel Catfish
St. Joseph River	Above Niles	2001086	Jul/30/2001	Channel Catfish
St. Joseph River	Above Paw Paw River	2001090	Jul/30/2001	Channel Catfish
St. Joseph River	Below Buchanan	97065	Sep/16/1997	Channel Catfish
St. Joseph River	Below Buchanan	2001087	Jul/30/2001	Channel Catfish
St. Joseph River	Below Niles	97066	Sep/16/1997	Channel Catfish
St. Joseph River	Benton Harbor, river mouth	89022	Aug/28/1989	Channel Catfish
St. Joseph River	Benton Harbor, river mouth	93045	Jul/01/1993	Channel Catfish
St. Joseph River	Benton Harbor, river mouth	97063	Sep/16/1997	Channel Catfish
St. Joseph River	Benton Harbor, river mouth	2001091	Jul/30/2001	Channel Catfish
St. Joseph River	Berrien Springs, below Dam	97064	Sep/16/1997	Channel Catfish
St. Joseph River	Berrien Springs, below Dam	2001089	Jul/30/2001	Channel Catfish
St. Joseph River	State Line, Berrien County	97067	Sep/16/1997	Channel Catfish
Thornapple River	Mouth	2001019	Jul/23/2001	Channel Catfish
Thunder Bay River	Alpena, river mouth	89024	Sep/02/1989	Channel Catfish
Thunder Bay River	Alpena, river mouth	96053	Aug/19/1996	Channel Catfish
Tittabawassee River	Cook Road	2002016	Jul/16/2002	Channel Catfish
Tittabawassee River	Freeland	2002019	Jul/16/2002	Channel Catfish
Tittabawassee River	Midland County, Smiths Crossing Road	2000095	Jul/20/2000	Channel Catfish
Tittabawassee River	Midland County, Smiths Crossing Road	2002017	Jul/16/2002	Channel Catfish
Tittabawassee River	Mouth	1998119	Sep/04/1998	Channel Catfish
Tittabawassee River	Mouth	2002021	Jul/16/2002	Channel Catfish
Tittabawassee River	RR Bridge below Dow	2002018	Jul/16/2002	Channel Catfish
Tittabawassee River	Saginaw County, Center Road	88023	Aug/02/1988	Channel Catfish
Tittabawassee River	Saginaw County, Center Road	2002020	Jul/16/2002	Channel Catfish
Tonquish Creek	Above Wayne Road, South of Joy Road	92039	Sep/14/1992	Channel Catfish
Two Hearted River	Mouth	92013	Aug/04/1992	Channel Catfish
White River	White Lake outlet, river mouth	92014	Aug/18/1992	Channel Catfish

APPENDIX D

INVENTORY OF CONTAMINANT MONITORING SITES, AND
SPECIES SUMMARIZED IN THE MICHIGAN FISH CONTAMINANT MONITORING
2004 ANNUAL REPORT

Waterbody	Location	Visit ID#	Date	Species
Au Sable River	Alcona Dam Pond	2003002	Jun/10/2003	Carp, Northern Pike, Walleye
Austin Lake	Kalamazoo County	2003154	Jul/21/2003	Carp, Largemouth Bass, Yellow Bullhead
Beaver Lake	Alger County	2003150	Aug/28/2003	Walleye, Yellow Perch
Black River	Mouth	2002007	Aug/02/2002	Channel Catfish
Black River, South Branch	Bangor	2002008	Sep/23/2002	Carp, Northern Pike, White Sucker
Black River, South Branch	Upstream of Bangor Dam	2002106	Sep/23/2002	Carp, Northern Pike, White Sucker
Bristol Lake	Barry County	2002009	May/15/2002	Largemouth Bass, White Sucker
Camp Lake	Kent County	2003015	May/21/2003	Brown Bullhead, Largemouth Bass, Northern Pike
Cass River	Saginaw County, M-13	2002024	Jul/16/2002	Channel Catfish
Chenango Lake	Livingston County	2003017	Oct/16/2003	Largemouth Bass, Yellow Bullhead
Chippewa River	Nature Center	2002015	Jul/16/2002	Channel Catfish
Crooked Lake	Barry County	2003020	Sep/19/2003	Brown Bullhead, Largemouth Bass
Deer Lake	Charlevoix County	2003021	Oct/30/2003	Largemouth Bass, Northern Pike
Emily Lake	Houghton County	2002110	Jun/06/2002	Walleye
Ess Lake	Montmorency County	2003023	May/29/2003	Northern Pike
Flat River	Ingalls Road	2003031	Jul/29/2003	Rock Bass, White Sucker
Flat River	Miller Rd	2003032	Jul/29/2003	Rock Bass, White Sucker
Flint River	Saginaw County, river mouth	2002023	Jul/16/2002	Channel Catfish
Galien River	Mouth	2002031	Aug/02/2002	Channel Catfish
Gaylanta Lake	Montmorency County	2003040	May/08/2003	Northern Pike
Grand River	Kent County, above 6th St. Dam	2003042	Sep/20/2003	Carp
Grand River	Maple Grove Road	2002113	Oct/03/2002	Northern Pike
Green Lake	Grand Traverse County	2003139	Jun/04/2003	Lake Trout
Huron River	Downstream Belleville Lake	2002041	Aug/20/2002	Channel Catfish
Huron River	Downstream Ford Lake	2002040	Aug/20/2002	Channel Catfish
Huron River	Rockwood, river mouth	2002042	Aug/20/2002	Channel Catfish
Huron River	Upstream Dexter	2002039	Aug/20/2002	Channel Catfish
Kalamazoo River	Lake Allegan	2003147	Jun/07/2003	Carp
Kingston Lake	Alger County	2003047	May/29/2003	Largemouth Bass, Muskellunge, Smallmouth Bass, Walleye
Lake Emma	Presque Isle County	2003050	May/22/2003	Northern Pike
Lake Esau	Presque Isle County	2003052	Jun/18/2003	Smallmouth Bass
Lake Gogebic	Gogebic/Ontonagon County	2003156	Oct/14/2003	Rock Bass
Lake Huron	Saginaw Bay	2003055	Sep/17/2003	Alewife, Spottail Shiner
Lake Huron	Saginaw Bay	2003056	Aug/26/2003	Carp, Walleye
Lake Le Vasseur	Marquette County	2002104	Jun/19/2002	Northern Pike
Lake Michigan	Bridgeman	2002112	Oct/03/2001	Lake Sturgeon
Lake Michigan	Bridgeman	2003159	Sep/05/2003	Lake Sturgeon
Lake Michigan	Grand Traverse Bay	2003060	Oct/31/2003	Carp
Lake Michigan	Kalamazoo River mouth	2003155	May/17/2002	Lake Sturgeon
Lake Michigan	Little Bay De Noc	2003061	Apr/15/2003	Carp
Lake Michigan	Manistee Lake	2003158	Jul/10/2003	Lake Sturgeon
Lake Michigan	New Buffalo	2003160	Aug/19/2003	Lake Sturgeon
Lake Mitchell	Wexford County	2003141	May/01/2003	Largemouth Bass
Lake Ovid	Clinton County	2003152	Jun/25/2003	Largemouth Bass
Lake St. Clair	Michigan waters	2003069	Sep/15/2003	Smallmouth Bass
Lake Superior	Keweenaw Bay	2003070	May/29/2003	Ciscowet
Lake Superior	Portage Lake/Dollar Bay	2003157	Sep/12/2003	Lake Sturgeon

<u>Waterbody</u>	<u>Location</u>	<u>Visit ID#</u>	<u>Date</u>	<u>Species</u>
Little Lake	Marquette County	2002043	May/24/2002	Walleye
Lobdell Lake	Genesee County	2003072	May/20/2003	Carp, Largemouth Bass
Long Lake	Kalamazoo County	2002064	Oct/16/2002	Black Crappie
Long Lake	Kalamazoo County	2003153	Mar/28/2003	Brown Bullhead
Manistique Lake	Mackinac County	2003075	Apr/25/2003	Walleye
Manistique River	d/s Manistique Papers Dam	2003077	Oct/07/2003	Redhorse Sucker, Smallmouth Bass, Walleye
Manistique River	Manistique, above Dam	2003076	Oct/08/2003	Redhorse Sucker
Manistique River	Manistique, river mouth	2002067	Aug/21/2002	Channel Catfish
Manistique River	Soo Line RR Bridge	2002066	Aug/21/2002	Channel Catfish
Mona Lake	Muskegon County	2002069	Jul/08/2002	Carp
Montcalm Lake	Montcalm County	2003065	Jul/07/2003	Largemouth Bass
Morrison Lake	Ionia County	2003081	Jun/15/2003	Carp
Muskallonge Lake	Luce County	2002070	May/15/2002	Brown Bullhead, Northern Pike
Muskegon River	M-82 at High Rollaway	2002074	Aug/20/2002	Channel Catfish
Muskegon River	Maple Island Road	2002075	Aug/20/2002	Channel Catfish
Muskegon River	Vance Road	2002073	Aug/20/2002	Channel Catfish
North Lake Leelanau	Leelanau County	2002078	Apr/26/2002	White Sucker
North Lake Leelanau	Leelanau County	2003082	Oct/21/2003	Lake Trout
North Manistique Lake	Luce County	2003083	Apr/24/2003	Walleye, Yellow Perch
Paint Lake	Iron County	2003144	Jun/11/2003	Northern Pike
Pere Marquette Lake	Mason County	2003086	May/05/2003	Northern Pike, White Sucker
Pine River	Gordonville Road	2002014	Jul/16/2002	Channel Catfish
Pine River	Harrison Road	2002011	Jul/16/2002	Channel Catfish
Pine River	M-46	2002012	Jul/16/2002	Channel Catfish
Pine River	St. Louis Impoundment	2002103	Jul/16/2002	Channel Catfish
Pine River	WWTP Bridge	2002013	Jul/16/2002	Channel Catfish
Pontiac Lake	Oakland County	2003094	Jun/25/2003	Largemouth Bass
Pratt Lake	Gladwin County	2003095	May/22/2003	Largemouth Bass
Rabbit River	Hamilton, downstream	2003098	Sep/17/2003	Carp, Largemouth Bass, Northern Pike, Redhorse Sucker, Rock Bass
Rabbit River	Hamilton, upstream	2003096	Sep/17/2003	Carp, Largemouth Bass, Northern Pike, Redhorse Sucker
Rouge River, Middle Branch	Phoenix Lake	2002086	Oct/22/2002	Carp, Northern Pike, White Sucker
Runkle Lake	Iron County	2003104	Apr/21/2003	Northern Pike
Saginaw River	Bay County, river mouth	2002028	Jul/16/2002	Channel Catfish
Saginaw River	upstream of Middle Ground Isle	2002027	Jul/16/2002	Channel Catfish
Saginaw River	Zilwaukee Bridge	2002026	Jul/16/2002	Channel Catfish
Sand Lake	Lenawee County	2003107	May/29/2003	Walleye
Shiawassee River	Exchange Road	2003109	Jul/22/2003	Carp, Smallmouth Bass
Shiawassee River	Fergus Road	2002022	Jul/16/2002	Channel Catfish
Shiawassee River	Mouth	2002025	Jul/16/2002	Channel Catfish
Silver Lake	Dickinson County	2002111	Jun/19/2002	Walleye
Siskiwit Lake	Isle Royale	2002105	Jun/29/2002	Lake Trout
Six Mile Lake	Charlevoix County	2003110	May/08/2003	Northern Pike
South Branch Black River	Downstream of Bangor	2002006	Aug/02/2002	Channel Catfish
South Branch Black River	Upstream Bangor	2002005	Aug/02/2002	Channel Catfish
South Groveland Pond	Dickinson County	2003146	Jun/04/2003	Walleye
South Manistique Lake	Mackinac County	2003112	Apr/25/2003	Walleye
Stevenson Lake	Isabella County	2002096	May/08/2002	Brown Bullhead, Largemouth Bass, Northern Pike, Yellow Bullhead

<u>Waterbody</u>	<u>Location</u>	<u>Visit ID#</u>	<u>Date</u>	<u>Species</u>
Stoney Creek Hatchery	Caged Fish Control Station	2002004	Jul/05/2002	Channel Catfish
Stoney Creek Hatchery	Caged Fish Control Station	2002010	Jun/18/2002	Channel Catfish
Stoney Creek Hatchery	Caged Fish Control Station	2002072	Jul/23/2002	Channel Catfish
Sunday Lake	Gogebic County	2003126	May/29/2003	Black Crappie, Northern Pike, Walleye, Yellow Perch
Tepee Lake	Iron County	2003145	Jun/19/2003	Northern Pike
Thompson Lake	St. Joseph County	2002036	Jun/25/2002	Brown Bullhead, Largemouth Bass
Thunder Bay River	Seven Mile Pond	2002097	Oct/15/2002	Brown Bullhead, Largemouth Bass
Tittabawassee River	Cook Road	2002016	Jul/16/2002	Channel Catfish
Tittabawassee River	Freeland	2002019	Jul/16/2002	Channel Catfish
Tittabawassee River	Midland County, Smiths Crossing Road	2002017	Jul/16/2002	Channel Catfish
Tittabawassee River	Midland County, Smiths Crossing Road	2003132	Apr/02/2003	Carp, Channel Catfish, Smallmouth Bass, Walleye, White Bass
Tittabawassee River	Mouth	2002021	Jul/16/2002	Channel Catfish
Tittabawassee River	RR Bridge below Dow	2002018	Jul/16/2002	Channel Catfish
Tittabawassee River	Saginaw County, Center Road	2002020	Jul/16/2002	Channel Catfish
Union Lake	Branch County	2003135	Jun/17/2003	Carp, Channel Catfish, Largemouth Bass, Walleye
Union Lake	Oakland County	2002100	May/29/2002	Largemouth Bass, Smallmouth Bass
Wixom Lake	Gladwin County	2002102	May/16/2002	Channel Catfish, Northern Pike